



EU SUB COMMITTEE B ON CIVIL USE OF REMOTELY PILOTED AIRCRAFT SYSTEMS (RPAS)

Oral and written evidence

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Aerospace Defence Security Space (ADS)—Written evidence (RPA0021)

Inquiry into the civil use of remotely piloted aircraft systems in the EU

ABOUT ADS

ADS is the premier trade association advancing the UK's Aerospace, Defence, Security and Space industries. ADS comprises around 900 member companies across all four industries, with over 850 of these companies identified as Small and Medium Size Enterprises (SMEs). Together with its regional partners, ADS represents over 2,600 companies across the UK supply chain.

The UK is a world leader in the supply of Aerospace, Defence, Security and Space products and services. With strengths in manufacturing, engineering and innovation, the sectors that ADS represent support around one million UK jobs, achieve revenues of over £27bn, support hundreds of thousands of jobs and invest around £3bn in R&D annually.

SUMMARY

- **Growth of the future civilian RPAS market is significant**

Development of civilian RPAS technology and the market growth potential will be significant over the next 10-20 years. Size and weight flexibility means the civilian use of RPAS could be utilised for a wide range of operations – including crop monitoring, search and rescue and telecommunications.

- **Regulatory issues and changes must be addressed at an international level**

Due to the global nature of our industries, developments in the regulatory system must be achieved at an international level to allow the market to grow and for new standards to be implemented safely and effectively. The UK and the EU must ensure it is leading these regulatory developments to ensure it can take advantage of growth opportunities.

- **Industry groups and ongoing initiatives must be consulted on future changes**

The UK's ASTRAEA programme is an example of industry working together in order to foster the new technologies required to grow the RPAS market, to understand fully the regulatory environment that is required, and to ensure that the operation of RPAS is done effectively and safely. Industry expertise and knowledge will be a key input across all areas which require focus in order for the market to develop.

RESPONSE TO THE COMMITTEE'S QUESTIONS

1. *Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?*

- 1.1 The European Union Commission's priorities listed in the April 2014 communication outline many of the key steps required in order to integrate civil remotely piloted aircraft systems (RPAS) into domestic and European airspace. They also identify the ways in which it will be necessary to foster growth and technology innovation in order to ensure the European share in this market will increase.
- 1.2 In addition to the priorities listed within the communication, it will be vitally important that European industry is consulted as new proposals and regulatory changes are developed. This is vital in order to ensure that those regulatory changes are proportionate and cost effective for industry, whilst ensuring aviation safety, which is of primary importance to the development of RPAS.
- 1.3 It is also important that national initiatives in the UK and across Europe are encouraged to support the body of evidence that has been, and is being, collected by ongoing initiatives such as ASTRAEA (Autonomous Systems Technology Related Airborne Evaluation & Assessment). This is necessary to underpin system certification of RPAS for the wide range of civilian uses which could be made available.

2. *What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?*

- 2.1 Due to the global nature of our industry and the regulations which underpin aviation operations, any development or changes to these regulations in order to accommodate RPAS integration must be achieved at an international level. Not only will this allow the flight of RPAS across international borders, but it will also ensure the growth of the UK's RPAS industry operates on a level playing field internationally.
- 2.2 It is, therefore, vital that there is one set of internationally recognised regulations, rather than regional specific ones for e.g. Europe, USA, Asia etc. The need to meet multiple regulatory requirements would greatly hinder the growth of the RPAS market.
- 2.3 It is also important to ensure that the UK and European industry are at the forefront of standard setting and rule making at an international level. The EU, including the UK, are leading the way in regulatory development but other countries (e.g. Japan in relation to agriculture) have more practical experience in spite of the significant and

continuing growth in operations of small RPAS in the UK. The region that takes the initiative to progress with a regulatory framework will both drive international regulatory development policy, and simultaneously gain the commercial advantage required to grow its market share.

3. In which new or innovative ways do you think RPAS will be used in the future?

- 3.1 As the operation of RPAS does not require an on-board pilot – rather an operator on the ground – the design and engineering of these products is less constrained than the development of manned aircraft. This will allow an increased degree of flexibility on size, increased payload, endurance levels and the ability to fly in hazardous environments.
- 3.2 Currently, there are around 250 licensed operators of less than 20kg RPAS in the UK – ranging from agriculture monitoring, to filming of sporting events, to safety inspections on oil rigs. The number of licences being granted has been doubling annually for the last few years.
- 3.3 There are a number of industries where civil RPAS could be used in the future including:
- **Security** – through the increased use of airborne surveillance systems at events and in dangerous situations.
 - **Search and Rescue** – to eventually replace manned services where more efficient.
 - **Agriculture** – the monitoring of crops.
 - **Telecommunications** – creating temporary communications links in emergency situations or at every day events.
 - **Conservation** – to track endangered species and changes to wildlife habitats. Early developments have been made in this area through the use of RPAS to track endangered species in the Gobi Desert.
 - **Energy** – the monitoring of overhead power-lines and nuclear power station construction.
 - **Construction** – to inform architects and project managers of progress and for the lifting of materials
 - **Logistics** – for the movement and delivery of parcels/packages, military equipment or emergency assistance equipment.

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

- 4.1. The employment projections for European industry, set out by the AeroSpace and Defence Industries Association of Europe (ASD), are supported by ADS. Much of this, however, is dependent on the development of the regulatory environment which

allows the RPAS market to grow significantly. Until access and integration into current airspace is fully understood, and the frameworks are in place to develop this understanding, the progression of a civilian RPAS industry in Europe may be hindered. The UK's ASTRAEA programme is a key focal point for developing the technologies and supporting the development of the regulations necessary to achieve this integration – and it showcases the UK's leading expertise in the area.

- 4.2. Future market growth will be dependent on increased sophistication and access to unsegregated airspace. In the last five years, the civil application of small (generally sub 5kg) rotorcraft has developed rapidly but their impact on the UK's high skill manufacturing base will inevitably be fairly limited. The main opportunities for the UK in the large RPAS class are with the next generation of military RPAS and the potentially significant civil market for long endurance and unmanned aircraft.
 - 4.3. RPAS depend on a high degree of automation of many decision-making functions that support the authority and decisions of the remote pilot. Ultimately these will become intelligent Autonomous Systems that have the integrity to assume full authority for decision making (such as detect and avoid) whilst being operated by a remote pilot. These capabilities have application in many other domains and RPAS are the leading edge of their development for regulated use.
 - 4.4. In parallel to the market for products, the progressive adoption of Autonomous Systems into both manned and unmanned systems will create demand for new support services. Opportunities for companies to offer new services will include: the creation of RPAS infrastructure at regional airfields; the provision of specialised maintenance operations; training and licensing of pilots to fly vehicles remotely; specialised legal and insurance services.
 - 4.5. The aircraft insurance market is worth approximately \$4.5bn per annum worldwide, of which approximately 65% goes through the London market (\$2.9bn). If development of the RPAS market represented an increase of just 1% of the insurance money going through London, that would equate to an extra \$30m annually.
 - 4.6. In addition, as a world leader in the technology, the UK also stands to benefit from education, training and consultancy services. Additionally, the technologies necessary to achieve safe operation of RPAS in non-segregated airspace will deliver safety, security and efficiency improvements to manned civil aviation.
- 5. *Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?***
- 5.1. ADS supports a review of the 'excluded aircraft' list, as part of the European Commission's policy initiative on changes to EASA's basic regulation, to reflect both the risk based approach to safety it is developing, and to ensure that it is involved in new technology developments. The civilian use of RPAS and UAS in the future should

be a priority for consideration due to the inherent capabilities of the UK's RPAS industry and future projections for growth.

- 5.2. This extension of the remit to include small RPAS in the 20kg to 150kg class, however, must be developed in cooperation with other member states across the EU and could delay the development of the sector if not approached strategically. RPAS in this class have less need to transition national boundaries, but any developments at EASA must be implemented across EU member states to avoid discrepancies.
 - 5.3. Allocation and use of the radio spectrum for RPAS command, control and communications (C3) is regulated at international level by the ITU-R and ICAO respectively, and will continue to be managed in a harmonised way following practices likely to be similar to those used in manned aviation that allow national administrations to organise air traffic to achieve optimum efficiency within their own authority. Programmes such as ASTRAEA provide a forum for industry to sustain the competence of CAA, Ofcom and DFT in the special conditions that apply to RPAS C3, in particular the modern ICT foundations of the innovative solutions that will be used in future unmanned, and indeed, manned aviation.
 - 5.4. The use of such advanced networked systems introduces significant information assurance issues, whose impact on safety is potentially severe, although not fully quantified at present, and will require oversight and regulation by international and national authorities responsible for electronic communications. These issues are already being studied within ICAO and it is expected that EASA will state its intentions and preferred direction through NPAs (Notices of Proposed Amendments) addressing the cybersecurity of aviation systems. Again, programmes such as ASTRAEA provide an opportunity for industry to engage with EASA, EUROCAE, and national regulators such as CESG and CPNI in the UK, so that consistent understanding is achieved and solutions that apply uniformly across all aviation systems can be developed.
- 6. *Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?***
- 6.1. The removal of the 'on-board' pilot for a pilot which is connected via a ground station, and the increased level of automation on the air vehicle to improve avoid and detection capabilities, will require extensions to the insurance and liability regimes, but are within the capabilities of the industry. The UK is in a strong position to play a leading role in this as a leader in the aerospace insurance market. However, delivery of these extensions will also require a significant increase in recognition of the civilian uses of RPAS and the perception of their operation.
- 7. *Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?***

- 7.1. Small and lightweight RPAS are a sub-set of RPAS and have to be subject to the same safety rules only ameliorated by the limited extent of risk to people and structures on the ground through operational restrictions. For the RPAS market to grow, these operational restrictions will have to be adapted proportionately to a wider range of operation, in particular above 500 feet and beyond visual line-of-sight, when small RPAS will be subjected to the same regulatory requirements of larger systems. It is, therefore, logical to concentrate the research effort on addressing the full RPAS requirement, with the result being proportionately applied to small RPAS.
- 7.2. The UK's ASTRAEA programme has developed decision support technology initially intended for the unmanned domain that can be re-introduced back into the manned domain to make pilots even better aware of their situation and flight status. Such technologies will have spin-off potential into other sectors including transport, automotive and health.
- 7.3. Similarly, sensor and communications technology in development for RPAS will have a number of civilian uses that have the potential to greatly improve everyday services, for example in the telecommunications and health sectors. Inclusion in medical equipment, both in and outside the body, is likely to benefit doctors monitoring the real-time health of patients both in person and at a distance.

19 September 2014

AeroSynergy Certification Ltd—Written evidence (RPA0001)

House of Lords submitted evidence regarding the Civil use of Remotely Piloted Aircraft Systems

A. AeroSynergy Certification Ltd (ASC)

ASC was set up in January 2014 in order to support companies and RPAS development organisations in the safe introduction RPAS for civil purposes. ASC are specialists in the emerging civil RPAS certification sector. ASC aims not only to support existing and established aerospace companies but to also guide new start up RPAS organisations who may have just ‘put wings on their robots’ and are not familiar with the aviation system and who’s knowledge of aircraft certification is particularly limited.

B. C Civil use of remotely piloted aircraft systems (RPAS) in the EU: Questions and answers

Questions posed:

1) **Question 1:** “*what is an ‘equivalent’ level of safety to manned aircraft, and how can RPAS be protected against security threats?*”

1.1) **Answer 1:** To answer the first part of question 1, ‘*equivalent levels of safety to manned aircraft*’: The equivalent level of safety for RPAS should be the minimum required to maintain the tolerable accident rate equivalent to that of a manned aircraft of similar size or type.

1.2) By maintaining the tolerable accident rate to this equivalent level, 3rd parties on the ground should be exposed to a risk no greater than that of an equivalent manned aircraft. For RPAS of a size and weight below that of known manned aircraft, such comparisons become more difficult. Therefore a ‘higher tolerable’ Catastrophic¹ accident rate of one per 10,000 flight hours (10^{-4} per flight hour) is deemed appropriate for all RPAS with no direct manned aircraft size or weight comparator ².

1.3) For mid-air collision accident rates things are different. 3rd parties in the air should be exposed to a risk no greater than that of an

¹ Catastrophic is defined as an accident that would result in one or more fatalities.

² Source: Joint Authorities for Rulemaking of Unmanned Systems (JARUS) paper: AMC RPAS.1309 and accompanying scoping paper.

equivalent mid-air collision between two aircraft. It is accepted that a mid-air collision involving even a small RPAS could cause a Catastrophic accident to any other aircraft including large transport types. In manned aircraft the pilots (aided by ATC) do most of separation assurance however with RPAS this will need to be accomplished, in part, by some form of Detect and Avoid system.

1.4) The RPAS pilot may still use ATC services and may be able to provide separation assurance, however other factors such as data link latency, a lack of situational awareness and the fact that the data link between the control station and the air vehicle cannot be relied upon to be in place at all times especially at low levels where aircraft congregate near airports and aerodromes, could all lead to a lower level of safety compared with that of a manned aircraft. Therefore a Detect and Avoid system must be able to automatically take evasive action with or without the RPAS pilot in the loop.

1.5) A Catastrophic mid-air collision cannot be a direct consequence of a Detect & Avoid system failure condition alone, as any such mid-air collision must also be the result of other factors and external events such as the pilot's actions in the oncoming aircraft. Therefore the consequence of a system failure should be no worse than loss of adequate separation. By definition there must be at least another aircraft on a conflicting trajectory that fails to separate, and possibly ATC failures as well.

1.6) Therefore, loss of Detect and Avoid system alone would result in a large reduction in safety margins and is therefore classified Hazardous³. Furthermore, as type-certification would permit operations in all classes of airspace, the possibility of a mid-air collision with a large transport aircraft cannot be ruled out. Thus a classification of Hazardous would require a quantitative probability requirement commensurate with that of a large transport aircraft, giving a probability value of 1×10^{-7} per flight hour for the Detect & Avoid system and supporting systems.

1.7) As a note of caution, there may be malfunctions of a Detect & Avoid system that could lead directly to a mid-air collision, i.e. the system malfunctions in such a way that it actively guides the RPAS towards other traffic rather than acting to avoid a collision, i.e. 'Detect and Attack'. These malfunctions are of such significance that it must be considered to result in a Catastrophic event and thus be

³ Hazardous: Possible examples of 'a large reduction in safety margins or functional capabilities' might include:

- a) Unintended deviations from the flight path if operating in the open airspace;
- b) Potential loss of safe separation (e.g. loss of D&A, incorrect altitude reporting);
- c) Activation of an emergency recovery capability potentially resulting in loss of the RPA where a fatality is not expected to occur.

assigned the highest levels of software development assurance and systems availability and integrity.

1.8) To answer the second part of question 1, *'how can RPAS be protected against security threats?'*

1.9) The worst event scenario could be a deliberate attempt to take over and fly an RPAS into a prominent public building, ground infrastructure or a large transport aircraft in flight.

1.10) Dealing with the latter first, a well-designed RPAS Detect and Avoid system, as mentioned at the bottom of section 1.4, *"Therefore a Detect and Avoid system must be able to automatically take evasive action with or without the RPAS pilot in the loop"*, must be able to protect 3rd parties both in the air and on the ground in the event of any potentially dangerous instruction, be it by human error or malicious, that could put lives in danger. See also 1.7.

1.11) Many commenters talk of security measures to protect both the Control Station and the air vehicle from outside attack by both physical barriers and by software encryption methods etc. However, as RPAS are almost entirely systems driven, such systems will need to maintain protection against any security threats over and above the physical security of the Control Station.

1.12) The possibility of any controlled surface impact event, possibly far more likely the result of a Human Factors failing than any malicious attack, will require procedures and safeguards to prevent such an occurrence. i.e. the pilot inadvertently instructs the air vehicle to land where it should not.

1.13) Therefore, built into the system of any RPAS could be programmed all suitable landing sites within its range boundary. Any malicious attack can only then result in the aircraft landing at one of these programmed sites. Such landing site programmes would have to be imbedded in the system and not changeable from the control station or any other form of attack whilst the aircraft is in flight.

1.14) Any other catastrophic failure that might bring the aircraft down at a random location combined with a coincidental malicious attack should not be considered.

1.15) Such a system would help to prevent both;

- a Human Factors error where a pilot might inadvertently put in the coordinates to land on the Houses of Parliament instead of Southend airport; Catastrophic! or
- a malicious attack on the RPAS control station or its data link that could have the same end affect.

1.16) Such a system will not, for example, stop the hijack of a cargo of diamonds on a flight being diverted to an alternative airport by a physical attack on the Control Station and its personnel. Therefore a good lock will still be required on the Control Station door!

2.)**Question 2:** *“does the current framework for liability and insurance for manned aircraft need to be amended to take into account the specificities of RPAS?”*

2.1) **Answer 2:** No. If, as per my answer ref: 1.1 above, the equivalent level of safety for PRAS can be shown to maintain the tolerable accident rate to that of a manned aircraft of similar size or type then no change to the current framework for liability and insurance should be needed. However the free insurance market place will set rates based on the risk.

3.) **Question 3:** *“Do you agree with the priorities identified in the European Commission’s Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?”*

3.1)**Answer 3:** Yes. The main priority is to ensure larger RPAS are safe and with continued support to RPAS related rules and implementing regulations this can be achieved.

4.) **Question 4:** *“What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU’s actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?”*

4.1) **Answer 4:** ICAO is a very high level organisation mainly concerned with cross boarder flights. Regulations within Europe should be developed by EASA. The Joint Authorities for Rulemaking of Unmanned Aircraft (JARUS) is an international body already working towards world standards for unmanned aircraft. JARUS is supported by EASA. However, at present, industry is denied access to contribute to JARUS.

5.) **Question 5:** *“In which new or innovative ways do you think RPAS will be used in the future?”*

5.1) **Answer 5:** This is a very difficult question to answer without a crystal ball. Like mobile phones, nobody could have envisaged their uses when they first came out. I would just say, prepare for an exponential increase in uses.

6.) **Question 6:** *“What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?”*

6.1) **Answer 6:** Although I have no direct comment on the above figures I will say that unless the industry seriously starts to look at and embrace the certification issues for larger RPAS variants (not quad copters and model aircraft sized types) of these novel aircraft, no commercial flights can be made. It is the initiation of commercial RPAS flights with the entire support infrastructure that goes with it that will be the greatest job creation sector.

6.2) The above figures can only be supported with safe and properly certificated aircraft systems. At present the emerging industry appears to be ignoring this Elephant in their room!

7.) **Question 7:** *“Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?”*

7.1) **Answer 8:** No comment.

8.) **Question 9:** *“Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?”*

8.1) **Answer 9:** No comment.

9.) **Question 10:** *“Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today’s small and lightweight RPAS?”*

9.1 **Answer 11:** No. Small and intimately involved organisations such as ourselves have seen no conduit to EU funding in order to contribute to such research. This funding appears to be going to establishment organisations where contact with the ‘coalface of the business’ is quite often remote.

31 July 2014

Agent Oriented Software Limited (AOS)—Written evidence (RPA0046)

Submission by Agent Oriented Software Limited on the civil use of remotely piloted aircraft systems (RPAS) in the EU

Introduction

The Internal Market, Infrastructure and Employment Sub-Committee of the House of Lords European Union Committee has requested that Agent Oriented Software Limited (AOS) make a submission to the sub-committee.

AOS (www.aosgrp.co.uk) is an SME, based in Cambridge, with a focus on developing and marketing the intelligent software that underpins the upcoming generation of autonomous vehicles and systems. Since its establishment in 2011 AOS has worked on a number of contracts for the Ministry of Defence and Dstl. AOS's core technology, intelligent (or BDI) software agents, is a branch of Artificial Intelligence, and was conceived to address the role of emulating rational human reasoning in dynamic environments.

The original concept of “rational agents” was developed by Michael Bratman (<http://philosophy.stanford.edu/profile/Michael+Bratman/>) at Stanford in the 1980s. This work prompted computer scientists, including key AOS staff members, to develop the area of BDI (Beliefs, Desires and Intentions) software agents. A good reference to this area is by Prof Mike Wooldridge of Oxford University (<http://www.cs.ox.ac.uk/people/michael.wooldridge/pubs/rara/>).

AOS's JACK product was first used by DERA (now Dstl) in 2001 and is now deployed in one of the few operational deployments of autonomous systems – live fire, mobile, robotic targets for the Australian Special Air Service Regiment (see attached).

There are very few operational autonomous systems. For many years driverless trains have run safely and reliably on the Docklands Light Railway, and between the terminals at Gatwick Airport. However, as these systems operate in sanitised or restricted environments with no human involvement, they are easier to implement.

Currently the most impressive commercial application of autonomous systems is by Rio Tinto Mining (<http://www.riotinto.com/ironore/mine-of-the-future-9603.aspx>) in their open cut iron ore mines, which includes 53 heavy haul trucks, drills and driverless trains. Rio's major competitor, BHP Billiton, is also deploying autonomous heavy haul trucks at its Jumblebar mine: (<http://www.miningaustralia.com.au/news/bhp-open-jumblebar-iron-ore-mine-announces-autonom>)

Interestingly the prime commercial benefits cited are: substantial savings in labour costs; increased reliability of the trucks; and safety.

The challenges for the UAV/RPAS industry is to demonstrate that there are sound business cases for the introduction of both small and large UAVs and for industry and government to work together to develop regulations that ensure UAV operations are at least as safe as manned operations.

AOS is one of the founding industrial partners of ASTRAEA, having been involved since 2006, and is unique in being the only SME. AOS has made a major financial commitment to ASTRAEA for two reasons: to contribute to the development of regulations that are both safe and efficient to comply with, and to build the company's profile in the supply chains of the primes.

AOS's Managing Director, Dr Andrew Lucas, was a principal contributor to the chapter on autonomy in the Civil Aviation Authority's CAP722 guidance document on UAS: (<https://www.caa.co.uk/application.aspx?catid=33&pagetype=65&appid=11&mode=detail&id=415>), Section 2, Chapter 7.

“In which new or innovative ways do you think RPAS will be used in the future?”

AOS has been asked to contribute to by addressing this question. It is best that the large and “small” sectors are addressed separately.

Large UAS

AOS sees the most innovative use of large UAS to be in the small packet freight market. With the growth of e-commerce, organisations such as Amazon are delivering millions of parcels per week. This mode of commerce has replaced the visit to a local shopping centre or a nearby major town, to personally inspect and buy, and then take the item home. Likewise, businesses now rely upon “just in time” practices and reliable deliveries are a necessity to minimise costs while ensuring on-time service to their customers.

In turn this has dramatically increased the “small packet” freight market. This is typically based upon a “hub”, e.g., Fedex's one in Memphis. Fedex provides a valuable example, it is the world's largest airline in terms of freight tonnes flown and the world's fourth largest in terms of fleet size. Goods are collected from the dispatch address, transported to Memphis, and then allocated to the appropriate Memphis/delivery location flight or lorry.

However, this hub approach is not infinitely scalable, at some point it makes sense to include a complementary, point-to-point service where the volume of freight between two particular locations justifies this. Interestingly, Fedex's fleet of approximately 650 aircraft includes 243 Cessna Caravans, which are a short-range, single-engine aircraft with a cargo payload of approximately 1.5 tonnes (<http://cessna.txtav.com/en/caravan/cessna-caravan>).

The economics of the Caravan would be transformed if an unmanned version becomes feasible. Payload would go up 10% and the aircraft's utilisation could be increased with the lack of a need for a duty pilot, and pilot costs would be eliminated.

However the hurdles to be overcome are:

1. Modifying the relevant FAR23/CS23 regulatory rules to accommodate an autonomous aircraft.
2. Providing a “detect and avoid” capability to allow the aircraft to operate in uncontrolled (Class G) airspace.
3. Providing an on-board autonomous capability that would allow the unmanned Caravan to operate in all weather, conditions that currently require an experienced pilot with good “airmanship” skills.

4. Ensuring that the insurance industry would cover such operations.
5. Finally, through openness and good communications, gaining the trust of the community that such operations will be at least as safe as manned operations.

Small UAS

While AOS is a tier-1 partner in ASTRAEA our company sees the “small” sector as the one that will first benefit our company commercially.

It is now possible to order a DJI Phantom and have it delivered in time for Christmas: (<http://www.dji.com/product/phantom>)

Such small vehicles are truly impressive in their capabilities, but at the same time they have one limitation: they must be continuously “piloted”, albeit remotely. While this is not a problem if the UAV is purchased for a leisure activity, however for commercial applications the most expensive element – the human – remains.

AOS sees an opportunity to develop “autonomous systems”, which include small UAS, which consequently do not require full-time human involvement. As such systems lack a “detect and avoid” capability they will remain in restricted airspace, i.e., line-of-sight, below 400 feet, and away from airports and human activity.

AOS has been looking at the industries, and industrial applications, that would benefit from this. In the UK the principal ones are agriculture, security of sites (e.g., nuclear power stations), and support for the emergency services where there is access to airspace.

Agriculture

The UK is similar to most developed western countries, agriculture is still a vital industry and yet the average age of a British farmer is 59 (<http://www.corporatewatch.org/content/rough-guide-uk-farming-crisis-3-uk-farming-crisis-which-crisis-do-you-mean-0>).

Farm labour is not simply expensive, it is very hard to get. The size, and capital cost, of equipment is growing, to overcome this.

AOS sees a role for autonomous UAVs in agriculture. Vehicles that can carry out a mission without a human having to be in active control the whole time. This will provide the productivity improvement that farmers are seeking, and will help to keep the sector viable.

AOS is currently actively developing an application that will greatly improve crop protection, both for cereal crops as well as orchards. The objective is to ensure greater production efficiency, while not increasing labour cost.

For the Sub-Committee there is an important distinction – AOS is not just looking at an autonomous UAV, it is addressing the problem from a systems perspective, with the UAV being a core part of an overall system that will involve remote sensors, communications, other vehicles such as ground robots, and with the farmer acting as the overall supervisor. This concept benefits from the astonishingly rapid rate of development of low-cost sensors (ranging from digital cameras through to GPS and infrared sensors), and the widespread availability of low-cost communications infrastructure – Wi-Fi and 3G/4G mobile.

The hurdles to be overcome include:

- Demonstrating to the regulators that autonomous systems operating on semi-sanitised sites, such as a farm, or within the boundaries of a nuclear or other secure site, are safe.
- Working with the agricultural community, typically conservative and not unreasonably sceptical of technology, that autonomous systems will provide the promised increase in farm productivity – AOS recognises that this will take time and effort.
- Refining the small UAVs, so that they are more robust and reliable, and can be operated by non-technical people in hostile environments.
- The establishment of a support infrastructure – even with established equipment such as tractors, farmers must now rely upon technically competent service personnel to diagnose and repair faults, unlike the “old days” where they mostly repaired their own equipment.

Conclusion

AOS sees the sub-committee’s enquiry as a valuable means for communicating to the wider community the benefits of UAVs, their possible commercial uses, and the challenges that are being addressed.

15 December 2014

Airbus Defence and Space—Written evidence (RPA0012)

Herewith our responses in italics.

1. Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

1.1 The Commission's communication is based on extensive work carried out by the European RPAS Steering Group (ERSG). The main organizations and experts involved were EASA, EUROCONTROL, EUROCAE, SESAR JU, JARUS, ECAC, EDA, ESA, ASD, UVSI, EREA and ECA. The ERSG received the mandate from the European Commission to establish this Roadmap for the safe integration of civil RPAS into the European aviation system. On 20 June 2013 the final report was handed over to the Commission.

1.2 The roadmap generated by the ERSG identified pillars which are reflected in the Commission's Communication:

- A Regulatory Approach*
- A Strategic Research Plan*
- A Study on the Societal Impact (Liability, Insurance, Data protection etc.)*

1.3 Harmonized regulations and standards are key for opening and developing the market.

1.4 In respect of Air vehicles between 20kg and 150kg, the proposed transfer of responsibility of regulations to EASA is an important step for the harmonization of regulations in Europe. That does not necessary mean that EASA is performing the certification for RPAS below 150 kg, of greater importance is that Europe has a common set of regulations in all member states and for that EASA should take the lead. Not forgetting that all stakeholders are involved in this process including industry.

1.5 For Research, the SESAR JU is the right, and probably today, the only organization to address this topic. It is recognized that the research part in the roadmap also needs further development to understand the budget required, timeline and whether there is an impact on the current ATM master plan. Industry has been promoting a definition phase for this to build on the roadmap.

1.6 The other actions related to security, liability and data protection in the Communication are also all important themes that need to be addressed in order to be able to open the market.

2. What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

2.1 ICAO has already been active in the field of RPAS for several years. RPAS regulation needs to be globally harmonized in order to permit international cross border operations. A global harmonization is of benefit for the market. Industry (including US industry) has, through ICCAIA, been supporting the work of ICAO for several years, as have EASA, FAA and many other Member States such as the UK CAA. The decision by ICAO to move from a working group to a Panel, starting in November this year, indicates the importance of regulating RPAS on an international level. Currently ICAO is working on a RPAS Manual, as well as a roadmap to provide guidelines to the member states and to set the baseline for the future amendments of the SARPS. The work done in ICAO will for certain influence the EU regulations in Europe.

3. In which new or innovative ways do you think RPAS will be used in the future?

3.1 It is difficult to predict all the ways that RPAS will be used. That would explain why the market is so difficult to estimate. Airbus experiences new innovative uses constantly. The uses are however, dependent not only on technology maturity but also on future regulation and public perception. To enforce stringent regulation will make the systems and operations too expensive and potentially impossible to comply too. No or less stringent regulations are also not good. Unsafe systems or operations are not of benefit for the Market.

4. What is your view of the estimate by the Aerospace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

4.1 As stated above the market is difficult to predict. It has however, the potential to generate many job opportunities on the scale indicated. This is very much dependent on future regulations which will in turn, affect the required investments. Only when the regulation set is stable can the business case be established with a level of confidence.

5. Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

5.1 The regulations need to be harmonized in Europe and the rest of the world, as it is for manned aviation. For that EASA is the right organization in Europe. Civil/Military dual use is another aspect which is important for the business case and hence can stimulate market growth. This will require however, harmonized regulations between Civil and Military also.

6. Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

6.1 This question is linked to the regulation of UAVs in general. Once they are defined the liabilities, insurances etc. be maturely defined and not before.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

7.1 The priorities are currently on small RPAS, which are outside of conventional certification; they are not correctly set from Airbus's perspective. Hence the key focus should be the regulatory and monetary support of the certification of UAVs (heavy to light). Many RPAS and UAVs have autonomous elements to their systems and this autonomy is likely to involve the greatest Certification effort

7.2 A re-prioritization on certification of UAVs (heavy to light) will boost the civil and military RPAS market by itself.

22 September 2014

COULD REMOTELY PILOTED AIRCRAFT SYSTEMS BE CONSIDERED A 'DISRUPTIVE INNOVATION'?

Simon Gilderson MBE, Senior Director Alvarez & Marsal

Simon Gilderson is a Senior Director who leads Unmanned Aerial Systems risk management advisory services for Alvarez & Marsal (A&M). Mr Gilderson retired from the British Army as a Lieutenant Colonel in 2010 having held senior command and staff roles in all major operational theatres and has since advised corporate clients on risk and crisis management.

A&M is a global professional services firm that provides performance improvement, turnaround management and business advisory services. The firm is well known for addressing complex business challenges by delivering deep operational insight and practical solutions that enable clients create efficiency, increase revenue, reduce costs, control risk and actively manage regulatory change.

Executive Summary.

Whilst the commercial and leisure use of Remotely Piloted Aircraft Systems (RPAS) increases rapidly, regulation and risk management evolves cautiously. Regulation must be reviewed and operator requirements for risk management and insurance need to develop.

1. The availability and use of RPAS has developed significantly over the past decade from a high-end and military-limited technology to a commercially available capability and now mass-produced privately owned and operated 'toy'. Whilst the numbers and capabilities of these systems have grown, and have the potential to continue to grow exponentially, regulation and risk management have not developed to anything like the same degree. The impact from RPAS is significant. They have the potential to change the way in which business is conducted, including the movement of freight and of passengers. They have the capability to add to the already complex threat matrix facing the security services. And they bring the private individual, of any age and experience, into a new environment, the airspace environment, in a way that has never been seen before. The disruptive effects of RPAS will be significant and regulation and risk management must develop rapidly to effectively manage this disruption.
2. The use of RPAS can be split into four broad groupings: military / government, commercial, serious hobbyists and toy operators. The first

two groups generally consist of large RPAS which, by their scale and use, are regulated under common aviation policy and controls are already in place. Even where smaller RPAS are used in these areas, existing regulation ensures a degree of risk management is in place. Hobbyists and toy operators tend to be at the smaller scale of RPAS (sub 20kg) where regulation (EC 785/2004) exempts operators from a more stringent regulatory environment.

3. The wide range of commercial applicability and increased availability of RPAS means that the market for these systems is set to expand exponentially. Commercially, this is likely to be constrained as law, airspace protocols and regulated safety frameworks will take time to develop nationally, let alone internationally, although the desire to develop less constrained physical infrastructure for commercial use will drive the change through. Of greater concern are the hobbyists and, in particular, the toy operators. Hobbyists tend to be members of associations whereby rules and, in some cases, insurance are provided and followed and operators will generally have a degree of training and experience. The same is not true for toy operators: RPAS can be purchased off-the-shelf in local stores or on-line, training or insurance are not required and many have no idea regarding the regulatory environment in which they are operating. The threat from such operators, whether intentional and planned or unintentional and accidental, is significant and will only increase as the scale of the RPAS market grows.
4. Regulation, risk management and insurance for RPAS must develop rapidly to catch up with and then drive the development of this market. The regulation for RPAS differs by country due to the variations in national airspace regulation and privacy laws. To ensure commercial viability and safety, laws and regulations require development in the short term. In Europe, overarching EU regulation is required enabling commercial operations across borders. Furthermore, certification requirements and standards require development and consistency to enable the commercial potential of RPAS to be achieved. Effective risk management regimens, including improved risk assessment and mitigation coupled with training and certification, must be developed and implemented quickly.
5. A core component of this risk management is insurance. In the UK, the RPAS insurance market is small and, to date, poorly developed. Many insurers avoid bespoke or exotic product lines such as RPAS although there are some who have developed products to cover RPAS operators for both property damage and third party liability. The focus for such

insurance products is the commercial operators where insurance cover is a requirement under existing regulations, albeit consistent cross-EU policies are not available due to differing regulations between countries. Such products are the exception rather than the norm and they are expensive in premium terms because it is impossible, in the early days of the product and without any real risk data, to truly rate the risk. There are also simpler insurance products available which cover solely property damage; of concern is the lack of third party liability cover. Such products are cheaper and are understandably more attractive to start-up companies and even the hobbyist associations but they are unlikely to stand the test of a significant incident or claim. Cover available in the insurance market of today is a significant risk in itself. The understanding of the risk is poor and non-specific, scope-limited but seemingly attractively priced products threaten the operators, the broader public and the wider insurance market.

6. Although commercial operators must purchase insurance cover, the same is not true for the hobbyist or the toy operator due to the size of their devices. Given the increasing availability of RPAS in this market and therefore the growing likelihood of an incident, regulation must be broadened to encompass the enthusiastic amateur as well as the professional. Owners of RPAS should understand the regulatory environment in which they are operating and be responsible, not just for their own property, but also for third party liability. A form of registration, as is required on light aircraft today, could be enforced and such registration would only be possible with the correct risk training and insurance cover in place. The adoption of such a system would bring safety and security to the top of the agenda and would provide a much needed control environment.
7. RPAS certainly have the potential to rapidly become a disruptive innovation in the governmental, commercial and recreational environments. Transfer of technological competencies from the defence environment has enabled commercial production of RPAS to grow exponentially and commercial and private use of these systems looks set to follow course. Regulation must develop in order to drive risk assessment, mitigation and management as well as risk transfer opportunities offered by the insurance industry in order to safeguard operators and the general public.

AM-UAS Ltd—Written evidence (RPA0006)

House of Lords Call for Evidence on Civil use of RPAS in the EU **AM-UAS Ltd Response**

1. Do you agree with the priorities identified in the European Commission’s Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

Broadly speaking, we agree with what the Commission has set out in their Communication. RPAS have revolutionised what is possible in a great number of areas outside the military sphere and reduced the cost of services to sectors where previously it would have been extremely expensive. This has brought many benefits to the end user of the data captured by the RPAS, as well as creating employment for a large number of people.

The Commission rightly identified that safety in all RPAS operations is key. This tenet underpins everything that happens in the industry and should inform all future developments. Currently, UAS legislation in each country differs, and some are more developed than others. This means that there is a differing level of requirement across Europe.

In order for society to benefit fully from what RPAS can offer, a regulatory framework must exist where a well defined set of rules keep in check the operators of remotely piloted systems, while still allowing growth and development.

Based on our knowledge of the sector, we feel that Sense and Avoid technology will be a turning point in what is possible with RPAS. It will be this that allows the large scale integration of unmanned aircraft into controlled airspace, and over much longer distances.

Public perception and terminology still has some way to go, and the media are in large part responsible for the misrepresentation of the capabilities, and uses of RPAS. The term ‘drone’ unfortunately persists in the civil sector and its military connotations bring a negative association to many parts of the industry.

2. What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU’s actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

A likely effect of an EU level set of regulations, across member states, would be the removal of barriers to entry in other countries. An expansion of the market is clearly an advantage for businesses, but it would result in a proliferation of operators in countries where previously there were fewer or, even, none before. This also has its benefits in the form of greater access to a wide range of services, but could flood a fledgling market with established operators, thus hampering the development of native businesses.

Enforcement will always present an issue and, in the day to day running of a country, it will still be the domestic authorities who have to enforce the rules, no matter what level they are defined.

Regardless, any set of regulations are better than nothing, and a great improvement on a blanket ban. As a result, currently the EU, and particularly countries such as the UK and France, are years ahead of the United States FAA in terms of regulations. Japan and Australia are both forging ahead with the development of their existing RPAS legislation and building on their successes to create a positive environment for the operation of unmanned aircraft systems.

In the UK, the CAA has been especially proactive in developing a set of regulations for RPAS, and was one of the first in the world to do so. This gave the UK a clear competitive advantage and gave businesses the right environment to grow and innovate. By regulating at an EU or international level, this advantage is removed, which we feel could do UK businesses a disservice and slow down development.

3. In which new or innovative ways do you think RPAS will be used in the future?

We feel that an RPAS-borne LiDAR scanning system will be an excellent development and will be in high demand.

Using an unmanned aircraft to hold and position lighting for photography and film-making is likely to increase, mostly as a result of the freedom and ease it affords. This has already been used in small ways, but requires further developments in battery technology to really be effective.

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

It's extremely hard to forecast such a complex variable as employment, but there is no doubt over the fact that the RPAS industry as a whole has created, and will continue to create, employment. We feel that, perhaps, the figure quoted will in large part be accounted for by the manufacturing sector, as opposed to the operators of RPAS.

Technological innovation in the RPAS industry is something that has attracted a great deal of funding and investment and, as such, companies will be looking to employ talented graduates and take on staff to pursue the research and development of new technology. While also an area of growth, the operating sector is not likely to provide as many jobs. This is partly due to the regulatory requirements imposed on operators, with the potential for this barrier to increase should RPAS become regulated at EU level.

5. Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

Yes.

6. Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

Being a relatively new and fast developing industry, underwriters are still in the process of fully understanding the risks involved with operating RPAS, so both public liability and hull insurance premiums remain high. This is especially notable as the industry is in large part made up of SMEs.

In some cases, the cost of the required insurance is too great for many would-be operators, and they will take the risk of not being insured in order to become a part of a fast growing and exciting market. They see an opportunity to make money, and expensive insurance is a barrier to reaching this goal.

Currently, in the UK at least, registration with the Information Commissioner's Office and adhering to the Data Protection Act 1998 is not a mandatory requirement for operators of RPAS. We feel that it should be, as this would go some way to alleviating the public concern over privacy and the capture of personal data by RPAS.

Many RPAS systems are now moving towards more and more autonomy in their operations and this presents a new set of legal challenges. Liability, and especially tortious liability, is extremely hard to define and should an accident occur, assigning liability will be difficult. Similarly, there are a number of 'grey areas' in the law surrounding RPAS that need to be clarified, such as privacy and intellectual property rights for data captured using an unmanned aerial system.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

As we are currently only operate RPAS platforms, we have not had occasion to receive any R&D funding, and are not especially familiar with the allocation of such funds. We do, however, feel that the two most constructive and beneficial areas for R&D funding are in the development of Sense and Avoid technology for small RPAS, and improving battery technology.

It is these two elements of RPAS performance that will enable their wider use and open up more airspace. The regulations are, of course, extremely important, but effective technology that is proven and tested will instil confidence in the rule-makers that the flying platforms are safe, and the regulations will reflect this.

We feel that it would be beneficial for the EU to provide oversight for R&D funding across Europe, to avoid duplicating research. A great deal of money could be saved, and spent more effectively, by allocating funding at a higher than national level, and streamlining the process to ensure that money gets to where it is needed most.

16 September 2014

Association of Remotely Piloted Aircraft Systems UK (ARPAS UK) and the Unmanned Aerial Vehicle Special Interest Group (UAV SIG) of the Remote Sensing and Photogrammetry Society (RSPSoc)—Written evidence (RPA0005)

Association of Remotely Piloted Aircraft Systems UK (ARPAS UK) and the Unmanned Aerial Vehicle Special Interest Group (UAV SIG) of the Remote Sensing and Photogrammetry Society (RSPSoc)—Written evidence (RPA0005)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

Background

The Association of Remotely Piloted Aircraft Systems UK (“ARPAS-UK”) currently has over 140 full and associate members, who are SME operators, builders or associated services for RPAS under 20kg. The majority of our members are currently focused on aerial photography, videography and surveying.

a. RSPSoc, the Remote Sensing and Photogrammetry Society, currently has a membership of ~720 individuals and 36 companies and is the UK's leading Society for remote sensing and photogrammetry and their application to education, science, research, industry, commerce and the public service. As a charity, its remit is to inform and educate its members and the public. It supports networking between the university, business and government sectors and highlights the crucial role played by scientific research by producing three ISI-ranked peer review Journals: International Journal of Remote Sensing, Remote Sensing Letters and Photogrammetric Record and a newsletter: *Sensed*. As an international society, RSPSoc is active in Europe and worldwide; it is the UK member of the International Society for Photogrammetry and Remote Sensing and has seats on the European Association of Remote Sensing Laboratories Council and the UK Space Agency Earth Observation Advisory Committee.

b.

This response has been submitted jointly by ARPAS-UK and RSPSoc due to our shared support for a common European approach but also our concerns about the potential negative impact of inappropriate regulatory action on both UK's leading position in RPAS research and the leading position of the UK's commercial activities, due largely to the highly supportive approach of the UK Civil Aviation Authority. Despite the very different remit of the two organisations, a number of individuals and companies are active members of both ARPAS-UK and RSPSoc and we recognize our interdependencies in maintaining a competitive advantage and strong UK leadership in this area. This is the first time that ARPAS-UK and RSPSoc have come together in this way; we do so because of the gravity of the issues surrounding regulation of RPAS technologies for our members.

1. Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities, which should have been included?

We broadly agree and support the European Commissions (“EC”) approach to the development of the RPAS market, technologies and associated regulation. However we would highlight a concern that the approach appears to anticipate a uniform framework of development and requirements for all RPAS under 150kg. We believe

Association of Remotely Piloted Aircraft Systems UK (ARPAS UK) and the Unmanned Aerial Vehicle Special Interest Group (UAV SIG) of the Remote Sensing and Photogrammetry Society (RSPSoc)—Written evidence (RPA0005)

this would restrict the development of RPAS in the sub 20kg category (with a substantial proportion of these being sub 7kg), which have to date proved to be the largest and most flexible growth area. We anticipate this will continue to be the highest growth area, particularly as miniaturization of sensors and components enables ever-increasing capabilities in smaller systems.

The smaller size and investment (both initial and on-going) allows these RPAS to be operated by SMEs of 1-3+ people, thus providing far more opportunities for their deployment. Whilst we believe that national interests (military, border, maritime) will be served by RPAS, viewed on a parallel with manned aircraft, an approach focussed on the sub 20kg category would provide more tangible short term benefits.

We would also question the inclusion of social and privacy issues in the EC paper. These are unrelated to the development of RPAS and are catered for through national and international legislation that already exists. The use of RPAS for aerial work is likely to be far less intrusive than CCTV coverage and the use of mobile phone cameras.

ARPAS-UK and RSPSoc welcome the focus on R&D funding for RPAS. Recent work has demonstrated the enormous value and level of uptake of RPAS in research. In particular, the sub-7kg category has generated many novel environmental research applications because it can operate at low-altitude, is easy and inexpensive to deploy, and can acquire very high resolution imagery with repeat coverage. On the other hand, there are considerable challenges to be overcome which include: development of reliable long-duration battery systems with low vibration engines and airframe stabilisation suitable for imaging; achieving highly reliable systems with appropriate *sense and avoid* technology; miniaturisation of scientific instruments suitable for RPAS deployment; processing software for geometrically correcting and accurately positioning of data and imagery. To date, SMEs have led technical R&D in this area in Europe.

Finally, there is a question arising in the definition of RPAS in the European Commission's Communication. The Communication appears to make a distinction between *remotely piloted* and *autonomous*. In practice there is a continuum of levels of autonomy. This is an important detail when considering priorities and the approach of easiest first. This approach should enable consideration of at least low levels of autonomy at an early stage where:

- a. It reduces levels of risk
- b. It reduces cost and leads to rapid market growth

2. What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

Association of Remotely Piloted Aircraft Systems UK (ARPAS UK) and the Unmanned Aerial Vehicle Special Interest Group (UAV SIG) of the Remote Sensing and Photogrammetry Society (RSPSoc)—Written evidence (RPA0005)

For larger RPAS that will operate in the same airspace and look to replicate manned aircraft, there would be obvious advantages of international regulations governing operations. However, with smaller RPAS a national or geographic approach that could respond more quickly to developing technologies would better assist the development of the industry.

Through our involvement with Unmanned Aerial Vehicle Associations (“UVSI”) at a European level, we have observed that the current rules being applied across the EC are relatively complimentary. However, as the development of the industry continues, it would be easy to see how this could quickly diverge. Currently UK operators enjoy a very good and close working relationship with the Civil Aviation Authority (“CAA”), however, CAA has limited resource to deal with rapid development outside the two core user groups (a and b) listed below.

Core user groups:

- c. Professional Operators – those SMEs who are have permission for aerial work from the CAA and aware of the regulations that they are required to work within. These operators, though ARPAS-UK, are working with the CAA to develop and define such issues as ‘Congested Area Operations’.
- d. Hobbyists – Model aircraft have been in use for years, primarily under the umbrella of local clubs and the British Model Flying Association (“BMFA”). They are self-regulating and operate in designated areas away from air traffic zones and the general public.

New user group:

- e. Armchair enthusiasts – By this we mean the rapidly growing section of the public who can now purchase an RPAS off of the shelf from many stores and fly it from the box with no appreciation of the regulations involved. Whilst flying as a hobby is covered by the Civil Aviation Publication (“CAP”) 393 Article 166 & when fitted with a camera by CAP 393 Article 167, it does present a question as to the enforcement of regulations, recognising the CAA is under resourced to cover such a wide spectrum We feel there is an increasing risk from this new group of recreational flyers and that it is sufficiently large that it be addressed through regulation at a European level. We would encourage the committee to give thought to this further and would welcome the chance to provide further input.

It should be noted that there is already significant commercial activity and economic impact in the small RPAS sector in the UK. Similarly, there is also a considerable component of research dependent on RPAS in the academic sector. Any new regulatory framework should ensure it safeguards existing research, licenced activity, or commercial revenue and the UK’s current active role may be lost.

Thought should also be given to the uniformity of operator licensing. Whilst currently there are only two qualified entities in the UK offering a recognised pathway to gaining Permission for Aerial Work (“PFAW”) from the CAA, we would like to see a

Association of Remotely Piloted Aircraft Systems UK (ARPAS UK) and the Unmanned Aerial Vehicle Special Interest Group (UAV SIG) of the Remote Sensing and Photogrammetry Society (RSPSoc)—Written evidence (RPA0005)

standardised approach similar to a Private Pilots License that could be offered by more providers.

ARPAS-UK believes that the EU's actions are consistent with, and potentially ahead of, developments in other non-EU countries. While we consider it extremely important to liaise at an ICAO level, ARPAS-UK would consider that the proposed actions from the EC is currently market leading, with legislation in the United States in particular still not close to being realised. ARPAS-UK feels it is important to enable the EC to maintain / develop a market lead, while at the same time ensuring safety is paramount.

RSPSoc notes that certain categories of civil aircraft are exempt from the need to comply with the Basic EASA Regulation and its implementing rules (Annex II aircraft), this includes aircraft specifically designed or modified for research, experimental or scientific purposes and likely to be produced in very limited numbers. RSPSoc believes that the CAA policy and guidelines (CAP 722 UAS Operations in UK Airspace – Guidelines) provides the scientific and research community with an appropriate framework for operation and these operations have resulted in the UK's current position as a global leader in research in this area.

RSPSoc believes that R&D is critical in stimulating new and innovative applications for RPAS, and we believe it is important to develop regulatory mechanisms, which continue to enable flexible low cost use of small RPAS for research purposes. Any change to regulation of RPAS would need to consider the impact on UK Science very carefully.

3. *In which new or innovative ways do you think RPAS will be used in the future?*

Whilst the uses of RPAS in the sub 20kg over the past 12-18 months has been meteoric, we feel that the surface has barely been scratched, indeed the number of ways they could be used in the future is the greatest unknown. Advances in power sources, airframes and most importantly, payloads will see them deployed into many spheres of industry that has yet to realise their potential. ARPAS-UK is working with a consortium of industry and academic partners to encourage this type of expansion.

The portability and relatively inexpensive nature of small RPAS make their deployment cost effective and time sensitive. Current and perceived uses for the sub 20kg category include:

- a. Photography & Videography – for TV, cinema, press, advertising and corporate publicity.
- b. Surveying – Mapping, measuring, building inspection, crop monitoring, wind turbines inspection. Potential for local councils to use as part of planning applications.
- c. Emergency Services – monitoring, spotting, hazardous air testing, search and rescue, rapid disaster response.
- d. Agriculture – Spraying, harvest monitoring, soil analysis

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- e. Forestry – Inventory and management of pests & diseases
- f. Environmental and ecological change monitoring
- g. Entertainment – Disney has already filed applications for their use
- h. Communications – Portable emergency relay stations in remote locations
- i. Short range delivery (?)

RSPSoc notes that RPAS are fast becoming established as platforms for scientific data collection both for High-Altitude Long Endurance (HALE) missions and for low-altitude sub-7 kg operations from lightweight platforms. The UK's Natural Environment Research Council (NERC) commissioned a review of “next-generation aerial platforms” that highlighted the scientific benefits to Earth and environmental science of unpowered aerial vehicles (MacKenzie et al 2009) and an “Aircraft Review” which looked at the use and scientific demand for RPAS and emerging technologies (NERC 2012). These reports strongly suggest that high-altitude UAV platforms primarily offer opportunities for innovative atmospheric science while small, low-altitude systems are suited to terrestrial and coastal applications that require high spatial detail and regular monitoring (e.g. precision agriculture, algal blooms, geohazards, boundary layer atmospheric studies). NERC have since established a collaborative agreement with NASA to deploy atmospheric experiments on their Global Hawk platform, and engaged with university scientists to developing capability in small RPAS operations. The NERC Aircraft Review concluded that technologies surrounding small RPAS platforms are developing very rapidly and being adopted by scientists because of their flexibility, ease of deployment and relatively low cost.

RSPSoc believes that RPAS have enormous potential to provide new and distinctive science that compliments and adds value to manned airborne data acquisition platforms. Specific areas of capability include science in support of **hazards**; time series and **monitoring** of terrestrial and marine environmental processes; acquiring data at **very low and very high altitude operations**. The exemption from stringent air safety regulation makes small UAVs attractive research platforms when compared with piloted aircraft. For many remote sensing applications the advantages include the low cost of purchase, operation and maintenance, as well as the lack of noise or other pollution. However, a significant limitation is that low altitude RPAS can only carry small payloads; most published studies use off-the-shelf digital cameras (d'Oleire-Oltmanns 2012; Eisenbeiss and Zhand 2006). At low altitude, it is possible to achieve very high spatial resolution with consumer-grade compact and SLR cameras, sufficient to allow photogrammetry and precision mapping. While there have been efforts to explore multi- and high spectral resolution imaging, including deployment of thermal infrared, RADAR, and even small laser scanners, the exploitation of this technology is still in its infancy (Berni *et al.* 2009). RPAS have demonstrated a unique capability for detecting water stress in individual plants using techniques of reflectance spectroscopy by combining very high spatial and spectral resolution (Pölonen et al 2013; Saari et al. 2013; Zarco-Tejada *et al.* 2012, 2013). Finally, there is an important overlap with piloted and unpowered aircraft platforms for the testing of instruments designed and planned for deployment in Space. The space

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industry identifies the lack of access to airborne test platforms as a severe limitation in verification and validation, calibration, cutting-edge instrument development, deployment and testing. RPAS technologies enhance quality of service to scientists by increasing the rate of data delivery and provide efficiency gains and savings in operations, maintenance, support, and data post-processing.

4. *What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?*

The ASD figure of 150,000 jobs was based on civil RPAS achieving around 10% of the current aviation market. We believe that this approach in estimating job creation through RPAS operations is a significant underestimate. We are already seeing that job creation will come from completely new areas of activity that will not necessarily be classed as aviation. Existing professions such as surveying, entertainment, research and many others will create jobs both directly and indirectly associated with RPAS use. Already organisations in the UK such as Defra and Network Rail are specifying the use of RPAS for specific contracts, and this will be set to continue. In order to understand the true economic benefits of RPAS it is essential that we recognise and quantify cross-sector impact.

Key factors restricting growth of the RPAS market include:

- Timeframe for development of the regulatory framework enabling operations in complex environments such as Beyond Visual Line of Sight, Congested Area operations etc.;
- End user market perception of the scope of sUAS capabilities;
- The sUAS supply chain which often lacks the conventional tiered supply chain structure, and which will limit the ability of the EU to bid for and win larger contracts;
- Availability of new skills and skillsets required by the sector, some of which still require definition.
- The use of RPAS in research is likely to extend beyond the traditional Earth observation, remote sensing and engineering communities into the humanities and social sciences (e.g. Archaeology, Design, Planning and others); sustaining this growth will require a sympathetic regulatory environment and stimulation of the market to provide value-added sensors and related products to make data accessible and usable.

5. *Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?*

Radio spectrum is a key issue for the commission to focus upon. For example, whilst the majority of control and command platforms operate on 2.4GHz and video downlinks are on 5.8GHz, recent RPAS have been sold by Maplins with this

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combination reversed. It is critical that for the industry to develop there needs to be co-ordinated EC agreement on this issue.

We believe it is essential that any changes in the remit of EASA still allow some involvement from Member States. Member States can best assess local environments and issues, which contribute to risk, that would not be possible at an integrated EU level.

6. *Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?*

The discussion on invasion of privacy with regards to RPAS has been wide ranging for some time. Whilst ARPAS-UK recognises these concerns, it is of the opinion that they should not be singled out from other such mediums such as CCTV, mobile phones and, for example, police helicopters / news crews. Existing legislation already provides an adequate framework and further education on these rather than additional regulation is seen as a more appropriate approach unless evidence suggests otherwise.

The insurance market for UK SMEs is currently restricted to a few providers and we would welcome greater competition in this area. As the industry develops and more operational data becomes available we would hope to see premiums reduced and more bespoke off the shelf policies become available.

RSPSoc believes that higher education establishments and research organisations would benefit from an environment where insurance providers were better informed about RPAS technologies and associated risks. It is important that premiums are commensurate with risk and do not restrict the educational benefit to students and researchers.

7. *Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?*

We agree that a significant focus should be on airspace regulation, but as with point 1, it is essential in this regard that EU research funding is weighted towards smaller RPAS, which are set to have a much greater economic and sustainable benefit in the short as well as long term. It should be noted that this would also increase the extent of research undertaken by SMEs.

We feel that suppliers are addressing airframe airworthiness, as operators are quick to migrate should a particular supplier fall behind the curve. However, we also believe that there should be a focus on other technologies, which will significantly improve performance and reduce cost of RPAS, as well as supporting RPAS for science measurements. It would be our recommendation that an element of R&D

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funding be focused towards power/battery technology, payload miniaturisation and flight control systems.

We also believe it is essential that R&D funds be available for cross sectoral research, for example integration of sensor systems, and data processing and analysis from a range of technology sectors into RPAS. If R&D funds are bounded entirely within the aviation domain, this will be a significant barrier to growth.

Notwithstanding Horizon 2020 and COSME funding, we believe there will be some individual Member State interest and issues, which should be funded locally. The rapid uptake of RPAS within the scientific community is notable and evidenced by the very rapid growth in peer review publications in both the engineering and environmental science literature. RPAS technologies are helping address novel problems and established questions in new and effective ways using scientific measurements, particularly for cross-sectoral research. RPAS represent technologies that have grown organically and ARPAS and RSPSoc believe there would be significant impact for UK science if Research Councils were able to recognise the importance of this research.

16 September 2014

Association of Remotely Piloted Aircraft Systems (ARPAS-UK)—Supplementary written evidence (RPA0047)

Association of Remotely Piloted Aircraft Systems (ARPAS-UK)— Supplementary written evidence (RPA0047)

Policy Position - Regarding safe operations and the responsibility of regulations; Response to the House of Lords.

For many years the model aircraft community ‘Hobbyists/Recreational users’ represented by the BMFA (British Model Flying Association), has maintained a safe record of operations. This is largely due to the difficulty in learning the skills required to fly, and the mind set of safe operations instilled into pilots the moment they join the BMFA

With the advance of flight controller technology in recent years a growing number of ‘Professional’ operators have emerged who must sit specific theory training and practical tests in order to ensure they operate safely, and they are represented by ARPAS-UK (Association of Remotely Piloted Aircraft Systems).

Most recently, as technology has continued to advance, it has become possible for the general public to fly very capable aircraft with little or no training. This latter group could be termed ‘Consumer/Leisure Users’ who are not currently represented by any body.

With the recent proliferation of AirProx reports and cases of illegal operators caught and not charged, the members of ARPAS are concerned about the safety implications that Consumers will have on all forms of aviation.

Two principal areas require work in order to mitigate the risk that Consumers pose: education and enforcement. Much work continues to be done with education however little is being done with regard to enforcement. The regulations are clear and proportionate but the CAA does not have the resource to cope with the extra demand, and no organisation seems to be willing to take full responsibility for this new form of aircraft.

The danger is there is the possibility with the proliferation of consumer drones (ready to fly out of the box) that one or many people will be killed in a tragic set of circumstances where a lack of knowledge, understanding and care will be the primary causes of the event.

We are concerned that if the CAA is not able to maintain full responsibility for small RPAS and RC aircraft (Radio Controlled), there will not be a body responsible for operational safety. It is important therefore that there remains a mechanism for ensuring competent operations if the CAA limits its responsibility below a certain weight category.

We would like to suggest mechanisms to limit risk and appropriately regulate the future of flights:

1. Empower the Police to act on enforcing the law. This includes educating them about the rules of the air to a minimum standard that should include articles 137, 138, 166 and 167 of the ANO as standard - this is not onerous as these articles total one side of A4. It is also worth mentioning that existing laws in place to protect the public can be used to prosecute people using these aircraft in an inappropriate manner, and they include but are not limited to endangerment, assault, harassment and annoyance.
2. Give the CAA enforcement branch the resource to pursue and prosecute high profile cases of illegal operations to set an example.
3. Give the CAA UAS team the resources to appropriately regulate the operators of smaller craft (sub 20kg) so that they don't deregulate in order to reduce the burden. ARPAS is currently developing another Policy Position titled "Future Regulations", which aims to layout the vision of the future landscape of regulations and enforcement that consider purpose, safety, proportionality, practicality, privacy, liability, insurance, security and business. If you wish to have more details about this, contact chairman@arpas.uk.
4. Give the CAA PR department the resources to engage with the public, and every RPAS/RC air user to promote best practice and raise awareness of the regulations and safety implications. Engagement can be through various channels including:
 - a. Exhibiting at relevant public exhibitions, shows and conferences
 - b. Advertising on TV
 - c. Responding to news stories
 - d. Promoting positive new stories
5. Put emphasis of raising awareness on to the retailers. This is the one point of contact that is common for consumer users. Once they have purchased the drone, they are very difficult to engage with again. This can be facilitated by:
 - a. Ensuring retailers issue the CAA's information leaflet with every purchase (not very effective and difficult to enforce)
 - b. Register the purchase and new owner of every drone on completion of each sale, much like registering the purchase of a tv, in order enable charging for the TV licensing authority.
6. Ensure manufacturers include the CAA's information leaflet within every purchase. Similar to how other products must meet international certification standards that include multilingual manuals for operation.
7. We suggest that some form of digital identity chip and or uv spray (similar to that used to identify bicycles) which has the details of the owner onboard should be investigated. This could be facilitated through the onboard controller, so that in order to fly the

Association of Remotely Piloted Aircraft Systems (ARPAS-UK)—Supplementary written evidence (RPA0047)

aircraft each owner must register their details with the manufacturer who shares these details on an online database.

8. Enforce manufacturers to add Geo fencing into the onboard computer to stop people taking off within 5 miles of any military or civilian airfield or any other areas where restricted airspace exists. This should only be applied to consumer type aircraft ie ones that can be flown 'out of the box', so that it does not stop commercial flights that gain an exemption from the CAA, to operate in these areas.
9. If CAA is unable to undertake actions 2 and 3 above, then an organisation responsible for these actions should be identified.

A survey has been published to capture peoples opinions regarding these matters and it can be found here: <https://www.surveymonkey.com/s/G9C56WC>

15 December 2014

BeUAS—Oral evidence (QQ 113 – 134)

Evidence Session No. 9

Heard in Public

Questions 113 - 134

WEDNESDAY 5 NOVEMBER 2014

Members present

Baroness O’Cathain (Chairman)

Lord Brooke of Alverthorpe

Lord Fearn

Lord Haskel

Examination of Witness

Mr Koen Meuleman, President, Belgian Unmanned Aircraft Systems Association (BeUAS)

Q113 The Chairman: Mr Meuleman, thank you very much for agreeing to give evidence to our Committee’s inquiry on RPAS. This session is not being recorded or webcast, but a transcript is being taken and you will have the opportunity to review this transcript in case there are any factual errors or whatever. Regarding the Members of this Committee, the four of us, their interests are disclosed in the list on our website. Do Members have any other particular interests?

Lord Brooke of Alverthorpe: I used to be a director of the National Air Traffic Services⁴ in the UK.

The Chairman: I used to be on the board of British Airways for 12 years—

Mr Koen Meuleman: I can see I am going to be very careful now.

Lord Brooke of Alverthorpe: A long time ago.

The Chairman: —and chairman of the board’s safety committee. That was a long time ago. Everybody, particularly Members of the Committee, please speak up clearly for the benefit of the record, and could you please say who you are and which organisation you represent so we have it on our transcript? Over to you.

⁴ NATS

Mr Koen Meuleman: I am Koen Meuleman. I am Chair of the Belgian Unmanned Aircraft Association.⁵

The Chairman: Thank you. What other countries have unmanned aircraft systems associations, do you think?

Mr Koen Meuleman: Holland's is called DARPAS. The French also have an association and also the Germans, together with the Swiss. That is UAV DACH.

The Chairman: I see. Goodness.

Mr Koen Meuleman: Yes, so we are not the only one, definitely not.

The Chairman: Can you please tell us a bit about your organisation and its membership and the current regulatory framework that is in place in Belgium?

Mr Koen Meuleman: We are an association that was founded in 2012, two years ago. We started with five members and now, as at today, we have 105 members of the association. It started with the push to have legislation in place, because it was an evolving business and there was no legislation in place. If you ask me about the current regulatory framework in Belgium, it is still the case we do not have legislation in place.

The Chairman: Nothing?

Mr Koen Meuleman: Currently commercial flights are forbidden. You can only get a permit to fly, which is an exemption, on the basis of scientific research or testing purposes.

Q114 The Chairman: I see. What about the RPAS underneath 150 kilograms? They do not have to have a—

Mr Koen Meuleman: Yes, indeed. Basically we do not have any RPAS above 150 kilograms, except for the Army ones, but all the rest are the small RPAS. Then you are talking in a range of mostly a few kilograms, between 5 kilograms and 10 kilograms probably, not more, which is the majority of the systems we have. But currently we have no legal means to fly, so it is forbidden. You can ask for an exemption for flying for demonstrations only in the framework of R&D and testing.

Lord Haskel: That is over 150 kilograms or for all?

Mr Koen Meuleman: All. I am from a research institute, I work at a research institute myself and we have, I think, the biggest ones that are in the civil market in Belgium, and that is about 45 kilograms, which are already big ones, yes.

Q115 The Chairman: You tell me that your association, the Belgian Unmanned Aircraft Systems Association, has over 100 members. Where do they come from and what are they interested in?

⁵ BeUAS

Mr Koen Meuleman: Most of them are flying illegally. That is the only way to survive currently, so we are an association getting together. As I said, I am from a research institute, but 90% of the members are commercial companies.

Lord Brooke of Alverthorpe: Are they commercial or hobbyist?

Mr Koen Meuleman: Some of them are commercial, obviously, but a big majority of them are not. It is really trying to earn the money with them. Some have stopped flying while being scared, but others are really flying. The funny thing is, they even sometimes have contracts from the Government for inspections, so it is a very strange situation currently.

Since we started two years ago, the two years we have worked, we have worked on a royal decree, as it is called. The legislation was submitted to the Government last April, but we had elections in May.

The Chairman: Then they closed down for another couple of months.

Mr Koen Meuleman: Indeed, so the current situation is that the legislation is a bit lost, yes, because we have a change of Government and that is unfortunate. But the Cabinet is being formed now, so we have taken contact with the cabinet for transport and we are hoping to soon have a meeting on how to recover the legislation that was in place last April. But the good thing is that the current Government has put it in their—

The Chairman: Manifesto.

Mr Koen Meuleman: —manifesto that the legislation should come into place, while the other one was not really supporting this.

Q116 The Chairman: In the intervening two years since it has been formed, have you spent all the time with your 100-plus members trying to draft legislation or are you just there to make sure that you know what is going to happen when you are given—

Mr Koen Meuleman: Both, but as board members—I was one of the board members before being the president, as I was already on the board since the beginning—we have spent two years together with some guy from the administration to draft the royal decree.

The Chairman: I see.

Mr Koen Meuleman: The unfortunate thing is it was reviewed by us and we even judged it as being one of the best currently in place.

The Chairman: But at least you have it then, so you can let it all roll when you get your permission.

Mr Koen Meuleman: When we have it, yes.

Lord Brooke of Alverthorpe: Good afternoon.

Q117 Lord Brooke of Alverthorpe: My question starts with: what are the biggest issues facing your members? You have already answered that question to some extent, but it then

takes us on to ask: has the European Commission's communication on the civil use of RPAS addressed the issues you feel that are of concern to your members, for example, on the issues of privacy and data protection, liability and insurance and so on? Do you think the initiative that is coming from the Commission meets your needs or, if not, what further changes would you be looking for? Given that you mentioned that there are representative organisations in several of the European countries, if you had a blank sheet and you could go to any of those countries, which would you see as being the easiest to accommodate your desire to fly in the way that you are talking about?

Mr Koen Meuleman: The UK or Holland, I think. Not France.

Lord Brooke of Alverthorpe: Not France?

Mr Koen Meuleman: No. The good thing about having legislation in place is that you have certainty. In Belgium, it is a bit fluid what is going to happen with that, but what we did not like about the French legislation is the categorisation in kilograms, which for us is very artificial and does not make sense at all. Kilograms is just only one part of the discussion. Weight is only one factor. It is an important one, but not the only one, and that is what the French legislation is mostly based on—on kilograms.

Lord Brooke of Alverthorpe: Yes. The British initiative has moved to risk rather than—

Mr Koen Meuleman: That is what we say also. The Belgium one is still based on risk: whether you fly in the city or in the countryside, there is a big difference when you are flying above people or not. Of course it remains true that the bigger your aircraft is, the more risk it might provoke to the people on the ground, but it is not only the weight.

I am referring to this document of the European Commission and I heard you spoke to Koen De Vos this morning.

The Chairman: Yes.

Mr Koen Meuleman: Koen De Vos was behind this text and I think they got quite well what our concerns were. I am referring to page 6 and the second paragraph of the Communication, where they are describing what the real challenges that they see are. That was our main concern, because they wanted to involve EASA⁶ quite strongly in the future and we were a bit scared about EASA, because these are the guys with the big airplanes. If you try to apply those rules to the smaller RPAS, it is over—you cannot do this. It should be more pragmatic than the current regulations. In that respect, they got it quite well.

Then in terms of what you specifically asked, on privacy and data protection, we had a discussion already in Belgium with the Privacy Commissioner, it is called, and also with Koen we exchanged ideas. I think in terms of privacy and data protection, there are basically no issues. With no issues, I mean I would say the laws in place are covering this aspect well enough. I can see that people are a bit scared of the privacy when they see a drone, but legislation is quite well developed in that respect and I think we do not need to refine this. It is more or less like with your smartphone: I can also film you and put you on the internet like

⁶ European Aviation Safety Agency

a drone, so in that respect I think there is not much to do any more about privacy and data protection.

Liability and insurance, yes, that is indeed a question mark, although most of our members are insured, with normal companies. It is not always clear whether or not the rules apply. Yesterday, as an association, we issued insurance for our members. I think it is civil liability insurance that was issued for our members and it is with one of our partner members, Aviabel, which is an insurer mostly for those in the aircraft sector, but basically it has nothing to do with aviation insurance. Whether or not those rules apply, it is not very clear. Some people say, “Yes, the current insurance from civil liability that you offer is not good enough, because the European law says that you should have a specific insurance for RPAS”.

The Chairman: RPAS, yes.

Mr Koen Meuleman: But that is an issue that is currently not clear, although they guaranteed us, this company, that we have this insurance, that it is really valid and that it covers the civil liability. An issue that could be clarified is the extent to which European law—it is referred to in this document, on page 8, as the regulation on insurance requirements for air carriers and aircraft operators—applies here.

Q118 The Chairman: But is it not a bit extraordinary that they can be paying insurance premiums and not be able to operate legally?

Mr Koen Meuleman: For me, this was a surprise too, but apparently there is a difference between—I am looking for the English word—doing something that is not according to the law and the fact you cannot be insured for it. Those are two separate things. We had that issue with the guys with the parachutes.

The Chairman: Yes, paragliders.

Mr Koen Meuleman: Paragliders. They were illegal in Belgium for the last 10 years and were allowed only since last July, so they were flying around, but all those guys were insured.

The Chairman: Extraordinary.

Mr Koen Meuleman: Let us say legally it is not right; that does not mean that you cannot insure, apparently, against that risk. It was very surprising for me also. But that is what we have. Our members are insured now for civil liability. Although they fly, they can do it illegally.

The Chairman: You cannot fly legally. They are quite happy to hand over premiums for insurance where they cannot fly legally. I wonder what their shareholders think. It does seem a waste of money.

Mr Koen Meuleman: The shareholders, they have no problem with that.

The Chairman: The shareholders' funds are being used to pay insurance companies for doing nothing, because they cannot fly anyway.

Mr Koen Meuleman: But they do fly, yes, and we have—

The Chairman: I see. As they are flying illegally, if they then have an accident, are they insured?

Mr Koen Meuleman: They are insured.

The Chairman: I see.

Mr Koen Meuleman: As I said, even Governments hire people with RPAS for inspections, for taking pictures of bigger road constructions. They do it although it is illegal. That is very strange in Belgium: depending on the police zones, the Ghent police zone knows the law and they act, while in other police zones they do not do anything. As for inspections from the Belgium Civil Aviation Authority, there are too few people to do anything. So it is a strange situation.

Q119 Lord Brooke of Alverthorpe: Do you have a research background?

Mr Koen Meuleman: I am a biological engineer, yes. I am working at the Flemish Institute for Technological Research dealing with remote—

Lord Brooke of Alverthorpe: The Commission is aiming to streamline R&D⁷. R&D has been particularly good in the defence industries, particularly in the States and in Israel. European countries' defence has not been in the same league at all. We are now running to try to catch up. Do you think there is any chance of that? Do you think that, with *Horizon 2020*, the revised budget that is now available and the money that is available through the Commission, RPAS should do well out of that? Is this likely to be helpful in trying to give us a push forward?

Mr Koen Meuleman: On *Horizon 2020*, let us say it might help RPAS in a way towards the direction of more or less applications, while for R&D, particularly for flying and integration in the airspace, it will be more or less I think for the SESAR Joint Undertaking initiative⁸.

Lord Brooke of Alverthorpe: You would not see that as a promising new technology then in that sense?

Mr Koen Meuleman: No.

Q120 Lord Fearn: Are you aware, and are your members aware, of the different regulators and the work they are doing to develop and harmonise rules governing the use of RPAS, for example, the International Civil Aviation Organization (ICAO), the Joint Authorities for Rulemaking on Unmanned Systems—which is JARUS, I presume? Do you see a clear delineation of responsibility? Also, how would you like to see industry involvement in the development of regulations and work in progress?

Mr Koen Meuleman: It is not always as clear here, that is true. We understand ICAO is on top, let us say, but it works very slowly. I know they had some communication issued a few years ago and they will discuss again on this next year, but how this will affect the national

⁷ Research and Development

⁸ Single European Sky Air Traffic Management Research Joint Undertaking is a European research programme.

rules or rules on the EU level is not at all clear for us. On JARUS, we have been participating in meetings with JARUS. We are not in favour of JARUS.

Lord Fearn: You are not?

Mr Koen Meuleman: No.

Lord Fearn: Why is that?

Mr Koen Meuleman: We have seen documents of JARUS, which they have issued, and if you would literally apply what they write, you will never be able to fly. I think they are evolving now. The latest issue documents are going to a more pragmatic way, but the first document about helicopters was just a copy and paste from an EASA document and they adapted the kilograms, I think. They were technical people or people from the administration that had never seen a drone, in my opinion. Regarding JARUS, we were warning also the European Commission, Koen De Vos, because they are talking about involving JARUS quite a lot. I said, “Be careful with JARUS, Koen. Did you ever read the text from JARUS?” The first text we commented on JARUS, it was kind of just—

The Chairman: Yes, but have you spoken to JARUS about it?

Mr Koen Meuleman: Yes, we met them—it was the chairman—a few months ago.

Q121 Lord Brooke of Alverthorpe: Is your view shared by others?

Mr Koen Meuleman: I think by many others, yes.

The Chairman: By the members of your association, but what about the others?

Mr Koen Meuleman: Yes, the members of my association, I think half of them are not even aware about this, what is happening. They are all looking to the national legislation, but what is happening above their heads at the EU level, ICAO level and JARUS, they are not aware at all. We try to inform them on this, but this plays above their heads, I would say. But we are afraid from JARUS, yes.

Q122 The Chairman: Yes. If you are afraid about JARUS and if you want to lobby people and say, “You better look at this more cleanly”, surely it behoves you, to try to get together and solve the problems of what is going on.

Mr Koen Meuleman: I do not think so. In fact, it is going in a good direction currently, but in the beginning there were just the civil aviation authorities, which just had a thought of what it should be, and the difference between what was happening in real life, it was not at all matched, not at all.

The Chairman: We thought, or I thought, they were very reasonable and they had thought things out sensibly.

Lord Brooke of Alverthorpe: I think some of the original documents were unacceptable.

Mr Koen Meuleman: But what they do not realise now, there is big difference between what we call the small RPAS, which will probably never get into civil airspace where the manned aircraft fly, and then everything that happens below. Those people are from the civil aviation authorities, they are dealing with manned aviation, so the rules that apply there are for most of the small aircraft operations not applicable. I think this was one of the problems. 90% of our members will never fly above 150 metres, they will never intrude and come into manned airspace and that is a big, big difference. In the draft Belgian legislation, the altitude was limited to 150 metres. Everything below has a different regulation, then from there, when you start to mix with manned aviation, the rules become very strict.

The Chairman: I am going to suggest that we stop taking a transcript on this one just for a minute.

[The evidence session continued temporarily in private.]

The Chairman: We are now back on record, so people should speak clearly.

Mr Koen Meuleman: Just maybe to add something, we had ICAO and we had JARUS. One party that I did not say and that is quite active, and I think had a good view on things, is EUROCONTROL.⁹ EUROCONTROL is acting in a very good way and is trying to pull it a bit towards them, together with SESAR, just to get this regulation. At least what we have seen in the last few weeks from EUROCONTROL, they are very good, aware of what is happening and they see clearly. They are aware about what happened with JARUS and they know what is happening around it, that there is a big difference between the big UAVs¹⁰ and the military type of aviation or aircraft and the small civil RPAS, that those two are not identically the same and the requirements are different.

Q123 Lord Brooke of Alverthorpe: Do you think that the interests in the small RPAS are being properly represented within the current set-up?

Mr Koen Meuleman: No. I was very happy to see this paragraph on page 6, the second one, which I think expresses exactly what we need, a more pragmatic approach, but until now, in the regulatory framework, it was not at all. The people were not aware what the small RPAS operations were about, I think.

Q124 The Chairman: But again, we have a bit of a problem here, because it has been more or less—at least I have taken it—that the 150 kilograms was the beginning 10 years ago when they started with RPAS, and they now know that you had to start somewhere and that now this is no longer applicable.

Mr Koen Meuleman: Yes, it is very artificial. Nobody understood why, nobody can explain.

The Chairman: That is right.

Mr Koen Meuleman: When you ask here, nobody can explain where the 150 kilograms comes from.

⁹ European Organisation for the safety of air navigation. It is an intergovernmental organisation with 41 Member States.

¹⁰ Unmanned Aerial Vehicles

The Chairman: That is right, and if they were starting here again, it would never have been in, it would not be 150 kilograms.

Mr Koen Meuleman: No.

The Chairman: Therefore, in the future that we are looking at, that should not feature, other than to say it had been there because they started there and was probably plucked out of the air—I do not know, but you say nobody remembers.

Lord Brooke of Alverthorpe: I think I am probably right in saying it is very important that we clarify our minds on the evidence we have had and then give a very clear statement on what needs to be the right position if we are to make sure that this technology moves forward.

Mr Koen Meuleman: It makes sense that EASA and the Commission become responsible for all type of RPAS operations, trying to harmonise the regulation throughout Europe, because this is a big issue currently. It is a big difference between Holland, Belgium and France, for example. The limit of 150 kilograms should disappear. It is just artificial.

Q125 Lord Haskel: Now, if we can have a discussion about, as you put it, everything that happens below 150 metres, it seems to us that quite a lot of money and time and effort is going to have to be spent on integrating RPAS into this non-segregated airspace if you are going to control it. It seems to me quite a large effort is going to have to be made, particularly in terms of enforcing compliance by the small RPAS users. Do you have a view on this?

Mr Koen Meuleman: I saw this question and you have asked it now, and I was not sure if I understood it fully, because I was wondering which resource implications, considerable resource—

Lord Haskel: By “resource implications”—

The Chairman: It is money.

Lord Haskel: —what we mean is spending money, spending time engaging people in looking after that airspace, setting up controls to check on what is happening in that airspace. If you are going to control it in some way, you have to have a mechanism for doing that.

Mr Koen Meuleman: Yes, but we are not convinced this will have a considerable cost.

Lord Haskel: You think it can just be left for everybody to manage as best they can on their own, everybody using that below 150 metres airspace you just—

Mr Koen Meuleman: No, because under Belgian law, 90% of the users which I represent will fly below 150 metres.

Lord Haskel: Exactly.

Mr Koen Meuleman: What we are after, and it is mentioned in the law that was drafted, is that a kind of notification system, as we call it, should be in place, because we know especially for traffic control and so on, the major concern is that we do not see these things

flying. That is the major concern and all the other aircraft you see on the radar. We had a clear view on what this notification system might look like, and it is written as such in the law that on the Belgian level this will be implemented. It is kind of more or less a software system in which each RPAS operator notifies where he will fly, when he will fly, but this could be done quite automatically. With the kinds of technology available, like with smartphones, people should just push a button and then this could be linked to a database and the system with the air traffic control centre where they would see that an RPAS operation is ongoing there.

It will not prevent what happened last week in France, with those drones flying over the nuclear sites. Also the Government, be it police or the ATC¹¹ authorities, want to know where and when somebody is operating and all the rest that is operating is illegal, you see? It would not prevent the guys who fly over the nuclear stations, for example, but at least it would clarify all the rest that is flying. From that perspective, we did not see that would be a big need for additional resources or personnel to control this.

The Chairman: I see.

Q126 Lord Haskel: So you envisage that people would just notify by some digital system that you are going to fly and then they can just get on with it?

Mr Koen Meuleman: For example, on the Belgian rules, depending on where you are flying in the countryside, it would be sufficient by just notifying the ATC authorities, “I am going to fly on that day”. Depending on the airspace, for example in the city environment, you would need to apply and then you would need also to get the feedback from the ATC authorities, “Okay, this is fine with us”. We had a proposal on how to automate this.

Q127 Lord Haskel: So below 150 feet, you would designate some areas where all you had to do was to notify, and other areas, say over cities, where you would have to get permission?

Mr Koen Meuleman: Yes, for example, regarding notification, it could also be that system could be—I do not find the word—consulted by the police forces, for example. When the system is operating on its own, it would be a database to which they have access. They could look into that database, “Okay, you are flying here. Who are you? What is your mission for? Who is your client?” and link to all the permissions and certifications and so on.

The Chairman: I see.

Mr Koen Meuleman: Because we do not see any other means to control below 150 metre operations. You do not see them on the radar. You need to have something in place and we thought this was a good idea, and above then I think they apply the standard aviation rules.

The Chairman: For civil aviation.

Q128 Lord Haskel: Civil, yes. Do you think that under those circumstances, the industry can develop?

Mr Koen Meuleman: We are convinced, yes.

¹¹ Air Traffic Control

Q129 Lord Brooke of Alverthorpe: I was going to ask again about research programmes, and I think to a degree we have covered it already with your view on what was happening with European Union research on it. There is an extra bit though: there is the SESAR Joint Undertaking looking at air traffic management and trying to create a unified regulated airspace. They will need, as you accepted, to integrate RPAS into those, to have a mechanism for that, but do you think that they could conceivably look below 150 metres as well, as part of their research programme?

Mr Koen Meuleman: They could, although to be quite honest and open, when my institute replied to a call from the SESAR Joint Undertaking for projects on RPAS—I should be very careful now, as I do not want to criticise; the quality of my proposal could also have been bad, of course—you could see that they were only looking to the big aircraft. A UAV for SESAR was a military UAV that could hardly fit into this room. That was for them UAVs. However, I think also from that point they are also changing their minds, so I am a bit reluctant to say they could also look into the below 150 metres stuff.

Lord Brooke of Alverthorpe: We have heard similar evidence that there was a push for the bigger manufacturers with—

Mr Koen Meuleman: Yes, because it is Thales, it is Cassidian, it is Airbus, it is all those guys of this world and they try to get into this. I think with the programme that is currently being established, Eurocontrol is in there and I am personally involved in that.

Q130 Lord Brooke of Alverthorpe: But do you think they could do it if there was a strong enough will or mind?

Mr Koen Meuleman: If there is strong enough will and guidance, yes, they could do it. Yes. But it was not the case until yesterday, I must say.

The Chairman: We have timed this brilliantly.

Lord Brooke of Alverthorpe: Thank you.

Q131 The Chairman: Thank you. The increased civil use of RPAS has raised fears about invasions of privacy and a new potential of physical threat to people and property. Do you think there can be an EU-wide solution to this problem? For example, could there be restrictions at the point of sale or information about regulations provided at the point of sale or is existing regulation sufficient?

Mr Koen Meuleman: No, I think there is a big gap or big discrepancy. Belgium is a nice example, you can buy any drone here, any type of drone online.

The Chairman: But you are not allowed to fly it.

Mr Koen Meuleman: You order today and tomorrow you have it, big or small. One of our members has a big shop in which you can buy any type of drone, but you cannot fly it.

Lord Brooke of Alverthorpe: Somebody must be buying them, otherwise the shop would close.

The Chairman: At least they are buying them, but not putting it—

Mr Koen Meuleman: That is our main worry. We know that guy is selling hundreds and hundreds of systems and it is in particular those DJI Phantoms that are white and small. I have seen it personally at a family reunion, and I did not tell them who I was. He said, “There is a drone, do you not know?” and I said, “No, I do not know any drones” and the guy was flying up to 200 or 300 metres without any problem with this. I said, “Be careful, you might hit—” and then half an hour later a helicopter passed by.

Yes, we are convinced there should be some information at the selling point but it is very difficult to arrange. We also had this discussion in Belgium, but I would say the Ministry of Mobility has nothing to say about what is being sold. There is the Ministry of Economy and it is regulated on the European level mostly, so there is a big discrepancy. The fact is today you can buy anything, you can buy it and then you cannot use it any more because you are not allowed to fly.

A big problem, I think, is there is hardly any difference any more between toys and professional systems, and certainly in terms of technology, it is just the same. A professional system might just be a bit more robust, but for the rest it is just the same, and that is a potential big issue, how to deal with this. In this way, the European Commission, I think on a European level, there might be some work to do, yes.

We had a case in Belgium: it is not very easy to order online some things, some pieces in China that are totally illegal in Belgium. They bought a jammer to ensure the data of the camera being recorded and transmitted real-time to the ground was a bit secured and they were disturbing the mobile phone network. Then the police came and they thought they were terrorists and were jailed for two days. But the guys were not aware. That is the situation of today, you can just buy anything online even though it might be illegal.

The Chairman: Scary.

Mr Koen Meuleman: Yes, that is scary. There was a meeting in Belgium a few weeks ago with all security forces and some forces were not aware that you just could buy a drone like this on the internet.

Lord Brooke of Alverthorpe: The authorities did not know?

The Chairman: The security forces did not know.

Mr Koen Meuleman: Some of them, yes. If you stop typing now, then I—

The Chairman: Yes. We will stop for this.

[The evidence session continued temporarily in private.]

The Chairman: Lord Haskel, you have the last question.

Q132 Lord Haskel: We are back on air. This is about accreditation of pilots and the aircraft carried out by agencies and state authorities. Is it possible or perhaps is it even desirable to

outsource some of these quality assurance and accreditation functions for RPAS and their pilots to the private sector to make sure that the standards are maintained?

Mr Koen Meuleman: I do not know if it is desirable, but it could be a good solution. I know in the UK you have what are called qualified entities and you have a company like EuroUSC that does the accreditation for the UK CAA and I think this might be a good way to proceed. Also we are looking at it now, in particular for the Belgian case. We know that the new administration has, how do you say it, money savings ahead, so there will be—

Lord Brooke of Alverthorpe: Cuts.

Mr Koen Meuleman: Cuts, yes.

The Chairman: Austerity.

Mr Koen Meuleman: There will be a problem. Then we had this question about resources anyway, not the additional resources, but there will be a cut in the current resources. We think this might be—and especially with this very new kind of business, which most of the administration is totally not aware of—a good way to proceed, to give part of the job to what is called qualified entities.

Q133 Lord Haskel: Do you know of qualified entities that could carry out this job satisfactorily?

Mr Koen Meuleman: I know there are companies that are doing this; whether they are qualified enough to do this, it is difficult for me to judge. As I said, in the UK that is the way they are working and I think most of the time to the satisfaction of the people. I know sometimes, for example, the same company is working in Holland and there were a lot of complaints. It is quite expensive, so that is something to be looked at. That is why I think it might work, but then it should be within certain limits, yes, because they are private companies, and their own goal is to earn money, of course.

Lord Haskel: There are two such companies in the UK that do this work.

Mr Koen Meuleman: It is EuroUSC and another one that I do not know.

The Chairman: We also had evidence from a member of one of these companies, Mr André Clot. I just want to say thank you very much indeed. Team, is there anything else?

Q134 Lord Brooke of Alverthorpe: Yes, if I may. You spoke rather warmly about experience with the Dutch authorities. Did I understand you to indicate you thought they were doing quite well in Holland, reasonably liberal?

Mr Koen Meuleman: No, I think the way they are now currently evolving is a good way to go. I would say, until half a year ago or a year ago, it was very difficult to fly in the Netherlands too, but there is perhaps a way forward. And in what they have put forward, if I may be honest, they have looked quite a lot into the Belgian draft.

Lord Brooke of Alverthorpe: Have they? Which you wrote.

BeUAS—Oral evidence (QQ 113 – 134)

Mr Koen Meuleman: Yes, which we partly wrote, so of course I have to say they are going a good way, but no, as I said, they are going more or less a pragmatic way, a risk-approached way rather than purely strict and based on kilograms like in France. Two kilograms is a big limit and why not two and a half, for example?

Lord Brooke of Alverthorpe: Do they have legislation or is this just—

Mr Koen Meuleman: It is just evolving. In July they had a public hearing. It is evolving, but I think by end of this year, they more or less will have legislation in place. I am not 100% confident if it is by the end of this year, so I should check to be very sure about that.

The Chairman: I repeat, members of the team, any more questions? Can I thank you very much? It has been very informative, although concerning.

Lord Haskel: Thank you for your frankness.

The Chairman: Yes, indeed. Thank you.

Bird and Bird LLP—Written evidence (RPA0027)

Call for Evidence: Civil Use of remotely piloted aircraft systems (RPAS) in the EU

Submission from Bird & Bird LLP

- 1 We refer to the call for evidence on the civil use of remotely piloted aircraft systems in the EU and are grateful for the opportunity for make this submission.

Summary

Regulation

- 2 As matters stand, individual states are exercising their own judgment, particularly in relation to smaller and simpler RPAS systems. The desire for a comprehensive, internationally agreed regulatory structure which would also enable more complex operations in all classes of airspace should not delay continued development and use of RPAS which do not pose the same risks.

Liability and Insurance

- 3
 - (a) The existing legal liability regime applicable to manned aircraft covers RPAS and channels claims by the "innocent bystander" through the owner or operator.
 - (a) There is no need to develop a more elaborate structure to regulate liability among others participating in the supply or operation of RPAS.
 - (b) There is a simple third party insurance obligation which already applies to RPAS as a matter of EU law.
 - (c) There may be merit in some clarification of the exemption for "model aircraft" from the obligation to hold third party insurance.

International Regulation

- 4 The primary purpose of this submission is to address the liability and insurance issues raised in question 6, but first we make a general comment in relation to question 2:
 - 2. *What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?*
 -

- 5 The balance that needs to be struck is between the desire for international standardisation and the speed with which agreement can be reached on a comprehensive international regime, bearing in mind the pace at which the industry is developing and its variety. Many current applications involve lightweight vehicles being operated within line of sight of the operator, and away from populated areas, which seem to pose very little risk except, perhaps, to the platform itself.
- 6 The UK has a statutory mechanism to enable the issue of permissions for the use of lightweight RPAS¹² which, from what we can see, works well – 301 permissions had been issued as at 11 September 2014¹³. It is certainly enabling the industry and the regulator to gain experience in the sector – even if it is limited to modest applications at this stage this experience will be valuable as the technology emerges to enable operations at longer ranges or which will integrate with other air traffic.
- 7 This situation contrasts with that prevailing in the United States where the regulator's ban on commercial operations without permission is subject to challenge in the courts, and where very few permissions have yet been issued. Against that background there are efforts at ICAO, US and EU level to develop regulatory standards but we note that the ICAO and EU processes are not speedy. The EU is presently consulting on a range of policy issues¹⁴ including, for example, whether to extend the jurisdiction of the European Aviation Safety Agency (EASA) to cover all RPAS, where at present, Member States regulate RPAS below 150kg. The current situation gives individual Member States the opportunity to apply their own judgment on what equipment may be operated and what operational limitations should be imposed.
- 8 The point is that there seems to us to be merit, in the short term at least, in enabling individual states to exercise their own judgment, particularly in relation to the smaller and simpler systems. Put another way, the desire for a comprehensive, internationally agreed regulatory structure which would also enable beyond line of sight operations and full integration with manned aircraft in all classes of airspace should not delay continued development and use of RPAS which do not pose the same risks.

Liability and Insurance

- 9 We now turn to question 6:
- 6. *Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?*

¹² Air Navigation Order 2009, articles 166/167

¹³ <http://www.caa.co.uk/docs/1995/20140911RptUAVcurrent.pdf> By way of comparison, as of 18 September 2014, France has issued over 800 authorisations (source: http://www.developpement-durable.gouv.fr/IMG/pdf/EXPLOITANTS_DRONES_AU_18092014.pdf)

¹⁴ http://ec.europa.eu/transport/modes/air/consultations/2014-civil-drones_en.htm

- Within the scope of that question we limit our comments to the liability and insurance issues and do not comment on the privacy issues.
- 10 The concern relates to the liability of those involved in design, manufacture, maintenance or operation of RPAS for injury, death or physical damage to natural persons or property. In this context there are three possible scenarios:
- (a) An RPAS causes injury to individual on the ground;
 - (b) An RPAS causes property damage on the ground;
 - (c) An RPAS hits another aircraft (on-board piloted or RPAS) in the air.
- 11 Put another way, in the event of an RPAS accident, how does the "innocent bystander" victim, who is not involved in the operation of the RPAS, recover compensation for loss or injury thereby suffered? A related issue which is frequently also raised in this context is how liability is apportioned or channelled among the operator, its supply chain and any other parties who may have contributed to the accident.
- 12 These are issues with which the aerospace industry and its insurers have been familiar – in the context of manned aircraft - for many years. The European Commission has raised the question in the context of RPAS and was in the course of a consultation on the subject before issuing its Communication on 8 April 2014¹⁵. In our submission the issues raised by the Committee in question 6, and before it by the Commission, reduce to two questions:
- First, should there be any change in the law, at European Union level, that governs the liability of owners or operators of RPAS for third party damage?
Second, should there be any change to European Union regulation on obligations of owners or operators of RPAS to hold insurance against their liability for third party damage?

The short point is that in our opinion the answer to both questions is no. This is for the following reasons.

Liability Regime

- 13 There is at present no EU legislation providing for third party or surface damage liability for on-board piloted aircraft. In those circumstances it does not seem logical to legislate for RPAS in isolation from manned aircraft. It would obviously be a more significant process to try to tackle liability for all types of aircraft.

¹⁵ We understand that the Commission consulted, a few years ago, on precisely this issue in relation to the consequences of accidents involving manned aircraft. While we regret we do not have details of their conclusions no recommendation has been put forward to introduce European legislation on the subject.

- 14 While efforts have been made to create international conventions governing third party or surface damage liability, take-up of those conventions has been low. Forty-nine states have ratified the Rome Convention 1952 and one state has acceded to the Montreal General Risks Convention 2009. This suggests that international appetite for a liability regime is low. The reason usually cited for this is that the incidence of aircraft accidents causing surface casualties is low and there are few if any incidents of surface victims of a material accident going uncompensated. This, in turn, is because the operator community generally accepts strict liability and insures those liabilities in any event.
- 15 Nevertheless, whatever the position at international level, many Member States' domestic laws already provide for strict owner or operator liability for surface damage caused by on-board piloted aircraft, and such laws extend to cover RPAS. We are satisfied that is the case in, for instance, the UK, France, Germany, Italy and Sweden¹⁶.

The UK Position

- 16 Section 76(2) of the Civil Aviation Act 1982¹⁷ establishes a strict liability regime to cover the situation of surface damage caused by an "aircraft":
- (2) *... where material loss or damage is caused to any person or property on land or water by, or by a person in, or an article, animal or person falling from, an aircraft while in flight, taking off or landing, then unless the loss or damage was caused or contributed to by the negligence of the person by whom it was suffered, damages in respect of the loss or damage shall be recoverable without proof of negligence or intention or other cause of action, as if the loss or damage had been caused by the wilful act, neglect, or default of the owner of the aircraft.*

When the aircraft has been leased for more than fourteen days the liability passes to the lessee¹⁸.

- 17 While the 1982 Act does not provide a definition of "aircraft"¹⁹, and nor do the Chicago Convention 1944²⁰ or the Rome Convention 1952²¹, certain Annexes to the Chicago Convention adopt the definition used in Appendix A to the Paris Convention 1919:

¹⁶ The only EU country we have identified which has fault-based liability for the consequences of surface damage is the Netherlands.

¹⁷ 1982 c.16.

¹⁸ 1982 Act, section 76(4).

¹⁹ The Air Navigation Order 2009 SI 2009/3015 ("ANO") provides definitions of various types of aircraft (article 255), and a table of classification of aircraft (Schedule 3), but no generic definition of "aircraft".

²⁰ Which is the foundation of modern international law governing airworthiness and operational standards.

²¹ Which provides for a strict liability regime similar to s76(2) of the 1982 Act; indeed although the Rome Convention has not been ratified by the UK, it is based on the English law predecessor to s76(2).

*"Any machine that can derive support in the atmosphere from the reactions of the air"*²².

Many believe that that as between parties to the Convention (and the UK is a signatory) this definition is controlling and has become part of international customary law²³.

- 18 On that basis we submit that RPAS amount to "aircraft" for the purposes of the strict liability regime under the 1982 Act. Furthermore, we believe this conclusion would be widely accepted within Europe.

Manufacturers, Supply Chain and Pilots

- 19 The effect of this regime is that in the event of an accident causing loss or injury on the ground, liability is channelled through the owner or operator. That regime operates without prejudice to a victim's ability to bring action against any other party who may be responsible under ordinary principles of tort law, and the European Product Liability Directive²⁴ applies to manufacturers and importers of RPAS. It also operates without prejudice to the owner/operator's ability to seek recourse against any other party responsible²⁵. Accordingly, if an accident occurs due to a product defect, there are avenues of recourse against the manufacturer or importer.
- 20 There is a debate within the industry as to the liability faced by the "pilot" who may be physically (remotely) controlling the RPAS at the time of an accident. In our submission this is an issue which has already been faced in the manned aircraft context: the individual may have a liability under ordinary principles of law, but in practice, in the context of any commercial operation, the target will be the business undertaking the operation.
- 21 In that situation, we see one business model in particular where identifying the liable party may initially appear confusing. However we do not believe that any confusion survives close scrutiny. This where a business owns a fleet of RPAS and engages pilots on a contract basis for particular operations, whether for its own purposes or as a service to others. In our view the operation would be conducted for the business purposes of the owner and we see little doubt that they would be regarded as the operator – which aligns with their ownership interest. If the situation were different in that a business engaged an owner/operator to perform a service using his own RPAS, then the owner/operator would be the liable party for the purposes of a strict liability regime.

²² This definition now includes the phrase *"other than the reactions of the air against the earth's surface"* for the express purpose of excluding hovercraft from the definition. Machines such as missiles or satellites which fly without support derived from the reactions of the air are excluded from this definition.

²³ See, for instance Cheng in "The Law of International Air Transport"

²⁴ Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products

²⁵ 1982 Act, section 76(3).

- 22 We also note that the present UK regime requiring permissions for commercial operations will clearly identify the operator and also ensures that insurance is in place (see below).
- 23 For these reasons we do not consider that existing law need be modified to govern the liability of other parties in the supply and operational chain. There is a further reason, though, which is this. Many current RPAS operations take place pursuant to a contract between the RPAS operator and the owner of the land, facilities or installation over which the RPAS is flown – for instance agricultural or geophysical survey or inspection of oil installations²⁶. In this instance the parties to the contract should be at liberty to allocate the risk of surface damage as they see fit²⁷, or as may best be insurable. It seems to us almost inevitable that additional legislation seeking to prescribe the liabilities of the various participants would have to put those parties into various categories which would not reflect the range of ways in which businesses would wish to work together, and would thereby restrict commercial flexibility.

Liability – Closing Points

- 24 There are two final points on liability. The first is the question whether the increased availability of RPAS – particularly light RPAS in the hands of "hobbyists" – and the difference in the airworthiness, licensing and operational regime when compared to manned aircraft, means that there is a greater risk of injury to the innocent bystander. There is a fear of reckless behaviour by poorly trained operators flying RPAS around our cities with disregard for the safety of passers-by. In our view that is a matter for regulation of the quality of the equipment and of operational standards, rather than a reason for changing the law on liability which, as we say above, already protects the innocent bystander. We also note that the ANO provides an offence of reckless endangerment of any person or property²⁸.
- 25 Second, we referred earlier to the air-to-air risk. As matters stand the strict liability regime governs the liability of an aircraft owner/operator to third parties on the ground – i.e. those outside the sphere of aviation activity. It does not seem possible to prescribe, in a similar way, for strict liability as between two aircraft in flight and at present such issues are dealt with on the basis of fault. We do not see how it could be otherwise as between one manned and one unmanned aircraft, or as between two unmanned aircraft. We do not see that this presents a problem of uncompensated victims since passengers on commercial aircraft are always able to claim against the airline.
- 26 On this basis we conclude that existing law will generally provide perfectly adequately for liability for RPAS operations in the foreseeable future, and that the effort and complexity of introducing new legislation would be disproportionate to the benefit. In any event, though, we consider that the mischief is already addressed by existing European law on insurance requirements for aircraft operators.

²⁶ In contrast to almost all overflight by manned aircraft

²⁷ There is no restriction in the 1982 Act on the parties agreeing to modify the presumption under that Act.

²⁸ ANO article 138

Insurance Obligations

- 27 EU Regulation 785/2004²⁹ requires all RPAS operators, other than operators of model aircraft of less than 20kg MTOM³⁰, to hold liability insurance. As a result *any* commercial operation of RPAS under 500kg requires the minimum standard of SDR750,000 third party liability insurance³¹. Such insurance must be available whatever the basis on which liability arises.
- 28 That level of insurance is regarded as adequate by the Commission for manned aircraft and we do not believe it is relevant, to the innocent bystander, whether an aircraft involved in an accident has a pilot on board or not. We do note some disquiet among operators of very small vehicles about the size of the minimum threshold but observe that the amount is not great compared to liability awards in any case involving serious personal injury.
- 29 Member States are already obliged to ensure that their operators comply with the insurance obligation. We understand that, in the UK, the Civil Aviation Authority seeks proof of insurance when issuing operating permissions for *all* RPAS over 20kg MTOM and for any operations below that threshold when used for aerial work. A similar approach in other Member States should ensure that operators are, in fact, insured.
- 30 There is at present a clear concern that a number of RPAS operators do not hold insurance simply because they do not know about the requirement. That is however an issue for *enforcement* rather than for *amendment* of the legislation. What is apparent to us, though, is that the trade associations³² are well aware of the issue and draw it to the attention of their membership. So too do the model aircraft community, who frequently operate within clubs which themselves take out insurance for their members' benefit, even though Regulation 785/2004 does not apply to model aircraft below 20kg.
- 31 The one area where we can see benefit in clarifying Regulation 785/2004 is in the definition of "model" aircraft, particularly given the emergence of a sector of "hobby" operators of RPAS which are not in any sense scale representations of full size aircraft, which is where we understand this exception originates. We note proposals to define model aircraft in terms such as "used exclusively for air display,

²⁹ Regulation (EC) No 785/2004 of the European Parliament and of the Council of 21 April 2004 on insurance requirements for air carriers and aircraft operators.

³⁰ Maximum Take Off Mass – i.e. weight of the aerial vehicle.

³¹ Heavier vehicles require more third party insurance. SDR750,000 (Special Drawing Rights) equates to about €874,000 or £688,000 at current rates.

³² Such as ARPAS-UK, which represents the UK-based operators of light UAS, the French RPAS Association (FPDC), and UVS-International, a non-profit association registered in the Netherlands and operating out of offices in France, which was founded in 1995 and represents manufacturers of civil and military remotely piloted systems.

recreational, sport or competition activity"³³. Such terminology would have the effect of requiring all commercial operations to be insured, regardless of weight, and reduce significantly any confusion which currently exists as to the scope of the insurance obligation. We note, however, that any private operator of RPAS towards the top end of the 20kg exception – particularly if engaged in sporting operations – would still be well advised to have good insurance in place.

We would be happy to expand on our reasoning or answer any questions you may have if that would be helpful.

19 September 2014

³³ Draft Commission Implementing Regulation at EASA NPA 2014-09, p21

Bird and Bird LLP and John Heath Insurance Brokers LLP—Oral evidence (QQ 135 – 148)

Evidence Session No. 10

Heard in Public

Questions 135 - 148

MONDAY 10 NOVEMBER 2014

Members present

Baroness O’Cathain (Chairman)

Lord Brooke of Alverthorpe

Lord Clinton-Davis

Lord Cotter

Lord Fearn

Lord Haskel

Baroness Hooper

Lord Kakkar

Earl of Liverpool

Baroness Valentine

Examination of Witnesses

Simon Phippard, Bird and Bird LLP, and **Philip Heath**, John Heath Insurance Brokers LLP

Q135 The Chairman: Welcome, Mr Heath and Mr Phippard. Is that how you pronounce your name?

Simon Phippard: Correct.

The Chairman: Thank you very much. Before we start questioning the witnesses, please may I have the assurance that you have declared all your interests?

Simon Phippard: Yes.

The Chairman: The only one is that our SpAd knows Mr Phippard.

Simon Phippard: Yes.

The Chairman: Sorry, we have got into that sort of shorthand: a special adviser. You have already, I think, the list of interests that have been declared by Committee Members. These were declared orally by Members at the previous session on Monday 13 October and can be found in the transcripts. This is a formal evidence-taking session of the Committee, and a full shorthand note will be taken. This will be put on the public record in printed form, and on the parliamentary website. You will be sent a copy of the transcript and you will be able to revise it in terms of any minor errors. The session is on the record. It is being webcast live and will be subsequently accessible via the parliamentary webcast. You are welcome to submit written supplementary evidence after the session, if something suddenly grabs you and says, “I wish I had done that”. Witnesses and Members are reminded to speak up so that everyone will be able to hear to you properly. The microphones are quite sensitive so, if you make any off-the-cuff comment, that also will appear. Would you like to make any brief opening remarks? I am doing it alphabetically, so, Mr Heath?

Philip Heath: No, thank you, my Lady.

The Chairman: No? Mr Phippard?

Simon Phippard: No.

Q136 The Chairman: Thank you very much. That makes it nice and simple. The first session we have is on insurance, and I am asking the first question, which is that the Commission’s communication said that there was a need to update the framework for liability and insurance in aviation to incorporate the characteristics of RPAS. Do you agree or do you not agree with this? Mr Heath?

Philip Heath: Thank you. In our opinion, we think the rules do need some slight modification. We are basically dealing with identifiable operators here acting in a professional manner and, whilst we would agree that there ought to be rules in place regarding public liability and third-party risks, we are not so convinced that that needs to extend to include the war-risks cover, which is currently a requirement under EC 785/2004.

The Chairman: The war risks—w-a-r?

Philip Heath: Yes, that is the specific aviation liability.

The Chairman: I see, yes.

Philip Heath: The 785 regulation stems from conditions applied to manned aviation. We are not convinced that they are entirely appropriate for the sub-20kg category, which is what we deal with exclusively. We do not deal with any larger RPAS devices. We think that the aviation liability risk is very low. The cover is not widely available. We consider it to be disproportionately expensive to obtain that cover. In our view, there is a slight anomaly, where the regulations require currently a commercial operator of a sub-20kg RPAS to arrange that cover, yet a recreational user is not required to have that at all, the only difference there being the status of the operator, not the platform that they are using.

The Chairman: Would you, then, suggest that both should be covered or neither should?

Philip Heath: We consider that public liability or third-party cover should certainly be a requirement.

The Chairman: For the hobbyists as well?

Philip Heath: Yes. I believe so, yes. My expertise, however, is restricted, I should say, to the commercial sector. We do not get involved with recreational users at all.

The Chairman: I see.

Philip Heath: I believe that there should be public liability cover in force. I do not believe it needs to extend so far as to include the aviation war-risks liability. Further, the current level of cover that is required in the regulations is too low. It works out at around 750,000³⁴ currently; we believe it ought to be at least 2 million.

Q137 The Chairman: I see. Thank you very much for that. Mr Phippard?

Simon Phippard: My Lady, thank you. I reduce the question, essentially, to two elements: first, whether there should be a change to existing law on liability; and secondly, whether there should be a change to existing law on the insurance obligations. As to that, my view as a lawyer is that there is a well-defined framework in place to establish both. It works on the basis of channelling liability through the owner or operator of the vehicle in so far as there is a risk to a third party—let us say an innocent bystander, whether that be an individual on the ground, whether that be other property on the ground, or whether there is some sort of mid-air collision. The last eventuality, I think, has to turn on fault, but, as far as the first two categories are concerned, English law, I believe, is clear that there is strict liability channelled through the owner and operator, and then there is the insurance regime to back that up. There are, of course, other parties who may be in the supply chain and who could have an exposure, but they are covered by other general principles of law.

If I may, I did not find the Commission's assertion that the framework needs to be changed. It is absolutely right that the question should be analysed but my own view, in simple terms, is there is not a great need. Then, as we know, we have an insurance regime underlying it. I do not make any observation on Mr Heath's comments as to whether insurance premia are too high at the moment. That is something I hear.

The Chairman: We are just having a little problem here. The war-risks insurance cover: is that just that—war, terrorism, et cetera?

Simon Phippard: If I can refer to the regulation, which I do have to hand: it covers the usual categories. The regulation, for many years, has made plain it should include acts of war, terrorism, hijacking and acts of sabotage, which is a current requirement for all aircraft. My own view, for what it is worth, is that should stay, and I differ from Mr Heath in that.

The Chairman: Lord Brooke, you want a quick question.

Lord Brooke of Alverthorpe: Good afternoon, gentlemen. You say that you do not feel that the Commission's assertion is necessarily appropriate. Do you say that in the context of you

³⁴ In Special Drawing Rights.

speaking for British law or, indeed, speaking on behalf of the law of other countries that may be affected and that may not have the same kind of cover that we have and, therefore, that the Commission's assertion may be appropriate for others, if not necessarily for us?

Simon Phippard: My Lord, I believe the proposition that third-party damage is almost universally channelled through the owner or operator is generally true through the European Community. We did a straw poll around a number of our offices to ask that question; the only one that we found where there is not a strict liability regime is the Netherlands. However, absolutely, if there are territories where that is not the case, then I have nothing to add. I do not challenge the underlying proposition that there should be some clear liability. I believe, however, in the main, it is already provided for.

Q138 Lord Haskel: Mr Heath, you spoke about companies insuring RPAS of 20kg. Many years ago, I remember, when I was in business, we used to have what was called all-risks insurance, where the insurance company would just cover us for all of the various things that they felt we were at risk from. When you insure a company, are RPAS included in all risks or do you feel that there should be separate policies?

Philip Heath: Certainly, the insurers that we are working with would consider that an RPAS would have to be dealt with separately to standard commercial risks. The basics of the cover would be the same as what you are referring to in terms of damage to the device itself, any equipment that is attached to it, and the third-party liability, but it would not fall under the scope of a normal commercial policy.

Lord Haskel: It does, then, need something special.

Philip Heath: Correct.

Lord Kakkar: Can I just be clear that, if I have understood, the operator of an RPAS would have liability for anything that happened? For instance, let us say that one of these devices brought down a large civilian airliner—some accident occurred—and they were just a private user of one of these things as something for recreational activity. How would those affected by the bringing down of a civilian airliner be compensated under those circumstances, if the liability were found to be that the RPAS operator had just sent it up into the sky too close to an airport and planes were landing?

Simon Phippard: My Lord, it is obviously a worrying scenario. The answer to that is that there is no strict liability as between two operators of different aerial vehicles. I suspect, in the situation you outlined, assuming the commercial airliner was following its normal procedures and so on, on a fault-based analysis it would be shown to be in the clear. So far as the underlying mischief is concerned, which is compensation to passengers who have lost their lives, then liability is already channelled under the air-carrier's liability regime through the operator of the commercial aircraft. That is established Community as well as international law, so there would then have to be some sort of recourse battle whereby, having settled any passenger claims for the individuals on the commercial airliner, that airline—or, more probably, its insurers—would then have to go after someone else.

Lord Kakkar: Is that someone else obliged to carry any form of indemnity insurance at all?

Simon Phippard: The operator of an aircraft, which includes RPAS, in the European Community is obliged to carry insurance by reference to the weight of the platform.

Lord Kakkar: Lord Chairman, just to see this point through: a small, below-20kg aircraft could cause substantial damage I think we have heard on a previous occasion.

Simon Phippard: Below 500kg—and I am sure Mr Heath will correct me if my memory is wrong—the limit that the operator must carry is 750,000 special drawing rights, which I think is about €660,000, so that is not very much, and that is obviously an issue.

The Chairman: No, absolutely not, because you could bring down an aircraft with one of these.

Simon Phippard: You would have to talk to the air safety experts but, if it is a 500kg vehicle, obviously that is capable of a lot.

The Chairman: I see.

Q139 Baroness Hooper: Good afternoon. I think it was Mr Phippard who referred to possible third parties being involved in liability. Where would you place the retailer? We have heard in evidence so far that particularly RPAS sold for recreational use come perhaps with instructions as to how to use them, but not with any reference to responsibility or liability. Do you think that should be rectified? How does the retailer come into it?

Simon Phippard: The scheme of liability that we have at the moment is channelling everything through the operator, who may be everybody from, as I think I saw in your earlier evidence, a child in a park through to a fully commercial organisation with a highly qualified crew. It is, however, channelled through the operator. The liability of the supply chain, whether that be manufacturer, importer, retailer or somebody in between the shop who then sells it second-hand, that liability exists in any event: the Product Liability Directive, possibly the General Product Safety Directive, or the Toy Safety Directive may come into play, or national implementation. Those avenues exist both in terms of an operator who buys a defective product seeking recourse or, if a victim wanted to pursue it. The fact that, as a victim, your claim is channelled to the operator does not stop a victim saying, “I cannot find the operator” or “He is not any good, I am going to go and find this high-street, retail big name and I am going to try to establish my case”, but you do not have anything fixed, other than applies to normal product-supply law under English law or European law.

Q140 Lord Clinton-Davis: First of all, I ought to declare my interest as the Vice-President for life of BALPA. In their written evidence, BALPA have said, “The option of mandating insurance for both commercial and non-commercial RPAS operators should be considered”. Do you agree with that?

Philip Heath: Certainly. I would think that, in terms of the commercial sector, operators ought to have insurance in place. They have that obligation already and, judging by the enquiries that we are getting from prospective operators, there is an awareness amongst many that insurance is required, but there are also an equal number who are not aware that insurance is a legal obligation. In terms of the recreational user, I do not have a huge amount of expertise in that area. All I can say is that the devices that the recreational users

are using are very similar to the ones that we are being asked to cover for the commercial sector. I would say that the risks are very similar, therefore, for the recreational user, and it would be generally advisable that some insurance provision perhaps be in place for those operators.

Simon Phippard: That obligation is there. The EU Regulation 785 obliges every aircraft operator to have insurance. The exception is model aircraft—whatever model aircraft are—under 20kg. Mr Heath says—and has outlined the reasons why—the risk to the public is really no different if this 10kg vehicle is being flown in the park by a child or used for survey purposes.

Lord Clinton-Davis: What harm would there be in giving further consideration to the matter?

Simon Phippard: None whatsoever. The British Model Flying Association provides a level of insurance for its membership, and you get that insurance as soon as you become a member of it. A lot of the model community, as I understand it, work through that association, and are members of it and in those clubs. I have heard it said that they tend to operate on their own, in their own clearly defined areas and within the confines of a club, so there are responsible people around and all of that sort of thing. The hazard, however, if not the risk, is identical.

The Chairman: Exactly.

Q141 Lord Fearn: Could you tell me what information you use to calculate the insurance premiums paid by RPAS operators? While you are doing that, do you offer any no-claims bonuses to RPAS operators?

Philip Heath: To answer the second part of your question, we do not offer a no-claims bonus as such. We do monitor the claims experience for an individual operator and, if we found that an operator had had multiple claims, that would impact on the underwriting of that particular operator's policy. In terms of the criteria that we use, before any calculation of premium is carried out, we always look to ensure that the operator is on an approved training course—there are currently two within the UK, through EuroUSC or Resource Group—and, further, that they are aware that they have to complete that training course and obtain their permission to fly from the CAA³⁵. We will not get involved with any operator outside of that framework, and that existing framework underlies the underwriting of the policy from our perspective.

In terms of calculating the premium, we have simplified that down to just a few areas. We look at the total value of the equipment that is to be covered, the total flying hours that the operator expects to carry out during the course of a month, and the level of liability cover that is required. From that, we can then calculate a premium.

The Chairman: Have you anything to add to that, Mr Phippard?

Simon Phippard: I am afraid, as a mere lawyer, I do not know about insurance premia and calculating them to that level of detail.

³⁵ Civil Aviation Authority

Q142 Lord Brooke of Alverthorpe: Coming to accidents, or possible accidents, it can be difficult to identify the operators or responsible parties in RPAS crashes or other incidents. Some of the witnesses so far have suggested to us that mandatory licensing of RPAS operators should be introduced, or that RPAS should be fitted with traceable serial numbers or transponders. What are your views on that? This is a question that relates to all RPAS—the small ones below 20kg as well as the ones above.

Philip Heath: My answer can relate only to the sub-20kg; that is the only sector that we deal with. We have not yet found an issue regarding identifying responsible parties, I have to say. Certainly, in all the incidents that have been reported to us, we have been able to identify the operator that is involved, mainly because it is the operator who has reported the incident to us. We recognise that, as the number of operators increases, that may well be an issue for the future. In terms of mandatory licensing, the current framework requires operators to obtain their permission to fly, they have to submit their ops manual to the CAA and, on there, they have to detail the individual RPAS that they propose to operate in the UK. Those details will include the serial number of that individual piece of equipment.

Whilst we would agree that mandatory licensing would be a good idea, we think that perhaps the existing arrangements would already cover the area of concern, which is identifying the individual piece of equipment and who that belongs to. Traceable serial numbers are a positive but perhaps already dealt with. We have considered self-build RPAS devices. They may present an issue, perhaps, because they are not produced by a sole manufacturer. Some operators are purchasing an airframe, a gimbal to hold a camera, and other components, and putting all these together, so that there is not one single serial number that is applied to that device. Our thoughts are, perhaps, either the RPAS operator produces a serial number for that completed device that is included when they submit it to the CAA, or that the CAA apply a number to that device when it is registered with them.

Simon Phippard: May I ask, my Lord, if the question is directed to commercial operation or including recreational operation—ie, all RPAS?

Lord Brooke of Alverthorpe: Including recreational.

Simon Phippard: I think, at a practical level, that is where the difficulty is likely to arise, in that the obligation to apply to the Civil Aviation Authority for a permission is applicable to commercial activity. I am afraid I have no sense of the numbers but, at the moment, a few hundred—400 or 500 or something—have been authorised by the Civil Aviation Authority. I imagine the private individuals with hobby drones are numbered in their thousands already, so there is an issue of the genie being out of the bottle as to how far you require either registration or licensing on the one hand, or an equipment-fit answer such as transponders. I cannot speak for the technical use of a transponder, but it would seem to me that there are some of those vehicles that are so obviously purely designed as toys that a licensing or an onerous equipment fit would be unrealistic, but I am not in a position to judge where a line should be drawn for that.

Lord Brooke of Alverthorpe: That is the problem: drawing the line between what is a toy and what is something that is potentially quite dangerous. We were in Brussels last week,

and concern was being expressed about problems that they had in France, with drones buzzing nuclear sites, and they had been unable to trace who was doing it.

Simon Phippard: It is that inability to track. One can envisage the public irritation situation. There is a video on YouTube of one being flown in a shopping centre.

Lord Brooke of Alverthorpe: They are, of course, now literally being produced in thousands and thousands in China.

Simon Phippard: Absolutely, yes.

Lord Brooke of Alverthorpe: We are looking, really, to see if we can find some ideas about whether or not it is a real problem and, if so, the ways in which solutions can be found. If there is anything you can say to help us in that regard, it would be very much welcome.

The Chairman: If you are thinking about it on your way home and you have some bright ideas, do you think you could let us know?

Simon Phippard: Of course.

The Chairman: Thank you.

Q143 Baroness Valentine: This somewhat touches on some of the things you have already said, but there are concerns about the airworthiness of some RPAS, particularly those at the lighter end of the spectrum, say under 7kg. Is the existing EU legislation sufficient to deal with RPAS or is something more specific required? For example, could toy-like RPAS be required to carry the CE marking³⁶, thereby reducing the regulatory burden?

Simon Phippard: Thank you, my Lady. It is a question that really goes to aeronautical regulation rather than to the liability and insurance aspects, which was really the subject matter of my submission. Plainly, if the Toy Safety Directive and the marking obligations are already applicable—and, as I understand it, that is for products designed for use by children under 14—then that regime is already in place. It may be that there is some mechanism there that might help to draw the line between toys that we are satisfied do not cause a significant hazard and others that are potentially more hazardous or a greater irritant to society. I do not think I can help more than that. The fact is that those light vehicles are largely under the radar as far as the CAA-approval process is concerned when they are being used as toys. If they are being used for commercial purposes, then, as long as the operator knows of the requirement, they should have gone through the permission process that Mr Heath has already described.

The Chairman: We are doing this inquiry into RPAS and we are a European scrutiny committee—and the European Union are worried about this on the one hand, but it is jobs and competitiveness on the other. It certainly seems that, since we started this, the whole thing has got legs. There is so much press about it and so many stories of where you can get them and how they are not regulated. Also, they are coming down in price as we sit. I saw an ad for one at £49 yesterday, and we thought they were £300 and below. Also, with

³⁶ CE mark is a mandatory conformity marking for certain products sold within the European Economic Area since 1986.

Christmas coming up, we really do have a problem, and not everybody who is going to get one of these things is going to be responsible. The European Union would like to do this, but we just have to try to be one step ahead.

Philip Heath: I have a few comments regarding airworthiness, if that is okay.

The Chairman: Yes, please.

Philip Heath: Currently, there is no strict airworthiness requirement for commercially operated RPAS in the sub-20kg category. The closest that you are going to get to that is an implied obligation under Article 166 that requires the operator to ensure that it is safe to carry out the flight before doing so. Our view is that this relies on the competence of the individual operator to make that assessment and, currently, there is no mandatory training to show how an operator should be carrying out that assessment. Most of the operators that we are seeing are photographers. They are not engineers and they do not possess scientific or engineering knowledge, or certainly knowledge of aircraft specifically, and we think that there is a gap there, where it is relying on the operator to carry out that assessment without any prior training. Approximately 10% of our operators have been involved in an incident that could be related to airworthiness and, in our view, anything that can reduce the risk of an incident has to be welcomed. Insurers would certainly be keen on that, but any solution would have to be viable both in terms of cost and general commercial viability.

There are several issues regarding airworthiness in general that we think would need to be addressed: how often the assessment was to be carried out; who would carry out that assessment; the cost of having it done, bearing in mind that most of these are one-man-band operations, so significant cost here could be a burden to them being in business at all; and whether an airworthiness check or assessment would have to be carried out following changes to the aircraft or following an accident or damage. I have made some notes regarding the CE marking: we feel it, perhaps, would be relevant only to a device that had been manufactured as an entire unit. Where there would be a difficulty is how that could be applied to a self-build RPAS.

Further, I would like to add that, since this relates to the issue of safety—and I have referred to training already—there is currently no mandatory flight training for a commercial RPAS operator. We believe that, again, as long as costs could be kept proportionate, that is something that ought to be considered as an addition to the current training regime that is in place. Currently, an operator will sit a ground school, there would then be a gap of as much as three months, and then they would carry out the flight test. There is no obligation to have any flight training at all.

The Chairman: Is this for commercial purposes?

Philip Heath: I am talking only about commercial, yes. We think that it would be preferable to have some form of flight training as an obligation. In general terms, 5% of our operators have had an incident that we can attribute to pilot error. Generally, incidents occur within the first 12 months, which, to us, indicates that inexperience is, perhaps, a key factor.

Q144 The Chairman: Quite, yes. Do you have any general statistics on claims or insurance? Is this being fed into the decisions about the cost of insurance?

Philip Heath: Yes, we do. We maintain fairly detailed claims records for individual operators. We note down the details regarding the RPAS themselves, so we can look at trends for individual makes and models. We also keep track of the circumstances of the incident.

The Chairman: Would you be able to share them with us, with names redacted?

Philip Heath: Yes. As long as it was not, if I might say, going to affect us commercially, we would be more than willing to share some data with you.

The Chairman: Statistics saying “x number of claims are above this” or whatever would be very useful. It also occurs to me there is a regime that you have for young people who decide to drive a car: driving tests and driving schools.

Philip Heath: Yes, this was our thought as well.

The Chairman: It is a big area. Are there any more comments on that particular issue?

Simon Phippard: No, thank you.

Q145 Lord Cotter: We certainly seem to be coming forward with developing situations and problems to come along the line, but can I specifically say to you: the resource implications for EU agencies and national authorities of integrating RPAS into non-segregated airspace seem to be quite large, particularly in terms of enforcing compliance by small RPAS with standards of safety, insurance and data protection. What is your view on these particular three issues?

Philip Heath: I do not really have a huge amount to add on this particular point, unfortunately. We are aware that the resources of the UK CAA are limited. They have a small but very dedicated team, as we understand. Beyond outsourcing some of that ever-increasing responsibility, I am afraid that we do not really have any further suggestions to make, unfortunately.

Simon Phippard: I do not think I am in a position to add objectively, other than to echo what Mr Heath says about potentially a very large volume of activity where the law or the regulation need to be enforced. It is not necessarily about changing the law, but where there is an enforcement requirement and it is quite a difficult one to manage. The Civil Aviation Authority’s performance has been very well received in terms of enabling the commercial sector to thrive, but their resources to manage, in particular, the worry or the problem that you identified, Lord Chairman, in terms of everybody else who does not have to come and apply to them every day for a permission, that seems to be a real challenge. I am afraid I cannot add much beyond that.

Lord Cotter: Looking at it, it is particularly an area of wider concern. Do you see the police, for example, possibly enforcing compliance in some respects, or how is it going to pan out?

Simon Phippard: The analogy, if I may, that I have been trying to find as to whether the irresponsible youth in a shopping centre is a major problem. There are two points. The first is: where does that sit in terms of a threat to society compared with, say, cyclists? I say this as a cyclist myself. As a pedestrian, I dodge cyclists almost every day, unfortunately. That is in central London, so there are a lot of them around. Where does it sit, then, in terms of the hazard? The other point is that there is plenty of existing law in the Air Navigation Order, whereby reckless endangerment by means of an aircraft is a criminal offence. It already is under the Air Navigation Order, so if you have your shopping-centre scenario of somebody flying the vehicle around and irritating people, first, it is likely to be on CCTV, and secondly, if you have a policeman or a security guard around, they know that Article 137 or 138—I can never remember which—of the Air Navigation Order makes it a criminal offence if they are recklessly endangering any person. You can take action. Every policeman, I suggest, should know those provisions. That may be a route. It may feel slightly heavy-handed but it might be a means to start putting the word about.

The Chairman: May I just read something? EuroUSC said it has been difficult for regulators to grasp the sheer scale of the RPAS market. “Regulators of the past are set up to deal with a relatively small number of relatively large systems operating from a relatively small number of locations, with relatively low volumes of activity. Regulators talk in 100s and 1,000s not in 100,000s and millions. Since the RPAS world will put aviation in the hands of every business on the planet the nature of regulation in this area has to change, otherwise ‘safety’ will not be achieved in an acceptable way for acceptance by the public.” Would you agree or disagree?

Simon Phippard: I have little perception, Lord Chairman, on the numbers that we are going to be looking at, but one hears that the Chinese are producing tens of thousands of the vehicles a month.

The Chairman: It is a bit scary, is it not?

Simon Phippard: It does sound a bit scary, but everything I hear is that that change of orders of magnitude between regulator and the activity that is being regulated absolutely seems to be moving that way. That is, however, what I hear.

The Chairman: Yes, quite. Thank you.

Q146 Earl of Liverpool: This is to Mr Heath, probably. I wonder if you could tell us to what extent you believe the insurance industry is prepared to deal with an RPAS disaster. I am thinking of such things as injuries to members of the public all the way through to a terrorist attack.

Philip Heath: We are currently working with one of the UK’s largest insurers exclusively with our facility. They have substantial UK and international resources and are well accustomed to dealing with personal-injury-related claims and large-scale disasters. We have absolutely no concerns whatsoever regarding their ability to deal with the types of situations that you are referring to in your question.

Simon Phippard: If I may add, my Lord, certainly my perception, having worked very closely with the insurance industry in the manned-aviation context over many years and dealing

with air accidents, is that the aviation-insurance sector—and I do not know if Mr Heath was referring to the composite insurers and major household names or the specific aviation-insurance market—is absolutely set up to handle those sorts of issues and knows exactly what to do if something goes wrong. The challenge here, perhaps, might be if the scenario were to come to pass of a major air accident caused by a lightweight vehicle that only has 1 million special drawing rights of cover or something. There is not enough insurance, ultimately, for it all to come back through that operator, but the airline would handle the issue in the first place, as well as their insurers, and there would be sufficient cover at least for the passenger claims to be resolved.

Earl of Liverpool: I wonder if I could come back to an answer to a question you gave earlier, in which you said 12% of operators who are insured have reported incidents. Was that correct?

Philip Heath: I mentioned 10% regarding having had an incident that could have been prevented by an airworthiness assessment.

Earl of Liverpool: I just wondered whether, at your fingertips, you could tell the Committee what the worst claim is that has been submitted through any cover that you have been responsible for underwriting or passed through to a company to underwrite.

Philip Heath: The worst claim in terms of value? Just bear with me one second. Off the top of my head, about £40,000.

Earl of Liverpool: Is it possible to say whether that was a personal liability claim for injuries or damage to a structure or something?

Philip Heath: All the claims that have been submitted to us to date have been property-related claims. There has not been a single public liability claim to date.

The Chairman: Very interesting. Thank you very much.

Q147 Lord Clinton-Davis: My question is about the future. How do you see insurance regulation changing as the technology develops?

Simon Phippard: Do you want to go first?

Philip Heath: Yes, I will try that one first. The question, I believe, relates to the fully autonomous RPAS devices. Our experience is, unfortunately, limited to the sub-20kg RPAS, which, by definition, precludes the autonomous devices, so I am afraid we do not have a huge amount of input to assist in this area. We can foresee a greater exposure, perhaps, for insurers where it is a fully autonomous device. Perhaps more stringent airworthiness regulations might be required, but that would require a fuller understanding of the technology that was available, which is beyond our expertise, unfortunately.

Simon Phippard: The only thing I was going to add is this: that I suspect autonomy in the sense of a system making up its mind about what it is going to do and when is not quite the question. It is really directed to fully automated systems, whereby the vehicle can start doing something and go flying without any human intervention, because, let us say, a

customer has placed an order over a web-based order system and has pressed “aerial delivery”. This is happening in the North Sea, I think, for delivering pharmaceuticals to an island off the coast of Germany. Whether it will come in major cities is some way away. The only observation I can make, my Lord, as far as increasing automation is concerned is that the air-transport industry has seen increasing levels of automation generally, because it has been introduced as a means that, generally, has increased safety. All kinds of equipment have been incorporated on manned aircraft to increase the ability of the pilot to operate the aircraft safely, so, if one can achieve that, then that ought to be a good thing and, therefore, that ought to be a good thing for insurers. I am afraid, however, that I am reasoning from first principles rather than offering something on which I can really offer a legal opinion.

Lord Clinton-Davis: Do you think that sufficient attention is being given to this issue? As the industry develops, things will change, inevitably, will they not?

Philip Heath: Yes, I am sure they will, my Lord, but, unfortunately, our underwriting is strictly limited to remotely piloted devices, so I really cannot assist you, I am afraid, with the autonomous ones.

Simon Phippard: The activity that we are seeing is generally involving those businesses that are thinking very carefully about exactly these issues in terms of producing a high-quality product that they can bring to market and operate or sell, and the operators who want to operate them responsibly. I am afraid I am simply not in a position to judge what is going on out in the rest of the world.

The Chairman: There is just a comment from Paul Cremin at the Department for Transport, who said that “if industry truly believes that this is a revolution in the aviation industry, it has to step up to the mark as well”, and I guess all the ancillary services likewise, like insurance and regulations, et cetera.

Simon Phippard: Absolutely.

Q148 The Chairman: Who is liable for an accident caused by an RPAS that has been taken over by a terrorist? Do we really need to ask that sort of question? I suppose so. “A criminal”—that would be better. What would happen? Who would be liable?

Simon Phippard: Liability may still be challenged through the owner or operator if it is strict surface damage. In the manned-aviation context, there is a new international convention, which has yet to receive sufficient ratifications to come into force, whereby the surface-damage liability of the manned aircraft that is, as you put it, taken over by terrorists and thereby involved in a terrorist incident would be channelled through the operator. That liability would be capped but there would be a fund created to make good the liabilities. That convention does not seem to have huge take-up among the international community at the moment, but that is something that was a result of 9/11.

The Chairman: Yes, indeed. Thank you very much for being such great witnesses. Any other questions?

Lord Brooke of Alverthorpe: My Lord Chairman, just to follow up on the last one, what happens if somebody puts a drone into an electricity substation and cuts electricity to a

community—stops the electricity in a hospital and stops operations, and stops traffic lights and people have accidents? Who would pick up the tabs?

The Chairman: It is like a suicide bomber, is it not?

Simon Phippard: If you could find the operator, that is one thing, but if you cannot find the operator, that, I think, is a public threat issue. Obviously, we have emergency responses designed to mitigate the immediate damage, so that power can be restored and hospitals can keep going.

Lord Brooke of Alverthorpe: Yes, but, at the end of the day, if damage that costs money arises, like when we had the riots—damage was done and compensation was claimed in certain circumstances—is there anything to cover these kinds of circumstances I am describing?

Philip Heath: The operator's public liability would be called upon, but it comes back to the point I was making at the outset: the current minimum requirement is, in our opinion, too low. It needs to be much higher.

Lord Brooke of Alverthorpe: Was that 750,000?

Philip Heath: Yes, about 700,000, it works out at³⁷. We do not offer cover below 2 million. Generally, we are seeing operators asking for five and, in some cases, 10. It is an issue.

The Chairman: Are there any questions you think we should have asked you that we did not?

Simon Phippard: I do not think so.

The Chairman: If there are, would you tell us what they are, and then answer them?

Philip Heath: You have covered it fairly comprehensively.

The Chairman: Thank you very much. You have certainly increased our information and knowledge base, and we are most grateful to you for giving up your time. Thank you.

³⁷ In GB Pounds Sterling.

Blue Bear Systems Research Ltd—Written evidence (RPA0023)

Question	Comment	Response
1	<p>Do you agree with the priorities identified in the European Commission’s Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?</p>	<p>In principle Blue Bear are in agreement with the priorities identified;</p> <ul style="list-style-type: none"> • Safe operation into non-segregated airspace: the regulatory framework • Safe operation into non-segregated airspace: enabling technologies • Ensure security of RPAS operations • Protect citizens' fundamental rights • Guarantee third party liability and insurance • Support market development and European industries <p>Safety is the ultimate priority and successful RPAS operators have worked hard with their respective national bodies and other Member States to develop, achieve and maintain appropriate standards.</p> <p>The regulatory framework must reflect the variety of platforms in operation and the type of operation they conduct; it is this variety which requires an appropriate equivalent level of safety in comparison to manned aviation.</p> <p>Blue Bear agree that the restricted scope of EASA competence to unmanned aircraft above 150 kg on the basis of traditional airworthiness considerations should be reconsidered. Current activities in manned aviation with the deregulation of single seat deregulated microlights (SSDR) from the UK CAA would seem to be at odds with this arbitrary cut off point given that the MTOM of SSDR can now be up to 300kg.</p> <p>EASA must work with EUROCAE to develop <u>appropriate</u> standards.</p> <p>Operation in non-segregated airspace will only be possible if technology which enables integration with existing manned aviation is accepted by all stakeholders.</p>

<p>2</p>	<p>What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?</p>	<p>Regulation at national level has undoubtedly allowed the UK and other member states to progress their respective indigenous RPAS industries.</p> <p>What is evident is that commonality and equivalence between states needs more alignment to foster international collaboration without significant increase in cost and loss of technological momentum and innovation.</p> <p>Barrier to entry due to regulatory issues is a significant issue for Blue Bear and others who offer products and services in this field.</p> <p>The EU's actions to date and those proposed for future implementation are in general to be applauded, however an opportunity for greater alignment particularly with FAA regulation should not be missed – however this will require non EU states buy in as well as USA / EU cooperation.</p>
<p>3</p>	<p>In which new or innovative ways do you think RPAS will be used in the future?</p>	<p>There is in effect no limit to the application of RPAS in commercial, military and civilian operations and we are already seeing the potential of point to point delivery services from small unmanned systems, this will undoubtedly expand to aid delivery and disaster relief.</p> <p>Repetitive tasks such as survey and environmental monitoring will require extensive use of the complete range of RPAS systems.</p>
<p>4</p>	<p>What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?</p>	<p>Regulation and failure to recognise the emergence of other countries / territories that may make it easier for their companies to take command of the market could significantly affect the predictions.</p> <p>Blue Bear agree that the growth potential will be possible if an enabling legal framework is established at the European level, however this must not be to the detriment of Member States if at a national level they are already growing their industries at similar or increased rates.</p>

<p>5</p>	<p>Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)</p>	<p>Blue Bear believe that it is inevitable that there will be an impact on some Member States; Developed competent member states such as the UK are likely to take advantage of a harmonised approach to regulation, but this harmonised approach must take into consideration previous bureaucratic issues to minimise the cost and time required for implementation without damaging the emerging technologies that are being developed for its benefit.</p>
<p>6</p>	<p>Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?</p>	<p>Data protection is vital to protecting people’s fundamental rights and operators of RPAS systems must not be able to exploit any data recorded through the use an operation of an RPAS without the permission or knowledge of any third party that may be adversely affected or otherwise by it.</p> <p>Operators must be held liable and meet their financial obligations to third parties.</p> <p>Insurance regimes must be appropriate to the application and platform size and greater flexibility must be offered by underwriters than is currently available. The minimum amount of insurance threshold applied to manned aviation (500kg) has inevitably set the premiums offered by the aviation insurance market for RPAS operations even though the majority of the platforms are less than a tenth of this.</p> <p>There is a risk that RPAS operators are electing to self-insure the loss or damage to their RPAS platforms and ultimately this will increase overall industry costs rather than the risk being shared throughout.</p>

7	Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?	<p>Blue Bear believe that a balance must be struck between all aspects of the implementation of regulation and operation of RPAS.</p> <p>Airspace regulatory framework must be able to accommodate RPAS, but Industry and Regulation must be able to show that airworthiness is appropriate.</p> <p>Implementing excessive airworthiness requirements to small and lightweight RPAS is not seen as the best use of funding, development of appropriate technologies to allow integration of RPAS into non segregated airspace is a key funding area.</p>
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19 September 2014

Jay Bregman—Written evidence (RPA0049)

**HOUSE OF LORDS
SELECT COMMITTEE ON THE EUROPEAN UNION
Sub-Committee B
Internal Market, Infrastructure and Employment
WRITTEN EVIDENCE SUBMITTED BY JAY BREGMAN ON CIVIL USE OF REMOTELY PILOTED
AIRCRAFT (RPAS) IN THE EU
JANUARY 2015**

INTRODUCING JAY BREGMAN

My name is Jay Bregman. I have started two businesses in the UK, eCourier and Hailo. Collectively they employ over two hundred people and have raised over a hundred million dollars in equity capital.

By way of background, I have an undergraduate degree in Philosophy from Dartmouth College and an MSc in Media & Communications Regulation and Policy from the London School of Economics.

1. Regarding the civil use of RPAS.

I became interested in RPAS a year ago when I was introduced to them by the CEO of one of the major manufacturers. I own several RPAS and have flown them (I believe in compliance) around Europe and the United States.

My interest began as a hobby, but I quickly sensed the commercial possibilities they could bring. I was surprised when I learned that their commercial use was effectively banned in the United States. I was also surprised at how fragmented the laws on commercial use were throughout the EU. I believe that the development of a significant commercial market for RPAS depends on regulation that is as predictable, homogenous, and lightweight as possible.

2. On regulating RPAS.

I view RPAS as a nascent platform - analogous to the Internet in the early 1990s. Assessing what specific RPA commercial applications will ultimately be the largest is as difficult a challenge as it would have been to answer that question with regard to Internet companies at that time. The market has a lot of innovation required to get there and I believe the primary focus of legislation should be finding ways of preserving this while protecting the public against the harm arising from misuse of RPAS, whether intentional or unintentional.

I do agree that we are witnessing the "Wild West" of RPA platform development as many labelled that period in the Internet. This is because, in both cases, trust is scarce. In the case

of the Internet, trust did not evolve through traditional laws. Rather, trust evolved through code - shared protocols developed and adopted by the industry (Verisign, Certificates, HTTPS, etc). This led to Professor Lawrence Lessig's famous observation "code is law". I believe that the present situation as regards RPA regulation should be allowed to evolve on a similar course.

It would have been tempting in the early 1990s to attempt to address the Internet problems of the day through traditional legislation. This might have led to ever-increasing prohibitions against identity theft, credit card fraud, and misrepresentation. But it would not have led to Verisign and Thawte. Likewise, I do not believe that traditional legislation should attempt to solve the problem entirely. It should instead be focused on providing a safe means for the market to develop innovations to regulate itself. These are not far off. In terms of impact, they will be felt much sooner than the impact of any other form of legislation.

3. On how regulation could work in the future.

One such company is the one I am now building. Like eCourier and Hailo, it is UK- registered. We are working with RPA manufacturers, academics in geospatial studies, and world-class engineers to develop trust protocols for the emerging RPA platform. This includes a global registry of identity for robots (not limited to RPAS) as well as a registry for activities. The latter includes not only a register of historic actions but also a real-time rules engine which will be used to help manufacturers programmatically prevent RPAS from flying where they should not, anywhere in the world.

While this system will be maintained for the public good, I do not believe it should be a system run as a public utility (as other witnesses appearing before the Committee as part of this Inquiry have recommended). This is because the underlying technology and the regulatory principles are evolving faster than the systems we currently have in place to regulate them. Only last week, *The Guardian* ("Photojournalist arrested after filming with Drone near Gatwick Airport", 31 December 2014) reported that a trained drone pilot and photojournalist—ho operates with the approval of the regulator, the Civil Aviation Authority (the CAA)—as arrested by police while filming near Gatwick Airport. This, and other recent cases, demonstrates the confusion that exists regarding both regulation and enforcement. I believe that as time goes on and innovation in robotics expands, the gap between what must be regulated in code and what can be regulated in traditional law will widen. That said, I believe there may come a point where it is possible and advisable to legislate standards which require the use of these protocols in order to be compliant.

RPAS are significant from a regulatory perspective because they are the first robots which have gained widespread marketplace usage. They are robots because they contain on-board autopilots which not only make certain forms such as quad-copters possible, but also because they use GPS and other sensors to make the full capabilities of the RPAS (good and bad) accessible to the layperson. They are as easy to fly as a computer game. In addition, they possess powerful automation capabilities which, I believe, will ultimately change the conception of "flying" to something much more akin to "programming" flight plans with the

RPAS automatically carrying out the instructions. RPAS will be followed by other common robots e.g. self-driving cars, in-home automation devices, and eventually humanoid robots acting semi or fully autonomously.

For this reason, I suggest that this body consider recommending that the UK establish a Robotics Commission to follow and advise government and civil service on issues which relate to robots of all kinds, known and unknown. This would consist of officials from relevant departments (e.g. the CAA) as well as experts in the field of law and robotics. It could provide a clearinghouse for the new ethical and legal questions which will inevitably arise as this technology develops. For a more detailed overview of the composition, mandate, and impact such a body might have, see Professor Ryan Calo's Brookings Institute Paper "The Case for a Federal Robotics Commission"

<<http://www.brookings.edu/research/reports2/2014/09/case-for-federal-robotics-commission>>. Although the article is written in an American context, having spoken to Professor Calo, he confirms the potential could be applied to the UK and other countries.

6 January 2015

The British Airline Pilots Association (BALPA)—Written evidence (RPA0031)

CALL FOR EVIDENCE ON THE CIVIL USE OF REMOTELY PILOTED AIRCRAFT SYSTEMS (RPAS) IN THE EU

Question 1: Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

BALPA Response: We broadly agree with the priorities identified. Areas we would like to see prioritised include the standards of training and competency that RPAS operators would need to demonstrate before being issued with a licence to operate. The required training for commercial operations using small RPAS (less than 20kg) currently consists of a three day groundschool course and a short flying demonstration. Whilst this may or may not be satisfactory for small RPAS, as the size, range and complexity of the systems increase then more training/testing will be required. We also believe that the mandating of insurance (not currently required in order to obtain a CAA Permission) should be introduced and, of great import is security. This includes security of the datalink connection and, with the inevitable introduction of beyond visual line of sight operations, the ground based station. The latter is vital because, unlike a cockpit in an aircraft, a ground based station could be vulnerable to attack using heavy lifting equipment and multiple people. Ultimately we want RPAS to be safely integrated into the airspace. This will necessitate addressing many issues including certification, training, medical requirements and licencing.

Question 2: What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

BALPA Response: The advantage of regulating at a national level is that it should be much quicker to implement changes, and this is fine whilst the majority of RPAS are small and do not travel far. However, as the size and range of these machines increase, as will inevitably happen, a more joined up approach will be required. When RPAS start long range, international flights there will need to be a set of common rules administered by ICAO but until that time formulating regulations at an EU level would be sensible as they could be harmonised with the aims of the Single European Sky Air Traffic Management Research (SESAR) project. We are fortunate in the UK as the CAA is taking an active role in this area and have been very open to suggestions.

Question3: In which new or innovative ways do you think RPAS will be used in the future?

BALPA Response: RPAS are already being used in many innovative ways including the obvious ones such as photography, pipe line inspection and filming but they are also being used in less obvious ways. For example the police use them to peer into hijacked aircraft windows, Air Accident Investigators use them to gain aerial views of crash sites and oil

companies use them to inspect flare stacks on oil rigs which would otherwise involve a very costly shutdown. The potential of RPAS, we believe, is huge. Who would have predicted the course that mobile phones have taken? Currently BALPA sees three streams of potential development for RPAS:

- More and more people will realise that they can complete tasks more efficiently and possibly more safely by using RPAS. This could be the small scale operators, some of which are mentioned above but could equally be large organisations such as Google or Amazon using them to deliver parcels. The use in emergency situations will increase; nuclear disasters, search and rescue and fire assessment would be some examples of this.
- RPAS may be used as the vehicle to transport other current or emerging technologies. For example a system may be used to carry robots to fix infrastructure in inaccessible/dangerous places. Being very stable they could be used for suspending light weight screens in the air onto which could be projected films or advertising. We see them being used to transport time critical items such as urgent medical equipment.
- Could RPAS be used in the commercial air transport sector? This is the area of most interest to BALPA. We believe that in the distant future we may well see passenger carrying remotely piloted aircraft, but this is fraught with difficulties. Putting aside the inevitable resistance of the public to fly on a machine where the person who holds their life in their hands does not actually sit alongside them, the financial side of it does not currently add up. If a manufacturer has to produce an aircraft that has all the life support infrastructure required for passengers and cabin crew there would be little point going to the extra expense of building a secure ground base station for the pilots; they may as well be on the aircraft. So the most obvious potential is in the cargo sector. An aircraft that does not require the life support equipment, does not require pressurisation (the air-conditioning packs are not only heavy but also take power from the engines to operate) and does therefore not have need of all the equipment that pilots require (catering, seating, windows and even toilets) will be a lighter, cheaper to run, more efficient and easier to build aircraft than its manned equivalent, but not necessarily safer. In reality we do not know what RPAS will be used for. Ultimately it may be that these aircraft have no people on board to worry about but the safety of the people and property that they overfly needs to be considered. We feel that there should be full involvement and consultation with all stakeholders and communities affected before large RPAS start flying in unregulated airspace.

Question 4: What is your view of the estimate by the AeroSpace and Defence Industries association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

BALPA Response: This statement may well be accurate. If we use an analogy, the development and success of the iPad has not been led by the product itself, but by the Apps that developers have come up with. In the aviation sector, the companies that design the RPAS will not concentrate on the applications but instead leave that to others. Two factors that may inhibit growth will be inappropriate regulation and lack of interoperability; if RPAS can use existing technologies to communicate such as Wi-Fi and geo-fencing, speed of adoption will increase. One example of an issue is the fact that currently the engines/motors on most RPAS face reliability issues. If we start seeing injuries caused by mechanical failures or inappropriate use then public perception may well turn against these machines which in turn could delay adoption. Two large aircraft manufactures have openly stated that there is going to be a critical shortage of both pilots and airframes over the next thirty years. If a European manufacturer decides that RPAS is the way to address both of these issues then the jobs estimate could actually be conservative. There are certain technical difficulties that need to be overcome before we see significant growth, such as Sense and Avoid.

Question 5: Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

BALPA Response: This is one area that the BALPA RPAS Working Group will be looking at. If EASA is to take a leading role in this then we would need to see that it is correctly resourced.

Question 6: Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

BALPA Response: It is the privacy issue that has, until recently, effectively stalled the adoption of RPAS in the USA. The public in the UK do not seem to be as concerned about having more CCTV cameras than other countries but if data starts to be collected on individuals using RPAS this may well become a serious issue. There may be a need to introduce specific privacy regulations for RPAS as the majority of rules will have been written when methods of collecting information on people did not include close aerial surveillance. With respect to liability and insurance regimes, as mentioned earlier, currently in the UK an RPAS operator does not have to prove they are insured before being granted a permission to operate commercially by the CAA. Even a small RPAS could cause serious injury, or even death, if control of it is lost. It is not just the weight of the device that could cause injury (imagine being hit on the head by a frozen chicken dropped from fifty feet), they are, of course, equipped with numerous spinning blades.

The option of mandating insurance for both commercial and non-commercial RPAS operations should be considered.

Question 7: Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

BALPA Response: There are a number of equally important areas that will require significant R&D input. Getting the regulatory framework right is important but resources will also be required to ensure that the policies are enforced. This will not be easy with the huge numbers of small RPAS coming into use both privately and commercially. We believe that light touch regulation (which is being adopted more and more in other aviation areas) or self-regulation will struggle. Airworthiness is another important area; as mentioned before reliability of the motors on a lot of RPAS is very poor and once a motor on a quadcopter has stopped the machine will crash, regardless of what is underneath it. The security of the datalink between the aircraft and the controller needs to be more secure; an incident in Australia, which resulted in injury, was blamed (albeit by the operator) on the link to the small quadcopter being "hijacked".

SUMMARY:

Our number one priority, here at BALPA, is safety. That includes not only the safety of those flying in aircraft but also the people and property underneath them. If correct regulation, and enforcement of those regulations, is not achieved then safety may be compromised and that has to be avoided. Likewise if the aircraft being used are not well constructed then the accident rate will almost certainly be unacceptably high so robust, but workable, certification regulations need to be developed.

Notwithstanding all the above comments, as representatives of British airline pilots we strongly believe that currently the safest way to operate commercial aircraft is with two pilots in the cockpit and we do not see this changing in the near future. RPAS are coming (some may say they are already here) and we should ensure that they meet or exceed current safety standards.

29 September 2014

The British Airline Pilots Association (BALPA), Unmanned Aerial Vehicle Systems Association, and Royal Aeronautical Society—Oral evidence (QQ 36 – 46)

The British Airline Pilots Association (BALPA), Unmanned Aerial Vehicle Systems Association, and Royal Aeronautical Society—Oral evidence (QQ 36 – 46)

Evidence Session No. 4

Heard in Public

Questions 36 - 46

Members present

Baroness O’Cathain (Chairman)
Lord Brooke of Alverthorpe
Lord Clinton-Davis
Lord Cotter
Lord Fearn
Lord Haskel
Baroness Hooper
Lord Wilson of Tillyorn

Examination of Witnesses

Captain Andy Brown, Chairman of RPAS Working Group, British Airline Pilots Association (BALPA), **Gary Clayton**, Chairman, Unmanned Aerial Vehicle Systems Association, and **Keith Hayward**, Royal Aeronautical Society

Q36 The Chairman: First of all, a very big welcome to you. This is a formal evidence-taking session of the Committee, and a full note will be taken, which will be put on public record in printed form and on the parliamentary website. You will be sent a copy of the transcript and will be able to revise any minor errors. This session is on the record and is being webcast. You are welcome to submit written supplementary evidence after this session. We value that, because sometimes things come up that surprise us and then we need a bit of amplification. Witnesses, and Members again, are reminded to speak up so that everyone can hear you all properly.

The Committee suspended for a Division in the House.

The Chairman: Again, apologies for that—it is one of the hazards of coming to the Houses of Parliament to give evidence.

Lord Clinton-Davis: Can I declare an interest? I was president of BALPA³⁸ for some 29 years, so I know a little about it. It is appropriate that I should declare that.

Lord Brooke of Alverthorpe: I have a very indirect link with BALPA. The general secretary of BALPA used to work with me, or I with him, many years ago.

Q37 The Chairman: Also, our spad—specialist adviser—knows two of the witnesses. I will ask the first question. What do you see as the main impediments to the development of commercial RPAS operation such as mapping, filming and precision farming in Europe, and does the Commission’s communication on RPAS address them?

Captain Andy Brown: Would it be possible for BALPA to make an opening statement?

The Chairman: Yes, and for the benefit of the transcript I should have asked you to give your names and, if you want to, to make an opening statement.

Captain Andy Brown: I am Captain Andy Brown. I am an elected pilots’ representative for the British Airline Pilots Association and I am on the national executive committee. I am chairman of BALPA’s RPAS working group, and my paid employment is as an airline captain in a UK airline. I have an opening statement, which will take less than two minutes.

First, for economic as well as other reasons, BALPA does not think that unmanned passenger aircraft will be operating in the near future. However, we consider that cargo aircraft, because they do not require life support systems, could become a reality in maybe 10 years. If they operate close to centres of population, and if they operate in the same airspace as other aircraft, they should be at least as safe, if not safer, than current manned cargo aircraft.

Secondly, we understand that ACROSS³⁹—a European consortium headed by Thales—is looking at operating an intentional reduction of crew in flight: that is, a reduction down to a single pilot flying during the cruise using associated RPAS technology. Flight safety has been enhanced by the requirement to use two pilots for cross-checking purposes such as headings, heights, speeds, decision-making, and ensuring, for instance, that the correct engine is shut down in the event of fire or failure. If single pilots flying in a cruise becomes a reality in the future, it will be vital that there is cross-checking between two pilots at all stages of flight.

Finally, of immediate and pressing concern is the proliferation of small RPAS, quadcopters or multirotors of up to 7 kilograms. Many are operated safely by responsible operators, but we know that a significant number operate either through ignorance or wilful disregard of the Air Navigation Order. They are cheap to buy and easy to operate. Our concern is that people will fly them close to airports, which could cause a collision, or they might try to take photos of a motorway accident and cause a collision hazard for an air ambulance helicopter. There are ways of stopping multirotors flying near airports with a technique called geofencing, which we believe should be mandated. We believe that a combination of awareness,

³⁸ British Airline Pilots Association

³⁹ Advanced Cockpit for Reduction of Stress and Workload

education and regulation is required to reduce the risk of collision between small RPAS and other aircraft.

The Chairman: Thank you, Captain Brown. Can you send us a note about geofencing?

Captain Andy Brown: Yes.

Gary Clayton: My name is Mr Gary Clayton. I represent UAVS⁴⁰, the UK trade association, and I had paid employment at one of the major defence companies.

Professor Keith Hayward: My name is Professor Keith Hayward. I am currently head of research at the Royal Aeronautical Society, and my primary interests in the sector are industrial and commercial.

The Chairman: You mean manufacture and sales?

Professor Keith Hayward: Manufacturing and markets.

Q38 The Chairman: My question is: what do you see as the main impediments to the development of commercial RPAS operations, such as mapping, filming and precision farming in Europe, and does the Commission's communication on RPAS address them?

Gary Clayton: I am rather concerned that we are focusing on particular applications. When RPAS started to become popular as a subject a few years ago, there was a series of applications, as thought up by the technologists, and I believe that these applications are very much what the regulations and the technology advancement are about today. Like the mobile phone or computer industries, the really big applications are the ones that the entrepreneurs will think of, and we will make the technology available to them so that they can think of their business cases. So in the case of mapping, filming and precision farming, it is all very good, but the wider use of RPAS is something that we who are sitting here today will not have thought of but an entrepreneur will have. Perhaps cargo is one application that we can think of. But certainly the small ones that are operating are doing things that we did not think of beforehand. These people have come across the technology and said, "I can do this with it", but I am not sure that we know that.

The Commission's communication identifies a load of areas that need to be looked at, as well as a series of actions, but it does not address any of them other than to say, "There are all these questions that we don't know about". It probably does not address any of the issues, but it does identify some of the issues that need to be looked into.

The Chairman: That is a very valid comment, of course, but none of us knows about the future. Surely if we deal at least with the situations that we have in the air now, that will give us some sort of pointers as to what one might develop with the other technological and manufacturing advances that come, too, so looking at it is not a waste of time.

Gary Clayton: No⁴¹.

⁴⁰ Unmanned Aerial Vehicle Systems

⁴¹ Note by the witness: [said in agreement].

The Chairman: Some people are very concerned about it from the point of view of privacy, data protection, and that sort of thing, as we discussed the last time. As a result, this Committee exists solely to scrutinise legislation, directives and information from the Commission and to see if in our view it is appropriate for the Commission to have a role or whether it is something that we should deal with, and in turn to liaise with other member states on their views so that all the legislation coming from Europe is as good as it can be. We also give information to our Government on how we see it, based on our scrutiny, so that they can adopt what they need to when they talk to the Commission and the legislation becomes law.

Professor Keith Hayward: If I may, Lord Chairman, I think the general point about trying to evaluate the market is going to be difficult. It is the proverbial bottling fog at the moment, when you just do not know the exact extent and the direction in which the major, most profitable and most significant market developments will occur. However, to my mind, we would have to think well beyond the small RPAS and to think of a significant commercial breakthrough, when we have platforms capable of carrying significant payloads that will deal with all sorts of communication capabilities and sensor packages beyond simple photography. At that point you are dealing with large systems that will have to be integrated into controlled airspace, particularly if you are thinking in European terms. For tundra, prairies or over the sea, there is more scope, but if you want to use these things for that kind of facility in a crowded, congested airspace like Europe, we are going to have to think about the way in which the technology and the protocols will evolve to develop the ability of these platforms to operate in controlled airspace. That is clearly where the Commission is directing its attention. To some extent industry—certainly the larger aerospace companies—are concerned to see that develop. The UK is certainly working on stuff like sense and avoid through the ASTRAEA⁴² programme. You can see that there is a sense of urgency about this, which to some extent the European Commission has recognised. However, the scope is yet to be defined.

The Chairman: Thank you.

Captain Andy Brown: We believe that we need harmonious, workable, robust and high-standards regulations. Japan, as I think you know from the report, increased its number of RPAS operators from 18 to 14,000. Now, I believe, that figure stands at 18,000. BALPA believes in good, firm, robust regulation, as we have seen with the success of airlines.

On the impediments, we believe that public perception could be an impediment particularly to small RPAS. These little Phantom RPAS, of which some say between 1,000 and 2,000 are being sold a month, weigh 1.5 kilos. They are quadcopters and are very easy to fly. They could probably be operated by a child. We think that with that sort of thing there could be a real annoyance factor on the part of the public. There could be low-level accidents, which could be an impediment. In the previous discussion we talked about privacy, which goes without saying.

Q39 Lord Haskel: Thank you for your views on regulation. We are, of course, a European Committee, so we are interested in the regulatory arrangements between EASA⁴³ and the

⁴² Autonomous Systems Technology Related Airborne Evaluation and Assessment

⁴³ European Aviation Safety Agency

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Joint Authorities for Rulemaking on Unmanned Systems—JARUS. Do you think there is a clear delineation of responsibility, and is there involvement of industry in the creation of these regulations?

Gary Clayton: There used to be a very good worldwide organisation called the Joint Aviation Authorities—the JAA. When EASA was created, taking at that time 17 or 20 authorities out of the JAA under the EASA banner, the JAA became very ineffective, because so much of it had gone away into a single voice. I think the Joint Authorities for Rulemaking on Unmanned Systems is a positive thing. It started to get the aviation authorities— European authorities, the FAA⁴⁴ and a few other centralised bodies—into a wider, worldwide community to discuss these issues. It is almost like the JAA coming back through stealth. It has taken a little time to get going. It has published some position papers. It has recently changed its chairman; the new chairman's name escapes me, sorry. There is a bit of playing for position within JARUS at the moment, but I think it will settle down to being a very valuable tool for the aviation authorities jointly to create strong regulation and obviously advise EASA and ultimately ICAO⁴⁵. Then, of course, industry can help to provide the aviation authorities with information to take to those meetings.

EASA has a European role in the delineation of responsibility. JARUS can have a wider role. It comprises the aviation authorities and other interested parties rather than a commission or organisation, so there is delineation, but there is a bit of a play on who is controlling which bit at the moment.

Professor Keith Hayward: There was certainly some suspicion in the early days of EASA that it would not be able to perform to the same degree of technical excellence which national bodies such as the CAA⁴⁶ and the French and the German equivalents have been able to implement successfully. But over the years in which EASA has been operating, confidence has grown in its capability to deliver effectively certainly on the airworthiness dimension, which of course is its first and primary responsibility.

My own view is that if you want to see RPAS operation across Europe, you have to have European-based regulations. It is a clear matter of subsidiarity. If you have beyond the line of sight operation, some of those beyond the line of sight operations will go across a frontier, and to my mind it is almost self-evident that you need a common European regulation that will affect both the reliability and the airworthiness of the platform and all the other regulatory aspects of integration such as air traffic control and perhaps a European privacy right. I do not know, but if you are operating these things across frontiers, or with the potential to operate across frontiers, we would be better off with a cross-European regulatory framework.

The Chairman: So you do not think it is a subsidiarity issue and that national Governments have their own competences?

Professor Keith Hayward: No. National competence is fine within visual control, which is where the CAA still fits, as I understand it.

⁴⁴ Federal Aviation Agency (USA)

⁴⁵ International Civil Aviation Organisation

⁴⁶ Civil Aviation Authority (UK)

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The Chairman: I misunderstood the first part of your response.

Gary Clayton: I would just add to Keith's point that the national authorities advise JARUS and EASA, so it is not a separate body, as you know.

Lord Haskel: Would you like to suggest a timetable as to when we will have regulations from these various organisations?

Professor Keith Hayward: In a sense, both the US FAA and the European EASA are working to similar timeframes. EASA is looking at various timeframes. If I remember rightly, the pattern is a two or three-stage delivery. If we go to the El Dorado of the exercise, so to speak, which is full integration into controlled airspace, the EASA European programme has 2025 as a potential target. The FAA is bringing it a little closer, but it has a more restricted view of what it expects this to deliver. Nonetheless, I think the mid-2020s is realistic.

The Chairman: Are there any other comments?

Captain Andy Brown: We have nothing to add in answer to your first question. On the second part of your question—how would we like to see industry involvement in the development of regulations work in practice?—we feel that while industry should have a say in the development of regulations, the national aviation authorities should not allow themselves to be swayed by purely financial arguments, because ultimately they will have to take total responsibility for the development, implementation and enforcement of these regulations. In other words, without being too blunt, they cannot be in the pocket of industry, as whatever the manufacturers say, the primary objective of manufacturers is to make money. But clearly you want to do that in the safest way possible.

We also feel that RPAS is so new that stronger guidance in the early years is what is really required.

Q40 Lord Brooke of Alverthorpe: I will pick up on some of the contributions that were made earlier on the smaller RPAS. Do you see the growth in employment coming primarily from the smaller ones being used for novel applications and entrepreneurs thinking of something fresh each day, or do you see them being used for small cargo operations and then larger cargo operations, or ultimately as a possible solution to the perceived shortage of pilots for conventional aircraft operations, including the carriage of passengers?

Professor Keith Hayward: I will give you the academic's classic argument: it is too early to tell. There is the clear emergence of a division in the industry. You are perfectly right that there is already an innovative, vital, small RPAS community, but many of them are using off-the-shelf purchases from Maplin. Newspapers or private individuals seeking to make a few pennies buy a single camera and off it goes taking photographs. There is a potential market for all sorts of things at this level, but I think most analysts suggest that you have to wait for the more sophisticated multi-payload system to come on stream and to be proven and turned into a valid piece of equipment. Again, the amount of money being made by the manufacturer is relatively trivial. The market forecast for the hardware to 2023 is between \$50 billion and \$70 billion, which is trivial compared with the overall output of the aerospace industry. But then you have to think of the multiplier effect of downstream use: the people who come along and see an interesting use or a particular application for this relatively

cheap 150-kilogram platform. They might think, “If I play around with a sensor package, I can deliver this to a client”. That kind of market opportunity is where the value is going to be delivered in this industry.

Lord Brooke of Alverthorpe: But Mr Brown mentioned the growth in Japan in a relatively short space of time. There must be some analysis of the breakdown between what the CAA referred to as A, B and C categories, with A being the very small ones and C being the larger ones. So some information must be available to give some indication of what is happening at the moment, and that must give some pointers to the future.

Gary Clayton: Your question was about where the growth is coming from. At the moment you have to treat this market as two things. The small ones are in the line of sight, because they provide the collision avoidance by being able to see the vehicle. There are moves from the CAA to put more regulation into that market, but there are also moves to slowly expand that box through the experience being gained by responsible operators within that box. At the same time you have the large operators doing research into sense and avoid systems, communication systems, prognostics, health monitoring, and so on—all the things that you would need to fly an aircraft safely. It is when they do that research and get those systems and the CAA says that you can get them on to larger aircraft that inevitably you get the miniaturisation that means that they can be used on ever smaller systems, which will then open the market for the smaller ones, because they will be able to carry that technology away from line of sight. However, you need almost to push the big systems to create the technology to allow the little systems to move out of that fixed box. That is when the little systems will get their expansion. But the bigger systems will probably expand first.

Lord Clinton-Davis: Do you see any role for SMEs in this?

Professor Keith Hayward: You could say that a large proportion of the RPAS industry is already SMEs. In a sense, the larger aerospace companies have struggled to catch up. To take an American example, Boeing had to acquire several competences from relatively small companies to get them into the market and into the technology that will enable it to develop larger RPAS. So in a way, there is a peculiar dichotomy about the industry. A whole number of people work on these systems, but then you switch to the very expensive end of the business—the combat platforms—which are very much the domain of the established, powerful aerospace and defence companies.

Captain Andy Brown: We believe that the miniaturisation of stability systems—GPS systems and navigation systems—and the technology in batteries have allowed far more electrical capacity to be put into a smaller battery that has led to the success of small RPAS. They may be able to fly for 20 or 25 minutes now, but in a few years’ time it might be an hour and a half. I see that there will be an explosion of small RPAS, with applications that we have not even thought about.

There are not many RPAS in the region of just over 20 kilograms; there are a few model flying aircraft flying around. However, we believe that economics could be in favour of large cargo aircraft. That may be led by the military trying to get cargo aircraft into hot, hostile areas; they have remote-controlled helicopters that fly into hostile areas. The thing about large cargo aircraft is that they need no pressurisation, which is a saving. There are no

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passengers to worry about. Costs against them are ground infrastructure and security, but we are not too sure how good this technology is, so if they are to be operated it should be over water and sparsely occupied areas, certainly initially until they can be proven.

You asked about the carriage of passengers, which is our subject. Passengers add a huge dimension to the problem of unpiloted, unmanned vehicles. We believe that passengers want the pilot to have a vested interest in the safe operation of the aircraft. You can have a vested interest only if you are sitting in it rather than on a flight deck in an office. So we think that there will be passenger resistance to unmanned aircraft.

I mentioned life-support systems, which you need for human beings to go up to 37,000 feet—you need pressurisation—so that is a cost, not just in the installation but in the fuel that you use for that. Passengers going on long journeys will require food and water, so they will need cabin crew to give that to them. We very often have passengers with problems, such as heart attacks, so we need somebody with some knowledge of medical aid. I also wonder whether it is a good idea to put 200 football supporters into an unmanned aircraft and send them down to Barcelona to watch a football match. In other words, we need to have good order and behaviour on an aircraft. We do not want people smoking in the toilets, as that is potentially dangerous. When things go wrong, we might need to carry out an emergency evacuation of the aircraft.

Lord Brooke of Alverthorpe: You need a pilot.

Captain Andy Brown: Yes, you need a pilot. I am trying to look at future RPAS, and they are a long way ahead. Keith was absolutely right. What will this future RPAS look like? It will have some sort of station that diagnoses all the problems that the aircraft has in flight with hydraulics, electrics and engines, and somebody will have to interface with that. So my feeling is that there will be a flight deck there. You can see where I am coming from.

The Chairman: I think we have just about got the idea, Captain Brown.

Q41 Lord Clinton-Davis: Small RPAS are allowed in the UK with basic levels of pilot competence, but for large RPAS the CAA is hoping to introduce a requirement that is similar to a commercial pilot's licence. How do you view this?

Professor Keith Hayward: I am not a professional pilot, so I have no interest to declare whatever. The truth of the matter is that it is already a skilled operation to operate something like a Predator or a Reaper—the big military systems require a fair degree of piloting competence or air awareness. I remember a pilot referring to it as “air awareness”, which he said can be achieved only by having experience of operating and flying a vehicle yourself. To some extent that view has been gainsaid by experience; many of the current operators of these large systems at long range—well beyond sight, operating from Nellis Air Force Base in Nevada with the aircraft over Afghanistan—are now trained on simulators, and that is sufficient, but it is not carrying passengers. They are particularly well trained personnel. That is one of the interesting things that might hamper the development of some of the commercial uses of the RPAS system—the hidden cost of operation of having an extensive set of individuals monitoring the system, flying it to a degree, and then taking note of the data that are being generated. That leads us to the implication of developing onboard autonomy, which is a rather more difficult set of technology to comprehend, where the

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aircraft itself makes decisions about its flight environment and its own situational awareness. That will reduce significantly the demands of operational requirement and might reduce some of the demands of bandwidth, which the society has mentioned in its evidence.

Gary Clayton: Bearing in mind that I also have no vested interest in being a pilot—it is interesting that you say that it is similar to a commercial pilot’s licence. It is a perfectly valid place for the CAA to be at this point. My view and the CAA’s approach to all this has been that we will move as we learn. With the small systems, it waited until it learnt more—

The Chairman: I am sorry, but we will have to leave you for about another 12 minutes.

The Committee suspended for a Division in the House.

The Chairman: Gary Clayton, please continue.

Gary Clayton: I will have to start again, because I cannot remember where I was in my sentence.

The key point in this question is similar. The CAA today has been very responsible in applying and relaxing regulations as it has learnt. There was an interesting case with a small RPAS where the regulations were very much restricted. The CAA made some changes and looked at an extended line of sight as it learnt and gained confidence in certain operators. I would say that a commercial pilot’s licence⁴⁷ is where it wants to go at the moment, because I do not think anyone has given it any evidence that suggests that is not needed. It has to maintain safety of flight for everybody, so to take that approach until such time as it can be proved that somebody does not need such a licence is very prudent for an aviation authority. We are lucky that our CAA is open to suggestion, sensible input and research and takes it on board. I cannot speak for other countries because I have not had to deal with aviation authorities in other countries, but the CAA is highly respected in this field, with CAP 722⁴⁸ giving it a very prominent position in this world, and it takes other views and learning to the European Union and to ICAO. I think the CAA is a very grown-up organisation that says, “We are going to take the prudent view until somebody can give us evidence or a good case as to why that view is wrong”. I would not do anything else if I was the CAA.

Captain Andy Brown: Starting with the small RPAS, the British Model Flying Association has for 90-plus years been flying model aircraft of over 20 kilograms and, under the Air Navigation Order, at a height no greater than 400 feet and within 500 metres line of sight, clear of other aircraft if something comes across the airfield, and there is no need to change that.

We like the permission for aerial work which the operators of small RPAS—of between 7 to 20 kilograms—have to carry out. They do a two or three-day course for about £1,300, which we encourage, and there is no need to change that. Clearly as an airline pilot I have to get an airline transport pilot’s licence. Two years’ training costs about £100,000 and the system works fairly well. However, for large RPAS—by large we mean probably 150 kilograms, which

⁴⁷ Note by the witness: With regard to Large RPAS.

⁴⁸ Operational guidance produced by the CAA on the safety requirements and constraints to civil use of RPAS

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is quoted—we believe that whether or not it is operated in controlled airspace, there should be some sort of licence and there needs to be much greater operator efficiency.

If you hit a small RPAS at 200 to 300 miles per hour, even one that is as little as 1.5 to 2 kilograms—these are being sold in their thousands—that will do a lot of damage, so we believe that for small RPAS, certainly of 7 kilograms and above, a commercial pilot's licence should be required if you operate such an RPAS in controlled airspace.

What would that commercial pilot's licence look like? It would certainly be a lot more comprehensive than the permission to fly which the small RPAS operators get. It might not be as comprehensive as an airline transport pilot's licence, and it would certainly be slightly different, but it would be towards that sort of level.

As an indication, in the United States the University of North Dakota now operates a full year RPAS course at a cost of \$150,000, which you will see as about the same cost as an ATPL. It took 120 students in 2012, so that might be an indication. Yes, we believe that there should be some form of commercial pilot's licence.

Keith brought up autonomous vehicles that can decide what they do as they are flying along. That is something that we would have a comment about. I am not sure I like the idea of an aeroplane that can, for instance, shut down an engine without asking a human being. You might remember Captain Sullenberger getting airborne from New York. He had a multiple bird strike that caused both engines to flame out, and he landed safely in the River Hudson, which was a tremendous bit of airmanship. If you had an autonomous or RPAS vehicle that got airborne and in a perhaps slightly better situation you had a multiple bird strike, one engine was damaged and was showing a fire but was still working, and one engine that was flamed out, the computer on the autonomous vehicle might decide to shut down the one engine that was producing thrust. My point is that human beings are very much better than machines at dealing with complex situations, so we would not favour them.

Professor Keith Hayward: I do not think that the autonomous question is going to be relevant to large multi-engine aircraft operating that close to an airfield. The notion of limited autonomy is already in place; the longer-range military RPAS already fly automatically to their theatre of operations, at which point in many cases they run an automated figure of eight racing track circuit and they are monitored by human beings, simply for the pictures of the data stream that is coming down from the platform. So to go from developments in autonomy and automated activity of relatively small RPAS straight to automated commercial-size vehicles is a big leap.

Gary Clayton: I would like to add to that. In conversations that I have had with the CAA about totally automated or autonomous vehicles, we always talk about humans in the loop, certainly in the case of large vehicles. We have conducted research in the UK into autonomy and levels of autonomy and what that would mean, but nobody envisages large aircraft flying autonomously in the near future. They might be flown automatically but with a human in the loop—I need to be careful with my words there—but nobody has actually started to suggest that we can reach the higher levels of autonomy which the research says is possible. That is pretty much to one side. All large systems are usually talked about in terms of a human in the loop.

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The Chairman: This question was Lord Clinton-Davies's, but he was not able to come back to the Committee in time, so to summarise, all three of you think that the CAA anticipating a requirement similar to a commercial pilot's licence is appropriate.

Gary Clayton: That was for the large RPAS. I am not necessarily talking about RPAS of 150 kilograms at that point.

The Chairman: No, but there was also a supplementary question: at what point should more demanding RPAS pilot-licensing requirements be imposed? The jury is out?

Professor Keith Hayward: I would say that the jury is out. This is where it gets very difficult. I can see where Andy is coming from, and I have a personal interest in ensuring that the person operating an RPAS is competent so that it does not land on my head. But I am also conscious that when you are trying to think about the commercial exploitation of these systems—and it is the downstream activity that is really going to generate the value from the technology—we will have to be very careful to calibrate the exact requirement of piloting competence with the investment required to generate that level of competence, because if you overqualify your pilot, your controller, and require him or her to invest a considerable amount of money in that process, it will considerably inhibit the development of the kind of downstream activities that we want to see developed for a future economy.

The Chairman: Thank you. Lord Clinton-Davies, is that okay? Yes, thank you.

Q42 Baroness Hooper: Do you therefore envisage that a commercial pilot, with his existing licence, will automatically be entitled to man an RPAS, or will that need an additional qualification?

Captain Andy Brown: No. The requirements for RPAS are quite different from those for manned flying, but you certainly need to understand what it means to be flying in an aircraft. The word "airmanship" is very important. Interestingly, I spoke to one of these chaps who train people to fly small RPAS, and he gets some airline pilots coming through, some of whom might have lost their licences or have retired and just want to come along and do it. He says that there is quite a difference between those who have an aviation background and those who do not. Those who do have this thing called airmanship, and the quality of their decision-making is a lot better. How you are going to get that sort of programme I do not know, but you need to be able to encourage that knowledge, experience and quality of decision-making. I would not want to become an RPAS pilot in my position.

Gary Clayton: I agree inasmuch as the answer is: no, they are not automatically qualified. The key word again is "similar", a word that was used before. There will be an awful lot of training of the same understanding of the rules of the air and all those activities, so they are highly likely to have been a pilot of some sort, whether or not that would have been of a large commercial aircraft, but they will have an understanding of the aspects of the commercial pilot side to do with procedure.

The Chairman: I think we have taken that very much on board.

Q43 Lord Fearn: RPAS can be used for varied operations, some of which are potentially dangerous such as dropping water to extinguish forest fires. How can airworthiness regulations be made flexible enough to adapt to this sort of use?

Professor Keith Hayward: Again, I am not a flyer. That is a question of ensuring that you have tight control regimes over the aircraft. If you recognise and can identify where the fire may be, you can limit the area in which the aircraft will operate and dump its load of water. I know that that may not necessarily be the case when you have a fast-moving fire, but it is within the bounds of current technology to be able to provide safety margins sufficient for it to operate.

The Chairman: Are you suggesting that you would be able to use both an RPAS and an aircraft that is used for dumping water: that is, the RPAS would find out where the fire was and the extent of it, and would then get the aircraft to go in strategically?

Professor Keith Hayward: I am just responding to the noble Lord's question. I personally think that that particular use is likely to prove quite difficult, because picking up the water is a very tricky exercise and requires a high degree of airmanship, and I do not think that an RPAS of any description is capable of that. However, I think the noble Lord has similarly risky situations in mind. They could be delineated by the use of satellite navigation positioning systems, which allow for the very precise delineation of operation.

Gary Clayton: I would like to add that I do not think that the main regulations should be changed because of the odd dangerous situation, because there may be dangers. You can end up with some special exemptions to work in certain areas with certain dangerous situations, whether that is a problem with a power station or a major fire at an oil refinery. With the CAA you can probably enact special exemptions, certainly with NATS. However, to take your forest fire example, if you can pick up the water, which is the technological argument, you can, irrespective of smoke, sense where the hottest points are, where you can put the water, because you are not using eyes to find the fire. So there are technological answers to a lot of this, but as far as the regulation side is concerned, which is one of the things that you are looking at to do with the European communication, you would have to look at exemptions based on the operator licence, the type of vehicle, what you were doing, and where.

Captain Andy Brown: We think that if RPAS can be used to replace pilots in dangerous missions, they should do so. As they say, it is a no-brainer. The military use RPAS for dull, dirty and dangerous missions where they do not want to lose a pilot, for instance over enemy territory. To go back to the example of fighting forest fires, that is a great use of RPAS. You could have an RPAS taking all the photos, and if it crashed it would not really matter. GPS systems are so accurate now that it could be programmed not to go to certain places, although who else would want to fly over a forest fire anyway, so it would not matter. We would have the RPAS there as the eyes for everybody else. So there are some uses, and it should not be a problem to ensure that these rules are made flexible enough to allow them.

Q44 Baroness Hooper: The European communication, which was published in April this year, stated that, "Industry is delaying investments until sufficiently legal certainty on the

legal framework is offered”. You have said already that operations of smaller RPAS are growing, but that there are apparently currently very few large civil RPAS operations. Is that because of this lack of certainty and inadequate regulation?

Gary Clayton: As regards the small ones, we know exactly where we stand: the CAA has set the rules and it is slowly changing them as it sees applicable, based on its knowledge. As far as the large ones are concerned, there are major research programmes both in the UK and in Europe with ASTRAEA⁴⁹ in the UK, MIDCAS⁵⁰, and AUTARKIA, recently renamed, programmes in Europe, which look at various aspects. According to CAP 722, and therefore EASA, we have to be equivalent and transparent. What is equivalence? Where do the rules say that the pilot shall maintain a look-out out of the window and avoid a collision—a detect and avoid system is trying to do that electronically. But how good does it have to be, what does it have to be able to detect, at what distance, moving at what speed? Then it has to be able to prove that it can do that. We do not know how, so we are working that through with the CAA. At the same time we have a communication system that does not exist, because pilots like Andy here are on the aircraft. What level of lateness is acceptable, and what retransmission and so on gives the same level of control? So in being equivalent on safety—“as safe as”—we need to deal with loads of things in regulations through the research in the UK done by the ASTRAEA programme. It is not until we have solved those problems that manufacturers can put a price on building a large cargo aircraft to fly unmanned. You cannot price an operation and make a business case until you can put a price on an aircraft. That is why the industry is trying to drive to understand those regulatory “as safe as” aspects and what the technological needs are to achieve them.

Professor Keith Hayward: To some extent a bit of perhaps not industrial obfuscation but a rather more complex set of political as well as regulatory factors might be involved here. If we are trying to consider the kind of system that might develop a very much larger and expansive commercial market for RPAS operation, to my mind we are thinking of the size and scale of certainly from the Thales Watchkeeper upwards. Inevitably I have in mind the American military systems Predator and Reaper, which are the classic medium-altitude long-endurance system with multi-sensors and all sorts of payload capacity. In short, there is no European military requirement for that system that seems to be generating a programme. The French, British and Germans have bought into—bought directly from—American systems to use to satisfy military requirements, and there is no commercial business case in its own right to justify the investment in developing a European equivalent of Reaper or Predator. Until the European Governments singularly, or more likely individually, can come together to produce a programme that will develop a system of that size, which one would hope would be technically more advanced than a Reaper or a Predator, there is little chance of a European RPAS hardware industry developing to satisfy any emerging commercial requirement.

Captain Andy Brown: Keith makes some interesting points about the military there. Looking back at history, it is interesting that it was during wars—the First World War and Second World War—that so many advances were made in aviation and in fact in drones as well, which existed as far back as the First World War. Similarly, advances in medicinal

⁴⁹ Autonomous Systems Technology Related Airborne Evaluation and Assessment

⁵⁰ Mid-air Collision Avoidance System

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applications were made during wartime. I feel that the military will develop these RPAS, which could get bigger and bigger, and it will take some time before eventually we think that actually this RPAS works. At the moment their level of safety is not great, although that is a bit of an unfair comparison because they often operate in hostile territory. We will look back and say, “Those RPAS seem to be working now. Perhaps they may be safe enough to use in a civilian context”.

The Chairman: If we have a young Bill Gates or a young Steve Jobs working in a garage at the moment, he might prove us all wrong.

Gary Clayton: To take the point that was made there, there is not, quite rightly, a European MALE programme on the military side. There is a lot of talk of a European MALE programme and a lot of the talk which tends to compete/contradict with itself about being certain that it has the next European MALE programme understood.⁵¹ However, there are large MALE systems within the militaries of Europe at the moment, they mainly fly and are coming back from, for example, Afghanistan as far as the UK is concerned. What are we going to do with them? There is a hope that we will be able to fly them in civil airspace, so there is some systems development around being able to use some of the systems that we have, even though we are not building any new platform. So there are certainly developments. When it comes to moving from danger area to danger area, across civil airspace, they need to start to look at how they do that without special exemptions and state aircraft exemptions. There is a willingness to work on those areas. We are looking at the technologies, even if we are not building a specific platform. I agree with Keith.

Professor Keith Hayward: My final point on that is that the regulation is still no less important. Even if we are not building platforms, if anybody in Europe—a European-based entrepreneur or innovator—wishes to use the technology, there clearly has to be an appropriate and positive regulatory framework within which that entrepreneur is able to exploit the technology. It may well be that the platform is European, although at the smaller end it will almost inevitably be an Israeli platform, but the crux of it will be putting the systems on and then using it to generate value.

The Chairman: I have just been handed an acronym: MALE.

Professor Keith Hayward: Medium-altitude long-endurance.

Gary Clayton: You will probably get HALE as well, which refers to high-altitude.

The Chairman: Okay. We have well overstepped our time and I am afraid that the witnesses must be pretty tired of all this. The final question, and one of the most significant I think, is from Lord Wilson.

Q45 Lord Wilson of Tillyorn: We have touched on the question of privacy and how it can be invaded by RPAS. We have not touched so much on the question of physical threat: putting an explosive payload or something on. Could you help us by suggesting how, in a very practical way, these issues might be dealt with? Could there, for instance, be some way of registering every RPAS so that you could identify who is infringing privacy or, if something

⁵¹ Medium Altitude Long Endurance

went wrong, who had put an explosive device on? I am thinking of a small RPAS, not MALEs. Are there practical suggestions for how this might be tackled?

Gary Clayton: First off, how can I know whether somebody is going to use an automobile and pack it full of explosives? The RPAS is not the issue; tracking the person with the intent is the issue. The same thing has come up in the European Commission. I was at a DG⁵² Enterprise meeting the other week that was looking at regulating the privacy side of RPAS separately. There was a group of us from Holland, France and, luckily, the Information Commissioner's Office in the UK, who were saying that an RPAS is just a means of collecting data and is no different from the other means of collecting data. Therefore the existing rules about collecting data and how you deal with them should be extant; they are there and they are enough.

The rules on delivering explosives are exactly the same regardless: you cannot track somebody who decides to use something like this in that manner with legislation, simply because by definition they are not going to come on to the radar or sign up and become licensed to do that operation.

Lord Wilson of Tillyorn: Perhaps I can put it slightly differently. Of course, by the time an explosive has exploded, it has done the damage. But if it is a question of privacy, it could be about trying to identify, even with an explosive, who did it. Is that possible at all? Is there any way of identifying who did it?

Gary Clayton: If you collected data, as on CCTV camera, there are certain rules that govern how you manage that. The collection of data on who is doing what surveillance with an RPAS—no matter what size, small or large—is governed by the same rules.

Lord Brooke of Alverthorpe: At the moment.

Gary Clayton: At the moment.

Professor Keith Hayward: With all due respect here, if you walked into Maplin, bought yourself a small RPAS and put a lump of explosive under it, there is no way you could trace that back, unless you require a licence for buying an RPAS from Maplin. You are getting into the realms here of gun control and the issues that the United States has over that kind of prohibition.

Captain Andy Brown: We are very concerned, not just for privacy reasons but because of the risk of these small RPAS that you can buy in Maplin getting into the hands of somebody who does not appreciate how dangerous it might be to fly over the approach to Heathrow. I know it would be a bit of an administrative nightmare, but if you buy a TV nowadays—I have not bought one for quite a while—you apparently have to give your address to the TV Licensing Authority. At least we should be able to do something like that in order to trace it. Yes, you have a question about privacy, but it is the danger of these small RPASs bumping into an airliner that really concerns me.

⁵² Directorate General

The British Airline Pilots Association (BALPA), Unmanned Aerial Vehicle Systems Association, and Royal Aeronautical Society—Oral evidence (QQ 36 – 46)

In terms of preventing them being from being flown somewhere, we have this technique called geofencing, for even some of the smallest and cheapest ones such as the Phantom, which is made by DJI in China. They can be put in all the controlled airspace, including where the airports are. They are doing that with the latest one that is coming off the shelves. If it is flying towards that controlled airspace, it will bump into it, fly down a cone and then land on the ground. If you happen to be in controlled airspace, I understand that it will not even take off. That is a fantastic safety thing that we wish to promote. I have heard that the geofencing in this particular model costs about £500 or £600. You cannot fly it in Tiananmen Square. You can put in whatever you like and it does not cost a lot of money to do it.

Gary Clayton: The TV licence idea is very interesting. In the last 20 minutes of the previous session, I heard the same question and a similar type of approach. As the trade association, it is interesting and an education. I agree with the licensing side, but you have to be careful not to stifle the entrepreneurs at the same time. The trade association got a telephone call only about four or five weeks ago from a gentleman up north—I will not mention his name—who rang me up and asked, “Do I need to do something?”. I asked why and he said, “I have been flying small systems taking photographs for the last two years and did not know I needed anything until somebody asked me if I was licensed”. They pointed him to us and we pointed him towards all the people who did the training et cetera. He had bought one, put a camera in, taken a picture of a friend’s house and framed it for them. Somebody else asked him to do it for them and he ended up with a small business, not knowing anything else. There is a need for education, and point of sale is part of where that education could start. I am as bad as everybody else in that I do not read any of the paperwork that comes with everything I buy, but at least you could put it there.

The Chairman: Are there any more questions, first from our witnesses but also from Members.

Q46 Lord Wilson of Tillyorn: Mr Brown, you mentioned Japan, and said that it is extremely active in this field. Maybe a written answer to this will be easier, but how active is Japan and what sort of rules and regulations does it have? I am not sure that we have a handle on that at the moment.

The Chairman: That is true, we do not.

Captain Andy Brown: I think that was in something we got from the European Commission, which said they have been so successful.

Lord Wilson of Tillyorn: I am not sure if we know what their regulations are.

Captain Andy Brown: I am not sure. All I want to point out is that regulations are good.

Gary Clayton: Japan was very early on this and used them a lot for monitoring agriculture. That was certainly the case in the early days, although I do not know whether the expansion is associated with that.

Captain Andy Brown: As I understand it, agriculture is the big thing there.

The British Airline Pilots Association (BALPA), Unmanned Aerial Vehicle Systems Association, and Royal Aeronautical Society—Oral evidence (QQ 36 – 46)

The Chairman: A very big thank you for your patience, for putting up with us and our Division, and also for giving such great answers. As I said, you will get copies of the transcript, and hopefully you will approve of the report when we produce it. You might not agree with everything in it, and we do not yet know what our conclusions will be, but this has been a very worthwhile session. Similarly, the people who are still at the back have been grilled and have still come back for more. We are very honoured that you have given us the time. Thank you.

The British Airline Pilots Association (BALPA)—Supplementary written evidence (RPA0041)

Geo-Fencing

Geo-fencing is a technique whereby an RPAS can have geographical information stored in its GPS navigation system to prevent it from flying in selected areas. These areas might be selected by the manufacturer and would probably comprise of a world wide data base of airports and controlled airspace. Security sensitive areas, such as nuclear power stations might also be selected. In addition the manufacturer might select an option that the RPAS will fly in an area defined by the limits of the Air Navigation Order (ANO), for instance not higher than 400 feet or further than 500 metres from its point of launch. It would be the responsibility of the RPAS operator to ensure that the other requirements of the ANO should be met whilst flying the RPAS vehicle, for example the requirement to fly more than 50 metres from a vehicle, vessel or structure, or more than 150 metres of a congested area.

If during flight an RPAS encounters an area bounded by geo-fencing, it cannot go any further, and simply flies in a downward sloping direction towards the ground.

Some operators might have a legitimate requirement to operate within controlled airspace. Examples are the Fire Service using drones to survey fires near airports, as well as the Police for crowd control. Other examples include airlines who now use drones to check the condition of the aircraft during routine servicing. For licenced RPAS operators an exemption would need to be made to operate drones within an area bounded by controlled airspace.

BALPA would request the Committee, for reasons of state security, security of infrastructure, flight safety and privacy reasons, to consider mandating all but the very lightest of small RPAS to be sold with geo-fencing. Some manufacturers, such as DJI from China, already do so with their latest models. Indeed such is the flexibility of this programming that it is reported that Tiananmen Square is bounded by geo-fencing.

October 2014

British Model Flying Association (BMFA)—Written evidence (RPA0043)

Dear Alicia

Thank you for your telephone call and subsequent Email providing the opportunity to respond on the Select Committee enquiry into the civil use of RPAS.

Please note that the views expressed are based on the following:

- The British Model Flying Association (BMFA) is the National Governing Body for the sport of model flying in the UK (established in 1922).
- The BMFA has delegated responsibility for model flying in the UK from the CAA and the Royal Aero Club.
- The BMFA consists of 35,000 members and 820 clubs.

I have responded to the specific questions raised in numerical order below, however the issues are not clear cut and some of the points raised are difficult to provide a meaningful response or view on due to the nature of the wording, I have included your questions in italics for clarity.

- 1) *Whether there is a need for public engagement between regulators and RPAS users regarding current and future legislation. (This point was discussed by the Minister, Robert Goodwill in last week's evidence session).*

Response:

It is difficult to envisage how engagement between the regulators and casual RPAS users would take place in an effective and structured way. However, the BMFA represents all model flying which includes the flying of multirotors fitted with camera equipment (drones) for the purpose of sport and recreation. BMFA members are provided with information on how to operate lawfully and considerately and are also provided with appropriate public liability insurance as part of the membership benefits. The BMFA has the full support of the CAA. Therefore the BMFA should be the "go to" body for any consultation or engagement with implications for lawful, sport and recreational model flying activity.

- 2) *What the resource implications are likely to be for the CAA, NATS and organisations like yourself with the increased civil use of RPAS, and whether the Government has dedicated sufficient resources to help enforce legislation.*

Response:

There is no doubt that the UK CAA are currently under resourced and any move to further legislate or regulate civil RPAS activity will only increase the workload. Whether sufficient resource has been directed to enforce the current legislation remains to be seen but there is no doubt that the UK will see a significant increase in the amount of small RPAS in use by casual operators, to be enforceable any legislation needs to be proportional and practical.

- 3) *Do you have any views on the possible future uses of RPAS could be and would these future users have any important implication on what type of regulation the European Commission should consider?*

Response:

There is no doubt that RPAS will see an increased commercial use, however this is classed as Aerial Work and is currently well regulated by the CAA. Small RPAS will continue to be an attraction for the leisure user due to the potential to accurately place cameras in previously difficult to reach locations.

- 4) *How should the line be drawn, with regards to the legislation and regulation, between the hobbyist user and the leisure user?*

Response:

I am not quite clear on the distinction you are drawing between “hobbyist” and “leisure user” however, I will take the reference to “hobbyist” as referring to an informed, committed and conscientious operator and “leisure user” as an individual flying on an ad-hoc or casual basis.

Going forward perhaps the aim should be to educate rather than regulate, the current framework and legislation is appropriate and proportional for the “hobbyist” use of RPAS, the key is to educate those who fall outside of this category and of course to prosecute those who wilfully breach the very adequate provisions of the Air Navigation Order.

- 5) *Does the BMFA have any views on the issues of privacy posed by RPAS and the insurance requirements for commercial RPAS use?*

Response:

In terms of recreational use the privacy issues are largely addressed by the minimum distances set out under Article 167 of the CAA Air Navigation Order, essentially 50 metres from any person or vessel not under the control of the pilot and 150 metres from any congested area or open air assembly. On a day to day basis these distances appear to be appropriate for the “hobbyist” but as with every other walk of life there will be individuals who choose to ignore the legal requirements and do their own thing.

British Model Flying Association (BMFA)—Written evidence (RPA0043)

I am not in a position to comment on the insurance requirements for commercial RPAS use other than it would seem to make sense that it is a condition of the issuing of the relevant CAA exemption for Aerial Work.

In terms of Sport and Recreational flying then the BMFA takes a strong stance on insurance hence the provision of £25 million of public liability cover as standard to all members. However as it is not a legal requirement there will be a significant number of individuals (“leisure users”) operating outside of the framework of the BMFA and in many cases without appropriate insurance cover in place, this is of significant concern but difficult to address at any meaningful level.

I hope this is of assistance, of course do not hesitate to get back to me should you require further information or clarification on any of the points made.

With kind regards

**Manny Williamson
Development Officer**

9 December 2014

British Model Flying Association (BMFA)—Supplementary written evidence (RPA0051)

Policy Position - regarding safe operations and the responsibility of regulations; **Response to the House of Lords.**

For many years the Sport and Recreational model aircraft community represented by the BMFA (British Model Flying Association), has maintained a safe record of operations. This is largely due to the difficulty in learning the skills required to build and fly the aircraft, and also due to the robust stewardship and guidance provided by the BMFA and it's network of affiliated clubs.

With the advance of flight controller technology in recent years a growing number of 'Professional' operators have emerged who must sit specific theory training practical tests in order to ensure they operate safely, and they are appropriately represented by ARPAS-UK (Association of Remotely Piloted Aircraft Systems).

Most recently, as technology has continued to advance, it has become possible for the general public to fly very capable aircraft with little or no training. This latter group could be termed casual users who are difficult to capture and classify as part of any organised group or association

With the recent AirProx reports and cases of illegal operators caught, and in a number of cases not charged, BMFA are concerned over the safety implications that un-lawful and irresponsible flying may have on other forms of aviation including the lawful and responsible sport and recreational flyers.

Two principal areas require work in order to mitigate the potential risk that casual users pose: education and enforcement. Much work continues to be done with education however little is being done with regard to enforcement. The regulations are clear and proportionate but the CAA clearly does not have the resource to cope with the extra workload of enforcement, and no other organisation has the delegated responsibility or authority to provide appropriate measures.

We are concerned that the irresponsible actions of casual users of such equipment is not considered in any way a reflection of the large number of responsible sport and recreational flyers, many of whom are members of the BMFA or other similar organisations or the growing number of CAA registered commercial operators represented by ARPAS.

We would like to suggest mechanisms to limit the potential risk, and appropriately regulate this rapidly expanding area of activity.

1. Empower the Police to act on enforcing the law. This includes educating them about the rules of the air to a minimum standard that should include articles 137, 138, 166 and 167 of the ANO as standard - this is not onerous as these articles total one side of A4. It is also worth mentioning that existing laws in place to protect the public can be used to prosecute people using these aircraft in an inappropriate manner, and they include but are not limited to endangerment, assault, harassment and annoyance.
2. Give the CAA enforcement branch the resource to pursue and prosecute high profile cases of illegal operations to set an example.
3. Give the CAA PR department the resources to engage with the public, and every RPAS/RC air user to promote best practice and raise awareness of the regulations and safety implications. Engagement can be through various channels including:
 - a. Exhibiting at relevant public exhibitions, shows and conferences
 - b. Advertising on TV
 - c. Responding to news stories
 - d. Promoting positive new stories
4. Put emphasis of raising awareness on to the retailers. This is the one point of contact that is common for consumer users. Once they have purchased the drone, they are very difficult to engage with again.
5. Ensuring retailers issue the CAA's information leaflet with every purchase (not very effective and difficult to enforce). Ensure manufacturers include the CAA's information leaflet within every purchase.
6. We suggest that some form of digital identity chip and or uv spray (similar to that used to identify bicycles) which has the details of the owner onboard should be investigated. This could be facilitated through the onboard controller, so that in order to fly the aircraft each owner must register their details with the manufacturer who shares these details on an online database.
7. If CAA is unable to undertake actions 2 and 3 above, then an organisation responsible for these actions should be identified and resourced.

It should be noted that the BMFA takes a proactive stance and seeks to educate and inform wherever possible.

However, the sheer number of multicopter, camera equipped aircraft being sold through a wide variety of outlets means that a significant proportion are purchased by casual users who have little interest in the law or regulation, making them very difficult to target through responsible bodies such as the BMFA or ARPAS.

Manny Williamson

British Model Flying Association (BMFA)—Supplementary written evidence (RPA0051)

Development Officer
British Model Flying Association

16 December 2014

Callen-Lenz Associates Ltd—Written evidence (RPA0004)

Background

This response is on behalf of the SME Callen-Lenz Associates Ltd (CLA). CLA is an aviation services company established in 1997, with offices and a UAV testing area near Salisbury, Wiltshire. A core part of CLA business is in remote sensing and unmanned aviation, providing intelligence to a range of industries. CLA is an early-adopter in the UAV sector, working with its customers to provide quantitative data as well as imagery. This forward-looking approach provides intelligence and development of solutions in previously inaccessible domains. CLA has experience of operating in a broad range of industry sectors, including agriculture, environmental and land use monitoring, security and archaeology.

CLA is concerned that any significant changes to regulation and hence cost-base governing its existing business could impact its operations significantly. CLA therefore welcomes the opportunity to provide a response to this consultation and fully endorses the importance of the civil use in the EU of remotely piloted aircraft systems (RPAS).

1. Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities, which should have been included?

We broadly agree and support the European Commissions ("EC") approach to the development of the RPAS market, technologies and associated regulation. However we would highlight a concern that the approach appears to anticipate a uniform framework of development and requirements for all RPAS under 150kg. We believe this would restrict the development of RPAS in the sub 20kg, which have to date proved to be the largest and most flexible growth area. We anticipate this will continue to be the highest growth area, particularly as miniaturization of sensors and components enables ever-increasing capabilities in smaller systems. We believe that an approach which includes a focus on the sub-20kg category would provide more tangible short term benefits, particularly for existing and emerging commercial activity in the UK.

We would also question the inclusion of social and privacy issues in the EC paper. These are unrelated to the development of RPAS and are catered for through national and international legislation that already exists. The use of RPAS for aerial work is likely to be far less intrusive than CCTV coverage and the use of mobile phone cameras.

2. **What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?**

- 1) For larger RPAS that will operate in the same airspace and look to replicate manned aircraft, there would be obvious advantages of international regulations governing operations. However, with smaller RPAS a national or geographic approach that could respond more quickly to developing technologies would better assist the development of the industry.
- 2) It should be noted that there is already significant commercial activity and economic impact in the small RPAS sector in the UK, including agriculture, environmental and land use monitoring, security and archaeology. Any new regulatory framework should ensure it safeguards existing licenced activity. CLA is concerned that any significant changes to regulation governing its existing activities could impact its business base significantly, and that a similar concern is shared by other RPAS businesses in the UK.
- 3) CLA believes that the EU's actions are consistent with, and potentially ahead of, developments in other non-EU countries. While we consider it extremely important to liaise at an ICAO level, CLA would consider that the proposed actions from the EC is currently market leading, with legislation in the United States in particular still not close to being realised. CLA feels it is important to enable the EC to maintain / develop a market lead, while at the same time ensuring safety is paramount.

3. In which new or innovative ways do you think RPAS will be used in the future?

- 4) The portability and relatively inexpensive nature of small RPAS make their deployment cost effective and time sensitive. Current applications already include:
 - Precision Agriculture
 - Forestry – Inventory and management of pests & diseases
 - Environmental and ecological change monitoring
 - Surveying – Mapping, measuring, building inspection, energy infrastructure, planning
 - Photography & Videography – for TV, cinema, press, advertising and corporate publicity.

These applications are growing rapidly, and key areas for the future include:

- Emergency Services – monitoring, spotting, hazardous air testing, search and rescue, rapid disaster response.
- Critical Infrastructure – planning and protection
- Communications – Portable relay stations and internet connectivity in remote locations
- Entertainment – Disney has already filed applications for their use
- Short range delivery (?)

- 5) It should be noted that growth of these and other applications will depend in part of the ability to routinely extend the envelope of operation, for example to Beyond Visual Line of Sight, congested areas and night operations among others. The CAA is already providing much input and help in these areas, and significant progress is being made. CLA is concerned that this progress at our Member State level might be lost in the development of a Uniform Framework for Europe.

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

- 6) The ASD figure of 150,000 jobs was based on civil RPAS achieving around 10% of the current aviation market. We believe that this approach in estimating job creation through RPAS operations is a significant underestimate. We are already seeing that job creation will come from completely new areas of activity such as in Precision Farming, that will not necessarily be classed as aviation. Already organisations in the UK such as Defra and Network Rail are specifying the use of RPAS for specific contracts, and this will be set to continue. In order to understand the true economic benefits of RPAS it is essential that we recognise and quantify cross-sector impact.
- 7) Key factors which could restrict growth of the RPAS market include:
- Timeframe for development of the regulatory framework enabling operations in complex environments such as Beyond Visual Line of Sight, Congested Area operations etc.
 - Ongoing licensing and other regulatory procedures which are more demanding than those currently extant in the UK
 - High insurance costs not commensurate with level of risk

5. Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

- 8) Radio spectrum is a key issue for the commission to focus upon. For example, whilst the majority of control and command platforms operate on 2.4GHz and video downlinks are on 5.8GHz, RPAS have recently been sold by the retail chain Maplin's with this combination reversed. It is critical that for the industry to develop there needs to be co-ordinated EC agreement on this issue.
- 9) We believe it is essential that any change in the remit of EASA still allow some involvement from Member States. Member States can best assess local

environments and issues which contribute to risk, which would not be possible at an integrated EU level.

6. Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

10) The discussion on invasion of privacy with regards to RPAS has been wide ranging for some time. Whilst CLA recognises these concerns, it is of the opinion that they should not be singled out from other such mediums such as CCTV, mobile phones and, for example, police helicopters / news crews. Existing legislation already provides an adequate framework and further education on these rather than additional regulation is seen as a more appropriate approach unless evidence suggests otherwise.

11) The insurance market for UK SMEs is currently restricted to a few providers and we would welcome greater competition in this area. As the industry develops and more operational data becomes available we would hope to see premiums reduced and more bespoke off the shelf policies become available.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

12) We agree that a significant focus should be on airspace regulation, but as with Question 1, it is essential in this regard that EU research funding is weighted towards smaller RPAS which are set to have a much greater economic and sustainable benefit in the short as well as long term. It should be noted that this will also increase the extent of research undertaken by SMEs.

13) We feel that suppliers are addressing airframe airworthiness, as operators are quick to migrate should a particular supplier fall behind the curve. However, we also believe that there should be a focus on other technologies which will significantly improve performance and reduce cost of RPAS, as well as supporting RPAS for science measurements. It would be our recommendation that an element of R&D funding be focused towards power/battery technology, payload miniaturisation and flight control systems.

14) We also believe it is essential that R&D funds be available for cross sectoral research, for example integration of sensor systems, and data processing and analysis from a range of technology sectors into RPAS. If R&D funds are bounded entirely within the aviation domain, this will be a significant barrier to growth.

12 September 2014

**Callen-Lenz Associates Ltd, Thales UK, and National Aeronautical Centre—
Oral evidence (QQ 24 – 35)**

Evidence Session No. 3

Heard in Public

Questions 24 - 35

MONDAY 27 OCTOBER 2014

Members present

Baroness O’Cathain (Chairman)
Lord Brooke of Alverthorpe
Lord Clinton-Davis
Lord Cotter
Lord Fearn
Lord Haskel
Baroness Hooper
Lord Wilson of Tillyorn

Examination of Witnesses

Dr Sue Wolfe, Project Manager, Callen-Lenz Associates Limited, **Neil Watson**, Thales UK, and **Ray Mann**, National Aeronautical Centre

Q24 The Chairman: Good afternoon, lady and gentlemen. First, I would like to welcome you. Secondly, thank you for giving up your time, and obviously your brain power in dealing with the questions in advance. It will be very useful to us. I have to ask if any members of the Committee have interests to declare in relation to this meeting. I will also point out that Lord Freeman, who is a member of the Committee, has decided to absent himself from this inquiry because of his involvement in Thales. Lord Clinton-Davies, you have an interest to declare.

Lord Clinton-Davis: Only in relation to the second panel.

The Chairman: Lord Brooke?

Lord Brooke of Alverthorpe: Not in relation to this panel.

The Chairman: Okay. Fine. Our specialist adviser knows two of today’s witnesses, Keith Hayward and Gary Clayton, who are at the back waiting to be groomed. And Dr Sue Wolfe. And Ray Mann—I am being briefed on the hoof.

Callen-Lenz Associates Ltd, Thales UK, and National Aeronautical Centre—Oral evidence (QQ 24 – 35)

This is a formal evidence-taking session of the Committee, and a full note will be taken. This will be put on the public record in printed form and on the parliamentary website. You will be sent a copy of the transcript and will be able to revise any minor errors. You are welcome to submit any supplementary written evidence—this is very important—after the session.

Witnesses and Members are reminded to speak up so that everyone can hear them properly. The acoustics are reasonably good, but sometimes people mumble. Would you like to make brief opening remarks, starting on the left of the panel? Can you, for the record, say who you are?

Dr Sue Wolfe: I am Dr Sue Wolfe. I am project manager with a company called Callen-Lenz Associates Limited and its sister company URSULA Agriculture Limited. I also represent the trade association for small UAS (Unmanned Aircraft Systems), ARPAS UK, and two other user groups from the Remote Sensing and Photogrammetry Society and the National Centre for Precision Farming at Harper Adams University.

Neil Watson: My name is Neil Watson. I am the civil RPAS campaign lead for Thales UK, which is based at Crawley and is looking at the civil and commercial viability of RPAS (Remotely Piloted Aircraft Systems) operations, primarily beyond line of sight: namely, the larger 150 kilogram-class UAVs in the civil domain.

Ray Mann: My name is Ray Mann. I am the owner and managing director of West Wales Airport, which established the National Aeronautical Centre along with Newquay Airport in Cornwall. We have been flying unmanned systems there since 2004, so we are the most established centre anywhere in Europe at the moment for flying unmanned systems, particularly beyond visual line of sight.

The Chairman: Thank you very much. Just before I ask the first question, can I clarify something with Dr Wolfe? You said that you represented the small RPAS. Are the big RPAS those over 150 kilograms?

Dr Sue Wolfe: That is right, yes.

The Chairman: So you represent everything under 150 kilograms?

Dr Sue Wolfe: Yes, at the smaller end of the spectrum: generally 20 kilograms.

Q25 The Chairman: I see. So there is not much between 20 and 150 kilograms. That is interesting.

You have a copy of the questions, and I am asking the first one. Has the European Commission's communication on the civil use of RPAS identified the main issues in the use of RPAS in Europe: safety authorisations, privacy and data protection, security of control, liability and insurance, and EU-funded research and development? Who would like to start?

Ray Mann: That is a broad question, but the answer is no, particularly when we look at safety authorisation and privacy and data protection. I think everybody is aware of the road map that has been produced by Europe. It covers all eventualities, but it does not really address what safety authorisation is because it struggles to address what type of technology

we are likely to use to ensure that that safety is achieved. There are a lot of shortfalls in its current proposals.

The Chairman: Yes, I see. Do you agree, Mr Watson?

Neil Watson: Yes. It is a mixed bag really. I think it is a very good definition of the problem space. It complements the airspace integration road map, which the European Commission produced back in 2012, and it is a kind of update and executive summary of the position that we are in, but as Ray says it raises an awful lot more questions than answers. It recognises that an awful lot of stakeholders are involved in it, and it comes down to a proportionate course of action in the evolving regulatory process. We talk about equivalence in safety with manned aviation, we talk about transparency with air traffic management, but the third tenet, which is equally important but often does not come across, is fairness. It has to be proportionate. We are not looking for over-equivalence or an overexerted level of safety. It is good, but it needs some caveats in some of the areas that it addresses.

The Chairman: Can I ask you to expand a little further on fairness? Are you suggesting that the larger manned aircraft are dealt with more fairly?

Neil Watson: Yes. It is not a one-size-fits-all. As Sue was saying, the 20-kilogram problem space is somewhat different from that of the larger and more strategic assets that we are looking at. We just need to be careful that regulation is proportionate and is directed at the right level to the right community.

Dr Sue Wolfe: I agree with Neil, but I would say that there is likely to be a change in the way regulation goes forward in that it will not be on the basis of the size limit but on the basis of risk and operation. While in principle that is fine—it helps to define the level of risk—there has been a long tradition within the small UAS community of working at a national level with the Civil Aviation Authority. There is a great rapport there, and at the moment the UK has some advantage compared with other countries because of that great working relationship. The concern of the small UAS community is about where that regulation is going to be in the future. Is there still going to be that relationship at a national level? We certainly want there to be.

The Chairman: Of course there is also the other dimension, which is the general public's concern about privacy, which comes into it. Thank you. That is a very good answer.

Q26 Lord Cotter: Despite significant RPAS commercial activity in the UK, operations are still, according to the CAA⁵³, subject to a number of restrictions. What are the key technologies that will allow relaxation of these constraints? Are the same technologies required for the both small and larger RPAS?

Ray Mann: The constraints are specific at the moment in that there are limitations to the area in which small systems under 20 kilos can operate. Although these systems are aircraft and are recognised as aircraft, they can do things that aircraft could not do previously. They can come much closer, they can fly much lower, they can achieve much more definition, but of course that causes a lot of problems with security, privacy and data protection. Those are

⁵³ Civil Aviation Authority

the three issues for very small systems. What has been invented is capable in a different way from previous aviation.

The current regulation on larger systems stipulates that if we are flying them beyond visual line of sight we have to fly them within a segregated airspace, so the airspace is free from other air users except from a safety point of view. These are larger systems that are more recognisable as aircraft. They are capable to similar levels and have the same restrictions that aircraft have in that they can get close to things, so the constraints are down to technology. How can we ensure that we have the equivalent command and control when a pilot is in a ground control station, as he would be if he was in the cockpit of an aeroplane? That is the main restriction.

We hear a lot about sense and avoid systems. We use sense and avoid systems today because a lot of aircraft fly in cloud and cannot use the Mark 1 eyeball⁵⁴. They have to use other systems: they have to use radar and other mechanisms on board that enable them to understand where they are and how they are relating to other aircraft.

The command and control link is the difference between a pilot on the ground and a pilot in the cockpit. It is that technology and that network of communications capability that we in this country could establish on our own. We could lay down a complete network of capability and run unmanned systems just in this country, because we are the right size of country to do that. If you are a very large country, it will be very difficult to put a network in that will give you the command and control that you need. Therefore, a little like with mobile phones, when you move to one location you pick up a signal, when you move to another location you pick up a signal. With unmanned systems we need a technology that ensures that that command and control is always linked to the aircraft, so that no matter what happens in any circumstance the control can be taken from the ground.

Q27 The Chairman: That is a very interesting concept. Have you pursued the thought of us being independent and doing it, in view of the fact that we are a European Union Select Committee and are doing scrutiny from the point of view of regulation, et cetera, which is likely to and has come from the European Union? I do not think that that is feasible, is it?

Ray Mann: Currently, it is not 2016, so Europe has not taken everything away from us. In 2016 we lose control of systems under 150 kilograms. However, if we look closely at the capability of the CAA, it can credit and certificate things that are even larger than that within our own airspace. So we have some autonomy. The secret is this. I read somewhere the other day—I think it may have come out of these hearings—that the value of the industry for systems that can fly beyond visual line of site is £100 billion pounds a year. When you consider that as a goal for UK plc, I am strongly tempted to look to our own aerospace industry and to our own capabilities in this country, both regulatory and technically, to be able to achieve this and to export that to the rest of the world. The opportunity is there.

The Chairman: That is an interesting thought.

⁵⁴ Mark I Eyeball refers to the search for specific information using one's eyes rather as opposed to relying on instrumentation.

Lord Brooke of Alverthorpe: Very quickly on this, we have a European Union country that is extraordinarily close to us: not France but the Republic of Ireland. Are you saying that you believe we could run a command and control system in the UK that would prevent a small RPAS going into Ireland?

Ray Mann: Yes. Command and control is not just for the systems themselves to be able to fly and operate them, but is about being able to control them. This is one of the things that we need with security, and we have this currently with manned aircraft. We know what they are, where they are, and who is operating them.

Lord Brooke of Alverthorpe: Yes, but are we not talking about the smaller, recreational systems, where people will not know who the controller is and what their intentions are? Could you argue that those individuals could be controlled?

Ray Mann: If you wanted to go to Ireland with a very small RPAS, under 20 kilograms, I do not think you would reach it. It is simply not large enough.

The Chairman: But you could export them.

Lord Brooke of Alverthorpe: Do you think that in five years' time it will be able to do it?

Ray Mann: It could, but in principle at the moment it does not have the endurance to be able to make those distances. That is where systems under 20 kilograms tend to operate—in a local area within line of sight. It is a specific case.

Lord Brooke of Alverthorpe: It is a bit like mobile phones when they were brick-sized.

The Chairman: Indeed. Now they are so small, we lose them.

Lord Clinton-Davis: Could I ask a question about this? Presumably you have meetings with representatives of the European Union. Who are they, and how often do meetings take place?

Ray Mann: We, at West Wales Airport, and the NAC tend not to engage ourselves too much at the moment with work that is carried out by Europe. We are a facility for the development of systems and not operators of systems themselves. Perhaps Neil can answer that.

Neil Watson: As regards European engagement, there are a couple of imperatives and large programmes that are looking at the integration of RPAS. SESAR⁵⁵ is a good example. From an air traffic management perspective, they are looking at harmonising a set of rules that will enable RPAS to be accommodated within the next generation of the ATM infrastructure. As you know, in terms of capacity, efficiency, safety and environment footprint, there is a set of objectives that Europe is aspiring to meet.

The really good thing about a programme such as SESAR is that it has woken up to the presence and importance of RPAS as a viable airspace user. It is being accommodated in the next phase of SESAR, which is called Horizon 2020 and will run for the next five years, and is

⁵⁵ Single European Sky Air Traffic Management Joint Undertaking

looking at how an air traffic controller deals with an RPAS and the fundamental differences in its operating characteristics. There are some good things. Predictability is a key positive, if you like, for RPAS compared with aviation. If something goes wrong an RPAS will take a set of pre-programmed responses. Air traffic controllers like predictability. So SESAR is one example.

The other, from the regulatory aspect, is the work that we are doing with the European regulator, EASA⁵⁶, through industry participation in the Eurocae⁵⁷ working groups. Eurocae is the organisation responsible for developing standards and procedures that feed into EASA. They are now planning on working with JARUS⁵⁸—I know there has been a lot of discussion about that in preceding hearings—which is a regulatory body. Now the constructs of EASA will engender more harmonisation between the two.

The Chairman: We will come to that question later.

Q28 Lord Clinton-Davis: Can I ask a question about the regulatory arrangements between the European Aviation Safety Agency and the Joint Authorities for Rulemaking on Unmanned Systems—JARUS. Is there sufficient delineation of responsibility between those two? How would you propose any development of regulations as far as practice is concerned?

Neil Watson: I wonder whether EASA has more interest in how things work and JARUS has more interest in how they should be regulated. The problem with EASA is that it is having difficulty second-guessing the technology that is possibly going to be applied for RPAS to operate as safely as a manned system. Maybe one of the reasons why JARUS has not been successful in coming forward with a timetable for rulemaking and is a long way behind the curve is because EASA has not been able to establish the manner in which we would do it. So I do not see that it would be possible to build an industry on the back of regulation. You build an industry and usually the regulation comes in behind it. That is why we are now talking quite seriously about the small systems, those under 20 kilograms: there is a proliferation of them, and they have to be addressed sooner rather than later.

Dr Sue Wolfe: The point about the small UAS is actually very pertinent. That industry exists now—it is commercial.

On your question about the relationship between the regulators, there has been a lot of work between industry from the small UAS perspective and the national regulator—the Civil Aviation Authority. As I mentioned earlier, that has helped to drive the industry very strongly. I agree with Ray Mann about there being two elements: there is the development of the regulation itself and the implementation process. They need to go hand in hand, because they impact on how the industry works. So, yes, at the small scale there is a lot of joint working with the regulator at a national level. That has not happened as yet at a European level, because we are not really at that stage. That comes back to the concern of the small UAS community about what will happen there with those relationships and how that regulatory work is ongoing.

⁵⁶ European Aviation Safety Agency

⁵⁷ European Organisation for Civil Aviation Equipment

⁵⁸ Joint Authorities for Rulemaking on Unmanned Systems

I would also say that this is not necessarily just about industry involvement; I do not know whether there will be a question later about working with Higher Education Institutions (HEIs) in academia. There is now a lot of activity in academia, both in driving UAS and the technology itself, but also in using UAS as a tool. Therefore there could be quite a significant interest from an academic perspective about engaging on the regulation as well.

The Chairman: Lord Haskel, you wanted to ask a question.

Lord Haskel: What, then, is happening at the present time? Are people just ignoring any possible regulations, are they just doing whatever they want to do, or are they just not flying?

Dr Sue Wolfe: Absolutely not at all. Basically, small UAS operators gain an exemption where they need to from the Civil Aviation Authority via a process that is laid down in a document called CAP 722⁵⁹. There are certain mechanisms whereby small UAS are allowed to operate in the UK, under certain restrictions—for example, within line of sight and certain height restrictions. That is the basis upon which the whole industry in the UK with small UAS has evolved. So the industry as it stands is already quite vibrant, even within those restrictions. If we can start to drive those restrictions just a little bit further, the industry will begin to open up more and more. Therefore because of that process, we have an industry that in many other countries does not yet exist.

Q29 Baroness Hooper: My question is about the European Union’s research programme. You already referred to SESAR, which is an example. Do you feel that these will be adequate and sufficient to provide the necessary infrastructures for the future?

Neil Watson: It is a partial solution. Because SESAR is absolutely focused on air traffic management, by implication you are looking at RPAS operations in controlled airspace: that is, airspace where you have air traffic management oversight. However, it is not looking at the type of airspace that the small RPAS community is likely to operate in: the line of sight type of operations.

Therefore of huge interest to me are the baby steps that we need to take to achieve full airspace integration. To move from operations in segregated airspace, where we are at the moment, the next step has to be to take the operational envelope into controlled airspace, because then you can rely on NATS⁶⁰—as it is in the UK—to provide the necessary separation assurance to complement the onboard detect-and-avoid systems that Ray referred to earlier on. SESAR is a very useful programme; it embraces RPAS, and our work package at this moment is being defined for the start of Horizon 2020, which will kick off next year. So it is addressing it with the proper, robust approach, but it is only a partial solution for the larger type of area that we will operate in: in controlled airspace. Typically that airspace starts in the UK at about 10,000 feet, so you have to get up there and then have the necessary equipage, and there are certain requisites that you need to meet to be allowed into the controlled airspace.

Baroness Hooper: So there is nothing in the pipeline to deal with the smaller ones.

⁵⁹ Civil Aviation Authority guidance document for RPAS operations

⁶⁰ National Air Traffic Services

Dr Sue Wolfe: Nothing is going through in a structured way at a European level at this stage. There is an additional concern that at the moment that sector of the market is very much driven by small businesses as well, whose ability to engage in some of the larger programmes can be a challenge. There are issues there at a number of levels.

Ray Mann: You mentioned EU airspace. Airspace is of course everywhere. Neil referred to the corridors that we use, such as A-class airspace, to keep passenger airlines in particular secure. RPAS beyond line of sight can operate anywhere, and should be able to do so, because that is where the work that they would undertake would be carried out. Therefore, to say that the CAA will eventually provide any necessary infrastructure is to hope for the best at the moment.

Baroness Hooper: I think I gather from what you are saying that you feel that research ought to be done in this area, which is growing so swiftly.

Ray Mann: Absolutely, and some of the EU packages that have been put forward for development in this area are unfortunately looking a bit too far over the horizon. We have an aviation infrastructure that is global, not just UK or European. We can enable unmanned systems to enter that infrastructure with some sensible caveats, proven technologies and confidence built into those technologies to be able to do it. The problem is that it is a bit all embracing. There is an industry that wants to get moving here. We have technology available to us in the UK that we are not applying well enough or efficiently enough.

The Chairman: I was just going to ask where this is going in the growth pattern. One of the things that we are looking at is obviously the potential for growth in the UK economy, and indeed growth in overseas sales. If issues like this are not sorted out, that is not likely to happen, is it?

Ray Mann: If we wait for regulation, the tail is probably wagging the dog. This waiting game has been going on for 10 years in the industry, and it has prevented a lot of companies from investing in research and development and taking a capability to demonstration and to market to enable systems to be produced, so there is a need to enable the regulation to meet those systems and the infrastructure to be regulated accordingly.

The Chairman: But looking at industry as a whole, and beyond the EU, events in the US have not helped, have they?

Ray Mann: No.

Q30 Lord Brooke of Alverthorpe: I would like to come back to RPAS—the smaller ones, primarily—and the fears about invasions of privacy and the potential physical threat to people and property. We opened up with some conversations on sense and avoid⁶¹. Could that apply down the line to the smaller ones?

On the issue of tracing who is controlling particularly the smaller ones, have you any ideas about how that could be tackled? The CAA is well removed at the moment from those

⁶¹ 'Detect and avoid' (also referred to as 'sense and avoid') refers to the ability of an aircraft to avoid mid-air collisions

individuals. Indeed, everyone is well removed from them. Generally we would like to have any suggestions that you might put to us about areas that we should be looking at.

Dr Sue Wolfe: Certainly what you might call the new hobbyist community—operators who do not consider an RPAS as an aircraft—are, as you say, of the biggest concern. It is particularly of concern to the small UAS community that is currently commercial. As you said, as we can see from the situation in the US, it could have a severe impact on that business base of all the industry that is currently in operation, so it is of concern to the industry as a whole to make sure that we maintain that professionalism and a way of being able to police operations that impact on privacy. It is very difficult to see what could be done to prevent that. Obviously it is difficult physically to prevent somebody operating a UAS in that manner.

However, two things could begin to make a difference. Reference has already been made this evening to not knowing who is controlling an RPAS. If there was some mechanism to be able at least to have some sort of point of sale record, some sort of licence—and not just for commercial UAS but UAS across the board—there would be data: some information that could be used, and some form of licence for all users. In other operations, such as driving a car or traditional operations, there is an obvious deterrent, because you know that there is a good chance of prosecution if you do not obey whatever the order is, which in this case is the Air Navigation Order.⁶² If there is much greater emphasis on prosecuting operators who contravene the order and a very high level of communication of that, that begins to form more of a deterrent to operators who may well otherwise be looking to break the order because they feel that there will be no prosecution. However, that will be resource-intensive, so it has to be borne in mind that to do that will require additional resource.

Ray Mann: If I could add to that, I spoke earlier about the potential for a network of communications in this country. That would help the operator of the system, irrespective of its size, but it would also monitor its use. Therefore that monitoring means that we know where they are, what they are doing, and who is operating it. If we take a soft approach currently to an issue that could grow out of control, before something quite serious happens, we could be too late.

The Chairman: I was thinking of bolting the stable door after the horse has bolted. The fact is, how would we separate such a scheme from the hobbyists—the model aeroplane people? They have been allowed to run free for so long, and to try to get them back into the box—I am mixing metaphors madly—is impossible, because even when you buy these things, it does not say anything about what care should be taken or anything.

Dr Sue Wolfe: There are two hobbyist markets. There is the more traditional hobbyist market, which is regulated at a level by the BMFA⁶³ and is the level of operation which the CAA currently sees as quite a low risk. They are professional hobbyists and they have a lot of experience, so a lot of the sales are in that sector of the market, which is relatively low risk. To focus on the new hobbyist is absolutely critical. Yes, a lot of aircraft are in use at the moment, but the longer we leave it before we do something, the more serious that situation will become.

⁶² The Air Navigation Order 2009 is legislation regarding safe use of aircraft.

⁶³ The British Model Flying Association

Ray Mann: We also have to consider that it is not just an aircraft; it has what they call a payload, which is invariably a camera, so the camera is as important to regulate from a privacy and data protection point of view as the safety of the flying system itself is. You have to address two issues.

Neil Watson: It is very much an educational, public awareness approach that needs to be the imperative.

Q31 Lord Brooke of Alverthorpe: First, do you think that the existing regulations on privacy and data protection are adequate for this purpose? Secondly, last week, when the CAA gave evidence to us, they indicated that two specific articles of the Air Navigation Order were capable of amendment. We did not get the chance at the time to go into those, but no doubt you will be aware of what those articles are. Would you care to comment on that and help us with them?

Ray Mann: Are the privacy and data protection laws sufficient? On paper they probably are. Whether we could get them to apply to the hobbyists and the people who can buy these flat-packs for £500 for Christmas will be quite another thing. I wonder whether they would even address the fact that those laws exist. My biggest concern is having the laws in place, both from a health and safety point of view and from a data protection point of view, and how we are going to police that. With that network of information coming to and from the operating systems, we have a chance to do that. However, a Pandora's box has been opened, and we have to bring them back in.

Lord Haskel: With all this in place, what is the likelihood of hackers taking control of these RPAS?

Ray Mann: Not very much at the moment, thankfully. That is one of the things that we are capable of at this stage. The crypto-capability is significant and at a very high level—bear in mind that there are crypto-capabilities on normal jet airliners as well—so a lot of the transmissions and the traffic over the airways is being safeguarded. That is something that we have in our favour.

Neil Watson: On the larger, beyond line-of-sight operations, obviously military platforms will use encrypted data links, so they will have that secure data link, whether for command and control or for dissemination of sensor products. However, it is interesting, and a conundrum for the future, that as the window of operations for civil RPAS extends, you will have to look at the integrity of that data link. Yes, at the moment they are battery-powered and have limited endurance, and line of sight is as far as they go, but as those boundaries begin to be extended—and people want to extend them—the integrity of the data link is a key topic that will have to be addressed in the future to sustain the market in that area.

The Chairman: It is not the only key topic; this area is full of them. I am afraid that we will have a Division very shortly, which means that we will be absent for about 12 minutes. When the Division occurs, you will not be able to think for the noise, so we will try to get through as much as you can. The Minister is speaking at the moment, but after this there will probably be a Division.

Q32 Lord Fearn: The UK has a significant but underused resource in the West Wales Airport and the National Aeronautical Centre. How can this facility and other resources such as higher education institutions be used to encourage more UK RPAS manufacturers?

Ray Mann: It is significant. It is not completely under resourced or underutilised. However, it struggles to send out the message that it is available for use. One of the things that seems to be happening in the industry is that there is a focus of attention on the whole system, but not very much attention is paid to the individual subsystems that enable the whole system to operate. I am talking about things like ground control stations, command and control capabilities, and other navigation potential. Even the network that controls those things is another instance. We at the NAC⁶⁴ find ourselves in a situation that we have created. They will come, but we are still waiting for them to come. However, they are moving, slowly. There is beginning to be some recognition.

In a way, one would think that if we created regulation, that would be a focus for the requirements for technology. However, we need to do more to advertise that there is a technological requirement for a number of different areas of this industry. We are trying to promote that now by going into a variety of initiatives and bringing them to the fore. We already have the capability to operate. We have the most advanced and capable environment for this type of work anywhere in the world. However, we now need to awaken our industries and our academic centres to maximise that.

Lord Fearn: When did you give out an invitation?

Ray Mann: About 10 years ago—I am afraid that we were a little early on the block. However, we have always been in the right place at the right time, and it will be utilised—I have no fear about that.

Lord Fearn: What is the Watchkeeper system?

Ray Mann: The Watchkeeper system operates out of West Wales Airport at the moment. It was the only centre in the UK that it could operate from, so it was rather fortunate that we embarked on this. We did somebody a favour.

The Chairman: And created jobs, I hope.

Ray Mann: We created a lot of jobs, and introduced a lot of money into the local economy every year from a standing start. But there is a long way to go with this area.

Lord Clinton-Davis: Who runs West Wales Airport?

Ray Mann: My company, West Wales Airport Limited, runs it. It used to be Aberporth Airfield, years ago, which was acquired in 2002.

The Chairman: Mr Watson or Dr Wolfe, is there anything to add to that question from Lord Fearn?

⁶⁴ National Aeronautical Centre

Dr Sue Wolfe: I will add a couple of comments that relate to HEI resource. The HEI resource in the UK has a huge amount to add here, and a lot of research is ongoing at the moment. A lot more could be done, particularly from the perspective of small UAS. That comes back to the availability of research funding that looks at the small-scale. We referred to the issue earlier in that some of the larger Horizon 2020 programmes are probably more geared to the large end. There is currently a small UAS consortium that is pulling together a project to look at some of these key issues, but again there is quite a strong limit to the resources that are available to bid into for consortia like that to be able to move forward.

Lord Fearn: I do not get the industry being involved at all, by the sound of it, with the actual technical knowledge that is going on. Is that the case all the time?

Dr Sue Wolfe: No. There is a lot of involvement of some companies, but there is the challenge of the business model for how small operators can work together with academia and the end user. Part of the development and R&D programmes⁶⁵ will be about looking at the business model as well as the technology. It is operating at a level, but a lot more could be done.

The Chairman: Mr Watson, you wanted to add something.

Neil Watson: To add to what Sue said, the business model governs the pace for the large community as well, so as the regulatory frameworks are established and become institutionalised, and as confidence grows and you reach that market take-off, the next stage is going to have to trialling the capabilities. Hopefully, we will then see changes in capacity and utilisation in the next couple of years.

The Chairman: Finally, Mr Mann, you wanted to come in.

Ray Mann: One of the things that is driving this is the marketplace for their use. I still think that to some degree there is a little reluctance on the part of industry to recognise that there is a marketplace out there. We have quite a large job to do. We have to ensure that we can enable them to operate, that we can give them the best possible accommodation, and that we can demonstrate to them where that marketplace is and to some degree how they can reach it. Even now, the company that is supposed to be equivalent to an airport operator has had to produce its own road map for unmanned systems to reach certification and to be put to work in a marketplace that does exist.

The Chairman: Thank you. A final question to you from Lord Wilson.

Q33 Lord Wilson of Tillyorn: I will be quick. A possible limitation has been suggested to us, particularly by the Royal Aeronautical Society, that the radio spectrum is a potential problem. Is it? If it is, is it the sort of thing that can be dealt with at the national, European or international level?

Ray Mann: I think it is about where you start. We should start in this country, because we have such capability within ourselves. I cannot answer on behalf of Ofcom with regard to what is available and how much the spectrum is squeezed by mobile telephones and so on,

⁶⁵ Research and Development

but there are certainly ways of operating that will enable us to have secure radio links and to have those links repeat themselves within a network that could be the whole of the UK. If we begin to worry about the availability of the spectrum at this time, we are assuming that if only a small amount of spectrum is available then by definition we have the potential for security breaches on that spectrum and interference with that spectrum, whether accidental or otherwise. However, it comes down to how we look to the command and control capability. I keep mentioning this because it is a real subject matter—you could throw it towards a university or a private company—but it is something that people can bring to the fore, and there is technology out there that is capable today.

Lord Wilson of Tillyorn: Are you suggesting that there is no limitation on the spectrum, or do you just not know?

Ray Mann: I am not absolutely certain. That is my best guess from where I sit at the moment, which is limited—as I say, I do not have that much detail on spectrum availability—but I do know that we have enough to work with, and if we use it successfully we can do this. We are squeezing the spectrum all the time; we are doing it in manned aviation, with radar and so on. A lot of people have a play.

The Chairman: Could you give us additional evidence on that? Could you write us a note about it? That would be wonderful, thank you.

Lord Haskel: Has spectrum been allocated?

Neil Watson: Yes. The World Radiocommunication Conference is the real decision-making forum for spectrum, and it has allocated terrestrial spectrum. There is now a huge debate on how best to utilise that. The other thing is space-borne operations and satellite communications. Those are the two key agenda topics for the next World Radiocommunication Conference. The trouble is that it is in 2015. They are periodic, so expediency probably needs to be looked at.

Dr Sue Wolfe: I concur with Neil that it is essential to go via the World Radiocommunication Conference, because if we are going to be operating between countries, somebody looking internally is not going to be sufficient.

The Chairman: Thank you very much. Are there any points that Members would like to make? No. Are there any questions that the witnesses think we should have asked you that we have not? Are there any gaps in our knowledge? If you think of things that we really ought to know, we would be very grateful if you could submit it in written evidence.

Q34 Lord Brooke of Alverthorpe: This is probably a question for Thales. Is there any way in which we can find the means of installing technology in machines that will enable us right from the beginning to know when they were produced in the factory and by whom, so that in turn we will know how we can trace them?

Neil Watson: There are degrees of sophistication, but yes, all parts are traceable. That is a prerequisite to achieving a certificate of airworthiness. You need to be able to trace each component in an RPAS to get a certificate as things stand at the moment. I do not know whether you are looking for something more sophisticated than that.

Lord Brooke of Alverthorpe: We can chip 6 million dogs. We try to trace who owns them. The number of these is relatively small, so one would think that technology could be developed so that something could be embedded in them that could not be taken out easily. Is anybody working on that?

Neil Watson: I will take that away and perhaps get back to you on that.

The Chairman: We would be very grateful, thank you.

Q35 Baroness Hooper: You said that you were not in touch with anybody in the European Commission in this field. Are you in touch with other bodies or people in the field in other European Union countries? Is there any meeting of minds about this? Do you have a forum to discuss this in?

Ray Mann: There is a lot of meeting of minds each year, I think. It would be difficult to keep up with all the conferencing that is going on about RPAS at the moment throughout Europe. The problem is that in the past few years we have been rather talking to our navel to some degree. It has seized up. There is nothing much new to say. I know that Gerry Corbett from the CAA gave evidence previously. He now says, “This is as much as I can tell you at the moment, because nobody is bringing anything to the CAA, nobody is actually offering the CAA anything for certification. Yet they are quite prepared to receive systems for certification”. Nowhere in the world does any civil aviation authority ever receive any system for certification. They seem to be waiting for regulation. It is a rather back to front affair.

The Chairman: It seems to be becoming a very live issue at the moment.

Ray Mann: It is a live issue for different reasons, Lord Chairman. The systems that are there now have brought altogether another concern for the whole of the RPAS industry, not just one end, so we are having to address all of it.

Neil Watson: It is probably worth adding that now that the European Commission has published its airspace integration road map and charged EASA with the responsibility for the regulation and SESAR for the research and technology (R&T) aspect of delivering the road map, there is a little more traction and the pace of progress will improve. If you look at the annexes to the road map, the thickest annexe is the one on the societal issues. We used to refer to those as soft issues.

Dr Sue Wolfe: Industry practitioners themselves, such as the small companies, have quite a strong role to play on the societal issues and in developing codes of practice and becoming professional bodies to ensure that there is a professional code of conduct that can be adhered to.

The Chairman: So everybody has to be on their toes now. Thank you very much indeed. It has been a very useful session and we are very grateful to you. You have managed to get out before the bell.

Center for Democracy and Technology (CDT)—Written evidence (RPA0034)

RE: Evidence for the House of Lords European Union Committee regarding the civil use of RPAS in the EU.

The Center for Democracy & Technology (CDT) is pleased to submit evidence in response to the Internal Market, Infrastructure and Employment Sub-Committee's call for evidence on its inquiry into the civil use in the EU of RPAS.

The inquiry's objective is commendable: striking the right balance between fostering innovation and protecting citizens' privacy and security has proven challenging for legislators both within the EU, the United States and abroad. CDT hopes our submission will help the Committee identify the appropriate middle ground.

The following submission will respond to Question 6: *Are there existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?*

Protecting citizens' right to privacy as it relates to civil use of RPAS will not require an entirely new legal framework — the EU Data Protection Directive's principles are applicable to RPAS use. However, as indicated in our 2011 comments to the European Commission, more specificity is needed within the Directive and EU member states' regulatory regimes to respond to privacy concerns presented by emerging technologies.⁶⁶ Any changes to the Directive or other legal acts or guidance should include (1) reasonable limits on RPAS surveillance, data retention and image identification technologies, as well as (2) the creation of publicly available standardized information on RPAS owners and operators.

1. Reasonable limits should be placed on RPAS surveillance, data retention and image identification technologies.

Data protection authorities should focus on providing clear guidance on the applicability of the Directive and their state's regulations to RPAS use, and robust enforcement against bad actors who do not comply with these rules. EU member states' implementation and enforcement of the Directive's principles should include placing reasonable limits on RPAS surveillance, data retention and image identification technologies.

Limits on surveillance conducted by RPAS.

As the European Commission's April 2014 Communication noted, surveillance equipment installed on RPAS is the most commonly identified privacy risk.⁶⁷

RPAS are capable of going places manned aircraft cannot (such as between narrow buildings) and operating in environments that humans cannot (such as during high-g tactical

⁶⁶ Comments of the Center for Democracy & Technology to the European Commission in the Matter of Consultation on the Commission's Comprehensive Approach on Personal Data Protection in the European Union, January 15, 2011, https://cdt.org/files/pdfs/CDT_DPD_Comments.pdf.

⁶⁷ Communication from the Commission to the European Parliament and the Council, *A new era for aviation: Opening the aviation market to the civil use of remotely piloted aircraft systems in a safe and sustainable manner*, April 8, 2014, <http://eurlex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52014DC0207>

maneuvers, high altitudes and long times aloft). RPAS, like manned aircraft, have unique vantage points allowing for levels of surveillance that ground-based individuals may not expect. Moreover, RPAS are becoming more affordable — a simple search for “drone with camera” on popular online shopping websites shows the availability of RPAs equipped with video cameras for well under 100 American dollars.⁶⁸

RPAS surveillance may be appropriate in many contexts, however these technologies should not lead to limitless snooping into individuals’ private lives. Regulations on RPAS should set boundaries for surveillance equipment use: RPAS should not, for example, be allowed to peer into windows of people’s homes. Some abusive uses of private RPAs should be clearly covered by existing harassment and stalking laws. There should also be reasonable rules limiting RPAS surveillance of areas immediately outside of the home or outdoor spaces on private lands that are enclosed or protected from observation by a passerby on the ground. While it would not be practical to prohibit RPAS surveillance from public airspace of all private property, some private lands may be sufficiently unobservable by ordinary means that RPAS surveillance would be contrary to reasonable privacy expectations.

Therefore, CDT recommends formal guidance from privacy regulators delineating the areas where data subjects would reasonably expect to be shielded from public surveillance — certainly within their homes, but potentially for other privately held property where a data subject would have a reasonable expectation of privacy. We encourage data protection authorities to explore and solicit public input on reasonable guidelines to determine where such an expectation exists.

Limits on retention of RPAS collected data.

In addition to RPAS surveillance limitations, reasonable restrictions must be placed on how long data collected through RPAS may be retained. This is in line with the proportionality principle of the Directive: Article 6 requires member states to ensure personal data is “adequate, relevant and not excessive in relation to the purposes for which they are collected and/or further processed.” The Directive further requires that data is kept up to date and not in a form that permits identification for longer than is necessary. Enforcement of these guidelines should thus include limiting retention of RPAS-collected personal data.

Data minimization is one of the most important privacy principles in the RPAS context and deserves particular attention from EU member states. Given RPAS’ unique ability to collect data on an individual without his or her knowledge or consent, placing limits on how long this data is kept will reinforce citizens’ fundamental privacy rights and reduce the likelihood of data breaches that may result from lengthy retention.

CDT recommends regulatory authorities distinguish between “identifiable” information that personally identifies someone (such as a name, picture, or biometric reading) and “unidentifiable” or anonymous data points when determining data retention limits. Identifiable information should only be retained for specified purposes and should be

⁶⁸ Amazon, Search for “drone with camera,” October 10, 2014, http://www.amazon.com/s/ref=nav_search_go?url=search-alias%3Daps&fieldkeywods=drone+with+camera&rh=i%3Aaps%2Ck%3Adrone+with+camera.

permanently deleted within a given period of time — CDT has previously argued for deletion or de-identification of these data types within ninety days of collection absent a compelling reason to retain longer or for journalist purposes.⁶⁹ Unidentifiable information or data that has been “de-identified” to remove all identifying features, may be retained for longer periods. De-identification processes may include (but are not limited to) removing names, birth dates and phone numbers, or blurring personal aspects of a data subject.

Limits on use of identification technologies.

CDT believes limits should be placed on the use of facial recognition or other automated identification technologies on RPAS-collected images. Civil use of RPAS will potentially produce numerous images of persons that may not be recognizable without the assistance of identification technologies. Biometric scanning, automated license plate scanners, and other tools designed to identify a person based on their unique physical or behavioral characteristics, could allow for identification of every person captured by a commercial RPAS while walking in a public space.

In general, we do not believe that universal recognition of everyone in public (or even private) spaces is necessary, reasonable, or proportional. Certain uses of these technologies to identify general characteristics of individuals may be acceptable — such as biometric characteristic collection that flags someone as falling within a general category like “young woman” or “blond-haired man” — however the categories must be sufficiently large to prevent someone from identifying specific individuals. It may also be permissible to ephemerally scan attributes such as faces or license plates for *specific known images*, like a missing child, a stolen car, or a wanted terrorist. However, the biometric identifiers associated with non-suspect individuals should not be logged or maintained.

2. Standardized information on RPAS owners and operators should be publicly available.

CDT recommends a license plate-type identification system for RPAS and accompanying RPAS registry. Ideally, all RPAS would be marked with a consistent identifier that is used to track and report the RPAS’ movements. However traditional license plate identifiers likely will not be detectable from the ground given RPAS’ small size and ability to fly at high altitudes. A more practical solution would be to require that all RPAS are configured to emit a standardized signal identifying the drone (such as through a registration number) that is detectable using radio frequency readers, or to provide identification information in response to interrogation by a radio frequency reader.⁷⁰

In addition to identification signals, regulatory authorities could establish a commercial RPAS registry where interested parties may access metadata on the RPAS transmitted through its identification signal — including names of the owner and operator(s) — as well as a link to other information on the RPAS, such as the owner’s privacy policy. This registry should be public facing and searchable. (There should be an exception for RPAS such as model aircraft that are designed for personal use.)

⁶⁹ Comments of the Center for Democracy & Technology to the Federal Aviation Administration on Unmanned Aircraft System Test Site Program, April 23, 2013, https://www.cdt.org/files/file/CDTComments_FAA-UAS.pdf

⁷⁰ For more information, see Joseph Lorenzo Hall, Center for Democracy & Technology blog, “License Plates” for Drones?, March 8, 2013, <https://cdt.org/blog/license-plates-for-drones/>

This regulatory system should also require detailed statements from the RPAS' owner outlining the RPAS' purpose, planned operations and capabilities. CDT's previous submissions to American regulatory authorities propose requiring RPAS operators in the US to submit a licensing statement, or Data Collection Statement ("DCS"), as a condition of receiving a license to operate.⁷¹ The DCS would be accessible from the RPAS registry and include information such as:

- The purpose for which the RPAS has been obtained;
- The scope of information that will be collected by the RPAS;
- The length of time information collected by the RPAS will be retained;
- Parties that will have access to information collected by the RPAS;
- How data collection will be minimized or aggregated and a procedure for data deletion;
- The possible impact the RPAS will have on individuals' privacy and the methods the operator will employ to mitigate this impact; and
- An individual point of contact for citizen complaints.

We believe this framework would be equally as effective in the EU. A licensing statement essentially serves as the RPAS owner's privacy policy. Allowing the public access to a detailed overview on the RPAS' past and current operations reinforces the Data Protection Directive's principle of transparency and will empower EU member state citizens to safeguard their right to privacy.

20 October 2014

⁷¹ Comments of the Center for Democracy & Technology to the Federal Aviation Administration on Unmanned Aircraft System Test Site Program, April 23, 2013, https://www.cdt.org/files/file/CDTComments_FAA-UAS.pdf

Andrew Chadwick—Written evidence (RPA0008)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

8. Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

1. The European Commission (EC) has identified safe operation in non-segregated airspace through regulation and technological developments, security, privacy, liability and insurance, and supporting market development as their priorities for the development of the civil market for RPAS (referred to within our response as Unmanned Aircraft (UA)) and have identified initial actions to be performed to enable this to take place. This is to be applauded, and it is important that in their actions, the EC adopt an all-inclusive approach to market development and not focus purely on the development of regulations, but allow the UA industry, and supporting industries, to develop under their own volition with regulation closely supporting the development of these technologies, not leading it, and not to be an end in themselves.
2. A concern we have is that the EC appears to have dismissed the difference between larger and smaller systems – thereby demonstrating a lack of appreciation of the technology and the short to medium-term market drivers for the industry. The use of smaller UA, in some cases much less than 7kg, is proliferating at an increasing rate. These systems are seen as a cheaper, flexible, and increasingly reliable introduction to UA operations, and equipment for photographic and surveying work, and are more likely to be the more predominant type of UA.
3. It is important that the EC acknowledges this difference, and puts in place a parallel programme for both smaller and larger systems, with differing timescales against each as it is believed that market growth for the smaller (less than 25kg) systems will accelerate at a faster level than that for larger systems as the amount of investment is less, the technology is more versatile, more readily available, accessible, and easier to use. Indeed, the use of small UA as a working tool, working in environments not normally solved with aerial means, is a different approach to the larger systems which are likely to be operated on the whole in a similar manner to manned aircraft.

4. There appears to be a number of mixed messages in the EC Communication. Whilst they are clear about the perceived regulatory and technical developments that will be required to support the development of the market, they have included societal issues which have no bearing on the safe operation and integration of these systems, but are better placed as a separate action, which addresses not just the growth in the use of UA but also other technologies and their potential impact on personal privacy. Respect for the right to private and family life and the protection of personal data, is not a UA issue, it is a pan-European issue and should be addressed separately, outside of UA regulation. Otherwise, this issue will subsume and potentially kill-off this technology before it has a chance to prove itself – as appears to be the case in the United States.
5. Of note, the EC has not included improved airworthiness as a priority for the development of the civil UA market. We believe this need to be added as a matter of urgency. With the growth of the market, the UA available, and the innovative technological developments expected to take place as a result of the UA market growth, emphasis should be given to the provision of airworthiness (i.e. Safety Assurance) guidance for all system types.

2. What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non EU countries, for example in the United States?

6. It is accepted that regulation of larger systems, capable of operating over larger distances, should come under the jurisdiction at an international level, with local monitoring at a national level. However, we believe that for smaller civil systems, used for day-to-day work at a local level, should be managed at that local level under the auspices of the national aviation authority, but under identical regulatory rules as the rest of the EC but with local “geographic” differences to enable day-to-day operations. Indeed we believe that regulation should be related to the size, shape and proposed operation of an UA. It should be noted that it will be difficult to develop a blanket regulation for such a wide variety of air vehicles and sub-systems, as this innovative technology develops, particularly for smaller UA. Indeed, there is a risk that the regulations may restrict the development of the technology.

7. Regulation at a local level enables a closer monitoring of the growth of UA usage and the regulatory developments, and tweaks, required to enable operations. If this function was to be centralised in Europe this “local touch” would be missing.
8. The large number of applications of the technology may mean it is not appropriate to have a blanket set of legislation. One of the strengths of a national aviation authority as a regulator is that it is comfortable reviewing UA operations on a case-by-case basis. In addition, centralised control will mean additional administrative and resource pressures on an already stretched EASA, leading to increased approval timescales, efficiency, etc. thereby adversely affecting the output and growth of this capability and market across Europe. There should be a lighter touch of control from EASA, with authority delegated to a local level, with administrative oversight at a centralised (EASA) level.
9. It is noted that the EC’s actions are leading those elsewhere, particularly in the United States, where the proposed widespread access to US airspace for UA by 2015 is nowhere near realisation. The EC has an opportunity here to take the international lead in technology and regulation development to the benefit of it’s members, and also play a supporting role to US aspirations.

3. In which new or innovative ways do you think RPAS will be used in the future?

10. It is acknowledged that there are no limits to how UA may be used. Indeed, applications currently identified (see below) are really just the tip of the iceberg. Smaller systems are viewed as working tools, whilst the larger systems may replicate manned aircraft use, but in more extreme environments, each being able to perform operations in more demanding environments. A number of applications have been identified by a number of industry bodies and individuals, the following table identifies just some of the potential applications that UA can deliver. Indeed, some of these are already being pursued and a number of companies are already developing business in these sectors. Currently identified examples – for both small and large UA - include:

Scheduled service	Air cargo
Aerial observation	Analysis, measurement, monitoring, tracking and research – particularly environmental, weather, atmosphere, nuclear radiation, marine mammal, farm animals, oceanographic, wildlife census, chemical, biological, volcanic ash cloud, etc.
Aerial survey	Inspection, detection, mapping, measurement, survey – critical infrastructure, vegetation, invasive species, waterways, coastal zones, wind turbine inspection, oil exploration, tidal zones, etc.
Agriculture	Dispensing and spraying, mapping, monitoring crops – fertilizer, insecticide, salt water infiltration, disease infection area, selective harvesting
Fire fighting	Spotting, monitoring, managing various types including building, forests, industrial, fire bombing, rescue assistance
Logging & forestry	Monitoring and mapping – tree growth, disease, harvesting
Photography	Aerial photography, cinema, TV – press, publicity.
Search & Rescue	Urban, harbour, country, inland & coastal waters, avalanche search, etc.
Corporate operations	Aerial photography, power generation companies, farmers, fishing farms, geophysical companies, industrial site owners, surveyors, railway operator, mining, etc.
Police	Crime scene recording, situational awareness, surveillance; illegal activity control; road & Highway traffic surveillance; illegal immigrant & human trafficking control; public gathering surveillance and safety; law enforcement; customs support – anti-smuggling, drug trafficking, border patrol, critical infrastructure surveillance
Coast Guard	Anti-piracy operations, fishery control, maritime surveillance, search & rescue, illegal activity control,

		safety monitoring, lane patrols
	Military operations	
	Emergency communications networks	local, regional, national – including communication relay
	Disaster site monitoring and mapping	Hurricane, earthquake, flood, landslide, mudslide, snow storms, aircraft crash site, train crash, tsunami, tidal surge, ship collision, oil leak contamination, volcanic ash cloud
	Nuclear accident monitoring	Contamination measurement, tracking, accident management
	TV, Movies and Entertainment	

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

11. The main factors that will restrict the growth of the UA market in Europe will be stringent regulations, over reaction of member states to perceived societal issues, lack of investment both public and private, over-regulation of UA operations, EU-centric control rather than local national management, lack of availability of EU designed, built, and operated UA systems

5. Will the existing competences of Member States for the safety of military and civil aircraft as well as for more general issues such as the allocation and use of radio spectrum be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

12. No response provided

6. Are the existing data protection liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the

potential greater use of RPAS or are changes required?

13. In order to reach their full potential civilian UA must fly autonomously in open, non-segregated airspace with other manned aircraft. Together this creates a potentially complex legal and regulatory environment although possibly the greatest hurdle for the UA industry to overcome, in the short term, is a cultural and perceptible one and this requires education and engagement with all the stakeholders in the industry.
14. The invasion of privacy debate and the use of UA is wide ranging although arguably many of the concerns are directed at personal surveillance and are not applicable to the use of UA in the majority of cases. Some deployments of UA are similar to CCTV systems or incident response and surveillance by police helicopter and there are clearly valid privacy concerns around the use of unmanned systems to monitor our environment.
15. Where UAS monitoring is used in public space, over-arching regulations such as the Charter of Fundamental Rights, the European Convention on Human Rights or the Data Protection Act may apply as well as associated consents. Covert UA surveillance that utilises technology such as thermal-imaging cameras or that is used to monitor private spaces may require additional oversight mechanisms such as search warrants and national law compliance approval in order to be lawfully deployed.
16. It is the belief of this group that the “concerns raised by the potential greater use of RPAS” arguably have no quantifiable basis. There has been a number of statements relating to privacy and data protection, particularly from within the industry, but no definite statement or evidence has been produced that this is the case. It is acknowledged that, with the growing use of surveillance devices, including the use of cameras integrated into personal telephones, there is the potential for abuse, but this is a societal issue rather than a UA-specific issue. UA should be included within the overall discussions relating to the impact of technology on privacy, but not be singled out for special attention.
17. It is noted that in the UK, the Information Commissioners Office (ICO) held a recent consultation of proposed changes to the CCTV code of practice. This focussed purely on UA and data protection compliance, rather than taking the opportunity to address other technologies and their potential privacy compliance issues. UA being seen as an easy target. We believe that it is

more appropriate for the ICO to address the wider question.

18. Until there is sufficient evidence – rather than supposition – there should be a light touch in managing data protection of UA. Indeed, we believe there should be more education than regulation. Introducing the requirement to have Privacy Impact Assessments in Operating Manuals with other risk assessment analysis is an appropriate way ahead, and this may be used to evaluate privacy risks – along with operating safety risks by the operator on a case-by-case basis – and then monitor and update as necessary.

19. In terms of insurance, the increasing use of UA and the need for insurance has been acknowledged by users, and a number of insurance companies in the UK now offer services to the UA industry. They have invested time in understanding the risks involved in operating UA and have spent considerable time understanding the mechanics and properties of UA themselves. As such, most are now in a position to provide bespoke insurance products. However, in some cases, as this is a relatively immature technology, the premiums can be expensive. We believe this will change as confidence grows with use.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues for example getting the airspace regulatory framework right as against improving the limited airworthiness of today's small and lightweight RPAS?

20. It is our recommendation that R&D needs to be more focussed on UA airworthiness, safety, continued airworthiness, payload/sensor miniaturisation, power/battery technologies, data management, UA pilot qualification and training, and airspace integration.

21. Airspace regulation should develop in line with technology and user requirements. The current focus seems to be on larger systems when in the near and medium term, the much larger market, is with the smaller systems. Regulations should enable the requirement of small UA in the near term (to support the rapidly expanding market in this sector) and larger UA in the longer term.

Civil Aviation Authority, EuroUSC and NATS—Oral evidence (QQ 13 – 23)

Civil Aviation Authority, EuroUSC and NATS—Oral evidence (QQ 13 – 23)

Submission to be found under EuroUSC, NATs and Civil Aviation Authority—Oral evidence (QQ 13 – 23)

Paul Cremin (Department for Transport), Robert Goodwill MP and Adam Simmons (Department for Transport)—Oral evidence (QQ 176 – 190)

Paul Cremin (Department for Transport), Robert Goodwill MP and Adam Simmons (Department for Transport)—Oral evidence (QQ 176 – 190)

Submission to be found under Robert Goodwill MP, Paul Cremin (Department for Transport) and Adam Simmons (Department for Transport)—Oral evidence (QQ 176 – 190)

Paul De Hert and Laura Jacques—Written evidence (RPA0039)

1. Executive summary

- Three main uses of RPAS: commercial, law enforcement and private.
- High risks of privacy and data protection issues.
- Policy recommendations:
 - *Commercial use of drone*: adoption of Privacy by Design, transparency and privacy certification measures.
 - *Law enforcement use of drone*: updating privacy and surveillance regimes face to the challenges posed by new smart and surveillance technologies; adoption of high-level privacy-protective standards.
 - *Private and recreational use of drone*: adoption of usage restrictions and prohibitions on the sale of intrusive payloads.

2. Introduction

2.1 Paul De Hert, Professor at the Vrije Universiteit van Brussels and Associated Professor at Tilburg Institute for Law, Technology, and Society, and Laura Jacques, PhD Candidate at the Vrije Universiteit van Brussels, are currently working on a European project entitled “Privacy and data protection issues related to the use of civil Remotely Piloted Aircraft System” in partnership with Trilateral Research & Consulting. In that respect, we have been consulted by Mrs. Alicia Cunningham to submit a written submission to the call for evidence launched by the Internal Market, Infrastructure and Employment Committee on the civil use of the RPAS technology in the EU. This written evidence suggests some policy recommendations for each category of RPAS usages.

3. Policy recommendations

3.1 In the next few years, civil RPAS are likely to be mounted with many payloads, to be performed by different operators and to be used for commercial uses, law enforcement uses and private and recreational uses. However, as an atypical instrument for collecting personal information and monitoring people, the RPAS technology raises some specific concerns in relation to the privacy and data protection rights of the European citizens. Whereas RPAS industries are already well organized and civil drones deployed in certain areas, the current data protection legislation and its enforceable bodies⁷² are not able to adequately address the challenges raised by the new technologies like drones. Therefore, this written evidence recommends some legal initiatives that European and national legislators should take in account when they will adopt regulations governing the RPAS technology. As the different uses of RPAS pose different privacy concerns and are subject to different legal privacy

⁷² The data protection authorities.

frameworks, we tailored our policy recommendations according to the different types of RPAS uses.

3.2 In the private sector, the uses of civil drones by corporates and professionals rely on commercial interests. The deployment of RPAS opens a new European commercial market and creates new jobs and thus participates to the European economic growth. Therefore, in the commercial sector legislators face two fundamental interests, the general economic growth interest and the individual privacy interest. Consequently, we stress legislators to balance both interests at stake when they create a legal framework applying to commercial RPAS. Several privacy instruments should be adopted in this aim, we think particularly to Privacy by Design, transparency and privacy certification measures.

(i) “Privacy by Design”: This technological solution implies that “privacy and data protection are embedded throughout the entire life cycle of technologies, from the early design stage to their deployment, use and ultimate disposal”⁷³. Being a preventive measure, PbD will address the privacy and data protection concerns posed by drones from the outset. For example, the commercial entity using RPAS for processing photographic or video images on which individuals are identifiable, should consider the use of anonymous video analytics⁷⁴ or blurring technology. Consequently, commercial operators will avoid remedial and punitive measures for breaches of privacy.

(ii) Transparency: This principle means that individuals must be aware that their personal information have been collected through the means of RPAS by a commercial entity. Therefore, it requires that data collectors notify data subjects of their identity and of the personal information they have collected. The transparency principle is fundamental as it allows individuals to exercise their data protection rights. Nevertheless, in the context of drones such principle encounters several implementation difficulties as drones are mostly invisible and operators not-identifiable. Some implementation and accountability mechanisms should, therefore, be set up by legislators. For instance, the creation of an online web portal in which RPAS operators would identify themselves and inform individuals about the aim and location of their operations and the information they collect would improve the transparency principle. So informed, individuals would be able, among others, to use their right to erasure.

(iii) Privacy certification procedures: should be set up to allow civil aviation or data protection authorities to check that commercial entities have ensured their privacy and data protection duties. In addition, privacy seals could also be granted to RPAS companies which have adopted specific privacy measures like conducting a Privacy Impact Assessment (PIA). Such instrument would necessarily help authorities to enforce the privacy and data protection law. In addition, it will reward companies having complied with their obligations.

⁷³ A Digital Agenda for Europe 17 (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Aug. 26, 2010) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0245:FIN:EN:PDF>.

⁷⁴ Ann Cavoukian, Privacy Commissioner of Ontario, Privacy and Drones: Unmanned Aerial Vehicles”, 2012, <http://www.ipc.on.ca/images/Resources/pbd-drones.pdf>

- 3.3 In the public sector, drones are mainly used by law enforcement authorities in the context of criminal investigations or public security. In this regard, they are likely to be mounted with privacy intrusive payloads like behavior detection systems and deployed in surveillance missions. Such use of drones by state agencies has been legitimately criticized by citizens and privacy advocates as being the most controversial application. The revelations of recent scandals related to the surveillance instruments that several countries have adopted over these last years have even more increased the already existing public distrust in the RPAS technology. In addition, we strongly think that the current national privacy and surveillance regimes applying to such sector does not encompass sufficient protective safeguards to address the privacy and ethical challenges posed by this new surveillance technology. Consequently, we stress the importance that legislators pay special attention to law enforcement applications. Legislations applying to this sector need to be revised by taking in account of the following elements: the purpose limitations principle, the proportionality principle, the necessity principle, the transparency principle, the balance of interests between privacy vs. security and an effective control by an independent supervisory authority. For instance, in order to carry out an effective check and balance by the judicial power, a court order should be needed before launching operations. In addition, for transparency reasons, state agencies should be required to notify individuals after having undertaken a surveillance measure involving them.
- 3.4 In the recreational and private applications, aeromodels may also raise privacy issues as they can fly above backyards, spy through a window without being detectable and be used for hacking other drones. Given the interests at stake in such drones applications, recreational vs. privacy, we strongly recommend legislators to restrict certain usages and prohibit the commercialization of certain equipment. For instance, private users should only be permitted to fly in specific airspace delimited for hobbyists. Additionally, drones providers should be forbidden to offer for sale intrusive payloads like biometric recognition systems and behavior detection devices.

24 October 2014

Department for Transport—Written evidence (RPA0011)

Civil Use of Remotely Piloted Aircraft Systems (RPAS) in the EU Written Evidence – Department for Transport

Q1 Introduction

- 1.1. The Department for Transport would like to thank the Internal Market Sub-Committee of the House of Lords European Union Committee for the opportunity to submit this evidence to your enquiry. We believe that it is of great importance that we set out exactly what we mean by RPAS. We are discussing the use of aircraft; aircraft which are still piloted by a responsible human being, albeit from a remote cockpit; hence why these systems are appropriately referred to as Remotely Piloted Aircraft Systems, or RPAS. Whether an aircraft is traditionally manned or remotely piloted does not change its status as being an aircraft. The location of the cockpit does not change the essential function of the pilot, in terms of his or her direct responsibility for the safety and overall management of the flight.
- 1.2. The Government welcomes the European Commission's Communication, but considers that the Commission's plan for integration of RPAS into European Airspace from 2016 onwards is highly ambitious and unlikely to be achieved owing to the vast number of technology hurdles still to be overcome. We accept that the current regulation is a barrier to growth, but there is a danger that heavy handed regulation will have the opposite effect to that intended.
- 1.3. The policy for remotely piloted aircraft systems and its legislation in the UK is the responsibility of the Department for Transport (DfT). The Department for Business Innovation & Skills (BIS) supported the research and demonstration of civil Unmanned Aerial Vehicles (UAV) technologies through ASTRAEA for the potential application of these technologies more widely in civil aviation
- 1.4. Civilian Remotely Piloted Aircraft operations are closely regulated by the Civil Aviation Authority and are treated in the same manner as that of an equivalent manned aircraft; this applies to all aspects of 'unmanned' aviation, from the initial design and construction, or airworthiness, through to the safety requirements of how it is flown and operated. This viewpoint is shared internationally. For the smaller sized, lightweight systems, which are referred to as small unmanned aircraft - those which are flown at short range and always within the sight of the person flying them – these are overseen to a lesser extent by the CAA, proportional to the level of risk involved.

- 1.5. The Government fully acknowledges the importance of the growth of the Remotely Piloted Aircraft part of the aviation sector and we support the need for the further development of associated technologies. The overall objective of HMG, as is also the case for the European Commission, is to enable the full and safe integration of Remotely Piloted Aircraft into the total aviation system, and thus sharing the same airspace as their manned counterparts.

Q2 Cross-Government Working Group on RPAS

- 2.1. The Government has created a cross-Government Working Group, chaired jointly by the Department for Transport and Ministry of Defence. Its key objectives are to:-

- Inform RPAS-related Departmental policies and publish a UK Cross Government vision / strategy for UAS.
- To identify Cross Government synergies and opportunities for efficiencies.
- To identify and address barriers to a successful UK industry base, to support the Government's growth agenda.

- 2.2. In achieving these aims the cross Government Working Group will be:-

- **Smarter** by applying lessons learned from MOD programmes across wider Government, undertaking collaborative research into key technologies, understanding both current and future Government requirements and being more joined up when dealing with difficult issues.
- **More Efficient** by looking at multifunctional capability to address broader government requirements for RPAS, maximising existing infrastructure and promoting the eight great technologies (robotics and autonomous systems).
- **More Successful** by coordinating common enablers to allow UK industry to grow, developing proportionate regulation and greater access to UK airspace and infrastructure, leading the debate in Europe and the wider international arena and creating a sustainable market for industry to grow in the areas of product, technology, operations and services.

Q3 ASTRAEA (Autonomous Systems Technology Related Airborne Evaluation Assessment)

- 3.1. ASTRAEA is a programme jointly funded by a consortia of UK industry and the public sector to enable the routine use of UAS (Unmanned Aircraft Systems) in all classes of airspace. The consortium consists of BAE Systems, Thales, QinetiQ, Rolls-Royce, Cassidian, UAVS, Cobham and AOS. The UK government, through BIS, the Regions and grants provided through the Technology Strategy Board have

been encouraging both industry and the regulatory authorities (through Civil Aviation Authority - CAA) to facilitate opening this market and keep the UK well placed. Government has supported the two major phases of the ASTRAEA programme with the aim of putting the UK industry in a strong position on the key technologies.

- 3.2. The first phase of the programme was taken forward in 16 projects brought forward under the ASTRAEA programme addressing separate technology challenges for UAV operation. In the second phase, which matures some of the work from the earlier projects, industry are developing and demonstrating the critical technologies required in autonomy, decision making and in separation control.
- 3.3. ASTRAEA has been engaging with the Civil Aviation Authority (CAA) on regulatory clearance for these vehicles in airspace and this is one of the key BIS drivers in working with the industry (which is considered to be ahead of the rest of Europe due to companies such as BAE systems and Thales which see RPAS as a growth area in the future aerospace business). The UK is at the forefront of regulatory development: the Civil Aviation Authority's guidance for operations in the UK (CAP 722) has been adopted by many other states across the globe and is one of the key documents being used by the Commission in taking this work forward. EASA (the European Aviation Safety Agency) is responsible for European airspace regulation. The CAA is the UK limb of EASA.
- 3.4. The programme, which began in 2006, concluded in March 2013 has involved £24m of grant funding from government matched by the industry. It has seen numerous demonstrations of improved capability of some of the key systems required and moved forward the formation of draft regulations for their use.

Q4 Questions

What are the advantages and disadvantages of regulating RPAS at the national, EU or International levels, for example in the International Civil Aviation Organisation (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

- 4.1. The UK is at the forefront of regulatory development in Europe: the Civil Aviation Authority's guidance for operations in the UK (CAP 722) has been adopted by many other states across the globe and is one of the key documents influencing the Commission's thinking as it develops common rules across Europe.
- 4.2. The Government broadly supports this Commission initiative to develop a clear understanding of the issues and take a harmonised approach to addressing them

across Europe and with other global regions through ICAO. However, we will seek to ensure that any proposals for further regulation or new Implementing Rules are proportionate to the risk and does not cause additional barriers to growth in this sector. Both Government and the UK CAA and industry are closely engaged in the various work streams involved in harmonising these requirements.

- 4.3. The overall objective of HMG, as is also the case for the European Commission, is to enable the full and safe integration of Remotely Piloted Aircraft into the total aviation system, and thus sharing the same airspace as their manned counterparts. The Government recognises that the current lack of a regulatory framework and a set of harmonised rules is the single biggest barrier to growth, but there is a danger that heavy handed regulation will have the opposite effect to that intended.
- 4.4. There is a hint within the Communication that the Commission intend to address a complicating factor, arising from the text of annex 2 of EC 216/2008 ('The Basic Regulation') according to which an RPA with a Maximum Take-off Mass (MTOM) above 150kg falls under EASA competency, while RPA with an operating mass below 150 kg are currently ruled by national Civil Aviation Authorities. The Commission believe that the 150kg distinction is not relevant to regulate this aviation segment and that coherence below and above 150kg must be ensured.
- 4.5. We expect that the Commission will propose an amendment to the Basic Regulation, which will include an amendment to remove the division of responsibility between EASA and National Authorities. Additionally we can also expect proposals for new Implementing Rules in areas where EASA already have competence on a licensing regime, and pilot competence.
- 4.6. Whilst in principle we see the logic to the Commission's arguments there is a real danger that the full weight of regulation could be applied to the lighter end of the industry, killing it off or stifling growth before it has a chance to be properly established. Regulation must be proportionate to the activity and we will wish to ensure that this emerging sector is properly established with industry dictating the pace of regulation. A more sensible solution in the near term would be for national civil aviation authorities to work closely together to harmonise rules for RPA below 150kg. The Joint Authorities for Rulemaking on Unmanned Systems (JARUS), a group of national authorities aiming at drafting harmonised regulations for all aspect of RPAS, would seem best placed to do this. The UK has a strong voice in the forum, however it is important that industry is given the chance to engage and contribute to their work.

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- 4.7. The UK is actively contributing to the development of harmonised, international RPA regulations. The International Civil Aviation Organisation (ICAO) is currently developing RPA Guidance Material, due for publication in autumn 2014, with Standards expected about 2 years later. Within Europe, the European Commission's RPAS Roadmap was published on Thursday 20 June 2013 - this sets out the milestones and timing aimed at an incremental integration of RPAS into European airspace from 2016, with the publication of Implementing Rules for operations, personnel licencing and certification from 2018 onwards.
- 4.8. Furthermore you may wish to know Department for Transport is talking to both the US Federal Aviation Administration and NASA Aeronautics about the problems of safely integrating RPAS into both the European and US National Airspace System. There is a recognition that the barriers to growth, such as the lack of a regulatory framework and key technologies, such as the development of sense and avoid and autonomy are common to the US, Europe and the UK. There is interest within these Agencies of undertaking a potential joint research project on the integration of RPAS into airspace.

In which new or innovative ways do you think RPAS will be used in the future?

- 4.9. The UK has a healthy RPAS industry compared with the rest of Europe. At present, there is a steadily growing 'community' of civilian UAS operators within the UK, although all are working at the 'small unmanned aircraft' end of the scale and are flown at very short range, within the visual line of sight of the pilot.
- 4.10. The majority of the small unmanned aircraft being flown are less than 7kg mass. This type of operation, which has many parallels with recreational model flying, is viewed as being simpler, available and relatively affordable, hence it tends to attract individuals or organisations who have little or no previous aviation experience.
- 4.11. There are currently about 300 small unmanned aircraft (SUA) operators currently flying with CAA permission in the UK, although the number is growing steadily. Whilst a very small handful of these are Police, Fire or 'security' related, the vast majority are connected with either aerial photography or aerial surveying (both land and building/structures survey) applications.
- 4.12. Activity at the larger end of the scale, where the 'flying' element of the system is of a size more comparable to a manned aircraft, is taking much longer to establish itself; this is directly related to solving the additional technical challenges associated with flight at greater distances and altitudes, in particular, the airworthiness requirements and the capability to avoid collisions.

- 4.13. Within this larger sized sector, the Thales Watchkeeper (a military system) is the only system currently flying in the UK and is undergoing Test and Evaluation flights at in the West Wales UAS Environment and received an initial release into service with the Army earlier this year. While some organisations and companies have made initial approaches to the CAA in order to commence the certification process, there are no large civilian RPAS flying in the UK at present. However, companies such as BAE Systems, QinetiQ, and Thales UK are developing important technologies that will be valuable to both the unmanned and manned aviation world, which will make a significant contribution to larger unmanned systems integrating with manned aviation. These companies see RPAS as important to the growth of their future aerospace business.
- 4.14. The use of RPAS by the police is an operational decision to be taken by chief police officers. At present their use by forces is extremely limited, yet it is possible that chief police officers may wish to deploy RPAS for public order events such as festivals, for surveying flooded areas, or to support emergency response. There is potential for using RPAS for monitoring routes of migration, and in respect of detecting the trafficking of illicit goods and people; the government may in due course consider the case for such deployment where it would be both legal and practical to do so.
- 4.15. Defra Agencies and Non Departmental Public Bodies have recently trialled and started using RPAS to support delivery. This has involved a combination of in house operation of RPAS and using services provided by contractors.
- 4.16. RPAS also has important and growing commercial uses in the farming and land based sectors. It is used in forestry for inventory mapping, pest and disease detection and tree species classification. In precision agriculture RPAS is used to increase profitability by targeting inputs to reduce costs and improve crop yields. In future RPAS could have a role in areas such as inspections of hazardous or difficult to access locations.
- 4.17. Although only a recent and relatively small capability, RPAS is used by Defra Agencies and Non Departmental Public Bodies as a cost effective and efficient tool for surveying and monitoring local areas. This has involved the use of small vehicles, operated in accordance with CAA guidelines.
- 4.18. The Environment Agency (EA) in particular are evaluating the potential of the larger Remote Piloted Vehicles with long endurance flights for their monitoring and incident response duties.

- 4.19. The EA have provided Defra with a written submission which Defra supports. The EA response is attached. Echoing the EA's response, Defra supports any harmonisation moves that will improve safety. However Defra would want to examine the impact any common European regime would have on current and potential future uses of RPAS, both for Defra and the farming and land based sectors.
- 4.20. The Government is also aware of the potential for RPAS to support Search and Rescue, disaster assessment, fisheries protection, environmental monitoring, digital mapping, Meteorology, Oceanic Observation, geological survey, road and traffic surveillance, oil and gas industry, infrastructure surveys (railways, highways, buildings, bridges etc.) and the airline industry (aircraft structures).

What is your view of the estimate by the Aerospace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

- 4.21. The current market is dominated by the military, which is driving technology development and market expansion. However, whilst a large number of potential applications have been identified for commercial and public safety use with the opportunity for significant cost savings, progress on the civilian side has been modest.
- 4.22. It is forecast that the worldwide RPAS market in terms of annual procurement and R&D market is expected to grow from currently \$5.2 billion to \$11.6 billion in 2023. Currently the US dominates the market with nearly 70% of procurement and R&D. There are 1708 different types of RPAS (566 in Europe) being developed or produced by 471 manufacturers worldwide (176 in Europe). It is difficult to estimate whether the figures quoted by the Commission and others, both in value and job creation will be realised, particularly whilst the barriers remain. It is certainly feasible that by 2050 there is the potential for both unmanned commercial cargo and passenger aircraft, which will have dramatic impacts for the aviation and aerospace industry, but this will only be feasible if the general public can be convinced that it is safe to exploit this technology.
- 4.23. The Department for Business Innovation and Skills recognises that robotics and autonomous has potential applications across many sectors and state that the potential global market is estimated to £13 billion by 2025⁷⁵. Additionally the Aerospace Aviation and Defence Knowledge Transfer Network have said that “

⁷⁵ Dept. for Business Innovation & Skills, “Robotics & Autonomous Systems Info graphics”, Published on www.gov.uk/government/publications/eight-great-technologies-infographics”, October 2013.

solving the technology readiness issues for aerospace though the Government backed 'ASTRAEA' programme will spin out benefits into other sectors - the value of autonomous systems to the UK having been estimated to be some £7bn per annum⁷⁶.

Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

- 4.24. Civilian Remotely Piloted Aircraft operations are closely regulated by the Civil Aviation Authority and are treated in the same manner as that of an equivalent manned aircraft; this applies to all aspects of 'unmanned' aviation, from the initial design and construction, or airworthiness, through to the safety requirements of how it is flown and operated. This viewpoint is shared internationally.
- 4.25. The safe operation of civil Remotely Piloted Aircraft (RPA) in the UK is governed by the requirements of the Air Navigation Order 2009 (ANO). RPA with an operating mass of more than 20 kg are subject to regulation as though they are manned aircraft.
- 4.26. RPA with an operating mass of 20kg or less are referred to as 'small unmanned aircraft'. Small unmanned aircraft are exempt from the majority of the regulations that normally apply to manned aircraft, however their use is specifically covered by two articles within the ANO, which legislate for the 'general' flying aspects and the flight of those equipped for surveillance. As well as these specific articles however, a more general article which prevents a person 'causing or permitting an aircraft to endanger the safety of any person or property' also remains applicable.
- 4.27. As with all other aircraft, RPAS will only be permitted to operate in UK airspace if it is considered that it is safe for them to do so. RPA that are of a mass exceeding 20kg may only be flown under an airworthiness approval issued by the relevant Authority (Civil or Military), or under an exemption issued by the Civil Aviation Authority – these requirements are identical to those which are stipulated for manned aircraft.
- 4.28. Just like manned aviation, the avoidance of collisions is the primary concern while an RPA is in flight. With this in mind, RPAS operations are split into two basic categories and are either flown within the 'visual line of sight' of the pilot, which is described as 'VLOS', or they are flown 'beyond the visual line of sight' of the pilot, which is described as 'BVLOS'

⁷⁶ "Autonomous Systems: Opportunities and Challenges for the UK", Aerospace Aviation and Defence Knowledge Transfer Network, July 2012.

- 4.29. For VLOS operations, the pilot discharges his responsibilities to ‘see and avoid’ other aircraft and obstructions by directly observing the RPA and the airspace surrounding it. This is the same way that model aircraft are flown and indeed, the same basic requirements apply. The effectiveness of visual observation is clearly limited by the size and colour of the RPA, the weather conditions and the surrounding landscape; for these reasons, VLOS operations are normally only accepted out to a maximum distance of 500m horizontally, or 400ft vertically, from the Remote Pilot.
- 4.30. In order to cater for the lack of a pilot in the aircraft ‘looking out’, RPA that are intended to be flown ‘Beyond’ VLOS must be equipped with an alternative method of collision avoidance. This requires a technical solution, generically termed ‘Detect And Avoid’ (DAA). Without such a collision avoidance system, an RPA’s flight must be contained within segregated airspace, to which access for manned aircraft is prevented or closely controlled.
- 4.31. The development of an effective DAA system is key to the safe integration of RPAS. While DAA systems are under development worldwide, none have yet been approved for RPAS use in non-segregated airspace.
- 4.32. RPAS specific airworthiness regulations are in the early stages of development, but this is being done on an international scale, with a view to global harmonisation, rather than the UK ‘going it alone’. There are no specific airworthiness standards for RPA with a mass of 20kg or below (which are termed small unmanned aircraft – SUA). Specific standards for such small aircraft would be disproportionate to the size and relative risk to third parties. It is the responsibility of the ‘person in charge’ of the SUA to satisfy him/herself that the flight can be safely manned and, while flying the SUA, he/she is required to operate it in a way that will not endanger any person or property. In certain circumstances however, the CAA might require additional airworthiness assessments for SUA - for example, for flights over people, or flights which will go beyond the visual line of sight of the pilot

Are the existing data protection, liability and assurance regimes at EU and member state levels sufficient to address the concerns raised by the greater use of RPAS, or are changes required?

- 4.33. The Government recognises that there is a growing concern over the potential of RPAS to interfere with the right to respect for private and family life. However, there are both national and European laws in place to protect these rights. RPAS operators are required to take into consideration European and national

legislation, when conducting operations and ensure that data is managed sensitively and securely in accordance with these rules.

- 4.34. At a national level, these include the Data Protection Act 1998, and the surveillance camera code of practice issued under the Protection of Freedoms Act 2012 (POFA code) as guidance for the overt use of surveillance camera systems in a public place in England or Wales. The POFA code promotes regular review of the effect of surveillance camera systems on privacy by the operator, and as much transparency as possible about their use as possible, including proportionate consultation and engagement with the public.
- 4.35. Any covert use of RPAS by a public authority likely to obtain private information, including by any law enforcement agency, would require authorisation under the Regulation of Investigatory Powers Act 2000 (RIPA). That Act permits covert investigatory techniques to be used only if they are necessary and proportionate for purposes such as preventing or detecting crime or in the interests of national security. RIPA makes any covert deployment subject to independent oversight, inspection and right to redress in case of individual complaint.
- 4.36. The government is not persuaded that any extension of EU competency into the regulation of surveillance for public safety, the prevention or detection of crime or for national security purposes is necessary.

Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, against improving the limited airworthiness of today's small and lightweight RPAS?

- 4.37. The Government recognises that the full integration of all types of RPAS requires the development of appropriate regulations in three key areas: airworthiness, flight crew licensing and air operations. These are essential pre-requisite safety requirements for insertion into the European aviation system. Given the complexity of the task, a European Roadmap has been developed to address it through a stepwise approach spanning over 15 years, with close coordination of R&D activities and the development of the necessary technologies.
- 4.38. In order for both the UK and Europe to take advantage of the potential of the RPAS, civil RPAS Research and Development (R&D) activities must be undertaken in full alignment with ongoing development of ATM R&D activities and meet existing requirements for manned aviation. However, both UK and European unmanned systems industry are reluctant to commit large amounts of resources in developing key technologies without the assurances of commercial market which will stimulate both opportunities and growth. With industry reluctant to invest in

the development of technology, systems, and demonstrations, regulators will not have the confidence in either the systems or the operators that they can meet the challenge of being equivalent to manned aviation.

- 4.39. The Government therefore welcomes this injection of European funding through both the SESAR Joint Undertaking (SJU) and European Space Agency. We understand that UK industry has been involved in the “Definition Phase” to help shape an R&D Programme on civil RPAS integration, for implementation as part of the SESAR 2020 Programme.
- 4.40. Additionally, the Department for Transport provides funding to the Civil Aviation Authority under the State Safety Programme to mitigate the risks posed by the aerospace and aviation industry to third parties. This includes support to projects related to the safe integration of RPAS into UK airspace and to those UK companies that have been successful in obtaining European R&D funding for research that is of strategic advantage/benefit to the wider UK. Projects such as DESIRE aimed at demonstrating the safe integration of RPAS into non-segregated airspace using satellite capabilities for RPAS command and control, ATC communications and mission data transfer to ground and to identify issues and required procedures and provide early inputs to regulatory bodies, such as EASA and the UK CAA.

18 September 2014

Department for Transport and Department for Business, Innovation and Skills—Oral evidence (QQ 1 – 12)

Evidence Session No. 1

Heard in Public

Questions 1 - 12

MONDAY 13 OCTOBER 2014

Members present

Baroness O’Cathain (Chairman)

Lord Brooke of Alverthorpe

Lord Fearn

Lord Haskel

Baroness Hooper

Lord Kakkar

Earl of Liverpool

Baroness Valentine

Lord Wilson of Tillyorn

Examination of Witnesses

Adam Simmons, Deputy Director, International Aviation Safety & Environment, Department for Transport, **Paul Cremin**, Head of UK Aviation Safety, SAFA & Permits Branch, Department for Transport, and **Andrew Horton**, Senior Technical Policy Adviser, Department for Business, Innovation and Skills

Q1 The Chairman: Welcome, Mr Simmons, Mr Cremin and Mr Horton. Thank you very much for giving up your time. I hope you might even benefit a little from our questioning—we will certainly benefit a lot. Before taking evidence, I have to ask the members of the Committee if they have any interests that should be declared. No? Okay. A transcript of this meeting is being taken. It will be sent to you for any changes and corrections and it will be published on the website.

On behalf of the specialist adviser, I declare that Anthony Henley knows two of today’s witnesses, Mr Cremin and Mr Horton, as they are both members of the Royal Aeronautical Society’s UAS specialist group, which he chairs.

If there are questions that cannot be covered in the time available, it might be useful if you could send us written answers or replies. Similarly, if the discussion raises other issues in your mind which you do not actually talk about, perhaps you could jot something down. Any

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bit of evidence will be important to us, because we have to weigh it all up. Let us get on with the questions. Would you like to say who you are for the benefit of the transcript?

Adam Simmons: Good afternoon everyone. I am Adam Simmons. I am deputy director at the Department for Transport and head of the international aviation safety and environment team.

Paul Cremin: Good afternoon. I am Paul Cremin. I am head of safety at the Department for Transport and chairman of the government working group on RPAS.

Andrew Horton: Good afternoon. I am Andrew Horton. I am a senior technical adviser with the Department for Business, Innovation and Skills export control organisation. I lead for the UK and head the delegation to the MTCR⁷⁷ for the technical experts meetings.

The Chairman: But you liaise with the Department for Transport.

Andrew Horton: Yes.

The Chairman: Why is there that distinction?

Andrew Horton: The export control organisation within BIS⁷⁸ is responsible for UK strategic exports, so we deal with the export control side.

The Chairman: I see. Thank you very much indeed. You have had a list of questions. There might be some stings in the tail with some of them, although I hope not. The first one will be asked by Lord Haskel.

Q2 Lord Haskel: This Committee is concerned with Europe and the European Union. According to the Commission's communication of April this year, "National authorizations do not benefit from mutual recognition and do not allow for European wide activities, either to produce or to operate RPAS". Obviously, that means that they cannot cross European boundaries. How do you think the situation can be resolved?

Adam Simmons: Perhaps I can start, and I am sure my colleagues will add anything. I think we would agree with the statement. In the absence of there being European rules on this, individual states have developed their own rules and guidance. It is helpful that the European Commission is thinking about introducing that. I would say that the JARUS⁷⁹ project is a good way of getting good communication between states, not only in Europe but internationally. I am sure there will be some questions later about JARUS and how that might be improved, but it is a good structure and organisation to have in place.

I would comment on one theme that I am sure we will come back to. While we think it is sensible for Europe to be thinking about some common rules and a common approach, it is about getting that balance right and not overregulating and stifling what is a growing industry, particularly for the lighter remotely piloted aircraft systems. It is going in the right

⁷⁷ Missile Control Regime Treaty

⁷⁸ Department for Business, Innovation and Skills

⁷⁹ Joint Authority for Rulemaking on Unmanned Systems

direction, but it is about doing it in an appropriate way. Paul, was there anything you wanted to add to that?

Paul Cremin: I would add that it is right to say that nationals have grown up—if you look at how regulation has grown up, the UK has done quite well. It has taken a lead and been very forward looking in the development of regulation for unmanned systems. The Civil Aviation Authority (CAA) is highly regarded in Europe and is seen as a benchmark among European regulators for how that comes together. But it is correct to say that the regulators across Europe have grown at a different pace, depending on how the market has emerged in those countries. It is also fair to say that the market has probably not materialised as fast as industry had initially anticipated, partly because of the lack of regulatory oversight and legal framework, but it is ongoing. There are obviously benefits from widening up regulation to make sure it is consistent, which is the way all other aviation regulation is going at the moment, and it is important to have common rules. The UK is very much influencing how those rules are being developed to make sure that the UK is not disadvantaged as a result of that regulation. The UK's regulations put the UK in a very good place for that to go forward.

The other thing I would say, about the emerging technology itself, is that we are maturing a number of technologies that still need to evolve. It is quite right that industry is seeking some common standards to help it to evolve that technology, but it is a chicken and egg situation in that regulators at the moment are telling industry, “You develop the technology and we will evolve the regulations around the technology”. But of course commercial companies are a bit more risk averse than that: they will not commit to developing those technologies until such time as the regulatory standards are in place. We are in a bit of a dancing circle, as we say, at the moment. It is quite important that we give a clear message to industry if this is going to go forward. But as we go forward, it is important that we have common standards—personally, from a UK perspective, more so at the higher end than the lower end. Some of the operations from the UK at the lower end would be challenged to fly across borders, but that does not mean that they cannot operate from within the European market or establish a commercial foothold in those markets.

Lord Haskel: If the lack of regulation is holding back development, as you seem to imply, why can we not in the interim say, “Well, we'll apply the rules on small aircraft”, or something like that? Then at least we can make progress and get on with developing the industry.

Adam Simmons: I think I understand the principle that you suggest. In one sense, there is the expectation that RPAS really should be treated in a very similar way to aircraft, while recognising that it is a different technology and that there are a number of issues to work through. A number of issues were identified by the European Commission, and others that need to be resolved, about the very different nature of how these aircraft are piloted and seeking reassurance before we fully integrate them into the same operations or apply the same rules as regular aircraft. Certainly that aspiration is there, but there are a lot of steps to work through.

Paul Cremin: One of the key things is trying to work out an equivalent level of safety between manned and unmanned systems. This debate has been going on for quite some time: what happens when you remove the pilot from the cockpit, and how safe it is

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compared with manned aviation. Certainly from within the Department for Transport we have been trying to encourage industry to take a proactive role and support activity so that we can challenge the regulators by putting systems in the air in the same conditional way that we employed with manned aircraft. The problem that we currently have comes back to companies being risk averse at the moment and the lack of commercial appetite to invest in programmes that they do not know at the end of the day will pass the regulatory test. As I said, we go round in a spiral. I heed your point that we should just tell them and perhaps see where we go, but it is far more complex than that, I fear.

Lord Haskel: What are the sanctions if you fly your RPAS across a European frontier?

Paul Cremin: The challenge at the moment is probably that not many systems are capable of doing it.

The Chairman: Watch this space. Baroness Hooper wants to ask a question.

Q3 Baroness Hooper: Not across the Channel, I imagine, anyway. My question is: is any other European country more advanced than we are in this, or more advanced than all the others? In other words, is whichever country in this position likely to provide the model for what we will eventually get?

Adam Simmons: My initial answer is that the UK is genuinely leading on this work, but Paul will give you a better flavour of the capabilities of other countries.

Baroness Hooper: So we might provide a model eventually?

Paul Cremin: I would hope so. The model for which the regulatory framework comes out will come through the extensive R&D⁸⁰ framework that is flying from Europe at the moment, because that will give us the opportunity to test those boundaries. Other states are also doing a lot of stuff in this area in Europe: Spain, which is particularly active, Switzerland, France, and Germany. There is huge potential in this. I think the UK holds its own; I think it is leading things. The bigger market share is probably coming from the US and Israel at the moment.

The Chairman: Yes, we have been told that before. Before I move on to the next question, another question suddenly dawned on me when you were answering that one: can you learn anything from the way satellites were introduced 30, 40 or 50 years ago? Institutions such as the University of Guildford have all these satellites up there. Is there anything to be learnt? Is there a crossover of information, or indeed of experience of flying things in the sky that could kill people on the ground?

Andrew Horton: I think there is a fundamental difference between putting an object into space, where there is a lot of space, and operating an air vehicle in unsegregated airspace.

The Chairman: At 1,000 feet or something.

Andrew Horton: Passenger airlines are an example. There is very much a safety issue there.

⁸⁰ Research and Development

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The Chairman: Can supplementary questions be very brief, because we are going to run out of time?

Lord Brooke of Alverthorpe: You can write to us afterwards if you need to. Can you say what is happening in China, South Korea and Japan?

Baroness Valentine: Do driverless cars have parallels to what you are talking about?

Paul Cremin: They are on the ground, so they are a lot safer.

The Chairman: Perhaps you could send any further thoughts you have about that to the Committee.

Q4 Lord Fearn: The Government's Explanatory Memorandum says that the Joint Authorities for Rulemaking on Unmanned Systems (JARUS) could be a more appropriate forum to develop regulations for RPAS under 150 kilograms. Why is that so?

Adam Simmons: There are three points to raise in answer to that question. For me, JARUS as a consortium that has been set up across a range of national airworthiness authorities is well established and has been considering these issues for a number of years now.

The second point for me is that the forum is not just in Europe. It is not constrained in that way. It is a global consortium. It is not just European, it is international. That enables us to share experience, as Paul set out. A range of countries have experience in this area, particularly with lighter aircraft. They are developing the aircraft and their uses, and it is very valuable to have that forum to discuss the lessons that they have learnt from their experiences.

The third thing that I think could be done better within JARUS, although there is industry involvement, is the link from the JARUS consortium back to industry. There could be improvements in those communications, in ensuring that there is more sharing when it comes to how the manufacturers are developing their products and how they are used, and in feeding into some of their considerations from JARUS.

Those are my three points in answer to that question.

The Chairman: My I interrupt? I have been requested to ask if you could speak up a little. You are a very gentle gentleman, but some of us do not have great hearing, so if you could, that would be very useful. Thank you. Are there any more comments on that question?

Paul Cremin: I would just add that JARUS is effective. It has its faults. It is not perfect by any means. It is exactly as Adam said: it has in it a number of the leading experts in regulatory authorities across the world; its challenge is how it becomes more transparent in what it is doing, particularly in how it engages with industry at the moment. It can do a lot better. The EASA, the European Aviation Safety Agency, now recognises the importance of JARUS and is looking to—take over is too strong a word: it now chairs it. It is something that we as a department are watching very closely, because obviously there is a competitive action there, but the fact that the EASA is engaged with JARUS is probably a good thing.

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Lord Brooke of Alverthorpe: I apologise if I missed it in the briefing, but I do not know much about JARUS. What is its origin, who runs it, who is involved with it, and who pays for it?

Paul Cremin: JARUS is a consortium of national airworthiness authorities, both EU and international. It has for a number of years been developing the requirements considered appropriate for RPAS-based regulation that is based on the collaboration of the member states. It is made up of what, in a sense, are civil aviation authorities coming together in a consortium. For the UK, the Department for Transport supports the CAA's attendance at JARUS. As for other states' representatives, my understanding is that they fund their attendance, which is free. The challenge with JARUS is that it is almost like voluntary attendance and could probably be more effective, so managing times and priorities is a key issue for JARUS. Getting the right people in the room at the same time also remains incredibly difficult. It does not meet as regularly as we would like, but it is probably the only vehicle that has been recognised as being capable of doing the job at this stage. If you would like, Lord Chairman, we can provide additional briefing on JARUS.

The Chairman: That would be very useful. I was going to ask you what you would like JARUS to be and how we get there.

Paul Cremin: That is a big question.

The Chairman: We have to ask all these questions.

Q5 Lord Wilson of Tillyorn: Can you help us on whether what the EU is either doing or might do is consistent with what is being done in non-EU countries—I suppose the United States and Israel have been quoted as the main players in this—or with international organisations such as the ICAO?⁸¹

Adam Simmons: I feel that almost every answer will to an extent include a reference to JARUS. I do think that what has been done in Europe is consistent with what has been done in the ICAO. We have talked about this and we will provide some more information about exactly how JARUS works and how it can help to get the collaboration that is needed between the different states that are currently working on this. I understand that there is an ICAO RPAS study group in place, which is shortly to become just the RPAS panel. My experience of some of these international groups is that you will probably see familiar faces sitting in both. That can be a strength, as it ensures a consistency of approach between the different groups and panels that are set up.

We recognise that there is perhaps a difference in maturity in where different states are. Some states have more established regulations while others are more immature. Indeed, others share a different route map or vision. The FAA⁸² has an extremely ambitious route map, even more so than Europe. However, we still think that the European vision is quite ambitious in terms of integrating it into airspace. We believe that the FAA's views are more challenging. We do think that these groups allow for a consistency of approach and sharing of information between them, so I do not think there is a concern that there is a disconnect between the ICAO and what we are doing in Europe.

⁸¹ International Civil Aviation Organisation

⁸² Federal Aviation Administration in the United States of America

Lord Wilson of Tillyorn: Are the United States and non-EU countries encompassed within ICAO?

Paul Cremin: The ICAO panel is a global panel on which the United States sits, and in fact it would argue itself that it is very influential within it. The good news, certainly from the Americans' perspective, is that while there is the odd difference we are moving in the same direction. Perhaps the best way to describe it is that there are differences in how we come to the same place. The FAA, NASA⁸³ and the Royal Aeronautical Society are very keen and the department is working closely with those organisations to see how we can collaborate and to look at the integration issue. In particular, we are looking at how we in the UK can use the US to promote the UK's aims in this area. Israel has recently approached the department and is looking at how to regulate unmanned aircraft systems within the country. It is turning to the UK to see how best to do that, which is quite reassuring. It is a very different environment in Israel than is the case in most places. The environment in which it operates is challenging and it is a very different type of arrangement from what we have the UK. We will see where that goes, but it is quite reassuring that people are coming to the UK for our expertise. We are able to export that expertise and exercise influence on the world stage.

The Chairman: That is interesting. Lord Liverpool wants a brief word on this.

Earl of Liverpool: The Honourable Company of Air Pilots has written to us stating that it feels that the EU should ensure that EASA seeks to match RPAS regulatory developments by the FAA to the greatest extent possible. I think you have been saying that you are working carefully with the FAA, but would you agree with that statement?

Paul Cremin: To as great an extent as is possible we are working as closely as we can. Differences emerge even within the national airspace system in the US. We are talking about different degrees of complexity, because the US has vast amounts of space in which to operate unmanned systems, and therefore the challenges are sometimes very different from those in Europe. But we are, to all intents and purposes, working towards the same goal. We are looking in Europe to work out how we integrate unmanned systems through our future air traffic system—SESAR⁸⁴. The Americans are doing the same through their future air traffic system, which is NextGen. Both sides are talking to each other about how to collaborate as effectively as possible. It is not always easy, but I am sure that we will get there in the end.

Q6 The Chairman: Thank you. Could the UK's existing obligations under various international treaties, such as the Missile Technology Control Regime (MTCR), hinder its ability to develop and deploy UAVs in the future and create a distortion in the single market? I ask because this Committee also has responsibility for the single market, along with infrastructure and employment.

Andrew Horton: I think this is one for me. Just to clarify the issue, two regimes are involved in the control of RPAS. They are not treaties so they are not legally binding internationally; they are arrangements. There is what is termed the Wassenaar Arrangement, which controls conventional arms and related dual-use technology, and there is the Missile Technology Control Regime (MTCR). The Wassenaar Arrangement controls virtually all RPAS systems,

⁸³ National Aeronautics and Space Administration of the United States of America

⁸⁴ Single European Sky Air Traffic Management Joint Undertaking is a European research programme.

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both military and dual use, with the exception of small recreational systems. The Missile Technology Control Regime controls only RPAS with a range of 300 kilometres or more, but the MTCR is often talked about with respect to RPAS because it has what are called Category I systems, which are systems that are capable of carrying a 500-kilogram or greater payload over a 300-kilometre or greater range. Within the MTCR there is what is a “strong presumption of denial” when it comes to the export of these systems. Basically, we have agreed that we would not export systems that are aimed at or potentially could be used for the delivery of WMDs. That is the underlying rationale in respect of the MTCR. In terms of whether this creates a distortion in the single market, the simple answer could be yes, but it must be borne in mind that Category I of the MTCR applies to around 5% of all RPAS systems. We are talking about only a small number of potential systems. However, as the technology matures and we see more of the larger systems, the situation is likely to change. There is, as I say, the potential for distortion of the single market because the assumption of denial applies equally to other member states within the European Union.

Lord Haskel: Is there any distinction between military and civilian use, or are they all regarded as dual use?

Andrew Horton: Within the MTCR no distinction is made, but within the Wassenaar Arrangement we have what they term the munitions list or, in the UK, the military list. It covers systems that are specially designed for or modified for military use. Everything else that is controlled is a dual-use item.

In terms of the strong assumption of denial, if there is an international treaty or other agreement that predates the MTCR, a grandfather clause allows for the export of, for example, military systems between the UK and the US because we are members of NATO. Where there is no pre-existing agreement, that is where we can run into difficulties with this strong assumption of denial for Category I systems.

The Chairman: Would you expect the EU to lead on this?

Andrew Horton: At the moment, because these regimes are national competency and the Commission has no responsibility for the regimes, it is up to the member states.

The Chairman: Would you prefer that? Do not answer that question if you do not want to. It is not a trick question at all actually.

Andrew Horton: Member States have resisted the Commission’s attempts to—to creep into this area. However, when it comes to dual-use items, there is the EU dual-use list, so a civilian RPAS that has a range below the 300-kilometre range and is therefore not MTCR listed can be exported to another member state without an export licence. Inter-community transfers are possible, but when it comes to the slightly more military systems and longer-range systems, there are concerns and we cannot export.

The Chairman: So we want to stick with it?

Andrew Horton: We do, yes.

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Q7 Baroness Hooper: Does the fact that some of these systems can be purchased for a few hundred pounds and are very lightweight and portable poses an additional security risk in this country and other EU countries?

Andrew Horton: The control under the Wassenaar Arrangement actually controlled a lot of the higher-end recreational systems. My colleague who deals with the Wassenaar Arrangement informed me that they are working on a decontrol that is based on the performance characteristics of these systems. So the intent is to decontrol the higher-end recreational systems but to maintain control on systems that represent the greatest risk for potential security issues.

Adam Simmons: It is worth me adding—this is going to be a very short answer, I am afraid—that the Government consider threats to aviation security as a whole, in the round, and this will include RPAS. Of course, it is government policy not to comment on individual threats other than the threat to the UK from international terrorism, which is set as severe overall. I probably could not get into a lot more detail about any specific threats that may be represented by RPAS.

The Chairman: We quite understand.

Lord Brooke of Alverthorpe: I made a note earlier of “small recreational systems”. Do you define those by weight? You are decontrolling something and I do not know what you are decontrolling.

Andrew Horton: The Wassenaar Arrangement is looking at decontrolling, which is a proposal that has come from our Australian colleagues. There have been months and years of debate based around how you define systems that you are decontrolling, and there are some complex proposals on the table with reference to things such as flight endurance, stability, resistance to gusts and so forth. It is a very technical area. I have not seen the full proposals from the Wassenaar Arrangement, but that is agreed by consensus. Forty-one countries have agreed that there needs to be some decontrol for these smaller systems.

The Chairman: It would be very useful if you could send us more information on the two types of agreement so that we can look at them.

Andrew Horton: Certainly, yes.

Q8 Earl of Liverpool: You touched on this in your answer to a subsidiary question from Lord Haskel earlier, but I wonder if you could tell us what your view is of the concerns expressed by some stakeholders about a blurring between the military and the civil use of RPAS, particularly in the area of law enforcement.

Adam Simmons: For me, there are two sides to this. Of course, there is the obvious weapons element in the military use of RPAS. Certainly there is no question of weaponising any use in a civilian sense. Indeed, there are regulations in place that prevent that. To get the right order here, Article 129 of the Air Navigation Order⁸⁵ prohibits the dropping of “articles and animals” in a manner that would “endanger persons or property”. There are regulations

⁸⁵ The Air Navigation Order 2009 is legislation regarding safe use of aircraft.

there that directly address the use of civilian RPAS to try to endanger or hurt somebody. Secondly, I understand that part of military use is surveillance, and that could be a question certainly for some of the use by law enforcement agencies. But, again, the technology itself is perhaps not the issue there; the issue is about making sure that the right legislation is in place to control how surveillance is gathered and how data and personal privacy issues are protected. We believe that that legislation is already there, or is certainly being reviewed, separately from RPAS, so it is perhaps less of an RPAS issue. In thinking about this question, we were not quite sure where the concern was about the blurring between military and civilian. I hope that answers your question.

Earl of Liverpool: Currently the classification in member states between civilian and military use is classified differently. Obviously, if we are going to be writing a report on this, it would be nice to be able to say whether that should be somehow clarified.

Adam Simmons: I understand.

Paul Cremin: Most of the military use of RPAS at the moment is constrained to operating overseas in theatre, where we are operating under different rules and in a completely different environment. I will not go into any of the operational aspects of that today. With regard to the civil aspect, a number of potential civilian applications are foreseen for this. In fact, I hear of a new one almost every day. People are becoming resourceful. When the internet first came on the scene, people looked at different ways of using that technology, and we are now seeing that with RPAS. The resourcefulness of entrepreneurial people to think about how people gather information or data in different ways is quite astonishing. As Adam quite rightly alluded to, the important thing is to make sure that we understand the boundaries within which those operations can take place and that there are sufficient controls to assure and reassure the general public. As it stands at the moment, those operations are constrained to what we call segregated airspace, so they are in operations that are specific to the task that they are looking to do. They are not, I would argue, in the area where there may be some blurring. The police have experimented and are experimenting with RPAS, it is fair to say, and I am sure that as we go further forward in time that will be increasingly likely. Again, we come back to the key thing of making sure that there is enough reassurance and—I am sure we will cover this later—that there are sufficient safeguards in place so that the data that we are collecting are collated and collected in a proper and, quite rightly, controlled way that both promotes the sectors that the industry is looking to develop and, equally, protects the public at large.

Andrew Horton: From an export control point of view, if it has been specially designed or modified for military use, it is definitely military, but we also control the dual-use items. A lot of that is based on the flight characteristics, such as whether it has autonomous capability or beyond visual line of sight capability. Those are the systems that we view as being very capable systems and not too dissimilar from military systems.

Q9 Lord Kakkar: I want to reflect on the whole question of detect and avoid systems⁸⁶, which I understand are a prerequisite for the safe use of these remotely piloted aircraft

⁸⁶ Detect and avoid' (also referred to as 'sense and avoid') refers to the ability of an aircraft to avoid mid-air collisions.

systems in unsegregated airspace⁸⁷. I would like to ask you two questions. First, do you consider it a prerequisite to have such a system in place before these devices are allowed to move around all airspace? Secondly, how close are we to having them?

Paul Cremin: It depends on the airspace you are operating in. You can operate in unsegregated airspace. I do not think we understand fully the areas in which you would almost certainly need a detect and avoid system. If you are flying in class A airspace, which is what we call ordinary airline airways, your separation from other traffic is provided to a large extent by air traffic control. So there may in some circumstances be some thought of saying, “Yes, you may need it”, but the extent to which you rely on it may be different from the extent to which you rely on it in what we call class G airspace, which is not controlled airspace: you are not being controlled as much by air traffic control and you have lots of different types of aviation stakeholders flying around, such as general aviation and military jets. The extent to which you rely on it will be dependent on how complex the airspace you are operating in is. I do not think that argument has yet been fully made either way.

In terms of the certification of UAS⁸⁸, it is true that detect and avoid is an important system, but actually there are lots of important systems that require significant work to make these things acceptable in uncontrolled airspace, not least secure communications, which, ultimately, I am led to believe, will be slightly harder to achieve than detect and avoid.

Coming back to your second question, the Department for Business is supporting a programme called ASTRAEA⁸⁹, which is made up of a consortium of UK national industry partners such as BAE Systems, QinetiQ, Thales, Rolls-Royce—the big aerospace companies—and they are developing key technologies that will push the boundaries of the integration aspects and the technology that is required to do that. I am led to believe that the UK has demonstrated some of those technologies through that programme, which places the UK very much at the leading edge of the development of those technologies. However, as I mentioned earlier, it is anticipated that the degree to which you rely on detect and avoid will depend on the challenge of the airspace that you want to fly in. But based on the work that ASTRAEA has pushed out, it is a difficult question because detect and avoid is still an emerging technology and you have to go through the robust testing of such a system. Not only do you have to evolve it and test the practical application of it, you then have to go through the full system-live demonstrations, as you would do in testing any other product. For instance, TCAS, which is a Traffic Collision Avoidance System in aircraft and which followed a very similar programme, took 10 years to develop. That is the kind of development that we are talking about here. We are working on the assumption that the regulator will evolve the regulations based on demonstration evidence, as I have just described, and it is further assumed that it will take two to five years to develop a production system capable of being certified against that evolved regulation. Realistically, you are looking at a potentially certified detect and avoid system in and around the 2023 timetable.

Lord Kakkar: If I may come back on that, in broad aviation safety terms, is there a risk that having these remote piloted systems operating by accident in bits of airspace that they are

⁸⁷ This is airspace shared with other users such as commercial aircraft.

⁸⁸ Unmanned Aircraft System

⁸⁹ Autonomous Systems Technology Related Airborne Evaluation and Assessment

not meant to operate in could threaten the safety of other aviation? If there is no detect and avoid system, which has clearly been a landmark development in broader aviation safety, does that mean that for other forms of aviation we are taking the whole safety question backwards by allowing these to be more broadly used?

Paul Cremin: Until such time as those systems can be demonstrated, RPAS or small systems are required to operate within segregated airspace away from other airspace users. It is not until such time as those technologies have been proven that they will be allowed to operate outside those systems. Yes, you are absolutely right: one of the precautions that we take is that at all times the pilot must be able to track his vehicle and tell us exactly where his vehicle is. Even within segregated airspace, the operator has to provide the Civil Aviation Authority with a safety case that demonstrates that he can track his vehicle—that he knows where his vehicle is—and that each time there is a failsafe mechanism that, should things go wrong, the aircraft can be safely brought down or whatever needs to be done with it to make it safe.

I mentioned earlier that some of the good work that is coming out of Europe at the moment is an extensive R&D⁹⁰ programme. There will be occasions when we want to trial aircraft in very closely monitored conditions that will, and have to, allow these aircraft to fly outside the box if we are to progress into an integrated airspace arrangement. They will be carefully controlled research programmes, where additional safety mechanisms will be put in place to do that, including the testing, because eventually you will have to test a detect and avoid system and presumably you will have to test it against some other targets that it may come up against. First of all, you would test that in a simulated environment until you felt safe to put that in an actual platform, and then you would test it in segregated airspace in very controlled circumstances and slowly widen the envelope.

The Chairman: Thank you. Perhaps you could send us a list of other important systems that also need to be developed, along with detect and avoid.

Paul Cremin: Other key technologies?

The Chairman: Yes, thank you.

Q10 Lord Brooke of Alverthorpe: A friend of mine was 70 last week. He is a man who has most things. He got a box, opened it up and discovered that he has got himself a small recreation system that will fly. He had no idea what it was or how to use it. There is very little inside in the way of instructions about what he should not do with it, except that the friend who sent it to him said, “You can try to get a camera on it and start taking pictures in different places”. That leads me to my question. It has been suggested that the increased civil use of RPAS challenges current legislation regarding data protection and privacy, which relies on individuals being able to identify who is collecting their data. Do you agree that identifying who is operating an RPAS and for what purpose is problematic and is going to be very difficult indeed? Can you propose any solutions to this problem? Are we going to have some form of regulation on it as well in due course?

⁹⁰ Research and Development

Adam Simmons: Your opening comment about your friend's birthday present is quite right. You mentioned a camera that may be mounted on an RPAS system, which could collect data or information on people. Of course, the Data Protection Act has an obligation regarding how data are collected and used, and an obligation on the people collecting those data. Your story highlights the key issue, which is whether more can be done at the point of sale to inform people of their obligations under the various different pieces of legislation that govern particularly where data may be collected on others, through photography or what have you.

You asked about identifying the operator of an RPAS. As Paul set out earlier, currently where an RPAS is operating within segregated airspace there needs to be a link with the CAA to get permission to operate in that way. At the moment there is that relationship, but as this is integrated more into non-segregated airspace, that will become an issue. I do not know whether this issue has been picked up by the cross-Whitehall group.

Paul Cremin: There are two issues that this brings up. I chair a cross-government working group of cross-Whitehall civil servants who are tackling this very issue. It is a very live issue. Obviously the proliferation of small unmanned systems could be a success and is showing the demand for this type of activity. Equally, you are absolutely right: there is the issue of privacy and data protection, and all the other things.

The issue that you quite rightly identified is not so much the regulation; we believe that there is sufficient regulation out there. It is a behaviour issue initially; it is about how you inform the person who is buying these things. You can go into Maplins today and buy a fairly sophisticated system for about £500. The question, as you quite rightly say, is that when you get the box home, where, first of all, does it tell you that you are buying an aircraft, let alone anything else? These are aircraft. They are viewed in the Air Navigation Order as aircraft, and you have responsibilities under that order, but if I do not know that they are aircraft I do not know how to behave. This is a very real problem that we are aware of. The Civil Aviation Authority is, I understand, targeting key manufacturers at the moment to look at putting some sort of leaflet in the box to tell them: one, their responsibilities as a pilot of an aircraft and how to behave; and, two, how to act responsibly in respect of the data protection and privacy points.

This leads into a much wider question. This is clearly an emerging issue that will only get bigger, I suspect, as we go through. We will be talking to Ministers very soon, and the Minister might be able to say more when he gives evidence. The time is drawing near when we look to have some sort of public dialogue with the general public on the use of RPAS and what they think. I think the time is right and that we will see an explosion of that. We are engaging through BIS with a programme called Sciencewise. We are looking to have key debates across the country on this, and we will put key questions to them.

Lord Brooke of Alverthorpe: Can you comment on what has happened in America, where there has been a widespread explosion in the use of the small ones and a very strong reaction in certain sections of the public, to such an extent that it has significantly slowed down development in the industry?

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The Chairman: Perhaps you could write to us about that. The point that you have been dancing around is very important. I was horrified the other day when I was given a certain website to look at. I could see the roses in my garden. It was on a Google map or something, and I have no idea how it was taken. It was taken from up there. Obviously it was not a large aircraft, but this is happening. It did not fill me with a sense of security.

Paul Cremin: We have to be careful in the sense that a lot of what RPAS threatens to do and what it is doing today, such as gathering information, is currently being provided by manned aircraft and manned helicopters. Compared with what Google has been doing with its cars and so on and what it has attempted to do, RPAS will be far less intrusive. It is amazing, when you look at it, how much aerial work is conducted today in the UK and across Europe using manned aeroplanes. In terms of the environmental footprint and everything else, RPAS offers an alternative, and with the longer sustainable hours that it can operate and loiter for, the calibre of the information is often vastly superior. There are challenges, and we recognise those challenges, but we should not forget that manned aviation is carrying out a lot of surveillance today that could be provided by RPAS.

Andrew Horton: Another thing to add is that there are companies already providing high-definition video with space-based systems, so in the future, satellites equally could be looking down on you, not just RPAS, manned aircraft and helicopters. A whole range of emerging technologies are going to be out there.

The Chairman: Before we come to the last question, from Lady Valentine, I have just been asked by our specialist adviser how long it will take to develop regulations using JARUS, and how JARUS will clarify the different operations and types. I am not asking you to answer that now, but if you could take those questions on board and send us answers, that would be very helpful.

Paul Cremin: What I would say is that I understand that the Civil Aviation Authority will be giving evidence, and since it sits on JARUS the questions might more appropriately be put to it.

The Chairman: Thank you very much.

Q11 Baroness Valentine: What is your view of the EU's consultation processes and stakeholder involvement so far?

Adam Simmons: For me, the consultation process is well proven. It is transparent. It is important that we have stakeholder engagement. That needs to be an integral part of the process. It does seem to enable many industry players to be involved. I recognise that there is a difficulty at times in encouraging different stakeholders to contribute. From the UK, we try to consolidate as many views as we can, but obviously there needs to be a process whereby we get full engagement. Overall, the consultation process works well, although I acknowledge that it is perhaps not a perfect way of getting absolutely everybody's view.

Paul Cremin: This is an area that the EU is very keen to get right. With regard to RPAS, it has had far more consultation than it would normally do on a lot of other things that I have seen. It went through an extensive exercise: there were five stakeholder sessions, which went from about 2009 to about 2010 or 2011, and there was extensive industry participation. I

was present at a couple of them and was surprised by how well attended they were from the industry's perspective. What is also reassuring is that the industry is very engaged at all levels of the development process. There are some challenges within that, because you find companies that want to go at a different pace commercially from other companies. You have prime companies and small entrepreneurial companies; often the likes of BAE Systems and others can throw a lot of resources at something but are looking for something very different from an entrepreneurial company that wants something very quick, simple and low cost. It is a very difficult process, but there has been extensive engagement with industry and stakeholders. The EU seems to have put out another consultation, which is running today. I think we can be fairly satisfied that we will be consulted to death on this.

Q12 The Chairman: This has been an amazing session. We have learnt a huge amount. I thank you all, individually and collectively, for doing a fantastic job. It really was great, and was a great pleasure. Time has flown and you could see the way that everybody was participating; I had to keep them down. I always ask what question, if you were in my position, you would have asked that we did not ask, and what your answer would be to that question. In other words, is there some glaring omission that we have not covered that would impact on our long-term report?

Adam Simmons: We touched on this earlier with your question, Lord Brooke, which is the conversation that we have with the public. I am sure that the prices of these things will come down and the technology will develop. Where there are the conversations with the Googles, which may have some bigger systems, or with the bigger industries, and as the regulation develops and it is clearer how we will do things with them, I think we will get that. It will be more about how we have that conversation at the individual level. As Paul set out, part of the answer is that there are some things that we can do with BIS and the Cabinet Office in terms of putting out information through Sciencewise—trying to have that public dialogue with people to get exactly the same sort of reaction as you, madam chair, about what these sorts of uses may well be. We hear a lot of stories about Amazon for example possibly delivering goods and, as we noted earlier, I am sure there will be lots more uses of this. It is the balance of having a regulatory framework that does not stifle the growth of the industry—I think there can be some very good uses there—but directly addressing privacy, in particular, and safety, which we have touched on here.

The Chairman: Ethics.

Adam Simmons: The cross-Whitehall group is well aware of those issues and does discuss them. It probably gets to the point of when we open the doors to that and have that conversation more publicly. We are starting to do some things through the Sciencewise approach, but engagement on this will be very difficult. For me, that is going to be the big challenge.

The Chairman: Thank you. Do both of you agree?

Paul Cremin: I do agree, but I would add one more challenging question that you might want to put to industry—I am sure you will be talking to most of the industry.

I think the challenge for government, as I am sure you recognise, is that we often get a number of companies or entrepreneurs coming to government and seeking government

money to support their products. That is no different for the bigger aerospace companies. We are in a very different climate now, as we all know, and we understand that there are technical issues and regulatory issues. In America, although it is a very different market, you find companies investing in products and bringing them to a level of maturity, and then coming to the government and saying, “We have a fairly mature programme. Let us exploit that programme to the best value”. In the UK, we find the opposite: “I will not develop my programme unless government or somebody with public funding pays for it”. We have to get out of this. If industry truly believes that this is a revolution in the aviation industry, it has to step up to the mark as well.

The Chairman: In other words, we ought to become a can-do country.

Paul Cremin: Exactly. In government, we support a number of initiatives and we will try to help them where we can, but that is what we would like to see if they believe in their products that much and believe in the opportunity.

The Chairman: Thank you very much indeed. We will send you a transcript but, if you have any bright ideas at about 3 o’clock in the morning, get out of bed and go and write them down and send them to us. Thank you very much indeed.

Department for Business, Innovation and Skills and Department for Transport—Oral evidence (QQ 1 – 12)

Department for Business, Innovation and Skills and Department for Transport—Oral evidence (QQ 1 – 12)

Submission to be found under Department for Transport and Department for Business, Innovation and Skills—Oral evidence (QQ 1 – 12)

Department for Business, Innovation and skills—Written evidence (RPA0038)

Civil use of Remotely Piloted Aircraft Systems (RPAS) in the EU **13-October 2014**

The following is additional evidence requested by the Committee from the Department of Business, Innovation and Skills' Export Control Organisation (ECO) in respect of Missile Technology Control Regime (MTCR) and the Wassenaar Arrangement (WA).

Missile Technology Control Regime (MTCR)

The Missile Technology Control Regime (MTCR) is a voluntary group of 34 countries focussed on preventing the proliferation of unmanned delivery systems for Weapons of Mass Destruction.

The regime was established in 1987 to specifically control the proliferation of Ballistic and Cruise Missile technology. In 1992 the MTCR extended its scope with the inclusion of Unmanned Aerial Vehicles (UAVs), of which RPAS are a subset, within its definition of "missiles".

The MTCR Technical Experts Meeting (TEM) maintains a list of goods, software and technology as a Technical Annex. The Annex is divided into two categories:

Category-I deals with long range missiles, UAVs and key sub-systems

Within this category are *"unmanned aerial vehicle systems (including cruise missile systems, target drones and reconnaissance drones) capable of delivering at least a 500 kg payload to a range of at least 300 km"*.

Category-II is a mix of Dual-Use and military goods

Within category-II are *"unmanned air vehicles (including cruise missile systems, target drones, and reconnaissance drones) not covered in Category-I, capable of a maximum range equal to or greater than, 300 km"*.

In addition to the Technical Annex, the MTCR has agreed a set of guidelines. *The Guidelines for Sensitive Missile-Relevant Transfers* refers to a *"strong presumption to deny"* transfers of Category-I systems. The Guidelines go on to say that the transfer of *"Category-I production facilities will not be authorised"*.

MTCR controlled UAVs (both MTCR Category-I and II) are listed within the UK's Strategic Export Controls as Category-B goods. That is they are regarded in the same way as high risk items such as Small-Arms & Light-Weapons and Man Portable Air Defence Systems (MANPADS).

The current participating states are:

Argentina, Australia, Austria, Belgium, Bulgaria, Brazil, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Republic of Korea, Russian Federation, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom and the United States of America.

Nine EU countries are current outside of the MTCR, (but have applied for membership), these are:

Croatia, Cyprus, Estonia, Latvia, Lithuania, Malta, Romania, Slovakia and Slovenia.

Wassenaar Arrangement (WA)

The Wassenaar Arrangement is a voluntary group of 41 countries focussed on controlling the exports of conventional weapons, military and related dual-use goods. The WA was founded in 1996 with the aim of *“preventing the transfer of arms leading to regional destabilising accumulations of weapons”*.

The regime’s Experts Group is responsible for changes to the regime’s two control lists, these are:

- The Munitions List, (which controls military goods specially designed or modified for military); and
- List of Dual-Use Goods and Technology, (which are those items not specially designed for military use but have certain characteristics which make them useful for military or other related activities of concern).

Approximately 70% of all the control entries in the UK’s Strategic Export Control List come from items that the WA have agreed to control.

The current WA participating states are:

Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom and the United States.

Currently the only EU Member State outside of the regime is Cyprus. Cyprus membership is strongly supported by UK and other EU members but its conclusion is a longstanding issue.

The Specific WA controls on RPAS are:

Munitions List entry ML10c (i.e. Specially Designed or Modified for Military Use) –

Unmanned aircraft and related equipment, as follows, and specially designed components therefor:

"UAVs", Remotely Piloted Air Vehicles (RPVs), autonomous programmable vehicles and unmanned "lighter-than-air vehicles".

Dual Use List Category 9 entry 9A012

"Unmanned Aerial Vehicles" ("UAVs"), associated systems, equipment and components as follows:

UAVs having any of the following:

An autonomous flight control and navigation capability (e.g., an autopilot with an Inertial Navigation System); or Capability of controlled-flight out of the direct vision range involving a human operator (e.g., televisual remote control).

"Unmanned aerial vehicle" ("UAV") - Any "aircraft" capable of initiating flight and sustaining controlled flight and navigation without any human presence on board.

Implementation of the International Export Control Regimes in UK Strategic Exports

The UK incorporates the items controlled under both the MTCR and WA within the UK's Strategic Export Control Lists.

The WA Munitions List is the basis for the UK's Military List.

The WA Dual-Use List and the MTCR Technical Annex is incorporated into the *EU Dual-Use List*, which is Annex-I of the EC Regulation 428/2009.

Items listed in the UK's Military List require an export licence to all destinations, including with the Single Market.

Items listed in the EU-Dual List do not require an export licence when being exported to another member state. However, MTCR Category-I "missiles" are subject to export licences even to other EU Member States, unless they are being exported as part of European Space Agency programme.

To date there has been no civilian MTCR Category-I UAV transfer from the UK to another EU Member State.

24 October 2014

DG MOVE—Oral evidence (QQ 76 – 97)

Evidence Session No. 7

Heard in Public

Questions 76 - 97

WEDNESDAY 5 NOVEMBER 2014

Members present

Baroness O’Cathain (Chairman)

Lord Brooke of Alverthorpe

Lord Fearn

Lord Haskel

Examination of Witnesses

Mr Margus Rahuoja, Incoming Director-general, DG MOVE, and **Mr Koen De Vos**, Policy Officer, Aviation Safety, DG MOVE⁹¹

Q76 The Chairman: Thank you for agreeing to give evidence to the Committee’s inquiry on RPAS. This session is not being recorded or webcast, but a transcript is being taken. Witnesses will have the opportunity to review this transcript and change mistakes that have been made—we all make them. Members’ interests are disclosed on a list on our website, and you have the details of our website. Do any Members have anything else to declare other than Lord Brooke and I? No, okay. Please speak up clearly, and that is to the team—

Please speak up clearly for the benefit of the record. Could you introduce yourselves as well because we need to put that on our record?

Mr Margus Rahuoja: Well, thank you very much, Baroness. My name is Margus Rahuoja and I am Director for Aviation and International Relations in the Directorate General for MOVE or transportation in the European Commission.

Mr Koen De Vos: My name is Koen De Vos. I am the official dealing with the file of remotely piloted aircraft systems. For two years we have tried from the European angle to gather the momentum politically, gather all the efforts made by all the actors involved—the ones you have seen yesterday already—liaise with industry and get the thing moving to make sure that we have RPAS flying around in European airspace.

The Chairman: Safely?

⁹¹ Directorate General for Mobility and Transport at the European Commission.

Mr Koen De Vos: Safely and swiftly.

Q77 The Chairman: Now, the first question is mine. Given the fast pace at which the RPAS industry is developing, especially at the sub-20 kilogram level, do you think that the priorities identified in the European roadmap published in June 2013 and the communication published in April 2014 are still relevant? I would like to add to that the outcome of the latest Transport Council where apparently everybody was united.

Mr Margus Rahuja: Thank you very much. First of all, I would like to welcome the Select Committee on the European Union's Sub-Committee on Internal Market, Infrastructure and Employment. Welcome to Brussels. You are always very welcome here, and I also welcome the discussion.

The roadmap and the Commission communication are two complementary documents. The first is produced by a range of RPAS stakeholders, including industry and European organisations such as EASA⁹², SESAR⁹³ and EUROCONTROL⁹⁴. The role of the Commission was to provide secretarial services. The communication is the official document of the Commission to announce the launch of its official RPAS policy. The document offers the opportunity for stakeholders to express their views.

The purpose of the communication was to make a state of play, indicating the main areas of action to establish a European market and start a dialogue with stakeholders. To that extent, the communication builds on the roadmap and gives an official way forward. No decisions are taken yet. The Commission is in the preparatory phase and is open to suggestions from stakeholders to address the issues to make the creation of the EU RPAS market possible if it is so decided.

Now, replying to your additional question about the discussions in the Council, this was raised in the Council of transportation as an additional point, under AOB⁹⁵. There was a very short discussion about that, mainly on, let us say, reacting to the Commission's communication based on select areas of questions posed by the Italian Presidency. The Commission took note of these points made. We did not make an official reply because it was a statement of interest by the member states' Ministers.

Recapturing the discussion, I would say two things. Most member states indicated their interest in the subject. They said this is extremely relevant and recognised that this is a fast-developing market that needs regulation. Then the question was raised at what level the regulations should be made and, of course, underlining the necessity of making the regulation where it is best suited and underlining also the question of or the need for subsidiarity. This was more or less the recollection of mine from the Council discussions. I was present myself.

The Chairman: Yes, that is very helpful indeed because we have some sort of a version of it.

⁹² European Aviation Safety Agency

⁹³ Single European Sky Air Traffic Management Research Joint Undertaking

⁹⁴ European Organisation for the safety of air navigation. It is an intergovernmental organisation with 41 Members.

⁹⁵ Any other business

Mr Margus Rahuoja: It was a statement of interest.

Q78 The Chairman: Yes, that is very good. From your point of view, one of the issues that we find—and we will be coming to it in a later question—that we are completely worried about is privacy and data protection. Was that actually homed in on in the statement, or was it not mentioned?

Mr Margus Rahuoja: Yes, there were several areas identified by different Ministers and privacy and data protection was one of them, obviously. The Commission replied as a preliminary statement and, of course, we look for the proportionality of rules. First and foremost, we look for the safety of the operations technically. Of course, as the Commissioner for Transport is not responsible for data protection or privacy, we then will include in our deliberations all the relevant authorities in the Commission.

Q79 The Chairman: Such as DG Justice⁹⁶, yes, I see. What other areas of the Commission are involved in this, would you say? Having been there and listened to the AOB discussion, who do you think are likely to be involved and in what parts of the Commission in detailing this? It is just an interest because we need to know where the pressures are going to come from or what the pressures are. We see data protection and privacy being one and, of course, safety being the number one.

Mr Margus Rahuoja: Yes, of course. I think you can divide this discussion into different questions. One, of course, is the safety of the general public. The second is the data protection of the data that is transmitted. The third one is the privacy of the general public in terms of use of the machines or the technology. These are the general questions we are asking all the time whenever we discuss the question of the new technology put into the internal market. Of course, we also have a question about the security, obviously, but security very often is linked to safety.

The Chairman: Indeed, yes.

Mr Margus Rahuoja: But then you look at it from different angles, either from the consumer point of view or from the producer point of view. I think there are also two aspects. Whenever we ask the question, is it a question of whether it is from the point of view of technology itself or it is from the use of that technology when the consumer comes in. But we are in the abstract discussion for the time being.

Q80 The Chairman: Yes. The last question you will hear from me before we open it up is on the issue of jobs, from the manufacturing and sale of these items, and the effect on innovation and research budgets. Did that come up, or was that regarded as an appendage?

Mr Margus Rahuoja: Well, this comes up in any Commission deliberation—

The Chairman: Jobs and growth, yes.

Mr Margus Rahuoja: —because we always have to make a prior impact assessment of the different aspects and the effect on the internal market. One of them is always the question

⁹⁶ Directorate General for Justice

of economic impact, including growth and jobs. We need to answer the question whether it is impacting it positively or negatively, but this is coming up every time we propose legislation. When we propose a political discussion, or the communication as we call it, we do not assess the impact immediately because we launch the discussion. Then the next step is we identify different areas where the member states advise us to move forward. We are in that phase now, and once we come to some concrete proposals on either legislation or opinions or suggestions, then we need to assess the economic, budgetary and environmental and social impact, if you wish. This is now the next phase after we have finalised the public consultation.

Q81 The Chairman: That has been more than helpful. Thank you very much. Just finally is that document, which you say is a checklist or box-ticking exercise for each communication or super-information and so on, available? Could we have the template for that, because it would be interesting for us to know what is on that list so that we in turn, when we are analysing a communication or super-information or even a directive, could know what has been important on the way through?

Mr Margus Rahuoja: Maybe I will give the floor to Mr De Vos. He will explain where we are in our processes and then you will see what kinds of documents are available.

The Chairman: Yes, that would be useful.

Mr Koen De Vos: We are currently in the process of conducting this impact assessment process, as Margus said. It is a thorough assessment of: what is the problem, what can we do about it, would European action add value, and, if you want to add value, what kind of value do you add in terms of employment, environment and economic?

The Chairman: And advancement of the internal market, I suppose?

Mr Koen De Vos: Yes. That is, of course, the core of the discussion and that is what we are trying to assess. Therefore, we are really in the process also. It is internal thinking.

With regard to your question on employment, I think we have to look at not only the employment created by building and operating these devices but, above all, how you can support your complete industry and your economy by these RPAS services. Look at farming, where many farmers are blocked in trying to satisfy so many green standards and productivity standards and they need more data. Where can they pinpoint water or put some more fertiliser or less fertiliser? They need data. There, the RPAS could fly over the farmland and provide exact real-time data on where they have to put some fertiliser or put some more water and so increase productivity. That is the real gain in employment. If you look at, for instance, logistics where you could have also the final mile, which is most difficult, if you could there have some use of RPAS, that is going to maybe create additional employment but, above all, make existing employment more competitive.

The Chairman: And, therefore, growth?

Mr Koen De Vos: Yes. We could develop that at European scale. That is why you need to bring RPAS on a European market so that all companies can make best use of it—all logistics, all farmers, all over. That is the big challenge.

The Chairman: Well, thank you very much. Did you want to add something to that?

Mr Margus Rahuoja: Just to put it in a framework, we are looking into the impact assessment from the more general economic perspective as well, in one sentence.

The Chairman: Yes, quite.

Q82 Lord Haskel: Thank you for explaining exactly what you are doing, but why is that necessary? The market is operating. People know what these things are useful for. The people who supply the services will go and visit all the farmers and tell them what they can do. People are going to sell their services. Are you coming along behind all of this, or do you think you are leading it?

Mr Margus Rahuoja: Let me reply to that. I think here we have to remember that we are looking at it from the internal market aspect. The angle is the internal market. We are not looking at it from the local or national markets perspective. Whenever the Commission makes an assessment or a proposal, it has to have a cross-border effect because, otherwise, the internal market is not affected. This comes from the basic concept of how the Commission acts or makes its proposals. Of course, we accept and very much agree with the concept of subsidiarity and we should not meddle where we should not meddle.

The Chairman: Absolutely right.

Mr Margus Rahuoja: Nevertheless, if you look at civil aviation in general, then the internal market has created value added where nobody could really impact it before it actually happened. By nature, if you look at, for example, the Benelux countries, almost all civil aviation operations are international because they affect cross-border movements or activities. Therefore, we see a great potential for the internal market by recognising that there is, of course, enough room and space for a national role or a local role if you wish. In many aspects, when we come to small machines—when I talk about the weight—then obviously the capabilities of these machines, we assume, will not be such that they would impact international interaction, but then we probably need to define exactly what should be done and where, just anticipating the discussion we have. Here, to conclude, we are looking at the internal market aspect that is cross-border in relation to the member states.

The Chairman: Yes. Of course, you have chosen the one area where that really works. I cannot think of any other area of economic or business activity where it works as well as it does in aviation.

Mr Margus Rahuoja: Well, just to anticipate again, it is a plea by the industry itself that we hear that we should not lose the international aspect of this industry. The industry, when it looks into the potential of the market and the potential of the economic benefit or growth in jobs, by nature the European industry is international when we look at the civil aviation. Very often, the producers or the interested parties are already very active in the civil aviation domain.

The Chairman: Sure, but the contrast is with, for example, the rail industry. It does the same thing—it moves people and goods—but it is just the way it has grown up.

Q83 Lord Brooke of Alverthorpe: I am asking the second question, which we have in front of us, although you have already given us a very comprehensive reply. What is your view of the regulatory arrangements between ICAO⁹⁷, the European Aviation Safety Agency, the Joint Authorities for Rulemaking on Unmanned Systems—JARUS, EUROCONTROL, SESAR and so on? Is there a clear delineation of responsibility and does it reassure RPAS stakeholders?

Mr Margus Rahuoja: As a reply, I would say that on the one hand there are regulatory complexities where it is challenging to integrate the specific roles and competencies of different organisations at different layers, local, national, European and international. On the other hand, such complexity should not lead to complex or heavy-handed rules for citizens and companies, especially as the RPAS sector has a large participation of small and medium-sized enterprises. We see that our task is to protect operators and citizens against this regulatory complexity. That is why we are considering a single set of clear and risk-proportionate rules. Again, the European citizens and European companies are the starting point for our action. Nothing has yet been decided.

ICAO is the overarching layer of safety requirements. These international requirements need to be transposed into national jurisdictions. In the EU context, this may mean into national or European rules. Only national and European rules are interpreted in the same way, can be enforced and offer legal certainty in the market. For us, ICAO is starting a formal process to produce standards and recommended practices; SARPs⁹⁸ in technological speak. As this is an international and consensus-based process, this may take time before the first SARPs concerning RPAS will be adopted.

Meanwhile, you know, of course, that a number of national authorities have grouped together in the Joint Authorities for Rulemaking on Unmanned Systems⁹⁹ and have taken an initiative to develop in a fast and pragmatic way international standards. This is an efficient way forward and the EU supports this approach.

Just to recap and conclude, the Commission fully supports the central role of JARUS for the time being. That is the main point of discussion and inspiration for the EASA proposals for rules. That then will be assessed by the Commission and the Commission will then proceed with the comitology procedure to regulate.

We see that we do not need to follow the rules or compliance-based approach that we normally have in civil aviation. We should go for the risk-based approach in general in providing for the safety, because the first purpose is safety not only of the machines but of the operations. Therefore, we need to find a way of defining the risk and then regulating accordingly to address that risk. There we, with the European Safety Agency¹⁰⁰ that is under the supervision of the European Commission, are fully in the same line and we are fully in line also with the European industry in that regard.

Q84 Lord Brooke of Alverthorpe: If I may, I have a supplementary, which links back to the Transport Council meeting and some of the discussions we had yesterday on the issue of

⁹⁷ International Civil Aviation Organisation

⁹⁸ Standards and Recommended Practices

⁹⁹ JARUS

¹⁰⁰ EASA

privacy and data protection. This is a new element that does not normally figure in the aviation area in quite the way it could conceivably figure, given the technological changes that now face us with RPAS and also with the way entrepreneurs almost on a daily basis are finding new ways in which they see RPAS could be used in the future and the knock-on effect then for business and employment and so on. I am jumping away from the previous question to some extent. You said that, although the fundamentals do link, there would need to be consultations with other elements that may have an interest, which I think probably would be DG Justice. We are moving into a new area and, to sum up what I am saying, we have a new element, to my mind. I think the decision that seems to have been taken is quite crazy—that is a personal view—on the Transport Council meeting, with everybody getting very excited about privacy and security and the subsidiarity argument starting to arise. Somebody will produce very small machines very soon that can fly a very long way. Indeed, I believe they are already around, in which case you are into an entirely new scenario compared to what we have regulated on in the past. If people start digging in very quickly, I think they will do only half the job.

Mr Margus Rahuja: Thank you for the additional question. I would divide it into two in reply. From one side, if I look at the responsibilities and the legislative power that we have here under our authority—and here we are talking about the EASA rule-making committee—our main task is to provide for safe operations of the technology, whatever that technology is. In that respect, we are not looking at the consumer applications of that technology. Of course, this is a layer that has been brought to our attention and we expect then the responsible parts of the Commission to give us the solutions. I do not expect that the transportation part of the Commission would deal with anything that is not linked to either safe operations of the environment or air traffic and airspace, or then the technical specifications of the technology that uses that airspace, so also linking then the complexity of the airspace.

I will give you two examples where we have, of course, special concerns. This is the aerodromes and the civilian habitat—I mean cities. We would restrict ourselves to these responsibilities because otherwise we would not only overstep but we will make the task too complex. We would expect, like you said, the other organisations who are responsible for privacy or the departments that are responsible for data protection then to regulate and, of course, we will ask once it comes. Because normally from the Commission we should get out complex rules that respond to all the angles that are then identified by either the general public or the industry so that, if these products are put on the market, some questions are not answered, like, for instance, privacy or data protection. We are very conscious about that, but when it comes to our responsibility, when we look at data protection, then we rather look into a protection of the data that is exchanged between the operator and the machine. Let us put it in perspective. We will not work on the data protection of, let us say, the application that is used—for instance, a camera that is installed, what will be happening to these pictures that are taken? I think our responsibility would be to keep these machines flying and bring them safely home, if you wish, and that data link is not compromised by any illegal activity or used by anything that is not regulated. I hope it was clear.

Lord Brooke of Alverthorpe: Yes, but it is still an area.

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Mr Margus Rahuoja: Yes, absolutely, we recognise that, but there is a limit to our responsibility here. Of course, what we do, we take note and we pass this on. This is what we can do.

The Chairman: Do you want to add something to that?

Mr Koen De Vos: Just shortly. If we come up with a Commission proposal, of course, DG MOVE as such is working together with all the DGs involved. We work closely together with DG Home, DG Justice, DG Enterprise, and they also make sure that those other areas are well connected and integrated in this thinking and in these proposals. It is not that we are going to regulate data protection, but from our main focus on safety we will make sure that the links can be made. That is the purpose.

The Chairman: Can I say that I am very impressed with two things that you said? In the answer to question 2, you said, “We see it as our task to protect operators and citizens against this regulatory complexity. That is why we are considering a single set of clear and risk-proportionate rules. Again, the European citizens and European companies are the starting point for action. Nothing has been decided.” It is the first time that I have ever been involved with the Commission in taking evidence where they have mentioned the European citizens.

Mr Koen De Vos: We work for them every day.

The Chairman: Well, exactly. I say what about the 500 million European citizens? Having said that, relating back to this discussion we have just had on privacy and data protection, I think that the European citizens are well aware of what is going on, are well aware of the necessity for data protection and privacy and know about the privacy we have, which is questionable, and the protection we have, which is questionable because we do not know where the threats are coming from. You are pushing at an open door to bring in more rules and regulations—I know you would not do it, but the Commission in total—about enhancing rules on data protection and privacy because most people are deeply concerned about it. We do not know where it is coming from; this is the whole point. We have not mentioned international terrorism and security, but we all know it is the elephant in the room. I did want to say how I thought you were great about mentioning the citizens.

Mr Margus Rahuoja: Let me make one comment. I fully understand what you are saying, and the question that you pose about privacy and data protection of the use of the information produced by that technology that we discuss should be addressed to the competent authorities. Here we are concentrating on the airworthiness and the safe operation of the remotely piloted systems rather than the applications or the economic potential or the abuse of this potential that they will then pose.

The Chairman: Yes, of course.

Mr Margus Rahuoja: Just to put it on the record.

The Chairman: Quite.

Lord Brooke of Alverthorpe: Sometimes I fear that this element is going to drop through a hole.

The Chairman: I do not think that is likely.

Mr Margus Rahuoja: Our task here is to identify the potential and then the next task will be to regulate the respectable use of this technology. Our task is to make the operation safe, so if it is decided to do any operations we will not be the stumbling block that we cannot provide for the safe operations. This is our purpose. I want to make that extremely clear.

The Chairman: Well, you have made that clear.

Q85 Lord Haskel: The third question deals with a matter that is a little bit outside safety. It really deals with the countries that have obligations with non-EU countries. We give the example of the missile technology control regime¹⁰¹, which is an obligation for Great Britain. It imposes restrictions on the trade in large RPAS. Do you think this is going to distort the single market?

Mr Margus Rahuoja: I will give you an answer and then we can have a discussion. Member states must continue to respect their obligations under non-EU treaties. This should not lead to distortion in competition for UK or EU companies in general. First, these treaties emanate from external relations policies that are more and more converging in the EU. Secondly, RPAS will be subject to requirements that already apply to aviation and payload, like sensors, across the board. As such, there is experience in the application of those treaties.

Coming back to the missile technology control regime treaty, for example the UK is bound by it but so are a substantial number of EU member states such as Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Spain and Sweden—so 19 out of 28 member states and the list is growing. All in all, we think or consider the risk for distortion at best to be very limited if not non-existent.

Lord Haskel: Presumably, though, this missile technology control regime is to stop missiles falling into the hands of terrorists or failed states. Each European nation has an interest in that but, of course, presumably, if you are a failed state and you want to buy some of this equipment, you can go to one of the countries that are members of the EU but are not members of the missile control technology regime. Are you going to make any effort to try to put a stop to that?

Mr Margus Rahuoja: I need to reply from the point of view of the responsibilities that I have. Here we are talking about regulating the civilian air transport market. We are not talking about any kind of export control regime. This is under the responsibility of a Commission department or a direct responsibility of a member state. Therefore, I will limit my comments.

The Chairman: Thank you very much. Lord Fearn, you can read out question number 4.

¹⁰¹MTCR

Q86 Lord Fearn: The resource implications for EU agencies and national authorities for integrating RPAS into non-segregated airspace seem to be quite large, particularly in terms of enforcing compliance with small RPAS users. What is your view on this?

Mr Margus Rahuoja: Thank you very much for the question. Compliance costs are one of the major elements in our reflections, together with subsidiarity and proportionality. That is why we are also assessing in the impact assessment process the merit of a single set of rules, which is really focusing on the risk and which is proportional.

We also believe in our process. We are devising this legislation in partnership with many stakeholders, including those administrations that will be competent for compliance monitoring. For instance, we regularly exchange views with the EU directors-general of the civil aviation, where also the United Kingdom can express its views.

Lord Fearn: Can I ask how the UK does express its views? Does it happen?

Mr Margus Rahuoja: I think the best way is to ask the UK CAA how they express their views in the records.

Lord Fearn: But you do get views?

Mr Margus Rahuoja: Of course we get views and we put them in the impact assessment, like Mr Koen De Vos has expressed. My answer would be that we are not ready to express our official views because they will be expressed in the impact assessment.

The Chairman: Fair enough. That is great.

Q87 Lord Brooke of Alverthorpe: The increased civil use of RPAS has raised fears about the invasion of privacy and a new potential physical threat to people and property. Part of the difficulty lies in identifying the controller and the RPAS's purpose. Do you think there can be an EU-wide solution to this problem? For example, should every RPAS be fitted with transponders broadcasting essential information to air traffic control or could there be restrictions at the point of sale of the RPAS? Indeed, could we do some research at European level possibly into producing some means whereby at the point of production there is some method incorporated into the product that enables ownership and operation of it to be known? There may be a bit of research for you there.

The Chairman: They have a lot of research funds.

Mr Margus Rahuoja: The privacy issue is a general issue and is discussed not only in this context but in many other contexts when we talk about especially the European legislation and its impact. Now, as explained before, we see the safety legislation as the key to operating the European market. Safety legislation should be conceived in such a way that it facilitates the implementation of rules in areas where there is no need for a new rule.

There are not yet concrete solutions on the table, but we know that there is a need to organise a partnership between European and national administrations and between different other administrations like the CAAs or the data protection authorities. We have discussed this issue in every single other question that was raised. Therefore, we recognise

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very clearly that that is an area that would be critical if any of these new technologies would be put on the civilian market for use. We recognise, of course, even if we are limited in our regulation that, without regulating or finding solutions either at national, local, international or European level, we think the economic potential for use of the RPAS will be severely limited. This is something we recognise and, of course, even if again we talk about safety and safe operations of the technology, this is the question we ask from our partners and stakeholders all the time, because we also do not want to be limited by non-solution of this privacy and data protection issue. We recognise it. We do not just say, “It is not our business—leave us alone”; we recognise that it will have an impact on the potential use of the technology, and that is why we want to have a comprehensive approach to the issue.

The Chairman: There will be costs, of course.

Mr Margus Rahuoja: Absolutely.

Q88 The Chairman: Where are the costs likely to fall? Do they fall on the national civil aviation authorities or European organisations? Where are they likely to fall?

Mr Margus Rahuoja: Again, like we said, our concept or the suggested approach that we support would be that they should fall where they are needed—so as little as possible and as much as necessary. That is, of course, easier said than done, but that is why we have this risk-based regulatory assessment rather than a compliance-based approach. This is what we ask from our European Aviation Safety Agency. For instance, as you may or may not know, I think it was last week or the week before, the Airbus company has applied for a certification of its RPAS. That is sizeable; this is not a small one. Our discussion so far has been about the limited-weight RPAS, but this will be a first step towards a general concept of how and when and why or where—all these questions—we can operate a large RPAS in an international or European environment. I think this process will give many answers, especially technical answers, that were raised around this table. The question is: can we then transpose or apply this to the smaller-scale or smaller-size operations? There, of course, our guiding principle is proportionality.

The Chairman: It is going to open a completely new scenario, is it not?

Lord Brooke of Alverthorpe: The problem with proportionality, of course, is borders, is it not?

Q89 The Chairman: Have you any ideas of what risk-based regulation would include?

Mr Margus Rahuoja: The risk-based approach is a concept that is developed in the organisations that deal with regulating civil aviation in general. Why? Because the compliance-based regulation is either too heavy or too costly or not dynamic enough.

The Chairman: It does not move with the times.

Mr Margus Rahuoja: This does not respond to the changes in the environment. There is no simple answer to that question because it is a concept. I would suggest that, if the Select Committee is interested in that matter, we would have a separate discussion.

The Chairman: All right. Thank you.

Lord Brooke of Alverthorpe: Or with the people back at home again in the Civil Aviation Authority.

Mr Margus Rahuoja: Well, this is a very complex question because, of course, it is a change of approach in the whole regulation of civil aviation but also in what happens about the compliance and control.

The Chairman: That was my next question.

Mr Margus Rahuoja: Then coming back to the adaptation of the regulations, so it is a process that we have launched within the European Aviation Safety Agency. I think the first word, if you wish, will be this certification of the Airbus RPAS because, of course, you need to start from somewhere. Then we will see whether this necessitates future changes in the approach. Of course, the main purpose is to address the new challenges of the civil aviation environment. That is why I suggested a separate discussion.

Q90 Lord Haskel: This continues the discussion about airworthiness standards but goes down to much smaller RPAS. There are concerns about the airworthiness of some RPAS. As a possible solution, could the leisure users—that is the smaller users—manufactured outside the EU be required to carry the CE marking¹⁰², which indicates the product's compliance with EU legislation? Those markings are very well known in the EU and recognised by the public.

Mr Margus Rahuoja: The general purpose is to keep the legislation proportionate, as we said before. Applying this principle already starts with the definition of the scope. The Commission is interested in creating an enabling framework for the RPAS manufacturing and commercial operations. A CE marking for small RPAS could indicate under which conditions the RPAS vehicle is safe to use for leisure purposes—not for commercial purposes—and hence excluded from other European rules. I can confirm that the CE marking is one of the legal tools currently under consideration for scoping purposes and for laying down basic safety requirements also for commercial purposes in order to avoid a certification process, which may be burdensome for both the administration and industry.

Q91 Lord Haskel: Could you tell us how this CE marking is supervised? For instance, if you decide that the CE marking is valid for these smaller RPAS aircraft, how would you make sure that they carry out the regulations? How can you make sure they will achieve the standards?

Mr Margus Rahuoja: I think my answer was in my third point, where we said that we are still under consideration for scoping purposes. I would not want to go further than that because it would get me on very thin ice.

Lord Haskel: How is that done under other products, just as a matter of interest?

Mr Koen De Vos: There are various ways of controlling how CE markings are respected. You have the public way where authorities do it and you have the private way where some companies, which see that their market is taken away by products that do not satisfy that CE

¹⁰² CE mark is a mandatory conformity marking for certain products sold within the European Economic Area.

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marking but which are brought on the market, go to some supermarket and perform their own tests. So we have two ways of compliance monitoring. Then you have a system whereby those results of compliance monitoring are then gathered and distributed among all member states so that over the complete EU market the information of those tests, either made by public authorities or by private companies, is then given to all players.

The Chairman: That is happening now?

Mr Koen De Vos: That is happening now. For instance, a Swedish steel company that makes machinery equipment performs its own tests on Chinese, South Korean and so on products. They know perfectly well what satisfies and what does not. Then they go to the authority, “They are taking away my market—take them out of the shopping malls”, and that is then spread all over the European market. It is a dual role way of trying to protect the quality and CE marking. That is why it is a very practical tool also to avoid much red tape.

The Chairman: Yes. Can I be clear with my colleagues: do you think that is a role for trading standards at the lowest level in the UK or do we do that, does anybody know, with trading standards? When they go into supermarkets and they find things, do they put their findings into some other big machine? Do we know that? It is perhaps something we ought to look at.

Lord Brooke of Alverthorpe: They do. They do it on food, for example.

Lord Haskel: No, but the CE marking is about satisfying certain standards on a piece of equipment or a toy or a wireless or something. I was not aware that, in fact, the companies themselves check up on their competitors. That is a very good way.

The Chairman: Well, of course, they would. Yes, excellent.

Mr Koen De Vos: We consider it one of the tools to keep the rules proportionate.

Lord Brooke of Alverthorpe: Self-regulation.

Mr Koen De Vos: Yes. It is a partnership between companies and public authorities also. The information tools are such that, if something happens in Greece, we also know it immediately in the UK.

The Chairman: It is rather like what happens in the aviation industry. If there is a crash somewhere, everybody knows, yes, because they exchange the information.

Q92 Lord Haskel: Who sets the CE standards? Is it the industry itself?

Mr Koen De Vos: It is the Commission that adopts the standard but we, of course, could use industry input or we could refer to the industry standards. That is what we are doing. In choosing whether industry can come up with the standards, we have to push them a little bit, but if we have good standards that are proportionate and deal with small things, that would be perfect.

Lord Haskel: It is very relevant to the small RPAS, yes.

The Chairman: Yes, indeed.

Q93 Lord Haskel: Right. The Commission's communication recognised the need to update the framework for liability and insurance in aviation to incorporate the characteristics of RPAS. What can the industry expect these changes to look like?

Mr Margus Rahuoja: The communication recognises this update, subject to an evaluation. The Commission has conducted a study that concludes that for the moment RPAS operations could be covered under the current insurance regime under the relevant rules. In general, operators can obtain coverage. As I said, the issue is under consideration. The question is where to start. This is subject, of course, to some gained experience and evidence on RPAS incidents and quality of operations. We need this first in order to feed this concrete discussion about insurance coverage because it is a little bit like a chicken and egg question. You would not want to overregulate and burden the industry, but then you need to know before the incident happens what you should insure against.

Lord Haskel: Yes, but as far as the public is concerned, it is third-party insurance that is important.

Mr Margus Rahuoja: Yes, absolutely.

Q94 Lord Haskel: When you have motor cars, you know that by law they have third-party insurance and they have a little mark in some countries. Have you given some thought as to how that could be implemented as far as an RPAS is concerned?

Mr Margus Rahuoja: I think this is a question we are posing ourselves, as with other questions we discussed earlier such as the issue of privacy or data protection. Again, I would underline that here we are looking into safe operations and, of course, this is very much linked to the cost of insurance. Our philosophy is that, the more we can provide the safe operations, the less the premium will be, because I am sure that insurance companies would immediately ask for certain assurances that are linked to safe operations of the vehicle, or whatever we call it then when we call it. Of course, you will have multiple questions because it is not only the third party, but just off the top of my head we have a situation whereby the pilot is not in the same place as the vehicle. This might be also a very complex question for insurance.

Lord Haskel: For liability, yes.

Mr Margus Rahuoja: Therefore, we are very conscious about the new situation, but this is not only a question for insurance; it is the same for the air traffic management communications.

Q95 Lord Brooke of Alverthorpe: Much of the evidence received has referred to a chicken and egg conundrum, whereby industry knows it has to invest in research and new technology to improve RPAS, but is reluctant to do so without knowing whether the results will be permissible under future regulation. There are also concerns about the need to differentiate between small and large RPAS, and for regulation to be proportionate. How does the Commission intend to balance these two competing needs?

Mr Margus Rahuoja: Vision and communication. That is one of the main reasons why the Commission has come up with the communication: to set the tone and to indicate that the Commission is considering the regulatory tools to produce an enabling regulatory framework. We do not know which form or which shape this will take, but we are working on it. The purpose of the communication was to kick off this discussion because it is relevant and the time is right.

Lord Haskel: Can you give us a hint on the direction of travel?

Mr Margus Rahuoja: Well, I think during the discussion we have given you very many hints already—for instance, one of them being that we would have a process or the risk-based approach rather than a compliance-based approach. By that, reducing the need for excessive discussions or regulations and then recognising, of course, that the purpose is to facilitate rather than complicate, and also recognising that this market is extremely dynamic and the risk is that whatever or whenever it is regulated it is already obsolete.

Q96 Lord Brooke of Alverthorpe: Director-general, could I go back into the privacy and security issues relating to data and so on? Mr De Vos mentioned that there would be other authorities within the Commission to whom you will be referring in areas that you say, “This is not a safety issue. Therefore, we must go and—”. I wonder if you would be kind enough to instruct Mr De Vos to tell us some appropriate names in the other departments concerned whom you would be consulting with so that, if needs be, we could ourselves follow up?

The Chairman: That is right, if you could.

Mr Margus Rahuoja: I will happily reply to this question. We will give you a separate reply in writing. We will send it to the indicated address with all the relevant authorities in the Commission that will be included in that discussion or development of the legislation.

Lord Brooke of Alverthorpe: That is both helpful and kind of you. Thank you.

The Chairman: That really is very good of you. Thank you very much indeed.

Q97 Lord Fearn: This is a short one. The evidence we have received says that the availability of radio spectrum for RPAS operations is limited and that this poses a risk to growth in the industry. Does this pose a risk to your plans to make the EU a global leader in this industry?

Mr Margus Rahuoja: Thank you for the question. Radio spectrum is a scarce good for sure. The question is: how scarce and what is the problem exactly? Here we should make a distinction between the need for spectrum for aeronautical reasons—link pilot-aircraft and link pilot-air traffic control—and for operational purposes, like to send data from sensors in real time to the ground station. Shortage of radio frequencies is a serious issue but has not been identified as an acute show-stopper for the RPAS operations. The EU must get its act together to defend its interests in ITU—the International Telecommunications Union—and that is what we intend to do.

In all, there is a need to monitor the situation of possible frequency shortage and ensure the efficient management of available capacity. We are following the situation through DG

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Connect—this is a special directorate general that is responsible and representing the Commission in the mentioned international organisation—in the framework of promoting the digital economy and society and through Eurocontrol.

Just as a side remark, as you know, the new Commission that took office on Saturday has dedicated now a vice-president for the digital agenda and there is also a separate Commissioner with the resources available for that purpose. I think that digital questions will be very high on the agenda of Mr Juncker's Commission. Therefore, we can also expect that our input and requests in having the spectrum and frequency discussion at the right place and the right time will be listened to and we will have access to these discussions. It is always a question whether something is politically important or not, not only from the technical point of view. Today we have the ear of the politicians, so we intend to use it.

The Chairman: Can I say it has been a brilliant session? Thank you very much indeed.

EASA and JARUS—Oral evidence (QQ 47 – 61)

Evidence Session No. 5

Heard in Public

Questions 47 - 61

TUESDAY 4 NOVEMBER 2014

2 pm

Members present

Baroness O’Cathain (Chairman)

Lord Brooke of Alverthorpe

Lord Fearn

Lord Haskel

Examination of Witnesses

Mr Trevor Woods, Flight Standards Director, EASA, and **Eric Sivel**, Chairman, JARUS.

Q47 The Chairman: Hello. Welcome. Good afternoon. I will tell you who we are—please sit down—and then you can tell us who you are. This is our specialist adviser, Tony Henley, then Lord Haskel, Lord Fearn and Lord Brooke, and I am Detta O’Cathain. Thank you very much for coming. Particularly thank you for agreeing to give evidence to the Committee’s inquiry on RPAS. This session is not being recorded or webcast, which we do normally in London, but a transcript is being taken and witnesses will have the opportunity to review this transcript. It will be also placed on the website. Members’ interests are disclosed on a list on our website. I ask the Members, as I do at each session: do you have any particular interests that you have to declare on this?

Lord Fearn: No.

Lord Brooke of Alverthorpe: No.

Lord Haskel: No.

The Chairman: All right, “No” from everybody. I am asking everybody—the witnesses and the Members of the Committee—to speak up clearly for the benefit of the record, and also could you now please say who you are and which organisation you represent?

Eric Sivel: Good afternoon. My name is Eric Sivel, and I am the Chairman of JARUS.¹⁰³

Mr Woods: Good afternoon. I am Trevor Woods. I am the Director of Flight Standards in EASA, European Aviation Safety Agency.

The Chairman: I believe that, for the record, Tony knows you.

Mr Woods: Yes, we know each other.

The Chairman: Thank you. You have had notice of the questions?

Mr Woods: Yes.

Q48 The Chairman: All right, so I am going to start. Has the European Commission's communication on the civil use of RPAS identified the main issues around the use of RPAS in Europe—safety authorisations, privacy and data protection, security of control, liability and insurance, and EU-funded research and development—or are there any more, or many more? Who wants to start?

Mr Woods: I will start off. Of course, we work closely with the Commission to help to support them when they carry out impact assessments of their policy on such things, and that is certainly the case and will continue to be the case with RPAS. We are fairly well aligned anyway on the paper, so I think it would not be a surprise that we would agree that it does highlight those priorities. The number one priority must be safety, and then, once you operate even in a safe way, there are the implications of all these other areas that need to be covered and they become very important, and I think it is very important for society to accept RPAS. In setting out the Commission's road map, its intentions, I think it helps us all to work towards a way forward to give confidence to the industry and to society that these areas will be covered and we can work to the future. In short, yes, we agree with the priorities set out.

The Chairman: Are there any more priorities that are not included on that list that we ought to be considering also?

Mr Woods: I do not think that we have identified any. With something new there is a certain uncertainty of the future. Other things emerge. The important thing is to look at the complete system, have a structure to the regulations that can be flexible and adapt to new things that come along that we perhaps did not think of.

The Chairman: Yes, but you are supposedly developing specific EU-wide standards for remotely piloted aircraft. How far has that gone?

Mr Woods: EASA's role is primarily for safety, so a lot of these other aspects do not directly affect our primary role. We see the work from JARUS to be one of the key ways forward in developing the regulatory environment. In terms of safety—and Mr Sivel can explain more what JARUS is doing—we are working closely with JARUS. It aligns with the European Commission's paper, which enables us to work in a proportional way according to the different types of RPAS, because we need to be able to address them from very small, tiny

¹⁰³ Joint Authority for Rulemaking on Unmanned Systems

RPAS to potentially transport aircraft that could eventually be remotely piloted. I think the Commission's paper provides the means so that we can start that dialogue and work with JARUS, work with the national authorities, work with the industry and work with ICAO¹⁰⁴ to develop that framework. The intention of the Commission is set out so I think that it gives EASA, as an agency of the EU, the foresight: which way to go and who to work with.

The Chairman: Do you have a timescale or a time plan of when you work through this, or is it just a case of, "We will look at a particular aspect of safety this week, and then we look at something else, fairly soon"?

Mr Woods: I think that perhaps Mr Sivel could give a better answer on the timescale because it is driven—

Q49 The Chairman: Yes, as the chairman of JARUS, could you tell us who actually decides the timescale? Is it EASA or is it JARUS?

Eric Sivel: No. The Commission communication has set the objective as the end of 2016 to have regulatory material adopted.

The Chairman: Adopted?

Eric Sivel: Yes.

The Chairman: Not even suggested?

Eric Sivel: No, so it is really challenging.

The Chairman: Yes. You do not have that much time in which to suggest it or propose it and then go through the mill, so to speak, to have it adopted.

Eric Sivel: At the Council of Ministers two weeks ago, the Ministers lifted the "until 2016", making it more of a political ambition than the original, "It must be adopted by then" because they realised that sometimes haste is not always the best way to go about things.

The Chairman: As they say, "More haste, less speed".

Eric Sivel: Yes. The political ambition in Europe is 2016. It is more or less driven by the fact that the United States Senate and House adopted 2015, which they will not make anyway, but it was more to align ourselves with what the United States had decided than something that was really technically piloted.

The Chairman: If you wanted to align more with what the United States is deciding, you would not do anything because that has come to a halt, has it not?

Eric Sivel: Yes, absolutely.

The Chairman: Therefore, do you still think 2016 is likely to be hit in terms of—

¹⁰⁴ International Civil Aviation Organisation, a United Nations specialised agency.

Eric Sivel: Some parts of the regulatory material will make it and there was an ambition to get everything regulated. But there are some RPAS that will not be flying in 2016 because there is no market for them, especially the large ones. The larger RPAS have a market in the military domain, but in the civilian domain there is not much business done with those. The big market is on the smaller end, so we are focusing a lot on the smaller RPAS, the ones below 150 kilograms. That is where the impulse of JARUS is taking place. In the EU there is a proposal to change, and the Commission said in its communication—which was confirmed two weeks ago by the Ministers—that it intends to remove the weight discriminant, which does not mean very much, and perhaps go towards a more risk-based discriminant. We do not know what it will be. That is the European—

The Chairman: Would that not be weight also?

Eric Sivel: No, because in the world of RPAS, the risks are very different. In the manned aviation world, over a century, everything was built around protecting the aircraft and the people in it, whereas today, in the RPAS or drone world, there are no people on board, which means that you do not need to protect the aircraft or the people in it. You need to protect the people on the ground or who are flying with them. It is different, so the weight is not necessarily a factor. There are some operations with unmanned aircraft that are envisaged, for example, to film sporting events in stadiums. These drones can weigh 10 to 20 kilograms and 10 kilograms falling on somebody can be very risky. So the weight discriminant of 150 kilograms is not necessarily the right discriminant. The risk is probably a better discriminant to decide what types of rules you have to write.

The Chairman: I would not want to be a risk assessor in those circumstances.

Eric Sivel: That is the idea, to take the weight out. There will be a weight factor, of course, but it is only one component of the risk assessment.

The Chairman: But you could see them being used for—

Eric Sivel: All sorts.

The Chairman: —not necessarily beneficial things. For example, if somebody was having a protest—we do not have many protests in Britain, like you have in some cities in the European Union—and just buzzing through one of these, it could start off a crowd problem and many people could be killed.

Eric Sivel: Yes. That is the risk.

Mr Woods: If we are talking about fringe activities, the regulations, it is difficult to control people who are breaking the law just by introducing regulations. If we talk about people using them for illegal activities, then I think this is a different debate.

The Chairman: Yes. I am sure you are right. Thank you. Would anybody like to come in on that question? Lord Brooke? Lord Fearn?

Q50 Lord Fearn: We were told at Cranfield University that the weight of the batteries is getting lighter. Does that affect the way that they are going to be made, the whole system or what?

Eric Sivel: One of the big challenges of the unmanned world is the fact that we are dealing with much smaller aircraft—some of them fit in your hand—which the aviation system has never been prepared for. The revolution is more on the smaller end than on the larger end. On the larger end it is an aircraft and you have to adapt. On the lower end it is brand new. You have aircraft nobody imagined we would have to take care of. This is where the biggest challenge is. It is on the smaller end.

Q51 Lord Brooke of Alverthorpe: My question is linked to what you just said, without changing the basis or moving away from weight to risk. My question is about the relation of the areas of responsibility between the different regulatory authorities, from ICAO at the top, the European Aviation Safety Agency—represented here today—and the joint authorities for rule-making, JARUS. EUROCONTROL soon comes in on the picture, and SESAR.¹⁰⁵ Do you think that the current relationships between the different organisations I just named are right for the circumstances that face us, given that you have just been talking about having less emphasis on weight and moving toward risk? Because the original terms on which the consultation was started by the Commission were in fact saying, “JARUS will deal with the smaller ones and you will deal with the larger ones”. Has that line now gone and, therefore, does that change the nature of the relationship between the two of you? If so, where is it likely to go in the future?

Mr Woods: If I can start. In principle, the responsibilities of the organisations in the air regulatory system are still valid. Starting with ICAO, it is setting international standards that enable acceptance around the world. I think that that desire could still be relevant for UAVs¹⁰⁶, either for market reasons or for international safety. The national authorities implement the ICAO standards within their own countries, and I think that principle is still relevant. In terms of Europe and the EU, the member states have agreed to give certain competencies on their behalf to EASA, and I think that that principle still applies.

What we have now is more of a system approach: we have to consider all these things together. We are looking more at the operation to look at the risks that the operation produces and then, as the aircraft get bigger, the certification of the machine becomes more important. In terms of the local oversight, it is still appropriate to have that with the national authorities. Where we need central certification, that still makes sense at an EU level.

With JARUS, they are enabling the discussion internationally. Where the weight limits are drawn, we need to look at it as a complete approach from very small to very large aircraft, with a continuum where the safety assessment of the operation is more important at one end and the certification at the other, but I think it is a continuum. JARUS is very able to have that discussion and make proposals that can be used by ICAO and by EASA and the national authorities. It is clear who is responsible for what. We have SESAR sponsoring the research activities, and this is a very useful enabler to technology as well. As you say, we have to adapt to more looking at the risks but I think the basic responsibilities are still valid.

¹⁰⁵ Single European Sky Air Traffic Management Research Joint Undertaking is a European research programme.

¹⁰⁶ Unmanned Aerial Vehicles

Eric Sivel: The areas of responsibility are quite well defined, and what is happening at the moment is very close to what exists in other fields. The limits may need to change, for example, in developing regulations in Europe. I am sorry, I am speaking for Europe. I am not supposed to. I am employed by EASA. In Europe today, in the existing legislation for unmanned aircraft, 150 kilograms was the break-off point. Above 150 kilograms, rules are adopted by the European Union. Below 150 kilograms, they are adopted by the member states. The oversight stays with the member states, so that is unchanged. The 150 kilograms, which is what I was saying a bit earlier, I think everybody is agreed—I am talking about Ministers, about the Commission—that it is not relevant. We need to find another limit under which—

The Chairman: Another criterion.

Eric Sivel: Another criterion, another limit where that could take place. Some would like no limit. Some would like a limit. That is open to debate. But everybody agrees that 150 kilograms was put there during the initial debates 10 years ago and it does not make sense any more.

To go back to JARUS, historically JARUS's responsibility has been to promote a certain view of the way to regulate RPAS. There were two different views in the world, and JARUS is a European initiative, initially started in the Netherlands. The Netherlands initially were the instigator of the JARUS approach. The idea was that a certain part of the community in the world approaches RPAS from a classic approach, "You certify the aircraft, you certify the airman, you certify the operator, and then it can fly in airspace". The opinion that was shared by a minority at that time was that that would lead to overregulation, because the classic approach for these types of aircraft, especially with the size, would clearly lead to overregulation if you asked for a type certificate on a 20-pound RPAS. It is not doable.

JARUS started about 10 years ago and it was a group of authorities working together. Since then it has grown. I will give you some data. The countries that have used the risk-based approach almost all now have rules in place, and they almost all certify operators. To give you an example, in the UK a month ago there were 300 certified operators. The country per inhabitant that has the most certified operators in Europe is Sweden, and then France, and then Norway. All these countries have taken a risk-based approach. If you take another very large country, the United States, that did not take the risk-based approach. Today they do not have a single certified operator.

The Chairman: They have drawn a line under it.

Eric Sivel: They therefore rethought their approach. They joined JARUS and are now the vice-chair of JARUS. They have put a means in place to support JARUS, and they are now moving towards a similar approach to what we have in Europe and in other countries—you also have Australia, Brazil and Canada. So now the US is joining in taking a risk-based approach to regulating RPAS.

The Chairman: They will not go for the 150 kilograms?

Eric Sivel: They never had the 150 kilograms.

The Chairman: Yes, but they have nothing at the moment, have they?

Eric Sivel: No, they have nothing, but they started—

The Chairman: If they are going to have an approach, they will not have the 150 kilograms.

Eric Sivel: They will move to a risk-based approach. An example of a risk-based approach is if you want to overfly a crowd. If you want to overfly a crowd, you need to protect the crowd from the RPAS, and then there are different types of risk. You are either flying directly above the crowd, in which case the equipment in your aircraft has to be highly reliable. If you are flying next to the crowd, you can mitigate the risks by other means and operational means, in which case you do not need to be as certified. If you are flying low altitude, removed from the crowd, you might not need to have a certified RPAS. That is the type of approach, the risks involved, and that is the way we are going at the moment.

The Chairman: Can I just ask briefly, because we have to get a move on: are you both happy with that approach?

Mr Woods: Yes.

Eric Sivel: Yes.

The Chairman: If you were starting all over again, you would not have the 150 kilograms?

Eric Sivel: No.

Mr Woods: May I just add that the 150 kilograms is a dividing line between who is the competent authority? At the moment below 150 kilograms, it is the national authorities. Above—

The Chairman: Yes. I think we have that.

Mr Woods: So it does not mean you have to do something different, yes.

Q52 Lord Fearn: How would you like to see industry involvement in the development of regulations work in practice, and is there a risk that the global membership of JARUS could slow down the development of regulations, particularly with RPAS, given that Europe is ahead of most of the world in this respect?

The Chairman: I think that we have more or less dealt with that. Yes. I think we have probably answered that.

Mr Woods: We always value industry being involved. What we want to do within the safety analysis, the systems approach, is to give credit for industry standards. For example, they may be in operation. In order to make it safe, you may need some equipment to make sure that, if something goes wrong, there is something that kicks in. We may say, “You do not need to certificate the machine, but you need to have an industry standard for that equipment”. For example, this is an area where we would look to industry to develop and keep updating these standards.

The Chairman: You would keep in touch with them and obviously support them, yes.

Eric Sivel: JARUS initially was a group of regulators in which industry was not involved, or was not invited as much as it should have been. At the last plenary board meeting of JARUS, it was decided to start the mechanism to outreach to industry and to make them participate more in the work JARUS is doing. Of course the risk of that is that is JARUS, being a club of authorities, did their work very quickly, so it might have the effect of slowing down the work a little bit. On the other side, it will help the acceptance of whatever is produced, so the time we lose now will probably help us in the future once these proposed regulations have to be adopted. Again, JARUS only proposes. Afterwards it goes into each of the countries. I am not sure that Europe is in the lead compared to the world. Europe is in the lead compared to the United States, but there are countries in the world that are doing very well in regulating RPAS, such as Canada, Australia and Japan. Japan has thousands of certificated operators. All these countries are members of JARUS. South Africa is also a member of JARUS. All these countries are helping to create a common vision in the world, and with the US joining now—well, they joined before but are now actively participating—they too need to go quickly. You might be aware that the FAA is under pressure to address the issue, so they too are going quickly. The only two countries in the world that are not part of JARUS and that are really big actors in this industry are Japan, because RPAS in Japan are controlled by the Ministry of Agriculture—I do not know why, but it happens to be the case—and China, and here we are reaching out to China and we hope that next year China will join JARUS also. Once we have China, all the main actors in the world will be in JARUS, and we all have the objective of finishing quickly.

Q53 Lord Fearn: The Government actually thought—one of our witnesses, anyway—that you would not have enough staff within JARUS to cover all the activities going on. Is that right?

Eric Sivel: JARUS has no staff whatever. JARUS has no staff. I work for EASA and my vice-chair works for the FAA.¹⁰⁷ Our secretary-general works for EUROCONTROL.¹⁰⁸ There are no staff in JARUS. One of the questions we are asking ourselves is: should we formalise the existence of JARUS and create an association similar to what existed in the past when the Joint Aviation Authorities existed in Europe or something like that, which will allow JARUS to have a minimum staff to develop? Today we probably are reaching the limit of the system of willing companionship of participants.

The Chairman: Can I just ask this as a matter of information? You were talking about all the other countries that have risk-based and weight-based regulation. Is there any chance that we could have a copy of the table you have to look at?

Eric Sivel: Yes, of course.

The Chairman: That would be great. Thank you very much. I would like you to have a look at it, with our specialist adviser, because it sounds as though—

¹⁰⁷ Federal Aviation Administration of the United States of America.

¹⁰⁸ EUROCONTROL is the European Organisation for the Safety of Air Navigation. It is an Intergovernmental organisation with 41 Member States.

Eric Sivel: I know him.

The Chairman: Yes, of course you do, you work with each other.

Eric Sivel: You have already seen this table, right?

The Chairman: Did he do it in the first place?

Eric Sivel: No. He has seen it before. It is a table that is edited by an organisation representing the smaller RPAS industry called UVSI¹⁰⁹, and they keep an update of what countries are doing what, what countries do have laws, what countries do not, and what the weight limits are when they do have them. For example, Spain has a 25 kilogram—

The Chairman: That would be very interesting. I take very much your point that when they started off 10 years ago it was 150 kilograms, but things change.

Q54 Lord Haskel: The next question was about China, and you have just told us that you were talking to China. Can I just then add a supplementary and say: as you are talking to China, does that mean that they will adopt industry standards, worldwide standards, or will they just participate in regulation? If they do not adopt industry standards, then it will be difficult.

Eric Sivel: What I can compare with is the manned world for China. It is difficult to foresee what they will do in the unmanned world because it is a starting industry. In the manned world, today, a lot of industry standards are already used in normal aviation. It is something that started in the 1980s and has increased. What we are trying to build for the RPAS world is what manned aviation should be like in 20 years from now when we have slowly evolved. Here the system has thought, “Let us not look backwards, let us look forward”, and we want to use industry standards. In the manned world, China is already using industry standards. The only threat that Europe has to industry standards is that the European standardisation system is challenged not by China but by the United States. Our standardisation system is slower than the American system and, therefore, we take longer to produce standards. There is the example of the RPAS system, where the national standardisation bodies—BSI in the UK and DIN in German—cannot agree who is going to do the work, so they have not started the work, while in the United States they are already producing the first standards. That is a threat for our industry because if all the standards are in the US, then that is a threat. That is a threat we have all over aviation and not just for RPAS, that our system is a bit slow and it needs to be—

Lord Haskel: Yes. Suppliers adopt the standards of their best markets.

Eric Sivel: Absolutely.

Lord Haskel: You told us that you hoped to have the regime in place by 2016. Would that include standards from China?

¹⁰⁹ Unmanned Vehicle Systems International

Eric Sivel: Well, the standards will come. We have an exercise in Europe, one body, which is called EUROCAE¹¹⁰, which has two groups working on industry standards. For reference, one is called working group 73 and the other one 93, and our colleague here knows of them. They are already working on developing standards in Europe. We are hopeful that we will be able—with JARUS and with the help of EASA, who have the staff—to help guide EUROCAE down that road. 2016 is the objective. We hope we will meet it, but we are not going to sacrifice everything to meet it. We are not going to sacrifice quality for 2016. If we make 2017, we will make 2017. We have the good fortune of being ahead of some of our partners, so losing a year might not be that dramatic.

Q55 Lord Brooke of Alverthorpe: If I may, could I just come back to Japan? They have more people licensed to fly than the statistics you gave anywhere else. Are they mainly manufactured in Japan? Do you know what they are flying there?

Eric Sivel: Mainly in Japan. They use—

Lord Brooke of Alverthorpe: What are the lessons that we can learn from Japan?

Eric Sivel: The lesson we can learn from Japan is: their industry is mainly Kawasaki, the motorbike manufacturers, who started manufacturing. They just found the market and they just took off on the market, and that is why it is the Ministry of Agriculture. The market was the rice fields. They use small helicopters and they use them for crop inspections. That is what they do. When we say that Japan is ahead, I will just give you a few numbers. There are 4,000 operators certificated in the world, 2,000 of which are Japanese. There are 15,000 airmen certificated in the world. Well, not airmen any more. Groundmen.

Mr Woods: Or groundpersons.

Eric Sivel: Groundpersons, 14,000 of which are in Japan. The difference is immense.

Lord Brooke of Alverthorpe: Are they still mainly concentrated in agricultural areas, or other areas?

Eric Sivel: We were talking to the Ministry of Transport over there, because the Ministry of Agriculture is not interested in talking to us, and they are having internal problems in getting a hang on things that are non-agriculture and other aspects.

Lord Brooke of Alverthorpe: So in a sense they are struggling.

Eric Sivel: It is a local phenomenon of a market that developed and is—

Q56 The Chairman: On a certain island, probably, yes. Can I ask if you could put down the history of the US on a piece of paper? We have been told, “No, everything has come to a standstill because of accidents and so on”, and then we are told they are way ahead of everybody else. I make some guesses as to whether they are going to release their manufacturing to go on and produce them again.

¹¹⁰ European Organisation for Civil Aviation Equipment

Eric Sivel: In the United States, the decision was made to regulate the aircraft coming back from Iraq and Afghanistan. They had lots of them, and they were looking for a market for those. That is why they started with the large, heavy RPAS and a lot of the energy focused on that originally. That is why they did not take care of the little ones and they started regulating, normally, as we probably will do afterwards when we do the large ones. Unfortunately, that market did not take off because who wants a predator for civilian use? It is not very useful. The market did not take off, so they found themselves focusing less on the smaller ones and more on the larger ones. Now they are changing their view and moving more towards the smaller ones due to public perception and due to all the—

The Chairman: So they are now producing them again and they are going to regulate them.

Eric Sivel: They are going to regulate them. They were producing them, but they were not regulating them. Today they work by exemptions, so they issue exemptions. That is why we say they do not have any certificated operators or airmen, because they issue exemptions, because they do not have the regulatory system to make them fly.

The Chairman: Certainly what I took from the explanation we got from some of the witnesses is that the US had just blanked out on it, and had said, no, they did not want anything to do with it, and it was a safety implication. But that is not true.

Eric Sivel: No.

The Chairman: I do not mean “true” or anything. I am not making a value judgment like that to express—

Eric Sivel: I am not saying it is untrue. I think they had a strategic problem. They went the wrong way and now they are correcting.

The Chairman: Yes, I see. That makes more sense.

Eric Sivel: By the way, they have done a lot of work with the CAA UK, and they have come several times to the UK to see what a risk-based approach is, because the UK has the good fortune of speaking English, so it is easier.

Lord Brooke of Alverthorpe: You speak very good English.

Eric Sivel: I was brought up in the UK, so perhaps that is why.

Q57 The Chairman: The resource implications for EU agencies and national authorities of integrating RPAS into non-segregated airspace seems to be quite large, particularly in terms of enforcing compliance by small RPAS users. What is your view of this?

Mr Woods: Perhaps I can start with the resource for EASA. We have looked at the resources we need to develop the regulatory structure. It is sizeable but not massive. We can cope with that. Then the certification of products: again, it would be like certificated comparable-sized aircraft, but with perhaps more systems involved, so it would be a little more than the same size aircraft. The national authorities would have to provide the local oversight of these machines, and we are talking about the whole range, as we discussed. As to the

options there, they could use qualified entities, which is an organisation that they can approve to carry out the certification work on their behalf and make a recommendation to them. There is one already being used in the UK for that purpose.

The Chairman: Satisfactorily?

Mr Woods: Yes. Then, according to the way that the risk is managed, perhaps there may be a category that does not need very much oversight but the label on the box and this kind of thing is sufficient for the very small machines. I think this emphasises the need for a proportionate approach, otherwise we will need so many resources to regulate it that it will not be possible, and this is where we need to look at the operating environment. What is the operation? Can we regulate it with minimum oversight but within a certain parameter? Then all the way through to the large machines, we have to carry out a full-scale certification process.

Eric Sivel: One of the bigger challenges could pose a problem, if things continue to develop as they are. Here it is more for member states than it is for the EU or EASA. Once we have written the rules, our job is finished, or once EASA has taken JARUS's rules, the work is finished. For the member states, the biggest challenge they will have is the sheer number there may be if things continue to develop the way they are. Some member states, for the lower-risk ones—as Trevor just highlighted—are starting to use the normal police. That means very simple rules that any non-aviation person can understand, enforced by the police, because a civil aviation authority cannot cope with the numbers that might appear, and there needs to be a reflection below the authorities' qualified entities, but below that there may be a need to think about what happens if the normal policemen for the very small, low-risk ones could not enforce.

The Chairman: Yes, I see. I would expect the policemen probably to enforce quite a lot of these, and you talked about the hobbyists earlier.

Eric Sivel: Absolutely, even the lower end of the commercial. Again it is a question of cut-off levels, but at the lower level the sheer numbers will prevent any authority from doing the classical oversight.

Q58 Lord Brooke of Alverthorpe: My question to that is on the same subject, and just following it through. Do you really think the police would cope?

Eric Sivel: For the moment. In at least one country in Europe, in France, they have given the lower end to the police, and they are coping. I do not know—

Lord Brooke of Alverthorpe: There is a difference between giving.

The Chairman: And enforcing.

Eric Sivel: Yes, enforcing. Much to the dismay of certain operators who are not respecting the law, they are enforcing.

The Chairman: Good.

Eric Sivel: The laws have to be very simple. If you start having very technical rules, the police cannot enforce. They have to be quite simple.

Lord Brooke of Alverthorpe: It was a view held by some of the witnesses that we heard that, “Yes, we have all the privacy rules in the present but it is an issue of enforcement”, and then we come back to the question of: who is responsible? There is also technology, which is moving at such a pace in different areas, and whether in fact there may not be technological developments that could be used in this context. Some have suggested transponders should be fitted to all of them, which broadcast essential information that would be picked up by authorities of one sort or another. What do you think about that?

Eric Sivel: That could be done if they are not real transponders, because real transponders would eliminate any small RPAS because they are quite large. For example, when my children are going somewhere and I do not know where they are, with my iPhone I can see where they are. So a type of chip, why not? That would allow, for example- if you have teenage children you need to follow sometimes. If you have a system that allows a policeman—when an RPAS is doing something wrong—to know who the operator is or who the owner is and to be able to prosecute, why not? It would help the French at the moment, who are trying to find who is flying over the nuclear power plants.

Lord Brooke of Alverthorpe: How could that be done?

Eric Sivel: Especially for the small ones, because they do not fly very high, you could use just a cell phone system and find ways of identifying them in a small way, using small chips. Afterwards, if somebody wants to do something illegal, there is nothing you can do to prevent them from taking their—

Lord Brooke of Alverthorpe: That is back to who is doing the research in these kind of areas, and certainly Europeans.

The Chairman: Take the chip out.

Eric Sivel: Yes, take the chip out. Even for manned aircraft, when they want to transport drugs, they paint a new registration on them. If they want to do something illegal—

The Chairman: It is not rocket science.

Eric Sivel: For the normal, law-abiding person, a bit like when somebody driving a car does something not quite right, a chip or some system, which exists today—again, as I said, it exists on my cell phone—would enable identification of the person in a way that would not add too much weight on the RPAS and would—

Q59 Lord Brooke of Alverthorpe: Does anybody have responsibility for doing the research on this and looking at it?

Eric Sivel: At the EU level, no. The Ministers said two weeks ago that they wanted to leave privacy and security at the national level. What will happen for that—and JARUS has discussed it with the Commission—is that when decisions are taken, whatever they may be, we will enable them technically to happen, but we first of all need to know what the laws

and regulations on privacy will be. It is not our field in aviation to deal with that. For example, if the decision were taken based on research security knowledge to say that RPAS or drones had to be fitted with such equipment, then we would mandate such equipment on all RPAS.

Lord Brooke of Alverthorpe: For the moment, my understanding is that Ministers have taken the decision that they do not want that to be explored. They want it to be left.

Eric Sivel: At the European level.

Lord Brooke of Alverthorpe: At the European level. They want it left at national level.

The Chairman: At national level.

Lord Brooke of Alverthorpe: I think it is quite frightening when you hear about the technological developments and the machines that are available that can cross borders.

Eric Sivel: That is the Ministers. I have no judgment call on that one.

Mr Woods: For a machine that can cross borders, we would have more air traffic rules that would come in—you would need a transponder and codes and this kind of thing anywhere, I would imagine. The rules of the air would kick in for those kind of—

Lord Brooke of Alverthorpe: My understanding is that there are machines available that are as low as, what, how many kilograms, which will do 700 kilometres? Forty?

Eric Sivel: Forty kilograms, yes. But you can have machines at 40 kilograms that can fly for a whole year without landing—solar-powered.

The Chairman: Yes. I want to repeat for the record that privacy and security is at national level, rather than at the EU level, despite the Commission communication.

Eric Sivel: That was the conclusion in October. You can probably read the Council meeting. Look at the Council—

The Chairman: We must look at that, yes.

Eric Sivel: It was one of the rare Council of Ministers meetings on RPAS where every single Minister had something to say. There are not that many meetings where that happens.

Q60 Lord Haskel: Can we use the similar sort of technology that they are using on driverless cars, for instance, where you just have big data that just tells you where everything is, operated from the ground or something like that, rather than have transponders or whatever, or these small transponders that you were mentioning?

Mr Woods: I am not sure I know what the technology for driverless cars is, but I would imagine that people involved in RPAS, as they are very creative, would develop all sorts of things and keep a view on technology available in other fields. In fact, the technology from other fields is what is enabling, so I would imagine that—

Lord Haskel: The whole thing is traffic management.

Eric Sivel: Airspace is a little bit more complicated. When we are talking about controlled airspace, or what we call in jargon class A airspace, here the aircraft are, if I may say, predictable. They follow air traffic controllers' orders. They are predictable, and you could have RPAS flying there more or less automatically because it is predictable. When you go to uncontrolled airspace, or in jargon what is called class G airspace, that is totally erratic and uncontrollable because you have GA pilots, you have military, and so here it is much more difficult even to create the big data software that would work. Probably big data software might work in upper airspace—what we call class A airspace—but it would be probably much more difficult to have it for class G airspace. By the way, the biggest challenge for class A airspace is the speed. In class A airspace planes fly at Mach 0.8, and you have RPAS that do not go anywhere near that and it would create difficulty in integration. The speed of the aircraft is an issue for integration.

Mr Woods: If you have to transmit big data to an RPAS, your data link might become a governing factor as well. The roads are defined, mostly, for cars. They are not in the air. Also, it is a three-dimensional road.

The Chairman: It is. We tend to forget that.

Mr Woods: Maybe it is possible, but the problem is bigger.

Lord Haskel: Presumably, this traffic management will be a big problem as more and more people come into the air.

Eric Sivel: It already is, with manned. You do not need RPAS. It is already a challenge.

The Chairman: Quite. It is growing at 2.5% per annum.

Eric Sivel: That is the problem, yes.

The Chairman: Yes, quite. The last question.

Q61 Lord Fearn: The Royal Aeronautical Society suggested in its written evidence to us that the availability of radio spectrum for RPAS operations is limited. Could this affect the growth of RPAS operations and, if so, what could be done to mitigate the problem at the UK, European or international level?

Mr Woods: This is not primarily an area we are responsible for, the allocation of frequencies for radio. It is the ITU—International Telecommunication Union—that is involved in that. No doubt the more the RPAS growth takes place, the more the frequencies will become valuable. One thing is that we need to make sure that the community that needs frequencies for RPAS is represented in that forum, and if there is a competition between mobile phone companies and the RPAS industry, whether it is a matter of who pays the most or who argues the most, I do not know, but this is something we need to really understand. Who needs to be represented? Who needs to put the bid forward? How should it work? As I say, it could be a limiting factor in terms of the capability of an individual machine if it has to limit

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a data transfer rate for any reason, but also the number, if there is a limit to the frequency spectrum available.

Eric Sivel: This is a global problem, not just a UK problem or European problem. The United States has exactly the same problem, and there are laws in the United States on the attribution of spectrums there, which is posing problems for them, so it is a global issue. Spectrum is a very rare product, and it is costing more and more.

Lord Haskel: Is it possible that they could share spectrum, in the same way that the banks use the telephone spectrum for the credit card payments and that sort of thing?

Eric Sivel: Yes. As Trevor Woods was saying earlier, the people operating RPAS are very creative, generally piloted by IT geeks who are very good at finding solutions on these things, and they are looking for solutions: how can it be done? It is still quite challenging. The spectrum will be one of the challenges.

The Chairman: Thank you very much indeed. That has been a very worthwhile session. I would like to thank you both very much for making time available. We have learnt a lot today—I certainly have—and we are most grateful to you. If there is anything that you think might enlighten us still further, we would be most grateful if you could drop us a line and drop a line to Alicia, our clerk. That would be very helpful, because we want this to be the best possible information and scrutiny exercise that we can do. Thank you very much.

EUROCONTROL and SESAR Joint Undertaking—Oral evidence (QQ 62 – 75)

Evidence Session No. 6

Heard in Public

Questions 62 - 75

TUESDAY 4 NOVEMBER 2014

Members present

Baroness O’Cathain (Chairman)

Lord Brooke of Alverthorpe

Lord Fearn

Lord Haskel

Examination of Witnesses

Witnesses: **Mike Lissone**, RPAS ATM Integration Programme Manager at EUROCONTROL¹¹¹, and **Denis Koehl**, SESAR JU.¹¹²

Q62 The Chairman: Thank you very much for coming here.

Mike Lissone: Yes, that is okay.

The Chairman: This session is not being recorded or webcast, but a transcript is being taken by our Hansard writer. Witnesses will have the opportunity to review the transcript. Members’ interests are disclosed on our website and I do not know whether your attention has been drawn to our website. Do any Members here now have any interests to declare on this one? Okay, thank you.

Sorry, Tony Henley, you know Mike Lissone. Tony is our SPAD¹¹³, as we call them, or specialist adviser.

Now, I want everybody to speak up clearly, please, for the record and could you please say who you are and what organisation you represent before we get into the questioning.

Denis Koehl: I am Denis Koehl. I am a former military fast-jet pilot in the French air force and now we can say officially I am a senior adviser for military affairs at the SESAR Joint Undertaking. Of course, you probably know that I have some skills that I can use in other

¹¹¹ European Organisation for the safety of air navigation. It is an intergovernmental organisation with 41 Member States.

¹¹² Single European Sky Air Traffic Management Research Joint Undertaking is a European research programme.

¹¹³ Specialist Advisor

domains so I can say I am a senior adviser. I take care, of course, of the military stuff, but also on RPAS activities, cybersecurity and some other domain. I have to say I am an expert in nothing, but they probably use my management skills to handle these new-coming activities in SESAR.

The Chairman: Thank you very much. Mr Lissone?

Mike Lissone: My name is Mike Lissone. I represent EUROCONTROL. I am the programme manager in EUROCONTROL for RPAS integration, specifically for the ATM¹¹⁴ part. I think I am similar to Denis in that I am a jack of all trades and the master of none because I am also the secretary-general for the JARUS¹¹⁵ group and I also support Denis in the development of the research and development part for SESAR, specifically on RPAS. So, I have many hats, as they say.

Denis Koehl: This has to be mentioned: we are working like two brothers for this RPAS definition for three or four months now, but we have known each other for years.

The Chairman: How long have you been working on RPAS, Mr Koehl?

Denis Koehl: Never. At the time I joined the SESAR Joint Undertaking, the RPAS or drone issue—or whatever you call it—was not clearly identified in the SESAR work programme. Of course, in the past, mainly at the air force level, I have seen some interest in engaging RPAS in the normal aviation systems. I tried to do face-to-face discussion with my former boss, who is Patrick Ky, now at EASA¹¹⁶ in Cologne, and I convinced him after some time and also with the support of Mike and some others that we need to consider RPAS or drones in SESAR activity because, in terms of technology and also in terms of concept, SESAR has a 4D view on how to manage aircraft. We can say the way is clearly pathed to have RPAS on board. Of course, I know the military have used this, but we will have more and more RPAS flying on the civilian side, with different sizes, different areas and different business uses behind it.

Q63 The Chairman: From the hobbyist right through. Has the European Commission's communication on the civil use of RPAS identified the main issues around the use of RPAS in Europe, safety authorisations, privacy and data protection, security of control, liability and insurance, and EU-funded research and development? Anything else?

Mike Lissone: I think they have covered everything. When we started developing the roadmaps, and I was one of the ones writing the research and development part, that was basically covering all the aspects and all the angles of how we should address integrating remotely piloted aircraft systems into the ATM environment, or more into the aviation system, because this is something completely new to aviation. The communication from the Commission was also synchronised with several technical partners. At least from my perspective, I think they have covered everything on that part.

Denis Koehl: I have exactly the same approach. What must be said in terms of RPAS is that RPAS is not something new. It has existed for decades. I think now the time is there to make

¹¹⁴ Air Traffic Management

¹¹⁵ Joint Authorities for Rulemaking on Unmanned Systems

¹¹⁶ European Aviation Safety Agency

business with it, and I say business in very general terms. Of course, it can be an air operator with different intentions to use this RPAS. What I have seen when I joined the Brussels area is that a limited number consider RPAS mainly as an air operator, but what we missed a couple of years ago was to have all the stakeholders sitting around the same table discussing this. When I say stakeholders, I mean of course Brussels or the member states, the RPAS operators, what we call the ANSP¹¹⁷ controllers, the industry and so on. We have seen in some limited domains people are talking and try to do something for different interests. Some want to promote RPAS and some want to fight it for different reasons, but there is no need. What we have seen mainly through various initiatives and at the end this idea to have a common roadmap was, first, for me bringing all the stakeholders together and starting to discuss it.

If there is only one thing that we can say is very positive in this approach, it is that we are all talking together. The outcome of this roadmap paves a way to go ahead. We may not be able to follow exactly what was said, but we have a common understanding and we are going ahead in a similar direction. For me, that is very positive.

Q64 The Chairman: One of the points I did not mention in all that list that I gave you is that the data collected by RPAS should comply with applicable data protection rules and data protection authorities must monitor the subsequent collection and processing of personal data. That is going to involve tougher controls on privacy and data protection. The Commission will assess how to ensure data protection rules apply fully to drones and propose changes or specific guidance where it is needed. Have you any ideas on that particular issue? This is causing a lot of concern.

Denis Koehl: As you said, there are a lot of issues behind this, and it is valuable not only for RPAS but also for the aviation domain and other domains. As usual in Europe, everything is fragmented and one of the main topics for SESAR—although it is not clearly said—is to kill this fragmented approach and have a single approach. This is valuable for aviation and for RPAS in general. When we monitor what has happened in different countries, either in Europe or outside Europe, they are starting with a different view and going in a different direction. In regard to data protection, if we do not have some kind of common view—I do not say a common regulation or a common law—this will be a nightmare at the end. It is probably a nightmare in general today already, but RPAS is a new partner in aviation and it is going very, very fast. There are a lot of crazy initiatives, such as those from Google and from Amazon, but these guys are driven only by business. If you are not in control or if you have a failure in your system or do not have a common view, this can be very dangerous and they will use that. I know of Google a little bit, because my daughter works there. When I see the numbers of lawyers they employ to run their business, I think that they will find a failure and, of course, there probably are failures. As you said, data is a concern but it is not only linked to RPAS.

The Chairman: Do you have any ideas on data privacy?

Mike Lissone: If I look at the operators that are in the field working on a very professional scale, they handle this with the greatest and utmost care according to the European

¹¹⁷ Air Navigation Service Provider

standards that have been developed. My personal view is that RPAS does not bring anything new to the party in regard to privacy or data protection. It is nothing more than another vehicle. It brings the same controversies as Google streetview when they were driving around with a camera on top of a car filming every house. I think the most important part is that we bring to everybody, including the general public, so that people understand what this means because, for a lot of people who do not understand it, this is a complete game-changer for aviation.

The Chairman: That is an interesting point.

Denis Koehl: What is also important to say—of course, as a former military person I do not want to say that I am playing against my former colleagues—is that, in terms of data protection or security in general, we have to take care. In practical terms, the military seems to be advanced in most of the cases compared to the civilian with regard to security in general but I would not say in all domains. What would be quite dangerous—and I have this issue because I am running, in parallel with my RPAS job, a cybersecurity issue—would be to hand over this task to the military. When we deal with security or data protection, we do not have to build fences around our system because we are running business in aviation. We have to manage securities and, of course, safety considerations to handle this. It is very important that we now open our minds in regard to security and data protection at a business level.

Q65 Lord Brooke of Alverthorpe: I would just like to come back to the relationships between the different players: ICAO¹¹⁸, EASA, JARUS and, as we have just heard, EUROCONTROL. These are all very different things yet all have an interest in the same subject. I was wondering whether you felt that the present structural arrangements for governance are the right ones or whether, indeed, there are any changes that you believe may be needed in light of the changing circumstances that RPAS brings alone.

Denis Koehl: We are sitting at different tables.

Mike Lissone: If you look at all the organisations, from ICAO to all the ones that you have mentioned, I think the delineation of responsibilities is quite okay. They all are working on the topics from different perspectives, either from a regulatory perspective or from a standardisation perspective or from an ATM perspective. These are the national and historically grown entities as they are. We have the JARUS group in place because the responsibility of EASA—as you have probably already heard—stops at 150 kilograms. The reason is there, and it has to be changed to basic regulation, which takes quite a long time.

The Chairman: Yes, we have discussed that already this afternoon.

Mike Lissone: I will not go into detail on that part therefore—from that perspective it is okay. What I think is missing from a practical perspective is that, now we have the roadmap in place, everyone knows the tasks they need to do but we still have a legacy. The legacy started when EUROCONTROL was the first one who started this whole RPAS integration aspect and bringing this to the table saying, “This is something we need to address.” We

¹¹⁸ International Civil Aviation Organisation is a United Nations specialised agency.

were instrumental in setting up Working Group 73 from EUROCAE¹¹⁹ and the terms of reference that EUROCAE at the time had were extremely wide—way beyond the task that a standardisation organisation normally would do. That legacy is still running a little bit too apart where several organisations are doing the main objective they should be doing but there is also a bit of a grey area. That means there is really a very slight duplication of effort. What we have put in place at this moment, and we are at the early beginnings from a working perspective, is to set up an implementation steering group where, on the working level, people from EUROCAE, from EASA, from JARUS, from all the parties involved are going to sit together to synchronise these paths, because otherwise, if we do not do this, we will have the perfect plan, perfect roadmaps, perfect deliverables done in splendid isolation.

The Chairman: Do you have this organised on the basis of quarterly or monthly meetings?

Mike Lissone: Initially, I have talked this through with the European Commission, with Koen De Vos, who could be before you tomorrow, to see how we could do it. We used to have a European RPAS steering group. That was the group that started pushing for the roadmap development. They have basically been superseded because the roadmaps are there. Unfortunately, the roadmaps are not up to date. I still think we are going at lightning speed in European Commission terms—we are going extremely fast—but there is a part where we need somebody at the helm to start synchronising and steering these elements and I want that not on a CEO level but on a working level. Practices have already been agreed with all the parties, including industry, to sit around the table and say, “Okay, how can we synchronise this best?” So, clear roles, clear responsibilities and if something in the roles and responsibilities and the deliverables you have is halted by the absence of technology or reduced, or a shortage of staff, at least we can synchronise these elements earlier. Otherwise, somebody will be at the finish and will be going for the first prize and the rest will be far behind.

Q66 Lord Haskel: Does this involve nations from outside the EU?

Mike Lissone: Yes, it does. JARUS is seen more as a global group than the other parties. If I put my EUROCONTROL hat on, the beauty of EUROCONTROL is that it is a pan-European organisation with perhaps 50 member states, so this is something that has really gone global. The JARUS part also has the Americans. At the moment the Chinese, the Taiwanese and the South Koreans want to join. It is growing incrementally fast and the beauty is that you have a lot of people sitting around with a great amount of trust built over a long time with a huge amount of expertise that you could otherwise never get together.

The Chairman: That sounds ideal, does it not?

Mike Lissone: In principle, it is a very ideal way of working.

Q67 The Chairman: Do you have an organigram showing this or something that says, “This is where JARUS sits, this is what it does and these are its responsibilities”? Do you have anything like that?

Mike Lissone: Not with me.

¹¹⁹ European Organisation for Civil

The Chairman: Do you think you could draw it up and let us have a look?

Mike Lissone: For JARUS specifically or do you want the bigger picture?

The Chairman: The bigger picture would be marvellous so that we could understand it all.

Mike Lissone: I do not envy you doing this, because I understand what you are trying to achieve, but I have quite some years in aviation—so has Tony Henley—and this is clearly the most complex issue ever.

Lord Haskel: It keeps developing.

Mike Lissone: I will take it up. There is one thing that I think speaks for itself. If I speak about Europe, I always say that we are tremendously united in our division in Europe, but for once we have a very practical approach on RPAS integration in Europe and that is the first time ever that everybody is looking at the same things in the same way.

Q68 Lord Fearn: The resource implications for EU agencies and national authorities of integrating RPAS into non-segregated airspace seem to be quite large, particularly in terms of enforcing compliance by small RPAS users. What is your view of this?

Mike Lissone: You are absolutely correct.

The Chairman: Pass.

Mike Lissone: Pass, yes. It is a big issue. It is a big issue in regard to enforcement, especially because I do not think there is a general consensus in understanding what this brings. That is an issue for the law enforcement parts. I think for the CAAs¹²⁰, such as the UK CAA, the blessing is that they are qualified entities—the UK has two qualified entities¹²¹—which makes the work already a bit easier on that part. It is a part where people are beginning to understand the implications of this new type of industry and what this could generate, but unfortunately we are always behind the curve on that part.

The Chairman: Can I quote Gerry Corbett from the CAA to you? He said, “There will be an increasing workload in time for regulators but I very much hope that we get to a point where these RPAS are just aircraft and we are regulating them in effect in the same way.”

Mike Lissone: From a regulatory perspective in general I would say yes, but the bigger picture is that from an ATM perspective we have bigger fish to fry, and specifically for the operations below 500 feet.

The Chairman: The bigger fish are usually more of a challenge.

Mike Tissone: That is putting it very mildly.

Denis Koehl: We have to focus not only on RPAS as an asset but on seeing the overall business behind these activities. In the previous question we spoke about the legacy or

¹²⁰ Civil Aviation Authorities are national aviation regulators.

¹²¹ Qualified Entities are independent organisations which provide assessments for airworthiness, operations and training recognised by CAAs.

heritage that we have to work with. We have to also try to improve it, but it is quite difficult. Sometimes when we try to improve something in the end we will have one or two more stakeholders. This does not help to have a common approach. I think we need in Europe—and the UK provides a good example—to have a high-level view on what we expect to do with RPAS. It is not just about flying in an air show, which I flew in previously with fast jets. Of course, it is quite sexy to fly these kinds of assets, but you need a business behind it. After that, you have to provide the right efforts.

When I talked to my former boss in EASA, that is exactly what the UK airspace authority say—there is a huge workload in terms of regulation. Often we say in Europe that, in terms of integration, we are in advance of the US guys. The US has a lot of unmanned aircraft, probably more than we have in Europe, but the willingness to integrate is probably higher in Europe. When I talk to the FAA, they say, “We will start regulating all this RPAS stuff when the picture is clear.” Of course, if you do not show the right direction, this will be a heavy workload for the guys who are working on the regulation. This means we have to really state what we want to do.

The Chairman: However, the last thing that you want to do is be plodders. Bill Gates and Steve Jobs were not plodders when they were sitting down all those years ago and wondering what they were going to do. They might have said, “Yes, this is impossible, it is a terrible workload”, but they did it. They cracked it and I am sure you can crack it because this is very exciting.

Mike Lissone: Yes, it is very exciting.

Q69 Lord Haskel: This brings us back again to air traffic management. Are we going to get it incorporated into EU airspace? There are all these matters to be had together of industry standards, communications and all the rules for traffic management. How are we going to stop them colliding into each other? Are we going to get all of this to work in practice?

Mike Lissone: There are two phases in the integration part. There is this delineation we have from ICAO, the 500-foot level. According to Annex 2, the lowest VFR¹²² flight level is 500 feet above ground. So, according to ICAO, which is the ATM Bible on that part, below 500 feet there is hardly anyone, although we know in every state there are an extreme amount of exemptions of people who operate below 500 feet.

The Chairman: Every aircraft does for landing and taking off.

Mike Lissone: However, even more than that. For the IFR¹²³ part, flying in the airspace, we will get it and we will get it sorted with the standards, with the communication issue, including the “detect and avoid” issue that needs to be resolved. That will be done. There are issues that are a legacy from the present system where we perceive a lot of things are safe—and I have to be very careful how I formulate this—but the “see and avoid”¹²⁴ principle that the pilot has looking outside is something that is not sufficient anymore by a long shot. According to EASA numbers, between 2006 and 2011 there were 85 mid-flight

¹²² Visual Flight Rules

¹²³ Instrument Flight Rules

¹²⁴ Also referred to as ‘detect and avoid’.

collisions for VFR light aircraft, where 85 people died and 19 seriously wounded. That is only in the EU states and that does not take into account near-misses. However, that shows—and the proof is there because there is a study done by EASA called SISA¹²⁵, which you can download as a document from the internet—that the human capability for avoiding accidents and incidents and other traffic in the air is far below par. This is the basis on which we say we have to have an equivalent level of safety to manned aviation, so we are building something on quicksand. So, from an IFR perspective, for flying among the other aircraft the technical regulatory issues will be resolved, including the standards. That will be done within five or maybe 10 years, but that will be resolved. It is not going to be that particular issue but how many people we are going to put in place and how fast ICAO can deliver the standards. We are all involved in that party anyway.

The biggest issue now is below 500 feet, because there we have a piece of airspace where we have our VFR traffic that is allowed to operate below that, such as helicopters—they are allowed to fly at 250 feet. If I am an instructor training a pilot, I am allowed to descend to 270 feet above ground level to train for the engine-out procedure, so you find a piece of grass to land your aircraft. All these things are there. Then there is a huge amount of other people such as parapenters, the ultralights, the gliders—it is huge amount. This is the part where we are pushing to the research and development programme for a fresh new look. The Irish have a very interesting website although it is not up and running at the moment.

This website is designed to develop the arrival and departure routes. They had huge issues of RPAS flying in Dublin City Airport and they said that, if we could ask them to file authorisation to fly in Ireland and then tell them where they are operating, what altitudes and what times, this would generate automatic aeronautical information to all the airspace users. That also means that our friends in the GA¹²⁶ community will also have to do the same thing because that is the first step in sharing the aerospace. NASA¹²⁷ is already doing extensive research in an air traffic management system for the future for the small and low-level ones. That is also something we envisage for SESAR but that is for beyond 2020—for a very long time, when I am already on my pension so that will be fine. However, the concentration lies on the lower airspace and unfortunately—as Tony knows very well—the things we are trying to define and the things we are trying to quantify to make it work do not exist at this moment in manned aviation and that makes it challenging and great fun as well.

The Chairman: Exactly. What would life be if you did not have challenges?

Mike Lissone: We have quite a bit.

The Chairman: Human factors are of course the big things, but I think sometimes—I should not say this because I am not supposed to express opinions, but I will—people magnify human factors beyond all capabilities when you consider the human factors you have in crossing the road. They are quite right. Cranfield University gave me a book about human factors because I was quite interested in those. We cannot get it all out of proportion. There will always be accidents so we should not damn a complete programme because of human

¹²⁵ Scoping Improvements to 'See and Avoid' for General Aviation

¹²⁶ General Aviation refers to all civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire.

¹²⁷ National Aeronautics and Space Administration of the United States of America.

factors or because of the concentration on human factors, because it is not necessarily worth doing.

Q70 Lord Haskel: Are the manufacturers and users also involved in these negotiations?

Mike Lissone: Yes, they are. Not all of them are, but we have a representative, Peter van Blyenburgh, for the SMEs and SMIs, because this is purely a part of aviation that is driven by innovation, which has never been the case in aviation at all. We have been programme manager for a new type of navigation capability in Europe. Previously, when we had everything finished including all the documentation and regulation in place, we would put something new in a cockpit that was already more than 15 years old. That is how it works in manned aviation and this is really driven by very smart people with complete other conventions that are capable of thinking outside the box. We have a flapping-wing bird UAV¹²⁸ in the Netherlands scaring away the birds at Schiphol airport and it flies exactly like a bird, and it looks like a bird. It is exactly the same. These things would never come up and it is fascinating.

The Chairman: Gosh, yes.

Denis Koehl: The main problem is that below 500 feet you want to apply rules to RPAS that the other aviators do not have or are not able to apply. This “sense and avoid” worked probably 20 to 30 years ago with a low level of traffic, but, believe me, today—sometimes I have the opportunity to fly in a cockpit because some of my former colleagues now fly civilian jets—I see that people apply the rule “see and avoid” but they are never looking outside because, when you look at the design of the cockpit, there is no place to look outside. Of course, today I have glasses but my vision is quite fine because I was trained in the past to scan the sky. I do not want to blame them because training involves costs and hours and so on, but they are not doing that.

I am a paraglider also. I have seen how fast the performance of these paragliders changed. At the beginning it was just enough to walk on a mountain and to fly slowly down. Now, you can take off from ground zero and you can climb. You are doing acrobatics and so on without following any clear rules. Each nation has its own approach to this because this is handled through federations. My home nation of France seems to be often led very strongly by law but, believe me, below 500 feet everyone is welcome in France because it is probably the country where you can do what you want. Often people are not aware that they are completely out of the rules by flying below 500 feet. So, applying that to RPAS, it needs to include, first of all, all flights under 500 feet, but this is another game.

The Chairman: This is fascinating. We could spend hours listening to this but we have an inquiry.

Q71 Lord Brooke of Alverthorpe: My question, which in a sense you picked up very earlier on, is on the fact that increased civil use of RPAS has raised fears about invasions of privacy, and a new potential physical threat to people and property. You felt there was nothing new, as I understood you saying, and that this was an issue of awareness rather than much else. Part of the difficulty lies in identifying the controller and the RPAS’s purpose, which is again

¹²⁸ Unmanned aerial vehicle

talking about what they might do and what their intentions are. Do you think there could be an EU-wide solution? Then we are coming back again to talking about under 500 feet. For example, should all RPAS be fitted with transponders to broadcast essential information to air traffic control, or could there be restrictions on what you put in the machines when they are being built or at the point of sale, so that you have a record of who has made them and who has bought them and how they are kept? Is the existing regulation sufficient? I do not believe either of you have said that it is sufficient, but you say it is a free world out there and something does need to be done about it, given the growth potential that lies ahead. So, can we press you a little bit more on how we are going to find a solution?

Denis Koehl: I think it is quite easy to answer your question. For me it is linked not to aviation but to the business from the industry. If we continue with today's situation, the UK will develop some RPAS that will fit in UK airspace with UK rules and perhaps in some others. France and some other countries will develop something different and this means that the market view on this is very limited. If everyone is happy with that, I would say, "Continue," because in terms of air traffic management, finding solutions below 500 feet is quite challenging—you can say close to impossible.

So, I think the game has to start from the industry side. We have to align local regulation so that everyone can make business across Europe as a minimum. That, for me, is the blocking point—it is the business, it is the market, it is the industry. In general, how can SMEs develop something ambitious when they are limited to a couple of countries and they are not able to sell what they produce to all the countries? That is the main issue. For me it is not ATM.

Lord Brooke of Alverthorpe: Is there an ATM view?

Q72 Lord Haskel: You were saying the problem is below 500 feet. We have been told that there is another division, and that is weight. We have been told that there is going to be two sets of regulations for above 150 kilograms and below 150 kilograms.

Mike Lissone: The 150 kilograms limit is a legal expect from EASA. In practice there is not going to be a 150 kilograms limit, so that is not going to be the case. So, JARUS will develop at this moment everything below 150 kilograms and EASA will adopt it. You have heard yesterday that they will take it on board for their own regulation. So, the 150 kilograms and weight issue is not going to be the regulatory element on that part.

Coming back to the ATM part, providing them with a transponder might sound like a very simple solution to keep track of what is going on. Unfortunately the present infrastructure of manned aviation will not allow that because that will simply have a completely negative impact on the way we operate the big aircraft in the network at this moment. We simply cannot cope with such an amount of transponders. In the Netherlands we had a problem with light aircraft flying inside the Schiphol TMA¹²⁹ with huge amounts of complaints from the transport aircraft saying, "Get rid of these things because it is horrible." The solution was to put a transponder on board of the aircraft flying above 1,500 feet. I remember going to the GA community, and twice I had to have police protection to get out of there because they had to pay quite a lot of money for this and it was as if it was an invasion to their privacy and such things. Do you know how long we used that transponder for? One day—

¹²⁹ Terminal Manoeuvring Area

because they forgot to ensure that on the radar screens of the controllers they could filter it out, so they only had the big blur of a huge amount of aircraft and could not see the transport aircraft anymore.

At the moment we have a lot of transponders and we have all kinds of new solutions, such as ADS-B¹³⁰, all based on a frequency perspective that is already limited and already coming to the maximum amount of the capability they have. Then we have the radar systems that have a tracking capability. Austria already knocked on my door and said, “We can only track 1,000 aircraft a day and we are very pleased with the economic downturn because that means we have spare capacity but now it goes up. I know that within eight to ten years we will be in trouble but now with these RPAS I am getting scared. What are you guys coming up with in terms of solutions for these things?” So, we have to come up with all the technical solutions on this and we will have to be a bit more restrictive.

From the ATM perspective, yes there are solutions there but I do not think it will be positive on air traffic control. It simply will not work. Every state—and I have mentioned it many times before—will have to do an airspace assessment. This is a phased approach. Where do you want them to fly and where do you not want them to fly for this moment, unless you have other stringent requirements? Know your airspace. Know who is operating in there. That is the way you have to start. That is the way we approach it.

What I do with my team is we go to the states and help them organise their RPAS community because it is all about organisation. Manned aviation is highly organised and this is just starting. We have all kinds of associations. We are working very hard within the community but we are not organised like manned aviation—and by “we” I mean the whole RPAS community—and that is a part that needs to be slowly developing. We have too many organisations representing RPAS operators. It is still scattered. It is still in its infancy on that part and that needs to change. So, that is another part we have to work on.

Lord Brooke of Alverthorpe: But the difference with the past is that they will be able to cross country boundaries below the levels that are regulated.

Mike Lissone: Yes, and for Europe that can be very fast if you live in Luxembourg, Lichtenstein, Andorra or Monaco—you name it.

Q73 Lord Fearn: The Royal Aeronautical Society suggested in its written evidence to us that the availability of radio spectrum for RPAS operations is limited. Could this affect the growth of RPAS operations and, if so, what can be done to mitigate the problem in the UK, European or international spheres?

Mike Lissone: I can only concur. Yes, definitely. Unfortunately, the way aviation manages the aviation frequency bands is on the outside seen as very poor. We have strategies in place where we should have released frequency bands from NDBs—non-directional beacons—and from VORs and we have not done it. In the MLS frequency band—the microwave landing system—we have one active operational at Heathrow and the other one in Europe that is active is at Toulouse for the Airbus factory for testing it. Yet this whole frequency band is kept for aviation.

¹³⁰ Automatic Dependent Surveillance-Broadcast

Now, on the outside we have the comms industry, which is capable of switching from 3G to 4G in a day, and our business model is completely different. We have already talked to them and explained our business model and why we cannot change at this part. The biggest risk we have and the biggest risk we face is that the moment we start using non-aviation frequency bands—and I presume that has already been explained by the Royal Aeronautical Society—we already tell everybody that we do not need these special frequency bands and that we can do without. If that happens, we have no fight whatsoever.

The Americans are pushing tremendously hard to do this, as is even Germany. In 2015 with the world radio conference we are going to have a war. The moment we accept, for command and control and for ADC¹³¹, non-aviation frequency bands we have an issue. The other issue is the chicken and the egg. We want a lot but we do not have a lot yet.

Denis Koehl: But you cannot exclude RPAS due to a lack of management of this spectrum.

The Chairman: Indeed, that is right. So a huge emphasis is on this spectrum.

Denis Koehl: There is a problem but you cannot exclude RPAS for this.

The Chairman: But problems are there to be solved and the joy of meeting people like you is to highlight these problems so that we can, in turn, weigh up where the balance of probability lies.

Mike Lissone: The way that the frequencies are managed in Europe was that the UK had to lead in this. It was done by Andy Neil from the UK CAA. Andy is now retired. That meant that the UK took the lead on that part and the rest of the four or five other states in Europe followed that track, but they are the only one doing this among all the member states in Europe. There are states that do not even come to the world radio conference.

Lord Haskel: What do they do? Do they just use it?

Mike Lissone: They just accept it as it is. They do not have the time to do it.

Lord Haskel: You mean they accept the decisions.

Mike Lissone: They cannot dramatically change the fact that all of a sudden their frequencies are gone. That is not the case, but they let the case be done by the UK CAA for instance on their part and by Germany—which has been quite active—and the Netherlands and also Italy, but most of the other states do not have the staff to do it. I had a department doing spectrum before the reorganisation and it is a very difficult topic. It is a very technical topic and it is very difficult to make people understand and make rapid decisions on that part, but we will have to invest staff and effort in there to make it work. If we can make it work for Europe, I believe there is enough frequency band for the next five to six years at least when we have resolved everything, but then we have to have a very fresh look at it.

Q74 Lord Haskel: Would you use frequency from the satellites?

¹³¹ Air Data Computer

Mike Lissone: Yes, but unfortunately most of the frequency bands that the European Space Agency is trying to sell are outside the aviation band, so our team—and Tony is also involved in that with the European Space Agency—has come up with all kinds of RPAS application based on space frequencies, which is perfectly fine, but not the frequency bands they would like to use. So, we are trying to find all kinds of solutions on that part.

The Chairman: That is another problem.

Mike Lissone: There are only challenges.

The Chairman: You have been fantastic witnesses and thank you very much indeed. When we come to an end of a session I always say, “If you were in my position, what questions would you have asked and how would you answer them?”

Mike Lissone: Another thing that I would like to say is that we—at least from my perspective from the EUROCONTROL part and from the JARUS part—are extremely happy with the support we get from the UK.

Denis Koehl: I share that, too.

Mike Lissone: However, I think it is essential that we work together on a common European—and maybe not the EU approach—solution on that part. We need the experience you have with flying in the UK because you are quite ahead with developing CAP 722¹³², we need the feedback on what is really happening with the CAP 722 and how it is really working and we need to feed back what we have on the other side of the water.

The Chairman: And we need a lot of friendship to get us through.

Mike Lissone: Definitely, but that is always the case.

Denis Koehl: It is important what you said in terms of RPAS because I am managing a demonstration project from various countries, mainly from Italy, France, Spain and one from UK called Clare, led by UK Thales and NATS¹³³ and I would like to invite you to look at this. Of course, the demonstrations are ongoing, but we have some feedback on the first findings. There is technical stuff, but you have probably heard from me that I do not really take care about the technical side as I have some guys who support me, but I see the motivation from the UK. They are sitting together discussing and, of course, the outcome is not always positive. In response to, “We are not able to do that and that,” they have said, “No, you are raising the right question and I am convinced you will find the appropriate solution.” This is the enthusiasm I would like to share with all the countries. That is important.

We will gain this game around RPAS only by winning for everyone, not only for the operators but for the ANSP¹³⁴ and for the industry, because at the end this will bring money for us and our children the future. When I look at what has happened on the other side of the ocean in terms of assets, they have huge assets and they will go fast. When I look at what the US Air Force is doing today, close to 50% of the pilots that they are recruiting are unmanned pilots.

¹³² Guidance document on RPAS operations published by UK Civil Aviation Authority.

¹³³ National Air Traffic Services

¹³⁴ Air Navigation Service Provider

If we do nothing, they will impose their solution. When I refer to my past in the military, we always said, “What are the US guys doing? It is nothing for us?” Yes, of course, it was something for us because we implemented what these guys have done five or 10 years later. We are saying we are probably most advanced in terms of being willing to integrate RPAS, but on the other side this kind of solution can be very fast. At the end, it is just one nation with probably less administration than we have in Europe.

The Chairman: That is very interesting. Thank you so much.

Q75 Lord Haskel: Monsieur Koehl, at the beginning you said that you have an interest in cybersecurity. Is there any part where cybersecurity and RPAS come together that we ought to be aware of?

Denis Koehl: I had a hard fight in SESAR, but I was able to launch this call. Why did I launch this call? We are dealing with cybersecurity issues but when you look to the partner and the people who are sitting around the table, these are mainly engineers. They will always find technical solutions, but for me technical solutions have a price at the end. When you buy or implement firewalls you will have a monster at the end. Often that is what I have faced in the past in the military. For different security issues you need you need huge computers to overcome all this data protection. That is what we need to avoid in this civilian one.

From our study—a study led by Helios, which I am sure you know of, and supported by Thales for the technical ATM stuff—I clearly got two things. First of all, the study is addressed not to our experts at the JU but to the key decision-makers like my boss and key players from the Commission and from the various stakeholders that we have in SESAR. What I expect is that they clearly understand that they need to have an interest in cybersecurity issues, and they will probably have to invest money and in a proper way. This is the first thing I expect from the study. The other domain is to say there are technical solutions but we do not have to only look at the technical solutions. For me what is important is the governance. How will we manage the knowledge about the threats? I do not want to say we need European governance; it is probably too early. At state level you have your own organisation and I know that the UK is deeply engaged in this area, but you have to think about how we share the information at the European level and also at international level. For the moment I have just drafted it and it is not approved, but it will be approved by the end of the year.

My US colleagues clearly understood that it is in our interests to share information together and I was really surprised how fast I was able to draft an agreement with the US. You probably know that we have an agreement between the European Union and the US, mainly through the FAA and SESAR. I was able to draft and to find an agreement in less than a month. When we spoke about RPAS, we needed one year just to have an intention.

Lord Haskel: Presumably, that was because they were worried about the security.

Denis Koehl: Security in general and cybersecurity in particular need to be also managed, and it is not an engineering game only.

The Chairman: Thank you very much indeed. It has been very useful. I hope you have got something out of it.

Mike Lissone: Of course.

The Chairman: I think I ought to tell you that one of the Members of our Committee—there are 12 of us on the Committee—is a man called Lord Freeman, who is on the UK advisory board of Thales. He absented himself from this inquiry for obvious reasons, as he is a man of honour and integrity. But I just thought you would like to know that he is one of the people we have in the team.

Thank you very much indeed.

Mike Lissone: I hope that was useful. And thanks for the task.

EuroUSC, NATS and Civil Aviation Authority—Oral evidence (QQ 13 – 23)

Evidence Session No. 2

Heard in Public

Questions 13 - 23

MONDAY 20 OCTOBER 2014

Members present

Baroness O’Cathain (Chairman)

Lord Brooke of Alverthorpe

Lord Cotter

Lord Fearn

Lord Haskel

Baroness Hooper

Earl of Liverpool

Baroness Valentine

Lord Wilson of Tillyorn

Examination of Witnesses

Ewan Kelbie, RPAS Strategy Lead, National Air Traffic Services (NATS), **Gerry Corbett**, UAS Programme Lead, Intelligence, Strategy and Policy, Safety and Airspace Regulation Group, Civil Aviation Authority, and **André Clot**, Centre Director, European Unmanned Systems Centre (EuroUSC)

Q13 The Chairman: Good afternoon. I am sorry you have been delayed somewhat. Thank you very much for coming. Unfortunately you might be delayed again as there will be a Division in the House, but if we can rip through this at a cracking pace the next Division bells will not interrupt us, we hope.

I believe, Mr Kelbie, that you are replacing Simon Hocquard.

Ewan Kelbie: Yes, that is correct.

The Chairman: Thank you very much for coming.

We have had a discussion about question 7, and we believe that we should have a private deliberation because of national security concerns. Rather than the witnesses answering question 7 on the record, we will ask questions 1 to 6 inclusive, and questions 8 and 9, on the record, and then we will close the meeting to the public and stop the recording. Is that agreeable to you? Otherwise we feel that we might have a somewhat stilted conversation.

I must remind Members to declare their interests. Does any Member have interests to declare?

Lord Brooke of Alverthorpe: I am Lord Brooke of Alverthorpe. I was a director of National Air Traffic Services between 2001 and 2006.

The Chairman: We have a list of interests that have been declared by Committee members. These were declared orally by them at the previous session on Monday 13 October and can be found in the transcript. This is a formal evidence-taking session of the Committee, and a full note will be taken. This will be put on the public record in printed form and on the parliamentary website. You will each be sent a copy of the transcript and you will be able to revise any minor errors. The session is on the record, as I have explained. It is being webcast live and will subsequently be accessible via the parliamentary website.

You are welcome to submit written supplementary evidence after the session. Witnesses and Members are reminded to speak up so that everyone can hear them properly. Although the acoustics here are quite good, sometimes the sound becomes a bit muffled.

Starting from my left, your right, I ask the witnesses to indicate who you are for the record and then to make any brief opening remarks that you want to make. Mr Kelbie.

Ewan Kelbie: Good afternoon, Lord Chairman. My name is Ewan Kelbie. I am the RPAS strategy lead for NATS¹³⁵. I have no statement to make at this stage.

The Chairman: Thank you. Mr Corbett.

Gerry Corbett: Good afternoon. My name is Gerry Corbett. I am the unmanned aircraft system programme lead for the Civil Aviation Authority. I have no additional statement to make at the moment, but I suspect that I will talk a lot during the session.

The Chairman: Thank you. Mr Clot. Am I pronouncing your name correctly?

André Clot: I always say that it is pronounced Clot, as in depot or Peugeot.

The Chairman: I thought so. As soon as I saw André in front of Clot I thought, “I’m a bit of a clot for saying Clot”.

André Clot: I was born in London. I am Mr André Clot. I am centre director of the European Unmanned Systems Centre, which is based in the UK, and I have no comment to make at the preliminary stages.

The Chairman: Right. With your permission we will go straight into questions. I am going to ask the first question.

According to the European Commission’s communication of April this year, national authorisations do not benefit from mutual recognition and do not allow for European-wide activities, either to produce or to operate RPAS. Do you believe this to be true? If so, how do you think the situation could be resolved? Is EU-level action necessary?

¹³⁵ National Air Traffic Services

André Clot: Not at this stage. I think there is a move towards mutual recognition, from what I have seen. A statement like this might have been made out of context, because it seems to me from what I have seen that there is a big move for the mutual recognition of any kind of standardisation of regulation between national authorities, which means between Governments if you are talking about aviation.

The Chairman: Thank you. Just going along the panel, let us hear from Mr Corbett.

Gerry Corbett: On the whole I think the communication is factually correct, although to be quite honest I do not think there is anything outstandingly new in the statement that was made. It could have been made probably three years ago with very much the same level of detail in it. National authorities are limited by their legal competence as to what they can and cannot deal with, but that does not preclude other states from recognising that authorisation mutually and working together. It could mean differences in processes and requirements, but that needs to be addressed on a case by case basis.

In bigger, broader terms, yes, there is a benefit to European-wide harmonisation. We are on the way towards achieving that already, but on the whole the statement is correct, I think.

Ewan Kelbie: I do not have very much to add, other than to say that as time progresses we will, in any development in airspace issues for RPAS, operate very closely with the CAA¹³⁶ and European agencies.

The Chairman: Thank you. Lord Cotter.

Q14 Lord Cotter: The Government's Explanatory Memorandum said that the Joint Authorities for Rulemaking on Unmanned Systems (JARUS) could be a more appropriate forum than the European Aviation Safety Agency (EASA) to develop regulations for RPAS under 150 kilograms. Why is that the case?

André Clot: I think that is true, because JARUS is a much wider forum than EASA. It encompasses people from South America and South Africa. Japan is going to be involved in it, so it is a nice, wide forum for getting mutual recognition of things, and, if you like, for getting harmonisation more broadly. What is really nice about JARUS is that it started in the Netherlands, which is where JAA (Joint Aviation Authority) was. JAA was a gentlemen's club; it was not forced on people. Neither was JARUS. That is what is nice about it: people are coming to the party at JARUS because they want to, not because they are forced to, and that is always a good place to be.

The Chairman: Can I just ask a supplementary? The question implies that there will be two bodies, and that one will be subsidiary to the other, whereas you seem not to think that.

André Clot: It is like everything else. If you go back to the early days of air traffic and the ECAC (European Civil Aviation Conference), you went to the highest level that you could to get the biggest conglomeration of people together to make things happen. If you do it at the lowest level you cannot move things properly because you do not have the economies of scale, of people, of ideas and concepts. In something like JARUS, you have people who are

¹³⁶ Civil Aviation Authority

there because they want to be and who want to have an input just to make things work. That is the place to start making things happen. If you want to do it at a level that has more political undertones to it and more differences, you are asking for something a bit harder.

The Chairman: That is a very interesting point. By the way, I am told that I should have mentioned that Mr Corbett and Mr Clot are known to our specialist adviser. That was just for the record.

Gerry Corbett: JARUS is a consortium of national airworthiness authorities, both European and otherwise: it has an international flavour to it. Yes, it is a good forum for developing regulations throughout the realm of the requirements. Initially it was restricted to RPAS above 150 kilograms. However, to be quite honest, an unmanned aircraft of 140 kilograms operating in a similar environment or in a similar method to an RPAS of 160 kilograms, for example, would be regulated in a similar way. So there is a natural move between the below-150-kilogram regulations and the ones above it. That is partly because of recent changes to the JARUS process. EASA has been asked to take a much greater role in the oversight of JARUS itself; an EASA colleague is now the chairman, and a Federal Aviation Administration (FAA) colleague is the deputy chairman, so it is truly international.

In many ways, it has been said throughout Europe, rightly or wrongly—it is certainly part of the European road map—that essentially JARUS is the only game in town with regard to creating regulations for unmanned aircraft. That is the case even in the way EASA generates rules; it creates a rule-making team that generally takes in elements of different national aviation authorities anyway. Essentially, JARUS is becoming the rule-making team for EASA. It is hard to say whether it is a more appropriate forum or not, but it is the forum for developing future European regulations and potentially international regulations as well.

The Chairman: With 50 years experience behind it.

Gerry Corbett: I would not quite say 50 years of experience on that side of things, but there is the collective experience of a select bunch of regulators or personalities within the regulators all working together to create something that is useable for everybody.

The Chairman: Do you have a different view, Mr Kelbie?

Ewan Kelbie: No, I have nothing to add.

The Chairman: It is interesting.

Q15 Lord Wilson of Tillyorn: Could you give us your view on the extent to which the fact that we are a member of JARUS helps us in helping to form the new regulations or, indeed, to help our own industries? By definition, we are there and we do, but to what extent do we in practice?

Gerry Corbett: That is the whole reason why we are there. At the moment, JARUS has seven working groups ranging from airworthiness and pilot licensing all the way down to detect and avoid and the categorisation side of things. We have to be in there to deal with it. The only way to influence or help things to move along is to be in there at the time and work from there. Each of the various authorities comes with not quite a unique viewpoint but

slightly different viewpoints. The UK has been fairly well thought of as forward thinking and certainly thinking in a revolutionary way at times in some of the things we do. We can do as much as we can to influence things, but we cannot do that unless we get in there. If you are out of it, your only opportunity is to come forward at a very late stage and start commenting on things, by which time it is probably a bit too late. It is better to get in there and get a bit of form in to start with, which is exactly why we are in as much as we can be.

Lord Brooke of Alverthorpe: Is there any major country, big country, in the world that is not involved?

Gerry Corbett: China is not involved. Offhand, the majority of the European countries are, although probably not all of them because they do not have the capacity or they do not do anything. The USA, Brazil, Russia and Australia are members. It covers most of the areas. China is not covered. I do not know why.

Lord Brooke of Alverthorpe: South Korea?

Gerry Corbett: No, not within JARUS. South Korea is involved in ICAO¹³⁷. You will actually find a lot of the same personalities at all the meetings of ICAO, JARUS and EASA.

Lord Brooke of Alverthorpe: Could we have a short note to say which are?

The Chairman: We are totally confused here. Lord Liverpool also wants to ask a supplementary question.

Earl of Liverpool: At last week's oral evidence session, Mr Paul Cremin from the Department for Transport identified an element of competition between EASA and JARUS and said that the DfT was monitoring this closely. Do you agree? Is that a good or a bad thing?

Gerry Corbett: Competition? I would not say that there is competition, because essentially an EASA colleague is now the chair of the JARUS group. EASA has identified JARUS as being the prime rule-making group with prime competence for developing. I would not see any competition at all. It is has more gone the other way. It is now that EASA is now actively absorbing JARUS into the team and is working from there.

The Chairman: I have got very confused between IATA¹³⁸, ICAO and JARUS. I should have declared that I was on the board of British Airways for 12 years, so I know something about these sorts of organisations. I am just beginning to get utterly confused. Could you give us a quick snapshot of how you see it?

Gerry Corbett: At the top is ICAO—the International Civil Aviation Organization—which does what it says on the tin. It deals with international civil operations. There are 193 Member States I think—almost all of them. It is part of the United Nations. It sets the top-level things such as markings on airfields, how ATC¹³⁹ is controlled and all those sorts of things. The idea is that because aviation is such an international market, down to the way you are ticketed and things like that, when you go to one place from another the procedure is

¹³⁷ International Civil Aviation Organisation

¹³⁸ International Air Transport Association

¹³⁹ Air Traffic Control

basically the same, although you can identify differences. That was essentially formed from the 1944 Convention on International Civil Aviation, called the Chicago convention for short because it was achieved there. There are now 19 annexes to that convention, which state different requirements for aviation in general for things such as pilot licensing, the rules of the air, airworthiness operations and the whole gambit of aviation. ICAO sets the top level for the whole world. Below that in Europe, EASA is essentially Europe's civil aviation authority. That is the simplest way to put it.

The Chairman: I am totally confused. I thought you meant IATA.

Gerry Corbett: No, it is EASA.

The Chairman: Sometimes people pronounce IATA as EATA.

Gerry Corbett: My apologies.

The Chairman: No, it is my fault. I am completely dense. I understand now. It is EASA, not IATA.

Gerry Corbett: Not IATA; that is the International Air Transport Association, which is different.

The Chairman: So to de-confuse me, EASA is—

Gerry Corbett: Essentially, in broad terms it is Europe's civil aviation authority, and represents the member states in some elements. However, within ICAO, each individual nation has its own specific vote. EASA has taken on a lot of the responsibility, the competence, for dealing with a lot of things. For example, an Airbus made in France is certified by EASA, but that certificate spans all the EASA states, the European states. It works from there. Then, sort of underneath that is JARUS, which is the Joint Authorities for Rulemaking on Unmanned Systems. I do not like to say that it is a rule-makers' club or an associations' club, although Tony Henley will probably agree with that sort of term. It is a group of national airworthiness authorities that got together voluntarily to try to solve a problem. You could say, as André did a couple of minutes ago, that 30 or so years ago a group of national authorities got together to form the joint airworthiness authorities, which became EASA. The aim is to harmonise regulations throughout an area rather than individual countries or authorities going off and setting their own rules. We tried at the start to get things together. It is all about team work, harmonisation and trying to work together.

Earl of Liverpool: Could I just come back to a question I asked a moment ago. We have to go with the evidence that we have, and last week we were told that there was an element of competition between EASA and JARUS and that the DfT¹⁴⁰ was monitoring it closely. We need to have some clarification about that, because if that is an incorrect statement and the DfT is perfectly happy, I do not quite why it said that.

André Clot: If I may, from my perspective what makes the world work is individuals operating to a common aim with other people. You find that there are individuals who can

¹⁴⁰ Department for Transport

see ways forward within the framework of what they have and what they do. EASA was formed from an EU regulation, so it has big support because it is driven by the EU. Individuals within that can work to a certain degree within the framework that they have been given. With JARUS, the Dutch authority was given the challenge of 120 kilogram-aircraft, and because it was a national authority and it was below 150 kilograms it had to respond to that customer, if you can put it in those terms. It had to develop a way of certifying a 120-kilogram aircraft. It knew it could not do it on its own, so it invited other national authorities. It could not do it through EASA because EASA does not go below 150 kilograms. It does not have that remit; only national authorities do. Then JARUS started because of the need. That is what is so important about an organisation such as that. Where there is a need, an organisation forms. If you support that, it normally drives itself faster than others. EASA has big problems: the whole transport system. There is Airbus and Boeing and all sorts of other things at that level. When it comes to the small things, there is not a lot of framework and not a lot of support for national authorities from EASA either. What you have here is the mutual support of national authorities. That is what is going on. I cannot understand that statement last week. What I see is individuals trying to use the forum for their particular needs, whether above or below 150. It might just be some confusion in some of the words that have been flying around. That is all I can say.

Gerry Corbett: I think it might have been a misinterpretation. I certainly do not see a conflict between JARUS and EASA. More than anything, I see a pushing together, because within its road map the European Commission has actively targeted JARUS to develop the rules. The JARUS group is the EASA rule-making team for unmanned aircraft.

The Chairman: I think we will look at the transcript, try to sort it out and come back on this issue if it not clear and if we think it is relevant. Does anyone else want to comment on this issue?

Q16 Lord Haskel: Obviously JARUS has a very important role in harmonising the regulations. The evidence from the Euro Unmanned Systems Centre (EuroUSC) called them a breath of fresh air. How long is it going to take JARUS to develop these regulations? Are they going to differentiate between different types of aircraft?

André Clot: The answer to the question about timing is that if you have ever seen any regulatory machinery working, it takes time. The downside is that the bigger the group, the longer it normally takes. That is just a function of the way the world works.

In terms of different aircraft, there are roughly three types of aircraft that unmanned systems fall into: the fixed wing, the rotor wing, and what JARUS has come up with, which we call CS-LURS—light unmanned rotary systems. I apologise for using more acronyms. They are basically helicopters to you and me. The fixed-wing aircraft one is still being made at the moment. Both probably had gestation period of two to three years. Then there is the new kid on the block, multi-rotor systems, which look like toys and have four rotors. They are very capable and sophisticated things when they are built properly.

JARUS is going to tackle all of them, as far as I know. Gerry sits on all the committees. I have been invited to only a few. The timeframe depends upon how much support you give these organisations when they are deliberating on things. If you gave full support to something in

JARUS rather than half-hearted support, it would take perhaps two or three years. If you accept the Earl of Liverpool's view, the confusion that exists between JARUS and EASA would slow the process down. Perhaps clarification coming in the future will help to get support to the right organisations to move that forward, because it would benefit industry not just in the UK but throughout Europe if that happened.

Gerry Corbett: As things stand at the moment with JARUS, it is developing recommendations for individual authorities to turn into their own regulations, because JARUS itself is not an authority that can develop or publish rules, but it develops the harmonised guidelines for individual authorities to take in. As things have changed more recently with it becoming more of a rule-making group in itself for EASA, it will generate those guidelines, which will be fed up to EASA to move on to create the regulations.

The timelines are governed by the European RPAS road map and the timelines in that, but a lot of us realised fairly soon that it was probably a bit hopeful and it is currently being rearranged and revised by the JARUS secretariat. I cannot give you exact times because it is being rearranged. However, the basic principle is to follow the European road map and the ICAO plans, which split the development of unmanned aircraft into probably three phases. The first is now until about 2018. Hopefully by 2018 we will have some initial regulations to permit initial operations to take place. About five years later, by 2023, which is ICAO block upgrade number 2, I think, we are talking about accommodation within the aviation environment. It is not complete integration by any means but is about being able to be accommodated within the existing environment. By about 2028, another five years beyond that, the regulations should be in place to start to permit full integration into the aviation system as a whole. That is the rough timeline. Certainly at ICAO there is a set plan to develop regulations, to publish initial regulations in 2018 and then to bring something out every two years after that.

I suspect the JARUS regulations and the European side of things will come in a very similar fashion.

In terms of differentiating between the different types, it depends upon what you mean by "different types". In terms of categorisation, one of the recent developments is to be a little more proportionate and flexible than was originally envisaged within JARUS. Essentially, there will be three categories of unmanned aircraft: categories A, B and C. We had to call them something other than numbers, so we called them A, B and C this time. Category A is at the far end of the scale. It is open. There is little or no regulation for the aircraft, which are probably very small ones, inherently harmless ones or ones that are not worked in too much detail. Category C at the other end is the equivalent of a fully certified, fully worked-up aircraft. In the middle, there is the specific category, Category B, where there is a bit of flexibility on a moving scale so that some of it can be done on the basis of a safety case in some areas, depending on where the operation is taking place. Clearly, if you are operating somewhere where there is very little risk to people on the ground or in the air, you can be a little less fixed with some of the requirements for the aircraft, as opposed to an unmanned aircraft flying over London for example where you need to tighten up the requirements a lot more. There is a bit of a sliding scale between almost no regulation up to full regulation. Those are the three categories that are being proposed at the moment. Some of that is still in its early days of development. It is relatively new.

The Chairman: Do you have anything to contribute to that?

Ewan Kelbie: No, thank you.

The Chairman: It has all been said.

Q17 Lord Haskel: In view of the fact that these things are developing all the time and that quite a lot of small companies are involved in this, will small companies be able to participate in this work of regulation?

Gerry Corbett: Not so much in the work of regulation, because that is at the behest of the regulators, but we will use our experience of dealing with smaller companies and whatever experience we can get into developing those regulations better. Obviously, if we have something to work with, it is easier to write better regulations than we can at the moment. Unfortunately with the world of unmanned aircraft you are faced with a myriad of different things, ranging from things that fit in my hand up to airliner-size. One example I use is the video player. You had Betamax, VHS, reel-to-reel, DVDs, Blu-ray and whatever else. There are so many options that to write one set of regulations to cover everything in precise detail would be quite difficult, so it has to be at a slightly higher scale.

We can develop better regulation by having more experience, more than anything. The aim throughout this Category A, B and C sliding principle is that the CAA is pretty well working to it already in that you come to us and we will try to put building blocks into place to get something going in the right order. It takes time, I am afraid, and a lot of people are having lots of different bright ideas, some of which are good, some of which are not so good.

The Chairman: What is the governance framework for JARUS?

Gerry Corbett: The governance framework?

The Chairman: I just bowled that one at you. If you could, please put it in writing between the three of you. We are used to governance frameworks in other areas.

Gerry Corbett: It has a set of terms of reference and is run by a plenary meeting, which takes the decisions.

The Chairman: We would be very grateful for anything you can give us on that.

André Clot: When you are talking about developing regulation, there is a difference between regulatory determination—making the regulation—and regulatory implementation. The question deals with the word “determination”. In the timeframes, if you implement something and it takes a lot longer, you have to think about the broad breadth of the companies and the national authorities involved to get a real idea. That will not happen until it becomes clearer what those regulations are and what their impact is within different regulatory frameworks on a national basis.

The Chairman: I understand that. It means that there has to be the closest co-operation between both sides to make sure that the governance regulation that is formed is appropriate or even applicable.

André Clot: We are always dealing—Gerry has it in the same way—with what we call expectation management: what we think is going to happen and what we want to happen.

The Chairman: We cannot guess all the things that could happen, can we?

Q18 Earl of Liverpool: Do you think that the EU's research programmes, such as SESAR¹⁴¹, will eventually provide the necessary infrastructures needed to implement RPAS into EU airspace?

André Clot: SESAR has only just begun in the past year to look at RPAS and its integration. It has a long way to go, from my perspective. I think my colleague from NATS¹⁴² will know much more.

The Chairman: Is there a sense of urgency?

André Clot: Coming back to what Gerry said, there is this A, B, C concept. Some things will be outside the worry framework, as I call it, of air navigation service providers, and others are much larger and are probably more capable in terms of the online site operation, which are the ones that SESAR ought to start looking at in very great detail. It has to some extent, but it has not really translated that into anything that we can understand in the implementation sense.

Gerry Corbett: From my point of view, programmes like this are only part of the overall work that is necessary to support the integration of RPAS. However, the ultimate aim of unmanned aviation integration into the general aviation system is that to all intents and purposes they are transparent to ATC (Air Traffic Control). That does not mean that they are invisible but that the way as a controller you deal with a manned aircraft should be as close as possible to the way you deal with an unmanned aircraft. We do not want air traffic management systems to have to start dealing with different things at different times. I would turn it on its head. The fact that we have SESAR and these other programmes going already—the American equivalent is called NextGen—means that it is more that the unmanned aviation industry or the systems will have to integrate into the extant air traffic management system as it is already.

Ewan Kelbie: That is correct. So far, the Single European Sky ATM Research programme¹⁴³ has been concentrating on the technology and the infrastructure that needs to be put in place for the European airspace of 2020 and beyond. Now it is starting to realise that it needs to include RPAS operations in those research programmes. There is potentially a bit of catch up being played here. There is probably a view that in America, for example, they might be slightly ahead in their thinking in developing the potential infrastructure for RPAS in future. We have certainly seen an acceleration in SESAR activity on the subject of RPAS integration.

¹⁴¹ Single European Sky Air Traffic Management Joint Undertaking

¹⁴² National Air Traffic Services

¹⁴³ Also referred to as SESAR JU

Q19 Lord Fearn: What are the resource implications for national civil aviation authorities and air traffic controllers regulating the use of RPAS? Is it possible or desirable to outsource quality assurance and accreditation functions to the private sector?

Gerry Corbett: There is likely to be some impact on the regulatory system in the potential for new and quite diverse sectors of the industry that provides unmanned aircraft capabilities. The regulatory system already makes use of some accredited or approved bodies in certain areas. This process can be extended and is expected to continue to develop throughout. We still need clear lines of responsibility and accountability between the national authority and whichever entities or approved organisations with the necessary oversight regimes to ensure that it is done correctly. The main implications are that there will be an increasing workload in time, but I very much hope that we get to a point where these are just aircraft and we are regulating them in effect in the same way. There will perhaps be subtle differences in the minor details, but the general principles should be the same. By the time we get to the operation, whether it is an airline air operator's certificate or a remotely piloted operator's certificate, I hope that the regulations and the way we deal with it will be relatively similar and straightforward. There is scope to outsource some of those elements if necessary.

Lord Fearn: Who bears the cost at the moment for air traffic management?

Ewan Kelbie: In terms of the activity that is going on to develop the right infrastructure and regulatory framework, we are playing our part in those debates. It is in our interest to understand how it will develop over the next few years so that we have a full understanding of how we can safely control RPAS alongside other aircraft.

The resources implications are not yet clear and are hard to predict. As Mr Corbett said, with the right technology and implementation, controlling RPAS from our perspective should be completely transparent and should place no additional burden on our controllers.

Until then, we will continue to support all the stakeholders involved in RPAS development in order to help them with the air traffic control and air traffic management aspects of RPAS integration.

Lord Brooke of Alverthorpe: Are you saying that NATS would have the ability to regulate small recreation systems? It is a subject that we spent quite a lot of time on last week.

Gerry Corbett: No.

The Chairman: It would have to be above a certain weight, would it not?

Gerry Corbett: NATS will not regulate anything like that at all as NATS is an air traffic service provider.

Lord Brooke of Alverthorpe: So who is going to be picking up what is coming out of JARUS in this area?

Gerry Corbett: The national aviation authorities. In this country the CAA will have to turn them into UK law, unless it is done at European level as European law, as it is already. I do

not know if you have had the discussion or will have it later, but at the moment EASA is looking to increase its competence on unmanned aircraft below 150 kilograms, potentially down to zero. That is for rule making. It will write the rules for everything. The aim is to be harmonised throughout. If that is done, the basic regulations for unmanned aircraft of all masses will be set at European level within the European Commission.

Lord Brooke of Alverthorpe: Someone has to implement them when they come down the line.

Gerry Corbett: National authorities will have to do that, as we do already for every other facet of aviation where the regulations are set at a higher level. It is the same for airworthiness, and it has recently become the same for personnel licensing and for air traffic management.

The basic regulations and things are done from there. You will progressively see some elements of rule making coming out of air navigation order¹⁴⁴, because they are already in other European-based regulations. Ultimately, national authorities will have to implement some of that.

André Clot: It is worth mentioning that Article 13 of the basic regulation gave rise to the term “qualified entity”. Annexe 5 to the basic Regulation 216/2008 states that if you treat a qualified entity as if it was a national authority—that is, independent of operators, manufacturers and flight schools—you can give it some sort of competence and have faith that it will operate as a national authority. That is extending the range of its capability, which is what you are trying to do.

The other problem you face is that you cannot outsource something if you do not understand it. There is a two-edged sword here, because if the pace is as fast as we think it will be, as Lord Haskel said, what do we do for the small players?

We have to have a blend. You have to mix and match the good in both. That is a balancing act. The CAA has spent a lot of time thinking about how it is going to do it and how it has done it with us. We are on a learning curve, and this is new territory. Whether EASA coming down below 150 kilograms helps us at all, I am not sure, but I understand that there are numbers coming here that none of us really understands. My company has doubled in nine months. I was not expecting that. I have a business plan. Twelve months is too long for a business plan in this business. You have to revise it every three months. I shudder to think where we will be in a year’s time, but I hope that we get dialogue going and that we can see the problems coming and solve them. We have the air traffic thing, the regulator and the new kid on the block, an entity that did not exist five years ago. How we manage these kinds of entities is a challenge for us all, and I shall do my best to be a good boy.

The Chairman: We have to crack on.

Q20 Lord Wilson of Tillyorn: Any ideas about what should be done about hobby RPAS? We were told in evidence before that you can buy a little box and here you are, off you go, but it does not tell you what the rules or the dangers are, so there is that problem. I gather that

¹⁴⁴ The Air Navigation Order 2009 is legislation regarding safe use of aircraft.

our secretariat has been on the internet trying to buy these things, and has probably bought lots of them. Is the CAA looking at how people could be helped to know what the powers of what they have bought may be and what the regulations affecting it are?

Gerry Corbett: We already have some fairly clear advice on our website and we have publicised some recent prosecutions to remind people of the consequences of the misuse of the regulations. I could go one way and say that ignorance of the law is no defence. I am not going that way; I am not going for that. That is the case, but there are slight differences when you talk about aviation law at times, because clearly you do not put road signs in the sky. We will shortly be launching a public awareness campaign aimed at educating recreational users about the rules that they need to follow. The campaign will, I hope, use media to reach users and will perhaps even give a quick start guide to basic users in some sort of digital format. We are going to do something as a video initially, a bit like the old public information films. Ideally, we would like to do some sort of animated video or something like that. That will be spread out or made available on our website to other media organisations as and when necessary to be broadcast at various times.

Going back a little from that, over the past few years I have noticed a change in the way a lot of this is reported. A few years ago, it was reported as a brilliant toy with which you could do this, and there was nothing else. Now invariably you get a box at the bottom that says, “By the way, here are the rules”. Even some television programmes show these brand new gadgets and what they can do, but at the end, even if it is joking by them, they talk about draconian CAA rules. They are not draconian by the way, they are fairly light touch and proportionate. There is always a reminder to people that there are regulations to follow because you are putting something into the air.

However, that is not the end of things. We realise that there is a need to do more publicity. We have started a media campaign. I have here a small-scale version of a two-sided leaflet, which we are hoping to get distributed at point of sale for aircraft in shops and things like that, and ultimately we hope to get it into the boxes on the production side of things.

The Chairman: What sanctions do you have against people if they say they will not put a leaflet in the box? We are told that there are boxes without leaflets.

Gerry Corbett: We do not have any sanctions, as far as I am aware, to say that they have to be put in. There is no law as such.

The Chairman: That seems ludicrous.

Gerry Corbett: It is all about education. It is the soft way of educating people from the bottom up rather than coming in from the top. However, people who fly as hobbyists are generally members of organisations such as the British Model Flying Association, which they work through. People who use them for work purposes are already required to go through a permissions process with us that educates them on some of the requirements.

The difficult bit in the middle is what I term “the leisure user”, who in essence has something that is in effect just a flying camera and who does not consider that. It is not quite the new kid on the block, but it is becoming a new kid on the block and we have to work to publicise and educate people about it to make sure that we can get the message out to them.

Lord Haskel: What about security? I saw a bit of film the other day.

The Chairman: We are not dealing with security. We will go back to that in closed session.

Q21 Lord Brooke of Alverthorpe: My question is really on the same theme. A friend of mine was given a box for his 70th birthday and discovered that he had a whole new world in it which he knew nothing about. He had no indication of what he could or could not do with it. I am not sure which country it was manufactured in. It seems to me that if it was manufactured in China, which is not a member of JARUS, there is nothing you could do about it.

André Clot: When we think of China we sometimes feel, “We’ve got to remember they speak a different language”. A lot of things that we write are not in Chinese. A lot of the people we talk to do not speak English. I was there three weeks ago and I was amazed at how receptive they were to some of the things we were saying to them. One of the things I said to the people who made the DJI Phantom¹⁴⁵ that your friend got was, “Why don’t you find out which country your production line is going to, so that leaflets can be put next to the line and popped into the boxes, so that when they end up at the distributor they will be in there and you will have fewer of the problems that you have in the UK at the moment?”. They were receptive to that, but the trouble is that you have to encourage people to go to them. There are no rules and regulations for them to deliver these things into the UK. People do not do things unless they asked to do them or a regulation is in place to make them do it.

Lord Brooke of Alverthorpe: Internationally?

The Chairman: We will have to pursue this later.

Lord Brooke of Alverthorpe: People join international organisations or stay out of them for particular reasons, do they not? To come back to the way in which current legislation regarding data protection and privacy is being challenged, or could be challenged, at the moment we rely essentially on individuals being able to identify who is collecting their data. This may not be the case with the machinery that will now be on offer. How do you think we need to start approaching that to try to find solutions to the problem. Who will be responsible for administering such regulations as they come through?

André Clot: With any rules and regulations, data protection and privacy are quite broad things. There is an obligation to adhere to them and comply with them. As an industry, we have to make sure that people are aware of those laws within the context of their operation, whatever that is. In our case, they are flying aircraft that are taking photographs of people who could be anywhere. If someone is flying an aircraft over someone’s back garden, why are they there, and why are they doing that? If you come back to the beginning of the process of making these people aware, they are pilots in the first instance. They have a pilot qualification that allows them to understand, if you can put it that way, the knowledge they need to operate safely within in the context of all the laws, not just the aviation laws but data protection and even dual-use laws as well, as an RPAS can be used for military or civil purposes. We have to make sure that those training courses for remote pilots and awareness campaigns include the relevant data for them to do it safely. The problem that

¹⁴⁵ Model of small RPAS

we face is when trying to police things, not in an unkind way but by making people aware. Sometimes you get a caution when you have parked your car in the wrong place rather than a fine. That is the way we do it in this country; we try to make people aware of things in a nice way to start with. That is what Gerry calls a light touch.

We can do the same thing with our people, but we have to know who they are. If we do not record who they are, if we do not have a picture of them, if we do not have a driving licence for these RPAS, we are on a hiding to nothing in understanding who they are and how to encourage them. We cannot even write to them to tell them that things have changed. In that process, we have to know the organisation and the pilot and know what the pilot intends with the aircraft. Once we can do that, it is easy to start moving things forward.

Lord Brooke of Alverthorpe: How do we do that?

André Clot: The process which the CAA has got the EuroUSC to do does that already. Everybody has the equivalent to a little card that has their name on it, the aircraft they are allowed to fly and the organisation they are with so that they are in a framework.

The Chairman: Like gun licensing.

André Clot: It is like a driving licence, but better. We know that in our world with drivers there is someone who parks on a red line. We cannot get away from that, but at least we can make people aware of their responsibility to society.

Gerry Corbett: I think a lot of this will have to go to the Information Commissioner's office, and I guess it will speak to you at some time because they are the experts. From the CAA's point of view, we deal with the safety of operations as opposed to privacy and elements such as that. My basic awareness of the Data Protection Act (DPA) is that for commercial operators or people who are subject to the DPA, there should already be adequate coverage on data handling and things.

The harder element is the fact that the DPA has an exemption for domestic processing, so with private flights, hobbyist flights or whatever the processing of personal data means that hobbyists using them are probably exempt from most of the requirements of the Act. However, that is very similar to walking around with a mobile phone and taking pictures willy-nilly, or sticking a camera on a stick and taking photos from that. There is an encouragement there to act in a responsible matter. I do not know whether you are aware of it, but the Information Commissioner's Office (ICO) has just released a new code of practice. It was previously called the code of practice for closed-circuit television, and it is now the code of practice for surveillance cameras and personal information, so it has opened up a bit. There are about two pages in there that deal with actions with regard to unmanned aircraft, including some of the hobbyist elements of that. I think the ICO can answer this, but it will be the first to say that the Data Protection Act does not cover private use particularly well, nor was it really ever intended to. This is where we stray into a new area, where there is now a flying camera that is essentially still for hobbyist use but that could be used in other ways. Ninety-five per cent of human beings, certainly people within the country, are reasonable human beings and know what to do. There are always people who are intent upon breaking the law or doing something slightly different. You cannot

police everything. You cannot write regulations for those people because they are going to break them anyway.

The Chairman: You could make it more difficult for them.

Q22 Lord Haskel: Are you going to try to advocate safety standards? The other day I saw a piece of film where somebody had flown one of these machines through a firework display. Of course, the pictures were wonderful, but the thing could have been knocked out of the sky at any moment by an exploding firework, presumably landing on somebody down below. Do you try to introduce any sort of safety standards?

Gerry Corbett: There are already articles within the Air Navigation Order. The whole reason for the existence of the CAA is to protect the public and to deal with safety operations. With regard to small unmanned aircraft, there are two specific articles within the Air Navigation Order that deal with requirements for operation and are primarily aimed at the protection of third parties. They are there already in terms of what is generally required. There is probably always scope to adapt and modify them.

To be quite honest, in many ways we would look to be a little bit more pragmatic and to reduce some of the requirements in some areas where there is clearly no risk to people. If it is no risk to anybody, why should we overdo things? Similarly, where there is clearly more risk, we need to tighten up the requirements as and when we can. Unfortunately, we have to make people aware of the basic requirements, or at least aware that they have to be responsible in the first place. It is just getting people to think the right way. What you have got out of your box as your present is an aircraft and it does not stay up in the sky all the time. Unfortunately, a lot of these aircraft overtly look very simple to fly, and they are very simple to fly until they go wrong. In many ways, they are fairly basic hobbyist equipment, which is not necessarily built to any particular standard. We purposely do not regulate that sort of thing because there are too many options to set regulations at this level, other than operational limitations, which is the way we do it at present. The small ones that we are mainly talking about are a little like the pedal bikes of the sky. There is no MOT¹⁴⁶ for a pedal bike, but you still expect to do basic checks on its brakes and tyres beforehand and go from there. I agree that the main difference is that unlike with a pedal bike, where if you have an accident you are likely to hurt yourself, with a small unmanned aircraft invariably it is going to be somebody else who is going to be hurt. That is where we have to look closely at the requirements. The aim throughout is to be proportionate. That is where we are pushed by the Government constantly to put proportionality throughout all our aviation regulations so that we are not overdoing things at the wrong time.

The Chairman: We have one more question before we go into purdah.

Q23 Baroness Hooper: My question follows on very much from this. It is about requirements for third-party insurance, as applied to these systems, and how that can be influenced.

Gerry Corbett: Third-party requirements for aircraft that come under our specific jurisdiction or that have to have a permission from us are covered by EU Regulation 785/2004, the

¹⁴⁶ Ministry of Transport Test is annual test for vehicle safety.

European insurance requirement. Within that there is a specific element. Bearing in mind that it is now 10 years old, it is generally understood within Europe that it is not necessarily completely fit for purpose for dealing with unmanned aircraft in general. However, there are requirements in it, based on the mass of the aircraft, about how much insurance cover is required against third-party risks. The bottom limit is a mass of 500 kilograms. Below that, it sets a target of €750,000, I think. However, this regulation explicitly states that it does not cover model aircraft with a maximum take-off mass of 20 kilograms or less. That is model aircraft. In the UK, we interpret that as aircraft used for recreational purposes as opposed to aircraft that are being used for professional purposes. We expect people to have appropriate cover against third-party risks when we issue permissions. This is a difficult area. There is probably not much more I can say on that.

Baroness Hooper: Lord Brookes' friend, who received this present, for example, would have no obligation.

Gerry Corbett: No. Nor do you on a pedal bike.

Baroness Hooper: Exactly. I was thinking that.

Gerry Corbett: That is the thing. Again, it is about proportionality. You expect people to be safe. It is difficult, but we have to get a handle on where the risk is and where the potential for damage is. If we tie it up to such an extent and require insurance for everybody who has even a small aircraft that fits in your hand, for example, I do not think we would be able to manage that appropriately.

The Chairman: You would not be able to police it.

Gerry Corbett: We could not police it. There are potential difficulties with some policing of the regulations that we have at the moment. It is a difficult one. There is a fine line between what we do and do not require. At the moment, our regulations are geared towards the need to approach the CAA for a specific permission in areas where we consider that the risk to third parties is greater. If there is no risk to third parties, we are not there to regulate it in such a deep manner.

The Chairman: Thank you very much. We are going to close this session so we want to stop broadcasting and clear the public out. Sorry about that.

EuroUSC—Written evidence (RPA0037)

Civil use of RPAS

This brief response concentrates on the Very Low Level (VLL) and initially Visual Line of Sight Operations overseen by National Aviation Authorities. This is referred to as VLL-VLOS in the text.

What is an ‘equivalent’ level of safety to manned aircraft, and how can RPAS be protected against security threats?

This is at least a 15 year old question which was tackled extensively within CAP 722 and then in the JAA/Eurocontrol UAV Task Force led by Yves Morier (now EASA) in 2003/2004 supported by the Joint Airworthiness Authority (JAA), Eurocontrol, National Authorities and Trade Association most notable the UK CAA, the UAVS Association and UVSI International. The definitions for “Equivalent Safety”, “Equivalent Risk”, “Transparency” and “Fairness” were all defined in the JAA/Eurocontrol Task Force Final Report and this report formed the basis of the EASA and JARUS work we see today.

To get a low risk operation one must look at the context of operations in a wider sense but with the common theme of knowing the operators’ maturity (accreditation), knowing the pilots’ competence (Pilot qualification), knowing the reliability and suitable operational envelope of the aircraft system (airworthiness) in any given operational scenario. A reasonably competent accreditation organisation, such as EuroUSC™, can then provide a statement concerning safety assurance. Based upon this the various issues related to security then become easier to accomplish.

However to understand “safety” in this new context it is useful to look at three significant disruptive factors in the assumptions currently used by aviation regulators.

Scale Number of organisations and systems involved in small weight category

Strategic Scenarios: Number of different operational uses and regulatory contexts of operations

International contexts: Number of different regulatory environments

Scale

What is significantly new in aviation is the rise of the sub25kg RPAS market and the rise in the numbers of aircraft. Aviation as it is today thinks in numbers. It has been difficult for regulators to grasp the sheer scale. When 2,000 of any type of aircraft is normally seen as a large number, then 150,000 of one particular type of RPAS sold globally last year, such as the DJI Phantom Vision 2 from a Chinese company based in Schenzen is on a new scale.

In the world of small RPAS this is becoming common place. Regulators of the past are set up to deal with a relatively small number of relatively large systems operating from a relatively

EuroUSC—Written evidence (RPA0037)

small number of locations, with relatively low volumes of activity. Regulators talk in 100s and 1,000s not in 100,000s and millions.

Since the RPAS world will put aviation in the hands of every business on the planet the nature of regulation in this area has to change, otherwise “safety” will not be achieved in an acceptable way for acceptance by the public.

Strategic Scenarios

Because the scenarios are all pervasive, all government departments will need to understand this new emerging sector and provide policies that deal with their unique characteristic in their particular regulatory area. So Road, Rail and Air Transport for RPAS may intersect especially for the more prevalent Visual Line of Sight Operations at Very Low Level (VLL) i.e. less than 500 ft. Hitting a bus at 15ft in a city is a more likely event than hitting another aircraft! So who is the regulator? Also the areas covered by Data Protection, Privacy and Spectrum all present an extremely complex environment for this new industry.

Many new Operators entering the new small unmanned aircraft market area come from non-aviation backgrounds and hence the lack of good reliable information means that new entrants rarely make good initial business decisions and so their progress is slowed by having to spend time learning from their mistakes. In safety terms this is not a good position to be in.

Also Manufacturers into the smaller end of the market usually mainly come from non-established aerospace backgrounds; at best with a recreational manufacturing background, akin to toy manufacturers rather than being aviation based and similarly regulated.

At the JARUS November 2013 plenary, EUROCAE WG93 presented an initial view of equivalent safety for the VLOS Operational scenarios for Light RPAS. The aim was to categorise where each of the various National Aviation Authorities were in their regulatory development so that they could later be mapped against the EU Roadmap.

CASE 1: No regulation

CASE 2: Regulation by declaration rather than independent oversight (Identify the operator)

CASE 3: Adherence to Pilot Qualification Standard (Know the pilots)

CASE 4: Adherence to Airworthiness standards (Know the aircraft)

CASE 5: Harmonised approach to manufacturer and operator organisational approval (Know the organisations)

In January 2010 the UK CAA moved from the CASE 2 approach to the CASE 3 approach after requesting EuroUSC™, then a recently approved Qualified Entity under Article 13, ANNEX V of EC 216/2008, to develop the Basic National UAS Specification and the start of the formal award of a Pilot competency certificate for pilots of small unmanned aircraft systems (BNUC-S™). After a crash of a small unmanned aircraft into the Thames in April 2013, EuroUSC™ undertook an investigation into the issues and in the conclusions of the final report

EuroUSC—Written evidence (RPA0037)

recommended that airworthiness assessment of aircraft in congested areas at least should be considered.

The result of this would have benefits for the security of RPAS as the pilot, aircraft and operating organisation would all be known quantities and therefore could be more easily tracked and monitored for safety and security purposes simultaneously.

In the rest of Europe it is interesting to note that Germany and France are still roughly equivalent to a CASE 2 scenario whilst the Dutch and Malta have moved to a CASE 4 scenario, where all RPAS are subject to an appropriate airworthiness assessment formalised in September 2014. All aircraft in the Netherlands are registered on the Dutch Civil Aviation Register, something that does not happen in any other country in the world.

International Context

Even small RPAS are international from day one whereas National Aviation Authorities are nationally based by definition. Hence it is inevitable that there is no real connection between National regulation and the needs of the businesses that are regulated in the modern world.

Manufacturers need to sell and operators need to operate worldwide, so they want a harmonised approach from day one. Here JARUS has been a breath of fresh air (JAA for RPAS), a gentlemen's agreement on the way forward which owes its formation and development of the last 5 years to Ron Van de Leijgraaf of the Dutch CAA. So successful has it been that it has grown to the status of being decided as the main mechanism within EASA to drive regulation forward.

Given all the other aspects of Very Low Level Operations, whether another form of regulation is reasonable should be the subject of a wider debate, even to the extent of discussing whether regulation by a pure Aviation Authority was even possible given the pervasive nature of the operations and the users involved. Perhaps new bodies better resourced and better equipped with a wider perspective and competence i.e. regulators of the future, may be the answer. This is not considered a National undertaking but a European one.

How will data protection rules apply to RPAS and their usage?

It is considered by EuroUSC™ and echoed in many presentations on the subject at various conferences that data protection for RPAS is no different than for any other activity. What has been recognised is that awareness and adherence to current regulations provides initial protection assurances but as with other industries could do with specific guidelines to assist RPAS operators.

Does the current framework for liability and insurance for manned aircraft need to be amended to take into account the specificities of RPAS?

EuroUSC—Written evidence (RPA0037)

EuroUSC™ has been active in the UK and Europe in discussion with Underwriters and the EU recent work for nearly 5 years. In this it has become apparent that the “safety” data of the regulator and the “risk” data of the underwriters has the same basic knowledge base and hence the same uncertainties.

If the pilot, aircraft, operation and maturity of the operating organisation, coupled with the CASE view above of the regulatory environment are taken into account, then there is a way of identifying the overall risks. What is apparent is that differences in National Regulations used by Authorities reflects the lack of understanding of these risks and that the perception of safety, i.e. what the public perceives as a risk, is different in different European countries.

We are now seeing the emergence of real data such as the EuroUSC™ Safety database fed by investigation and reports from over 1,000 companies. What this is showing is that regulators and the underwriters are underestimating future risk by a factor of between 3 and 5, and that their actual costs and accident rates will be much higher than predicted. What has also emerged is that the probability data is based on many false assumptions such as the Transmitter failure rates being only 1 in 1,000 hours as used by the UK CAA. Most of these systems are unproven in the professional aviation market. Hence types of failure are emerging that never existed before. One such failure surrounded the introduction of a new flight control system resulted in 10s of failures in systems around the world within days of its introduction.

Has the European Commission identified the key issues in its recent communication on RPAS, and how can the EU’s actions benefit the RPAS industry in Europe in a way that is acceptable to all stakeholders?

Key issues addressed such as insurance, privacy and data protection are best dealt with at the European level. Many of these are the subject of regulations rather than directives which allows for more direct support to harmonisation. Reliability of systems is being addressed through the development of appropriate standards such as LUASS-AW™. So from a UK perspective support to these developments can only be beneficial.

Although the UK Government has been less than enthusiastic with the role of EASA and the developments that it has been promulgating, UK RPAS Community has largely embraced the need to move forward in a collective way. The reason for this is simple. UK Business is an export to Europe and in that industry sees Europe as a new economic horizon. The only stakeholder that suffers in this scenario is the need to keep UK Civil Service jobs within the Aviation Authorities rather than utilise the more flexible approach of using proper European based Qualified Entities under EC 216/2008 ANNEX V, rather than those generated for National only operations.

What are the advantages and disadvantages of regulating RPAS at national, EU or international level?

If one regulates at the local national level one in effect segregates policy, diversifies procedures and kills harmonisation. All these are ingredients for the slow-down in the growth potential of the RPAS industry in whichever country turns its back on. The only

EuroUSC—Written evidence (RPA0037)

benefit of such a policy is national containment of issues due to the lack of resources to address them.

If one regulates at a regional level then the benefits of any regional mutual trade and regulatory frameworks can be utilised. In this the EU has one of the most advanced set of rules for harmonisation and growth. Not taking advantage of this will inevitably lead to a slow down in the market size and increase the overheads of regulatory compliance. Hence the benefits of an EU led approach are seen as a first step.

The International Civil Aviation Authority (ICAO), a UN agency, has a prominent place in Aviation regulation but been restricted to International Flights only. However, the recent success of the ICAO RPAS Manual and the move towards a change in the Annexes is already underway and one can see that by 2020, if the support to an EU led approach is given, the emergence of a better International framework will become ever more achievable.

In 1998 an aircraft called the Aerosonde crossed the Atlantic (Canada to the UK) on 5kg of fuel, it weighed 18kg and landed in the Hebrides after 2,600nm! So size is not the issue, it is capability and in that RPAS of all sizes can be seen in an international context. This aspect will continue to challenge the current regulatory mindset but inevitable point to an International approach as being the ultimate goal.

One aspect to consider under this question is the limits of National Authorities as opposed to other organisations such as Qualified Entities. Qualified Entities such as EuroUSC™ have gained “trans-national acceptance” and been allowed to operate in a way that provides a way to “dynamically harmonise” approaches for all concerned. So for instance an organisation can be simultaneously assessed for operations in both the UK and the Netherlands against different rules and simultaneously granted Permission to operate in both countries.

UK industry focus

UK Manufacturers and Service Providers have an opportunity to export ‘key component technology’ and novel services in to a fast growing international market. Globally 95% plus (by volume) of RPAS sold for commercial purposes are in the VLOS sub 20kg category. To stimulate exports companies need a strong home market and level playing field to encourage investment and development of leading edge technology including flight control systems, software, r/c transmitters/receivers, other high technology components and complete RPAS.

Currently, low cost imports from the Far East, of unknown airworthiness state and safety, account for in excess of 80% of UK demand by volume leaving domestic manufacturers with less than 20% market share. Market information indicates that one such FE manufacturer has already supplied over 15,000 systems into the UK market in the past 18 months.

Fair competition stimulates efficiency through product improvement processes. However, UK regulations do not require any independent airworthiness validation in this RPAS category. Consequently, there is low incentive for UK RPAS Operators to purchase higher

EuroUSC—Written evidence (RPA0037)

cost 'airworthy aircraft' or Importers to supply such systems. This leaves UK manufacturers facing a dilemma

(a). whether to risk investment in development of airworthy products for a market where regulations do not require compliance

or

b). become an assembler using imported technology of doubtful origin and quality with limited export opportunity.

A change in the UK Regulations requiring all sub 20 kg RPAS to comply with airworthiness standards (CASE 4) would help create a level playing field in, which domestic manufacturers would be better placed to risk investment in higher added value products and to develop capacity for meeting export demand. EuroUSC™, as part of its export drive, have already published the International LUASS-AW™ Standard to enable manufacturers to comply with airworthiness requirements. Given a strong domestic market, together with Government focussed support for SMEs, exports will follow.

20 October 2014

APPENDIX 1

INTRODUCTION TO RESPONDENT

Formed in 2003, EuroUSC™ specialises in operating as an independent accreditation body working within the specific field of Civil Aviation for Unmanned Aircraft Systems (UAS). EuroUSC™ is recognised by many National Aviation Authorities (NAAs) as a competent body for assessing manufacturers, operators and flight schools against agreed airworthiness and flight crew licensing standards.

EuroUSC™ is directly approved by the UK CAA and complies with EU Regulation 216/2008 Article 13 ANNEX V as a Qualified Entity.

The Light Unmanned Aircraft Systems Scheme (LUASS™) for Remotely Piloted Aircraft Systems (RPAS) below 150kg is run by EuroUSC™ under its A8-22 approval (DAI/9932/09) from the Civil Aviation Authority (CAA) and is recognised in full or part in over 20 countries as far afield as Hong Kong, covering currently over 1,000 RPAS Operators, Manufacturers and Flight Schools worldwide.

EuroUSC™ is a corporate member of EUROCAE (www.eurocae.net) and supports EUROCAE WG93 and as is a member of the ICAO RPAS Panel Group on Airworthiness (www.icao.int).

This short response concentrates on systems using sub25kg aircraft systems for low level (below 500ft) Visual Line of Sight (VLOS) Operations and assumes that it is in the context of wider information base so not all organisations mentioned and their work is explained.

20 October 2014

First Person View—Written evidence (RPA0045)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

Submission from Firstpersonview

I represent Firstpersonview.co.uk. We are the largest UK importer / distributor / retailer of medium size (approx. 1kg) recreational drones. I have also worked full-time in recreational aviation training and safety for 28 years.

I have been made aware of recent representations made to the Committee by vested interest groups who obviously believe that their positions are best protected by attacking the position of the everyday consumer, who is not represented. Hence this submission – I apologise for its lateness!

Media interest has been sparked by alleged sightings of drones by airline pilots. There are two such reports – one from Southend and one from Heathrow. Southend is on the Thames estuary, and the sky there is full of seagulls – which are bigger and heavier than recreational drones, and pose a greater flight safety risk. Also the airspace around that aerodrome is subject to various campaigns to gain fully controlled airspace – so any reported sightings of any type of flying machine near Southend airport has to be checked against the possibility that it is simply an attempt to promote a cause.

The ‘drone’ allegedly spotted near Heathrow was apparently black and helicopter shaped. It may well have been an R/C helicopter of the type flown by BMFA members for the past 20 years. It is very unlikely to have been a ‘quadcopter’ machine, as these are invariably coloured white and are not shaped like a helicopter.

So two media-hyped instances, neither of which come even close to being proven to be the result of an everyday consumer behaving recklessly with his recreational drone.

And on the other hand we have probably 20,000 medium sized recreational drones sold in the UK in 2014, being enjoyed by their owners. And even more of the smaller ones in use, providing outdoor fun and recreation.

Safety: The safety card has been played by ARPAS. Without doubt sooner or later someone will get hurt with a quadcopter. People get hurt with roller skates, bicycles, cracks in pavements, zips, safety pins, matches, conkers etc. And people have been killed with model aircraft. However, any normal person ought to be capable of assessing the risk when operating their skateboard or football or kite – and so should be trusted to be capable of exercising the same intelligence when operating a recreational drone. (Ready to fly model aircraft have been available in high street shops for ten years or more – the only point that is new is that the recreational drones are easier to operate and more popular.)

Terrorism: This comes up repeatedly with drones. Yes a terrorist could attach a payload to a drone and fly it somewhere undesirable. Similarly they could attach a payload to a bonfire night rocket and shoot it into the air. Or attach it to an arrow and fire it over a wall. But the recreational drones can only carry a small GoPro camera, about the size of a twenty sized cigarette pack. So unless the terrorist have nerve agents, this is a silly thing to worry about.

First Person View—Written evidence (RPA0045)

And if the terrorists have nerve agents, we have a lot more to worry about than the method of delivery. I very much doubt that a determined terrorist would be put off by any UK regulations limiting small recreational drone use! (And the actual objects we should actually be focussing on are rucksacks – which are a known, proven terrorist weapons delivery system.)

The Key Points that the Committee might be interested in are:

- The recreational drones we import and distribute are now all fitted with firmware with a default height limit of 400feet. And with limiters (geo-fencing) that restrict their height further when close to airports. (The motors will not arm if closer than 1.5 miles to the airport.)
- The recreational drones that we import and distribute now all contain the CAA Safety Leaflet, explaining the pilot's responsibilities. We have got the manufacturer to agree to insert this on all UK shipments in future.

I hope this information is of use.

Yours

Mark Dale
Firstpersonview.co.uk

17 December 2014

Flirtey—Written evidence (RPA0050)

An Open Letter to the House of Lords Inquiry into Commercial Drones

I founded Flirtey, one of the world's first unmanned aerial vehicle delivery companies, to revolutionise three industries – online retail, fast food, and logistics.

Today, we sit together at an inflection point in the development of commercial unmanned aerial vehicle technology. We have an opportunity to democratise and commercialise these small flying robots to create a new industry. Imaginative minds are just beginning to explore the applications of this technology, which is at a similar point on the technology curve to personal computing in the early 1980s.

In the near future commercial drones will be ubiquitous. According to the Congressional Research Service, the Federal Aviation Administration in the United States predicted, “30,000 drones will fill the skies in less than 20 years”. This reminds me of a famous quote, commonly attributed to Thomas Watson, “I think there is world market for maybe 5 computers”.

The biggest barrier to the commercialisation of this technology is regulation.

The regulatory bodies that provide the safest and fastest path for companies to commercialise this technology at scale will attract entrepreneurs and opportunities to their geographies.

I recommend the following framework for your regulations:

1. Adopt a risk-based approach to unmanned aerial vehicle activities (rather than a hobbyist vs. commercial distinction, which is a false dichotomy)
2. Consider five key criteria to determine the risk of unmanned aerial vehicle activities
 - i. What is the weight of the unmanned aerial vehicle (or, how many joules of impact energy will be delivered by a crash)?
 - ii. Are operations below commercial airspace?
 - iii. Are operations outside the range of aerodromes and controlled airspace?
 - iv. Are operations within the live sight of the person authorised to override the autopilot?
 - v. Are operations outside populated areas?
3. Exempt low-risk operations from requiring any form of regulatory approval
4. Provide a clear and achievable path to scale for higher risk operations for all five criteria
5. Provide a free internet service for all unmanned aerial vehicle operators to log their flight paths, plan flights in advance, and to submit requests to Air Traffic Control for higher risk operations on the fly

Flirtey—Written evidence (RPA0050)

Today marks the 111th anniversary of the Wright Brothers first powered flight at Kitty Hawk. If you get these regulations right, you will empower a new industry across Europe.

Matthew Sweeny
CEO | Co-Founder
Flirtey

17 December 2014

Jacqueline Foster MEP—Oral evidence (QQ 98 – 112)

Evidence Session No. 8

Heard in Public

Questions 98 - 112

WEDNESDAY 5 NOVEMBER 2014

Members present

Baroness O’Cathain (Chairman)
Lord Brooke of Alverthorpe
Lord Fearn
Lord Haskel

Examination of Witness

Jacqueline Foster MEP, Member of the European Parliament for North West England and Deputy Leader of the Conservative MEPs

Q98 The Chairman: Thank you very much for agreeing to see us. I am sure it will be very useful. You certainly have a good background; we have a mutual background. It is very important that we get the best type of information we can on this study. This session is not being recorded or webcast as we normally do in the UK but a transcript is being taken and you will have the opportunity to review the transcript. Members’ interests are disclosed on our website and I am sure you have seen that. For the purpose of this, you have an interest to declare as well, Lord Brooke?

Lord Brooke of Alverthorpe: I used to be a director of the National Air Traffic Services (NATS), after it was privatised.

The Chairman: I ask everybody to please speak up clearly for the sake of the record. Just at the beginning of the session, could you say who you are and which organisation you represent?

Jacqueline Foster: My name is Jacqueline Foster. I am Member of the European Parliament for the Conservative Party and I represent the North West of England. I am deputy leader of the Conservative MEPs here. I am the transport spokesman for the Conservatives and I have been in that position from 1999 to 2004, when I lost my seat and worked for the aerospace, space and defence industries. I came back in 2009. I maintain that position and I have just been re-elected for the next five years.

The Chairman: Congratulations.

Jacqueline Foster: Thank you.

Q99 The Chairman: I did not introduce Tony Henley, who is our SPAD or specialist adviser, or James Galbraith, who is our Hansard transcriber. Can you please tell us about the work that you have done as an MEP on aviation issues?

Jacqueline Foster: It is quite wide and comprehensive. My background was with British Airways for many years so I had always had an interest and hence I became the transport spokesman for the Conservative Party. I have also had a position as a vice-president on the Sky and Space Parliamentary Intergroup during the last mandate, and that will be the case for this mandate. I was a member of that group during my first mandate as well. As I said, I worked in the private sector for the aerospace, space and defence industries for five years. I have worked for Airbus as well, so the manufacturing side is hugely interesting too.

In terms of legislation, directives and communications, during the times I have been in the European Parliament I have been involved in the following. I took through the regulation on airport security following 9/11 in terms of standards of security in airports across Europe and have maintained a very good relationship with the American FAA¹⁴⁷ over those years. Work on security issues is always ongoing. I was a rapporteur on what is called occurrence reporting, which has just recently been reviewed. That is on mandatory reporting when incidents take place, whether it is the airline's engineers or whoever in the industry. EU-US "open skies" service agreements, passenger rights and air accident investigation legislation also came through here. I have dealt with EU-OPS¹⁴⁸, in terms of pilots' hours and passenger name records, and I have been involved with slots, noise, ground handling and really everything that comes through these institutions. In terms of this particular communication, this has led to what is called an own initiative report from the Transport Committee. I will be the rapporteur for this communication in the Transport Committee. You have a Brit who will be the rapporteur.

Q100 Lord Haskel: Can you tell us what an own initiative is?

Jacqueline Foster: The Committees normally agree to have, during a period of time, perhaps six own initiative reports. I will give you an example: one of the big issues in aviation is Single European Sky, which is the restructuring of airspace. Running parallel to that you will have what is called SESAR¹⁴⁹, the technical side. There you are looking at ground-to-air communications, where we have actually developed the technology. We will be in competition with the Americans on NextGen. We have dealt with Single European Sky for many years and it needed a kick-start a couple of years ago. We in the UK are fully behind it because of the congestion and all of the problems that we have with airspace across Europe.

Not enough member states are joined up on this, although they have made a commitment, even the new member states that came in in 2004. It is hugely important for us when we look at the impact on the environment, when we look at the on-cost on ticketing, when you

¹⁴⁷ Federal Aviation Administration

¹⁴⁸ Refers to regulations specifying minimum safety and related procedures for commercial passenger and cargo fixed wing aviation.

¹⁴⁹ Single European Sky Air Traffic Management Research Joint Undertaking is a European research programme.

are looking at competition and all those things, because the cost of all of this congestion is absolutely massive to our business, industry and consumers alike.

I, at that time, was the rapporteur on an own initiative report and that was kick-starting the debate on Single Sky¹⁵⁰. That then allowed the Commission to bring forward what was called SES II—Single European Sky package II. We do these things if there is somebody with an interest, normally in the committee, and it will generally work in quite well with the Commission. For example, I host what is called UKTiE, UK Transport in Europe. They have a two-day conference, I am a patron here, and I have just been talking to them. I have already spoken to a colleague from NATS, a colleague from the CAA¹⁵¹ and others. What I will do for this report is get all of them round the table, people dealing with this issue, and get their expertise to put together a little report in the Transport Committee, for the members, basically.

Q101 The Chairman: Where does that go from there?

Jacqueline Foster: It will go through the Transport Committee. It will end up in the plenary.

The Chairman: Of the Parliament?

Jacqueline Foster: Of the Parliament. It will be voted in the committee and it will be voted in a full plenary when it reaches its conclusion. Other members of the committee will be allowed to put down amendments. There will be shadow rapporteurs from the other political groups. It will run like any directive or regulation.

The Chairman: But it does not stop there: you then send it to the Commission, do you? What is the link between the Parliament and the Commission when you do work like that? Is it a case of it just lying there or does it go into the Commission, where they might decide that this is something that they really need to follow on and then they, in turn, put out communication, super-information or even directives based on that?

Jacqueline Foster: It is part of and all of that in a way, because what they have done is put out this communication. It is not a directive and it is not a regulation. Our response as the committee is to say, "Actually, we would like to have a say on this." It is a bit like a Green Paper, in a way—your equivalent.

The Chairman: I see. Yes.

Jacqueline Foster: We go through that process. I will do a report for the committee. They will all be able to have an input. The Commission will be there when we have our little hearing and when we have the discussions in the committee, and that will then give them an idea where the Parliament is coming from with regards to their communication.

The Chairman: I see. Yes. So it is a box-ticking for them?

Lord Haskel: What is the timing on it?

¹⁵⁰ Also referred to as Single European Sky.

¹⁵¹ Civil Aviation Authority

Jacqueline Foster: I do not see any timing. There is nothing that is specifically laid down at this moment in time. We have this communication and I shall press on and get the work done, then take it through our committee. It will take probably a few months because we have only just got a new Commissioner, whom I have met, and I think we are going to be able to work with her very well: she is very pro-business, which is very good. I have met her and she was charming. She had only been in the position for about five minutes because there had been a bit of a swap-around, as we all know.

Q102 The Chairman: Yes, quite. Getting back to the work you do: have you really been a bit of a self-starter on this? Was it not necessarily something that your group, the aviation group in the Parliament, would have tackled?

Jacqueline Foster: It would eventually come to the Transport Committee.

The Chairman: Because there was a communication?

Jacqueline Foster: Yes.

The Chairman: I see. So everything that comes from the Commission in terms of communication, super-information and of course directive does get looked at by your group?

Jacqueline Foster: It does, by the Transport Committee, yes.

The Chairman: So it is joined up?

Jacqueline Foster: It is, yes.

Q103 Lord Brooke of Alverthorpe: Good morning. Thank you for your background information. What is your view on how the EU and its agencies such as EASA¹⁵², the safety agency, interact with aviation regulators at international level, with ICAO¹⁵³, at regional level, and at domestic level, like the CAA? How do you think it works? Are the right lines drawn or are there overlaps? We now have JARUS¹⁵⁴, which has been formed to work specifically with the RPAS, which we are looking at. Again, there is some overlap that is taking place between them. What is your general view on that? Is it about right? Are responsibilities delineated properly or should there be change?

Jacqueline Foster: EASA was a brand-new agency, as you know, and I was here when the initial legislation went through. It was created for the certification of the A380. That was the reason it was kick-started, to do that, because obviously we were certifying parts of aircraft we were all manufacturing and it was going through all these individual Governments. They needed a centralised system because we cross-border manufacture. I think that the creation of EASA was the right thing to do. Having said that at the time, I do not think it has been a true love-in with the national aviation authorities. I think it has been quite difficult, but it has started to improve because you do get overlap. One of our concerns when they created EASA was duplication. These were issues I raised. We have, in my view—I am biased,

¹⁵² European Aviation Safety Agency

¹⁵³ International Civil Aviation Organisation is a United Nations specialised agency.

¹⁵⁴ Joint Authorities for Rulemaking on Unmanned Systems

naturally—one of the best civil aviation authorities in the world. We have been world leaders in many areas and many countries around the world have copied the sort of practices and the experience that the CAA has brought in over the decades. I think it was a great challenge when they created the agency. They have just replaced the director-general, Patrick Goudou, who started this agency in the middle of Germany with three people to help. It has become an agency that has to be recognised by the FAA and other aviation authorities throughout the world. They now have an absolutely massive remit. It is not just the fees and charges, the certification and the manufacturing side; this is pretty well everything to do with the airline sector from security to pilots' hours, to EU-OPS and the transposition of JAR-OPS¹⁵⁵ and all these sorts of things.

Certainly from my own experience over the last few years—once a piece of legislation has been dealt with, it is gone and the compliance is dealt with in other areas, by member states or whatever it may be—there have been hiccups in terms of EASA's role. One example is how they would have dealt with general aviation. We have had probably a light touch in the UK. We have a very robust system as well if you were looking, for example, at somebody with a PPL¹⁵⁶, light aircraft, flying schools, balloons and all of this sort of stuff. I think it has been quite difficult for EASA because the rules on certain things like that were quite different in different countries. It was about harmonising. From my point of view, it is all very well harmonising but I am not a great fan of overregulation when it is not necessary and then putting small businesses out of businesses or restricting certain things happening that we have done as a norm and have been perfectly safe. That has been a great challenge for them.

EASA has a new director-general called Patrick Ky. It would be useful at some stage if you could perhaps meet him. He was in charge of the SESAR joint undertaking so he has some seriously good expertise in terms of where we are with this. I have known him for many years and I knew him when he was in the industry, so I was rather pleased when he took over. In terms of the big stuff, when you are looking at the big commercial aviation and that sort of stuff that they will deal with, it has probably been slightly easier to transpose JAR-OPS to EU-OPS and rule-making and whatever. I think that it has been more of a challenge when you are looking at some other projects where much smaller things that take place.

The Chairman: When our witness said, “We have the best aviation in the world,” that was the UK. She was being parti pris.

Jacqueline Foster: Yes. It was the UK CAA.

The Chairman: Of course, we are doing this inquiry as an EU investigation. Sorry, I interrupted.

Jacqueline Foster: No, not all.

Q104 Lord Haskel: The European Commission communication of April this year said: “National authorisations do not benefit from mutual recognition and do not allow for European wide activities, either to produce or to operate RPAS”. It would seem to us that

¹⁵⁵ Joint Aviation Requirement for the operation of commercial air transport.

¹⁵⁶ Private pilots licence

this is an impediment to the internal market. How do you think the situation will be resolved if it is an impediment?

Jacqueline Foster: I read that too, and both communications and the information—thank you—that I have had from you and obviously from the DfT¹⁵⁷. I always call them UAVs¹⁵⁸: it is the family of UAVs and then there are different things that fall within the family—now, obviously, the RPAS. Certainly from a military point of view, we do not really have the discussion. We are not dealing with military issues.

The Chairman: No. Correct.

Jacqueline Foster: I have been to BAE Systems, I have to say; I do know what an unmanned aerial vehicle can look like. I certainly agree with some of the comments on the implications from the UK Minister. I, on the one hand, see where the Commission are saying, “If we have a market here for X or Y, we need to make sure that everybody complies with that so that nobody is disadvantaged because they are not part of it”. You have two strands here. You have vehicles which need to be manufactured, and normally when you manufacture anything you are going to need to have type approval, you would normally have to have certain standards, they are normally going to have to comply with certain criteria in terms of safety—we are talking about a vehicle here that can certainly cause serious damage in the wrong hands—so if you are looking at the manufacturing side of that, that is one issue. Do I have confidence that those that are manufacturing these sorts of vehicles across the piece know what they are doing? Yes, I do. I am not an expert, but what know is that it is vitally important that these sorts of vehicles are in the right hands.

We then come to the operational side of that, and that is of course—certainly from what I have read—that we know what they are being used for. They seem to be being used more and more, and that is hugely important. Then it comes to, I think, where you are. There seems to be a slight difference in terms of what is recognisable. A MTOW, maximum take-off weight, has come in as 150 kilograms. Now, I do not know what an RPAS looks like at 150 kilograms and what it looks like at 170 kilograms.

The Chairman: Neither do we.

Jacqueline Foster: I know what a commercial aircraft looks like at 25,000 tonnes MTOW, and I know how the regulation will work there whatever its purpose. The criteria, the size of a commercial aircraft, will fit into the legislation and the way things are. In terms of this, it is hard to envisage. What I have gleaned is that it appears the Commission does not want to have any different sort of rules for anything that is built below 150 kilograms. It looks to me as though they want to have rules that apply—whether it is on airworthiness, whatever the operational criteria may be—however big this RPAS may be.

On the other hand, I am obviously reading information, which is hugely important and which I probably lean towards, to say that the Commission have put in a deadline to try to get all of this harmonisation in place by 2016. I think this is wholly unrealistic. In anything, when you build something and something starts to be used more, the market very often determines

¹⁵⁷ Department for Transport, UK.

¹⁵⁸ Unmanned Aerial Vehicles

how that product may move in the future, how successful it may be and what it may be used for. Therefore, in this case I think that the other organisation, JARUS—which has taken a global look at this in terms of all the countries involved and has clearly been working very hard on how this is going to move forward—seems to me a good organisation to deal with these issues alongside the national aviation authorities, who are clearly working hard to determine how this can move forward.

I understand where the European Commission are coming from; they do tend to like things in a bit of a box. I am saying nothing here that is not on the record as to how I feel. We have good, fun, frank discussions, which is how it should be. In terms of allowing the market to move on this, to see where it is and to clearly make sure that the criteria are as they should be, the steps are taken if somebody is buying a vehicle and of course they should be licensed to be able to operate something like this.

Q105 Lord Haskel: Can I just pursue this point about the market? With many other products, certification, standards and harmonisation have been found to help—for instance, products that have the CE mark on¹⁵⁹. Manufacturers, users and the public have found that it helps. One of the things that concerned us about this quotation is that it seemed to be ignoring that.

Jacqueline Foster: When I mentioned the manufacturing side, we know that we obviously have BAE Systems and Thales UK; we are quite ahead of the game, big players in this in any event. Anyone of any worth who is going to pay a huge amount of money out in research and development and building unmanned vehicles would be very foolish if they then could not sell them anywhere. That really goes without saying. We build cars and all sorts of things in the United Kingdom because we want to export them and we want to make sure we have investment, so I do not see anything different here. I think that is already the case. I would hope that that would be already the case. As I said, where the difficulties are coming in is: where do the Commission want to be, where does industry want to be and where should we all be? There needs to be a thoughtful process about how we move it forward because there are a number of issues, as you have said, of concern. But yes, they are in a single market. If BAE Systems are going to build something that then could not be used somewhere else, I would find that quite odd and I do not think that that would happen, to be perfectly honest.

The Chairman: Yes. However, there are going to be an awful lot of smaller companies involved in this because they are probably quite easy to manufacture.

Jacqueline Foster: This is where I was coming from on the manufacturing side. Even if you bought them on Amazon.com—“Here is your mini-drone,” or whatever they want to call them—

Lord Haskel: You can.

Jacqueline Foster: I think that once you have something that could do serious damage to somebody in the wrong hands, and it is of a weight or of a power that could do something like that, the goods have to be manufactured to a certain standard. That would apply equally

¹⁵⁹ CE mark is a mandatory conformity marking for certain products sold within the European Economic Area since 1985.

for import. If we were importing and people wanted to buy stuff online that was from abroad, we would expect, as when we buy a car for abroad, it complied with the sort of standards that a consumer in the UK would find perfectly okay.

Q106 The Chairman: How are you going to do it? You can buy them now for £300, £500 in Maplins, and there are no instructions in the box and there are no licensing agreements. They could fall into anybody's hands and could cause that same sort of trouble. We do not talk too frequently about terrorist threat or anything like that but just the fact of some kid getting hold of it as a Christmas present and then putting something on it, a camera or even just to send a parcel to somebody—it could fall out of the sky and kill somebody.

Jacqueline Foster: I think you are quite right. I do not like over-egging the pudding and knee-jerking into, "My God, this could be—" but the reality is that, in the wrong hands, anything that really flies around could be pretty lethal. As time moves on—you are trying to be thoughtful—how do you take this forward without overreacting and being silly about these things?

The Chairman: Right, that this is why we are here.

Jacqueline Foster: All right. Depending on what it is—as you said, there are very tiny little things that kids might have—we are going to have to be realistic and I think it is up to the decision-makers, with the advice from the Civil Aviation Authority and the agencies and various others, to look at. What are we looking at here; what is the device like that is different from the child playing in the park with a thing whizzing around to somebody that is physically doing something that could cause security issues? If it is a device that is of the size and has the power to be able to do something like that, then I think it is about having a licence. If you have a gun and if you are a farmer, you are not going to go out and shoot anybody but you may need it for your job, you have a licence. So I do not know whether the right road would be to move down, depending on the type of device it happens to be, over a certain weight or a certain power, that somebody who wants to purchase something like that would have to have a licence to do it, whether it was for pleasure or whether it was for commercial reasons. Could that be a way without it being too bureaucratic? This is where the advice from the experts comes in and, of course, I am not a security expert at all. I am not familiar enough with it. As we know, I can build a wing, I can talk about composites but when it comes to this sort of thing I am certainly out of my comfort zone, apart from seeing these magnificent things that BAE Systems build and going, "Wow". But this is about how we differentiate how they are being used and in what category they are. Do you categorise and if you get to a certain category you say, "Well, if it is category 2, we have to start looking at a licence for that"? How do we then deal with that? Then you are bringing it back to Europe, so does everybody have to do the same sort of thing? It is quite complicated.

Q107 Lord Fearn: The increased civil use of RPAS has raised fears about invasions of privacy and a new potential physical threat to people and property. Do you think there can be any new solution to this problem? For example, could there be restrictions at the point of sale, which you have not mentioned so far, or information about regulations provided at the point of sale, or is existing regulation sufficient at the moment?

The Chairman: There is none.

Jacqueline Foster: I think from what we are talking about you are going to be having to look at point of sale, quite frankly.

The Chairman: Then there is the point about model aircraft.

Jacqueline Foster: Yes.

Lord Fearn: How do you think individual MEPs and the Transport and Tourism Committee see this?

Jacqueline Foster: I will let you know when we are halfway through the debate.

The Chairman: Will you send us—

Jacqueline Foster: I will keep you informed.

The Chairman: Yes, please.

Lord Fearn: Is it on the agenda?

Jacqueline Foster: Not yet, no, because we have only just agreed to do reports on several issues and this is one of them; initiative reports, they are called. Certainly, yes, I would agree with that. As I said, what would be more helpful for me is if we could look at how we could categorise the things as to what sort of damage X or Y could do.

The Chairman: You also have a situation where those who want to harm are always four or five steps ahead of those who do not think that anybody wants to harm.

Jacqueline Foster: This is where the risk comes in and this is where we have to take advice from people who are—

The Chairman: In security.

Jacqueline Foster: —far, far away over my pay-grade, to sit and chat with them. I would be very happy to come and meet up with anybody over in Westminster you thought appropriate that you would share information with.

Lord Fearn: We were shown at Cranfield how far it could go, the particular one that we were looking at, but it could be twice as far or three times as far—

The Chairman: Yes, we were told there what the limit was and that was only a few weeks ago and now the limit has gone up three times. So they are really mushrooming.

Jacqueline Foster: This is why I think a decision is going to have to be made at the end of the day. Are we going to allow these vehicles to be used just for commercial—apart from military—reasons where there are very good reasons, or are private citizens going to be able to buy them?

Lord Fearn: They are buying them now.

Jacqueline Foster: That is what I mean. That is when the risk comes in.

Q108 The Chairman: Gerry Corbett of the CAA said, “You cannot police everything. You cannot write regulations for those people because they are going to break them anyway”. The ones who want to do harm will do harm, but that is a very defeatist situation; we are not going to come up with that in our report hopefully. We are just going to have to come up and say what is practical or can we just not do it.

I am going to move it on slightly. What is your view of the EU’s consultation processes and stakeholder involvement when it comes to aviation issues? We are talking about the whole EU consultation processes, the Commission, and not necessarily you doing your thing representing the UK.

Jacqueline Foster: The Commission do have a process. They put stuff out to consultation and they have various consultancies who may do impact assessments for them. We brought those in about 10 years ago; we pressed for those because of the impact on business very often from the legislation that had not been costed. They do impact assessments. If I speak to industry and I say to industry, “What is your relationship like with the Commission?” I think it can be mixed. Parts of the Commission can be very, very good to work with from an industry point of view and then you will find other parts of the Commission where industry will find that they want to have access, which they should have quite frankly, to put a point forward and they find it quite hard to access. It varies, like departments all over the world.

The Chairman: Indeed.

Jacqueline Foster: I work closely with industry, the Commission, Council, the departments and the civil servants. I work closely with the Department for Transport. It is very much a team effort, all of it. If a British company came to me, or a company in the UK with employers, and said, “We have been trying to see that person in DG MOVE about X and we cannot knock on the door,” or, “We are knocking on the door and nobody’s going to let us in,” and I think they should actually have access, then I would certainly intervene. They are public servants and industry and business have a right to have access to public servants in any event. That has got better over the years, too. One of the most difficult areas is probably the environment gang round the corner, on the ring road. They used to be called DG Environment then it was CLIMA.

The Chairman: You do not actually like them very much, do you?

Jacqueline Foster: I worked with them when I was with the industry and I found that the hostility towards industry was breathtaking.

The Chairman: All right, well we will not go over that—

Jacqueline Foster: In DG MOVE¹⁶⁰, where we are—you have spoken to Margus today—you will find that you can have good discussions with them. There is a good open-door policy. Those of us who have been around a long time know the players, so it is good to have that access. You have to be able to talk to each other. You can agree to disagree—

¹⁶⁰ Directorate General for Mobility and Transport of the European Commission.

Q109 The Chairman: Yes, but it seems as though size matters so some organisations have no problem at all but some SMEs, such as Resource Group Ltd, express concern that large companies like Airbus and Thales were dominating the RPAS agenda in Brussels. Alan McKenna warned that if a stakeholder consultation took place alongside the drafting of regulations, the current decisions may, in essence, have already been taken and any consultations risked being hollow. What would your response be to that?

Jacqueline Foster: I would say to the smaller businesses, “Are you in touch with the department to drive the first stage before Europe? Are you in touch, for example, with the DfT or people who are dealing there?” Industry and business also have to be proactive there. In terms of input it is much harder for the SMEs. Quite a lot of them are attached to trade associations and if my trade association was not doing its job I would be giving it a good rally to make sure it did. They should be representing their interests here. There are loads of trade associations who are here in Brussels. I was Head of European Affairs for the AeroSpace and Defence Industries and that was all the companies across Europe. That was looking at all their interests and making sure there was a position for whatever it might be that was put forward. It did not prevent the individual companies from speaking to anybody but equally they have to be proactive with their Ministers back in the UK, in this case—with the departments and the civil servants. They can always contact me as a representative.

The Chairman: Adam Simmons of the Department for Transport said, and I quote, “Overall the EU consultation process works well although I acknowledge that it is perhaps not a perfect way of getting absolutely everybody’s view”. You say that people have just got to be proactive.

Jacqueline Foster: I think they have to be pretty pushy.

The Chairman: Also, with the type of new technology, I suspect they probably are because if they have hammered it out on the kitchen table in the first place usually they are very young thrusting people who will go ahead. We do not want to block off development but also, of course, one has to be very conscious of the downside.

Jacqueline Foster: Plus they do not have the resources of the likes of Airbus and BAE Systems. They do not have those resources and this is why you say to them, “Can you link yourself to a trade association? Can you do something?” It is very, very difficult for them, to be perfectly honest.

The Chairman: Quite, you can understand why it is, can you not?

Jacqueline Foster: It is, yes. As Brits we love our entrepreneurs; we love people taking that chance and inventing things. It really is fantastic. You do not want that quashed, but equally the structures at local, national and Europe levels are very heavy at times and very difficult to get through. These sorts of meetings that we are having now—and obviously when you have Select Committees—I think are a very good way for people to get their views across.

Q110 Lord Brooke of Alverthorpe: Staying on the same subject, the Americans and the Israelis have been the principal leaders throughout the world in producing the RPAS and doing the research—producing and, in military terms, using them as well. In a sense Europe is running to catch up. In fact Airbus probably put in some authorisation for some licensing

and it is probably quite a good move. It is time that we saw more of it over a wider front. Do you think that there is enough knowledge of RPAS around? In the UK we are getting almost daily reports of different things that are taking place with them, of one sort or another, but I am wondering about the extent to which people see that they are a major development in the aviation industry and will have—from all the evidence we have been getting—a phenomenal impact in 10 to 15 years' time when you see that people are looking to use these in commercial terms. The last mile is expensive because of communication blockages on the ground—Amazon and so on and people who are delivering spare parts for cars and so on see a role for them going round—so it could be quite a different life in the air compared to what it is at the moment. Is that the same feeling around in Europe? Do they see the developments that way?

Jacqueline Foster: To be honest, I do not think the public really are that aware. We are the man in the street and we watch the telly and we think we are pretty up to date with what goes on. We watch the news and we may see something in some theatre of conflict somewhere and hear somebody say from the military, “And they used this drone”, or whatever they want to call it, “and it went beep, beep, beep around here and bong over there,” and people go, “Gosh, isn't that clever?” Then they use them for surveillance and they can find out if there has been some catastrophic event near a mountain somewhere, “Isn't that fantastic because they don't have to have a pilot on board?” That is pretty well the extent to where most people really would be. I have never come across anybody who is pro or anti. I do not think there is really a point of view about them. Generations now expect us to be so good at technology—we had a man on the moon all those years ago—but when something is flying around and the pilot is not actually on board, initially people go, “Oh my God, we've got to have the pilot”. They said the same about the trains when they found they did not have a driver—

The Chairman: And cars.

Jacqueline Foster: —then the cars parking for you. I do not think there is a big serious debate as such with the general public. As things develop and people are made aware, unless there is a conversation taking place and people are made aware of what these devices, vehicles, can do or are doing—they will understand the military side of it—in terms of the civilian side of it perhaps they do not see what the potential is there.

Lord Brooke of Alverthorpe: The military side in Europe is not particularly advanced compared with what has been in America and Israel—

Jacqueline Foster: I am not suggesting it is.

Lord Brooke of Alverthorpe: But the civil side in America has slowed down because there have been objections over the number of accidents and there have been objections over the invasion of privacy from the Tea Party group types who have been complaining about them and running out there to shoot down a drone.

Jacqueline Foster: We will have a similar thing, probably, with the civil liberties. They may have touched on it; I do not know if they have touched on it yet. That will certainly come through and it will be a factor.

Q111 Lord Brooke of Alverthorpe: Do you think that you are going to get some debates in the Parliament on this?

Jacqueline Foster: Oh, there will be.

The Chairman: Who would initiate an innovation debate on this?

Jacqueline Foster: We are doing it now in the Transport Committee. If this goes past the communication, once this has gone through, once my report—this own initiative—has gone through the process, that is when the Commission come forward then with either a directive or a regulation. That is when—there are about 20 major committees, as you know—other committees will take an opinion. So, for example, in the Transport Committee I might be doing something on whatever but what I will also have then is the Environment Committee wanting to do an opinion on something that we are doing in the Transport Committee, or vice versa, so that is when I would see the civil liberties issue coming in from that committee. But that is not until the Commission come forward with either a proposed directive or regulation or whatever it is they think that they should be doing. That is when you will get the other input, I would suggest, on privacy and civil liberty. It is like PNR. PNR is—

The Chairman: Yes, that was 9/11.

Jacqueline Foster: PNR is passenger name records and that was all through the legal committees but I spoke about it with a transport hat on. Really it was the Legal Affairs Committee that led on that, albeit that we were talking about air transport.

The Chairman: This is aviation jargon, Passenger Name Records, which came in really as a result of 9/11.

Jacqueline Foster: It was. It was to strengthen the information they required.

Q112 The Chairman: We have concentrated in this conversation on the small drones and what they can do. We were worried about regulation and so on: where is the conflict between jobs and growth? Who is going to win out on that? I would have thought that that carried more importance than RPAS. I do not know, I am just throwing it at you because you said that you could do this and you can do that and all the rest of it, but if there are groups saying, “Hold on, we could also make an awful lot of money and make many more jobs and encourage technology in youngsters,” and all the rest of it, it is a powerful argument.

Jacqueline Foster: I think it is. I have read some of the documentation and they have put all sorts of figures—millions and squillions of jobs. God knows how they came to that at this stage of the game; I really do not know. It is like anything, I suppose: if something becomes popular, if something is used, if something is found to be extremely good and it works well for industry and business, then the bigger that business becomes, normally more people will be employed. Then you are looking at what sort of market that is; it depends how successful it all is and where it goes. If it moves on—we have talked about the things flying around—as you have said, this takes this up to a commercial aircraft. I know we can get up to a commercial aircraft because they had a flight, did they not, that went up to Scotland. They never told us about it. It had no pilot on it; the pilot was on the ground. Of course, it is

massive. Then you obviously have NATS; you have all the airspace issues there; it is massive. It is one thing where you have military airspace—it is sectioned off and the military are doing whatever they are doing, manoeuvres—but it is certainly another thing once you move into the civilian side. You say, “Well, now we have civilian air,” and the pilot is sitting in wherever he is sitting—I do not know, watching daytime telly—he is just on the computer and is going somewhere—

The Chairman: It is more than that.

Lord Haskel: It is the services that will come from this where the growth probably lies.

Jacqueline Foster: It will be massive, probably.

Lord Haskel: Do you have any views as to how this can be stimulated?

Jacqueline Foster: Not really. I would need to spend more time on this and think it through more. This is outside my zone, to a degree. I know what RPAS they are, to a degree, but the top line of this discussion is, “She said she’s definitely not an expert in this field”. I am probably not an expert in anything. I am just giving you probably what I have read and where we are maybe just at the moment in the European Parliament.

The Chairman: It has been interesting, informative and engaging. If I summed it up correctly, am I right in saying that you do not actually put it in the too-difficult basket?

Jacqueline Foster: No.

The Chairman: Good. Anybody want to ask any final questions? The time has defeated us again.

Lord Haskel: Thank you very much for your responses.

The Chairman: Thank you very much indeed.

David Goldberg, Academic lawyer, the Information Commissioner's Office (ICO) and Peter Lee, Taylor Vinters LLP—Oral evidence (QQ 149 – 161)

David Goldberg, Academic lawyer, the Information Commissioner's Office (ICO) and Peter Lee, Taylor Vinters LLP—Oral evidence (QQ 149 – 161)

Submission to be found under the Information Commissioner's Office (ICO), David Goldberg, Academic lawyer and Peter Lee, Taylor Vinters LLP—Oral evidence (QQ 149 – 161)

Robert Goodwill MP, Paul Cremin (Department for Transport) and Adam Simmons (Department for Transport)—Oral evidence (QQ 176 – 190)

Robert Goodwill MP, Paul Cremin (Department for Transport) and Adam Simmons (Department for Transport)—Oral evidence (QQ 176 – 190)

Evidence Session No. 13

Heard in Public

Questions 176 - 190

MONDAY 1 DECEMBER 2014

Members present

Baroness O’Cathain (Chairman)
Lord Brooke of Alverthorpe
Lord Clinton-Davis
Lord Cotter
Lord Fearn
Lord Haskel
Earl of Liverpool
Baroness Valentine

Examination of Witnesses

Robert Goodwill MP, Parliamentary Under-Secretary of State, Department for Transport,
Paul Cremin, Head of UK Aviation Safety, SAFA and Permits, Department for Transport, and
Adam Simmons, Deputy Director, IASE Group, Department for Transport

Q176 The Chairman: Good afternoon, Minister, Mr Simmons and Mr Cremin. We have seen you before, Mr Cremin. In fact, we have quoted you several times. We welcome you here, and we are delighted to see you. This is our last session of evidence—keeping the best till last. I just have to go through the formalities first. Members have declared their interests that are relevant to this inquiry on our website. Any Member with an interest that is relevant to this evidence session should disclose this on the record. Our specialist adviser knows Paul Cremin. That is the only interest, apparently. This is a formal evidence-taking session of the Committee and a full note will be taken. This will be put on the public record in printed form and on the parliamentary website. You will be sent a copy of the transcript and you will be able to revise any minor errors. This session is on the record. It is being webcast live and will subsequently be accessible via the parliamentary website. You are welcome to submit written supplementary evidence after the session, and we might welcome it because things might come up that we had not thought about before. Witnesses and Members are reminded to speak up so that everyone can hear properly.

Robert Goodwill MP, Paul Cremin (Department for Transport) and Adam Simmons (Department for Transport)—Oral evidence (QQ 176 – 190)

Minister, and Mr Cremin and Mr Simmons after you, would you like to make any brief opening remarks?

Robert Goodwill MP: Just to say that I think this inquiry is very timely, given the way this technology is developing. I have to say that I think we have lost one big argument, and that is not calling these things drones. These things are not referred to me as drones. I was at St Leger at the Doncaster Racecourse in September, and somebody pointed to the sky where there was an RPAS flying and said, “Oh, there’s a drone”, so while we may endeavour to keep everybody calling these things RPAS, “drone” is the word that has now come into common parlance, and I am sure that when reports of your work go into the newspapers they will be referred to as drones, so maybe we ought to admit defeat and call these things drones.

The Chairman: I totally agree with you, but we have not discussed this. What do we feel about that? Do we make that decision now?

Lord Brooke of Alverthorpe: Fine.

The Chairman: Yes, good. The problem was the word “drone”.

Robert Goodwill MP: The second point I would make—I was thinking about this on the train on the way down—is that we can all remember watching episodes of “Tomorrow’s World” in the 1960s or 1970s where they would discover this wonderful new technology and predict how it would be in 10 or 20 years’ time. They usually did find a technology that was going to have applications, but they correctly predicted neither how it would be developed nor how it would be used. We need to make sure that whatever we do as a Government now we do not tie ourselves into future predictions both of the technology and of the application. It is important that we have that degree of flexibility.

The Chairman: A very good point.

Robert Goodwill MP: Having said that, I hope that set the scene a little on my overall thinking, which is more about the political than the more technical matters which I suspect you will also want to explore. That is why I am very pleased that I have my two colleagues from the department next to me.

Q177 The Chairman: Thank you. I am going to ask the first question. Can you tell us about the cross-Whitehall working group on RPAS, or drones? Who sits on it, what is its mandate from government, and what is it expected to produce and when? We are asking those questions because we had evidence from Nick Aldworth, the Chief Inspector of the London Metropolitan Police. He talked about a cross-departmental group that was looking at enforcement issues and was police-only. Could you give us some indication of what the cross-Whitehall working group on RPAS is?

Robert Goodwill MP: Our cross-Whitehall group on RPAS has been set up to inform government and to develop policy in this new, emerging aviation sector. Its first objective is to inform RPAS-related departmental policies, and it is going to publish a UK cross-government vision and strategy for UAS. Its second is to identify cross-government synergies and opportunities for efficiencies. Its third is to identify and address barriers to a successful

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UK industry base to support the Government's growth agenda. I am going to give you a very long list of who is on this, and I apologise in advance for the length of the list, but a number of government departments and agencies sit on this group, which is chaired by my department and the Ministry of Defence, which are the two lead policy departments in this sector. Other departments include the Department for Business, Innovation and Skills, the Home Office, the Foreign Office, the Department for Communities and Local Government, Defra, the Department of Energy and Climate Change, the Maritime and Coastguard Agency, the Marine Management Organisation, the Border Force, Her Majesty's Revenue and Customs, the Information Commission, the Civil Aviation Authority, the Military Aviation Authority—and the Cabinet Office, of course, is kept informed at all times. Some of those organisations I did not even know existed. It is a very large commission.

The Chairman: Where is the Department of Health? It is about the only one that is missing.

Robert Goodwill MP: We do not have the Department of Health. If you would like make a recommendation—

With the exception of Health and Education, we have virtually everybody on there. I do think it is important that we look at all sorts of issues.

The key objectives of this group are: first, to identify the extent to which the UK can support safe and secure RPAS operations in the UK, including options for the certification of these aircraft, pilot licensing and associated systems; secondly, to identify the key characteristics of RPAS infrastructure, including the potential radio spectrum for RPAS operations in the UK; thirdly, to seek to identify common cross-government user requirements to understand future concepts for shared assets or system procurement and maintenance; fourthly, to determine how the UK might best position itself to take advantage of the RPAS industry and technology operations; and, finally, to engage in a public dialogue—this is probably the most important one at this stage—on the use of civil and military remotely piloted aircraft systems in the UK. The group is at a very early stage in its work and is in the process of developing its activities through four communities of interest. This includes consulting a range of stakeholders and the general public that will help to shape policy in this area. We anticipate that this public engagement will take place during 2015.

The Chairman: To be published when?

Robert Goodwill MP: We have not yet set the date. It will depend a little on the level of public engagement that we get. Something is also happening next year—sometime in early May, I understand—that might have some impact.

The Chairman: I think it is 7 or 8 May, or something.

Robert Goodwill MP: Yes. We certainly hope to be the incoming Government, and we are keen to make some progress in this area.

The Chairman: Mr Cremin, are you the person who chairs this group? You chair one group. Is this yet another group?

Paul Cremin: No, I co-chair this group with my Ministry of Defence colleagues.

Robert Goodwill MP, Paul Cremin (Department for Transport) and Adam Simmons (Department for Transport)—Oral evidence (QQ 176 – 190)

The Chairman: I see, so it is the two lead players: the Department for Transport and the Ministry of Defence. Thank you very much.

Q178 Lord Fearn: Thank you Madam Chairman. Government officials told us that the time is drawing near when we have to look to some sort of public dialogue with the general public on the use of RPAS and what they think. Do you think there needs to be a separate dialogue with commercial and leisure users of RPAS? How should these dialogues take place? How should they be carried out? Should the priority be on public safety or economic opportunity?

Robert Goodwill MP: I think the short answer is that it has to be both, but there is no doubt that we have seen a big increase in the use of small unmanned aircraft in the UK and across Europe. The CAA¹⁶¹ has experienced a big jump in applications for the commercial use of small unmanned aircraft, and it has issued approximately 670 permissions so far in 2014. However, we note that the availability of relatively low-cost small unmanned aircraft over the internet and high-street retail outlets has resulted in a dramatic increase in the number being purchased for leisure activities. Indeed, I have written my own list to Santa. The more I hear about these, the more I would quite like to have one.

The Chairman: Christmas is coming.

Robert Goodwill MP: Christmas is coming. Small unmanned aircraft will almost certainly be very popular purchases this Christmas, and a large number of these systems are bought with an internal camera designed on to the platform. I do not believe it is easy to separate commercial and leisure users, because in some instances they use very similar systems. I recently came across one example. One of my friends has her house on the market, and there was a photograph, obviously taken by one of these aircraft, on the brochure for the house. If the estate agent or somebody appointed by the estate agent had taken that picture, it would be regulated. If the same picture had been taken by the householder themselves with the same aircraft, it would not, so it is very difficult to try to draw a distinction between the two.

The Government recognise that an increase in the popularity of small unmanned aircraft systems with cameras and other sensitive payloads also gives rise to a number of questions about safety, security, privacy and data protection. Safety and security must always be the overriding priority, and both commercial and leisure operators must operate these aircraft responsibly and within the rules. The Government recognise that it is a good time to go to the general public to ask their views on the use of unmanned aircraft, and I am pleased to be able to confirm that the cross-government working group on RPAS has initiated a programme of work that will result in a series of public dialogue events next summer, as I have already mentioned, to better understand the public's perception and their concerns about the use of unmanned aircraft in the UK. We are at a very early stage in planning these events, but I anticipate that a series of events will be held in several locations around the UK, drawing on a wide range of people from all walks of life to discuss the prominent issues with operating these systems in the UK. This work will help to shape and inform future government policy in this area.

¹⁶¹ Civil Aviation Authority

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Furthermore, the Department for Transport and the CAA will host an industry forum in early February 2015 with a view to better understanding the development of remotely piloted aircraft systems and their potential applications in the UK.

The Chairman: Can I just ask as a side issue how fast you see the market developing? Do you see 100,000 or 200,000? What do you think the critical mass will be where they all take off?

Robert Goodwill MP: For leisure users, the market is almost unlimited. Indeed, I think we need to think very carefully about the stage at which we have no regulation at all. For example, somebody recently told me that they had been in one of their local electrical retailers and somebody was flying a very small aircraft in the actual shop. Of course, it is strictly illegal to fly within 150 metres of a building. Well, they were in the building, so we need to think about the point at which we say, “These are toys. They cannot be hazardous to the general public and they should be outside the regulation”. I think the weight of the vehicle would probably be the way to decide that.

On the question of more widespread commercial use, there are suggestions that they could be used to deliver parcels, for example, or for crowd control. The police might want to replace their police helicopter vehicles with vehicles of this sort, or our coastguard might want to use them for rescue operations and for initial identification of where people are lost at sea—they could go in with unmanned vehicles.

We are at an early stage, and I suppose I go back to the “Tomorrow’s World” issue and the fact that we are really not sure how they are going to take off, but we need to make sure that we are in a position to react should we find new applications. I am a farmer myself, and every farmer in the country might well have one of these for inspecting their crops to spot areas where yellow rust is starting or where crops are particularly drought prone, which they need to address with their own agronomy solutions.

The Chairman: Lord Fearn, you wanted to ask a supplementary question.

Lord Fearn: You mentioned regulation in the case of someone taking a photograph of a house, for instance. How would that be regulated at the moment?

Robert Goodwill MP: In terms of privacy, I do not see an awful lot of difference between somebody going up a stepladder with a camera, using CCTV or using one of these vehicles. I think the privacy rules should apply in the exactly the same way. Similarly, if these vehicles were a noise nuisance, we have legislation which local authorities could implement to address a situation where a nuisance was being caused by noise. In many ways we already have legislation on the statute book. In particular, we have the Protection of Freedoms Act 2012, which governs police use of these vehicles for surveillance operations. I sure that would be a suitable way of doing that. Of course, we also have the Regulation of Investigatory Powers Act 2000—the RIPA legislation—which covers covert technologies and says that their use must be necessary and proportionate. So I do not think that we need specific legislation for this type of application, but I do think that we need to make sure that existing legislation on privacy covers the way in which government agencies or private security companies, for example, can use these technologies, and if necessary make any adjustments to that legislation, given this new challenge that we face.

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Q179 Lord Brooke of Alverthorpe: Good afternoon. I have a couple of questions. You mentioned the preparations that are being made for the dialogue with the public next year. First, could you put a bit more flesh on the bones and say just how that might be run? Is this going to be done on social media, at events, or in a public way with the BBC, and so on? If you could add a little to that, we would be very grateful.

Secondly, reverting back to your first answer—you gave a long list of people associated with the cross-departmental group—we have been to Europe and have had conversations with people from the private sector. In Belgium they were particularly unhappy about the nature of the poor relationship with the Government on regulation there; nobody can fly there at the moment. Here we questioned the police about the nature of the relationship with the security industry. There is no mention of the security industry being involved with you, and there are many areas in which they may see potential benefits or opportunities arising. Is there not a case, which we put to the police, that the security industry ought to be closely linked as well, leaving aside the MoD?

Robert Goodwill MP: First, we do not anticipate a large number of events. There will be a small number of events across the country that will engage with people from a diverse range of communities. I think we should ensure that we look at some of the rural issues as well as some of the urban issues. One advantage that we have in this regard is that this seems to be viewed by the media as a very sexy area: you do not need to say very much before you get a headline and a piece in a newspaper, so it will be relatively easy to get public interest in this. I am sure that using web-based portals to encourage people to feed in as well will be particularly important. Indeed, without using that method of engaging with the public, it would be almost impossible. Sorry, your second point was—

Lord Brooke of Alverthorpe: On security and the private sector.

Robert Goodwill MP: It is something that we should definitely consider, and we will certainly be looking at the report of this Committee. If it was one of the recommendations, we would certainly take it much more seriously. Things that the police or the security services would do are viewed in a different context entirely from something that is done by a private security company. I am always minded a little that while everyone gets very excited about the use of CCTV cameras, whether inside shops or put there by the council or the police, their view changes dramatically when someone has been attacked or raped. The first question is why there was no CCTV camera in the shop or someone taking photographs of that particular street? If this could be seen as a useful tool for combating crime and improving security in particular areas, people might see it as a positive thing. If they thought that they were being snooped on and that people could go on the internet and look at the photographs being taken by these cameras—we saw a website last week where people had not put in the correct passwords and anyone in Russia could look at your baby being fed—that would create problems. If they are being used by the security industry, whether that is almost down to Neighbourhood Watch level, it is important that we make sure that proper controls are in place so that any information gathered or people seen coming or going from particular buildings could not be used for reasons other than the correct pursuit of better security and safety.

The Chairman: Thank you.

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Q180 Lord Cotter: You have spoken about current UK legislation. For example, would the Air Navigation Order¹⁶² properly facilitate prosecution for the misuse of RPAS, do you think? Would it cover prosecution of commercial operators and leisure users?

Robert Goodwill MP: First, I should say that no current distinction is made between commercial users and leisure uses of RPAS. Currently, they would be dealt with in exactly the same way if a misuse could be proved. I go back to the situation where the estate agent could take exactly the same picture as a person who lived in that house. The Air Navigation Order 2009 prevents a person causing or permitting an aircraft to endanger the safety of a person or property, and prohibits the flying of small unmanned aircraft over or within 150 metres of built-up areas unless approved by the CAA. These regulations were introduced purely with safety in mind and we believe that they are sufficient for that purpose. However, the Government recognise that one of the challenges that we face is how to make sure that the public, particularly leisure users who are looking forward to Santa arriving with one of these in his bag, are aware of these regulations and their responsibilities, particularly when flying small unmanned aircraft. We accept that we need to find an effective way of making people aware of the potential risks, both to the people on the ground and to other aircraft, and to think about the risk before sending their RPAS into the air. I am pleased to say that the government working group on RPAS and the Civil Aviation Authority have been thinking about this problem and that the Civil Aviation Authority is launching a publicity campaign, “You have control! Be Safe, be Legal”, which is aimed at raising the awareness of the general public at the point of purchase about their responsibilities as RPAS operators.

In terms of information at point of sale, I suspect that information in the actual package with the vehicle itself would be important. I think that was mentioned in an earlier evidence session. I hope that we can avoid the need for prescriptive legislation on this, which we believe might end up being disproportionate and difficult, if not impossible, to oversee. At the moment, all remotely piloted aircraft systems, no matter how small, are deemed aircraft and fall under the rules set out in the Air Navigation Order. However, we believe that there is a need to take another look at some elements of the Air Navigation Order with a view to relaxing some of these requirements, because some smaller types clearly represent a low risk from injury or damage. The big problem is identifying a suitable limit below which such a detailed safety regulation is not required—i.e. when is a toy not a toy? What level of potential injury would be acceptable? I know that the CAA is thinking about this and will examine very carefully the areas that require little or no regulation while identifying other areas that need to be regulated but not necessarily by the CAA. I suspect that noise is possibly one of those. These include being a public nuisance, privacy and data protection, although on those latter points the Government believe that the existing legislation is adequate and that it will be for other agencies and not the CAA to determine the appropriate intervention. We will probably need to consult further on this issue. Irrespective of the regulations that we have in place, it is still very difficult to secure prosecutions, not least because there remains difficulty in capturing suitable evidence of what actually happened and the identification of the person responsible for the aircraft at the time. I will ask the cross-Whitehall group to look into this further.

¹⁶² The Air Navigation Order (ANO) 2009 is legislation regarding safe use of aircraft.

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Lord Cotter: That is very welcome. The Minister has anticipated something that we were concerned about, which is to identify the source of the problem—who is actually operating the vehicle. You say that the working group will be looking at this in due course.

Robert Goodwill MP: Yes it will. I will be very interested when this Committee writes its report to hear how you think we can set the limit for what is clearly a toy. Clearly, a small drone that can fly around a room like this one is clearly a toy and is very unlikely to cause anyone any injury. But at what point do we decide that this is no longer a toy and could be commercially used? Most importantly, if it actually crashed on your head could it cause serious injury? That is a judgment that will need to be taken, and I look forward to seeing whether the Committee reaches a conclusion on that particular subject.

The Chairman: Can I make a special plea before Lord Liverpool comes in? Can the instructions in the box be readable? Can they also be accessible to people who are not techies but who just want to have a bit of a go? All these extraordinary expressions that you have in instructions. The Government or somebody need to spend a lot of money—perhaps the people who build the RPAS in the first place—to make sure. I do not want every word that we say or thing that we do to be regulated, but this is a plea to make instructions better.

Robert Goodwill MP: Maybe we should run it past the Plain English Campaign.

The Chairman: Exactly.

Robert Goodwill MP: There are buttons in my own motorcar that I still do not know what they are for.

Q181 Earl of Liverpool: Minister, you mentioned privacy on one or two occasions, and the Committee is concerned that we must cover this question. We were slightly concerned to find in a previous oral evidence session that under Section 32 of the Data Protection Act there exists an exemption for journalistic work. We are therefore are slightly constrained in making special conditions for journalists. But are you concerned, like us, about the possible misuse or overuse by journalists of drones?

Robert Goodwill MP: Funnily enough, we were discussing this morning what would happen if someone decided to put a drone up over the No. 10 garden while the Prime Minister was entertaining the President of France or the United States, and what the reaction would be to that. I suspect that this area is covered by particular security legislation, but there is a real issue with intrusion. We would need to look carefully at this. I would not want to do anything that would prevent an investigative journalist from doing something to reveal a wrongdoing, but as we have seen from recent cases, journalists often push barriers and go further than that. It is something that we need to think about and maybe it should be part of the consultation process that we should use. Particularly, looking at members of the Royal Family and paparazzi activity that goes on, even those of us in public life could find that our private lives were being intruded on. People may be using these supposedly in the public interest because we are in public life and therefore anything we do is interesting to the public if not in the public interest. I hope that the wisdom of this Committee could be brought to bear a little to see how we can get the balance right between the need to reveal

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wrongdoing while at the same time ensuring that people have the right to privacy in their own gardens or houses.

The Chairman: That is a good point.

Lord Brooke of Alverthorpe: There is a growing consensus among the industry and regulatory bodies in the EU that RPAS should be regulated according to the risks that they present to the general public and other aircraft and not according to their weight, which is what we talked about in the past. At the same time, many stakeholders want member states to retain regulatory oversight of the small RPAS that we were speaking about earlier, particularly the ones weighing less than 20 kilograms. What is your view on this?

Robert Goodwill MP: The United Kingdom recognises that the use of weight as an arbitrary factor in determining regulatory oversight makes little sense. It is right for the EU to move away from this model and focus on the third-party risks associated with the operation of RPAS. The challenge is to ensure that when you take away the arbitrary weight limit, whatever regulation you put in place is proportionate to the risk that the operation poses to third parties. I have already mentioned that taking what are genuinely toys out of the system would be very helpful. The CAA is already moving to this model and in processing commercial applications, the CAA will focus entirely on what the operator wants to do and where he wants to do it, focusing specifically on the overall risk of the operation. For example, while it may be perfectly safe to use a vehicle for crop inspection, it may not be if it were used for crowd control flying over large numbers of people. It is important for commercial companies to take advantage of harmonised rules across Europe. It does not make sense to retain any weight limit if the regulation is disproportionate or is applied differently in other member states.

However, the EU's current intent is only to regulate commercial or business activities and leave the regulation of model aircraft and toys, which are those used only for recreational use, to individual member states. At the lighter weight end of the scale, there is a blurring of the lines between commercial and recreational, as the same type of aircraft can be used for both activities and hence the same risks to third parties will exist. In these cases, we must ensure that the regulatory oversight function remains proportionate for types of operator. It may also be appropriate to have a limit below which all types are simply regarded as toys and hence not subject to any aviation regulation at all. If this were done, however, the method of discriminating will need to be simple and easily understandable, and in this case the use of weight would probably be the most appropriate method. I understand that the CAA is looking into this.

Q182 Lord Brooke of Alverthorpe: It is a very complex area as technology moves on. Instead of just dealing with model aircraft or the equivalent, we now have very small machines being produced that are well under 20 kilograms that can not only fly beyond line of vision but can cross borders. They could cross the Channel to Ireland or vice versa and could fly from the south of England across to France and vice versa. Does that not put us into an entirely new ballgame from anything that we have dealt with previously or for which the CAA has had to deal with previously?

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Robert Goodwill MP: Yes. This, of course, is something that the military have been dealing with for some time. I was in Afghanistan a few years ago and saw the drones taking off from Camp Bastian. I was told that the guys flying the planes were actually not far from Las Vegas, Nevada. That is nothing new in the military sphere. In terms of aircraft flying beyond the line of sight, you are absolutely right that we are in a completely different ballgame. We need completely different rules in place, which is why it is important that we work with our European colleagues to ensure that we can come up with some form of rules that can be applied. We need to look at three important areas. The first would be airworthiness. The second would be flight crew licensing, because why should the people playing these particular aircraft be any less qualified than those on the flight deck? Thirdly, we should look at the type of air operations that being carried out—the altitudes, for example, or the areas they could fly in. Currently, we can look at these being flown only in non-segregated air space, but for these to fly in the same areas as other commercial aircraft would be a big leap forward. Not only the department and Ministers but the general public would need a very high degree of reassurance before any of these types of operations could be carried out in a civilian setting.

Baroness Valentine: Can I ask a question about weight? There must also be a risk at the very small end of the spectrum—the bee-sized RPAS. Do you have anything to say about that?

Robert Goodwill MP: As toys, they could take your eye out, but so could a catapult and so could the toys that lots of children get at Christmas. We need to be proportionate. Any of these types of vehicles have risk. The judgment is to decide what a toy is that would be outside the regulations and at what stage you move into something that must be regulated. We do not want a situation in which large numbers of people are brought under a regulatory burden when that is unnecessary. In the situation that I mentioned with an estate agent, you have people using the same type of equipment for different uses but finding that they have different regulations placed on them. Indeed, that could push people into operating in the margins of regulation in an informal way, which would then pose difficulties. Any of these vehicles could be dangerous—they could take your eye out—but we should be proportionate in how we look at regulation.

Baroness Valentine: I was thinking of some of the fly-sized drones, which are used for spying. Another thing comes into play when you get very small drones, because you could easily be spying on a neighbour and the neighbour would not know that you were doing it.

Lord Haskel: I got the impression from your response that we should regulate by virtue of the drone's capabilities rather than what the drone is being used for. Is that correct?

Robert Goodwill MP: Regulation should be based on the hazard that it might present to people on the ground. Therefore, what it is being used for would have an impact. If it was being used in an agricultural setting, there would be a different risk from a situation where the same aircraft was flown over a large sporting event or demonstration in the middle of London.

As for the CAA licensing equipment, I think they need to look at the application as well as the aircraft that are being flown. Then again we have segregated and non-segregated airspace. What may be possible in segregated airspace may not be possible in other situations. That

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would depend on the application as well as the vehicle, and the risks would need to be assessed on the basis of that particular situation.

Q183 Earl of Liverpool: Could you tell us of the Government's view of recent changes in the leadership of JARUS¹⁶³? Further to your Explanatory Memorandum on the Commission's communication, do you still think that JARUS is the most appropriate form in which to develop rules for RPAS use in the EU? I ask that question because we are lucky enough to have Mr Cremin with us again. The last time you were here, you told us that JARUS getting the right people in the room at the same time remained incredibly difficult. We also understand that it is a voluntary body.

Robert Goodwill MP: Mr Cremin may want to chip in when I have said what I have to say. I warn him about that in advance. Since our Explanatory Memorandum was written, JARUS has become more formalised and is now chaired by EASA and supported through a secretariat provided jointly by EASA¹⁶⁴ and EUROCONTROL¹⁶⁵. The CAA is a member of JARUS and is actively contributing to its output, and many of the JARUS members also sit on the newly created ICAO panel, ensuring consistency of approach towards RPAS regulation internationally. I understand that it is intended that the EC and EASA will use the output from JARUS as the basis for regulation of RPAS in Europe.

In the absence of any other international body, I am content that this is the most appropriate form to undertake this role. However, JARUS will work out its relationships with industry, and in particular how industry can make an effective contribution to the work. I will keep that under review. Certainly, there is a difficult balance to be struck between the principle of subsidiarity, allowing member states to go their own way as far as possible, and having EU-wide, or better still international, agreement. I hope we can strike the right balance between maintaining as much control in the UK as possible but at the same time co-operating internationally.

In terms of the manufacture and licensing of this equipment, it is an international market. I would not want to put the UK or the EU at a disadvantage in terms of our operations being able to purchase equipment that has been licensed only in the US and is not available to use in the UK. Similarly, with equipment produced in the UK—and the UK along with the rest of the EU lead in the field of smaller aircraft—I would not want a situation whereby we could not sell our aircraft on to the global market because of some different rules applying in the US, China or Japan.

Earl of Liverpool: We have also been told that these meetings take place all over the world, and this might make it difficult for some SME companies to participate. Should we be concerned about that in employing JARUS?

Robert Goodwill MP: JARUS is a member state organisation, so we engage as Governments of the EU member states. With EASA in the chair, that is a very good structure. I am sure that JARUS will be keen to take views feeding in from the larger operators in this market, the

¹⁶³ Joint Authorities for Rulemaking on Unmanned Systems

¹⁶⁴ European Aviation Safety Agency

¹⁶⁵ European Organisation for the safety of air navigation. It is an intergovernmental organisation with 41 Member States.

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BAEs and Thaleses of this world, as well as some of the small start-up companies. I am not sure whether attendance at its meeting is a necessary prerequisite for those smaller companies to engage in this way, but I hope that they seek to take as wide a view as possible of what is going on in the industry. We would not want embryonic companies to be killed even before they have a chance to launch because of some rule that applies to them in some unexpected way.

Paul Cremin: In the past, JARUS has been a voluntary organisation and has been troubled by the fact that it has lacked leadership that it probably needed. There has been a tendency to travel wider than Europe, to the US and other places, either to co-ordinate with other panel meetings going on elsewhere or to try to be efficient with people's time. If they were attending an ICAO¹⁶⁶ meeting in Montreal, for example, it made sense to have a JARUS meeting at the same time. I accept that in these difficult times not everyone can attend these meetings, but the membership of JARUS is quite large and they get a good attendance for the vast majority of these meetings. I am hoping that now EASA is on board we will see more structure to the meetings and a more stable approach to where they are held.

Robert Goodwill MP: Shoot me down in flames if I am reading this wrong, but we seem to be in a bit of a chicken and egg situation in that the industry would like us to produce regulations so that they can design equipment that will lead the regulations, but we are saying that we would like to know what sort of equipment they are going to build so that it works the other way around. We would not want to kill the companies before they even got going because the regulation was too prescriptive, but on the other hand we would not want companies to develop equipment that was patently dangerous and not able to be used. That is where the interaction between regulators and innovators is important. Neither solution is the right one. We need to make sure of that engagement, and JARUS is a good opportunity for that engagement to take place.

Q184 Lord Clinton-Davis: As RPAS develops, here and in the rest of the EU, do the Government consider that more expert staff will be required in the CAA and EASA?

Robert Goodwill MP: There will certainly need to be more resource committed by regulatory bodies in the short to medium term, but this does not necessarily translate to an increase in headcount in regulatory bodies themselves. I suspect that this will likely result in the transfer of suitably qualified personnel in these organisations. How this will be reflected at national level will largely depend on how the future regulatory responsibilities are devolved, and also on rates of growth within this emerging sector.

Lord Clinton-Davis: The first part of your answer in some way conflicts with the latter part.

Robert Goodwill MP: If I can give an example, we have a large number of police helicopters operating in this country. It may be that a number of those could be replaced by remotely piloted aircraft, in which case there will be less need for those involved in the regulation of helicopters and they could transfer to these types of vehicles. It could well be that if other aerial applications are being replaced by these vehicles, there will be an opportunity for some cross-fertilisation.

¹⁶⁶ The International Civil Aviation Organisation is a United Nations specialised agency.

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We also need to look at the Air Accidents Investigation Branch, which already investigates incidents involving vehicles where there is damage or injury to a person or structure. For aircraft over 150 kilograms they would investigate all crashes. For over 20 kilograms they would investigate only where there was damage. For less than 2 kilograms, by and large there would be no need for investigation. There are a number of areas, including the one that I just mentioned, where we need to see how things will work together, but like I said, in some instances it may be that existing aviation systems will be replaced by RPAS. Therefore, the staff regulating those will move across.

Lord Clinton-Davis: It is a matter of guesswork at the moment, is it not?

Robert Goodwill MP: We are back to “Tomorrow’s World”: we are trying to guess what will happen in five, 10, 15, 20 years’ time. The safety of the public on the ground, the travelling public, is paramount. We will ensure that there is no situation where lack of resources resulted in any risk to people due to the application of this technology.

Q185 Lord Haskel: We have already discussed security. I wonder whether we can turn to law enforcement. What plans do the Government have, if any, to use drones to assist with law enforcement? How will you deal with contractors who are contracted to involve themselves in law enforcement? How, for instance, are we going to ensure that they use drones according to the rules and regulations? Also, will they use them according to the CAA rules and regulations, as well as the police rules and regulations?

Robert Goodwill MP: Thank you. It is certainly true that the use of these vehicles by police forces is one of the obvious applications of them, particularly in view of the cost of operating a police helicopter and, given what happened just over a year ago, the risk of using helicopters, which, if they do get into difficulty, are a real hazard to people on the ground. If a police force is considering plans to deploy RPAS, that will be an operational matter for the chief officer concerned. However, we would also expect them to follow the relevant statutory requirements relating to civil aviation and surveillance camera operation systems. We would also expect them to be as transparent as possible about any such proposals and engage with local people to make them aware and seek views as appropriate. The Home Office and its agencies have no current plans for the deployment of RPAS to assist with law enforcement. I also suggest that the police and crime commissioners also took a leading role in engaging with the public if a police force were to go in that direction.

If a government department decides to contract a private company to provide a service as part of its solution for gathering data or information, it must require the operator to provide sufficient evidence that it has received the necessary CAA approvals, depending on the size of the RPAS. Indeed, that would be the situation if a police force engaged a company to provide a helicopter for it in the same type of situation. Such approvals would give the responsible department the reassurance that it needs to satisfy itself that the operator can meet the appropriate safety conditions and have put in place such mitigations as agreed by the CAA to keep the general public safe. The Government are satisfied that the CAA process of granting permission, privileges and/or exemptions, coupled with its general oversight activity, is enough to provide the Government with assurances that due examination of the competence of the operator or company has taken place in much the same way as normal aviation activities are assured.

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Lord Haskel: What you say makes an awful lot of common sense, but were drones not used for security and law enforcement at the Olympics? What was the situation there? How were they regulated?

Robert Goodwill MP: We are not aware that they were used at the Olympics. However, we would not comment on matters relating to national security, even if we did know how they were used. There are military applications of these vehicles, which in many ways are superior to using fast jets for the same sorts of things. As far as I am aware, they were not used during the Olympics. There is no reason why, using the correct licensing and going through the correct procedures, they could not be used for that type of use. In fact, I think people would be very pleased to see that they were more secure, because a vehicle such as this could be stationed above a particular location where there was a potential terrorist threat.

Lord Haskel: I think one of our witnesses mentioned—

The Chairman: Was it the policeman? I think it probably was. We will have to look at the transcript.

Robert Goodwill MP: We certainly had ground-to-air missile systems. A few people kicked off about that, but generally I think people were quite pleased that the security in place for the Olympics was very robust and we—thank God—did not have any incidents during those fantastically successful Games.

The Chairman: We have the utmost faith in our national security systems. When it comes to security, the security that we talk about is private security—G4S and people like that—because we obviously do not have any information.

Robert Goodwill MP: I visited Surrey Satellite systems recently, and saw that a tremendous level of surveillance can be deployed with satellite technology but that it can be restricted by cloud cover. The advantage of some of these systems is that they can operate at reasonably low altitudes and therefore you could continue to keep a particular location under surveillance without the need to worry about cloud cover.

Q186 Baroness Valentine: We note the success of, and government support for, projects focused on larger RPAS such as ASTRAEA. Do the Government have any plans to invest in research projects aimed at small RPAS?

Robert Goodwill MP: ASTRAEA is the Autonomous Systems Technology Related Airborne Evaluation Assessment, I am told. Through Innovate UK, the Government are investing £10.3 million in groundbreaking projects in remotely piloted aircraft systems and their related technologies, including £7.5 million to the ASTRAEA programme, which is successfully supporting UK businesses and regulatory authorities to research the safe integration of unmanned aerial vehicles into our airspace. Most recently, the Government launched a £25 million collaborative research and development competition through the Aerospace Technology Institute, which is encouraging civil aerospace projects in eight main areas, including the RPAS sector. The Government are also supporting UK companies bidding for RPAS research work through European programmes, such as the Single European Sky Air Traffic Management Research Programme—SESAR JU—and research money available

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through organisations such as the European Space Agency. This includes research to be undertaken by operators of small unmanned aerial systems under 150 kilograms, in programmes such as Project RAPSODI, which aims to demonstrate the utility of RPAS to support user-relevant missions in operational environments where radio line of site communication means are not available. I am also pleased to say that my department is assisting operators of small unmanned aircraft with meeting the regulatory cost, which is helping to drive innovation in this area.

Baroness Valentine: Could you give me a sense of how much of those various bits and pieces might be being invested into this sort of area? I think you said that roughly £2 million was left over from the £7.5 million in the first one you were talking about. There are then other bits with Europe and whatever. Can you tell me what all that adds up to, or just give me some sense of some quantum of investment and attention that this sector is getting?

Robert Goodwill MP: The three figures I just mentioned were £10.3 million, £7.5 million and £25 million. This is a very innovative area and many private companies are investing in research in this area. There are tremendous opportunities for the companies that manage to come up with viable solutions to particular problems.

Paul Cremin: We are seeing the amount of research money available in Europe for RPAS-related technology turning into millions, and in some cases billions, of pounds. Admittedly at the moment a large proportion of that goes to the large aerospace companies that can afford high-end stuff, but we are increasingly seeing a number of very innovative small RPAS companies starting to apply for this money and being quite successful. That requires match funding, and the trouble is that a lot of the companies at the smaller end are often one or two individuals working in a very small company who do not necessarily understand the route to obtain European money.

In terms of what is happening in the UK, BIS is increasingly getting approaches from the small end of the market to help with innovation. I cannot put a specific figure on it, but it is increasing. From our department's perspective, it has been roughly about £150,000 for the past two years, so it is about £300,000 in the past two years.

Baroness Valentine: That is £300,000 invested in small RPAS.

Paul Cremin: We cannot invest directly in the companies, of course, but one of the biggest barriers to the small unmanned systems market is the unknown regulatory costs. That is often seen as a barrier to innovation in that area. The department is meeting the cost of the first 20 to 25 hours consultation that these companies have with the CAA.

Baroness Valentine: My prior question was about small RPAS hidden inside the figures you quoted: the £10.3 million and £25 million. If there is any insight you can give us, even possibly after this session, about what is going into small RPAS or whether there is an issue there, we would be interested.

Paul Cremin: I will make some inquiries.

Baroness Valentine: It would be very helpful.

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Robert Goodwill MP: It is not just small versus large, it is line of sight versus outside line of sight, and the real challenge in innovation is to come up with aircraft that will operate beyond the line of sight, which worries me much more than the line-of-sight operations.

Q187 Lord Haskel: Minister, I think you said in your response that the regulatory costs would be met by the industry. Is that by virtue of a levy?

Robert Goodwill MP: The CAA certainly charges for the services that it is providing. Therefore, that covers the cost.

Lord Haskel: Are these companies subject to a levy for the CAA?

Robert Goodwill MP: They pay when they want to be registered.

Lord Clinton-Davis: Does it have any difficulty getting the money out of them?

Robert Goodwill MP: They do not get their licence if they do not pay the fee. The user pays is a good principle, and it applies to air traffic control and a variety of areas within the CAA's operation. The CAA recovers the cost of the service it provides through the fees it charges. It is not something that we do as a Government to make a profit, but the CAA washes its face in terms of its operations.

Earl of Liverpool: Just quickly, I am interested in detect and avoid systems that are being researched.¹⁶⁷ Is it possible to say how much of the funding that we talked about earlier is going to companies? Perhaps it is not. How much is going into that specific research on detect and avoid?

Robert Goodwill MP: We will have to come back to you on that. The other thing with beyond-line-of-sight equipment is that I am sure there is lots of very good military research going on, particularly in countries such as Israel and the United States. It is how we get cross-fertilisation into civil use without undermining some of the ITAR and other security-related issues. I get the impression—it is just my view—that we are trying to reinvent the wheel in some cases. A lot of this stuff will be operating in a military application and in some ways we will have to reinvent it because of the way that military secrets are covered. I do not know whether there is any way of trying to unlock some of that in a way that does not jeopardise our national security or the national security of the United States so that we can use some of this technology—which I am sure is out there, having seen the Reaper aircraft flying in Afghanistan. It is a very technologically advanced piece of equipment, but you would not be able to go on the internet and download the software or the hardware that is currently being applied there. I wonder whether we need to reinvent the whole thing for commercial use when a lot of it will be there and could be applied to commercial use.

The Chairman: It would be sensible if you could do something about trying to get stuff that was not going to be so secret.

Robert Goodwill MP: I think Mr Cremin is going to pull me up on that.

¹⁶⁷ Detect and avoid' (also referred to as 'sense and avoid') refers to the ability of an aircraft to avoid mid-air collisions.

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Paul Cremin: The military struggle with the same problems with detect and avoid as we currently do. Unfortunately it is a common problem with all unmanned systems, irrespective of whether they are civil or military. I am sure that different amounts of money are being spent in the civil compared to the military area to find a solution to this problem. I am pretty sure that the military systems will have them first, but I do not think we are quite there yet.

The Chairman: Lord Brooke, the last question.

Q188 Lord Brooke of Alverthorpe: To come back to Europe, you attended the Transport Council meeting on 8 October where privacy and data protection issues and RPAS were discussed. I gather from our meeting with the director-general concerned that almost every Minister attending spoke at that meeting. Do you think that the existing EU and member state regulatory regimes are sufficient to address these issues, or is RPAS-specific legislation required? Here again, I come back to the issue I raised earlier about how small machines—they can be very small indeed—crossing borders can be regulated from a privacy and data protection point of view.

Robert Goodwill MP: I was certainly very pleased to make a contribution at the Council meeting, not least because of the opportunities for UK businesses to export to the rest of Europe. The cross-border issue is more important to other member states that are not surrounded by sea, although we have a common border with our very good friends in the Irish Republic. The Government take both the protection of personal data and the right to privacy extremely seriously. All organisations that collect personal data in the UK, including operators of RPAS, must comply with the Data Protection Act 1998 unless a relevant exemption applies. Since the DPA came into force, traditional CCTV systems have become an established part of society, while other technologies such as automatic number plate recognition have emerged. The Data Protection Act (DPA) has proved to be flexible enough to ensure that these technologies can be used in privacy-friendly ways. The requirements of the DPA are regulated by the independent Information Commissioner's Office, or the ICO. The DPA is a principle-based piece of legislation and is not sector specific. However, the ICO provides extensive guidance to help organisations to comply with their responsibilities, including codes of practice targeted at specific areas of data protection. This includes the ICO's code of practice on surveillance cameras entitled *In the Picture: a Data Protection Code of Practice for Surveillance Cameras and Personal Information*, which has recently been updated to provide advice and guidance on the data protection implications of using RPAS. The ICO has a range of tools at its disposal to aid compliance with the DPA and to take tough action against those who knowingly flout the rules. They include criminal prosecution, non-criminal enforcement and audit. The Information Commissioner also has a power to issue a civil monetary penalty of up to £500,000 for serious breaches of the Data Protection Act. The European Commission has proposed a new EU data protection regulation, which, if adopted, will repeal and replace the 1995 data protection directive. The proposed new regulation is intended to take account of any new technological developments, including RPAS, in a technologically neutral way as far as possible.

The proposed regulation also focuses on data control accountability and privacy by design, which RPAS developers and regulators would need to consider carefully. The regulation is currently being negotiated across member states but could be in force as early as 2017,

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although I would add that if anything in this regulation represented a watering down of the strict controls that we have in the UK, it would be difficult for the UK Government to go forward in that direction.

Q189 Lord Brooke of Alverthorpe: We have some very good regulation and law in this country. Is not the weakness that you were talking about there that it refers to “static” technology—cameras that do not move, CCTV that does not move but stays there—and the legislation governs that. We are talking about a technology that can move from one country to another in a way that we have not previously experienced. I wonder whether our existing regulations, even though they may be better than in some European countries and superior to what may come out of Europe, would be adequate to cover people coming from, say, France?

Robert Goodwill MP: For line-of-sight RPAS, the opportunities for cross-border operation are pretty limited, for obvious reasons. If you are moving on to the next generation, there may be challenges that we need to address, but I do not think that we have got there with the currently available technology. There is legislation in this country to protect privacy. There is regulation—if the security services or police force were carrying this out—through the Protection of Freedoms Act and the RIPA¹⁶⁸ legislation that covers that. If it was done by the state—the police force or the security services—that is already covered in the UK. We need to look at developments and react to those as necessary. However, we believe that the current legislation covering the use of CCTV cameras is sufficiently flexible. In some of our cities, the camera overlap is so good that it would be same walking around the city with an RPAS following you as it would walking around when the cameras are switching from one to the other.

Lord Brooke of Alverthorpe: Those data would not be transmitted overseas, would they?

Robert Goodwill MP: No they would not if someone was collecting them from abroad. That would present problems.

Lord Brooke of Alverthorpe: Our technical adviser tells us that now somebody can purchase machinery as light as 5 kilograms that could travel 90 or 100 kilometres.

Robert Goodwill MP: But if the offence were committed in a member state, the legislation in that member state would apply and the person, if they were operating the equipment from across the border, could then be subjected to extradition or even, dare I say it, the European arrest warrant, to get them to answer for their activities.

Lord Clinton-Davis: Do you see any sign of a watering down of the relevant legislation?

Robert Goodwill MP: No, we are at a very early stage with EU-wide legislation. It is not primarily a transport issue, but other departments, particularly the Home Office, would be keen to look at it.

Lord Clinton-Davis: But from what you have said, do you have any allies? Are you supported by any other countries as far as you can tell?

¹⁶⁸ Regulation of Investigatory Powers Act 2000

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Robert Goodwill MP: The Home Office will be the department taking that forward. I have not had discussions with Home Office colleagues. I am personally a great fan of the principle of subsidiarity, and it would depend on the level of cross-border operation as to whether it was deemed appropriate to act at a European level on this. Having been a Member of the European Parliament, I know that you often start off legislation with the best possible intentions and end up with something that is a lot worse than what you started off with. Indeed, I personally see no need, given the current RPAS available, to have cross-border legislation. That may come, but we are not there yet.

Q190 The Chairman: Minister, thank you very much indeed. This has been a great session. One final question. Can you be more specific about how industry will engage with JARUS? Perhaps you can write to us about that, because I know that time is of the essence now, when we have to deal with another issue. Will that be all right?

Robert Goodwill MP: Yes, I will do that.

The Chairman: Any other final question from Members of the Committee? If there is none, I shall ask just one. What questions were you expecting us to give you that we did not give you? If you were going to produce a report now, what gaps do you think there were in the questioning?

Robert Goodwill MP: I am not quite sure whether there were gaps, but I was also thinking about how you can stifle an industry by overregulation and at the same time not have proper controls with good regulation. An excellent example is the Red Flag Act¹⁶⁹, which stifled innovation in the UK motor industry at the turn of the 19th century.

At the same time in France, Germany and America there was tremendous innovation. When we got rid of the Red Flag Act, we did not put in place the regulation that was needed in relation to driver training and testing, vehicle testing and rules of the road. If we can cast our minds back 117 years, we need to ensure that we do not put a Red Flag Act in place to stop these aircraft being used, but at the same time we should not wait until the death tolls build up on the roads before we bring in driver testing, training and all the other things. We can learn lessons from that situation. I know that Lord Montagu was the first person in the House of Lords to ride in a motor car, and was one of those who were delighted when the Red Flag Act was finally repealed.

The Chairman: We have come all the way from the early 1900s to “Tomorrow’s World”, and you are asking us to cast back our minds even further.

Robert Goodwill MP: 1896 was the repeal of the Red Flag Act.

The Chairman: Above all, we hope that we will not stifle—we cannot stifle—innovation and research. We are also looking for growth and jobs.

¹⁶⁹ Also known as the Locomotive Act 1865

John Heath Insurance Brokers LLP and Bird and Bird LLP—Oral evidence (QQ 135 – 148)

John Heath Insurance Brokers LLP and Bird and Bird LLP—Oral evidence (QQ 135 – 148)

Submission to be found under Bird and Bird LLP and John Heath Insurance Brokers LLP—Oral evidence (QQ 135 – 148)

The Honourable Company of Air Pilots—Written evidence (RPA0022)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

The Company was established as a Guild in 1929 to ensure that pilots and navigators of the (then) fledgling aviation industry were accepted and regarded as professionals. From the beginning, the Guild was modelled on the lines of the City of London Livery Companies, which were originally established to protect the interests and standards of those involved in their respective trades or professions. In 1956 the Guild was formally recognised as a Livery Company and in 2014 it was granted a Royal Charter in the name of The Honourable Company of Air Pilots.

Today, the Company's principal activities are centred on sponsoring and encouraging action and activities designed to ensure that aircraft are piloted and navigated safely by individuals who are highly competent, self-reliant, dependable and respected. The Company fosters the sound education and training of air pilots from the initial training of the young pilot to the specialist training of the more mature. Through charitable activities, education and training, technical committee work, aircrew aptitude testing, scholarships and sponsorship, advice and recognition of the achievements of fellow aviators world-wide, the Company keeps itself at the forefront of the aviation world.

The Company is honoured to have this opportunity to respond to the Call for Evidence by the House of Lords Select Committee on the European Union - Sub-Committee B Internal Market, Infrastructure and Employment - Civil use of remotely piloted aircraft systems (RPAS) in the EU. Each of the Committee's questions, together with our answer, is set out below:

1. Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

1.1 RPAS development has progressed as fast as military requirements demanded and the enabling technologies allowed but within a regulatory vacuum. The Air Pilots welcome the Commission's recognition that an enabling regulatory structure is required for RPAS operation to extend their use into the manned aviation environment. Our view is that:

1.2 RPAS regulations should require that the unmanned nature of an air vehicle is transparent (not apparent) to manned air vehicle pilots operating within the same air space. This principle does not appear within the European Commission's Communication.

1.3 Safety standards for each RPAS class/operating environment should reflect the achieved (as opposed to theoretical) safety standards of their equivalent manned aircraft in class. This means a small RPAS operating in the open FIR should in general match General Aviation (GA) safety levels while any RPAS in controlled airspace should match airliner safety

levels. Our published papers on ‘Equivalence’ for GA-type RPAS vehicles and operations, using data from UK and North America respectively are available at <http://www.airpilots.org/file/737/sense-and-avoid-safety-level-requirements-for-unmanned-and-remotely-piloted-aircraft.pdf>

and

<http://www.airpilots.org/file/917/uas-access-to-national-airspace-paper.pdf>

One of the EU’s priorities, not spelt out in the European Commission’s Communication, must be to establish what safety levels are actually achieved already.

1.4 Regulation must reflect and address the potential range of RPAS sizes and activities. Regulation by size alone could threaten manned commercial aviation safety if a small, lightly regulated RPAS entered controlled airspace. Equally, draconian rules applied to a larger RPAS that was only operated over the sea/sparsely populated areas would close off potential RPAS development areas to EU industry and operators.

2. What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU’s actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

2.1 RPAS operation must integrate with manned aviation, which is truly global. In manned aviation, consistency across international boundaries is an important aviation safety enhancer. This will remain true when RPAS are introduced. The aspiration should be a single global regulation framework. In terms of manned aviation regulation, FAA and EASA predominate and most states adopt or copy the processes and practices of one or the other agency. ICAO does provide an over-arching framework but it has yet to consolidate the differences embedded within FAA and EASA approaches; those differences are still a source of confusion for pilots who fly internationally.

2.2 From a purely safety perspective, RPAS legislation would start with a single unified approach across all aviation regulators. However, achieving international agreement would incur significant delays¹⁷⁰ that must be weighted against the pressing need for certainty in and control of the un-manned sector. Nonetheless, the EU should ensure that EASA seeks to match/mirror RPAS regulatory developments by FAA to the greatest extent possible. Aside from the safety driver, this will also simplify EU manufactures and operators penetration of North American markets.

3. In which new or innovative ways do you think RPAS will be used in the future?

3.1 As soon as regulation permits, we would expect to see extensive demand for/use of small (up to the size of microlight aircraft) surveillance platforms for policing and utility inspection, largely replacing manned helicopters. Once public privacy concerns are resolved, SESAR Joint Undertaking (SJU) expectation that un-manned vehicles will not be permitted to

¹⁷⁰ We have seen relatively simple and zero cost safety initiatives take some 14 years to achieve international agreement.

operate over built up areas¹⁷¹ will undoubtedly be challenged to facilitate this. Other applications could include:

- 3.1.1. Paramedic advance attendance (a fly-ahead vehicle surveys the site and injuries to allow paramedic preparation/remote doctors to be ready prior to paramedic arrival.)
- 3.1.2. Property Survey (boundaries, heat insulation)
- 3.1.3. Wildlife survey (e.g. seabird nesting sites, migration patterns)
- 3.1.4. Rural area security (large area surveillance by day and night)
- 3.1.5. Coastal monitoring (counter illegal immigration/smuggling)
- 3.1.6. Haulage vehicle monitoring (counter illegal immigration)
- 3.1.7. Remote rural Broadband/Radio/TV (network relay broadcast)
- 3.1.8. Road monitoring, patrol and signage control
- 3.1.9. Pipeline inspection (internal and external)
- 3.1.10. Sewage inspection
- 3.1.11. Course Mapping (e.g. providing rider's eye view of 3-day Event Cross Country Course or drivers eye view of a Motor Rally stage)
- 3.1.12. Security surveillance of out-of-use buildings by day and by night.

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

4.1 In the manned General Aviation sector, over-burdensome certification, equipment or maintenance requirements escalate the cost of ownership and reduce activity. Equivalent RPAS operating in a similar sector would be affected similarly. RPAS regulation must be correctly sized to the class of vehicle/role of vehicle so that safety is sustained appropriately in all cases.

5. Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

5.1 Yes. Member States' appetites for approving RPAS operations already vary; unless each Member State retains an opt-out from consolidated regulation, which would defeat its purpose, their competency in these areas will be reduced.

5.2 The drive to facilitate RPAS operation within EU airspace must be balanced against Member States' military training requirements so as not to compromise individual or collective military capabilities.

6. Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

¹⁷¹ http://www.sesarju.eu/sites/default/files/documents/events/rpas-workshop/RPAS-workshop-2014-RPAS_Definition_Phase.pdf

6.1 With the current regulatory vacuum, amateur RPAS operators have placed their (uninsured) vehicle in the same piece of sky as commercial airliners, without the slightest understanding of either the potential consequences or the law. While the public might be expected to raise concerns over the threat to privacy posed by increasing use of RPAS, increasing public awareness must be exploited to ensure wider awareness of aviation law.

6.2 RPAS regulation must address and assure operator competency so that any subsequent deficit is identifiable. The role and responsibility of a manned aircraft Captain has been established over many years and is clearly understood. In contrast, the responsibility chain for an RPAS, which may have a Mission Commander, a Pilot and a Sensor Operator with the ability to adjust vehicle flight path all working in the same command centre (or even in different command rooms), is not established traditionally and can vary with vehicle type, vehicle role and operating company. Current liability rules do not adequately address this, so regulation must provide clarity on who carries ultimate legal responsibility for any adverse event and damage. It is also important that insurance practice is consistent across the EU.

6.3 Except in exceptional circumstances (usually where an aircraft has been circling a house for an extended period), the public do not raise invasion of privacy objections over light aircraft flying. In contrast, they are cited as a major concern for smaller RPAS that can carry high definition cameras and observe through house or high-rise apartment windows. It is not apparent that existing national or EU law is sufficient to combat the potential nuisance this represents. As the European Commission's Communication mentions, a legal framework that protects the public from unwarranted intrusion of privacy but also permits appropriately authorised information gathering by the security forces must be developed in parallel with regulation that enables wider use of RPAS.

6.4 Since RPAS can range in size from something that fits in the palm of the hand to a multi-seat business jet and beyond, it will be important to avoid unnecessary leakage of RPAS rules into the model flying community. This will ensure a clear delineation between hobbyists and those who are professional RPAS operators with the operational and legal privileges and responsibilities that will entail.

6.5 Sanctions for inappropriate behavior by RPAS operators/pilots/commanders should be framed in recognition that, unlike the Captain of a manned aircraft, whose fate depends on the successful resolution of any unexpected event, the RPAS 'Captain' remains on the ground and is able to access a myriad of advice not available to pilot sat in the flying machine.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

7.1 To date, military RPAS programme funding has focussed on command and control and military utility, rather than achieving safety standards commensurate with integration into the manned civil aviation environment or even operation over built-up areas. The public perceives, quite correctly, that airliners that fly are safe. It is then easy to conflate ‘it flies’ with ‘it is safe’. The high RPAS accident rates in military use are attributed variously to poor operator behaviour and airworthiness standards, neither of which would stand scrutiny in manned aviation. This indicates that much work remains in both the areas of regulation and of unmanned vehicle airworthiness. The successful deployment of RPAS depends as much (if not more so) on achieving the appropriate levels of safety through design redundancy as it does on appropriate enabling regulation. Both must be afforded research and funding support.

19 September 2014

Hybrid Air Vehicles Ltd—Written evidence (RPA0019)

1. Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

1.1 One of the key benefits of RPAS is the ability to fly aircraft for extended periods (weeks rather than days). As RPAS technology increases, in particular with hybrid aircraft (which benefit from the efficiencies of lighter-than-air craft with the flying characteristics of aerodynamic lift – in layman's terms fusing a wing with an airship), ultra-long endurance will become possible. Crew duty hours, which grew out of recognition of pilot fatigue, is currently the main limiting factor on this type of extended flight. What hasn't been researched well is the fatigue effects of operators of RPAS, particularly for ultra-long endurance flights. Is it similar to Air Traffic Controllers or is it similar to existing pilots? Or does entirely new research in the video-gaming generation need undertaking?

3. In which new or innovative ways do you think RPAS will be used in the future?

3.1 Hybrid Air Vehicles' Airlander is the largest flying aircraft available and is an innovative fusion of a wing (aerodynamic lift) and an airship (aerostatic lift). It was created originally as an RPAS (which was also optionally manned) for military surveillance roles due to its unprecedented endurance – 21 days without landing or refuelling. HAV are now developing the airship out of Cardington Hangars in Bedford and have been dealing with many enquiries, a number of which would lend themselves to RPAS use. With reference to pilot endurance issues mentioned in question 1, many roles involving long endurance could be better performed as an RPAS variant. These include search and rescue (we've had a number of enquiries about the monitoring and humanitarian rescue of migrants to the EU in the Mediterranean, as well as Malaysian Airlines MH-370 type search missions), geo-survey, temporary communications rebroadcast (in both emergencies and disasters, and in major events) and potentially as a temporary solution to rural broadband availability.

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

4.1 HAV predicts that its Airlander programme will create 1,800 new jobs within 5 years (although not all associated with RPAS), and will be in the 10's of thousands by 2050, so this is consistent with our calculations. The other factor we recognise is that as RPAS legislation is created, standard piloted aircraft will convert to RPAS so there will be a displacement effect in the jobs market too.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

7.1 The funding focus for the RPAS itself has been on small and lightweight RPAS. These by design have limited roles and capabilities. Large RPAS also need significant funding for research, as they will enhance capabilities in a much more transformational way. We believe the type and characteristics of RPAS will dictate airspace regulations, rather than the other way round (airspace regulations creating development of types of RPAS). Therefore it is logical that funding for the aircraft development precedes funding for the airspace regulatory framework. A November 2011 United States Congressional Budget Office Report on Military Airships illustrates this point with a clear diagram of the significant capability shift of airship RPAS versus other military RPAS currently available:

<http://www.cbo.gov/sites/default/files/cbofiles/attachments/11-01-Airships.pdf>

7.2 The LEMV (in civilian designation, Hybrid Air Vehicles' Airlander) is designed to remain onsite at 20,000 feet with a 2,500-pound payload for 21 days. The planned endurance of those...airships is substantially greater than that of operational fixed-wing unmanned aircraft such as the RQ-4 Global Hawk, MQ-9 Reaper and MQ-1 Predator, all of which can remain aloft for a day and a half or less.

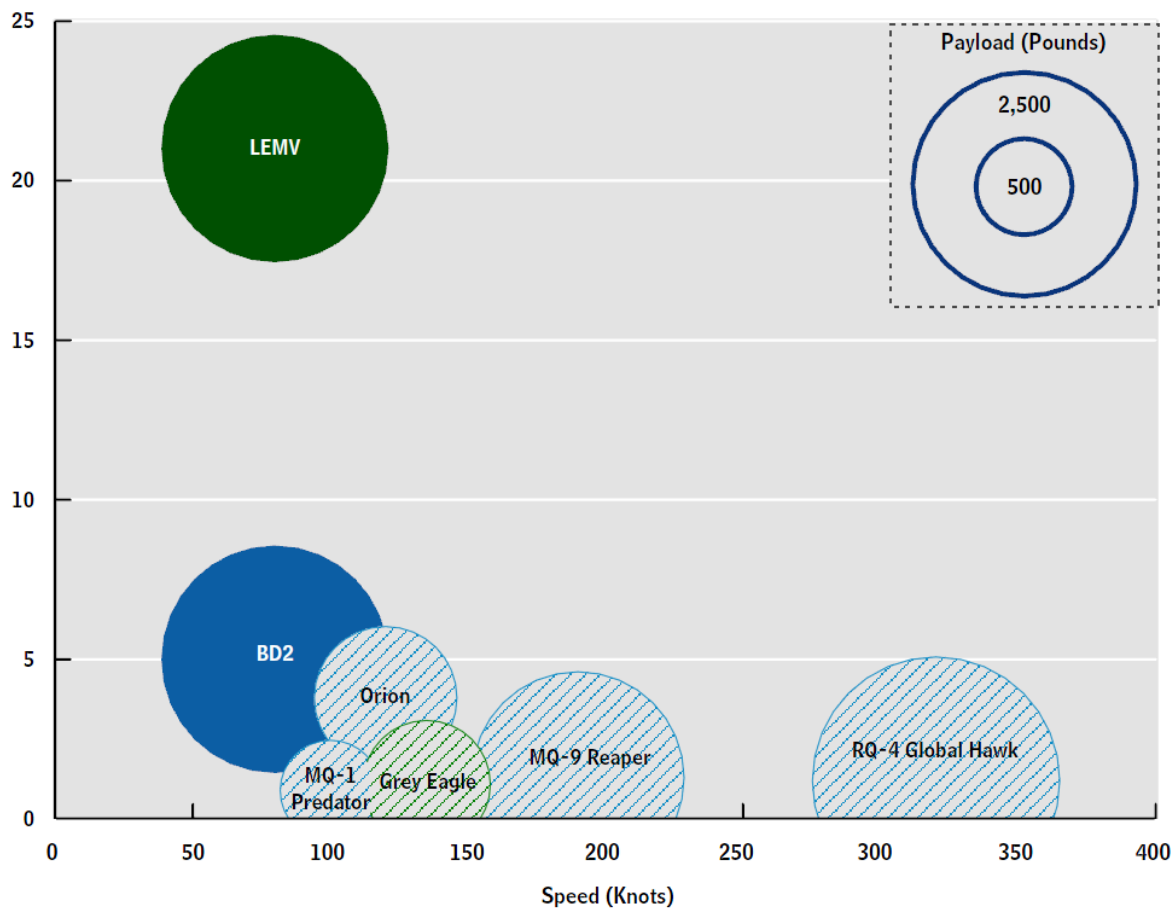
7.3 Exhibit 5.

Payload, Endurance, and Speed of Low-Altitude Airships and Fixed-Wing Aircraft

(Endurance, days)

Payload, Endurance, and Speed of Low-Altitude Airships and Fixed-Wing Aircraft

(Endurance, days)



Source: Congressional Budget Office based on data provided by manufacturers.

Notes: Solid circles denote airships, hatched circles denote fixed-wing aircraft. Circle area is proportional to payload.

Performance characteristics are for typical mission profiles.

LEMV = Long-Endurance Multi-Intelligence Vehicle; BD2 = Blue Devil Block II.

19 September 2014

Imperial College London—Written evidence (RPA0048)

Written Evidence regarding the opportunities in Remotely Piloted Aircraft Systems (RPAS)

To whom it may concern

It is my pleasure to provide written evidence regarding RPAS connecting to the call for evidence. I'm happy to be of assistance and develop on it further if needed.

Sincerely yours,

Mirko Kovac

3. In which new or innovative ways do you think RPAS will be used in the future?

One of the main advantages of RPAS is that they can access areas that are otherwise difficult to reach, such as high rise buildings, off-shore installations and coastal areas. RPAS will be able to not only take pictures and inspect or observe, but they will also be used to repair structures or construct buildings autonomously. While this is currently not possible with commercially available RPAS, several research groups are working in these areas. The first commercial solutions where RPAS will be used for repair should be on the market in around 1-3years which will open major commercial opportunities for both the UK and EU construction and industrial service sector.

Currently, the UK is leading this area of research while groups in the US (UPenn, Harvard) and Switzerland (ETH) are close competitors.

Another area of high impact where RPAS can be transformative is autonomous water health monitoring. For example, RPAS will be able to do water sampling in a flooding situation where sewage contamination of urban environments is one of the main challenges to human health. RPAS will act as assistive devices to rescue teams enabling them to quickly sample and inspect flooded areas. This will both reduce cost and provide a faster response to emergencies.

Another emerging field where RPAS are being introduced at the moment is ecology research in inaccessible natural terrain such as tropical forrest and also in urban areas in a smart city context. RPAS will act as mobile sensor nodes that will be located on top of buildings in trees and in industrial facilities where they will monitor environmental pollution and act as autonomous warning systems. Compared to a large number of static sensors, mobile RPAS sensor nodes offer much

lower cost and higher flexibility to better monitor the environment offering a step changing technology to sensor networks.

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

I consider 150,000 jobs as a rather conservative estimate and to evaluate the impact of RPAS, we also need to consider the jobs that will be impacted by the technology. For example, RPAS will be used routinely for inspection, repair, assessment, search and rescue as well as filming and it will significantly enhance existing jobs with increased capabilities that are now not being conducted by the same job description. For example, a construction worker who is not trained in high rise structure inspection will be able to do that using RPAS while before the same task required a different profile and training. Not only will more jobs be created but the current jobs will change due to RPAS, which needs to be considered in this estimate.

The basis for growth in RPAS is an environment where the systems can be developed and tested quickly, offering rapid design cycles. If these environments are not available sufficiently the growth of RPAS will be restricted and development will move to other countries. Best would be to have RPAS flight areas across the UK where testing can happen easily allowing for internationally leading R&D of RPAS technologies.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

While regulation is important, the key to international leadership is the technology and more investment should be directed towards supporting the development of next-generation RPAS.

RPAS safety from both a software and hardware perspective and novel RPAS capabilities are equally important. The major challenges for RPAS are autonomy, energy efficiently and advanced mobility in constrained environments such as forests and cities. Close inspection and repair of buildings and industrial facilities as well as autonomous water sampling are examples of application areas where future RPAS will be used. Having an adequate investment in these areas of RPAS now would build on the strong research that happens in the EU and it would develop leadership in next-generation RPAS technology.

The Information Commissioner's Office—Written evidence (RPA0017)

The Information Commissioner's submission to the House of Lords Select Committee on the European Union

Call for evidence on the civil use of remotely piloted aircraft systems (RPAS) in the EU

1. The Information Commissioner has responsibility for promoting and enforcing the Data Protection Act 1998 (DPA) and the Freedom of Information Act 2000 (FOIA), together with associated legislation such as the Privacy and Electronic Communications Regulations (PECR).
2. He is independent from government and upholds information rights in the public interest, promoting openness by public bodies and data privacy for individuals and taking appropriate action where the law is broken.
3. The Commissioner is pleased to be able to respond to this call for evidence and has limited his response to those questions which relate to the areas which he regulates.

Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

4. The European Convention on Human Rights (the ECHR) and the Charter of Fundamental Rights of the European Union (the Charter) set out important rights and freedoms for individuals. In particular, Article 8 of the ECHR and Article 7 of the Charter provide individuals with the right to respect for their private and family lives and Article 8 of the Charter provides an explicit right to data protection.
5. RPAS are platforms that can feature a number of technological devices that process personal data, such as cameras. They may be used in ways which are privacy intrusive and so their development should be undertaken in a way which respects the fundamental rights set out above. It is encouraging to see that at paragraph 3.4 of the Communication, the Commission makes this point clear and we encourage continuing work at EU and national level to assess the impact on privacy and data protection as the market grows.
6. There are already studies being carried out on the potential impact of RPAS as well as the use of surveillance technology more generally.¹⁷² Despite this, more needs to be done to ensure that individuals' fundamental rights and freedoms are given appropriate attention as part of any move to open up the market for civil use of RPAS.

¹⁷² See for example Annex 3 of the European RPAS Steering Group's 'Roadmap for the integration of civil Remotely-Piloted Aircraft Systems into the European Aviation System – Final report' available at http://ec.europa.eu/enterprise/sectors/aerospace/files/rpas-roadmap-annex-3_en.pdf.

In which new or innovative ways do you think RPAS will be used in the future?

7. RPAS are still very much an emerging technology and so it is difficult to predict with too much accuracy the uses to which they may be put in the future. However, their uses are limited only by their physical size and the types of sensors which can be fixed to them. As they get smaller they will become more covert and batteries will inevitably improve enabling them to fly further for longer. There is also huge scope for them to be combined with other emerging technologies such as High Definition cameras and facial recognition technology.
8. There are undoubtedly a variety of ways in which RPAS could be used where it would be beneficial, particularly where it would remove the need to place individuals in harm's way. For example, RPAS could be used to survey areas of flooding or forest fires without the need to send in people on the ground or manned aircraft putting these at risk.
9. However, clearly RPAS can be used for purposes which would be privacy intrusive, such as for surveillance of individuals. There are already examples of this technology being considered for use by UK law enforcement bodies.¹⁷³ It will no doubt also be of interest to the national security agencies if they are not already using such technology.
10. It is not just in the field of law enforcement where RPAS could be used in ways which may give rise to privacy concerns. Use can range from a roofing contractor checking inaccessible areas viewing inside a neighbouring property or garden through to assisting with the perimeter security of large installations like power stations or oil refineries. Farmers are also users and whilst these may overfly their land these are often areas which include public rights of way. Film and television production organisations are already using the technology for the production of entertainment programmes. A number of UK media organisations, including the BBC and Sky News, already make use of RPAS.¹⁷⁴ Whilst there are generous exemptions from the full application of data protection legislation for journalistic, literary and artistic activities, the use of RPAS may arouse public concern and will require responsible use.
11. With costs already starting to fall and that trend likely to continue, the use of smaller RPAS amongst private individuals is also likely to increase. Small RPAS with the capability to stream high definition footage directly to a connected smartphone or tablet and record the footage are already commercially available for less than three hundred pounds.¹⁷⁵

¹⁷³ See for example the recent trial by Sussex Police -

http://www.theargus.co.uk/news/11071238.Sussex_Police_trials_drones/.

¹⁷⁴ Taken from an article on the Guardian website - <http://www.independent.co.uk/life-style/gadgets-and-tech/news/drones-open-up-uk-skies-but-the-small-versions-are-a-long-way-from-hunter-killers-9674594.html>.

¹⁷⁵ <http://www.amazon.co.uk/Parrot-AR-Drone-Outdoor-Hull-Orange/dp/B007HZLLOK>.

12. These are only some of the examples of ways in which RPAS could be used in the future. However, privacy concerns extend beyond the use of these devices to hold cameras or other imaging equipment. GPS tracking device data processing is also used to ensure a RPAS gets back to base in the event of breakdown or errors. RPAS may also be used to extend Wi-Fi or mobile signal coverage. This would introduce additional privacy risks to interception of data while it is being transmitted.

Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

13. The Commissioner can only look at this question in so far as it relates to the existing data protection regime. The DPA has stood the test of time remarkably well with regards to the development of new technologies. Since the DPA came into force, traditional CCTV systems have become an established part of society while other technologies such as automatic number plate recognition have emerged. The DPA has proved flexible enough to ensure that these technologies can be used but in compliance with essential legal obligations/safeguards and in privacy friendly ways and there is no reason to believe that RPAS will be any different. The Commissioner's own CCTV Code of Practice is currently being updated to reflect the changes in technology and to provide advice and guidance on the data protection implications of using RPAS.
14. The European data protection legislation is also currently being updated to take account of any new technological developments in a technologically neutral way as far as this is possible. This would therefore include RPAS. The focus on data controller accountability and privacy by design/privacy by default will be important concepts that RPAS developers and regulators should consider carefully.
15. There are some areas where the use of RPAS does pose unique challenges. One requirement of the DPA is that individuals are told at the point at which their personal data is collected who the data controller is in relation to the processing and the purpose or purposes for which their personal data are to be processed. The way in which RPAS operate and their potentially small size means that being open and transparent about when and how they are used may well be difficult.
16. The DPA also requires data controllers to ensure that personal data is adequate for and relevant to the purpose for which it has been obtained. Since RPAS operate at much higher altitudes and so offer unique vantage points and points of view over traditional fixed cameras, there is an increased risk that cameras attached to these devices may inadvertently capture images of individuals that are of no interest to the user. In large public spaces the privacy intrusion to those individuals may well be small. However, where these devices are used in areas containing private spaces the sense of privacy intrusion may be much greater, such as seeing through windows or flying over back gardens and playing areas.

17. Any RPAS system used to collect personal data will need to ensure it has appropriate security measures in place to safeguard that data. Where an RPAS is streaming live footage or other information back to the user, the user should consider whether or not it is appropriate to encrypt the information. The same measures should be considered where RPAS are used to extend Wi-Fi or mobile signal range.
18. Some RPAS may not stream information back to the user but may instead capture and record the data onto the device itself using an SD memory card for example. In this instance the card should be encrypted as there is greater risk, since RPAS may be operating some distance from the pilot, that if it were to land some distance away it may be found and the memory card and device taken before it can be retrieved by the pilot.
19. There are also a number of exemptions in the DPA which will be relevant in many of the areas of possible new use which are referred to above. Sections 28, 32 and 36 provide wide ranging exemptions from large parts of the DPA, including most of the principles, where personal data is being processed for national security, journalistic and domestic purposes respectively.
20. The section 29 exemption may also be relied upon by law enforcement bodies. This means data controllers processing personal data for the prevention or detection of crime may not be required to comply with the requirement that personal data be processed fairly and lawfully. The exemption also restricts an individual's right of access to their personal data in certain circumstances.
21. There is no doubt that the DPA is perfectly capable of regulating the use of RPAS where they are used to process personal data. In addition to updating the CCTV Code of Practice, The Commissioner has been working extensively with other agencies such as the National College of Policing to make sure those using or intending to use RPAS have appropriate guidance available to them. This guidance includes continuing to press home the message that a proper Privacy Impact Assessment should be conducted prior to the use of RPAS or any other privacy intrusive technology.
22. However, it is also true that in some of the areas where RPAS are likely to see increasing use, such as national security and use by private individuals, the DPA provides limited protections or oversight. Nevertheless, the exemptions for national security should not be interpreted overly broadly and the focus for the regulation of RPAS should be purpose driven not ownership-driven. There is a growing awareness among DPAs in Europe that drones designed for military use and owned by national military forces are also often used for civil uses and there are also cases of the situation vice-versa.

Summary

23. RPAS are capable of being used in a privacy intrusive way, particularly but not only where images of identifiable individuals are captured. In these circumstances they must comply with the requirements of the DPA. While there may be some practical challenges in this area, tools such as the Commissioner's Privacy Impact Assessment Code of Practice and revised CCTV Code of Practice are available to assist data controllers in complying with their obligations.
24. In any case, careful consideration should be given to any potential privacy risks prior to the deployment of RPAS. They should be deployed only where there is clear justification for doing so and where proper safeguards are in place during their operation.

19 September 2014

The Information Commissioner's Office (ICO), David Goldberg, Academic lawyer and Peter Lee, Taylor Vinters LLP—Oral evidence (QQ 149 – 161)

The Information Commissioner's Office (ICO), David Goldberg, Academic lawyer and Peter Lee, Taylor Vinters LLP—Oral evidence (QQ 149 – 161)

Evidence Session No. 11 Heard in Public Questions 149 - 161

MONDAY 10 NOVEMBER 2014

Members present

Baroness O'Cathain (Chairman)
Lord Brooke of Alverthorpe
Lord Clinton-Davis
Lord Cotter
Lord Fearn
Lord Haskel
Baroness Hooper
Lord Kakkar
Earl of Liverpool
Baroness Valentine

Examination of Witnesses

David Goldberg, Academic lawyer, , **Peter Lee**, Taylor Vinters LLP, and **David Smith**, Deputy Commissioner, Information Commissioner's Office (ICO)

Q149 The Chairman: Thank you very much for giving up the time. I think you sat through the whole of the last session, so you know what to expect, but the questions are likely to be quite different. Would you like to, for the record, say who you are so we can get it? You know all about the webcast, et cetera, yes? Do I need to repeat any of that?

Peter Lee: I was not here for the last session, my Lord Chairman, sorry.

The Chairman: Right. The list of interests that have been declared by Committee members were declared orally at the previous session on Monday 13 October and can be found in the transcripts. This is a formal evidence-taking session of the Committee, and a full note will be taken. This will be put on the public record in printed form and on the parliamentary website. You will be sent a copy of the transcript and you will be able to revise it in terms of any minor errors. The session is on the record and is being webcast live, and will be subsequently accessible via the parliamentary website. You are welcome to submit written

The Information Commissioner's Office (ICO), David Goldberg, Academic lawyer and Peter Lee, Taylor Vinters LLP—Oral evidence (QQ 149 – 161)

supplementary evidence after the session if any bright ideas come winging their way through the night. Witnesses and members are reminded to speak up, so that everyone can hear you properly. The acoustics are quite good but not that great. Now, would you like to say who you are and make any brief opening remarks? Shall we start on my left? Mr Goldberg.

David Goldberg: Thank you very much, my Lord Chairman. My name is David Goldberg. I am simply a freelance, self-employed academic lawyer in that I took early retirement many years ago, so I do all my academic work on a freelance basis. I should, I think, in the interests of transparency, my Lord Chairman, say that I—

The Chairman: You know our spad.

David Goldberg: Yes, yes. It is how we always fondly think of him. I am a member of the group that Mr Henley convenes at the Royal Aeronautical Society: the unmanned aircraft special study group. I should also say that I am a member—just an ordinary paid-up member—of ARPAS-UK, which is the Association of Remotely Piloted Aircraft Systems UK. It is a relatively new organisation chaired by Phil Tarry, which has a number—30 or 40—of small to medium-sized operators. It is basically an operators' network. I do not have any opening statement, thank you.

The Chairman: Mr Lee, I believe you also know our spad.

Peter Lee: Good evening. I am Peter Lee. I am an English qualified solicitor. I practise at a law firm called Taylor Vinters, and my area of speciality is technologies, where I practise contract law, intellectual property, privacy and regulation. I also happen to have a leading RPAS unmanned systems practice and I advise operators, manufacturers and end-users of unmanned systems mainly in the UK and the United States. I also talk and write on the subject.

The Chairman: Thank you. Mr Smith?

David Smith: I am David Smith. I am the Deputy Information Commissioner. We are the regulator responsible for overseeing data protection law. As an opening remark, I would like to remind members of the Committee that the data protection law clearly protects the personal information that will be collected through remotely piloted aircraft systems, but it has an exemption for personal, family and household use, including recreational purposes. Simply, the data protection law will apply to those who deploy systems for commercial purposes, but hobbyists are unlikely to fall within the requirements of the law.

Q150 The Chairman: I see. Thank you. I am going to ask the first question. Is the threat to privacy posed by the civil use of RPAS radically different from other forms of technology such as a camera phone? Is it right that the Commission included societal concerns raised by RPAS as a priority in its communication on the civil use of RPAS? Right, who is going to start?

David Smith: I am very happy to start, Lord Chairman. I do not think that, from a privacy point of view, the technology is radically different, but it extends its capability and use. Our concern is essentially cameras attached to remotely piloted systems and, of course, we have cameras; we have CCTV; we have mobile phone technology where cameras are

The Information Commissioner's Office (ICO), David Goldberg, Academic lawyer and Peter Lee, Taylor Vinters LLP—Oral evidence (QQ 149 – 161)

commonplace now. However, remotely piloted systems take it into a new dimension, I suppose, in going into what we might regard as private areas that would not normally be accessible to someone with a camera on their mobile phone or even a journalist or a photographer with long-lens photography. This is particularly the case for people's back gardens, where they would expect a degree of privacy, and perhaps going up to their houses and properties and even looking through the window.

There is more scope with these systems for what we would call collateral intrusion. I am going to inspect the roof of a house, but I pick up lots of images of people in the garden, neighbours' gardens and around, which I am not intending to pick up but I do pick up. Again, that is perhaps a little different from, say, a camera phone, where you are likely to be focusing on a particular target more narrowly.

If I might just change subject, the other point is that it is less clear who the operator is. With most CCTV cameras, even if it is not immediately obvious, you should fairly easily be able to track down the operator. With a camera phone, someone is holding it. If you see a RPAS buzzing around, who is controlling it? Where are they? Who is responsible? It is a different degree, but not a totally new technology.

The Chairman: Yes, I see.

Peter Lee: Yes. The Commission is right to consider the societal concerns. It probably is the case that the actual differences are not too radical with other technologies. In fact, they could be perceived as being less so in some circumstances when one considers data harvesting by some of the internet companies et cetera. However, there is a very clear perceived risk by the public, and that may be historic or it may be fuelled by science fiction, but that certainly exists. That is why it is important that the Commission addresses that as well, as David has mentioned.

The Chairman: Well, it is not only science fiction; it is fuelled by what has happened with press intrusion et cetera. I guess that the mind can imagine all sorts of areas, so it is very important that it should be considered.

David Goldberg: I would like to raise the contrary perspective.

The Chairman: Good.

David Goldberg: There is absolutely no reason to consider privacy in relation to the deployment of remotely piloted aircraft, because it seems to me that is just a matter of general societal interest and concern, and has to do very much with the nature of behaviour and so forth. No operator among the operators that I am familiar with has the slightest interest—the slightest interest—in surveillance or in close scrutiny of independent human beings. For example, in Japan RPAS have been used for 30 years in agribusiness for monitoring the state and condition of plants, fields, crops and so forth. With no disrespect to His Royal Highness, it may be that there are only a few people in this world who think that plants have feelings. Therefore, it seems to me that the deployment of RPAS in that context has no connection with privacy whatsoever. With respect, this focus on an RPAS peeking into somebody's window is, in a certain sense, a difficult attitude even to understand, because it is a bit like looking at the world through the "old man in the dirty raincoat" lens.

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It is just not relevant and not credible in relation to the use of RPAS in the market that we are talking about.

The Chairman: Well, Mr Goldberg, if people did have intent to carry out surveillance or to find out what the security system was in any house along a road, do you think they would tell you?

David Goldberg: My point, my Lord Chair, is that an RPAS is not in itself anything that changes any existing scenario. Indeed, if you look, for example, at the case of *Bernstein v Skyviews*, which I think was 1997,¹⁷⁶ where there was aerial photography of Lord Bernstein's home, the judge in that case said that the privacy issue would really only kick in if there was serious, systematic surveillance of every aspect of Lord Bernstein's activities. I find, with respect, the Information Commissioner's Office's concern with the collateral, incidental, accidental and happenstance capturing of images quite the tail wagging the dog. I would like the Committee to think of that as an alternative perspective.

The Chairman: Well, it is very good to have an alternative attitude as well.

Q151 Lord Cotter: Notwithstanding what has just been said, the briefing I have says that the RPAS industry in the US has stunted growth. Fears about the invasion of privacy in the US have stunted growth there. This has also been raised in the European Union. What would you think about concerns about privacy and how can they be addressed without hindering growth of the industry?

David Goldberg: The industry's growth in the United States has been hindered by the Federal Aviation Administration's (FAA) inability to get its act together and do anything other than issue ad hoc permissions on the basis of individual petitions. The real issue there is the activity of the FAA compared with the CAA¹⁷⁷ in this country, which has been far more progressive and proactive about that. As regards the European Union, with respect, I am very nervous about hearing about any intervention by the EU in what you might call common law principles. The matter is adequately covered by Article 8 of the European Convention on Human Rights and I do not see what, if anything, the EU brings to the table. It has absolutely no competence in the area of a common law societal principle, in my opinion.

Peter Lee: I would disagree in quite strong terms with my colleague, Dr Goldberg. To ignore the privacy concerns of this technology is quite a folly, not least because the media and the press tell us that it is such a concern. People are genuinely concerned about it. Yes, it is true that certain applications may not infringe on people's privacy as much; for example, agriculture. However, certainly, there is the police and journalistic use of this technology, and user-generated content, which I hope we will talk about later, in the media is potentially an issue for sensationalist journalists. I think Europe has a big role to play in this because the privacy risk falls through the gaps between various regulators. It could fall between the remit of the Civil Aviation Authority and the Information Commissioner and even Ofcom, which would regulate television and broadcast. It is important that somebody makes sure that that is joined up and knitted together.

¹⁷⁶ Later on, Peter Lee provides the correct date for this case.

¹⁷⁷ Civil Aviation Authority

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David Smith: EU law has a very clear and well-established role here through the Data Protection Directive, which undoubtedly applies to the collection of personal information by businesses, whether those businesses are surveying companies that are surveying buildings and capturing images, or whether they are people like the paparazzi using it for those purposes, or whether they are private investigators. There are all sorts of uses that could have a significant impact on privacy, which would be caught by existing EU law.

Q152 Baroness Valentine: I am slightly confused now by this position we have got into. There is clearly the privacy breach of intentionally invading somebody's private space, which is different from the technology that you use to do the breach. For those of you on this side who are arguing that you need something different, I do not understand. Indeed, regarding what Mr Goldberg is saying, the point is that it is the technology that is used to do the privacy breach that somehow causes one to have some special legislation, as opposed to the type of privacy breach. Presumably it is illegal to go anywhere near a nuclear power station anyway. The fact that you do it via a drone, via a car or via something else is not the point. I do not quite understand how the combination of the technology and the privacy come together.

David Smith: It is not the technology of the flying device, the RPAS; it is the camera attached to it. It is the ability to obtain images that were not obtainable by previous forms of technology.

Baroness Valentine: On that point, if one takes an image that is a breach of privacy, existing legislation would say that is not on. Is that correct?

David Smith: I agree with you entirely. Please forgive me: I am not arguing that we necessarily need new privacy legislation or a different framework. I am saying that where it is a commercial user, it will be covered by the existing data protection legislation. We may need to apply that in slightly novel ways, but I am not saying there should be a change in the law. There is a gap in relation to the hobbyist—the private user—who can do so much more now with technology. All of us as private individuals can invade other people's privacy in a way we could not before, and it is not confined to RPAS. It is the same with mobile phones and the technology that people carry now. It is a common problem.

Baroness Valentine: If I, as a private individual, invade somebody else's privacy vaguely wrongly, that is covered by law. It is the fact that I can now do it more easily that means you think there should be different rules.

David Smith: No. It may be covered by some law. There is clearly law on harassment—my fellow panellists may know more about those areas of law—but where it is for personal or recreational purposes, there is a specific exclusion from data protection legislation. You escape the data protection law that would apply were you doing it for commercial purposes—for a business purpose.

Peter Lee: I do not think there is a need for new knee-jerk laws either in this area. The Data Protection Act dates from 1998. The *Skyviews* case that was mentioned earlier is from the 1970s and privacy law has developed considerably since then. It is the job of lawyers, regulators and judges to interpret the law as it is in the light of new technologies. That is why this discussion is very encouraging. Also, regulators like the Information Commissioner,

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who has released recently a guide to the law in this area that deals with this technology, are very important for users.

The Chairman: Thank you. Does anybody else want to comment on that before we move on?

Q153 Lord Brooke of Alverthorpe: I understand there are now machines available dubbed RPAS that will travel 700 kilometres with cameras on them. That is quite a different situation from anything that we have had before. Would they be covered by existing legislation, either at a European level or in the UK, if they came across from France?

David Smith: Yes. I mean, if they came across from France and were operated by a French operator, they would be covered by French data protection law, which, I guess, is derived from the European directive and is broadly similar to our law.

Lord Brooke of Alverthorpe: Could I just interject there and ask about the 28 countries? Can you say that they all have satisfactory data protection legislation in place based on previous EU directives?

David Smith: Yes, I can say that they all have satisfactory laws in place because they all have to comply. That law has to be consistent with the European directive. I do think that the level of enforcement varies because of the resources available to our equivalent agencies in some countries, but the legal framework is broadly similar across Europe, yes.

Q154 Lord Haskel: Whichever side of the argument you are on, it is quite clear that the national aviation authorities and the data protection agencies all across the EU are going to have to work together more closely. How can one do this to ensure that there is a clear delineation of responsibility and what role does the European Commission have in this?

David Smith: There is a fairly clear delineation of roles here by the nature of the technology and what we are talking about. The question of aircraft systems and the safety risk is very much Civil Aviation Authority territory and not our authority. Our concern is the personal data—the images that are collected and how they are used—which is not really the aviation authority's territory. However, we do work together. Forgive me, but we work together with all sorts of regulators within the UK where we have overlapping responsibilities: financial services regulation is a very clear one. We have already done some work with the Civil Aviation Authority (CAA) to produce a small leaflet for, essentially, the hobbyist users. We are looking at the moment at how we can get that distributed to the people who need it. We sit on the RPAS cross-government working group, as does the CAA as well. We are, if you like, taking a joined-up approach to this issue with the assistance of Government. We are intending to have cross-links on our website, so that our website will link to CAA guidance and it will link to us. We do not, at the moment, have a memorandum of understanding in place with it, and I am not sure that we need it for this. However, that is a common approach with other regulators.

Basically, we are used to working with others, trying to provide joined-up regulation to users that is consistent with good regulatory practice, and we are committed to doing the same here. I am not sure how much of a role the European Commission has in that—others may be able to comment. At European level, we, as data protection authorities, sit together with

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the data protection authorities in the other 27 member states through what is known as the Article 29 Working Party, where we develop collective opinions and guidance. We are working on an opinion on this very area at the moment. There will be a joined-up view from the European data protection authorities forthcoming.

David Goldberg: First of all, my general perspective on this, which is clearly a little different from that of others, is to ask Committee members to remember that the tort in England is the misuse of personal information—it is the misuse of personal information. On the actual happenstance, incidental capturing of images that are not of the slightest interest—I really need to emphasise this—I know of no operator who has the slightest interest in that among the manifold businesses that are being established, unless it is something like taking wedding photographs, which would clearly have the consent of the wedding party. The manifold businesses that are being established by the RPAS operators have absolutely not the slightest interest, never mind in misusing personal information but in acquiring it in the first place. In any case, the Data Protection Act does not prevent you doing that; it is just to do with the fair information practice principles.

Let us remember that the roots of the data protection laws on which we have all got so hung up were admirably set out in 1974 in America, and they were called the fair information processing principles—the FIPPs. It is the FIPPs that really lie at the heart of this thing. That is the sort of thing that you now see in the principles and the schedules of the Data Protection Act. It is not all the very complicated, detailed stuff; it is the broad general principles. In a nutshell, I would urge the Committee to consider the issue of the misuse of personal information, not the happenstance incidental acquisition. Secondly, please bear in mind that no operator that I know of has the remotest interest in anybody's personal information image that may be acquired as collateral to the business of, for example, inspecting a very hard-to-access gas or other flue stack that would otherwise have to be done in a very dangerous way by a human being. There is a great health and safety advantage of using remotely piloted aircraft. You use them for the three "ds": for doing the dull, dangerous and dirty jobs. There is a health and safety risk there.

The Chairman: We have the message.

Lord Brooke of Alverthorpe: I think we would be very surprised if Mr Goldberg did know any of these people who are setting up businesses or who are as individuals seeking to find information they should not have access to. We would also have been very surprised, indeed, if you had known journalists who were in the business of hacking a few years ago.

The Chairman: Lord Kakkar, you wanted to come in on that one, did you not?

Lord Kakkar: If I may. Just to be absolutely clear, for the hobbyist, as it has been put, at the moment there are gaps in the current legislation that would mean that in using this device—or these devices—to extend the scope they could breach other people's privacy. What would be the recourse of the individual whose privacy had been breached by putting a camera on one of these remote devices under those circumstances?

David Smith: I do not want the Committee to be misled about the data protection legislation in this country. It is not only about the misuse of personal information; it regulates the collection of information. If the RPAS that is surveying the chimney stack collects images of

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people who are identifiable, even if they are only collected incidentally, they are covered by the Data Protection Act and the operator has data protection responsibilities. That does not say that you cannot use RPAS for surveying stacks; it just says that you have to be aware of that and treat that information properly. However, where it is a hobbyist, essentially the data protection law does not apply. If you are using it for recreational purposes, it falls outside data protection law and the person whose privacy is being intruded on has no protection under data protection law. They can complain to our office, but we would essentially say, "This is outside our scope". You come down to harassment laws and other legal provisions to protect you.

This question of how far data protection law extends to personal and private use is more than under debate; it is under legal question. There is a case before the Court of Justice of the European Union at the moment about domestic use of CCTV, where essentially a camera has been put on someone's private house but it overlooks the public area into the street. I have to say that our approach in the UK based on the wording in UK law, which is a little different from that in the directive, will be that that is all outside the scope of data protection law. The advocate-general of the court has given a preliminary opinion that says that because it extends into public spaces it should be caught; it is not simply personal and domestic. However, we have not yet had the full judgment of the court, so it is a bit of a moving field on this one.

The Chairman: I see, thank you. Mr Lee, do you want to say anything on this?

Peter Lee: There are two things. The first is that we should be very cautious in the collateral acquisition of data, just because if we look at how data analytics companies now harvest data that have been collected in that past, it would be slightly foolhardy to think that data that are captured now will not be used in the future in some other way than intended. Secondly, the question about personal hobbyist use is an interesting one, because many people who would go under the auspices of a hobbyist or a leisure user are maybe also publishing those images or videos on YouTube or on their blogs, which in turn can generate that individual some income via Google advertising or advertising revenue. Therefore, there is a more sophisticated technical question here about whether they are any longer leisure users or hobbyists and I wonder whether the exemptions for domestic use are so applicable with this new technology.

Lord Haskel: Drawing lines is obviously very difficult.

David Smith: For the record, yes, I can only agree. That is a problem.

The Chairman: As a supplementary to all this, do you think that harassment law is adequate to deal with concerns raised about the private use of RPAS? I do not know anything about harassment law. I am only asking you.

Peter Lee: What my Lord Chairman may be referring to is myriad of common laws and also human rights law that is derived from Europe—for example, the right to a private life—which may be infringed by that sort of action. That might be the recourse that someone may have.

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Q155 Baroness Valentine: I am afraid that this is sort of continuing the same theme. Could privacy concerns be dealt with at different levels; that is to say, at the professional level targeting professional RPAS operations and at the leisure-user level targeting people who are neither professionals nor members of a model plane flying club?

Peter Lee: I may have alluded to that in my answer to the last question. There is this blurred distinction with domestic leisure users. Where, in previous years, people may have considered the use of a video camera at their school nativity play or whatever it may be, that distinction is now blurred because of the ability to post these videos and images on social media sites.

Q156 Baroness Hooper: This is an interesting one, I think. Do you feel that there is a need for an exemption to apply to the press using RPAS in carrying out their duty to inform the public?

David Goldberg: Yes, absolutely. There is of course the newsgathering exemption already under the Data Protection Act, and it is very worrying that the new General Data Protection Regulation might not be as strong as what we have at the moment, but that of course remains to be seen. However, it is in my opinion absolutely the case that the responsible press should be facilitated to use these devices simply as flying cameras. Therefore, there is again very little difference, it seems to me, between the current situation and the situation if one is using an RPAS, because public-interest journalism requires not merely the right to distribute the information but also the means to gather it.

There was a very interesting case, for example, in Strasbourg¹⁷⁸ some years ago involving a family's argument with a landlord about their right—I agree it is not in a journalistic context—to have a satellite dish in order to receive television signals pertaining to their own indigenous culture.¹⁷⁹ The implication of that judgment is that there is a right to access communications technologies. RPAS, in that context, is a means to facilitate access to communications, in the sense of both gathering the data and also distributing it.

Perhaps I may refer to a very important and, in my opinion, interesting report. It may well have been mentioned before here so please cut me off at the pass if that is the case. About six or eight weeks ago, the Australian Law Reform Commission published a report called *Serious Invasions of Privacy in the Digital Era*. Has this been mentioned? I commend it to the Members of the Committee. It is one in which the Australian Law Reform Commission confined, it seemed to me on an initial reading, the tort that they were asked to construct—the basis of the report is that they were asked to construct a tort of privacy—to serious and intentional invasions, not happenstance, not incidental, not collateral. This is a tail that must not wag our dog here, in my opinion. Not only that; very importantly the Australian Law Reform Commission proposed a defence of responsible journalism, and that is something that cuts to the heart of your question and should well be considered in the context of this Committee's deliberations.

David Smith: There is already an exemption in Section 32 of the current Data Protection Act essentially for the processing of personal data for journalistic purposes. As was said, it is an

¹⁷⁸ *Khurshid Mustafa v Sweden* (2008) [23883/06](#)

¹⁷⁹ *ibid*

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exemption for responsible journalism, which means that the normal data protection provisions do not stand in the way of journalism where there is a significant public interest. If RPAS are being used to investigate matters of serious public concern and to comply with the data protection law would stand in the way of that, there is an exemption.

However, our concern would be around what I would call the less responsible areas of journalism, and particularly about the paparazzi, who are not necessarily employed by the news media that are subject to media regulation and so on. They operate as individuals in a freelance way, and we know how they have used long-lens photography in a number of cases to take pictures of celebrities, essentially on their private premises. If you will forgive me—you may know more than I—there was a European Court of Human Rights case, I think, from the Princess of Monaco to do with long-lens photography. You are giving another, more powerful tool here to those who will not comply with the rules, are not willing to abide by the rules, to further intrude on privacy. Here, if you will forgive me, it is not just about the law and data protection regulation; it is also about media regulation and the new media regulators taking a firm view as well on what is and is not acceptable for publication when it has been obtained through privacy intrusion.

Lord Clinton-Davis: Could we have, in any event, a résumé of the Australian law in this particular?

David Smith: We already essentially have an exemption for responsible journalism, which, as I understand it, was what was being suggested for Australia.

David Goldberg: Indeed.

Q157 Lord Haskel: Could I just ask where responsible journalism begins and ends? For instance, you spoke about social media just now.

David Goldberg: The Australian Law Reform Commission addresses this precise issue and offers a very succinct characterisation of responsible journalism, which is quite short and talks about journalism that is in the public benefit, that is not trivial, and that is not feeding interests of pure prurience or gossip. It is something that is much less difficult to recognise, understand and accept than very often this issue of where you draw the line leaves us.

Finally, one could also mention the late lamented Press Complaints Commission's (PCC) report in relation to the Goodman and Mulcaire acquisition of information, because they were the first two, way back at the start of that whole process that was mentioned. They talk in that about the right to subterfuge, in the context of public interest journalism. There is a very interesting adjudication by the PCC called *Bell Pottinger v The Independent* quite late in its life, which did uphold precisely that.

Peter Lee: There is clearly already an exemption in Section 32 of the Data Protection Act for journalistic work. What the question should perhaps be focusing on is a need to allow RPAS operators in the UK and Europe to respond to rapid-response journalism requirements. Most RPAS operations are pre-planned. It may be surveying a house or surveying a field and therefore there is, one hopes, adequate opportunity to inform people of the risks, both physical and privacy-related. However, if there is an incident or a natural disaster that

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requires reporting, there is an argument that you might need to get RPAS in the air quickly. It is the challenge for the Civil Aviation Authority to allow that safely.

If it does not address that issue, the risk is that that vacuum will be filled by rogue pilots who are unsafe. My example here is the riots, where a member of the public who has bought a small drone from Maplin for £500 gets it up in the air and takes footage, creating user-generated content, and now of course there are channels for that footage. For example, *The Guardian* has developed a sister website called GuardianWitness, where you can upload your own generated content.

There are two points here. The first is creating the ability for responsible and safe rapid-response journalism. That is possible because, the Friday before last, the Civil Aviation Authority issued an information notice for Congested Areas Operating Safety Cases. These are to allow people to operate more freely within built-up, congested areas—cities and towns. The focus would be on airworthiness, and it is missing a trick here if it does not also consider privacy risk.

Then, regarding user-generated content, there needs to be clear guidance, probably from Ofcom, around how acceptable user-generated content from drones is, and who is responsible or liable for user-generated content when it is posted on an intermediary platform such as GuardianWitness.

Baroness Hooper: I understand that the Professional Society of Drone Journalists has suggested that “in general, the freedom of the press can be preserved by guaranteeing permission to fly small RPAS, in a responsible manner, at sufficiently low altitudes over public land”. Is it not the policing of that that is the difficulty, and who is going to do it?

Peter Lee: It is, and that is why this new move by the CAA for a Congested Areas Operating Safety Case that it has instigated, which I think will come into effect within three months, should allow people who can prove that they are safe and have an airworthy platform to do what helicopters can do at the moment in built-up areas: fly over people and take images.

Q158 Lord Kakkar: At the moment, the member states of the European Union have different classifications for military and civilian aircraft. If this were to apply to RPAS, what would be the privacy implications, if any, and how might that play out for operators of commercial and then potentially private hobbyist RPAS in a single market? An addendum to that would be the question of how states' surveillance using such devices might be regulated, potentially with regard to the Regulation of Investigatory Powers Act (RIPA) here in the UK and its amendment.

David Smith: I am not sure that I can really add anything about military and civilian uses, other than that the European data protection framework does not apply to use where national security interests are engaged—that is outside the EU competence—or to law enforcement and justice issues—for policing and the like. It is only the UK's Data Protection Act that extends more widely. So far as RIPA provisions are concerned, I have not considered this in detail but I would assume they will apply to the use by law enforcement agencies of RPAS for surveillance purposes—for targeted or covert surveillance. Sorry, I am just trying to get my head around how covert it can be if you have a noisy thing flying above, but, in theory, yes, it must apply.

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Peter Lee: As far as surveillance goes, it is clear that it is not just the noisy Hexacopter platforms that are available for surveillance. You can survey people very well with the right technology from extremely high altitudes. The military have very small drones that look like insects, which can also capture images, so there are concerns there. Undoubtedly, RIPA would be engaged if it were used for surveillance purposes. For me, it is irrelevant whether you distinguish between civil platforms and military platforms in this context. It is important for the state to justify its use of such exemptions, regardless.

I have an ancillary answer, which I am not sure the question was getting at, but, just anecdotally, I know from several of my clients who have tried to work in other countries that they have found it difficult because the laws have been applied slightly inconsistently in other member states. Therefore, that is a concern as well, and another reason why harmonisation would be good from a single-market perspective.

The Chairman: Was that all in EU countries or in others?

Peter Lee: The specific example I am thinking of was in other EU countries.

The Chairman: Therefore, that is a plus for regulation by—

Peter Lee: I think so. That particular concern was to do with the implementation of the insurance directive, and the interpretation in Sweden versus the interpretation in the UK.

The Chairman: Of course, there is another thing. They are not supposed to go across country boundaries?

Peter Lee: Yes.

The Chairman: Maybe there would be exemptions.

Q159 Lord Brooke of Alverthorpe: The Regulation of Investigatory Powers Act, RIPA, has come in for a lot of examination and criticism in the UK itself. Do you think it should be amended to clarify the use of surveillance RPAS by the state?

Peter Lee: My view generally with this type of legislation, and it goes with the data protection legislation as well, is, if it is not broken, please do not tinker with it. It is better to have guidance on how to apply it, which I think is what the ICO has done well in its last document issue. Maybe that is what we need for RIPA as well.

David Smith: There are other pressures to say that the Regulation of Investigatory Powers Act should be reviewed. Perhaps, if it is being reviewed because of other pressures, the opportunity should be taken to make sure it properly addresses this as well. I am not sure this alone would be a basis for saying, "RIPA needs to be reviewed".

Lord Brooke of Alverthorpe: We have had some very interesting evidence from Dr Kevin Macnish, who was formerly a GCHQ¹⁸⁰ employee, who was concerned that there could be creep in the civil use of RPAS by authorities such as the police and you could end up

¹⁸⁰ Government Communications Headquarters

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potentially with RPAS carrying and using tear gas. This was an area of concern, and he has an interesting background, coming from GCHQ.

David Smith: I can see the issues about RPAS carrying tear gas and any sort of weaponry and things like that, but that would not be covered by the Regulation of Investigatory Powers Act. It would only cover surveillance. I fully accept that it is a new tool to enable more surveillance. Equally, the controls within the Regulation of Investigatory Powers Act about authorisations and oversight by the Surveillance Commissioners and so on would, I should have thought, still come into play. However, I am not an expert on that, so, if others think it does need review, then that may be the way to go.

Q160 Lord Brooke of Alverthorpe: I will be very quick on this one. It is really about the resourcing for EU agencies and national authorities such as the CAA for regulating RPAS. They could have quite a demand on their resources. Particularly, we have heard about the CAA, which has, following its first evidence session, issued a document, which it has drawn up I think in consultation with you, for the attention particularly of those buying the smaller pieces of equipment, on what their rights are and what in fact their responsibilities are. This could be quite an increasing area of pressure for personnel. Do you see that? Do you see that they are geared up to do it, or do you think that they may, in the longer term, need more resourcing?

David Smith: I can only really comment from the point of view of ourselves, the Information Commissioner's Office, as the data protection regulator. In terms of regulating the commercial users of RPAS, yes, it places some additional pressures on us, but it is only one of so many developments in technology and the application of that technology that we are faced with. We can do things to minimise the demand on our resources by the provision of guidance—you have referred to our code of practice, which is on CCTV but covers this area as well—and also by encouraging responsible development and deployment of the technology, which is very important to us, and building in what we call privacy-enhancing technologies, privacy by design, so that you are keeping the collateral intrusion to the minimum. We have operators conducting privacy-impact assessments where there are likely to be intrusive uses of this to keep complaints and the amount of enforcement we would be involved in to a minimum.

There is also working with other regulators, which you have talked about. The idea has come up of the Civil Aviation Authority, through some of its licensing-type provisions, being able to take up some of the privacy concerns as well. Using each other's powers and resources to best effect is very promising in keeping the workload for both of us to a minimum.

The real challenge, I think, is this extension into the more personal hobbyist, domestic use. If we become responsible for regulating that, which there are pressures to do from other areas, that is very demanding in terms of the number of cases we will get. Resolving disputes between private individuals is a different skill and requires different tools from resolving disputes between individuals and commercial organisations. I am not sure that the legislation and the powers we have are particularly well suited to this one individual invading another individual's privacy. They are better suited to dealing with commercial organisations and public bodies: the police and others who may deploy these technologies.

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David Goldberg: Just to respond to Lord Brooke's question, *WIRED* magazine had an article on the state of the UK and RPAS earlier this year. In it, it quoted the CAA's press officer saying that it had had only a couple of dozen phone calls in connection with RPAS over quite some months previously. In the context of today's event, I contacted the CAA's press office to ask whether it could confirm that that was still, broadly speaking, the state of affairs. I got an email back saying, yes, that was the state of affairs. We perhaps, with respect, need to put all of this a little into perspective and be a little balanced about the fears and concerns that are around the table.

The Chairman: I can assure you we will be taking all these considerations into consideration.

David Goldberg: I am sure you will.

Q161 Lord Clinton-Davis: I am going to ask the last question, but you never know. A great deal of the evidence we have looked at has involved the industry realising it had to invest more in research and development. On the other hand, it is uncertain about the future; it does not know where the whole thing will lead to. In any event, do you think the concerns about privacy are affecting investment by the industry?

Peter Lee: From my perspective, working with companies which seek investment in this area of technology and look to exploit it, 12 months or so ago that was maybe the case. In the last year or so, there has been more appetite to invest in this technology.

Also, going back slightly to the previous question, the opportunity cost of not addressing this is considerable. It has threefold significance: first, individuals—the public—missing out on the benefit of this technology versus their privacy invasion; secondly, businesses which may miss out on investment and the opportunity to develop and may suffer from kneejerk regulation; finally, from the Government's perspective, because this is an area of technology where we lead the world in many ways. We also have the perfect environment, regulatory and scientific, and with our creative industries, to lead the world. If we do not do that, it would be a great shame.

The Chairman: I am sure you are right. Of course, one of the things the EU and every member state is now singing all the time is "jobs and growth". The last question is going to come from me. Should privacy impact assessments be mandatory, and who would approve them—the CAA or ICO? Now, who is going to answer that?

David Smith: I am happy to start. I do not think that in any sector we would say that privacy impact assessments should necessarily be mandatory. They are a tool to help develop privacy-friendly approaches, so I would rather say that it should be mandatory to consider whether you need to carry out a privacy impact assessment and then, if the activity you are undertaking is likely to have a significant impact, you should undertake one.

They are part of conducting all this with a privacy-friendly approach. They relate to the last question as well, because, if some of the research and development effort goes into developing the technology in a privacy-friendly way, clearly it is going to be more acceptable; it is going to have more of a market so everybody, all the players—not just the manufacturers, but perhaps particularly those who deploy the technology—should have a role in that. If guidance or a code on how to conduct privacy impact assessments specifically

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related to this context was thought to be of value, then we certainly could look with the Civil Aviation Authority at developing something—so not mandatory, but a very important tool.

The Chairman: That is very reasonable.

Peter Lee: I would like to see them become mandatory for Congested Areas Operating Safety Cases, the new move by the CAA. That is important in the context of the congested area where there are many people around. As for permission for aerial work, when the CAA gives an operator permission, in certain circumstances, if you are going to be using it in built-up areas, then, yes, it should be, but in other areas such as agriculture or offshore work not necessarily.

David Goldberg: I fear that they will become mandatory, and not least at a national level but at an EU level. A massive report has been sent to DG MOVE ¹⁸¹and it has four recommendations. That is one of the major recommendations. It sounds terribly objective and technical and it is bound to be taken on board because it sounds as though it is something that can really be implemented and can protect privacy. Therefore, I fear that it will become a mandatory requirement and probably very much just a box-ticking exercise.

The Chairman: Oh dear. Are there any other questions from members of the Committee? Are there any questions from our witnesses? What have we forgotten?

David Smith: Everything I made a note of to cover has been covered very well, so I have nothing to add.

The Chairman: Thank you. It has been covered by you—the three witnesses. Mr Lee?

Peter Lee: Nothing from me, thank you very much.

The Chairman: Mr Goldberg?

David Goldberg: Not from me either, but thank you very much for the opportunity to be a witness before this Committee.

The Chairman: Thank you for giving your time and for putting so much effort into preparing for the questions.

¹⁸¹ David Goldberg amended this statement to say that it might be more accurate to state that it was sent to the "European Commission".

Laura Jacques and Paul De Hert—Written evidence (RPA0039)

Laura Jacques and Paul De Hert—Written evidence (RPA0039)

Submission to be found under Paul De Hert and Laura Jacques—Written evidence (RPA0039).

JARUS and EASA—Oral evidence (QQ 47 – 61)

JARUS and EASA—Oral evidence (QQ 47 – 61)

Submission to be found under EASA and JARUS—Oral evidence (QQ 47 – 61)

Peter Lee—Written evidence (RPA0040)

Response to the Internal Market, Infrastructure and Employment Sub-Committee of the House of Lords European Union Committee inquiry into the civil use in the EU of remotely piloted aircraft systems (RPAS).

1. I am delighted to submit written evidence in response to the Internal Market, Infrastructure and Employment Sub-Committee of the House of Lords European Union Committee's inquiry into the civil use of RPAS in the EU.
2. I am a practicing English solicitor with specialisms in technology law, data protection, regulation, intellectual property and contracts. I have one of the leading legal practices in Europe focusing on RPAS. My clients include RPAS operators, manufacturers and end users of RPAS services in several countries including the UK and US. I am also a committee member of the Technology Futures Group at the Society for Computers and Law and I lecture and write widely on the subject of RPAS technologies and the law.

Response

3. My expertise is primarily the law relating to RPAS. Therefore this response is largely focused on answering question 6 of the Call for Evidence. However, for several years I have spent a considerable amount of time with various stakeholders in the sector and so shall comment briefly on some of the Sub-Committee's other questions before addressing question 6:
 - a) I agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS. I believe the priorities they set out are sufficiently broad and comprehensive to cover the most immediate issues raised by RPAS integration and deployment in the EU.
 - b) Pan European coordination for RPAS regulation is fragmented. Basic national safety rules apply in many Member States, but the rules differ across the EU and a number of key safeguards are not addressed in a coherent way. The "RPAS Roadmap" has an ambitious objective of integrating RPAS into the European air system from 2016 and should go some way to addressing this. An even more complex matrix of laws governs flights between and across different states around the world and includes the Chicago Convention provisions and the ICAO rules.
 - c) One of the risks of a national approach to regulation is that some Member States can be slow to implement any regulations for commercial RPAS use. The issues of this approach were demonstrated in Spain earlier this year when a number of "pirate flyers" were exploiting the vacuum created by a lack of clear rules. These RPAS operators were pushing (or flagrantly ignoring) the boundaries of safety and professional acceptability and their antics, often posted online, attracted concerned interest internationally especially on social media sites.

- d) Many small RPAS operators are frustrated at the different standards and regulations at national levels across European countries. For example, it is not at all straightforward for an experienced UK qualified-RPAS pilot to travel and offer his or her services in another Member State. The complexity of different national regimes therefore risks stifling the development of the small RPAS services industry.
- e) There is no doubt that the RPAS industry will create jobs in the coming years. I believe the most exciting growth will be with SME companies. SME's are typically agile and innovative enough to thrive in the rapidly developing RPAS market. There is also room for highly technically specialised SME manufacturers to be contractors and subcontractors in complex civil and military RPAS projects. Two excellent examples of successful British RPAS SMEs are industrial inspection services provider Sky-Futures who are heavily involved in the government supported "Business is Great Britain" campaign and Blue Bear Systems Research, a manufacturer of automated and autonomous systems that participate regularly with UKTI and various trade delegations.
- f) Over the past 12 months in the UK and US I have noticed a significant increase from angel investors, venture capital funds and industry investors that are interested in investing in SME RPAS companies.

Question 6: Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

Data protection and privacy

- 4. The Call for Evidence question above asks specifically about data protection i.e. citizens' information privacy. I think the question would be better posed if it also more widely considered the impacts on privacy and freedom of expression; both rights that can seem at odds but are fundamental in a democratic society. These rights are enshrined in the European Convention on Human Rights and are enacted in Member States by national legislation.
- 5. Good pan European legislation should be flexible enough to cope with innovative, disruptive technologies that may not have been envisaged by the legislation's original draftsman. The role of judges and lawyers is then to apply the existing laws to tackle the effects of such new technologies. Europe and the UK have a long and generally successful tradition of doing this and in my view it should not change. There should be no need for new privacy laws for RPAS (beyond those that are currently being formulated for wider application such as the new General Data Protection Regulation); rather there should be straightforward guidance and consideration of the issues so that the law can be applied fairly and consistently to the use of RPAS.
- 6. National aviation authorities should coordinate closely with national data protection regulators. To this end, the UK Civil Aviation Authority (CAA) and the Information Commissioner's Office (ICO) have been coordinating their activities. Recently the ICO

consulted on a revised Code of Practice on CCTV that included a section on emerging technologies and RPAS. A recommendation I made to that consultation is that “Privacy Impact Assessments” should be a mandatory part of any operations manual that a prospective RPAS pilot must submit to the CAA in order to apply to receive permission to fly for aerial work or surveillance purposes.

7. It is important to acknowledge that RPAS have many uses, not all for surveillance purposes, and so any privacy impact of RPAS is largely dependent upon how the technology is deployed. It is clear that if RPAS is used in a covert surveillance role against human activity then the privacy and data protection impact risks are likely to be significantly higher than if a RPAS is to be used to analyse crop damage or an isolated offshore oil platform. Developments in the law and associated guidance must deal with these differences and the European Commission’s Communication appears to generally acknowledge these distinctions where it states “*the regulatory framework should reflect the wide variety of aircraft and operations, keep rules proportionate to the potential risk and contain the administrative burden for industry and for the supervisory authorities*”.
8. Most RPAS operations are pre-planned and it should be possible to coordinate with the public, authorities and various other stakeholders in advance of an RPAS flight to manage privacy and physical safety risks. The main exceptions to this are disaster response deployments and rapid response journalism. The latter could become a vital part of reporting up to the minute, nationally important and breaking news in the future. Therefore, it is very important that the national aviation authorities and data protection regulators work together to ensure RPAS technology is sensibly regulated for this purpose. The authorities should consider recommending a data protection and airspace permission exemption for rapid response RPAS journalism similar to the exemption for journalism, art and literature to protect freedom of expression incorporated in the UK by s 32 of the Data Protection Act 1998. If this particular developing area of rapid response journalism by RPAS is ignored then irresponsible, amateur cameramen will, in all likelihood, attempt to take footage anyway and try to sell it to news agencies. This will result in significant risk of physical accidents and privacy concerns.

Liability and insurance

9. In the short term there is arguably no need to significantly change or create new liability and insurance laws for RPAS use. This is because the well-established principles of negligence and contract law have proved to be broad enough to successfully apportion blame for accidents in the automotive, marine and flight sectors; even allowing for new technologies that were not envisaged when the laws were developed. This is the case across Europe despite differences in national laws as well as between common and civil law jurisprudence. Furthermore, the aviation community generally accepts strict liability—here liability usually rests with the manufacturer responsible for a defect in a product that causes injury. In the EU such strict product liability claims are harmonised under the Product Liability Directive. In addition to this regime there

exists a straightforward mandatory requirement for RPAS operators to have liability insurance under EU Regulation 785/2004.

10. As robotics, artificial intelligence and automation develop further and systems become capable of making critical decisions without the intervention of a human, law makers may have to consider a new form of legal personality to cope with the actions of an “intelligent thing”. This legal form could sit somewhere between traditional notions of a legal object and a legal person. Such an approach would probably need to be underpinned by fresh thinking on underwriting risk by the insurance sector.
11. Finally, it is important that the industry has strong regulators. It was encouraging to see that in the CAA has recently prosecuted two reckless small RPAS pilots. However, the CAA must work harder at explaining RPAS regulation to operators, prospective users and the public (especially as it is now possible to purchase a fairly advanced RPAS system for less than £1,000 by mail order). The CAA website is the main access for most stakeholders to the authority and the rules; it is not user friendly, too complicated and difficult to navigate. The CAA should look to other regulators such as the Intellectual Property Office, Ofcom and the ICO that have all developed clear, user friendly websites despite each having technically complex subject matter to communicate.
12. Decisive action and clear guidance by regulators will help ensure safety and also protect the development of a legitimate RPAS industry that has significant economic and societal potential.

September 2014

Peter Lee (Taylor Vinters LLP), the Information Commissioner's Office (ICO) and David Goldberg, Academic lawyer—Oral evidence (QQ 149 – 161)

Peter Lee (Taylor Vinters LLP), the Information Commissioner's Office (ICO) and David Goldberg, Academic lawyer—Oral evidence (QQ 149 – 161)

Submission to be found under the Information Commissioner's Office (ICO), David Goldberg, Academic lawyer and Peter Lee (Taylor Vinters LLP)—Oral evidence (QQ 149 – 161)

Dr Kevin Macnish—Written evidence (RPA0020)

This contribution is not submitted on behalf of any organisation.

Executive Summary

- There are important ethical differences between the capabilities of fixed-wing and quadcopter RPAS, and between the use of RPAS by the state and their use by private individuals.
- Ethical issues regarding RPAS extend beyond privacy and safety. Additional concerns include chilling effects, diminution of trust in police, and a sense of vulnerability.
- Access to fixed wing RPAS should not be extended to the civil state but restricted to the military to mirror the current civil-military arrangement regarding access to RAF Sea King search and rescue helicopters.
- Acceptable use of RPAS by the state should be stipulated in law to prevent function creep leading to the arming of RPAS in extreme situations with non-lethal weapons.
- Existing laws concerning stalking and peeping Toms should be reviewed to ensure that they cover such activities when carried out by RPAS.

Response

Introduction

1. This response will deal with the ethical issues arising from the use of Remotely Piloted Aerial Systems (RPAS). It will firstly draw an ethical distinction between fixed wing and quadcopter RPAS, and then between RPAS operated by the state and those operated privately. Finally, attention will be drawn to harms arising from surveillance by RPAS other than privacy/data protection and safety.

Fixed Wing RPAS and Quadcopters

2. A number of RPAS have been developed for use in recent years. These have tended to take two forms: fixed wing Reaper and Predator-type vehicles used initially by the US military and “quadcopter” which are available on the private market. For a number of years, both sorts of RPAS have been used in civil contexts: the US-Mexican border is patrolled by unarmed Predators, while the UK 2012 Olympics was overseen by quadcopters.
3. There are important technical and ethical differences between fixed wing RPAS and quadcopters. The former have a significantly higher ceiling of up to 50,000 feet (1.5km), virtually invisible to the naked eye from the ground. At such heights they

are also effectively silent to people on the ground. Their size enables them to carry more powerful surveillance equipment such as Gorgon Stare or ARGUS (Lee, 2013; Shachtman, 2009), systems which allow a single vehicle to record activities in an entire city to a reported resolution of six inches. They are also able to remain airborne for long periods of time. The Reaper is able to fly for 14 hours, and research is underway for solar-powered vehicles to remain airborne for years (Barr and Albergotti, 2014).

4. By contrast, quadcopters have a lower ceiling of around 200m and a flying time of approximately 60 minutes (sometimes considerably less). They are able to carry high definition cameras, but from the limitation in altitude one vehicle does not have the capacity to record the activities of an entire city. If the capacity of quadcopters increases significantly in terms of flying time, altitude and surveillance capacity then the difference between these and fixed wing RPAS clearly diminishes.

State and Private Use of RPAS

5. The difference in technical specifications between the fixed wing RPAS and quadcopters has an ethical significance. Quadcopters differ little from existing helicopter capability. They are cheaper to operate and can operate in arenas inhospitable to human pilots, such as areas of high radiation. Their flight time is less than that of a helicopter and the ceiling is lower. As such, the ethical concerns of a quadcopter when operated by the state are similar to those when the state operates a helicopter. In the UK, for example, police use of quadcopters is likely to be broadly similar to that of helicopters. However, there is likely to be an earlier resort to quadcopters rather than helicopters owing to their relative cost. It is also possible that if police use of quadcopter flights do not have to be logged with air traffic control that there may arise situations of public risk (through in-air collisions) and poor accountability for police use of RPAS.
6. New ethical concerns arise when authorities with current access to helicopters gain access to fixed wing RPAS. Fixed wing RPAS extend surveillance capacities to an extent hitherto impossible in the UK. A single RPAS is able to remain unnoticed by the public in the skies above a city while monitoring the activities of everyone in that city. This is akin to a single authority controlling every CCTV camera in a city in real time. The capabilities of a fixed wing RPAS can go beyond that of CCTV, though, insofar as RPAS may also be fitted with infra-red capability, to allow vision through walls, and aural capabilities for intercepting mobile phone calls and call records. It could, in essence, be a “one-stop shop” for state surveillance.
7. The power (for good or ill) that would thereby be vested in an authority with fixed wing RPAS could be significant. This is of particular concern in the UK where the authority with access to such vehicles would most likely be the police. The disparity in power between the police and the public could become such that policing by consent becomes anachronistic and the British police take on a more authoritarian role. While there may be times of exceptional national concern, such as the summer 2011 riots, when fixed wing RPAS may be useful in patrolling cities to rapidly identify

areas of concern, these are not so frequent that the use of these aircraft should be standard.

8. It would be preferable for the use of fixed wing RPAS to remain with the military and be used in cases of national emergency by the military working with the police. This would be similar to the current use of RAF-piloted and owned Sea King helicopters for search and rescue operations in remote or inhospitable areas. While fixed wing RPAS currently could not perform a rescue operation, they could be extremely effective at locating missing persons in mountainous areas or at sea, and at delivering emergency rations or first aid kits to individuals awaiting rescue, especially when operating at night or in inclement conditions.
9. This discussion has focussed on state use of RPAS for purposes of surveillance, both visual and aural. Given their widely-discussed military application, it is clear that RPAS are not limited to intelligence-gathering operations but can also be used for delivery. There may be a point in the future when they are armed with non-lethal, or even lethal, weapons in the domestic context. While this seems unlikely in the current climate, it will only remain unlikely with any degree of certainty if the acceptable purpose of RPAS use by the state (i.e. intelligence gathering) is clearly laid out in British law. Function creep, the tendency of the purposes of technology to change incrementally, would be a serious risk in the absence of any such laws.
10. Private use of RPAS, in the UK at least, is likely to be limited to quadcopters. Fixed wing RPAS are too expensive and unnecessary for private use in the UK, unlike the US where farm lands in need of crop spraying, for example, may extend over thousands of acres. Within this context, the concerns are that the citizen with a quadcopter could gain similar surveillance capabilities to the police with a helicopter. Furthermore, the low cost of buying and operating a quadcopter when compared with a helicopter suggest that many more citizens would own quadcopter RPAS than currently own helicopters.
11. Private uses of RPAS are varied. These range from film-making and journalism, to oversight of farms and hobbyists, to delivery of pizzas and books. None of these poses an obvious ethical concern. Safety concerns arise from an overuse, or poor use, in urban areas leading to collisions, or RPAS flying out of range or battery power and so falling from the sky. There are also concerns for the privacy of individual citizens from peeping Toms and stalkers, each of whom would find their practices easier to engage in with an RPAS. It is noteworthy that there were 10,535 prosecutions for stalking and harassment in the UK between April 2013 and March 2014 (Boetcher, 2014). The abuse of RPAS by these individuals is best dealt with by ensuring that existing laws regarding stalking, peeping Toms and telephone interception extend to cover cases involving RPAS and do not allow for loopholes.

Harm and RPAS

12. The potential for harm from RPAS therefore exists when these vehicles are operated by both private and public bodies. There is a tendency when considering the harms

of surveillance to focus on privacy, compounded by safety issues in the case of airborne surveillance. However, there are a number of further concerns that should be weighed when looking at surveillance, particularly when it is carried out by the state. These include the following, each of which will be explained in paragraphs 13-17 below:

- I. Chilling effects (para. 13)
- II. Social sorting – stereotyping, stigmatization, discrimination (para. 14)
- III. Imbalance in distribution of costs (para. 14)
- IV. Paternalism (para. 15)
- V. Social fatalism (para. 15)
- VI. Behavioural uniformity (para. 15)
- VII. Reduction in trust (para. 16)
- VIII. Vulnerability (para. 17)
- IX. Fear of control (para. 17)
- X. Human error and abuse of power (para. 17)
- XI. Fear of legitimately hidden information being “found out” (para. 17)

13. Chilling effects occur when an individual or group is deterred from engaging in politically legitimate activity, such as demonstrating or voting. If an individual or group declines to engage politically for fear of retribution by the state then they are said to have been chilled from engagement. This possibility can be widely recognized in our insistence on private polling booths during elections, such that an individual’s vote cannot be impacted by the fear of surveillance from the state. More broadly, individuals or groups may be deterred from expressing frustrations with the state through demonstrating if they fear having their faces added to a police database as a result of surveillance.

14. Social sorting occurs through groups in society being treated differently owing to particular characteristics of that group, such as race, religion, sex, or age (Lyon, 2002). A notable example of this occurred when Islamic communities in Birmingham were targeted by so-called “rings of steel” in Project Champion (Thornton, 2010). Similar problems arise through the increased attention paid by CCTV operators to young black men, who are perceived to be more likely to commit crime than any other group in society. Related to social sorting is the imbalance in distribution of costs of surveillance. In the case of Project Champion, the innocent members of the communities most affected bore a cost of high levels of state surveillance that the remainder of the UK did not have to endure. This serves to exacerbate divisions in society.

15. There is a danger that high levels of state surveillance may also have an infantilising effect on citizens. There may be a sense of state paternalism (“we are watching you for your own good”), social fatalism (“there is nothing that I can do as ‘they’ are always watching”), or behavioural uniformity (“I do not want to do anything that makes me stand out from the crowd and thus invites attention”). All of these are typical of states with high levels of state surveillance, including Russia, China, North Korea, and the former German Democratic Republic. At the same time, each of these

perceptions reflects a diminishing of individual autonomy and thus poses a risk to a democratic society.

16. It is often said, or intimated, that “if you have done nothing wrong then you have nothing to hide” from surveillance. This is patently false. I do nothing wrong when I undress at night, but still I close my curtains. However, the prevalence of this attitude may lead to a reduction of trust in those who insist on privacy in a society where privacy is an increasingly rare commodity. The implication is made that if I do not want state surveillance then I must be in some way at fault and thus I become a target of distrust (and, ironically, potentially increased surveillance) by those who know of my dissent. There is a related concern that children brought up with CCTV in school toilets and changing rooms, and biometric methods of paying for school meals, will see these as the norm and distrust anyone who wishes to avoid such methods. Thus surveillance is “normalised” without question as to its dangers. This same concern at normalisation of surveillance exists with fixed wing RPAS.
17. With increased surveillance often comes increased fear. This does not have to involve only political activities, but simple fear of (non-criminal) secrets being discovered. These may include a person’s sexual orientation, religious beliefs, or occasional cross-dressing preferences. There is a fear of being found out, and potentially of being manipulated, blackmailed, or otherwise controlled by the surveillant. There is also the potential for (and the fear of) human error and abuse of power emerging from information gained by surveillance.

Summary and Recommendations

18. In summary, there are currently significant differences in the technical capabilities of quadcopters and fixed wing RPAS. These differences have ethical implications which will depend in part on who is operating the RPAS. In the case of the state operating fixed wing RPAS there will be a significant increase in surveillance capability over that currently available. State use of quadcopters, at least with their current limitations, will by contrast differ little from that of helicopters, although the use of quadcopters may be greater owing to the relative cost. Private individuals and groups are less likely than the state to have access to fixed wing RPAS but again their low cost means that quadcopters will become widely affordable. There are many good uses of RPAS by the state and private groups, but there are dangers as well. In the case of private use these dangers tend to revolve around stalking and public safety. Where the RPAS is operated by the state there are greater harms which emerge. While discussion of these dangers tends to focus on privacy and safety, these harms are more widely ranging and more deeply felt.
19. It is my recommendation that the civil state does not have easy access to fixed wing RPAS. There may be occasions when civil use of fixed wing RPAS by the state is called for, such as would have been a benefit to the police during the 2011 riots or some cases of search and rescue. In such cases standing arrangements with the military should be in place such that military-operated fixed wing RPAS can be used, as currently happens with RAF Seaking helicopters for search and rescue.

20. Private use of RPAS should be restricted by regulations affecting the flight ceiling and flight times of the vehicle, to prevent private capability nearing that of the current fixed wing capability. Existing laws regarding peeping Toms and stalking should be reviewed to ensure that loopholes do not exist which would exempt people engaging in these activities via a RPAS.
21. Finally, it is essential that the debate regarding surveillance at the policy level extends beyond concerns with privacy to an appreciation of the wider harms of surveillance. It is not simply a case of weighing one person's privacy against the security of the state. There are serious societal and particularly democratic harms that can arise from an inappropriate resort to surveillance. Such resort should therefore only be undertaken with care and deliberation.

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19 September 2014

Alan Mckenna—Written evidence (RPA0025)

Civil use of remotely piloted aircraft systems in the EU

1. My submission to the Committee takes a general approach which considers some of the relevant issues, rather than seeking to address specific individual questions posed by the Committee.
2. Whilst the European Commission are understandably concerned with the potential economic implications of further falling behind competitors in the development and use of RPAS, the Communication which identifies what are seen as the key factors in need of addressing to achieve the primary goal, does arguably in places suffer from a problematic vagueness as regards some elements of the approach put forward. As well, there might be seen to be at least one contradiction within the Communication, and also some omissions.
3. The Commission recognise that there needs to be regulatory certainty in order for investments to be made in RPAS. However, they also speak of taking a step approach to such regulations. This could be seen as risking the very thing that the Commission seeks to avoid, that being that competitors are able to increase their lead in RPAS development and use. Decisions need to be taken on what will and what will not be acceptable. For example research is already being undertaken that could enable RPAS to be used for passenger transportation. If there is a lack of certainty as regards the regulation on such matters, then investors are to prove less willing to provide the finance necessary for the research and development work to be carried out.
4. Little attention appears to be given to the private (non-commercial) use of RPAS. Although the RPAS hobbyist is not flying for commercial gain, they do remain within the overarching commercial development of the RPAS market, in that manufacturers will seek to meet (create) the demand of the personal user. It is also an area of the RPAS market in which via the private use of RPAS may well lead to innovative (commercial) uses. Consequently, both manufacturers and users will need to be fully appraised of the regulatory system that is applicable to them, just as much as those seeking to develop and use RPAS for direct commercial operations.
5. Whilst the Communication recognises the need for a public debate on RPAS use, it remains very unclear how and when such a debate will actually take place. We have from the Communication it speaking of the progressive integration of RPAS into non-segregated airspace from 2016 onwards, which it says must be accompanied by adequate public debate, but then there appears a void as regards such a debate. It is hard to identify any element of such a public debate taking place from the Commission's six Action Points. So in the absence of guidance as to when the Commission consider a public debate should take place, we need to look at the role

of the public debate to consider when would be the most appropriate time. Should it occur at the same time as the drafting of the regulatory structure for example? Or should it take place before the commencement of such drafting? There is a risk that if it takes place alongside the drafting process the central decisions may in essence will have already been made, with only the technical details to be worked out. This risks making any public debate hollow.

6. A major overarching question as regards RPAS is what will be acceptable to the public? Clearly safety is highlighted as something that cannot be compromised, but then we have a number of thorny issues affecting both commercial and private use, and these matters will need addressing. For example we have what might be termed the aesthetic nuisance issue. To what extent will the general public accept RPAS flying in the skies above them? We know as an example the controversy surrounding wind turbines, where the issues relate to both the appearance of the turbines (the blot on the landscape concern), and the issue of noise generated by the turbines.
7. In respect to commercial use of RPAS – what will be the flight path rules? Are we to have an open sky policy within set altitudes? If so, are we saying RPAS will be allowed to take the shortest distance where applicable, or would they be required to operate in specific air corridors? Such questions as these clearly link in to further matters such as the risk of the becoming observational hazards, and possible nuisance and trespass considerations.
8. As regards the question of jobs, whilst there may be job creation, although any figure must be pure speculation, with the development and use of RPAS we also need to think about the possibility of job destruction. It has already been widely publicised that Amazon have been undertaking experiments looking into the feasibility of using RPAS for delivery purposes. If it is shown to be commercially viable, there then becomes the question of scale. Could there be a wide scale impact on delivery jobs? Furthermore, if both job creation and job destruction proves correct, are we then looking at high end job creation, and low end job destruction, which would have its own economic and social consequences?
9. If wide scale use of RPAS for purposes such as delivery is possible, then we also need to think about any possible environmental impact. On the question of such an impact, whilst the Communication speaks of impact assessments, there appears no mention of any potential environmental impact, either negative or positive.
10. The Communication points to the important issue of the necessary resources being available to police any RPAS regulatory system. This needs to be carefully thought through across the EU. As things currently stand in the UK it can be said that the CAA does not have the human resources necessary for any wide regulatory role as regards RPAS. It may also be asked similarly whether there is the possibility of an increased

workload for the Information Commissioner's Office, and what might be the implications of this for that organisation?

11. In developing a pan-European regulatory structure, it will be important to provide for the rules to ensure that the operators of RPAS have the requisite competence. In this regard licensing should be mandatory, but where private operators are involved in the licensing process, for example to assess the competence of individual operators, it will be important that not only should there be a requisite standard recognised across Europe, but that there should be adequate competition amongst such certification providers.

19 September 2014

Metropolitan Police—Oral evidence (QQ 162 – 175)

Evidence Session No. 12

Heard in Public

Questions 162 - 175

MONDAY 17 NOVEMBER 2014

Members present

Baroness O’Cathain (Chairman)

Lord Brooke of Alverthorpe

Lord Clinton-Davis

Lord Cotter

Lord Fearn

Lord Haskel

Baroness Hooper

Lord Kakkar

Baroness Valentine

Lord Wilson of Tillyorn

Examination of Witness

Chief Inspector Nick Aldworth MPA, Dip PR, Metropolitan Police

Q162 The Chairman: Good afternoon, Chief Inspector. Thank you very much for giving up your time and expressing an interest in coming to give evidence to this Committee. First, I have to ask, as I always do, whether any Member has any interests to declare in relation to this meeting or the questions that we have just talked about. No? Thank you. Members have declared their interests that are relevant to this inquiry on our own website, and any Member with a relevant interest should disclose this on the record. We say that the whole time, and I am sure it happens.

This is a formal evidence-taking session and a full note will be taken. This will be put on the public record in printed form and on the parliamentary website. You will be sent a copy of the transcript and you will be able to revise any minor errors. The session is on the record, is being webcast live and will subsequently be accessible via the parliamentary website. You are very welcome to submit written supplementary evidence after this session if some thought comes winging its way to you. The witness and Members are reminded to speak up, although the acoustic is quite good in this room, so that everyone will be able to hear you properly. Also, the recording is very sensitive and if you do make asides you might regret it.

Chief Inspector, would you like to make any brief opening remarks.

Chief Inspector Nick Aldworth: Thank you, my Lord Chairman. I represent the Metropolitan Police service and a much broader group of police and other agencies across the UK. We are currently looking at how we will respond to the emerging challenges of what this Committee defines as RPAS. Please excuse me if I slip into using “UAV¹⁸²” or “UAS¹⁸³”, but they refer fundamentally to the same things: things that fly and do not have pilots in them. That is the best way for me to describe them.

In particular, my strand of work within that group is to see how we can best work with the Civil Aviation Authority and others to use existing legislation to best effect. There is a degree of national cohesion on this project already, and although I represent the Metropolitan Police service, the working group’s broader intention, once we come to a conclusion, is to start rolling out some of that work nationally through some of the existing national structures.

Perhaps I will just lay on the record before we commence that there are a number of policy constraints that I will have to operate under today in respect of what I may or may not discuss. I am not permitted to discuss security or police use of this technology.

Q163 The Chairman: Thank you very much. I think we are quite aware of that. Thank you very much again for coming.

The increased civil use of RPAS has raised fears about invasions of privacy and a new potential physical threat to people and property. Are these fears justified?

Chief Inspector Nick Aldworth: I never like to talk about fear in respect of crime. Thankfully we live in a very safe country that is becoming safer, but certainly we are looking at the emergence of this technology, which we believe undoubtedly creates opportunities for negligent, reckless or malicious use. We have certainly seen some behaviours and some examples across the world and in the UK of activity that we would certainly seek to enforce against. Some of those examples have most definitely occurred in the UK. Commonly our intelligence feed into that activity at the moment is the internet and material that is posted on the internet, often showing the offences after they have occurred, thereby leaving us with very little opportunity to subsequently investigate. That is part of the work that I am undertaking with the broader group at the moment.

As you will be aware, we do not have a criminal privacy law in this country, so it is not the concern of the police to try to develop or enforce it, but we do sense that this technology creates opportunities that would engage with other legislation that people would properly consider protected their privacy. The most obvious example to date is the Sexual Offences Act 2003 and the specific offence of voyeurism.

Is it conceivable that we will have these things, particularly the ones with cameras, hovering outside people’s bedrooms for whatever nefarious reason? I can definitely tell you that this technology has been used around London, and we are very aware that it has been used

¹⁸² Unmanned Aerial Vehicle

¹⁸³ Unmanned Aerial System

elsewhere in the UK. There is quite a lot of imagery of these devices flying over football stadiums, for example, which would be in contravention of the Air Navigation Order¹⁸⁴, potentially creating a public safety risk if it were to suffer some sort of power or flight failure and then come into the ground. We are talking about devices that are probably up to about 7 kilograms and have significant height ability, and that sort of weight dropping from the sky would, I imagine, cause problems if it struck people. However, there is legislation to deal with that.

We also know that this technology has been used to embarrass people, either VIPs or members of the public. There is, in my world, a famous clip of one of these devices being dropped at the feet of Angela Merkel while she was giving a presentation somewhere in Germany. Could we see that sort of protest or disruption activity in the UK? The internet is such that it breeds copycat behaviour, I suspect, and it is certainly one of the areas that we are looking at.

Q164 The Chairman: Thank you. We have had quite a lot of expressions of concern in some of our evidence sessions, and I do think that privacy is very high in people's minds, because they do not know, as you do, about all sorts of other security problems. Do you think there is any way in which you are ever likely to be able to control that if something comes buzzing past you, looks in through your attic window and goes off again? Frankly, with the police having all the work to do that they have, if somebody complains it is unlikely to go right to the top of the Met.

Chief Inspector Nick Aldworth: The big challenge is in the application of the legislation and actually finding the person responsible for that offence. When this material appears on the internet, for example, it cannot necessarily be attributed to the pilot or the person flying the machine. They are the person who actually commits the offence, not the person posting the image on the social media site or wherever it has appeared. So I think you are absolutely right: if it whizzes past your window and catches something you would rather it did not catch, unless we can get there there and then and identify the pilot or the person flying the machine, subsequent intervention becomes far more challenging than it would be otherwise.

The Chairman: Yes I see. Would any other Members like to ask a question?

Baroness Valentine: Just on a point of clarification, you are saying that the law as regards privacy is sort of fit for purpose; it is catching people that is the problem. Is that correct?

Chief Inspector Nick Aldworth: Please let me clarify. The law of privacy clearly does not exist in criminal terms, but there are specific offences under the Sexual Offences Act, for example, which we could overlay if it was used in that context for voyeurism specifically. There are other offences that we are looking at to see whether we could overlay them, but as with so many things historically in policing we tend to try to shoehorn legislation to fit emerging challenges, and although we will look perhaps at some offences under the Public Order Act 1984, such as harassment, I cannot imagine that when that legislation was instigated—it was that long ago—anybody ever had that sort of use in mind for this sort of purpose.

¹⁸⁴ The Air Navigation Order 2009 is legislation regarding safe use of aircraft.

Baroness Valentine: But your primary concern is catching the offender at the moment as opposed to the legislation being fit for purpose?

Chief Inspector Nick Aldworth: I look at it as a two-pronged approach. I am trying to develop some sensible application of the legislation that currently exists. I have some concerns about how practical some of that legislation is for us to actually implement.

The Chairman: Lord Clinton-Davis, I believe you want to come in here.

Q165 Lord Clinton-Davis: I do not know whether you can answer this question, but how many police officers are involved who have direct knowledge of RPAS?

Chief Inspector Nick Aldworth: I could not give you a definite answer, but the working group on which I sit is quite small. There are half a dozen of us; there will undoubtedly be others. With new and emerging problems, to start with the police service tends to act independently with experts in different forces using their own personally gained knowledge to try to resolve local problems. Then you get to the stage we are at now where somebody recognises that there is challenge to be met and starts to bring a bit more national cohesion to it. That is definitely the stage that we are at now.

Lord Clinton-Davis: But when you talk about six people, you are talking about the Metropolitan Police.

Chief Inspector Nick Aldworth: No, I represent the Metropolitan Police on a much broader group.

The Chairman: I see.

Lord Clinton-Davis: I see.

Chief Inspector Nick Aldworth: That group would probably be half a dozen more police officers who are actively involved in working on this issue, but again that is unlikely to be full-time work; they will all be doing other jobs, as I do.

The Chairman: But if your group of six came to the conclusion that you really had to go much wider on this, would there be agreement from the powers that be—the Home Office or whatever, or even the head of the Metropolitan Police—that this should happen?

Chief Inspector Nick Aldworth: Aspirationally, the work that we are doing at the moment is building the foundation to roll out very clear guidance and policy nationally.

The Chairman: I see.

Chief Inspector Nick Aldworth: I sometimes find that an incremental approach on some of these issues is a little easier, and I am involved only because it has become an apparent problem in London in particular, or some of the more obvious offending has happened inside London and we have picked up the mantle, if you like, to protect our own territory. But there is every intention that once we have some definition in the working group and the work of the group, it will be rolled out nationally.

Lord Brooke of Alverthorpe: Good afternoon. You have expressed the view that some concerns have already started to be established, and I wonder whether you are at liberty to share those with us.

Chief Inspector Nick Aldworth: The concern is really the fact that we are seeing this technology being used for criminal conduct. We have undoubtedly seen it flown in controlled airspace. We have undoubtedly seen it used to harass people. We have seen it flown in contravention of the Air Navigation Order. So the concern arises from the fact that there is clearly a means of offending that we do not seem necessarily to be able to address quickly. Our concern is whether, when you look at these devices and how available they are becoming and at the price coming down—and we are approaching Christmas—we are likely to see greater use of this technology moving into next year and the year beyond. I suspect the answer is very probably yes.

The Chairman: It will be top of the list, I should think, on a lot of people's Christmas list.

Q166 Lord Fearn: What is the relationship like between the police and the CAA¹⁸⁵ in regulating the use of RPAS? Is there a clear understanding about each other's respective roles?

My supplementary question is whether the organisations are sufficiently resourced to do what they are doing.

Chief Inspector Nick Aldworth: We have an excellent working relationship with the Civil Aviation Authority, and in fact my last act before coming here this afternoon was to follow up on an exchange that I am having with it regarding some legal matters. So at a project-group level I would say that the relationship with the key CAA enforcement team is very strong and very, very collaborative. As the Committee will be aware, the CCA is the commercial RPAS regulator. It has very little statutory authority over the private use of RPAS unless that use breaches the Air Navigation Order, so my sense is that it has some real limitations as to what it can achieved in the face of the volume that might be coming around the corner.

It would not be for me to say whether the CAA is well resourced or otherwise. That is probably for the CAA to answer. I am conscious that it has a relatively small team and a big challenge in looking across the whole of aviation in the UK. The key to that has to be public safety, and that, offset against yobbery, using this to harass somebody, is probably not going to be at its highest level.

What is really important is that up to this date it has been our practice to refer the misuse of RPAS to the CAA to resolve. Part of our wanting to be more proactive in policing enforcement is the recognition that it is unlikely to have the capacity to deal with potential problems leading into the future. My sense from talking to my colleagues in the CAA is that that is the most welcome approach.

The Chairman: Yes, it all falls back on you.

¹⁸⁵ Civil Aviation Authority

Chief Inspector Nick Aldworth: I represent an organisation of about 32,000 in London alone, so my sense is that we definitely have more capacity with the lower-level offending.

Lord Fearn: Are they part of your small team, or are they quite separate from the police?

Chief Inspector Nick Aldworth: The team is multidisciplinary and I believe that some of the individuals have spoken to the Committee. It is probably best not to disclose the origins of the organisations of other individuals. Representatives of the CAA definitely attend all the meetings. The most recent was about two weeks ago, and I sat next to the CAA. I have another meeting on 28 November with the CAA, which shows how closely and regularly I work with them.

Baroness Hooper: Following on from that, I have a general question about the relationship between the police and private security forces. A lot of the installations where some of the activities of RPAS users might be suspect are probably controlled by private security forces. Again, would representatives of that side of security be represented on your working group?

Chief Inspector Nick Aldworth: I should emphasise that it is not my working group, it is one that I attend on behalf of the police service. To the best of my knowledge, I have only ever seen the police or governmental organisations attending those meetings.

The Chairman: Who actually runs your working group? Who set it up?

Chief Inspector Nick Aldworth: It is run by what was originally ACPO—the Association of Chief Police Officers.

Lord Brooke of Alverthorpe: While much police work may start in the state sector, a lot will invariably gravitate towards the private sector. A lot of the functions that we see now in many places are being undertaken by the private sector. I am a bit surprised to hear that you do not have any links with them. Are they being allowed to do just as they wish on their own?

Chief Inspector Nick Aldworth: Perhaps I misunderstood the question that the Baroness asked.

Lord Brooke of Alverthorpe: There is a great potential for them to use these machines.

Chief Inspector Nick Aldworth: I think I understand what you are asking. The issue for the police will be to enforce the areas where criminality occurs. It is not for us to regulate the private, commercial or governmental sectors in relation to the use of RPAS.

Lord Brooke of Alverthorpe: Could I put it another way? Are you aware of whether the private sector is being consulted to any degree by anybody in government?

Chief Inspector Nick Aldworth: I am personally not directly aware, but I understand that there is a cross-government working group and one of the areas that it has on its agenda is undertaking public consultation. More than that, I could not give you the detail because I do not have it.

Q167 Lord Clinton-Davis: We know that a man from Cumbria was prosecuted in relation to this issue. Then there was another case later on in Lancashire, although I believe that neither of them were proceeded with—or something of that order. Do you know of any issue concerning drones by which you have been directly affected?

The Chairman: Have you or your colleagues in the police force successfully prosecuted anyone for the use of a drone?

Chief Inspector Nick Aldworth: My Lord Chairman, to the best of my knowledge there have not been any police-led prosecutions. This refers back to the practice I mentioned earlier, which is that we may identify the offence but we would refer it to the Civil Aviation Authority to initiate the prosecution. My understanding is that the CAA has prosecuted a number of times on this particular issue, and obviously many other times on many other issues. The lack of police-led prosecutions in respect of the Air Navigation Order in particular would almost certainly be because of our lack of familiarity with that particular legislation. I can expand further if you wish.

Lord Clinton-Davis: Do the six people who are involved with you on this issue have any knowledge at all of what we are asking about?

Chief Inspector Nick Aldworth: In terms of the total number who have been prosecuted by the police, I suspect that it is probably a matter of not collating those numbers. If I were to send out a request to the 43 forces of England and Wales, I might well be able to secure an answer for you, but I would ask that the question should be refined in terms of whether the police have led prosecutions under the Air Navigation Order, for example, or whether they have led prosecutions of other offences in which RPAS have been involved. As you can see, we can engage with a broad, wide-ranging set of statutes with this particular technology. It might be recorded somewhere as a public order offence, and finding out whether that offence involved an RPAS would be quite difficult.

Lord Kakkar: Is there a way in which the RPAS technology might be modified or made more identifiable that would increase the likelihood of your achieving a successful prosecution?

Chief Inspector Nick Aldworth: Almost certainly. One of the things that would assist the evidence trail would be some form of registration. As now, if we found an RPAS on the ground, we would not necessarily be able to trace it back to anybody. If we found somebody with a controller, we would not necessarily be able to tie them to a particular aircraft. That is my understanding. But of course registration is not an area of my expertise, I am afraid. It has been discussed at some meetings that I have been to. I think there would be many challenges such as who administers the process. There are other issues in linking devices to people and to aircraft, but I am afraid that I probably cannot comment in any more detail; it is not my specialised area.

Q168 Lord Wilson of Tillyorn: You have more or less answered the question from Lord Kakkar, but I was interested by what Lord Clinton-Davis quoted from a Civil Aviation Authority news release in April this year. It said that the first conviction was a particular case. The fascinating thing to know is how on earth they knew who this particular device belonged to, because it eventually crashed into the water. You mentioned the registration of

devices, which is a very interesting idea. Do you happen to know in this particular case how the identification was achieved?

Chief Inspector Nick Aldworth: I am sorry, but I do not know. I cannot help you with that.

The Chairman: It all seems a bit James Bond-ish, does it not?

Lord Wilson of Tillyorn: You could not find out, could you?

Chief Inspector Nick Aldworth: I will be more than happy to contact the Civil Aviation Authority and forward it to you if it will give it to me.

The Chairman: We could contact the CAA ourselves. We do not want to burden you too many things to do because you have a lot to cope with anyway.

Q169 Lord Cotter: It just seems very surprising to me and I am sure to other colleagues that this piece of paper talked about the first conviction ever. In your submission you talked about all sorts of unsatisfactory events and you mentioned registration as a separate issue. Do you think that there will be increased police involvement in future events that will result in more convictions? Given the general misbehaviour in this area, I am quite surprised that something has not arisen before, such as people having their head knocked or whatever it may be.

Chief Inspector Nick Aldworth: I think Lord Cotter highlights one of the key challenges for us. Perhaps I may refer to one of the more notable events that we have seen on social media: a drone being flown around the Elephant and Castle and harassing people shopping there. That has been uploaded on to social media and it is there for the world to see, but of course what it does not show is who is piloting the aircraft. Even if you were to get an authority under the Regulation of Investigatory Powers Act 2000 to find out who the uploader of that information was, it would still not tell you who the pilot was; it would just tell you who uploaded that imagery. Perhaps that best highlights one of the great challenges for bringing a successful prosecution: it is because the person who is committing the offence of harassment or an offence under the Air Navigation Order would be the pilot, not the person filming it from a distance and finding it to be amusing.

The other challenge for us is that to the best of my knowledge—I use those words carefully—there have been no police-led prosecutions. That is simply because, for example, if one of these devices had been used to commit an offence of voyeurism under the Sexual Offences Act, it would not be recorded as an aviation issue on the police indices; it would be recorded as an offence under the Sexual Offences Act. Our ability to go and search for this information is somewhat diminished. Part of my strand of the project is to try to bring some cohesion and rationalisation into how we actually record these matters.

Lord Cotter: Thank you for your answer. It is not really within your ambit, if you like, but there does seem to be a terrific problem in identifying who is actually responsible for flying the craft, and perhaps it is something that the Committee will have to look into separately. But it seems to be quite a problem area in that you cannot actually identify a drone. Perhaps there could be a registration number on the drone itself or perhaps it could emit a noise so that we could identify who it belongs to or where it has come from.

Chief Inspector Nick Aldworth: Most definitely. In all law one has to find the points to prove and one has to prove all the points before the offence is complete. In this particular case one must find the pilot, and that pilot is the person who has committed the offence. Unless there is a sound and unarguable way of finding and identifying the pilot, there is nowhere to start, quite frankly.

The Chairman: This question is obviously eliciting a lot of interest. Four members of the Committee want to join in.

Q170 Lord Clinton-Davis: I asked you before about successful prosecutions. There is also the possibility of unsuccessful prosecutions. Do you know of any?

Chief Inspector Nick Aldworth: I do not, my Lord, but I do know of cases where we have chosen not to prosecute. An example of that might be—and this is a concern for everybody—that much of the activity that takes place is legitimate. It will be kids flying their RPAS or UAV which they just got for Christmas with no knowledge that they are possibly even contravening the law. I am certainly aware that in London we have come across people flying them in places where they should not be flying them. They have been, for example, American or Korean tourists. We have decided not to enforce the legislation that exists, even though they were in contravention of it, because it did not seem proportionate to do so in the circumstances that were presented to us. What we have to do as an organisation—this is part of the policy that I am attempting to develop—is set up a coherent way of recording that an event has taken place. There is no reason why we cannot do that, and that is a key strand of what I am trying to achieve. At least, if I ever come here again, I can give you a sound number for the number of interventions that we have made. Once we have that process in place, we will be able to consider what prosecution either did or did not arise from a particular encounter, why we prosecuted, why we did not prosecute, and whether there was a community resolution? I could not answer the question of whether there have been unsuccessful prosecutions because I do not know, but have there been circumstances in which we could have prosecuted and chose not to do so? Yes.

Lord Brooke of Alverthorpe: We went to Cranfield University to have a look at some drones there. On the return train journey I got into conversation with a man who told me that his home had been burgled last summer and his next-door neighbour had recorded the whole of the event on a camera on an RPAS. I asked him what had happened: whether the burglar had been traced and a prosecution case brought forward. What struck me first was whether the neighbour was actually in trouble himself for having taken those images, and secondly whether that would have been evidence that could have been brought to court and used by the police and the prosecution. Are you looking at this kind of issue?

Chief Inspector Nick Aldworth: I have to say that that had not occurred to me as something worth looking at. I suppose what I am optimistic about is that as the police become more aware of the problems that this technology may create, we will also become aware of the opportunities it may create. As for footage of a burglary taking place, we are presented with that kind of evidence quite frequently by way of CCTV or mobile phone footage. Depending on what it shows, it can become quite usable. I do not see any reason why footage from an RPAS could not be used. Of course, when you look at the Air Navigation Order articles, the individual concerned may or may not have been committing an offence by flying the device.

That then creates a moral dilemma for the law as to how we choose to move forward in that particular circumstance. As the Committee will be aware, how offences are dealt with is within the discretion of the police and one would hope that a sensible application of the law would take place.

The Chairman: Well answered, thank you.

Baroness Valentine: As a quick postscript on opportunities, if police helicopters can be replaced with quiet drones, I am with you on that.

I want to ask you about the overlap with cybercrime, because elements of what you are talking about must overlap with it. Do you have some mechanism for making use of whatever is happening in the police world around cybercrime to help with the RPAS investigation?

Chief Inspector Nick Aldworth: I am not sure that I have an understanding of a distinct connection between those two areas. I am sure the Committee will be aware that cybercrime is an emerging issue that I am most definitely not qualified to comment on. We are seeing a distinct overlap between RPAS and the internet in the posting of footage that people have taken. Some of that footage would certainly have been achieved through committing offences in respect of controlled airspace, or would show harassment offences being committed.

Q171 Baroness Hooper: Registration has been suggested as a method of tracing the ownership of these devices, but that would not necessarily lead to tracing the operator. The device could be stolen, I suppose, and then you would be in the same position as if your car was stolen and used for a criminal activity. Do you think it would be helpful to have some form of instructions in the packaging for these devices, particularly for those being sold as toys, and warnings that they might cause the individual to break the law? That does not seem to happen at the moment. Another point that occurred to me from the case that led to the first conviction was that the gentleman in question had built the device himself.

Chief Inspector Nick Aldworth: You make some very valid observations in that respect. Registration of itself is not the total solution. It is part of many solutions, one of which is having cohesive and effective enforcement. Another is education. I am most definitely aware that the CAA is working hard to engage with manufacturers to insert a flyer into their merchandise to alert individuals to the possibility that they would be engaging with primary legislation in the UK.

Q172 The Chairman: We asked questions on this when we started this investigation. We were led to believe that there was nothing at all inside the boxes that you could buy at Maplin, but we have had some evidence to the effect that there is beginning to be some.

Chief Inspector Nick Aldworth: I have certainly seen a sample of the material that they want to insert. I am uncertain as to whether they have got to that position yet. I believe they have met some significant manufacturers in the last few weeks. It is all part of ongoing activity to try to get a holistic resolution to this emerging issue.

The Chairman: Who actually has to run this? Who takes responsibility for doing just that and making sure that they can get legislation for bits of paper to be put in these boxes? Is it the police or the Home Office? Well, the Home Office and the police are they same, are they not? Who would it be? Would it be BIS?¹⁸⁶

Chief Inspector Nick Aldworth: I am uncertain as to whether anybody holds a statutory responsibility to make that happen. The advantage of working as a collegiate group is that we each take it forward in some way or other. By meeting regularly we have an understanding of who is doing what. It is not surprise that the three principle strands of the project that I am part of are enforcement, education and engagement. It is about trying to educate not only the police service in how to deal with this but the broader public on how they may well be committing offences. It is also about engagement with the industry to try to engender support for what we are trying to do.

The Chairman: It seems very good, therefore, that you have this group of six doing that.

Chief Inspector Nick Aldworth: I threw the number “six” into the discussion as indicative of a relatively small, tight-knit group. It is not a defined council of wise people, I am afraid.

The Chairman: We will not hold you to that number.

Baroness Hooper: As a further follow up, do you consult trade association-type groups? In this case that it would be the retail consortium, I imagine, that would instruct its members, if we are talking about guidance as opposed to a statutory requirement, to flag it up.

Chief Inspector Nick Aldworth: I cannot answer in any greater detail on this issue than I have already. It is very much within the bailiwick of the CAA at the moment on how they are managing it.

Lord Kakkar: You have kindly mentioned that it is existing legislation that would form the basis for achieving a successful prosecution. Has your group identified any particular legal impediment that would make it more difficult for you to achieve successful prosecution as we see greater use of these devices for recreational purposes and so on?

Chief Inspector Nick Aldworth: This is not easy legislation for a street police officer to enforce. It is relatively complicated in some respects. What I think complicates it is the fact that it involves the ability to measure distances in three dimensions, particularly in the enforcement of the Air Navigation Order. I am struggling with how you teach people to do that. My sense is that the Air Navigation Order articles had their genesis in more traditional aviation types, where that sort of measurement might take place through technical means such as radar or in-flight recorders—the sort of things that have enabled the CAA to bring prosecutions in more significant cases. Clearly those sorts of technologies do not work for RPAS. In Article 167, for example, I am potentially asking a police or civilian witness to tell me whether or not this device has flown “over or within 150 metres” of a “congested area”. That could prove difficult in identifying points to prove. What is 150 metres? I am not sure I could judge that on the flat accurately, to be honest.

¹⁸⁶ Department for Business, Innovation and Skills

There are other limitations. There is no power of seizure under the Air Navigation Order. Therefore, the ability to retain evidence and perhaps interrogate it further would be challenging. Certainly if we were looking to prosecute under other legislation, that would certainly attract the relevant powers to that legislation for the seizure of evidence, but if we were looking to enforce just under the Air Navigation Order it would be quite challenging.

Lord Kakkar: If I may make one further point, I know it is difficult because these are all recorded in different places, but if one looks at the proportion of activity in this area that might be subject to prosecution, how much of it falls in the premise of the Air Navigation Order and how much in other bits of legislation?

Chief Inspector Nick Aldworth: Of that which falls within my personal knowledge, probably about 75% is under the Air Navigation Order and 25% under other legislation.

The Chairman: That is very interesting, thank you.

Q173 Lord Haskel: To move on, an official from the Department for Transport told us that, “the time is drawing near when we have to look to have some sort of public dialogue with the general public on the use of RPAS and what they think” —presumably about what the rules should be. How do you think such a dialogue could be carried out?

Chief Inspector Nick Aldworth: In some respect I may have dealt with this in previous answers. In summary, where there is a risk of legitimate activity easily crossing the line into criminality, we have a duty to make sure that people are educated. There is the adage that ignorance of the law is no defence. On this particular issue, the connection between the law and innocent use is probably quite disconnected in most people’s minds. Most people will see these things as toys. We have an obligation to try to do something about education. As I have said, the CAA is attempting to do that through leafleting and trying to get manufacturers to carry that information. I know that its website carries information on the relevant legislation, but if you bought little Johnny an RPAS for Christmas it is unlikely that your first port of call would be to check the CAA website to see if you are breaking the law. That reverts back to the issue of whether manufacturers and retailers can do more to support the effort. Again, I do not have the detail of this, but the cross-government working group has a public engagement activity on its agenda. Key for me is the proxy dialogue through leafleting. I am led to understand that there are technical opportunities whereby GPS receivers can be programmed not to fly in certain areas, so that is something that people could think about. Almost certainly, if we are to end up in a position where thousands of young people get these devices for Christmas every year and then inadvertently start to commit offences, we really do need to be on the front foot about warning people of the implications.

Lord Haskel: How would one set about that? Would you want some sort of public dialogue?

Chief Inspector Nick Aldworth: I do not have the strategic influence to get government to tackle this in any particular way. From my simple perspective, the more we see in the media about this issue the better. That is only a good thing, and it warns people about these things. One of the reasons why we are keen to develop a cohesive prosecution strategy is because there is then a story upon which to hang the message to the public. For me, that is a priority so that we can start talking about this in a more public and fact-based way. For a lot of

people, and me included to some degree, it is almost a hypothetical scenario because we have not actively prosecuted on the adverse use of this technology.

The Chairman: You mentioned that the Government would have to think about it, but surely we have public service broadcasting. Very often there are warnings about drink-driving, seatbelts and lots of such things for which there are TV adverts that have an immediate impact. This is a new technology with potentially very difficult and dangerous effects. Would it therefore be in the public interest for that to be brought to the attention of everybody?

Chief Inspector Nick Aldworth: I would not disagree, but I recognise that many people out there are trying to compete for limited airspace with very important messages. Whether the lower level of offending, which is the most likely current problem, would reach the threshold whereby people would give us that sort of space is, I should have thought, unlikely. Speaking on behalf of the Metropolitan Police service, there are options to use social media. We run Twitter and Facebook accounts, and at the point at which I have something valid to say we will certainly be looking to exploit that technology. Our own website is one of the most frequently visited in London, so there is an opportunity to send out that message as well. There are opportunities. The challenge is always rolling it out nationally. I have a degree of influence over what happens in London but not necessarily what the chief constable in Manchester will choose to do within his or her force. We certainly have the support of ACPO in trying to develop this project.

Lord Haskel: How far up your list of priorities is this?

Chief Inspector Nick Aldworth: Personally, I spend an awful lot of time on this matter.

The Chairman: That is a very satisfactory answer from our point of view. We know that the matter is in good hands.

Q174 Lord Wilson of Tillyorn: I am sure you know that this is an EU Committee dealing with EU matters. The question is how the EU could, might or should helpfully get involved in this. Would regulation at an EU or international level be helpful in dealing with the sort of problems you face? I think, for example, of a tourist coming here from continental Europe. If there were EU regulations, they might know that there were certain things that one could not do with these gismos.

Chief Inspector Nick Aldworth: I would be getting well beyond my area of expertise if I started talking about European regulation, but I think there have been some sensible activities that would always help. Whether or not they are achievable is in the hands of others. As you mention, universal awareness of legislation is very helpful. As our borders rapidly disappear across the globe, not just within Europe, people's understanding of what might constitute an offence here would be very different in many circumstances from what constitutes an offence in their own country, so universal or European-wide legislation in this context would never be a bad thing, in my view. The most likely form of European regulation would most probably be on import-export activity and engagement with the manufacturers and to have a consistent approach towards material that comes in, either the capability of the equipment that is being sold or, going back to our education piece, our ability to get people to take messages on our behalf within the material that they are selling. I am afraid that beyond that my expertise on European regulation would be well and truly stretched.

The Chairman: I am just thinking about Lord Wilson's point that we are an EU Committee scrutinising EU legislation. Surely you must be consulted about proposed EU legislation, or are you? We do not know what the situation is. Have you ever been asked your view on something which the EU has proposed?

Chief Inspector Nick Aldworth: Like many people in the United Kingdom, I have been asked many times for my view on European legislation.

The Chairman: I mean professionally.

Chief Inspector Nick Aldworth: With respect, professionally I have not. I suspect that sort of engagement takes place at many pay grades above my own. As you are aware, at present the Home Office is talking about the European arrest warrant. I would find it inconceivable that the police had not been engaged in that in some form or another over that sort of activity, but at my pay grade I am afraid not.

The Chairman: Thank you very much. We have one question left, which concerns the uses the police could have for RPAS, with new guidelines being applied for the operation for example of crowd surveillance. I believe you are reluctant to answer that question.

Lord Brooke of Alverthorpe: If I may intervene, I can understand your reluctance, but a number of police have gone into the public domain saying what they are doing. We have evidence before us of reports from way back in March from Superintendent Brian Bracher down in Sussex where they have been using these things over at Gatwick Airport and have seen the opportunity for them to be deployed in a range of activities, so maybe we could have a little bit of an exchange on it.

The Chairman: As Chairman, I should say that if the witness is reluctant to do this, we should pursue it further outside this public evidence session and see if there is any way we can get round that. The last thing we want you to do is to get into a situation that you find uncomfortable and that we in turn would find uncomfortable.

Chief Inspector Nick Aldworth: I have to stand by the instructions I am given that it is operational policy for us not to discuss such matters. More significantly, I would definitely not be the best person to answer those questions, given that it is not the field in which I am currently operating.

The Chairman: If I said that we might pursue this with the Home Office or somebody, would that be satisfactory?

Chief Inspector Nick Aldworth: There are a number of aviation functions within policing, the National Police Air Service being one of those. Certainly, if this Committee felt that they would like to discuss that matter, I would imagine, but I do not know, that somebody from the National Police Air Service might be one of the people to go to.

Q175 The Chairman: For a final question, could you give us a list of people who would be involved in this so that we could pursue it and ask them ourselves, as we are running out of time now?

Chief Inspector Nick Aldworth: I have no problem at all with trying to identify somebody who can speak to you. My understanding is that the position I am asked to take is a national governmental position, if not just a Met Police position, so whether or not you will get that engagement from them I am not sure, but I am more than happy to find you the details of people you can ask.

The Chairman: That is extremely kind of you, Chief Inspector. I must say that this has been a brilliant session. You have been very helpful and have answered all our questions, whether they were close to the mark or not. Before we let you go, is there any question that you think we should have asked that we have not? If there is, can you tell us what it is and then answer it?

Chief Inspector Nick Aldworth: I do not think there is, to be honest. We have gone into all the areas that are of interest to me. I am particularly pleased that I have had the opportunity to discuss with you the opportunities and limitations of the legislation. We are most definitely in relatively virgin territory about how we move forward with this, but of course this is no different from the many different places we have been in the history of policing where new technology has arrived, criminals exploit it and innocent people accidentally wander into it. We have to try to be on the front foot and be one step ahead of them and be able to deal with this when it arises. The fact that we are relatively advanced on this matter at the moment says to me that we are definitely heading in the right direction and at the right pace. But, clearly, as a significant amount of the response and activity around RPAS is technically based, we will always have some limitations on how quickly people get around whatever it is that we do.

The Chairman: On behalf of all the Committee, thank you very much indeed. We are very grateful to you.

National Aeronautical Centre, Callen-Lenz Associates Ltd and Thales UK—Oral evidence (QQ 24 – 35)

National Aeronautical Centre, Callen-Lenz Associates Ltd and Thales UK—Oral evidence (QQ 24 – 35)

Submission to be found under Callen-Lenz Associates Ltd, Thales UK, and National Aeronautical Centre—Oral evidence (QQ 24 – 35)

National Centre for Precision Farming UAS Special Interest Group—Written evidence (RPA0016)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

Background

This response is on behalf of the UAS Special Interest Group (SIG) at the National Centre for Precision Farming (NCPF). The NCPF UAS SIG was set up at the end of 2013 and brings together experts from academia and industry to increase discussion, networking and collaboration. The UAS SIG is open to everyone interested in the use and development of UAVs in agriculture. The SIG is initially chaired by URSULA Agriculture, with secretariat services provided jointly by URSULA Agriculture and Harper Adams University (HAU) as the founder members.

Introduction

The NCPF UAS SIG welcomes the opportunity to provide a response to this ‘Call for Evidence’ and fully endorses the importance of the civil use in the EU of remotely piloted aircraft systems (RPAS). Responses to each of the questions posed are as follows:

1. Do you agree with the priorities identified in the European Commission’s Communication for opening the aviation market to the civil use of RPAS? Are there other priorities, which should have been included?

- 1) We broadly agree and support the European Commissions (“EC”) approach to the development of the RPAS market, technologies and associated regulation. However we would highlight a concern that the approach appears to anticipate a uniform framework of development and requirements for all RPAS under 150kg. We believe this would restrict the development of RPAS in the sub 20kg category (with a substantial proportion of these being sub 7kg), which have to date proved to be the largest and most flexible growth area. We anticipate this will continue to be the highest growth area, particularly as miniaturization of sensors and components enables ever-increasing capabilities in smaller systems. We believe that an approach focussed on the sub 20kg category would provide more tangible short term benefits, particularly in the agricultural domain.
- 2) We would also question the degree of inclusion of social and privacy issues in the EC paper. These are unrelated to the development of RPAS and are catered for through national and international legislation that already exists. The use of RPAS for aerial work is likely to be far less intrusive than CCTV coverage and the use of mobile phone cameras.

2. What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

- 3) For larger RPAS that will operate in the same airspace and look to replicate manned aircraft, there would be obvious advantages of international regulations governing operations. However, with smaller RPAS a national or geographic approach that could respond more quickly to developing technologies would better assist the development of the industry.
- 4) It should be noted that there is already significant commercial activity and economic impact in the small RPAS sector in the UK, including the Precision Farming sector, which AUVSI predicts to be the most significant growth area for the USA. Any new regulatory framework should ensure it safeguards existing licenced activity, or commercial revenue or the UK's current lead in this area may be lost.
- 5) The UAV SIG believes that the EU's actions are consistent with, and potentially ahead of, developments in other non-EU countries. While we consider it extremely important to liaise at an ICAO level, the UAS SIG would consider that the proposed actions from the EC is currently market leading, with legislation in the United States in particular still not close to being realised. The UAS SIG feels it is important to enable the EC to maintain / develop a market lead, while at the same time ensuring safety is paramount.

3. In which new or innovative ways do you think RPAS will be used in the future?

- 6) The portability and relatively inexpensive nature of small RPAS make their deployment cost effective and time sensitive. Key areas for the future include:
 - Precision Agriculture – harvesting, yield prediction, vegetation, pest, disease and soil analysis, integrated remote sensing generally, including land usage assessment and potential precision livestock farming (PLF) applications
 - Forestry – Inventory and management of pests & diseases
 - Environment - Environmental and ecological change monitoring, and land usage assessment

In particular, for precision agriculture and farming, we believe near and medium term uses include:

- Low altitude (<10m)

Animal herding, Low flight sensor applications, Targeted weed, disease and pest treatment, Seed planting, Disease detection, Sample capture and transportation.

- Medium Altitude (10 to 30m)

Animal monitoring, Crop monitoring.

- High Altitude (>30m)

Large area sensor based data capture, First response monitoring

- 7) Academic R&D is critical in driving new and innovative applications for RPAS, and we believe it is important to develop regulatory mechanisms which continue to enable flexible low cost use of small RPAS for research purposes.

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

- 8) The ASD figure of 150,000 jobs was based on civil RPAS achieving around 10% of the current aviation market. We believe that this approach in estimating job creation through RPAS operations is a significant underestimate. We are already seeing that job creation will come from completely new areas of activity that will not necessarily be classed as aviation. Existing professions such as surveying, entertainment, research and many others will create jobs both directly and indirectly associated with RPAS use. Already organisations in the UK such as Defra and Network Rail are specifying the use of RPAS for specific contracts, and this will be set to continue. In order to understand the true economic benefits of RPAS it is essential that we recognise and quantify cross-sector impact.

- 9) Key factors which could restrict growth of the RPAS market include:

- Timeframe for development of the regulatory framework enabling operations in complex environments such as Beyond Visual Line of Sight, Congested Area operations etc.
- Initial training and other regulatory procedures are required to gain initial operating licences which are more demanding than those currently extant in the UK
- Ongoing licensing and other regulatory procedures which are more demanding than those currently extant in the UK
- High insurance costs not commensurate with level of risk

5. Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

10) Radio spectrum is a key issue for the commission to focus upon. For example, whilst the majority of control and command platforms operate on 2.4GHz and video downlinks are on 5.8GHz, RPAS have recently been sold by the retail chain Maplin's with this combination reversed. It is critical that for the industry to develop there needs to be co-ordinated EC agreement on this issue.

11) We believe it is essential that any change in the remit of EASA still allow some involvement from Member States. Member States can best assess local environments and issues which contribute to risk, which would not be possible at an integrated EU level.

6. Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

12) The discussion on invasion of privacy with regards to RPAS has been wide ranging for some time. Whilst ARPAS-UK recognises these concerns, it is of the opinion that they should not be singled out from other such mediums such as CCTV, mobile phones and, for example, police helicopters / news crews. Existing legislation already provides an adequate framework and further education on these rather than additional regulation is seen as a more appropriate approach unless evidence suggests otherwise.

13) The insurance market for UK SMEs is currently restricted to a few providers and we would welcome greater competition in this area. As the industry develops and more operational data becomes available we would hope to see premiums reduced and more bespoke off the shelf policies become available.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

14) We agree that a significant focus should be on airspace regulation, but as with point 1, it is essential in this regard that EU research funding is weighted towards smaller RPAS which are set to have a much greater economic and sustainable benefit in the short as well as long term. It should be noted that this will also increase the extent of research undertaken by SMEs.

15) We feel that suppliers are addressing airframe airworthiness, as operators are quick to migrate should a particular supplier fall behind the curve. However, we also believe that there should be a focus on other technologies which will significantly improve performance and reduce cost of RPAS, as well as supporting RPAS for

science measurements. It would be our recommendation that an element of R&D funding be focused towards power/battery technology, payload miniaturisation and flight control systems.

16) We also believe it is essential that R&D funds be available for cross sectoral research, for example integration of sensor systems, and data processing and analysis from a range of technology sectors into RPAS. If R&D funds are bounded entirely within the aviation domain, this will be a significant barrier to growth.

17) Notwithstanding Horizon 2020 and COSME funding, we believe there will be some individual Member State interest and issues which should be funded locally. RPAS is becoming an increasingly popular tool for science measurements, particularly for Precision Agriculture and Agri-informatics, and there would be significant impact if Research Councils were able to recognise the importance of this research.

Relevant Matters that are not covered by the above questions

18) It should be noted that there have been demonstrations of best codes of practices by NCPF UAS SIG aiming to show and prove safe responsible operation for RPAS. It is felt that achievements such as this by UK companies and organisations are very important and have contributed to the UK's lead in this area. This progress and these achievements should not be lost if we move towards an integrated EC approach.

19 September 2014

NATS—Written evidence (RPA0036)

Introduction

1.1 NATS is the UK's leading provider of air traffic management (ATM) services. We are licensed by the Civil Aviation Authority (CAA) as the regulated provider of en-route air traffic services in the UK and the eastern North Atlantic. NATS also provides air traffic services at 15 UK airports through commercial contracts.

1.2 Airspace is a pillar of the UK's transport infrastructure. NATS seeks the most efficient use of airspace to maximise its capacity, minimise delay and environmental impact (noise and CO2 emissions) and maximise flight efficiency (less fuel burn) while maintaining a high standard of safety.

1.3 In 2013/14 NATS handled nearly 2.2 million flights in UK airspace. This equates to around 6,000 flights per day, some 4,000 of them to and from the five main London airports, making the airspace in the south-east of England some of the busiest and most complex in the world.

1.4 NATS is respected worldwide for its expertise in unmanned flight management and we were instrumental in developing and validating the procedures for unmanned flight in UK airspace.

Integrating RPAS – NATS work to date

1.5 In 2012, working with QinetiQ, NATS helped to establish a new flight test area on behalf of the Welsh Assembly Government; this is new airspace in mid- Wales from ground level and, uniquely for the UK, a floating area from 10,000-22,500ft, stretching from the Irish Sea in the west, almost to the border of controlled airspace in Shropshire. It is an area of over 2,500 square miles for testing RPAS over land and water, and NATS is instrumental in integrating RPAS and general aviation aircraft, which are allowed to fly within this airspace.

1.6 Initially, we started with 10 nautical miles separation laterally and 2,000ft vertically, and have made significant progress since then in reducing required separations. We are now regularly managing the latest RPAS in this airspace, at 5 nautical miles and 1,000ft separation, the same as our procedures for civil aircraft in controlled airspace.

1.7 NATS was also involved in a trial which proved the principle of full integration. ASTRAEA (Autonomous Systems Technology Related Airborne Evaluation & Assessment), a UK industry-led consortium focusing on the technologies, systems, facilities, procedures and regulations that will allow autonomous vehicles to operate safely and routinely in civil airspace over the United Kingdom flew a BAE Systems Jetstream aircraft controlled from the ground.

1.8 The aircraft flew several 500-mile journeys between Preston and

NATS—Written evidence (RPA0036)

Inverness, with take-off and landing controlled by a stand-by pilot on-board while some handling functions and all voice communications were handled from the ground station. NATS provided ATC services for all the flights, with instruction to treat them just like any other manned aircraft. All the flights were completed safely, with ASTRAEA gathering vital data for their ongoing trials.

General Points

1.9 NATS believes safe and normal integration into unsegregated airspace can only be ensured if RPAS can demonstrate, as far as possible, an equivalence with manned aviation standards and be able to comply with the appropriate airspace rules, in conjunction with the current RPAS rules as set by the CAA.

1.10 In this way their operation becomes in effect transparent to ATS providers and they are managed in such a way that they do not negatively impact other airspace users; this premise should underpin EU legislation, which we believe is the minimum institutional level of oversight required to ensure harmonisation and standardisation.

1.11 Regulating RPAS is likely to be difficult and primarily depends on the weight, task and capability of the RPAS in question. While regulation is required too much could stifle the growth of this new industry. Small RPAS are difficult to regulate. Technology has made them relatively inexpensive to purchase and therefore, the majority of the population could legally purchase and operate a system. It may be easier to regulate the sale of RPAS in the UK, ensuring RPAS are made to a minimum standard.

1.12 We note that the term RPAS operator is mentioned several times but the European Commission should acknowledge that an RPAS operator could be a fully qualified commercial pilot in a sophisticated operations room or a child in the park, yet both could present a safety risk to other airspace users.

1.13 At the smaller end of the sector, there is the need to determine a set of national rules that are proportionate to both the risk that the operation presents to other airspace users and to the technical and financial ability of the RPAS operator to comply.

1.14 A proposed additional safety measure for small RPAS, in the event of a loss of control scenario, could be a transmitting device that is detectable by any airspace users and air navigation service providers to avoid.

Questions

1. Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

1.1 Yes, NATS agrees with the priorities identified in the European Commission's Communication.

2. What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

2.1 Safety regulation at international level ensures a level of standardisation which is key to safe airspace integration. However it is recognised that at the smaller commercial and recreational end of the RPAS sector, regulation at even EU level may constrain activities, and it may be appropriate to develop national rules to address the societal risk. These rules should be proportionate to the level of risk presented by the activity i.e. Visual Line of Site activities below a certain height, where the risk to aviation is minimal but where protection of individuals is more relevant.

2.2 As far as we understand, the EU's actions to enable greater integration are consistent with the detail and aspiration of those in the United States, although the latter appear to be ahead of Europe in developing RPAS support such as ground based detect and avoid systems.

2.3 It is important that RPAS are equivalent. Manned aviation adheres to international, European and national rules depending on where the operator wishes to operate. If the same basic rules could be applied to RPAS, various regulations will be adopted, for example international RPAS flights will require international standards. At the other end of the scale, if an operator intends to only fly in a single country, local laws/standards should be established, primarily to address societal and privacy concerns.

2.4 Manufacturers rely on economies of scale to make their equipment affordable; therefore international standards are required to allow an aerial system to operate in neighbouring regions of the world.

3. In which new or innovative ways do you think RPAS will be used in the future?

3.1 We believe there are a number of new and innovative ways in which RPAS may develop, for example, carrying out flights that expose pilots to unacceptable levels of danger, rapid transport of medical supplies across busy cities, and transport of freight.

3.3 We may still have some way to go before we see remotely piloted passenger flights. We may not mind a remotely driven train, but leaving the ground without a pilot is a stretch the public may not quite be willing to currently accept.

4. What is your view of the estimate by the Aerospace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

4.1 Growth is dependent on airspace access, and this will only happen through safe integration. Equivalence with manned aviation standards should be the underpinning policy

and access to the different types of airspace must be in accordance with the relevant rules. It is important that these rules are not watered down simply to realise the economic value of this new sector. Safe integration of RPAS must also ensure that there is no negative impact on current airspace users.

4.2 However considering the varying physical size and technical range of capability of the RPAS sector, particularly at the smaller end below private recreational flying, national regulators should assess the particular risk to manned aviation and for applying an appropriate level of safety regulation; specifically for the smaller end of the sector, “is RPAS safe enough to undertake that particular task in that particular airspace”. This assessment may mean slightly different rules from manned aviation in some areas and would not unnecessarily constrain economic activity.

4.3 There are also risks to people and property on the ground which may require a very different regulatory approach.

6. Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

6.1 Legislation at an EU level is by its nature more generic and invariably is not able to accommodate local needs where these are known to be different from other areas, or perhaps understand the full impact of a piece of legislation where there is a lack of understanding of a particular operating environment. Any extension of EASA’s remit for regulatory oversight of RPAS below the current discriminant of 150kg needs careful consideration if inappropriate rules that constrain small RPAS activity are to be avoided.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today’s small and lightweight RPAS?

7.1 The approach needs to be balanced as all these elements are needed for safe airspace integration. Our experience is that the EC is comfortable in directing a regulatory framework but safe airspace integration at the smaller end of the sector does require the development of some new technologies, where the Commission is currently investigation. There is a new EU initiative to task the SESAR JU to address some of the technological gaps but key to achieving rapid progress will be to incentivise industry to develop the key technologies for this sector e.g. detect and avoid and electronic conspicuity. Otherwise proper integration will take longer than hoped for and other regions of the world may take the lead in commercialisation of the sector.

NATS, EuroUSC and Civil Aviation Authority—Oral evidence (QQ 13 – 23)

NATS, EuroUSC and Civil Aviation Authority—Oral evidence (QQ 13 – 23)

Submission to be found under EuroUSC, NATS and Civil Aviation Authority—Oral evidence (QQ 13 – 23)

Network Rail Infrastructure Ltd—Written evidence (RPA0026)

Network Rail response to **Question 3: “in which new or innovative ways do you think RPAS will be used in the future”**

Within Network Rail, it is being proposed that the technology could be used to undertake non-tactile surveillance of its wider range of assets that form the railway infrastructure. The technology could also improve workforce safety by enabling such surveys to be carried out from a position of safety outside the boundaries of the infrastructure.

Unmanned Aircraft on NR infrastructure:

Objective: enable safe and efficient integration of unmanned aircraft on or near Network Rail infrastructure.

Summary (high level) progress to date:

- **A Safe System of Work** protocol and minimum operator requirements and qualifications has been established (in consultation with the Civil Aviation Authority)
- **A number of carefully co-ordinated trials** using small (<7kgs) unmanned aircraft to inspect our assets in different environments has already been undertaken to help us further understand potential benefits and risks:
 - From these trials, we can see potential uses such as inspecting difficult to access infrastructure, buildings (especially roofs), structures and earthworks
 - The technology could reduce the need for trackside access/inspections bringing potential safety and efficiency benefits
 - There is healthy interest within the business to further exploit unmanned aircraft for infrastructure inspection and surveillance purposes in the future
 - There are constraints around line of sight operations, endurance of platforms / aircraft and payload size (camera and lens weight)
- **The bow-tie risk assessment** methodology has been used to determine hazards and begin to map out appropriate mitigation measures
- **A tender process** has been initiated to invite bids from suppliers for a (nil cost) framework contract for both unmanned inspection services and unmanned aircraft technology
- **Formal policy** in respect of unmanned aircraft operations is being developed as part of our Business Critical Rules Programme

19 September 2014

Tony Porter, Surveillance Camera Commissioner—Written evidence (RPA0024)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

Thank you for the opportunity to comment on this fascinating arena. RPAS have many uses ranging from military through to delivering aid to difficult to reach or disaster zones. However, they are also able to carry out surveillance activities.

You may be aware that my role is to facilitate light touch regulation of surveillance camera systems via the Surveillance Camera Code of Practice across England and Wales. The regulatory system arose within the Protection of Freedoms Act 2012. The Act is applicable to “surveillance camera systems”, including CCTV, ANPR and “any other systems for recording or viewing visual images for surveillance purposes”. RPAS fit within that definition.

Any relevant authority under the Protection of Freedoms Act must show due regard to the Code referred to above. In a nutshell, this means that use of surveillance cameras must be used proportionately, transparently and effectively.

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An area that the Code does not cover as part of my statutory functions is domestic use. We are aware of an emerging issue related to where surveillance has been undertaken using a RPAS. This area will no doubt grow both in use and in concern.

I would be happy to provide more detail to you and the committee on the Surveillance Camera Code and the implications for RPAS.

19 September 2014

The Professional Society of Drone Journalists—Written evidence (RPA0032)

I am responding to your request to submit evidence to the House Internal Market, Infrastructure and Employment Sub-Committee of the House of Lords European Union Committee, to assist their investigation of the civil use of Remotely Piloted Aircraft Systems in the European Union.

The Professional Society of Drone Journalists (PSDJ) is honored to be considered by the House of Lords committee for this purpose, and greatly appreciates the opportunity to engage in the conversation on civil use of RPAS. The PSDJ is a not-for-profit association of journalists, engineers, educators, and filmmakers who seek to develop and/or use RPAS to augment news reporting worldwide. To date, we have more than 343 members from 47 countries. Twenty-two members live in the European Union, including eight members who reside in the United Kingdom.

Our organization was founded in 2011 with the goal of establishing the ethical, educational and technological framework for the emerging field of drone journalism. Over the past four years, we've increased awareness through numerous presentations and outreach opportunities, developed a code of ethics for drone journalism, provided training of RPAS to many individuals, and have conducted ourselves as responsible professionals in our respective countries.

Our bylaws, signed by the PSDJ Board of Directors in January 2014, officially defined our purpose in three domains: fostering the development and safe operation of unmanned vehicles for journalistic purposes; furthering the adoption of unmanned vehicles by the press through education, outreach, and promotion; and advocating freedom of responsible and ethical use of unmanned vehicles by journalists. As such, we are pleased to provide experiential knowledge and professional opinion in the pursuit of effective regulation of civilian RPAS.

We have carefully examined the questions and have selected to respond to those which we feel the most expertise to answer confidently and authoritatively. I hope the following answers to your questions provide good information for the House of Lords, and I wish the Right Honourable Members of the Sub-Committee the best in their pursuit of equitable and safe RPAS regulations.

Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

The Communication from the European Commission¹⁸⁷, adopted 8 April 2014, states clearly that safety is the paramount objective of EU aviation policy. The greatest challenge in creating rules that proportionately reflect the risk of the various types of RPAS operations, according to the Commission, is "taking into account weight, speed, complexity, airspace

¹⁸⁷ http://ec.europa.eu/transport/modes/air/doc/com%282014%29207_en.pdf

class and place or specificity of operations.” Further, the Commission notes in this Communication that RPAS are a segment of aerospace technology that encompasses an enormous range of aircraft, in terms of size, capability, and complexity.

This is an appropriate priority; safety of the public has the greatest weight when comparing all relevant considerations around civil use of RPAS. Large news organizations may in the future desire aircraft with complex abilities, such as being able to fly hundreds of miles from the station of control, hovering or loitering for an hour or longer, or flying at an altitude such that it is necessary to sense and avoid air traffic¹⁸⁸. However, for the foreseeable future, most news organizations and individual journalists seek to use small RPAS, which typically fly under a mile from the operator, fly for perhaps 20 minutes at most, and are designed to operate below the minimum safe altitude for manned aircraft.

The risk to harm with small RPAS is greatly decreased when compared to traditional manned news helicopters¹⁸⁹, which weigh thousands of pounds and carry hundreds of pounds of flammable liquid during flights¹⁹⁰. Small RPAS operators lack these risks, and so the expectation of licensure and certification should not be the same as larger, manned aircraft. At the same time, it is reasonable to require some kind of licensure to ensure that RPAS operations are being conducted only by those who can competently manage small unmanned aircraft in a dynamic environment.

Following the issue of safety, privacy is addressed, specifically “the right to private and family life, and the protection of personal data.” The greatest concern with regard to privacy is the use of RPAS as surveillance devices, which may collect sensitive data about people and families, which may be distributed by electronic means.

Given recent scandals amongst members of the press involving hacking and bribery¹⁹¹, the public is understandably concerned that similar mal-content individuals might prey on the public using RPAS. However, regulators must consider deeply whether certain privacy-minded regulations would unjustifiably interfere with the duty of the press to inform the public through their use of RPAS to capture and disseminate knowledge about critical events, or to uncover malfeasance and injustice.

RPAS, even at this early stage in development, have already proven effective in uncovering contamination of public waterways¹⁹², revealing the impacts of natural and man-made disasters¹⁹³, and providing documentation of important political movements¹⁹⁴. Overly-

¹⁸⁸ <http://www.tvnewscheck.com/article/61816/will-drones-take-flight-for-tv-stations/page/1>

¹⁸⁹ <http://www.komonews.com/news/local/News-helicopter-crashes-burns-beside-Space-Needle-250790281.html>

¹⁹⁰ <http://airbushelicoptersinc.com/products/AS350B2-specifications.asp>

¹⁹¹ <http://www.bbc.com/news/uk-11195407>

¹⁹² <http://www.dronejournalism.org/news/2014/5/plants-blood-dumping-uncovered-by-drone-photos-will-go-without-felony-charges>

¹⁹³ <http://www.dronejournalism.org/news/2014/2/flooding-in-south-western-britain-captured-by-low-flying-drone>

¹⁹⁴ <http://www.dronejournalism.org/news/2013/8/interview-with-a-citizen-drone-journalist-in-istanbul-i-have-been-witnessing-some-very-bad-things>

burdensome regulations not only would hamper the ability for journalists to report on these issues, but also would restrict the public from receiving vital information.

In general, the freedom of the press can be preserved by guaranteeing permission to fly small RPAS, in a responsible manner, at sufficiently low altitudes over public land. The issue of privacy thus is tied to the right of people to make good use of the air above their private land, by deploying RPAS to monitor and tend to crops, and to image, assess, and track their property. Therefore, it would behoove the Commission to consider an additional priority to the ones mentioned: the right for the press and public to have fair and complementary access to the sky.

What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

At this time, there is no consensus in the global aerospace community on how to integrate RPAS into airspace, or how to regulate the operation of small RPAS. Outside of the EU, each country seems to be on an independent regulatory path, and few countries seem eager to borrow regulatory best practices from other countries. Further complicating the issue of international continuity is the fact that some countries, such as the United States, are internally conflicted about the current status and direction of RPAS regulations.

One advantage of international consensus on RPAS regulations is that countries are on equal footing from an economic standpoint. In a world with equal RPAS regulations, developers, instructors, and operators have economic security knowing that a particular system is legal wherever it may be operated. From the standpoint of the news industry, unified RPAS regulations mean journalists can be confident in respond to an event in another country with RPAS, which in turn ensures the public has access to news on international affairs.

Conversely, non-unified RPAS regulations can be crafted in a manner that protects native aerospace industry at the expense of the international community. For example, one country could require expensive but unnecessary electronic features (i.e. ADS-B transponders¹⁹⁵ or advanced “sense-and-avoid” capability for small, low-flying aircraft), or have an unreasonable classification for small RPAS (i.e., restricting certain technologies under laws similar to the US International Traffic in Arms Regulation).

Such regulations might protect the interests of large aerospace businesses that are accustomed to producing military-grade equipment, but would block “grassroots” RPAS developers and small businesses from participating in the RPAS economy. This is understood by the European Commission, which acknowledges in its RPAS Roadmap¹⁹⁶ that “the experience of the first European operators and services providers clearly shows that solid businesses cases require internationalisation of the activities beyond the national market.”

¹⁹⁵ <http://www.faa.gov/nextgen/programs/adsb/>

¹⁹⁶ <http://ec.europa.eu/enterprise/sectors/aerospace/uas/>

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Similarly, strict regulations would deny many end-users access to affordable RPAS equipment and services.

The Commission's RPAS Roadmap additionally anticipated that VLOS flights of small RPAS would be a "daily occurrence" between 2014 and 2018, with common rules expected toward the latter part of the time period. Furthermore, Annex 1 of the Roadmap indicates an emphasis on quickly resolving the regulation small or light RPAS, especially used in VLOS operations, with the understanding that "below a certain threshold to be determined (e.g. 20-25 Kg or other criteria) there would be no formal airworthiness processes, but only safety assessment of the system, under responsibility of the RPAS operator." Specifics are not available at this time, but broadly speaking, these regulatory intentions, if carried out, would place EU Member States among the most progressive in the world in terms of small RPAS regulations.

In its own UAS road map, the US Federal Aviation Administration shares some similarities with the EU roadmap where small or light RPAS are concerned. The US Roadmap¹⁹⁷ indicates that small RPAS have priority in the rulemaking process, and eventual rules may not require airworthiness certification for small RPAS flown in a limited range. The US Roadmap shows intent that the FAA will require "classification of sUAS, certification of sUAS pilots, registration of sUAS, approval of sUAS operations, and sUAS operational limits." The FAA Comprehensive Plan¹⁹⁸ for UAS integration further notes an intention to require permits for sUAS pilots.

However, should the proposed timeline of the Roadmap, the EU could potentially permit widespread RPAS use ahead of the US. The US only recently has allowed commercial RPAS flights under special, restrictive conditions (known as "333 exemptions"¹⁹⁹), despite the vast differences in risk and skillsets between manned flight, and remotely-operated small UAS flights within VLOS. The Comprehensive plan originally anticipated routine civil RPAS flights without special certifications in 2015, but a recent audit of the Federal Aviation Administration found that regulations for small RPAS are far behind schedule²⁰⁰. These two developments do not inspire confidence that when rules eventually are produced, the US will prove to be as favorable as the EU for RPAS operations and services.

Canada, meanwhile, is significantly more amenable to small RPAS commercial operators, but requires a Special Flight Operations Certificate (SFOC), and a Notice to Airmen (NOTAM) for each flight. This document must be submitted at least 20 days before each operation, and is a significant investment of time for many Canadian RPAS operators. Finally, operators are required to have a minimum of \$10,000 liability insurance coverage²⁰¹. The EU Roadmap seems to indicate no such paperwork or delay is required for similar operations, which would make the EU more favorable to commercial RPAS use in this respect.

¹⁹⁷ http://www.faa.gov/uas/media/uas_roadmap_2013.pdf

¹⁹⁸

https://www.faa.gov/about/office_org/headquarters_offices/agi/reports/media/UAS_Comprehensive_Plan.pdf

¹⁹⁹ <http://www.dronejournalism.org/news/2014/9/faa-exemptions-require-licensed-pilots-sterile-sets-for-commercial-uas-use>

²⁰⁰ <https://www.oig.dot.gov/library-item/31975>

²⁰¹ <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/FullText.html#s-606.02>

In looking outside EU Member States for countries where RPAS regulations have balanced the public's safety and security with a fertile economic climate for businesses, Australia serves as a useful example. Written into law in 2002, Part 101 of Australia's Civil Aviation Safety Regulations²⁰² (CASR) requires no special airframe certification, but requires all RPAS pilots obtain or create an operations manual, risk assessment, flight manual, and maintenance manual for their aircraft. Pilots obtain a UAV Operator's Certificate. Additionally, if conducted over non-populated areas, individual flights require no special authorization, but RPAS operators may obtain area approval on a case-by-case basis to fly in populated areas.

In numerous discussions during PSDJ Board of Directors meetings, it has been generally concluded that Australia has the most beneficial small RPAS regulatory system for journalists, developers, businesses, and the public at large.

In which new or innovative ways do you think RPAS will be used in the future?

In Considering the future use of RPAS it is worthwhile to note the different categories that RPAS will fall under, small RPAS under 20-25 kg will find different uses to those in higher weight categories, and fixed wing RPAS will be used differently than rotor craft. To be able to understand what uses may occur, it's important to understand the different types and capabilities in these classes. Small RPAS are easily deployed posing little risk under most circumstances²⁰³, but may be limited to certain altitudes and line of sight operations²⁰⁴. Larger RPAS will be able to fly higher and have sense and avoid systems²⁰⁵ and be able to be integrated into the current air traffic system²⁰⁶, and this will give them capabilities beyond line of sight operations.

In all areas of use, RPAS are only as useful as the sensors on board. This ties into the weight categories, as some of the more sophisticated sensors are still above 10 kg, applications such as mapping that involve LIDAR may require larger systems to carry them²⁰⁷. However, the market is seeing a massive opportunity in RPAS and is adapting many technologies to be lighter and more compact and specifically designed for RPAS. At their basic level RPAS are simply data gathering machines that can gather data quicker and more safely than current methods, in this regard they can be seen as a disruptive force across a broad range of uses.

Many of the most innovative uses will come in the small RPAS categories, in part because of the lower cost and easy access of this type of aircraft but also because of the decreased risk. Here the uses will explode with innovation across a massive range of industries. Most obviously has been the film and broadcast markets, who have already found a multitude of

²⁰² http://www.casa.gov.au/wcmswr/_assets/main/rules/1998casr/101/101c01.pdf

²⁰³ https://www.mitre.org/sites/default/files/pdf/12_2840.pdf

²⁰⁴ <http://www.dronejournalism.org/news/2013/11/road-map-gives-hints-of-us-drone-privacy-regulations-to-come>

²⁰⁵ <http://www.frc.ri.cmu.edu/projects/senseavoid/Images/CMU-RI-TR-08-03.pdf>

²⁰⁶ <http://www.nasa.gov/centers/armstrong/news/FactSheets/FS-075-DFRC.html#.VCI50BZ0Zrs>

²⁰⁷ <http://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-1-W2/87/2013/isprsarchives-XL-1-W2-87-2013.pdf>

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uses for airborne camera systems²⁰⁸. These include, replacement of traditional helicopter work, removing the risk and reducing both financial and environmental costs. They also add new perspectives to help storytellers, replacing expensive cranes in movie shoots. In television and new media, RPAS can be used for breaking news, general news stories, and gathering data that until now journalists have not been able to access²⁰⁹. RPAS may also cover sports events, even inside arenas which until now has been impossible.

Agriculture is often cited as the first area of effective RPAS use, due mainly to the large geographic areas involved and the relatively low population density. Using sensors such as multispectral and hyperspectral cameras, RAPS can be programmed to fly across millions of hectares of crops, gathering data on the health of every plant. Until recently, this data has been hard or prohibitively expensive to gather, but RPAS will make it easy and cost effective.

Larger RPAS are currently in use in Japan to spray crops²¹⁰. This replaces the current method of piloted aircraft flown at low level often considered the most dangerous of all flying jobs²¹¹. The use of semi-autonomous RPAS spraying crops is expected to be approved in Australia and Canada in 2015.

Industry is perhaps the biggest area of RPAS use. Growth here will be an ideal place for novel and innovative uses in helping industry remove risk from some of their most dangerous work²¹². For example, a reoccurring requirement for electricity suppliers is to inspect their towers for damage or corrosion. This currently is a dangerous job, yet easily is replaced by an RPAS, which can give more accurate data than a person²¹³. Similarly, windmill and chimney inspections can quickly and easily be done, without the costs of having to shut down plants²¹⁴. This really just the beginning, but it's hard not to imagine many industries that will be able to benefit from de-risking projects. Perhaps the most obvious ones are the jobs currently done by full size aircraft, such as oil rig inspection, easily replaced by RPAS, pipe line inspections, again often done by full size aircraft are ideal uses for Beyond VLOS operations. Large and small area mapping projects can now be done remotely, a small light weight RPAS which poses much less risk mapping urban areas than the current use of full size helicopters²¹⁵.

Law enforcement and military uses are already underway. Although concerns over these uses are common, many times the uses have proven to be very effective in the work required of these intuitions. Search and rescue using RPAS has saved lives by the ability to rapidly deploy a system out of the back of a police car, rather than call in a full size helicopter, when minutes mean the difference between life and death²¹⁶. Less dramatically, traffic incidents that can cause long shut downs of key motorways while accident data is

²⁰⁸ <http://www.wileyonmedia.com/2014/09/uas-takes-flight-for-film-companies/>

²⁰⁹ <http://www.dronejournalism.org/news/2014/3/aerial-robots-provide-accurate-independent-data-on-coal-ash-disaster>

²¹⁰ <http://rmax.yamaha-motor.com.au/history>

²¹¹ <http://www.kboi2.com/news/local/21050204.html>

²¹² <http://www.engineerlive.com/content/drones-cut-risk-industrial-inspections>

²¹³ <http://www.aeryon.com/applications/missions/295-hydro-inspection.html>

²¹⁴ <http://www.thecyberhawk.com/inspections/utilities/>

²¹⁵ <http://www.suasnews.com/2014/08/30842/uas-urban-mapping-for-the-world-bannk/>

²¹⁶ <http://www.mentalmunition.com/search/label/search%20and%20rescue>

being gathered, and this can now be quickly mapped with a low cost RPAS, meaning motorways opened in minutes rather than hours, something now commonly done in Canada.

Mapping has proven to be a very effective use of this technology, low altitude high-resolution images can easily outperform satellite imagery, geo-referenced data allows high-definition mapping to be easily done. Maps and mapping is becoming more and more important to everyday life and RPAS could play a key role in the future of cartography.

Environmental issues are well serviced by RPAS, in the Canadian arctic RPAS were used to assess the environmental impact of mining projects²¹⁷, counting the wildlife both in the ocean and on land, removing the extreme danger of flying over hostile regions. In the same area, RPAS were used by the mining company to topographically map the area for industrial development²¹⁸. Other data such as air quality measurement can be now done daily with easily launched RPAS and on-board sensors.²¹⁹

In summing up the use of RPAS may replace traditional methods of data gathering, but they are also being used in ways never possible before, this spirit of innovation will continue as long as the regulations continue to allow such development. Use of RPAS to deliver life preservers²²⁰, using thermal cameras to locate persons at sea is just one example, launched from a boat or from land an RPAS can quickly deliver a life preserver faster and more accurately than any other method. RPAS can be used to lift lights for a variety of night time coverage, much more effective than flares due to their long flight time and directional control.

Rapid Traffic management²²¹ is another area RPAS can deliver, with the ability to give detailed imagery for traffic control during national events that require instant feedback on non-typical traffic routes. RPAS can be used in sport training²²², allowing instant information to be given to coaches on movement of players, the moving aerial perspective has proven invaluable to professional sports teams that have experimented with the technology. Animal herd management²²³ can be carried out, with RPAS being able to see herd stock with thermal cameras, this technology has proven effective in anti-poaching practices throughout Africa²²⁴. High Altitude RPAS are being tested as a way to cheaply replace satellite delivery of internet signals, allowing low cost transmission to remote areas²²⁵.

²¹⁷ <http://www.scienceworldreport.com/articles/11716/20131220/global-hawk-uav-in-canadian-arctic-for-first-time.htm>

²¹⁸ <http://www.theglobeandmail.com/technology/tech-news/canadian-technology-and-the-flight-of-the-drones/article17849259/>

²¹⁹ <http://www.energy.ca.gov/2011publications/CEC-500-2011-039/CEC-500-2011-039.pdf>

²²⁰ <http://www.wired.co.uk/news/archive/2011-02/22/unmanned-drones-life-jackets>

²²¹ <http://www.roadsbridges.com/traffic-management-georgia-dot-contemplating-drones-traffic-control>

²²² http://espn.go.com/espn/otl/story/_/id/10974559/drones-use-ucla-mlb-starting-show-more-sports-fields-coaches-embrace-technology

²²³ <http://cwf-fcf.org/en/discover-wildlife/resources/online-articles/funding-stories/tracking-wildlife-with-uavs.html>

²²⁴ <http://www.bbc.com/news/business-28132521>

²²⁵ <http://www.wired.co.uk/news/archive/2014-03/04/facebook-drones>

Delivery by RPAS has already become a reality, despite the news made by Amazon, DHL has become the first company to regularly use RPAS to delivered medicine to remote areas in Germany²²⁶. Delivery by RPAS was met with much skepticism, but may prove to be a critical part of life for some communities

Given the potential uses of this technology, we can expect rapid growth in RPAS use across all industries, provided that appropriate regulations will not block these innovations.

What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

The initial estimate by the AeroSpace and Defence Industries Association of Europe is dependent on two factors: Firstly the consistent overall growth of the RPAS market, Secondly: The competition between the two other main Markets, namely the North America market and the Asian market.

The first question on the growth to 2050, every study seen to date projects a rapid increase in RPAS adoption and growth, number vary from publication but in the United States RPAS revenues are expected to exceed 8 Billion Dollars per year, with over 100,000 jobs created until 2025²²⁷. The same growth is expected worldwide with a potentially higher adoption rate and job growth in China, in part due to the more favorable regulations and labour cost.

Europe has an advanced and successful aerospace industry, whether they can compete globally in the RPAS market will depend on early adoption and the speed at which regulations can be put in place across Europe. Presently each country has its own regulation for RPAS use, this is a large disincentive to opening a successful RPAS operation in Europe. Each countries rules and regulation for RPAS use, frequency allocation and privacy issue will need to be harmonized to ensure that companies can operate successfully in each country without the burden of different regulations and licenses required. There needs to be central body which will oversee a standard approach to RPAS integration, any slow down or undue red tape at this critical stage will mean industry and jobs will go elsewhere. The USA has suffered from slow adoption of RPAS regulation²²⁸, other countries such as Australia and Canada have moved ahead with several key companies now operating in these countries. However, the FAA is moving to catch up, and we expect to see more commercial small RPAS operations in the USA in the next 12 months.

Burdensome regulation will slow down job growth, but also so will any catastrophic accident involving RPAS and manned aircraft. This would be not isolated to Europe, Asia or North America. Any incident that would involve the loss of life due to an RPAS would have a ripple effect across the industry regardless of location, so regulations and enforcement of the

²²⁶

http://www.dhl.com/en/press/releases/releases_2014/group/dhl_parcelcopter_launches_initial_operations_for_research_purposes.html

²²⁷ <http://auvsi.org/resources/economicreport>

²²⁸ <http://www.computerworld.com/article/2488394/data-privacy/u-s--commercial-drone-industry-struggles-to-take-off.html>

regulations are an important part of the overall growth the industry. We would encourage reasonable regulations that still take into account the actual risk of a small RPAS unit operated within visual line of sight.

Other possible risk to growth is the lack of reasonable patent enforcement. This technology is relatively low cost and in Asian markets Intellectual Property is often disregarded²²⁹, giving many new businesses a lack of incentive to continue development. Strong rules regarding design patents and testing would be an important feature to secure a robust RPAS industry.

Similarly, a clear path for RPAS operators to follow will help in the overall growth. Presently, most regulations are unclear and hard to find, and this does nothing to help the growth and hinders development. Many inspectors are poorly trained and have little understanding of RPAS technology, a comprehensive, clear strategy with specific deadlines for introduction would be welcome and aid growth.

Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

The European Union's Data Protection Directive 95/46/EC²³⁰, adopted in 1995, defined personal data as "any information relating to an identified or identifiable natural person," where an "identifiable person" can be directly or indirectly identified by one or more characteristics – namely, "factors specific to his physical, physiological, mental, economic, cultural or social identity." Much attention is given in 95/46/EC to the concept of data processing, which should only be permitted based on transparency, legitimate purpose, and proportionality.

RPAS or "drones," being essentially sensor-carrying aerial devices, are used to collect data. The data may come in many different forms, from still images and video of visual light, to multi- and hyper-spectral imaging that reveals the chemical nature of the world. The data collected by RPAS typically is processed by a computer or network of computers, which may take minutes, hours, or days, depending on the amount of the data and the complexity of computer tasking. The result of this processing can be any number of data products: information-dense maps, three-dimensional models, aerial video and photography, among other items. Thus, the processing and distribution is administered by persons, and is outside the scope of RPAS regulations.

More crucially, Article 8 of the European Convention of Human Rights²³¹, signed 4 November 1950, grants the right "to respect for private and family life, his home, and his correspondence." Naturally, this is balanced with respect to Article 19 of the Convention²³², which grants the right to "hold opinions and to receive and impart information and ideas without interference by public authority and regardless of frontiers." Rights in both Articles are subject to restriction based on the needs of a "democratic society."

²²⁹ <http://hbr.org/2012/03/us-competitiveness-and-the-chinese-challenge/ar/1>

²³⁰ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31995L0046:en:HTML>

²³¹ <http://conventions.coe.int/treaty/en/treaties/html/005.htm>

²³² <http://www.theguardian.com/media/2002/mar/27/pressandpublishing.privacy4>

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Given these foundational documents and the rich case law history, the EU has the means to protect privacy while ensuring the function of a press in a democratic society. RPAS are a powerful, useful tool that can uncover pollution, oppression, and corruption, but exploit no special loophole in existing rights or laws. RPAS users may still be prosecuted and face fines or imprisonment should they use their technologies unjustly, as with any other technology. As such, the EU is sufficiently prepared to address concerns presented by RPAS.

29 September 2014

Resource Group Ltd—Written evidence (RPA0009)

Question 1: Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

1.1. Broadly speaking the ECC outlines the correct priorities for the European RPAS evolutionary path, providing that the correct level of support is provided to achieve it. A lot of the activity stems from industry who wish to help shape the new landscape but often do not have the resources to do so.

1.2. The successful realisation of these goals will be driven by a consolidated approach throughout Europe and, as a leading operating nation of RPAS in comparison to many in Europe, the UK should look to be an integral part of that.

Question 2: What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example International Civil Aviation Organisation (ICAO)? Are the EU's action, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

2.1. The advantages of current regulations globally have enabled the RPAS industry to develop into a huge international growth market without the restrictions and expense applied to that of manned aviation. Research and development has seen RPAS technology rapidly producing affordable RPAS, able to provide a myriad of industry applications which are seen as a cost effective alternative to current products in use. This will only enhance the explosion of RPAS (sub 20kg) sales seen over the last 2-3 years as the demand for RPAS increases.

2.2. Current regulations (national, EU and globally) are not aligned with many aviation authorities independently regulating RPAS. Some countries are more developed than others with the US leading the integration of larger RPAS in civil airspace, to some degree this is perfectly acceptable as long as the lessons that have been learnt and identified are distributed widely.

2.3. One thing that all International aviation authorities must be unified in agreement is the development of a common airworthiness standard to which RPAS manufacturers' must abide before selling any product. To date National Aviation Authorities (NAA) as a 'standalone' entity will not have the impact to force global RPAS manufacturer's to take responsibility.

2.4. Clearly the rapid expansion of RPAS use would render control outside of national borders ineffective. The solution must be a combination of global standards that are implemented on a national level.

Question 3: In which new or innovative ways do you think RPAS will be used in the future?

3.1. In the immediate future we believe that the most likely scenario is that RPAS will be used in conventional ways but by a wider variety of users. Areas such as:

- Science and Research
- Maritime Security
- Utilities (Oil, Gas, Electricity)
- Security and Policing
- Archaeology
- Mapping and Survey

All are likely areas of expansion but RPAS could be used to make efficiencies and savings in most areas of industry.

3.2. There has been much talk of late about the use of “Drones” for parcel delivery current technology and regulations mean that this use is some way off becoming mainstream and in any case the likelihood is that traditional methods of delivery will still be the norm as they offer good value for money.

3.3. A more likely innovation is the use of RPAS to provide communication networks as a cheaper alternative to satellite communications is very much a possibility, the technology already exists to place long loiter solar powered UAS at high altitude. Again regulation is somewhat behind this.

Question 4: What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

4.1. Resource Group Unmanned Aviation Service have been teaching the RPQ-s (Remote Pilot Qualification-small) course since August 2013, since this time we have trained more than 300 Remote Pilots looking to obtain a CAA Permission to Operate for RPAS in the <20kg weight classification. Our projection for 2015 is to train in excess of 500 persons.

4.2. Historically the majority of the people that attend our course are privately funded individuals who are planning to operate as small limited companies or as sole traders with businesses in the film and photography industry. We are now seeing much greater interest and enquiries from a wider range of businesses and large organisations that wish to use

RPAS to enhance their current businesses, these range from News Gathering applications to Archaeology.

4.3. From this experience it seems reasonable to expect that pan EU the RPAS industry will have in excess of 150,000 employees. The larger number of operators, and a likely increase in demand for services, will create a greater network of support activities such as training and maintenance, it may be fair to assume that some of these jobs will be created at the expense of other areas of the aviation industry.

4.4. Regulation and restrictions on where/how RPAS can be used is restricting growth in the <20kg RPAS industry. These aircraft (when operated correctly) pose limited threat to other air users as they are normally operated in airspace, below 400ft, that is free of other traffic and the applications for which they are being used only require them to be flown in visual line of sight. Therefore if a method of allowing <20kg platforms to operate more freely in busy and congested areas is established then this industry would expand. One weakness of the industry in this weight classification is air worthiness, the current regulations stipulate that there is no requirement for an air worthiness certificate for aircraft in this classification.

4.5. Larger surveillance platforms such as those used by the Army and RAF on operations have demonstrated that UAS can be operated at a high tempo and maintain reliability and air worthiness equivalent to manned aircraft. These machines are subject to close scrutiny and are serviced and maintained

4.6. The two factors that are restricting growth in the larger UAS sector (>20kg) are intrinsically linked. UAS are not allowed to fly Beyond Visual Line of Sight (BVLOS) of the operator, this restriction will not be relaxed until a reliable and accepted method of sensing and avoiding other air users can be found. Once a solution can be found to this problem then this will allow the full utility of these machines to be exploited.

4.7. In summary the factors that will allow expansion of the RPAS industry are:

Technology factors

- Development of a reliable, accepted and light weight sense and avoid system so that RPAS can be used freely in airspace occupied by other air users.

Regulation Factors

- Acceptance of RPAS to operate Beyond Line of Sight
- Greater freedom to operate small <20Kg RPAS in busy or congested areas.

Question 5: Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

5.1 No Answer Submitted

Question 6: Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

6.1. Each country has their own data protection laws and the UK is not different. They are concise and meet the needs to support RPAS use. There will always be general public unease but not the majority of RPAS that are used will support industry rather than surveillance. If they are to support surveillance then the data protection law is 'fit for purpose'

6.2. RPAS Insurance is limited at the moment with only a hand full of companies offering cover for liability. These are normally high premiums with low liability cover. The cost to insure a small unmanned surveillance aircraft (SUSA) is almost twice that of insuring a standard family car. There should be a greater choice of insurance offerings to reduce the cost to the consumer.

6.3. Insurance companies do not have a price scaler where premiums are reduced subject to number of demonstrated safety processes in place or for 'no claims'. This would be a good way to encourage a professional approach to safety in the RPAS industry.

Question 7: Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

7.1 There are a certain amount of research funding initiatives in the EU, many of which are geared to the issue of 'Sense and Avoid' and linked to the SESAR JU project. These are limited in scope though and mainly seek to get industry engaged in order to address the issue. There are many other associated research avenues which could be better supported so that the RPAS industry has a consolidated effort as it moves forward.

7.2 Through initiatives such as EUROCAE Working Group 73 & 93, industry seeks to shape the regulatory evolution of RPAS in Europe. Attendance is on a non-funded voluntary basis and so stakeholders bear the associated costs which does not encourage smaller organisations with limited budgets to support fully. This brings the possibility of a skewed agenda if it's the same few stakeholders who may be working to their own initiative. We would like to see more funding aimed at the smaller (SME) organisations who have much expertise to offer to the debate but do not have the platform to do so.

18 September 2014

Rights Watch UK—Written evidence (RPA0010)

1. **Our Mission:** Promoting human rights and holding governments to account, drawing upon the lessons learned from the conflict in Northern Ireland.
2. **Our Expertise and Achievements:** Since 1990, Rights Watch (UK) (formerly British Irish Rights Watch) has held the UK Government and non-state actors to account for human rights abuses in conflict settings. We work with victims and communities to expose human rights abuses, to obtain redress and to hold those responsible for such abuses to account. Our interventions have reflected our range of expertise, from the right to a fair trial to the scope of the government's investigative obligation under Article 2 of the European Convention in Human Rights. We have a long record of working closely with Non-Governmental Organisations (NGOs) and government authorities to share that expertise. And we have received wide recognition, as the first winner of the Parliamentary Assembly of the Council of Europe's Human Rights Prize in 2009 alongside other honours.
3. Our interest is in the regulation of the use of Remotely Piloted Aircraft Systems (RPAS) for surveillance. The use of RPAS for surveillance concerns communities in the United Kingdom (UK) who feel that they have traditionally been subject to unwarranted scrutiny. We will therefore limit our submissions to the questions directed specifically around issues of surveillance in order to aid the committee with its deliberations.
4. We thank the Committee for the opportunity to provide written submissions on this important issue.

In Response to your Question 1

5. We are pleased that considerations of citizen's fundamental rights are included in the European Commission's Communication for opening the aviation market to the use of RPAS (the Communication). We agree with the Commission that the growth of RPAS use is likely to endanger a wide range of individual's rights around privacy. The rights at stake are those of privacy of person, home, family life and information as guaranteed by Articles 7 and 8 of the Charter of Fundamental Rights of the European Union and Article 8 of the European Convention on Human Rights. In all these areas RPAS would provide different challenges, some of which will prove to be unique to RPAS, some of which are sufficiently regulated under existing regulations. For example there is little legislation about how individual's right to privacy should be protected if aerial surveillance devices are used around homes by private or public bodies.

6. Although in section 3.4 the Commission focuses on data protection issues, it does not address how Member States should regulate the use of RPAS for surveillance, or how the use of RPAS by European Union institutions itself will be regulated. We consider it vital to the protection of fundamental rights and the promotion of public confidence in RPAS usage that greater attention must be paid to these issues. Further, to the Commission should make clear how such uses might be regulated in a consistent manner, especially if it concerns usages that may span the jurisdiction of multiple Member States, such as for border protection.

In response to your Question 6

7. The current data protection regulations will prove to be insufficient to govern the use of RPAS by both private and public bodies for surveillance of individuals. The current data protection regime is reliant upon an individual being able to identify which organisation has collected data about them so they can contact that organisation if they seek to challenge or utilise the data that has been stored. As such, private and public bodies have a duty to warn individuals that they may be subject to CCTV, or that their data may be stored or used for particular purposes. Due to the nature of RPAS this is more difficult as it is likely to be hard for a normal individual to identify which organisation is flying an RPAS, for what purpose, and whether that RPAS is being used for a purpose that will collect data about that individual. Therefore an individual is unlikely to be able to access their data protection rights unless a great deal of clarity is added to what actions an RPAS user would need to take to constitute sufficient notice to possible subjects of their data collection.
8. If the use of RPAS becomes more prolific and the sight of RPAS more normal, it will also be increasingly difficult for ordinary individuals to determine whether a particular usage of RPAS is collecting information legitimately or illegitimately. For example it must be possible for an individual to challenge usage which they believe has led to data being collected which an organisation is not permitted to collect, for example sensitive personal data. Therefore any regulatory regime must also provide a sufficient disincentive for individuals that fail to abide by the notification requirement or for those who would collect data that they are not entitled to collect or process.
9. Finally we must ensure that any uses of RPAS by public bodies for surveillance is closely regulated. This is especially the case if the surveillance is carried out covertly. RPAS provide a flexible platform from which a range of surveillance can be carried out. It would allow a public body to carry out surveillances that the Regulation of Investigatory Powers Act 2000 defines as both 'directed' and 'intrusive'. RPAS challenge this regulatory framework as they provide the capability for operators on the ground to more easily switch between surveillance that is 'directed' to 'intrusive',

and they severely test the distinction between the two. ‘Directed’ surveillance is differentiated from ‘intrusive’ surveillance by the type of target, with the surveillance inside homes or vehicles being considered to be ‘intrusive’, and so require greater authorisation. However if surveillance carried out exterior to a home or vehicle provides the same information as a device inside a home or vehicle it is also considered to be ‘intrusive’. RPAS have the capability to provide that level of information with a reduced risk of discovery by the intended target. Therefore they should be carefully regulated to ensure that all uses are correctly defined and authorised. This would then afford the individual a degree of protection in relation to the fundamental rights set out above at our paragraph 4.

18 September 2014

Gareth Roberts BSc (Hons), MSc, DipCSE, PGCE, Grad.I.Fire.E, MInstLM—Written evidence (RPA0002)

**Gareth Roberts BSc (Hons), MSc, DipCSE, PGCE, Grad.I.Fire.E, MInstLM—
Written evidence (RPA0002)**

(Owner, Operator, Trainer and Consultant on the civil use of RPAS by public service agencies)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

Background

My name is Gareth Roberts I am a subject matter expert in the civil use of drones within the public and emergency services agencies. Not only do I own an RPAS and offer services in the UK, I also provide various RPAS related services including research and development, procurement, establishing operational services within public agencies and training services. I deliver these services in both the UK and abroad (mainly Africa and the Middle East).

Education

Having read the six points raised by their Lordships in which evidence is sought, I find myself being drawn back to “operational and professional” service delivery. Whilst I accept that we must work within both National and European guidelines what appears to be sadly lacking is investment in training and education services and if we allow it, this new trade will be legislated by the EU with the UK responding to their requirements. Consequently we are likely to see education programmes that are more EU focused rather than to our own strategic requirements.

It is inevitable that RPAS will eventually become integrated into civil airspace. However, yet again we see little proactive attention paid to the establishment of a “civil RPAS trade”. Consequently, we are likely to see a reactive stance taken by legislators with all that this entails.

If we accept that the civil use of RPAS is here to stay and that we accept what the CAA say, in that RPAS must be “flown safely and professionally in the same manner as a full sized aircraft” then we must NOW start to examine strategic training requirements and offer future career paths to the young people of this country.

Money spent on education and training is money well spent. However, here in the UK we have a reputation of being slow to “grasp the straw”. There are many relevant areas to their Lordships enquiry such as data protection. However, if you fail to educate a person, they simply cannot be held responsible for what occurs.

We are now starting to see various training initiatives in the UK but there is no strategic or “national” input and CAA is often in a supportive role with reactive decision making. These training initiatives are uncoordinated and often purely “commercial” endeavours and do little to enhance the new trade.

Gareth Roberts BSc (Hons), MSc, DipCSE, PGCE, Grad.I.Fire.E, MInstLM—Written evidence (RPA0002)

There has to be a clear strategic and operational pathway for legal RPAS operations and this has to include education along similar lines to the Private Pilot's License (PPL) or Commercial Pilots License (CPL). However, we have an ideal opportunity to provide new career pathways for young people and consequently degree level courses could be delivered not just in piloting RPAS but maintenance and payload operations.

The innovative use of RPAS is only restricted by the users' imagination. Consequently it is likely that we will see RPAS being used in many areas such as fish and wildlife conservation, health and safety inspections of buildings and structures, disaster response (victim location, H&S survey etc.). We must accept that RPAS can support and in some cases replace full sized aircraft. However, we must also accept that RPAS can never fully remove the human from aviation operations. If we accept that, we are likely to see a greater use of RPAS in non-traditional areas. We should look at this technology not just as "yet another advance" but as a new area of aviation.

My own experiences in this field can demonstrate how people are joining this industry from some of the most unlikely areas and then claim to be "experts". There is confusion in the industry as to what role Government plays in the civil use of RPAS and because there is confusion between UK and the EU we see people joining the trade who are unsuited. As this progresses we then see poor quality standards developed, which at best are partially adopted or totally ignored. We cannot hope to have a professional civilian RPAS market if continues to allow the Large Scale Modellers Association to have a centre position, or commercial companies dictating standards to support their own commercial endeavours.

Remotely Piloted Aircraft Systems are well established within the military environment but it appears that Governments of the world are reacting slowly to their civilian usage which sees poor quality legislation and standards enacted and even worse, poor quality enforcement. Whilst manufacturers have a part to play in this new trade it should not be down to them to educate RPAS crew. Again, it is accepted that trade associations have a part to play; it should not be down to them to determine how the trade will evolve as this would inevitably follow pure commercial routes. It is easy to ask manufacturers and trade associations to take on the educational role but this new technology needs strong support and legislation which can only come from Central Government.

Conclusion

Consequently, we should look at establishing a framework of education to support this new and emerging technology. This education should take the form of "legal minimum standards" and career education up to and including a level 7 qualification. This educational approach should be underpinned with legislation and a clear supportive stance taken by Government to demonstrate that the UK will be world leaders in RPAS technology and usage, which is supported with high quality education and robust legislation. In other words develop education and training programmes along similar lines to the PPL and CPL. Build education which will drive and support this new and emerging technology. Demonstrate to the world that the UK will lead in training people for tomorrow's aviation.

Gareth Roberts BSc (Hons), MSc, DipCSE, PGCE, Grad.I.Fire.E, MInstLM—Written evidence (RPA0002)

This evidence is submitted to support their Lordships hearing on the civil use of RPAS in the EU.

27 August 2014

Carl Robinson—Written evidence (RPA0003)

Individual Submission from Carl Robinson, Head of Airborne Sensor Technology, British Antarctic Survey

1 Background

1.1 British Antarctic Survey (BAS) is a component of the Natural Environment Research Council (NERC). Based in Cambridge, United Kingdom, it has, for over 60 years, undertaken the majority of Britain's scientific research on and around the Antarctic continent.

1.2 BAS has always utilised the most appropriate technology to carry out Polar science and is considered to be World leading amongst its peers.

1.3 The use of UAVs provides complementary platforms BAS can use alongside and independently from the manned fixed wing fleet of aircraft to provide enhanced capabilities to deliver science.

1.4 In some instances a UAV are the enabler; whether it is due to cost, in terms availability or unique capability.

1.5 With the increased capabilities of UAVs, BAS is using UAVs as science platforms in order to carry out Polar research.

2. Evidence to consider

2.1. Current UAV regulations in the UK are suitable for our operations as we perform testing in the UK in remote isolated open areas away from infrastructure, persons and live stock.

2.2. The Civil Aviation Authorities (CAA) CAP 722 as it stands allows BAS to conduct non-aerial work.

2.3. The current operational limitations detailed with in CAP 722 of 400 feet above ground level, 500 metres range, not over or within 150 metres of any congested area of a city/town/settlement, and not within 50 metres when flying of any person, vessel,

vehicle or structure and 30 metres when landing; allow BAS to safely and responsibly perform pre Polar deployment testing.

2.4. BAS major operational areas are on the Antarctic continent where regulatory framework is different. The ability to test in the UK in the above described way enables BAS to effectively and efficiently conduct Polar Region science utilising UAVs.

2.5. As BAS operates in Antarctica, UAVs enable some unique advantages over manned aircraft including winter time operation when aircraft are off continent, greater science accessibility, operationally flexible, lower environmental impact and lower fuel costs.

2.6. Changes to the current UK regulation could mean there are extra regulatory and financial constraints placed on BAS to use UAVs as platforms. Due to the requirement to test in the UK, any changes could directly impact on BAS UAV Antarctic platform operations both current and future.

4 September 2014

Remote Sensing and Photogrammetry Society (RSPSoc) and the Association of Remotely Piloted Aircraft Systems UK (ARPAS UK)—Written evidence (RPA0005)

Remote Sensing and Photogrammetry Society (RSPSoc) and the Association of Remotely Piloted Aircraft Systems UK (ARPAS UK)—Written evidence (RPA0005)

Submission to be found under Association of Remotely Piloted Aircraft Systems UK (ARPAS UK) and the Unmanned Aerial Vehicle Special Interest Group (UAV SIG) of the Remote Sensing and Photogrammetry Society (RSPSoc)—Written evidence (RPA0005)

Royal Aeronautical Society—Written evidence (RPA0018)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

Introduction

1. The Royal Aeronautical Society is the learned society for the aerospace and aviation community. It has some 19,000 individual members world-wide. Its activities are supported by a number of Specialist Groups, including Air Power, Weapons Systems and Technology, UAS and Space Groups, all with an interest in RPAS.

Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

1. The European Commission (EC) has identified safe operation in non-segregated airspace through regulation and technological developments, security, privacy, liability and insurance, and supporting market development as their priorities for the development of the civil market for RPAS (referred to within our response as Unmanned Aircraft (UA)) and has identified initial actions to be performed to enable this to take place. This is to be applauded, and it is important that in their actions, the EC adopt an all-inclusive approach to market development and not focus purely on the development of regulations, but allow the UA industry, and supporting industries, to develop under their own volition with regulation closely supporting the development of these technologies, not leading it, and not to be an end in themselves.
2. A concern we have is that the EC appears to have dismissed the difference between larger and smaller systems – thereby demonstrating a lack of appreciation of the technology and the short to medium-term market drivers for the industry. The use of smaller UA, in some cases much less than 7kg, is proliferating at an increasing rate. These systems are seen as a cheaper, flexible, and increasingly reliable introduction to UA operations, and equipment for photographic and surveying work, and are more likely to be the more predominant type of UA.
3. It is important that the EC acknowledges this difference, and puts in place a parallel programme for both smaller and larger systems, with differing timescales against each as it is believed that market growth for the smaller (less than 25kg) systems will accelerate at a faster level than that for larger systems as the amount of investment is less, the technology is more versatile, more readily available, accessible, and easier to use. Indeed, the use of small UA as a working tool, working in environments not normally solved with aerial means, is a different approach to the larger systems which are likely to be operated on the whole in a similar manner to manned aircraft.

4. There appears to be a number of mixed messages in the EC Communication. Whilst they are clear about the perceived regulatory and technical developments that will be required to support the development of the market, they have included societal issues which have no bearing on the safe operation and integration of these systems, but are better placed as a separate action, which addresses not just the growth in the use of UA but also other technologies and their potential impact on personal privacy. Respect for the right to private and family life and the protection of personal data, is not a UA issue, it is a pan-European issue and should be addressed separately, outside of UA regulation. Otherwise, this issue will subsume and potentially kill-off this technology before it has a chance to prove itself – as appears to be the case in the United States.
5. Of note, the EC has not included improved airworthiness as a priority for the development of the civil UA market. We believe this need to be added as a matter of urgency. With the growth of the market, the UA available, and the innovative technological developments expected to take place as a result of the UA market growth, emphasis should be given to the provision of airworthiness (i.e. Safety Assurance) guidance for all system types.

What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

7. It is accepted that regulation of larger systems, capable of operating over larger distances, should come under the jurisdiction at an international level, with local monitoring at a national level. However, we believe that for smaller civil systems, used for day-to-day work at a local level, should be managed at that local level under the auspices of the national aviation authority, but under identical regulatory rules as the rest of the EC but with local “geographic” differences to enable day-to-day operations. Indeed we believe that regulation should be related to the size, shape and proposed operation of an UA. It should be noted that it will be difficult to develop a blanket regulation for such a wide variety of air vehicles and sub-systems, as this innovative technology develops, particularly for smaller UA. Indeed, there is a risk that the regulations may restrict the development of the technology.

- 8. Regulation at a local level enables a closer monitoring of the growth of UA usage and the regulatory developments, and tweaks, required to enable operations. If this function was to be centralised in Europe this “local touch” would be missing.

- 9. The large number of applications of the technology may mean it is not appropriate to have a blanket set of legislation. One of the strengths of a national aviation authority as a regulator is that it is comfortable reviewing UA operations on a case-by-case basis. In addition, centralised control will mean additional administrative and resource pressures on an already stretched EASA, leading to increased approval timescales, efficiency, etc. thereby adversely affecting the output and growth of this capability and market across Europe. There should be a lighter touch of control from EASA, with authority delegated to a local level, with administrative oversight at a centralised (EASA) level.

- 10. It is noted that the EC’s actions are leading those elsewhere, particularly in the United States, where the proposed widespread access to US airspace for UA by 2015 is nowhere near realisation. The EC has an opportunity here to take the international lead in technology and regulation development to the benefit of it’s members, and also play a supporting role to US aspirations.

In which new or innovative ways do you think RPAS will be used in the future?

11. It is acknowledged that there are no limits to how UA may be used. Indeed, applications currently identified (see below) are really just the tip of the iceberg. Smaller systems are viewed as working tools, whilst the larger systems may replicate manned aircraft use, but in more extreme environments, each being able to perform operations in more demanding environments. A number of applications have been identified by a number of industry bodies and individuals; the following table identifies just some of the potential applications that UA can deliver. Indeed, some of these are already being pursued and a number of companies are already developing business in these sectors. Currently identified examples – for both small and large UA - include:

Scheduled service	Air cargo
Aerial observation	Analysis, measurement, monitoring, tracking and research – particularly environmental, weather, atmosphere, nuclear radiation, marine mammal, farm animals, oceanographic, wildlife census, chemical,

Royal Aeronautical Society—Written evidence (RPA0018)

	biological, volcanic ash cloud, etc.
Aerial survey	Inspection, detection, mapping, measurement, survey – critical infrastructure, vegetation, invasive species, waterways, coastal zones, wind turbine inspection, oil exploration, tidal zones, etc.
Agriculture	Dispensing and spraying, mapping, monitoring crops – fertilizer, insecticide, salt water infiltration, disease infection area, selective harvesting
Fire fighting	Spotting, monitoring, managing various types including building, forests, industrial, fire bombing, rescue assistance
Logging & forestry	Monitoring and mapping – tree growth, disease, harvesting
Photography	Aerial photography, cinema, TV – press, publicity.
Search & Rescue	Urban, harbour, country, inland & coastal waters, avalanche search, etc.
Corporate operations	Aerial photography, power generation companies, farmers, fishing farms, geophysical companies, industrial site owners, surveyors, railway operator, mining, etc.
Police	Crime scene recording, situational awareness, surveillance; illegal activity control; road & Highway traffic surveillance; illegal immigrant & human trafficking control; public gathering surveillance and safety; law enforcement; customs support – anti-smuggling, drug trafficking, border patrol, critical infrastructure surveillance
Coast Guard	Anti-piracy operations, fishery control, maritime surveillance, search & rescue, illegal activity control, safety monitoring, lane patrols
Military operations	
Emergency communications networks	local, regional, national – including communication relay

Disaster site monitoring and mapping	Hurricane, earthquake, flood, landslide, mudslide, snow storms, aircraft crash site, train crash, tsunami, tidal surge, ship collision, oil leak contamination, volcanic ash cloud
Nuclear accident monitoring	Contamination measurement, tracking, accident management
Sport and Entertainment	Recent TV coverage of the winter Olympics in Sochi in February 2014 showed small UA used to provide up-close real-time coverage of some sports such as snowboarding. The use of UA for these kind of events, showing “close to the action” shots is anticipated to grow.

What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

12. Any forecast of numbers likely to be employed by the growth of UA activities is speculative and dependent on several factors: the size and complexity of a given platform, as smaller UA will require less industrial support; the degree to which complex platforms will replace conventional aircraft; and whether the figures include people employed in UAS related services delivery. A further unknown is the extent to which future UA platforms will exploit equipment and components generally available in the aerospace sector, create new requirements and a new dedicated supply chain, or use technology and equipment from outside the aerospace sector. In general, there is a tendency on the part of conventional aerospace companies and agencies to assume that the future UA industrial base will reflect that of the contemporary aerospace sector; this assumption may not be valid.
13. The main factors that will restrict the growth of the UA market in Europe will be stringent regulations, over reaction of member states to perceived societal issues, lack of investment both public and private, over-regulation of UA operations, EU-centric control rather than local national management, lack of availability of EU designed, built, and operated UA systems. Equally, a failure to appreciate the novel structure and dynamics of the emerging UA market, especially in potential new civil applications, could lead to poorly judged public policies that focus primarily on the UA platform could lead to a neglect of the service elements of the UA industry where

the greatest value-add may ultimately lie. In this respects, the UA sector may be comparable to applications satellites, where operation and downstream use generates the bulk of value and employment.

Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

14. Two way communications between a remote pilot and a remotely piloted aircraft, operating beyond the line of sight, require reliable satellite links which are tolerant to the weather and free from interference. Satellite operators view UA as a growth area for the associated payload data transmissions. The bandwidth required for the command and control links of military systems has so far not been that demanding as the systems are highly autonomous and the main operator interest has been the payload data. For civil applications, the bandwidth required for the command and control links is likely to be significantly increased with the objective to integrate unmanned aircraft with manned aircraft operations in non-segregated airspace. The ITU World Radiocommunication Conference of 2012 (WRC-12) afforded additional frequencies in dedicated bands to aeronautical mobile services for the support of UA. Some already existing UA implementations in segregated airspace use the currently available fixed-satellite service (FSS) frequencies in Ku band and Ka band. Next year's WRC conference (WRC-15) has an agenda to consider the use of FSS bands for the command and control links of UA in non-segregated airspace. This is likely to be contentious as the Ku band spectrum is highly congested. Furthermore, the necessity for safety could put restrictions on the spectrum for traditional telecommunications services, if indeed there is a consensus that the required safety can be assured.
15. Safety considerations make it imperative that these radio links are of the same quality as those required for air traffic management of conventional aircraft. COM(2014)207 does not make it clear that this requirement is accepted or even understood
16. We believe that there is a definite requirement for dedicated UA frequencies (with appropriate bandwidth in the near-term) for UA operations. It is anticipated that, in the longer term, as the use of autonomy within UA becomes more commonplace, the demands on bandwidth will reduce with that growth.

Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

17. In order to reach their full potential civilian UA must fly autonomously in open, non-segregated airspace with other manned aircraft. Together this creates a potentially complex legal and regulatory environment although possibly the greatest hurdle for the UA industry to overcome, in the short term, is a cultural and perceptive one and this requires education and engagement with all the stakeholders in the industry.
18. The invasion of privacy debate and the use of UA is wide ranging although arguably many of the concerns are directed at personal surveillance and are not applicable to the use of UA in the majority of cases. Some deployments of UA are similar to CCTV systems or incident response and surveillance by police helicopter and there are clearly valid privacy concerns around the use of unmanned systems to monitor our environment.
19. Where UAS monitoring is used in public space, over-arching regulations such as the Charter of Fundamental Rights, the European Convention on Human Rights or the Data Protection Act may apply as well as associated consents. Covert UA surveillance that utilises technology such as thermal-imaging cameras or that is used to monitor private spaces may require additional oversight mechanisms such as search warrants and national law compliance approval in order to be lawfully deployed.
20. It is the belief of this group that the “concerns raised by the potential greater use of RPAS” arguably have no quantifiable basis. There have been a number of statements relating to privacy and data protection, particularly from within the industry, but no definite statement or evidence has been produced that this is the case. It is acknowledged that, with the growing use of surveillance devices, including the use of cameras integrated into personal telephones, there is the potential for abuse, but this is a societal issue rather than a UA-specific issue. UA should be included within the overall discussions relating to the impact of technology on privacy, but not be singled out for special attention.
21. It is noted that in the UK, the Information Commissioners Office (ICO) held a recent consultation of proposed changes to the CCTV code of practice. This focussed purely on UA and data protection compliance, rather than taking the opportunity to address other technologies and their potential privacy compliance issues. UA being seen as an easy target. We believe that it is more appropriate for the ICO to address the wider question.

22. Until there is sufficient evidence – rather than supposition – there should be a light touch in managing data protection of UA. Indeed, we believe there should be more education than regulation. Introducing the requirement to have Privacy Impact Assessments in Operating Manuals with other risk assessment analysis is an appropriate way ahead, and this may be used to evaluate privacy risks – along with operating safety risks by the operator on a case-by-case basis – and then monitor and update as necessary.
23. In terms of insurance, the increasing use of UA and the need for insurance has been acknowledged by users, and a number of insurance companies in the UK now offer services to the UA industry. They have invested time in understanding the risks involved in operating UA and have spent considerable time understanding the mechanics and properties of UA themselves. As such, most are now in a position to provide bespoke insurance products. However, in some cases, as this is a relatively immature technology, the premiums can be expensive. We believe this will change as confidence grows with use.

Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

24. It is our recommendation that R&D needs to be more focused on UA airworthiness, safety, continued airworthiness, payload/sensor miniaturisation, power/battery technologies, data management, UA pilot qualification and training, and airspace integration.
25. Airspace regulation should develop in line with technology and user requirements. The current focus seems to be on larger systems when in the near and medium term, the much larger market, is with the smaller systems. Regulations should enable the requirement of small UA in the near term (to support the rapidly expanding market in this sector) and larger UA in the longer term.

19 September 2014

Royal Aeronautical Society, The British Airline Pilots Association (BALPA) and Unmanned Aerial Vehicle Systems Association—Oral evidence (QQ 36 – 46)

Royal Aeronautical Society, The British Airline Pilots Association (BALPA) and Unmanned Aerial Vehicle Systems Association—Oral evidence (QQ 36 – 46)

Submission to be found under the British Airline Pilots Association (BALPA), Unmanned Aerial Vehicle Systems Association, and Royal Aeronautical Society—Oral evidence (QQ 36 – 46)

SESAR Joint Undertaking and EUROCONTROL—Oral evidence (QQ 62 – 75).

SESAR Joint Undertaking and EUROCONTROL—Oral evidence (QQ 62 – 75).

Submission to be found under EUROCONTROL and SESAR Joint Undertaking—Oral evidence (QQ 62 – 75).

Adam Simmons (Department for Transport), Robert Goodwill MP and Paul Cremin (Department for Transport)—Oral evidence (QQ 176 – 190)

Adam Simmons (Department for Transport), Robert Goodwill MP and Paul Cremin (Department for Transport)—Oral evidence (QQ 176 – 190)

Submission to be found under Robert Goodwill MP, Paul Cremin (Department for Transport) and Adam Simmons (Department for Transport)—Oral evidence (QQ 176 – 190)

Thales UK—Written evidence (RPA0030)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

Background

Thales is a global technology leader in the Aerospace, Transportation and Defence & Security markets. In 2013, the company generated sales in excess of €14 billion, with 65,000 employees in 56 countries. With its 25,000 engineers and researchers, Thales has an extensive capability to design, develop and deploy equipment, systems and services that meet the most complex security requirements. Thales has an exceptional international footprint, with operations around the world working with customers and local partners.

Thales UK employs 7,200 staff based throughout the country. In 2013 Thales UK's sales were around £1.3 billion.

Introduction

RPAS are perhaps the key emerging military technology of the 21st Century so far. Just as in previous eras, the rapid adoption and exploitation of this disruptive technology has, over the last decade, created both opportunities and challenges. The UK military's early adoption of RPAS has significantly enhanced its ability to deliver timely and critical Intelligence, Surveillance and Reconnaissance information, thereby reducing risk to service personnel.

As regulatory, technological and societal obstacles are overcome, RPAS will, in time, also offer affordable and beneficial solutions for civilian applications. The European Commission has promoted efforts to develop enabling technologies and regulatory frameworks to address the increased operations and automation of RPAS. The significant benefits resulting from the development of military RPAS capabilities underscore the requirement for similar civilian applications for the foreseeable future.

Over the past decade, the UK Civil Aviation Authority has become a leader in developing regulatory frameworks for RPAS, highlighting the safety requirements in terms of airworthiness and operational standards that have to be met for RPAS to operate in UK airspace. Publications, such as CAP-722, have informed international standards and guidance documents on a global scale. Development initiatives covering both technology and regulatory frameworks, such as ASTRAEA have allowed the UK to address some of the challenges of introducing RPAS into non-segregated airspace.

Thales Pedigree

This submission offers an industrial perspective based on Thales's position as a leader in the development and long-standing operational deployment of RPAS. Thales UK's RPAS activities include the provision of 100,000 flying hours of RPAS support to British forces, via the Hermes 450 "ISTAR by the hour" service contract, and as the supplier of the UK

WATCHKEEPER programme which has achieved 'Release To Service' Certification and is now operable with the British Army.

Thales UK is one of the major industry players in the ASTRAEA consortium, tasked with developing the future regulatory, certification and technology roadmap for the routine use of RPAS in non-segregated airspace, with responsibility for "Sense and Avoid". Thales UK is the nominated Chairman of the Joint ASTRAEA regulatory committee (JARC), acting as a primary point of contact between the industrial consortium and the various regulatory bodies in the UK, Europe and globally. Thales is involved in a number of European programmes and regulatory working groups, including EUROCAE WG73 which is dedicated to the development of aviation standards for RPAS.

Thales UK has been selected as the UK participant in the Single European Skies Air Traffic Management Research (SESAR) RPAS demonstration programme, which is aimed at understanding how the new harmonised European Air Traffic Management systems will accommodate RPAS as airspace users. Thales's 'CLAIRE' programme is based on an incremental series of RPAS simulations, using scenarios to exercise Air Traffic Management interoperability and communications concepts in conjunction with the UK national air traffic service provider (NATS) and European partners.

Thales UK has participated in several European working groups reviewing the societal aspects of RPAS, including liability, Insurance, and Data protection.

This submission gives a brief overview of Thales UK's views on the main areas the Committee has outlined for discussion. Thales would welcome the opportunity to elaborate further on these points, and other areas of interest, in the course of the Committee's deliberations.

Response to Committees Questions

1. *Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?*

1.1 Thales UK is in agreement with the key priorities set out by the European Commission. The focus is correctly aligned with creating a requisite and fair level of regulatory, technological, operational and societal conditions to enable the development, sustainment and growth of the civilian RPAS market sector.

1.2 The European Commission Communication and associated reports have been prepared following a comprehensive consultation period, including workshops and engagements with key stakeholders and industry. Thales has participated in the European workshops and remains active in the resultant working groups and committees, including the recently launched SESAR Project Definition phase to meet the European Commission RPAS roadmap.

1.3 Thales's pedigree and experience in RPAS, particularly arising from the WATCHKEEPER programme, has proven invaluable in shaping the needs of future RPAS programmes, operational guidance and certification standards. The technical and regulatory activity

within the ASTRAEA and SESAR programmes has provided Thales UK with the understanding necessary to work with UK national bodies, including DfT, CAA and the European Commission, to provide guidelines and develop the foundations to access this breakthrough market sector.

1.4 The priorities identified in the Communication outline the next steps towards National, European and Global objectives for the integration of civil RPAS. However, how these objectives are subsequently defined, supported, directed and implemented will be critical. As collective experience grows, a body of evidence is established and lessons are learnt from the numerous national and international groups working in this sector, it is important that these steps are supplemented with timely inputs from the wider stakeholder and industrial community.

1.5 A coherent approach is vital to sustain Europe's position as a leading innovator within this field. This will also ultimately provide a solution that meets with international certification standards through proportionate and fair regulation. Additionally, it will provide a body of evidence that demonstrates equivalence, within a cost effective and safe regulatory framework, to allow the Civil RPAS market to become established over the next decade.

2. *What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?*

2.1 National bodies have no regulatory control over >150kg sized civil RPAS. In terms of expediency, there are demonstrable benefits from national level regulation of small civil RPAS below 150kg. However, care will have to be taken to ensure that bespoke national rules remain compatible with EU or ICAO requirements.

2.2 European guidelines for civil RPAS above 150kg will be determined by the European Aviation Safety Agency which, as a Regional Safety Oversight Organisation (RSOO), is working closely with the CAA, FAA and other national bodies to develop and institutionalise global regulations for RPAS. There are a number of important initiatives currently ongoing, one of the most important being a joint publication of the ICAO RPAS Manual due to be published in 2015.

2.3 The benefits of addressing the regulatory aspects at European level can be seen through the successes of the EUROCAE and JARUS RPAS Working Groups (WGs), who are publishing a number of framework documents to help define performance and safety targets for RPAS.

2.4 International control (via ICAO) provides the global market with fully interoperable systems, common regulations and common operations developed within a framework of global ATM / AOC. However the process of approval and revision is often slower with many diverse stakeholders, with national and regional interests, striving to gain a consensus leading to international agreements.

2.5 With the establishment of the RPAS panel in ICAO, significant steps have been taken that will provide global benefit and help harmonise European efforts with work being undertaken in other countries and especially the US. It is therefore imperative that the UK and Europe stay at the forefront of these international developments to support UK and European industry.

3. *In which new or innovative ways do you think RPAS will be used in the future?*

3.1 The full extent of the military utility of the newly deployed generation of RPAS is still emerging, but it is clear that there is a step change in such utility.

3.2 The European Commission roadmap has established significant numbers of applications and operational frameworks for RPAS, based on achieving current and innovative capability requirements.

3.3 For larger RPAS, initial applications are likely to be for state operations such as search and rescue, protection of borders and national infrastructure and policing. Some examples of future Commercial use of RPAS could include: applications such as point-to-point cargo transportation, agriculture, media, environmental monitoring and network communication services.

3.4 Additional benefits may accrue through RPAS driving the development of technology, regulation and infrastructure that have strong synergies with manned aviation; such as: single pilot commercial operations; transfer of autonomy; automation to reduce pilot / controller workloads and reduced training budgets over next 20 years will be potential 'spill-over' beneficiaries from RPAS.

4. *What is your view of the estimate by the Aerospace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?*

4.1 It is widely recognised that RPAS are on the brink of a large growth opportunity that will provide substantial employment for, and economic benefit to, the Aerospace, RPAS industrial and stakeholder sectors.

4.2 The small RPAS market has grown rapidly and there are many forecasts predicting similar market growth for larger RPAS. It is likely that the market for large RPAS will open as technologies become more tangible and enablers are established to support 'beyond visual line-of-sight' operations.

4.3 The growth of the RPAS market requires the timely deployment of enablers, such as airspace integration, regulations and wider societal aspects of RPAS operations. The positive economic and operational benefits of RPAS will need to be fully articulated for

unmanned systems when compared with manned aviation, for both substitution opportunities as well as new applications.

4.4 Current market trends show a period of sustained growth in the post 2020 timeframe, providing the basis for an increase in employment within the RPAS sector. Factors most likely to restrict growth include delay in the process of the development of the national and RSOO regulatory regimes, which may allow the US and others nations to dominate the market.

5. *Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?*

5.1 The Commission should already be aware that the allocation of suitable Radio Spectrum is under consideration by the International Telecom Union (ITU), as is Speech Comms by OFCOM. The UK CAA is a major player and, as chair in the RPAS spectrum workgroups, undertakes considerable activities on behalf of Europe for RPAS integration.

5.2 The proposed changes to the EASA remit are already altering the perception of Member States. The competency of national regulation has been gradually devolved to EASA over the past eight years. This is based on the desire for regulatory harmony in areas such as Airworthiness, Licencing, Aerodrome operations, Personnel and Aircraft operations.

5.3 It is likely that RPAS regulations will follow a similar course, underscoring the importance of the EU RPAS roadmap and UK industry's proactiveness through engagement with ASTRAEA and other European bodies, coupled with UK Government support.

5.4 A key limiting factor at present is the requirement for access to spectrum, both for flight command and control and data transfer. These additional demands for bandwidth will need to be factored into future electromagnetic spectrum requirements.

5.5 A primary legal consideration for the future of RPAS is the efficacy of the Missile Technology Control Regime (MTCR) in controlling RPAS technology. This is particularly relevant in ensuring that the control of RPAS technology alongside that of ballistic missile technology remains a credible and manageable method of preventing the proliferation of technologies necessary to produce long range missiles, whilst allowing the legitimate globalisation of RPAS for both military and civil applications.

6. *Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?*

6.1 There are many RPAS stakeholders, including industry, insurance and data protection companies that are reviewing these areas. The relocation of the pilot to the ground, and

the increased level of automation on the air vehicle, will require changes to insurance and liability regimes, whilst recognising industrial capacity to manage those risks.

6.2 The liabilities and insurance requirements for the use of RPAS will need to be clearly understood by all operators and manufacturers, particularly for small RPAS, to ensure sufficient protection under insurance policies. Currently the minimum limit of aviation liability insurance required to fly an aircraft is defined and based on the weight of the aircraft. Due to the lighter weight of RPAS, this limit would be low and may not be appropriate. The limits would need to be analysed based on best, worst and most likely evaluations for RPAS, but the EU should certainly consider this aspect.

6.3 Existing data protection regimes should be adequate, but may be challenged by the potential scale of RPAS operations and the sensitivity of privacy concerns. The nature and extent of concerns will vary significantly as a result of different cultural perspectives. For example, use of RPAS is analogous to that of CCTV, which is pervasive and largely accepted in the UK, whilst the opposite tends to be the case on continental Europe.

6.4 A basis for wider acceptance will be for users to demonstrate a rigorous approach to personal data security, recognising the duties and responsibilities of Data Controllers, under EU and UK Data Protection legislation to only collect data that is adequate, relevant and not excessive in relation to purpose and to retain the data for no longer than necessary for that purpose.

7. *Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?*

7.1 Light RPAS are an established growth area and have already driven sector expansion, despite some concerns regarding adherence to regulations.

7.2 It is essential that funding for research and development into innovative technologies and established regulations is made available in a timely manner to allow full access to market. The SESAR Project Definition Phase and ASTRAEA are targeting the critical enablers necessary for the future sustained growth of the entire RPAS sector, including Sense and Avoid, Airspace and Airport access, C2 Communications, Human factors, Contingency, Security and ATM compliance.

7.3 In addition there should be consideration for research into new innovative technologies, such as small size fuel cells; secure Command and Control links for RPAS in urban areas; energy and sustainable environmental efficiency; advanced sensors development; and societal benefits.

7.4 There will be elements of research and technology advancement in the RPAS sector that will provide benefits into the manned aviation sector. These may include Sense and Avoid and efficiencies within Air Traffic Management systems, as well as for potential to support future developments in other transport, health and automotive sectors.

SUMMARY

Thales UK has substantial pedigree and is at the forefront of RPAS initiatives in this key growth and disruptive technology market sector.

The EU is delivering a clear airspace access campaign based on establishing regulations, guidelines for airworthiness, licencing and operations and addressing the societal aspects in order to ensure that Europe is one of the leaders, and remains at the forefront, of Civil RPAS market integration.

The UK's current industrial position in RPAS is built on core research and development over the last two decades. It is subject to erosion by both other nations and exploitation by civilian users. Therefore, in order to maintain the UK's relative strength in RPAS for the future, it is essential that the UK Government continues to support and fund UK industry and stakeholders to maximise National, European and Global Initiatives that will create a sustainable wealth creation capability in the UK.

It is recommended that the Committee supports the European Roadmap initiative and continues to support UK stakeholders and national participation in the SESAR Definition Phase and ASTRAEA programmes. Less than full engagement on current RPAS initiatives will leave UK industry at a significant disadvantage and may lead to an unrecoverable loss in market position.

September 2014

Thales UK, Callen-Lenz Associates Ltd and National Aeronautical Centre—Oral evidence (QQ 24 – 35)

Thales UK, Callen-Lenz Associates Ltd and National Aeronautical Centre—Oral evidence (QQ 24 – 35)

Submission to be found under Callen-Lenz Associates Ltd, Thales UK, and National Aeronautical Centre—Oral evidence (QQ 24 – 35)

Thales UK—Supplementary written evidence (RPA0042)

‘Civil use of Remotely Piloted Aircraft Systems (RPAS) in the EU’

Thales has been at the forefront of RPAS operations for over two decades and is heavily involved in studies and research initiatives to identify the benefits and issues associated with civilian use. This work is based on a three-fold activity portfolio based on developing a common regulatory framework, validating enabling technologies and addressing ‘societal’ topics such as data protection, insurance and public perception. A harmonised approach is required to ensure technology is able meet emergent performance specifications and ensure equivalent levels of safety are achieved as for manned aviation, only then will RPAS operations be fully integrated within the airspace structure.

Thales welcomes the opportunity to support the House of Lords Select Committee initiatives and welcomes the publication of the European Commission (EC) RPAS roadmap which establishes a realistic and step-wise approach to regulation and airspace insertion in Europe. Furthermore the April 2014 EC Communication provides a concise very well articulated description of the roadmap and steps being taken to implement a European level policy framework leading to development of a commercial RPAS market. The timescales for integration are aggressive but this methodology is welcomed as global competition for a new market intensifies in established military RPAS nations (such as the US and Israel) together emergent nations such as Brazil, China and India.

The paper addresses all the major issues that need to be addressed to realise the potential of civilian RPAS operations including the necessity to develop secure and reliable command and control data links; the need to modify current insurance regimes to ensure policies are fair and proportionate to risk; and citizen’s rights are protected using data protection measures comparable with current legislation. It is important that the EC understands that the concept of a remotely piloted aircraft is disruptive and challenges many aspects of aviation law which has evolved over the past hundred years or so. Lessons learnt need to be considered and a pragmatic approach adopted to ensure RPAS operations are enabled in a far more expeditious timescale.

Commercial operations in the UK are currently limited to a vibrant yet highly restricted market predominantly occupied by small RPAS typically with a mass of less than 20kg. Though operations are excluded from aspects of the UK Air Navigation Order (ANO), operators are still required to obtain permission from the CAA and are subject to operational constraints dependant on flying operations and potential risks to third parties. In general terms this sector is limited to ‘visual line of sight’ (VLOS) operations with a normal maximum heath of 400ft above the surface and maximum range not exceeding 500m.

A number of key technologies are required before RPAS, regardless of their size, are able comply with the current requirements of the ANO and operate ‘beyond visual line of sight’ (BVLOS). It is also necessary for RPAS to be accommodated in a transparent manner with regards to provision of an air traffic service (ATS), this requires the RPAS to be able to comply with instructions from the ATS provider and carry a requisite level of equipment

appropriate to the class of airspace they intend to operate. This will include special equipment such as a Secondary Surveillance Radar (SSR) Transponder as well as an approved method of aerial collision avoidance. The UK regulator has made it abundantly clear that RPAS operations will not be permitted in non-segregated airspace without a Detect & Avoid (DAA) system. Industry is developing a number of DAA systems using various sensing technologies such as Electro Optical (EO); Infra Red (IR); Radar and transponder based systems. It is likely that size, weight and power (SWP) constraints will initially restrict carriage of DAA systems to larger platforms which will enable more strategic commercial operations such as maritime surveillance, search and rescue and homeland security applications.

A number of European Agencies have been contributing towards development of regulatory arrangements for RPAS; these include the European Aviation Safety Agency (EASA), the European Organisation for Civil Aviation Equipment (EUROCAE) and the Joint Authorities for Rulemaking on Unmanned Systems (JARUS). A number of organisational changes within EASA and JARUS will help ensure a more coherent approach is adopted and a clearer delineation of responsibility is established. Though each organisation shares a common aim (to develop a single set of technical, safety and operational requirements for the certification and safe integration of RPAS into the European airspace), the relationship between the regulator and industry groups needs to be more transparent and inclusive. This is essential as industry will constrain civil RPAS development until standards and regulatory requirements are clear and institutionalised on a transparent and mutually inclusive basis.

The strategic aim of the European Single European Skies ATM Research (SESAR) initiative is to harmonise and rationalise the ATM infrastructure of Europe to improve capacity; efficiency; safety and environmental aspects of the airspace. Importantly, the SESAR demonstration phase, recently mandated by the EC and due to commence in 2015, recognises RPAS as legitimate airspace users and will provide the necessary ATM infrastructures needed to integrate RPAS into EU controlled airspace. However it is not clear how well or effectively SESAR will address the requirements for small RPAS and operations outside of controlled airspace. In 2013 the SESAR Joint Understanding (JU) launched an initial demonstration programme to better understand the maturity levels of RPAS integration, Thales UK is the UK participant in this programme.

Thales recognises that the increased civil use of RPAS has raised fears about invasions of privacy, and a new potential physical threat to people and property. It is felt that existing regulation provides a sufficient level of protection in terms of data-protection and preservation of privacy especially for highly regulated 'large RPAS' operations. RPAS are not fully autonomous and are regarded as collector platforms, responsible use should be governed in much the same way as for manned aviation, CCTV and even mobile phones. There is a strong case for accelerating an educational process to the wider RPAS community with focus on recreational user sometimes with little knowledge, experience, regard or awareness of operational rules. This may be achieved through providing warnings at point of sale, registering all RPAS types and prosecuting when necessary.

The Royal Aeronautical Society has, quite rightly, raised an important issue regarding the limited availability of radio spectrum and its potential impact on future RPAS operations. It is recognised that RPAS will eventually require spectrum to be assigned using frequencies

protected for aeronautical use or satellite communications links. Work is ongoing to ensure the integrity of communications links as RPAS operations, using standard systems can be hacked and jammed or 'spoofed' by parties with malicious intent thus posing a danger to operators and civilians. To date progress has been slow and limited to allocation of terrestrial spectrum frequency at the 2012 World Radio Conference; the next WRC event is scheduled for 2015 to discuss utilisation of radio spectrum as well as satellite spectrum requirements. A global effort is underway to ensure preparatory studies are completed so as to make the necessary technical, regulatory and operational recommendations to WRC 2015 regarding the usage of fixed satellite services (FSS) and the safety critical Control and non payload communications (CNPC) links for RPAS.

Supplementary question raised during the proceedings

Lord Brooke of Alverthorpe: the number of these is relatively small, so one would think that technology could be developed so that something could be embedded in them that could not be taken out easily. Is anybody working on that?

Neil Watson: I will take that away and perhaps get back to you on that.

The introduction of automated identification technologies (AIT) for aircraft parts is a relatively new approach offering advantages in the management of individual parts and accurate traceability of RFID (Radio Frequency Identification) tags that may be affixed to aircraft parts. In recent years, radio frequency identification technology has moved from obscurity into mainstream applications that (unlike traditional labelling or bar-code readers) enable identification without requiring line of sight. By affixing tags to parts or assemblies during the manufacturing process it is possible for data to be recorded and retrieved including information such as date of manufacture, configuration baselines and even maintenance service records.

Information stored on secure data tags may be periodically updated and checked using readers enabling ease of access and controlled data storage. Many tags meet stringent environmental factors such as humidity, pressure, and flammability enabling them to be used in external aircraft (or RPAS) locations as well as pressurized cabin spaces.

9 December 2014

Trilateral Research—Written evidence (RPA0035)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

1. Trilateral Research & Consulting is a specialist research consultancy focused on issues related to risk, security, privacy, data protection and new technologies. We have conducted more than 20 research projects for the European Commission (under the 6th and 7th Framework Programmes), a range of tenders for the European Commission, the Information Commissioner's Office and the UNHCR as well as private sector services. All of Trilateral's research is focused on providing policy recommendations for the safe and responsible deployment of new technologies, with a particular focus on respect for privacy, data protection and other fundamental rights. Trilateral has examined the civil deployment of RPAS in an EC-funded project called PRESCIENT – Privacy and Emerging Fields of Science and Technology and a tender for DG Enterprise on the Privacy and data protection issues associated with civil RPAS. We have peer-reviewed publications on the civil use of RPAS and our researchers are recognised experts in this field.

Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?

2. Trilateral agrees that safety is a key consideration with respect to civil RPAS, and the protection of people and their property should be the primary priority of the policy push in this area. This includes integrating RPAS into the single European sky and protecting the security of RPAS and their operations. This also includes a clear identification of the liabilities of different stakeholders involved in the RPAS sector, as a clear liability structure will support compliance by relevant organisations. The protection of citizens' fundamental rights should also be understood as a key priority in relation to the integration of civil RPAS into European airspace. Any use of RPAS for civil purposes which does not adequately respect fundamental rights is essentially operating outside of European and Member State law, and as such, should be treated as seriously as breaches of safety regulations. However, RPAS operators and manufacturers are often well informed about aviation regulations and less well informed about privacy, data protection and other fundamental rights. This situation needs to be rectified both at the European and national levels. Supporting the market in relation to RPAS manufacturing and services is also important, but it should not be prioritised over considerations of safety or fundamental rights.

What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

3. As Trilateral's expertise is focused on privacy and data protection, we will limit our answer to this question accordingly. The advantage of regulating RPAS at the national level is that privacy and data protections laws are clearer for RPAS operators and manufacturers, and there is greater likelihood of relevant jurisprudence in this area to assist in answering

practical queries. Furthermore, many countries have laws or soft law measures (e.g., codes of conduct) relevant to RPAS operations that could be used to provide guidance on privacy, data protection and other fundamental rights issues. For example, the UK has the CCTV Code of Practice developed by the Information Commissioner's Office.²³³ These laws and other measures can assist RPAS representatives in identifying when privacy is likely to be infringed, when personal data is being collected, and what measures they should consider to mitigate these issues. Furthermore, each country has a specific agency, e.g., a Data Protection Authority or other body, to whom citizens, organisations or other interested parties can raise questions, issues and complaints. From the perspective of citizens and local and national authorities, national regulation might be more attractive.

4. However, regulation at the European level offers many advantages, particularly from the perspective of industry stakeholders that are operating across European borders. Specifically, there is no harmonisation of, for example, the definition of personal data between different Member States in the European Union. Furthermore, because RPAS are, themselves, such complex devices that can collect a myriad of different types of data, this lack of harmonised definition has significant impacts on the predictability of the regulatory environment. This is especially true as the RPAS industry grows, expands and matures. Regulation at the European level would provide more legal certainty and a predictable environment.

In which new or innovative ways do you think RPAS will be used in the future?

5. Many of the new and interesting ways that RPAS will be used in the future will be to make the collection of data mobile. This includes the collection of personal data or data relating to people, as well as data that have little to do with people (e.g., environmental data, etc.). One of the most interesting and potentially troubling aspects of RPAS is their ability to operate undetectably and to enter spaces that were previously difficult or impossible to access. For example, RPAS could fly inside buildings, can access private gardens, and can also access areas of a crowd that might have been difficult to surveil from the edges (e.g., protests, concerts and other events). As such, RPAS may fundamentally change the nature of surveillance, and have significant impacts of privacy, data protection and fundamental rights.²³⁴ In addition to the expanded use of visual payloads, the sensors and other technologies that can be connected to an RPAS are many, particularly as these other technologies become miniaturised. These could be used to infringe many different types of privacy, including privacy of location and space, privacy of behavior and action, bodily privacy, privacy of association, privacy of data and image and privacy of communication.²³⁵

6. Many RPAS operators and manufacturers are beginning to consider their RPAS as machines through which they can collect massive amounts of data. Much of this data is being collected and processed in real time and is coming from a variety of sensors. As such, it meets the core definition, originally offered by Gartner, of big data in the sense that it is high

²³³Information Commissioner's Office, *CCTV Code of Practice*, Wilmslow, 2008. There is also a draft, revised version that is currently the subject of public consultation.

²³⁴Finn, Rachel, and David Wright, "Unmanned aircraft systems: Surveillance, ethics and privacy in civil applications", *Computer Law & Security Review*, Vol. 28, No. 2, 2012, pp. 184-194.

²³⁵Finn, Rachel, David Wright and Michael Friedewald, "Seven types of privacy", in Serge Gutwirth, Yves Poullet et al. (eds.), *European data protection: coming of age?*, Springer, Dordrecht, 2013.

volume, high velocity and is of significant variety.²³⁶ However, like all new information and communication technologies, this collection and processing of big data related to people raises significant risks when the following issues emerge.

7. When the data processing by RPAS is focused on the “usual suspects” whose rights are often infringed by new surveillance and monitoring technologies (protesters, consumers, people marginalised by race, class, gender or other social categorisations)²³⁷
8. When the data collected is linked to other data sets to create profiles of specific groups of people or to identify individual people²³⁸
9. When the “big data” sets are processed and used to infer causal relationships without sufficient theoretical support.
10. Each of these issues may cause harm to people on the ground by infringing upon their fundamental rights, including rights to the protection of personal data and rights to privacy. Research on media reports about the use of RPAS in Europe, the US and Canada has already revealed that RPAS operations by authorities in particular already target protesters, youth on council estates, squatters and other marginalized populations.²³⁹ The deployment of RPAS on a large-scale will likely augment this disproportionate attention. Furthermore, many big data processing activities focused on people aim to discriminate between different categories of people in order to tailor products and services.²⁴⁰ Additionally, as more and more data is collected, the linking of this data may reveal intimate details about a person’s habits, preferences, etc. resulting in a privacy infringement.²⁴¹ It may also impact upon people’s life chances in that decisions may be made about individuals based on profile information that has little relationship with their “real” circumstances. This is particularly problematic as the processing of large data sets often result in the identification of spurious relationships – relationships between data points that are the result of chance but which emerge simply because the data set is so large.²⁴² Therefore, the linking of emerging “big data” applications with RPAS data collection may result in significant impacts on people’s fundamental rights and life-chances.

What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

11. Trilateral is not in a position to provide estimates of the commercial market for civil RPAS. However, we do feel that a lack of understanding of manufacturers’ and operators’ liabilities with respect to privacy and data protection may introduce costs that could negatively impact

²³⁶ Laney, Douglas, “The Importance of ‘Big Data’: A Definition”, Gartner, 2012. <https://www.gartner.com/doc/2057415?ref=clientFriendlyURL>

²³⁷ Finn and Wright, op. cit., 2012.

²³⁸ Finn, Rachel, and Kush Wadhwa, “The Ethics of ‘Smart’ Advertising and the Regulatory Initiatives in the Consumer Intelligence Industry”, *Info*, Vol. 16, No. 3, 2014, pp. 22-39.

²³⁹ Finn and Wright, op. cit., 2012

²⁴⁰ Finn and Wadhwa, op. cit., 2014.

²⁴¹ Ibid.

²⁴² Boyd, Danah, and Kate Crawford, “Critical Questions for Big Data: Provocations for a Cultural, Technological, and Scholarly Phenomenon”, *Information, Communication, & Society*, Vol. 15, No. 5, p. 662-679.

the growth of the RPAS market. Specifically, the research conducted for DG ENTR included a survey of civil RPAS practices among industry representatives, including RPAS manufacturers and operators. The associated research is ongoing, and the survey results will be released at the close of the project in late 2014 or early 2015. The survey found that the majority of the 91 self-selected RPAS manufacturers and operators who responded reported “basic” or “poor” understanding of European and national privacy and data protection laws. Furthermore, the same survey revealed that at least half of RPAS operators are probably collecting personal data during their missions. This means that there is a significant gap between the practices of civil RPAS operators and their legal obligations. This gap could introduce liabilities to the RPAS sector that could inhibit the growth of the market, while at the same time introducing risks to European citizens that their personal data is not being adequately protected. As such, it carries the potential to negatively impact the industry sector as well as members of the public.

Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

12. This is outside the scope of Trilateral’s expertise.

Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

13. The research carried out by Trilateral for the EC’s DG Enterprise, in partnership with Vrije Universiteit Brussel, has found that the existing data protection regime, and especially the changes flowing from the proposed Data Protection Regulation, are adequate to address privacy and data protection issues raised by RPAS. However, our analysis reveals that there is a significant gap in RPAS industry representatives’ understanding of their privacy and data protection obligations and there is a significant gap in enforcement of data protection principles. Specifically, many commercial RPAS operations are posing significant risks to privacy and the protection of personal data. Yet, RPAS operators are not aware of or adequately addressing the following European data protection principles:

- Transparency
- Consent
- Accountability
- Data security
- Data minimisation
- Proportionality
- Purpose limitation

- Rights of access, correction and erasure

This is a significant problem, as it can harm members of the public and the industry itself. Ensuring that transparency protocols are met will be a significant step in ensuring the accountability of RPAS operators and manufacturers.

14. In addition, the current data protection regime also leaves significant gaps in respect of the household exemption. In the survey conducted by Trilateral for DG ENTR, Data Protection Authorities, Civil Aviation Authorities, RPAS industry representatives and civil society organisations all recognised private use of RPAS as representing the greatest threat to privacy, data protection and safety. This gap has not yet been adequately addressed by the legislation, and instead, individuals who are negatively impacted by RPAS must rely on laws surrounding harassment or stalking for legal recourse.

15. Trilateral also welcomes the addition of an obligation to consider privacy by design in the proposed General Data Protection Regulation as well as the obligation to carry out a Data Protection Impact Assessment (DPIA) or a privacy impact assessment (PIA). If the RPAS industry is adequately educated about these two measures and their associated obligations, we feel that many of the potential negative impacts of RPAS on privacy, data protection and fundamental rights could be identified early and prevented. The strength of such impact assessments is that they enable the regulatory framework to take account of the heterogeneity of RPAS technologies and missions. However, we caution that a PIA must not take a checklist approach and must be accompanied by a commitment to adequate training in order to ensure that RPAS operators are aware of their obligations.²⁴³

16. We recommend that RPAS operators that are likely to collect data about people undertake a privacy impact assessment before conducting each type of operation. This will ensure that privacy, data protection and other fundamental rights are respected at the beginning, planning stages of the data collection, and that companies avoid costly retro-fixes or liabilities by reducing the risks their operations pose. We also specifically recommend that the European Commission or national policy-makers commission a privacy impact assessment framework, similar to the one that was constructed in relation to RFID and smart meters and evaluated by the Article 29 Working Party. Such a framework would assist the RPAS industry in recognising, understanding and meeting their legal obligations whilst protecting the fundamental rights of members of the public.

Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

17. In addition to the funding that has been allocated to study airworthiness, liability and insurance and privacy and data protection, Trilateral would argue for the allocation of funding to a transparency tool which would enable a holistic regulation of these issues with respect to RPAS. We feel that EU research should set aside funding to construct a recognition system for RPAS that would enable each and every RPAS to be identifiable, both in real time and in the event of a crash. This would require RPAS to carry mandatory, unique

²⁴³ For more information on privacy impact assessments see Wright, David, and Paul de Hert, *Privacy Impact Assessment*, Springer, Dordrecht, 2012.

identifiers that would also enable the RPAS to be tracked via GPS using a centralised system.²⁴⁴ It would also require a centralised database of RPAS and their unique identifiers and well as their operators and contact information. Such a system would be a robust transparency tool that would enable citizens to immediately identify the RPAS, the operator and the avenue through which they could find out additional information. There is a significant opportunity to link accountability with regard to safety and liability and the protection of privacy, personal data and other fundamental rights.

18. Finally, as noted above, Trilateral recommends providing funding to commission a PIA framework for RPAS. Given the complexity of RPAS technologies and missions, a PIA framework would offer clear guidance about good practice in assessing the potential impacts of RPAS missions on privacy, data protection and other fundamental rights. Furthermore, such a methodology would also result in a harmonisation of practices across Europe.

20 October 2014

²⁴⁴ Such a system was also suggested by the International Working Group on Data Protection in Telecommunications, *Working Paper on Privacy and Aerial Surveillance*, 54th Meeting, Berlin, 2-3 September 2013.

UK Civil Aviation Authority—Written evidence (RPA0029)

CIVIL USE OF REMOTELY PILOTED AIRCRAFT SYSTEMS (RPAS) IN THE EU

Introduction

1. The Civil Aviation Authority (CAA) is the United Kingdom's specialist aviation regulator. As such, it is therefore responsible for the regulation of Unmanned Aircraft Systems (UAS) operations within UK airspace from a safety perspective. The CAA's guidance document for the operation of UAS is entitled CAP722 and can be found at www.caa.co.uk/cap722

Question 1

2. *Do you agree with the priorities identified in the European Commission's Communication for opening the aviation market to the civil use of RPAS? Are there other priorities which should have been included?*

3. The Commission's document identifies the following priorities:

- Safe operation in non-segregated airspace
- Security
- Protection of citizens' fundamental rights
- Third party liability and insurance
- Support for market development and for European industries

The CAA is broadly in agreement with these priorities, however it must also be noted that there is nothing particularly new, or different, within the document from what has already been discussed at length for several years.

4. The safety of all aviation operations, be they manned or unmanned, is clearly of primary importance and the integration of unmanned aviation with manned aviation within the same airspace (ie. without any form of segregation) is one of the key challenges to be overcome. Whilst not specifically mentioned in the document, the airworthiness of the RPAS is obviously directly linked to 'safe operation' and a great deal of the security aspects are related to this also.

5. Public perception, particularly concerns about the privacy aspects, has been a thorn in the side of unmanned aviation since its inception, although the document appears to be a little unclear about any specifically new actions that will need to be undertaken in this area.

6. The document rightly accepts that accidents may happen and that a liability and insurance regime needs to be in place. It also acknowledges that the current insurance regulation (EC 785/2004) requires updating, although the wording of paragraph is somewhat ambiguous as it implies that RPAS of less than 500kg mass do not need to be insured against third party liabilities, which is not the case currently.

7. Finally, the EC clearly aspires to promote jobs, growth and competitiveness within the EU. The RPAS market is at the leading edge of technical development and hence the Commission will clearly wish to give Europe a lead over the rest of the world if at all possible.

Question 2

8. *What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?*

9. Aviation is an international activity and hence requires a significant degree of international harmonisation, in order to assure safety of operations and also to allow freedom of operation within the EU. In practical terms, there is probably little difference between regulating RPAS at a national or an EU level at present. EASA currently has the responsibility for the regulation of RPAS with a mass of more than 150kg, with RPAS of 150kg or less being regulated by the individual national aviation authorities (NAAs). Clearly, however, it is most unlikely that an RPAS of 160kg (EASA) would be assessed in a way that is dramatically different from an RPAS of 140kg (NAA) when performing a similar mission/type of flight. There is also little benefit in the UK working to develop its own bespoke RPAS regulations if they are at odds with those of other nations.

10. This has already been realised and as a result, a large number of NAAs (European plus other states such as USA, Russia, Brazil and South Africa) are already working together under the JARUS group (Joint Authorities for the Rulemaking of Unmanned Systems) with the aim of producing a harmonised regulatory set which can be adopted into national regulation. Most notably, JARUS has already been nominated as the 'rulemaking group' for the current EASA rulemaking programme, and hence the work towards harmonisation is already underway, irrespective of whether EASA's competence is subsequently taken below 150kg. The most important point to note is that the regulations are developed in a way that is both proportionate to the risk and complexity of the operation.

11. One important point to note is that the RPAS 'definition' excludes unmanned aircraft used for recreational purposes (ie. toys or models) and so national regulations will still be required to cater for these. At the very small end of the UAS spectrum (Eg. 3kg or less) however, the lines between both can become somewhat blurred and so it will again be important to maintain proportionality (ie. so that two similar devices being flown in the same location, one used recreationally and one used commercially, are not subject to drastically different regulatory requirements).

Question 3

12. *In which new or innovative ways do you think RPAS will be used in the future?*

13. A large number of potential RPAS applications have already been identified, particularly as the technology has improved rapidly in recent years. For the larger types that are more or less comparable to the size of a manned aircraft, the main applications are likely to be those where the activity can be performed at less cost than for a manned aircraft, or where the required flight time exceeds the endurance of an onboard crew. This is most likely to include cargo and long range surveillance type flights. The smaller sized RPAS are thought likely to be a more 'disruptive technology' in that they are also likely to provide new opportunities for surveillance or photography in a quick and inexpensive manner. We have already seen this in surveying applications where a small UAS can dispense with the need for expensive scaffolding, or trained climbers.

14. Additionally, there is now a new 'leisure use' emerging which should be noted. Due to the ever decreasing size and cost of some systems as technology develops, small unmanned aircraft are now being used by the general public as their 'personal camera', offering new types of 'holiday snap'. This is a different use from either the traditional model aircraft enthusiast, or the 'commercial operator'. We have already seen instances of foreign tourists bringing their 'drone' on holiday with them and using it to take photos of notable landmarks in London. This type of footage is also shared online via sites such as Youtube. Although not specifically an 'RPAS' issue (because of its 'recreational' nature technically falling outside the accepted use of the term), it is nevertheless a good example of the novel/unexpected ways that unmanned aircraft may be used.

Question 4

15. *What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?*

16. The CAA does not have any specific view on this estimate.

Question 5

17. *Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?*

18. The proposed changes are not expected to have any effect on the competences of Member States with regard to military aircraft, as these are outside of the competence of EASA. There may well be an impact on Member States' competences for civilian aircraft (as there was on airworthiness competence when EASA was first formed), however the precise level of this impact cannot be determined until the full details of the proposed changes in the EASA remit are known.

Question 6

19. *Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?*

20. As mentioned in paragraph 6, it is already acknowledged that the EC insurance regulation requires amendment in order to better reflect the consequences of RPAS introduction. Although not the purview of the CAA to assess, as it is a societal matter rather than a safety one, the current data protection requirements (through either the Data Protection Act or the Regulation of Investigatory Powers Act) would appear to be broadly suitable for RPAS purposes. The challenge, however, will be to convince those that think otherwise of this. It is felt most likely that there is a greater human rights/privacy problem resulting from the private use of unmanned aircraft (ie. not within the scope of what the EC calls an 'RPAS'), however to the uninitiated a 'drone' is still a 'drone'.

Question 7

21. *Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?*

22. The CAA does not consider that there is any specific necessity to 'get the airspace regulatory framework right' for RPAS. It should be up to the RPAS industry to ensure that it can fit into the existing framework safely. As such, there clearly needs to be a degree of research targeted at identifying the potential problems (or proving that there are none) associated with RPAS operations within the existing airspace. In particular, research and development could, perhaps, be better targeted at Detect and Avoid capability development, as this is the key to enabling the safe RPAS operations in non-segregated airspace.

19 September 2014

Unmanned Aerial Vehicle Systems Association, the British Airline Pilots Association (BALPA) and Royal Aeronautical Society—Oral evidence (QQ 36 – 46)

Unmanned Aerial Vehicle Systems Association, the British Airline Pilots Association (BALPA) and Royal Aeronautical Society—Oral evidence (QQ 36 – 46)

Submission to be found under the British Airline Pilots Association (BALPA), Unmanned Aerial Vehicle Systems Association, and Royal Aeronautical Society—Oral evidence (QQ 36 – 46)

Ursula Agriculture Ltd—Written evidence (RPA0014)

Civil use of remotely piloted aircraft systems (RPAS) in the EU

Background

This response is on behalf of the SME URSULA Agriculture Ltd (UAL). We are an agricultural data company combining advanced remote sensing and analysis to deliver ‘state of the crop intelligence’ across the agricultural sector. Backed by regular research activity and cross-sector collaboration we leverage remote sensing expertise, agricultural knowledge and advanced aviation know-how to help farmers and agri-businesses improve their economic performance. We analyse images from a combination of RPAS, manned aircraft and satellites to produce maps that inform management decisions leading to improved crop performance and reduced environmental impacts.

RPAS are a critical tool for precision farming, and their use is already a commercial reality in the UK. UAL is concerned that any significant changes to regulation and hence cost-base governing existing activities could impact its business base significantly. UAL therefore welcomes the opportunity to provide a response to this consultation and fully endorses the importance of the civil use in the EU of remotely piloted aircraft systems (RPAS).

1. Do you agree with the priorities identified in the European Commission’s Communication for opening the aviation market to the civil use of RPAS? Are there other priorities, which should have been included?

15) We broadly agree and support the European Commissions (“EC”) approach to the development of the RPAS market, technologies and associated regulation. However we would highlight a concern that the approach appears to anticipate a uniform framework of development and requirements for all RPAS under 150kg. We believe this would restrict the development of RPAS in the sub 20kg, which have to date proved to be the largest and most flexible growth area. We anticipate this will continue to be the highest growth area, particularly as miniaturization of sensors and components enables ever-increasing capabilities in smaller systems. We believe that an approach focussed on the sub 20kg category would provide more tangible short term benefits, particularly in the agricultural domain.

16) We would also question the degree of inclusion of social and privacy issues in the EC paper. These are unrelated to the development of RPAS and are catered for through national and international legislation that already exists. The use of RPAS for aerial work is likely to be far less intrusive than CCTV coverage and the use of mobile phone cameras.

2. What are the advantages and disadvantages of regulating RPAS at the national, EU or international levels, for example in the International Civil Aviation Organization (ICAO)? Are the EU's actions, proposed or otherwise, consistent with developments in non-EU countries, for example in the United States?

17) For larger RPAS that will operate in the same airspace and look to replicate manned aircraft, there would be obvious advantages of international regulations governing operations. However, with smaller RPAS a national or geographic approach that could respond more quickly to developing technologies would better assist the development of the industry.

18) It should be noted that there is already significant commercial activity and economic impact in the small RPAS sector in the UK, including the Precision Farming sector, which AUVSI predicts to be the most significant growth area for the USA. Any new regulatory framework should ensure it safeguards existing licenced activity. UAL is concerned that any significant changes to regulation governing its existing activities could impact its business base significantly, and that a similar concern is shared by other RPAS businesses in the UK.

19) UAL believes that the EU's actions are consistent with, and potentially ahead of, developments in other non-EU countries. While we consider it extremely important to liaise at an ICAO level, UAL would consider that the proposed actions from the EC is currently market leading, with legislation in the United States in particular still not close to being realised. UAL feels it is important to enable the EC to maintain / develop a market lead, while at the same time ensuring safety is paramount.

3. In which new or innovative ways do you think RPAS will be used in the future?

20) The portability and relatively inexpensive nature of small RPAS make their deployment cost effective and time sensitive. Key areas for the future include:

- Precision Agriculture – harvesting, yield prediction, soil analysis, agricultural “big data”, RPAS owner-operator models
- Forestry – Inventory and management of pests & diseases
- Environment - Environmental and ecological change monitoring

21) Academic R&D is critical in driving new and innovative applications for RPAS, and we believe it is important to develop regulatory mechanisms which continue to enable flexible low cost use of small RPAS for research purposes.

4. What is your view of the estimate by the AeroSpace and Defence Industries Association of Europe that RPAS activities will create about 150,000 jobs in the EU by 2050? What are the factors that might restrict the growth of the RPAS market?

22) The ASD figure of 150,000 jobs was based on civil RPAS achieving around 10% of the current aviation market. We believe that this approach in estimating job creation through RPAS operations is a significant underestimate. We are already seeing that job creation will come from completely new areas of activity such as Precision Farming, that will not necessarily be classed as aviation. Already organisations in the UK such as Defra and Network Rail are specifying the use of RPAS for specific contracts, and this will be set to continue. In order to understand the true economic benefits of RPAS it is essential that we recognise and quantify cross-sector impact.

23) Key factors which could restrict growth of the RPAS market include:

- Timeframe for development of the regulatory framework enabling operations in complex environments such as Beyond Visual Line of Sight, Congested Area operations etc.
- Ongoing licensing and other regulatory procedures which are more demanding than those currently extant in the UK
- High insurance costs not commensurate with level of risk

5. Will the existing competences of Member States for the safety of military and civil aircraft, as well as for more general issues such as the allocation and use of radio spectrum, be impacted by the proposed changes in the remit of the European Aviation Safety Agency (EASA)?

24) Radio spectrum is a key issue for the commission to focus upon. For example, whilst the majority of control and command platforms operate on 2.4GHz and video downlinks are on 5.8GHz, RPAS have recently been sold by the retail chain Maplin's with this combination reversed. It is critical that for the industry to develop there needs to be co-ordinated EC agreement on this issue.

25) We believe it is essential that any change in the remit of EASA still allow some involvement from Member States. Member States can best assess local environments and issues which contribute to risk, which would not be possible at an integrated EU level.

6. Are the existing data protection, liability and insurance regimes at EU and Member State levels sufficient to address the concerns raised by the potential greater use of RPAS, or are changes required?

26) The discussion on invasion of privacy with regards to RPAS has been wide ranging for some time. Whilst ARPAS-UK recognises these concerns, it is of the opinion that they should not be singled out from other such mediums such as CCTV, mobile phones and, for example, police helicopters / news crews. Existing legislation already provides an adequate framework and further education on these rather than additional regulation is seen as a more appropriate approach unless evidence suggests otherwise.

27) The insurance market for UK SMEs is currently restricted to a few providers and we would welcome greater competition in this area. As the industry develops and more operational data becomes available we would hope to see premiums reduced and more bespoke off the shelf policies become available.

7. Is EU research and development funding for RPAS sufficiently targeted towards the most important issues, for example, getting the airspace regulatory framework right, as against improving the limited airworthiness of today's small and lightweight RPAS?

28) We agree that a significant focus should be on airspace regulation, but as with Question 1, it is essential in this regard that EU research funding is weighted towards smaller RPAS which are set to have a much greater economic and sustainable benefit in the short as well as long term. It should be noted that this will also increase the extent of research undertaken by SMEs.

29) We feel that suppliers are addressing airframe airworthiness, as operators are quick to migrate should a particular supplier fall behind the curve. However, we also believe that there should be a focus on other technologies which will significantly improve performance and reduce cost of RPAS, as well as supporting RPAS for science measurements. It would be our recommendation that an element of R&D funding be focused towards power/battery technology, payload miniaturisation and flight control systems.

30) We also believe it is essential that R&D funds be available for cross sectoral research, for example integration of sensor systems, and data processing and analysis from a range of technology sectors into RPAS. If R&D funds are bounded entirely within the aviation domain, this will be a significant barrier to growth.

31) Notwithstanding Horizon 2020 and COSME funding, we believe there will be some individual Member State interest and issues which should be funded locally. RPAS is becoming an increasingly popular tool for science measurements, particularly for Precision Agriculture and Agri-informatics, and there would be significant impact if Research Councils were able to recognise the importance of this research.