Unlocking the UK's High Tech Economy: Consultation on the Safe Use of Drones in the UK

Government Response

July 2017

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Ministerial foreword

The UK is at the forefront of an exciting and fast growing drones market. We are seeing drones being used across many of our sectors, improving services, creating high tech jobs and boosting our economy. Drones and their applications are a key opportunity to cement the UK as the place for exciting technology companies to build their business, scientists and engineers to drive innovation, and tech investors to invest – in line with our Industrial Strategy aims and objectives.

Our police, fire services and search and rescue services use drones in emergency situations, and drones are being used to inspect and maintain key road, rail and energy infrastructure. We are seeing efficiency gains and productivity across other sectors as well – such as conservation organisations monitoring natural environments, telecom companies providing temporary internet coverage to disaster zones and hard-to-reach areas, airlines completing safety inspections on its aircraft, and the delivery of medicines to remote areas.

It is important that we make the most of this emerging global sector, creating a UK world-leading research and development centre in what has been estimated to be a global market of over £100bn by 2025.

We are already making great strides in this.

But this is still an advancing and developing industry, which faces a number of challenges if we are to realise the full potential of drones whilst maintaining our world class aviation safety record and addressing security and privacy concerns.

It is this balance that we are striving to meet. It was clear in the consultation responses that the benefits of drones are significant, and that in the UK we have a policy and regulatory regime which allows for the commercial exploitation of this technology whilst not compromising safety. But as the sector grows, new applications emerge, and the technology develops, we have to make sure that this framework keeps pace and addresses the misuse of drones we are seeing, which challenge safety, security and privacy.

The Government's first objective is to ensure that we do not compromise on meeting and addressing these concerns. This is why I think it is important for us to implement the measures we are setting out in this document. At the heart of our approach is

accountability on the part of the operator, around which we have built a package of measures which will both aid us to address the challenges we face whilst enabling and supporting the UK drone applications industry to grow and become world leading.

We are at the beginning of an agile and reactive approach by Government. Some of these measures, such as the registration scheme and educational programme, will need to be future proof and adaptable to changing technology and an emerging market. There is more work to be done, and what we are setting out is a long-term programme of measures to be taken forward over the coming years, working with partners and industry to deliver this ambition.

I am confident that our approach will keep the UK at the forefront of the global market, delivering a sustainable framework for the long-term success of a safe and secure UK drones industry.

Lord Callanan

1. Introduction

1.1 The Department for Transport ran a public consultation between 21 December 2016 and 15 March 2017. The purpose of this consultation was to receive feedback on the Government's proposals to develop the UK's policy and regulatory framework for drones.

1.2 The consultation covered proposals in the following key areas:

- Stimulating drone innovation and enterprise in the UK;

- Ensuring safety and operation within the law;

- Laying the foundations for a developed drone market.

1.3 There were also additional economic impact questions in the annexes for manufacturers, vendors and commercial drones users, or those considering using a drone for a commercial service.

1.4 There were 678 responses received. Of these, 567 were received via responses to the consultation's online survey and another 111 were received as correspondence submissions to the Department of Transport.

1.5 Respondents came from a broad range of stakeholders. The majority of respondents (503) were classified as individuals and they expressed a variety of interests in the drone sector. Those who responded via the online survey were asked to select all categories which applied to them - this showed that:

- 286 used drones for leisure;

- 213 flew model aircraft;

- 61 were General Aviation pilots. (General Aviation (GA) flights are recreational flights, ranging from gliders and powered parachutes to private plane flights);

- 51 were self-employed and considering using drones in their business; and

- 34 were self-employed and using drones in their businesses.

- Another 36 were members of the public who were not involved in any of the previously laid out categories.

1.6 The rest of the responses - 175 in all - came from organisations. Again, a broad range of organisations responded, which were grouped into the following:

- 58 drone using companies or other companies involved in the sector;

- 38 membership or representative bodies from a range of sectors, including trade unions, model aircraft and drone flying associations, and other associations;

- 21 organisations from the traditional aviation sector, such as airports, airliners and manufacturers;

- 17 public bodies;

- 12 drone manufacturers or vendors;

- 9 companies who could not be placed into a clearly defined category;

- 6 charities;

- 5 research bodies or networks;

- 5 test centres or training providers; and

- 4 insurance companies.

1.7 The Government is grateful for the thoughtful responses received for this consultation and values the evidence and opinions submitted.

1.8 All responses to this public consultation have been recorded and analysed. As well as considering the full written response to questions, we have drawn out the common themes that emerged from these responses in order to obtain an indication of the most frequently expressed points of view. This document includes a summary of the responses received based on this analysis.

1.9 Each of the proposals in the above three key areas were under consultation and are considered in turn in this document. The Government's response is given, and information set out regarding the next steps. A more detailed summary of responses received for each proposal then follows.

2. Executive summary

2.1 In 2016, Goldman Sachs predicted that the total spend on drones in construction, agriculture insurance and infrastructure inspection between 2016 and 2020 would be almost $20bn. This is matched by predicted retail and consumer global sales in 2020 of 7.8million drones, totalling around $3.3bn. PwC estimate that the global drone application market will be worth over £100bn by 2025.

2.2 This is symptomatic of what is a staggering global growth in the robotics and autonomous systems market, with the potential benefits of drones in the UK being clear and substantial. Drones present exciting opportunities for business and the public sector to boost productivity, improve service provisions, support emergency response and infrastructure safety inspections, create high-tech jobs and boost the economy across the UK. New technologies such as drones are central to the UK's Industrial Strategy, supporting our ambition to place Britain at the forefront of this autonomous systems opportunity and make Britain the go-to place for scientists, innovators and investors in tech.

2.3 It is clear from many of the responses to our consultation that this opportunity and the potential for drones to make a difference is recognised across the UK, including the aviation industry, private sector, infrastructure providers, and the public.

2.4 It was also clear from the responses that the safe use of drones is universally recognised as a priority if the UK is to realise the full potential of drones, alongside strong concerns around security and privacy. These are challenges that the Government recognises, with many of the proposals in the consultation designed to help address those concerns, alongside the work that is already being undertaken across Government to do so.

2.5 Following the consultation, our ambition remains the same. We want to build on the burgeoning activity in the UK, where drones are used by the emergency services to help and protect the public, infrastructure providers to maintain and inspect our key infrastructure, and farmers to monitor crops and animals. And we want those that use drones for fun to keep using drones responsibly, and understand the rules for safe flight.

2.6 But we cannot escape the reality that drones can be used for negative or harmful purposes. Sometimes this may be unintentional, where users are unaware of the technology and the law, while other misuse may be intentional, such as around prisons, but the consequences can be extremely dangerous either way. This is why safety, security and privacy remain our priority and are at the heart of our packages of measures and programme of further work.

2.7 Our programme of measures is built around increasing the accountability of drone users.

- We will require all drone users of drones of 250g and above to register themselves, and their drone(s) too. The Government will work with stakeholders

to consider how best to embed electronic identification and tracking capability within this registration scheme so that enforcement action against irresponsible drone use can be improved.

- There will also be mandatory competency testing, such as online tests, for all leisure users (commercial users already have required standards to meet).

2.8 As well as this, we are exploring:

- Whether to tighten rules around where users can fly certain classes of drones;

- Options to increase penalties when the law is broken;

- The possible banning of the use of drones within the proximity of airports; and

- Reviewing the powers law enforcement agencies have to enforce relevant law.

2.9 We will use all these measures to increase drone users' awareness of the rules and regulations, to reduce the misuse of drones and decrease the risk of accidents - without compromising the ability of businesses to innovate and thrive.

2.10 But we are keen that these measures are carried out in such a way that they do not raise barriers to the sector's success and the UK realising maximum benefits. This is why we intend to implement a registration scheme which will provide a platform for user education. Alongside this, we will continue work with the CAA to support commercial users of drones grow their businesses through increased use of drones. This will include:

- Ensuring the Air Navigation Order 2016, which includes key clauses on how to fly drones in the UK, is updated to reflect the needs of the growing market and reflects incoming European drone regulations;

- Supporting the CAA in implementing changes to its permissions process to bring in greater efficiency and effectiveness; and

- Setting up a joint CAA and DfT led working group to work with the insurance sector and the drone industry to improve the insurance regime.

2.11 This is only the start of a programme of work which will take some time. At the same time as drone usage is growing rapidly, the drone industry's technical capabilities and requirements are also changing at pace. It is important that we do our best to anticipate these advances and develop the policy and regulatory framework to accommodate them. The UK has a world leading safety regime, underpinned by an air traffic management system which controls one of the most congested areas of airspace in the world. We recognise that if the UK is to unlock the full potential of drones and their applications in the UK, this will only be possible by a management system that allows for the integration of drones with other airspace users and supports the commercial and public use of drones. We will therefore:

- Continue to explore the development of an unmanned traffic management system (UTM); and as a key first step,

- Bring forward work to create an authoritative source of UK airspace data, which will facilitate the implementation of geo-fencing and build greater awareness of airspace restrictions amongst drone users.

2.12 As we move towards the 2020s, these measures will place the UK at the front of the global drone applications market.

3. Government response

3.1 The Government's consultation laid out proposals under three themes: stimulating drone innovation and enterprise in the UK; ensuring safety and operation within the law; and laying the foundations for a developed drone market. This consultation was on the civil use of drones in the UK; military use of drones was out of scope.

Stimulating drone innovation and enterprise in the UK

A drone being used to inspect an oil rig gas flare.
Image copyright: Sky-Futures

3.2 The Government believes that when safely and appropriately used, drones can bring great benefit to the UK, improving the safety and productivity of many public and business services. As this is a growing and new market, it also offers the UK the opportunity to become a frontrunner in developing and implementing new and innovative uses of this technology and growing drone service start-ups here.

3.3 The proposals captured under this theme were included to achieve this. The Government asked whether drone testing sites in the UK needed expanding and how to do so (Proposal A), sought proposals for new standards on pilot competency for the increasingly sophisticated and specialist drone operations being developed (Proposal B) and proposed options for improving insurance requirements for drone use in the UK (Proposal C).

3.4 The Government received a great variety of responses to this theme and the three proposals in question. Many of these responses also touched upon the wider theme

and in general agreed that the safe and proper use of drones in the UK could bring numerous benefits.

Proposal A - Testing drones in the UK

3.5   On Proposal A, there was no consensus from respondents as to whether more test sites were needed now or not. There was a view, particularly from respondents from the industry, that new testing sites will be required in the future. Of the options the Government gave for improving test sites, the first two, to relax rules in certain remote, rural areas on a case-by-case basis and to encourage the development of a network of regional small testing sites, were most popular. However, this was coupled with recognition that current utilisation of existing facilities does not appear to be high and that there are many complexities to be overcome and thought through before any new testing sites are developed. The responses received provided a good starting point for a more thorough exploration of these issues. Given the diversity of views received on this matter, the Government has therefore decided more exploration and review of the drone testing ecosystem in the UK will need to be undertaken. As well as this, given the generally low awareness of the current test facilities that some respondents cited, the Government will seek to collaborate with industry and the CAA to improve awareness of current testing sites, particularly smaller local ones, and make it clearer how to set up a testing or 'go fly' site.

Proposal B - Pilot competency and licensing (for commercial users only)

3.6   On Proposal B, a consistent view amongst respondents was that some new competency standards for leisure pilots might be required now. As Proposal D of the consultation covers the setting of competency standards for leisure users, this will be addressed there.

3.7   With regards new standards for commercial users, respondents tended to agree that in future there might be a need for new standards for commercial pilots too, above those already in place. But it was unclear whether a requirement for new standards for these pilots existed now. With regards to the more sophisticated and specialist commercial operations being developed, the consultation did not receive many concrete proposals as to what, if any, new competency standards should be. This is perhaps because the range of drone uses in different sectors is so wide and varied, and require a correspondingly wide range of standards.

3.8   Since the consultation has closed, the Government has begun engaging on this issue more thoroughly with the UK Drone Industry Action Group run by the Department for Business, Energy and Industry Strategy, who recently organised a teach-in session with members of the group on the new standards being developed within their industries. In particular, the oil & gas industry and Network Rail and TfL have published standards for the use of drones in their work environments, and ARPAS, a membership body for commercial drone users, is leading work to collate and develop more of these.

3.9   As a result of the evidence received during the consultation and this work being undertaken by the UK Drone Industry Action Group, the Government has decided at this time not to implement any new regulatory competency standards for commercial drone pilots. Instead, the Government will continue to work closely with the Drone Industry Action Group and other drone use experts to facilitate and encourage these

bodies, as the leaders in their fields, to develop and promote relevant specialist standards for their fields, and then seek to feed these into regulatory cycles or guidance at an appropriate later stage. The Government will also use the evidence it received in the consultation to influence European and international negotiations ongoing in the field of pilot competency.

Proposal C - Insurance

3.10 On Proposal C, responses showed agreement that some form of insurance is advisable for at least some types of drones, but they also highlighted the complexity of the matter and priorities for action in this area varied. Option 1 - To work with the drone and insurance industries to develop best practice in delivering insurance products received more support from respondents than Option 2 - To use primary legislation to set new insurance requirements or amend them. As it is clear from responses that this policy area is not yet developed enough to merit a primary legislation proposal, the Government instead intends to launch with the CAA a 'drone insurance project group' to work together to more comprehensively explore the issues, develop solutions and implement best practice. If through the work of this group it becomes clear that new or amendments to regulation are required, the Government will implement these at a later stage.

Ensuring safety and operation within the law

Extract from the CAA's Dronecode, assisting drone users in flying safely. The Dronecode is available at dronesafe.uk/drone-code/

3.11 The Government recognises that misuse of drones (whether unintentional, reckless or malicious) poses challenges to safety, security and privacy, which rightly cause the public much concern. As laid out in the consultation document, the Government is committed to ensuring the safe and proper use of drones in the UK and has already made progress in improving this, notably through the funding of the CAA's 'Dronesafe' campaign.

3.12 Under this theme, Government consulted on further proposals to continue its work in this area. We consulted on a series of options for improving leisure user awareness of the law (Proposal D), improving deterrents such as by raising penalties or creating new laws (Proposal E) and how to improve communication to drone users of 'no drone flying zones' (Proposal F).

Safety research conclusions

3.13 In making its decisions on these proposals, the Government has naturally considered the evidence and responses received during the consultation period, but it has also taken into account new evidence of safety risks received from a study jointly commissioned by the Department for Transport, the Military Aviation Authority (MAA) and BALPA, the British Airline Pilots' Association. This study undertook testing and modelling to understand the impact a drone could have when colliding with the windscreen of manned aircraft, including helicopters and airliners. The results of this study, which is being published today alongside this consultation response, have shown that very small drones of even 400g can pose a critical risk to the windscreens and tail rotors of helicopters. For airliners, the test results are more reassuring - only a much heavier drone of above around 2kg in weight would cause critical damage and only when airliners fly at higher speeds, which is commonly done at heights where these drones are not flown or can easily reach.

3.14 In considering the outcomes of this study, it must be noted that these test results are relevant to the impact of a collision only, and do not reflect whether a collision is likely or not. The Government will now ask the CAA to consider the evidence this study has presented alongside other pieces of work, and produce an assessment of the overall risk. The CAA have committed to publishing this work by the end of the year.

3.15 Whilst this assessment is developed, the Government is still determined that action must be taken to mitigate the risks the study shows. It is clear that users of all drones need to be aware of these risks, and adjust their behaviour accordingly to make sure the risk of a collision happening is reduced. The Government has fed this conclusion into some of its decisions below, alongside considering the consultation responses received.

Proposal D - Improving leisure drone user awareness of the law

3.16 Within Proposal D, the Government proposed and sought feedback on a variety of options, including mandating manufacturers and vendors to issue official guidance, improving the format of the guidance on offer, including the introduction of a short knowledge test for users, and reducing the complexity of the drone flying rules laid out in the Air Navigation Order 2016.

3.17 Many respondents supported the options proposed, in particular, mandating manufacturers and vendors to improve guidance, the introduction of a short test for leisure users and a redrafting of the Air Navigation Order 2016 clauses. Support for these proposals was nuanced, with some respondents saying that if a registration scheme was introduced, this might reduce the merit, for example, of mandating manufacturers and vendors to issue guidance, and that it was important that any measures as a whole did not overburden users and the industry. The Government supports this assessment, and as such in making its decision in this area has taken into account its decisions in other areas, and the combined impact of these.

3.18 In particular, as laid out under Proposal G below in the 'Laying the foundation for the future' theme, the Government has decided to proceed with the implementation of a registration scheme for all users of drones of 250g and above in weight. It is the Government's intention that registration be used as an opportunity to educate these drone users. This has led the Government to decide that some of the original measures proposed under Proposal D may not now be required, as the Government envisages that registration will enable the targeted education of drone users, which

will be more effective in delivering improved safety, security and privacy, than some of the proposed educational measures on their own.

3.19 The Government will therefore proceed with:

- Making it mandatory for leisure users of drones of 250g and above in weight to take a basic knowledge test on the law in the UK and how to fly safely.

   The Government is making this mandatory because it wants to be clear how important knowing how to fly your drone safely and within the law is. Using a drone can be extremely enjoyable, but users need to be aware of others using the airspace around them as well as those on the ground, be considerate and follow the law. The outcomes of the safety research laid out above show how serious the consequences of failing to do so with even a small drone could be for aviation safety.

   The Government will begin by developing standards for this test, accompanied by training materials for taking the test, which will cover safety, security and privacy issues. The threshold of 250g has been selected to match that of registration; the reasons for picking 250g as the threshold for registration are laid out under Proposal G.

- Building on the CAA's 'Dronesafe' communications campaign, using the feedback received during this consultation on how guidance could be improved, and examining the possibility of producing separate guidance aimed particularly at adults supervising children flying drones.

- Pursuing further engagement with manufacturers and vendors on issuing guidance on safe and proper drone use. Through their campaign, the CAA have already had great success collaborating with drone manufacturers, including DJI, one of the world's largest manufacturers of drones popular with leisure users, and UK vendors, including Maplin and John Lewis, to ensure 'Dronecode' leaflets and safety information are issued at point of purchase or within the packaging of the drone.

   Given this extremely positive collaboration so far, the Government will ask the CAA to continue its work in this area. The Government will therefore, at this time, refrain from implementing a mandatory requirement on manufacturers and vendors to issue this guidance, in favour of focusing its energies on implementing a registration scheme, a short knowledge test and associated educational materials alongside this.

- Continuing the work of the Government and CAA at European and international level to agree and implement product standards, and possibly standards for 'age labelling' on packages, for all drones sold in the UK and EU.

- Scoping and developing potential amendments to the Air Navigation Order 2016 drone clauses, to make them easier to understand, beginning with suggestions received through this consultation. The Government will plan to implement a fuller update to the Air Navigation Order 2016 drone clauses once the EU has set new rules in this area (currently expected around mid-2018). This is in order to implement all significant changes at once and give businesses clarity.

Proposal E: Improving deterrents

3.20 The consultation document set out the law as it currently applies to drones in an Annex, which has been re-included as Annex D to this response. The consultation asked if penalties needed increasing to deter misuse or if the law could be amended to better enable deterrence and enforcement.

3.21 Responses were divided as to whether raising the penalties for breaking some of the current drone flying rules would be effective in reducing such incidents. Many respondents suggested that changes to the law were not necessary and instead, that enforcement of the rules could be improved in other ways instead to achieve the same effect. They advocated, for example, improving education and safety campaigns for users, increasing enforcement resource, better communicating the law and how to enforce it to individual police constabularies, or publicising prosecutions more widely.

3.22 Those that thought the law did require changing made a wide variety of suggestions around how to do this. These included the introduction of on-the-spot fining, new powers for the Police when enforcing the law on the ground, and the introduction of a registration scheme to help with education efforts and aid enforcement and investigation following an incident.

3.23 The Government has decided, given the many and varied range of suggestions, that further scoping and exploration of some of these suggestions will be required. In particular, the Government will further explore the justifications for:

- Increasing the maximum penalty for offences under Article 94 of the Air Navigation Order 2016, for flying a drone with a camera within 150m of a large crowd of people without a CAA exemption (Article 95), and for breaching an airspace restriction (Article 239). If the Government pursued this, it would give the courts the option to set a penalty above the current £2.5k limit, where the court felt the gravity of the offence merited a more severe punishment. The Government believes a higher penalty could be beneficial in deterring misuse of drones.

- Banning the use of all drones within a certain distance of airports, unless the drone user has permission from air traffic control or the CAA. The Government is minded that this new offence could improve safety and security around airports by reducing inadvertent misuse of drones around airports and near airliners, whilst also making it easier for purposeful misuse of drones around airports and airliners to be identified and addressed.

3.24 As well as this, the Government is minded to:

- Amend the Air Navigation Order 2016 to ban all drones of 7kg or less in weight flying above 400ft or 122m (drones of above 7kg are already banned from flying above this height). All drone users are already advised as best practice not to fly above 400ft, in order to reduce the likelihood of them coming into conflict with manned aircraft, and this change in the law would be an update to reflect this. The collisions study commissioned by the Department for Transport, Military Aviation Authority and pilots' union, BALPA, showed that drones of extremely low weights can pose a significant risk to helicopters and small manned planes. The Government considers it vital therefore to reduce the likelihood of these two aircraft forms being in the same airspace together wherever possible. This

change will help in deterring this behaviour, by making the flying of a drone above 400ft or 122m an offence.

- Review and amend the powers available to law enforcement agencies to tackle breaches of the Air Navigation Order 2016 and criminality involving drones. This could include powers to require the production of registration and ID documents from drone users, to require a drone user land their drone, and to search for and seize a drone where there is a reasonable belief that a crime is about to take place or has taken place. The review will also include engagement with the devolved administrations.

Proposal F: 'No Drone Flying Zones' and enforcement

3.25 The Government proposed two options for action here - firstly, to improve communication of no-drone-flying zones on the ground and secondly, to make information of flying restrictions more readily available and accessible to drone users, working with industry to do so, and encouraging the development of apps to alert drone users to nearby restricted flying zones.

3.26 Both of these options received considerable support from consultees. Responses in general affirmed that both physical and electronic communication of flying restrictions were important, though more felt that electronic means had the edge in a digital world.

3.27 In light of these responses, Government has decided to proceed with implementing both options. Since the consultation closed, the Government has developed 'no-drone-flying' signage. The Government will be encouraging the use of these signs at national infrastructure site such as airports, power stations and Government buildings.

3.28 With regards to improving the information available on flying restrictions, the Government is today launching a pilot project. This pilot project will look to regularly publish data for UK areas that drones, whether commercial or leisure, should not be flown in. The intention is to publish this data in formats that can be easily and instantly used by app developers to visually show restrictions on map apps, as well as a format that is easily digestible by members of the public.

3.29 The Government will work with drone manufacturers for them to use this data to implement geo-fencing for these areas in their drones. Geo-fencing is a useful tool in addressing inadvertent incursions into restricted airspace, whereby a drone is programmed not to fly in certain GPS coordinates. This pilot project - named Project Chatham - will be set up within six months, and will be reaching out to drone manufacturers, app developers and key infrastructure sites in the next year. The Government views this project as one of the first steps in moving towards a dynamic drone traffic management system in the future.

Laying the foundations for a developed drone market
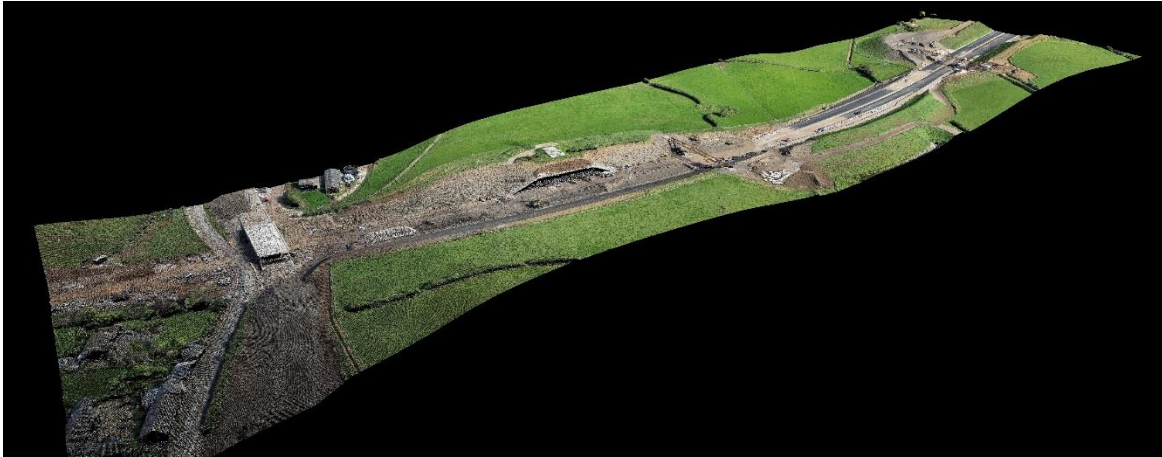
Heysham to M6 link. Assisting construction with imagining captured by drone. Image copyright: SenSat Ltd

3.30 Like other new and emerging technology the drones market and use of drones are rapidly developing as new drone-powered solutions are discovered and flying drones for leisure 'catches on' with the public. This offers exciting opportunities to individuals, the public and private sectors in the UK. However, such rapid change and growth is also a challenge for regulators, to ensure that regulation and infrastructure is in place in time to manage and meet these changes, without placing unwanted restrictions on innovators. This section of the consultation therefore proposed a registration scheme (Proposal G), an approach to implementing electronic identification (Proposal H) and consulted on the characteristics and operating principles a drone traffic management system should have (Proposal I).

Proposal G: Registration

3.31 The Government proposed a registration scheme for all drones weighing 250g and above, set out details of the registration process, and consulted on these. It set out the three overall options with regards to a registration process: to introduce such a scheme in the near future, to introduce it in the longer term or not to introduce such a scheme at all. The Government laid out that it was minded to introduce a registration scheme, envisaging that such a scheme would improve the accountability of drone users, aid enforcement and enable direct educational targeting of these users in order to improve safety, security and privacy.

3.32 Responses were roughly split between whether a registration scheme should be introduced in the near future or not at all. But when taking into account the respondents who instead supported the introduction of registration in the longer term, an overall preference for the introduction of a registration scheme emerged. Reasons given for not supporting registration included that the benefits of registration were unclear or non-existent, existing legislation is already adequate, or that further thinking would be required before a scheme could be introduced. Those who supported registration, many of them drone-related businesses, tended to agree with the reasons for registration laid out by the Government. They cited factors such as that registration would help with the education of operators, create a professional and accountable drone culture and help build wider public confidence in drone use and users.

3.33 When it came to the questions Government posed on the design of the scheme, again a variety of answers were received. Whilst excluding drones below 1kg from the registration scheme received most support overall, a threshold exclusion of 250g or there being no exclusions at all, also received sizeable support. Some suggestions for different kinds of exclusion thresholds to use, such as maximum flying height, were made, but overall respondents tended to support using a weight threshold as an exclusion measure.

3.34 The CAA was the body most frequently picked as the body who should be responsible for registration. But others such as the DVLA (Driver and Vehicle Licensing Agency), Police or BMFA (British Model Flying Association) or even an entirely new body garnered some support too. Respondents reasoned that for such a new and emerging sector a new and more digitally-savvy organisation might be better placed to act. Respondents also suggested several ways in which the proposed registration scheme process could be improved, such as registering the operator rather than the drone wherever possible, and only requiring operators to notify changes to their ownership of drones or if one of their drones were destroyed, rather than annual renewal of details. With regards to making some anonymous and non-identifying registration data (such as numbers of drones in a local area) publically available, there was support from those who said the data would be useful for informing the public and local policy-makers. The data could also be helpful for risk assessments for manned aviation. Those who opposed the data being made available questioned why it was necessary, and stated it could be misrepresentative and could lead to scaremongering.

3.35 Responses to questions about the possibility of imposing a charge for registration on drone operators were fairly evenly split. Many thought a small fee was reasonable, but that a large fee would discourage compliance, and could inhibit innovation and the growth of the sector. Others were concerned that the fee should only be levied once, and not again on renewal or 'per drone' registered, and some also thought that Government should bear all the costs involved in running a registration scheme and that no drone user should be charged.

3.36 When it came to the issue of whether registration should apply to model aircraft 20kg or less in weight, the vast majority of those who answered against this, were model aircraft flyers. They cited the long standing safety record of model flying clubs as showing that the current system for model aircraft was fit for purpose. Those who disagreed and thought that requirements should apply equally to model aircraft flyers generally thought so because an exclusion like this could create a loophole and reduce the simplicity of a registration scheme, given the difficulty in legally defining the two types of aircraft as different to one another.

3.37 The responses received through this consultation have affirmed the Government's initial assessment that the introduction of a registration scheme in the near future is the most beneficial option to explore. The Government has therefore decided to proceed with this option. Some aspects of the registration scheme - such as penalties for not complying - will be subject to further exploration. But with regards the elements of the registration process the Government consulted on, the following decisions have also been taken:

- Registration will be mandatory for all operators of drones weighing 250g and above. Whilst this weight threshold was not supported by all respondents, the Government feels the threshold cannot justifiably be any higher than this. This is due to the outcomes of the study sponsored by the Department for Transport,

Military Aviation Authority and BALPA, the pilots' union, which shows that even small drones of 400g in weight can cause critical damage to helicopter windscreens and tail rotor blades. It is therefore vital that the users of these drones are aware of this and their responsibilities to fly safely. The Government sees registration as a crucial way of achieving this.

- Drone operators of drones of 250g and above will be required to register their details. This will not, in general, mean that they are required to register individually each of their drones, where these drones are at the lower end of the weight range, for example. This will minimise the burden placed on commercial and committed hobbyist operators who can own, and operate, multiple drones. However, in some cases, depending on where they intend to fly or what kind of operation, or where the drone is heavier, there will be a requirement for drone operators to register each such drone individually. The exact threshold at which a registered operator will be required to register the individual details of their drone will be scoped further before a decision is taken.

- It is highly likely that there will be a charge for registration, just as there are charges for undertaking mandatory requirements when you own a car. The Government does not believe it appropriate for the taxpayer to fund the costs of regulating drones, as not everybody owns one. The basis of the charge would be to cover the cost of running the scheme. Every effort will be made to keep the process of registration as simple and 'admin-light' as possible, which will reduce the charge required.

- When undertaking registration it will likely also be necessary to complete relevant mandatory educational requirements. The combination of these two requirements into one process will be done if it is assessed that this will save time, reduce overall costs and increase compliance. The Government will also explore ways for these requirements to be undertaken online and through smartphone apps to make the process as easy to comply with as possible.

- The Government will work with model aircraft flying clubs to examine ways in which it may be possible to exempt members of model aircraft flying clubs with adequate safety cultures and practices from certain elements of registration and other educational requirements, or where their club will be permitted to undertake regulatory requirements on their behalf. Flyers of model aircraft who are not members of a club, or are members of a club not deemed to have adequate standards will, however, not be excluded from registration or other requirements.

Proposal H: Electronic identification

3.38 The Government set out in the consultation its assessment that electronic identification (the identification of a drone from a distance by other airspace users, air traffic control and other drones) will in the future be required to ensure safety and enable more complex and sophisticated use of drone technology, as well as benefiting enforcement. The Government is working towards an international consensus on an electronic identification product standard, which it expects will be put in place over the next few years. In the meantime, the Government proposed exploring the option of mandating the use of an app to notify pre-flight an intention to fly a drone in a particular geographical location.

3.39 Responses to this section were, again, wide-ranging. Many respondents, including many of the model aircraft flyers, were concerned that an electronic identification requirement would be overly burdensome, and would not aid in addressing safety and security risks. They were concerned the requirement could be easily avoided by those with malicious intention. Others who supported the approach the Government set out thought that the measure would help address safety, security and privacy, although there was still uncertainty as to how and when appropriate and effective electronic identification technology would be sufficiently developed.

3.40 Given some of these outstanding questions, the Government feels its approach to not pursue an electronic identification requirement in the immediate future is correct. Instead this time will be used to scope out issues and challenges that this requirement could pose, and work with international partners and industry to develop a sophisticated and appropriate standard.

3.41 With regards the option of using apps to notify pre-flight, responses again were divided. Responses raised a number of aspects which will need to be considered further - such as, that areas where drone activity takes place are remote and as such, may have poor 3G/4G coverage. There were also questions as to how this requirement could be implemented effectively and made enforceable. But many responses also agreed with the proposal to proceed with a pilot project, citing safety and security as their main concern and seeing this measure as a way of helping to address the problem and improve enforcement.

3.42 As such, the Government is minded to pursue further the option of mandating use of an app further and will begin by undertaking further scoping and exploration of the idea with industry. The Government may also consider if this measure could be extended to allow implementation of other requirements, such as registration and education, also through the means of the same app, to reduce burden on drone users.

Proposal I: Drone Traffic Management

3.43 The Government set out the work it had already undertaken with industry partners to explore the development of a UK drone traffic management system and consulted on what a drone traffic management system could look like and how it should function.

3.44 Responses showed a general approval for some sort of drone traffic management system and an appreciation that such a system will become essential as the sector grows, especially with increasingly sophisticated drone operations taking place in the future. Some commercial respondents commented that traffic management systems would aid the emergence of safe and reliable operations that could fly beyond visual line of sight (BVLOS). Some, such as some model aircraft flyers, were not so supportive of a drone traffic management system being developed, and were concerned that it would negatively impact upon their hobby. Responses in general also highlighted the complexity of designing and building such a system, and taking into account so many different needs.

3.45 Following this consultation, the Government remains convinced that a drone traffic management system will be the best way of replicating and ensuring the high safety standards currently applied to manned aviation. The Government will therefore continue pursuing the development of a drone traffic management system, in collaboration and consultation with industry and international partners, using the responses and overall indications for future direction received during consultation.

3.46 The Government has laid out in this response its intention to implement several measures that are integral to the running of a future drone traffic management system - such as registration and processes for issuing geo-fencing data. As these are such key prongs of a drone traffic management system, the Government will seek to ensure that these measures are implemented in a future-thinking way.

4. Detailed summary of responses: Stimulating drone innovation and enterprise in the UK

Managing and monitoring drone operations using a SkyCircuits Ground Control Station. Image copyright: SkyCircuits

Proposal A: Testing drones in the UK

Background

4.1 This was a call for evidence to establish if the current drone testing sites in the UK meet the needs of the start-up and small-medium enterprise (SME) drone services industry developing here. The intention of the call for evidence was to support the development of new safe and beneficial uses of drones in the UK, and the growth of the UK drone industry.

4.2 The options for improving the UK's drone testing provisions were:

- **Proposal A, Option 1:** Relax certain rules in the remote, rural areas of certain parts of the UK that meet certain characteristics on a case-by-case basis,

following careful risk analysis and the implementation of mitigations, such as signage, for example. These areas could perhaps be marked as 'Drone Innovation Zones' on maps or in the safety apps many drone operators use. The purpose of these 'Drone Innovation Zones' would be to more easily allow for ambitious new testing in geographical areas where any risks to safety are naturally much reduced.

- **Proposal A, Option 2:** Encourage the development of a series of regional, smaller test sites across the country to develop a network.

- **Proposal A, Option 3:** Explore whether it is possible to build a new larger national drone testing centre to complement the existing facilities at Parc Aberporth and Llanbedr in West Wales for aircraft of all sizes and hireable by the hour. This could be done by exploiting areas that already have segregated airspace, attaching it to areas of learning, or picking a new area entirely.

- **Proposal A, Option 4:** Explore options for integrating drone testing facilities into other Robotics and Artificial Intelligence testing centres.

Question 1

Is the UK's current testing site provision for drones adequate?

Consultation responses

4.3　There was a dominant view, particularly amongst industrial respondents, that new testing sites will be required as new opportunities and applications open up.

4.4　There was a generally low awareness of the current test facilities. A number of respondents expressed concern over access to, and cost structure of, the Wales UAS Environment facility. The time taken to get to this test site is seen as a significant cost burden by some SMEs.

4.5　Proximity to test facilities is particularly valued by those who wish to undertake testing in the form of numerous short flights, as opposed to through extended test campaigns. However, it was recognised that if we get too many small test sites and they are too diffuse then we could fail to deliver an internationally recognised centre of excellence in drone testing.

4.6　Participants recognised that whilst utilisation of existing facilities does not appear to be high, the sector is expected to continue to grow. This growth will, at least in part, be driven by new markets and applications opening up. Testing will be needed to show that drones have been safely adapted to these new requirements.

4.7　Whilst a number of participants commented that they felt that testing could be undertaken alongside leisure use, others highlighted that testing drones in congested airspace could prove challenging. It was noted that drones on test will not necessarily be as reliable as commercially available craft and hence due regard need to be paid to where the device might come to ground

4.8　A recurring theme was that test sites need to be able to test – as and when necessary – for factors such as speed, manoeuvrability, high altitude operation, extended flight duration, ability to work over challenging terrains etc. The particular challenges associated with testing BVLOS drones were highlighted by a number of participants.

4.9 There was a consistent view that test site capabilities need to be able to demonstrate domain relevance (i.e. an application focus) so that testing relevant to final use can be undertaken. For example the need for testing for rail, agricultural (including spray), urban environment, (building survey) and infrastructure (bridges, masts, tunnels, buildings, cables) applications were all mentioned by respondents – and all have specific requirements of any test site. This need was summed up by the statement " it is not just a question of finding 'more places to fly', but instead about finding the 'right place to fly"'.

4.10 Several respondents commented that military and civilian drones have differing requirements and operating practices and hence may need segregated airspace or separate sites.

4.11 A recurring theme in the responses to this question was of a perceived need for more airspace being made accessible to drone users. However, in many such cases it was not clear if this need referred to enable greater innovation and enterprise or a desired increase in the freedom to fly drones for leisure purposes.

4.12 A view put forward by a number of model aircraft users was that their club facilities are suitable for drone flying. Flying at such locations would have the additional benefit that if flown at BMFA sites drones would benefit from access to associated training, certification and insurance provisions.

Question 2

Which of the above Proposal A, Options 1-4, is your preferred option and why?

Consultation responses

4.13 Relaxing certain rules in the remote, rural areas of certain parts of the UK on a case-by-case basis is the most popular answer because this was felt to be simplest and most accessible for a wide variety of different drone users. However, many also favoured the second option of encouraging a regional network of test sites, for many of the same reasons. The building of a larger national drone test centre was not favoured by many, perhaps due to the still empty capacity of the West Wales UAS centre and that a national centre would still be too far to travel for many, particularly start-ups. The integration of drone testing facilities into other robotics and autonomous system testing sites was more popular. Respondents felt it would create efficiencies for companies testing multiple systems and encourage cross-pollination of technology and innovation.

Question 3

What other options could you suggest?

Consultation responses

4.14 Many of those who felt that there was a need for more places to fly drones, suggested opening-up currently restricted air space (e.g. MoD ranges/sites and National Trust land). Several also mentioned a desire to see expanded offshore testing.

4.15 However, it was pointed out that many such sites are in remote and/or rural areas that have significant environmental and landscape value. Hence there is a need to

ensure that we do not end up adversely affecting wildlife or compromising the amenity value of such areas.

4.16 Some respondents mentioned that the emergence of standard tests should stimulate the emergence of a validation services market, and that the natural location for these would be within easy commuting distance of an (internationally) recognised test site.

4.17 The potential to use simulation alongside field testing was raised by a small number of respondents.

4.18 Several participants commented that whatever approaches to testing emerges, there will always be a need to be able to deal with special cases such as the HALE UAS with its 42m wingspan, 18-27km operating altitude and its "months at a time" flight duration.

Proposal B: Pilot competency and licensing

Background

4.19 This section of the consultation set out the work taking place at European level to extend pilot competency requirements and internationally to create common standards for a formal remote pilot's license, for future drone operations that go beyond visual line of sight of the pilot. As the UK continues its significant engagement in developing these standards internationally, this section of the consultation asked whether in the interim the UK Government could helpfully work to create more extensive UK pilot competency standards as drone operations become increasingly complex and specialised.

4.20 The call for evidence was seeking proposals for this that would give more clarity to businesses as to the level of qualification they should expect from pilots for different types of operation, and solidify safety and competency standards across the sector, before the introduction at an international level of a remote pilot's licence.

Question 4

Are new competency standards and qualifications needed? Why?

Consultation responses

4.21 There was general agreement that new competency standards and qualifications are needed. However, a large number of respondents also answered no to this question. In general, commercial users and organisations were more in favour of new competency standards and qualifications than leisure flyers of model aircraft and drones.

4.22 For those who responded in favour, a recurring theme was the need for such standards and regulations to be introduced based on safety and for the future growth of the industry. Comments varied between the need for more consistent standards between commercial and leisure drone users; or for more tailored training for leisure users who may need a basic level of knowledge and awareness of flying a drone.

4.23 For those who responded against, a dominant view was that current standards and regulations are sufficient and introducing further measures would be confusing and cumbersome on users. Another concern was the potential costs further measures may entail. Instead, alternatives such as increased education of current standards and regulations would be more helpful, such as at the point of sale.

Question 5

What should the new standards and qualifications be?

Consultation responses

4.24 One recurring suggestion was for a PPL (Private Pilot's Licence) equivalent licence, or similar, specifically tailored to drone use. Comments on this included that such licences should be time-limited and have an expiration date. Some respondents commented that a new competency test should be introduced to allow users to use drones out of the line of sight. Another recurring theme was that an eyesight test should be introduced for all drones users.

4.25 Many respondents highlighted the different considerations that need to be taken into account if introducing any new qualifications or licensing requirements and that these should be proportionate to the risks involved. Comments focussed on the type of operation - night/day, recreational or commercial. This would exempt users of drones weighing less than a specified amount from having to acquire a licence as well as take into account the different environments in which drone users may operate.

4.26 Other comments also focussed on a tiered qualification system based on the application of the drone, taking into account whether the drone would be flying over congested or open areas and basing competence levels on this.

4.27 Some respondents suggested that current standards are adequate, but that all drones should have a registration number and be registered with a governing body such as the British Model Flying Association.

4.28 Attention was drawn to the need for raising awareness and education of current regulations amongst retailers of drones in order to pass a basic level of knowledge on to consumers.

Question 6

How should the new standards and qualifications be taught and tested?

Consultation responses

4.29 Many respondents suggested that qualifications should be taught by qualified instructors or teachers and that subsequently, users should undergo theory and practical flying tests.

4.30 A consistent view was that any such teaching and examination should be overseen by the CAA. Some respondents suggested that tests should be mandatory for commercial and heavy drone users, but left optional for leisure drones users. Comments included having an agreed curriculum covering topics such as the basics of flying a drone, situational awareness, the control of a flight area and safety.

4.31 Other respondents suggested that users should self-teach via online tutorials and then sit an online test. Comments focussed on making this available to low risk drones operations as being adequate.

Proposal C: Insurance

Background

4.32 This was a proposal looking at improving insurance requirements for drone users in the UK to ensure appropriate insurance cover for any incidents that may occur. Whilst there is an EU Regulation that sets an insurance requirement for aviation, the Government were aware of the House of Lord's recommendations for improving that insurance requirement as well as several stakeholder anecdotal reports that the insurance requirement wasn't working as well as it could. The Government therefore consulted as to what should be done to address this.

4.33 The Government proposed two options for taking action:

- **Proposal C, Option 1:** Work with Industry to encourage best practice. The Government already has some engagement with the drone insurance industry, and has recently launched a specific Drones Industry Action Group. Following the consultation, the Government could explore with industry options for addressing the arising issues and potentially develop an industry agreed and improved standard for drone insurance. Drone operators could then protect themselves by only purchasing drone insurance delivering industry-endorsed standards.

- **Proposal C, Option 2:** Create an Enabling Power in Primary Legislation. This would allow us to put in place improved insurance requirements on top of the EU requirement, but more tailored to the drone market, following consultation with stakeholders and the public. This proposal is now explored in more detail.

Question 7

Do you support: Proposal C, Option 1: Working with industry to develop best practice, Proposal C, Option 2: The creation of an enabling primary power to set UK drone insurance requirements, or neither? Why?

Consultation responses

4.34 There was agreement that some form of insurance is advisable for at least some types of drones but not on how it should be developed. Wide ranging views on third party liability insurance were expressed with a general view that insurance would need to be appropriate for the drone in question: the cost should be based on risk as the weight of a drone provides an indication of its potential risk to third parties and property. The responses indicated three potential categories that drones could be grouped into for insurance purposes:

- large commercially operated drones, which could be treated as light aircraft;

- mid-weight drones used by a mixture of leisure users and commercial pilots; and

- small hobby drones that would not require third party insurance.

4.35 The majority of respondents favoured Option 1 proposed in the consultation - it was a recurring view amongst leisure drone users and model aircraft flyers. Some who supported this option were keen that the drone industry influences the insurance requirements as they have already worked with insurers to develop products for commercial drones. They considered that the industry held expertise, and in addition there are some products already existing which have met customers' needs. It was also suggested that Option 1 would be more flexible, allowing insurance products to

adapt alongside the technology and that there would through this Option therefore be less chance of over-regulation.

4.36 Support for Option 2 was found amongst leisure users, commercial users and other organisations. Some who supported this option thought it might enable clearer, standardised and more comprehensive drone specific insurance, with better enforcement. Others stated that making insurance mandatory for at least some categories of drones could prevent misuse and that Option 2 would be beneficial in stopping industry adopting a 'cheap' option and might provide more stability after Brexit. A common view expressed was that, as drones are a vehicle, insurance should follow the same principles of other transport insurance.

4.37 Some respondents stated that they already had insurance: operators of larger, commercial drones require it and membership of model aircraft flying clubs includes third party cover. However, some hobbyists objected to mandatory third party cover due to cost and because other activities that pose a risk to third parties, such as cycling and horse riding, do not need it.

Question 8

Some of the areas the Government is interested in considering for improvement are:

a. The levels of public liability insurance required; such as raising the minimum amount of public liability cover required by commercial drone operators.

b. Completeness of Insurance Policies; the House of Lords report also identified that the quality of certain insurance products was in doubt. Anecdotal evidence suggests that user-error may not be covered under traditional policies leaving scope for the insurance to be rendered useless.

c. Tailoring insurance requirements to reflect the risk profiles for different commercial uses, which may be considerably different for each segment of the market.

d. The relationship between risk and Maximum Take-Off Mass (MTOM): this may mean that insurance requirements could be put in place which reduce unnecessary burden on smaller / lower risk drone users.

e. How to use insurance requirements to encourage self-regulation of the drones market, particularly by leisure users. This could include mandating all owners of drones of a certain weight to have insurance. Insurance companies could then set safety requirements to mitigate their risk assessments.

In which of the above areas a-e would you be supportive of action being taken? Why do you support action in the areas you have picked and not in others?

Consultation responses

4.38 The most popular area for action was Area D, the relationship between risk and MTOM, and this was closely followed by Area C, tailoring insurance requirements to reflect the risk profiles. The least popular option was Area A, with Areas B and E not receiving much support either.

4.39 Commercial users identified with Area C and felt the still innovating and developing industry requires an approach that is flexible and fit for purpose. It was also felt that more needs to be done to educate those who purchase drones, such as mandatory flight instruction or registration.

4.40 One insurance company was supportive of Areas A-D as long as the Government consulted further with industry before passing any legislation and only if industry endorsed standards could be agreed in a timely manner, particularly in relation to Areas A and B.

4.41 The majority of users who responded felt the cost of cover had to be affordable and proportionate as hobbyists might be dissuaded from flying if it vastly surpassed the cost of owning and operating a drone. Leisure users tended to support the idea of self-regulation.

4.42 Some respondents were content with current processes but a sizeable number of responses recognised the need to take action. This was regardless of the opposing opinions expressed on whether commercial or leisure users pose more of a risk. Respondents strongly felt that a tailored risk based approach would be more effective than a blanket one.

4.43 It was suggested that looking at other markets as a framework of sorts could be helpful, predominantly vehicle insurance. Some even suggested methods, such as an MOT equivalent, to test drone airworthiness. While industry and stakeholders agreed with some of these thoughts, there was also the opinion that not enough real world data exists to effectively judge how insurance cover for drones should be further developed. Other important stakeholders expressed safety concerns in relation to location of flight.

4.44 The following further comments were also received regarding the five areas in which action was proposed:

- Area A – Many commercial operators take out extra cover as they see the minimum level of surface damage insurance specified in EU Regulation 785/2004 as too low. Therefore, rather than raising the minimum level, larger operators carrying out riskier operations could proactively review their insurance to ensure they have enough cover.

- Area B – Insurance policies must be comprehensive enough to cover all reasonable situations, including user error. The latter is important as many incidents could occur due to this and, as this is often the reason for having insurance, most aviation policies include it. Until technology advances there are likely to be incidents where the drone malfunctions or the user loses control, even if training is provided for operators. It is also unlikely that cover will have a breach of warranty exclusion in it. Some operators may be relying on their home insurance policies which are unlikely to provide war and terrorism or third party liability cover. Whilst in a practical sense most operators are not likely to require insurance in these particular areas, it is a requirement of the EU insurance regulation. It is also worth noting, however, that several home insurance policies now exclude drones and model aircraft.

- Area C – Insurance should be based on the risk posed by the drone. Insurance cover limits could be based on the hazard and premiums on the likelihood of it occurring. However, if insurance is too costly, an operator may be dishonest about the use of their drone. Insurers need to be aware that different operations are likely to have different risk profiles. If a drone is used for different types of

operations, multiple policies may be needed, the complexity and cost of which could discourage use.

- Area D – Understanding risk is key to making progress and factors other than Maximum Take-Off Mass (MTOM) could be used to determine third-party risk. Those who own multiple drones of differing weights could just insure for the largest and how they intend to use it e.g. beyond the line of sight. Narrower weight categories would be wise for insurance and a lower weight limit may be needed (at least temporarily) to rule out small drones that pose little risk.

- Area E – Leisure drones under 20kg that are flown in approved areas do not need registering or licensing. A level of mandatory public liability cover (with a lower weight limit) would be ideal but a register would be needed of who should be covered and suitable leisure policies can be hard to find (as can commercial cover). It was questioned whether leisure users would need war and terrorism cover, which Regulation 785/2004 requires for mandatory insurance. As technological safety solutions have not yet matured, policies' safety requirements should not be set by insurers but follow existing guidance and the law.

5. Detailed summary of responses: Ensuring safety and operation within the law
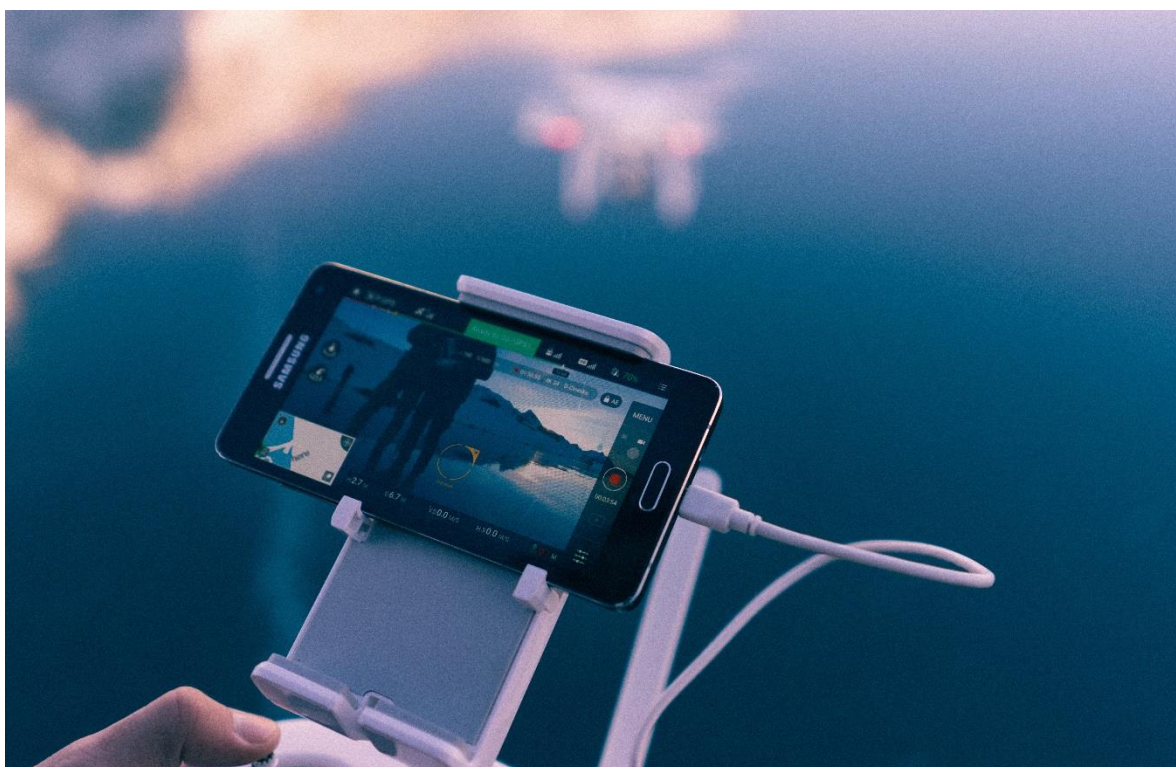
Remote control of a drone using a first person view app.
Image copyright: ConsortiQ Ltd

Proposal D: Improving leisure drone user awareness of the law

Background

5.1 The Government considered several options for how guidance on safe and legal flying could be better delivered to drone users. The three key options for action within this proposal were:

- **Option 1:** Mandating the issuing of guidance: This was an option to mandate that drone manufacturers and/or vendors issue official guidance on safety and legal flying requirements at point of sale and/or drone activation. The option was intended to reach all drone users and improve safety, privacy and security.

- **Option 2:** How the guidance could be improved: This sub-section asked respondents what information should be covered by official guidance for drone users and how best to communicate it. The intention was to improve safety, security and address privacy risks.

- **Option 3:** Reduce the complexity of rules for drones: This was an option to amend the flying rules for small drones to simplify them and ensure consistency. This option was intended to enable more effective communication of this law to drone users, thereby improving compliance with safety and privacy laws.

Question 9

Other than those already described here, what other options could the Government consider to improve leisure drone user awareness of the law?

Consultation responses

5.2 Many responses supported the options presented, particularly for the issuing of guidance material at the point of sale or printed on packaging. Many respondents commented that if registration becomes mandatory then an educational aspect should be also required, but that these should be proportional and should not cause negative economic impacts to users.

5.3 There was a lot of support for an expanded public awareness campaign, either through social media or more traditional mediums such as newspapers, billboards, TV advertisements etc. It was also suggested that there could be more publicity around successful prosecutions of offenders. Suggestions also included working with schools to teach them about responsible flying, perhaps as part of STEM (science, technology, engineering and mathematics) subject lessons.

5.4 The responses from the model aircraft community suggested that, due to their extensive experience and culture of safe flying, the rules should not be changed in a way that would unduly affect their activities. It was also suggested that one method to improve awareness and demonstrate competence would be for leisure drone fliers to be required to join model flying organisations such as the British Model Flying Association or the Large Model Association.

5.5 There were also some responses that suggested that the evidence for a requirement for any further action was lacking.

Question 10

Would you support a requirement to issue guidance on flying your drone safely and legally by manufacturers, sellers, or both? Why?

Consultation responses

5.6 There was a great deal of support for requiring both manufacturers and sellers to issue guidance.

5.7 Arguments for manufacturers to include information include the fact that this follows precedents for other products, for example the Toy Safety Directive. Manufacturers of common components used for home-built drones could also be included meaning that home-builders are more likely to also be exposed to such materials.

5.8 There were also suggestions that the manufacturer could provide product specific performance data for the drone, while the seller should provide country specific information regarding the rules in the country of delivery.

5.9 Many respondents pointed out that some retailers and most manufacturers are international companies and that compelling them to include information might be difficult for the UK Government to achieve.

5.10 There were some comments that people do not tend to read instructions, meaning that a policy to mandate sellers or manufacturers to issue guidance would have limited effectiveness. These respondents sometimes stated that they thought a training course would be better.

Question 11

Have you read any official drone guidance (such as the CAA's Dronecode, the Informational Commissioner Office's guidance or any other official guidance on drones)?

Consultation responses

5.11 A large number of respondents had read the Dronecode. A smaller number had read the ICO guidance. Several other sources had been seen as described in Question 12. Fewer general aviation respondents had read the Dronecode or the ICO guidance.

Question 12

What guidance have you read?

Consultation responses

5.12 Other than the Dronecode and ICO guidance, the information that had been read or seen by respondents included:

- The FAA 'Know Before You Fly' video
- The Air Navigation Order (ANO) and CAP 722
- National Qualified Entity (NQE) training materials. (NQEs are organisation that are recognised by the CAA as having the expertise to assess drone operators' competence).
- Information provided by the Drone Assist app

Question 13

How can the content and formats of official guidance on drones be improved?

Consultation responses

5.13 Many respondents were positive about the Dronecode being clear, concise and easy to understand. However, some felt that it contained some oversimplifications, for example, it was not clear if distances referred to cylindrical or spherical volumes.

There were also comments that it should be made clear which points are legal obligations and what are recommendations.

5.14 On improving the content of guidance, respondents gave suggestions such as explaining the potential seriousness and consequences of breaking the rules both in terms of the possible damage and injury caused as well as the potential punishments. Suggestions were also made to explain why the particular distance limits had been chosen. There were also several suggestions that any information provided should also encourage considerate usage of drones near others.

5.15 On the content of the ANO, many respondents requested that the distinction between drones with and without cameras be removed since most drones come with cameras now and the current format does not fully address the privacy issue. It was suggested that a clearer definition of a 'congested area' was devised. Again, as in other parts of the consultation responses, a clear definition of a 'drone' was called for.

5.16 On improving the format, it was felt that CAP 722 could be written in simpler terms. People looking to use drones for the first time, for example for their commercial businesses, usually do not come from an aviation background so the currently used terminology is not easily understandable by the aviation layperson.

5.17 The use of other media forms was suggested including videos, FAQs, and guides from actual drone users.

Question 14

Do you support the creation of official guidance specifically aimed at helping parents and adults responsible for supervising children fly drones safely? Why?

Consultation responses

5.18 There was general support for the idea of official guidance for responsible adults.

5.19 For those agreeing with the proposal, reasons given included that drones are often seen as toys and the rules of aviation are not considered. Guidance for responsible adults would increase the adults' knowledge and an understanding of the serious responsibilities that come with flying a drone. Encouraging children to fly drones responsibly from an early age was seen to be more likely to ensure lifelong responsible use and to create a culture of safe drone use among the next generation. It was also suggested that it was made clear that the adult is responsible for the actions of the child under their care, and to ensure the adult had the same training as would be required if they were controlling the drone.

5.20 For the smaller number of respondents who disagreed with the proposal, reasons given included that the guidance would not be read and that children should not be flying drones anyway.

Question 15

Do you support the creation of a labelling system on drone packaging stating the age suitability? Why?

Consultation responses

5.21 Most respondents agreed with the suggestion of a labelling system stating age suitability.

5.22 Many of those who supported the suggestion commented that this is common sense and that most manufacturers do this already, although it could be made more prominent, and that this would help responsible adults make better decisions. Suggestions were made that whatever system is chosen it should align with international regulations.

5.23 Some of those that did not support the suggestion felt that large drones should not be flown by children at all. Others felt that actually knowledge and experience are more important than age. Some pointed to the ability of younger people to be better at picking up new technologies than their parents, in other words that adults are not automatically more knowledgeable.

5.24 A suggested alternative given by some respondents was to include a difficulty rating rather than an age rating. Reasons given included the suggestions that older people coming to drones for the first time may be put off by a low age rating and opt to purchase a more complex to fly model with a higher age rating. On the other hand low age ratings could give the impression that drones are toys, reducing the incentive for responsible adults to provide adequate supervision.

Question 16

Would you support for leisure users the introduction of a knowledge test, situational awareness test or both? Why?

Consultation responses

5.25 There was general agreement that there should be some level of knowledge and situational awareness testing, but some also answered no to both options. Leisure flyers of model aircraft and drones were slightly less in favour of tests than commercial users and general aviation pilots.

5.26 For those who responded in favour of a knowledge test, comments included that this would remove the common "I didn't know the rules" excuse. There was also considerable support for combining this test with a registration system. There was a less favourable response in favour of the situational awareness test with comments including that it would be unlikely there would be sufficient availability of test centres to fulfil this policy.

5.27 For those who answered yes to both, comments focussed on the benefit to safety, but suggested that any testing should be proportionate to the risk associated with pilot error. It was also suggested again that training should only be required for people who are not members of one of the recognised model aircraft associations.

5.28 Some call was made for drones to be treated more like aircraft than toys and therefore require a more serious aviation style approach.

5.29 Opinion was split in terms of whether tests should be voluntary or mandatory. Some felt operators would not read guidance if it was on a voluntary basis and suggested if training was part of the registration process, passing a test could be required to activate registration. Others felt just as the voluntary cycling proficiency test improved safety in cycling, a mandatory test for drone operators was not necessary.

5.30 Of the minority who answered in the negative to both options, comments focussed on the possible lack of practicality or effectiveness of such training. Some thought that there would be little impact as the minority of users who intend to use their drones irresponsibly will do so anyway. It was pointed out that training is already available from model aircraft flying clubs.

Question 17

Are you supportive of changes to the Air Navigation Order 2016 small drone flying rules to make them simpler? Why?

Consultation responses

5.31 There was clear support for changing the Air Navigation Order (ANO) in line with the suggestions given in the consultation. A caveat given by many, among both those who answered 'yes' and those who answered 'no' was that any simplification of the rules should not make them more restrictive or more permissive. The support was mostly constant across all user types, with slightly stronger support for changes coming from professional drone users.

5.32 Comments were made regarding the complexity of the ANO in general and how its primary purpose is clearly to deal with the rules of manned aviation. The language used is very technical and assumes a high level of understanding of aviation terminology. The sections concerning drones make up a very small fraction of the ANO and although these are fairly short, the complexity of the rest of the document could put people off.

5.33 There was support for merging Articles 94 and 95, removing the distinction for surveillance aircraft, and improving clarity on the rules on flight near airports. Several others specific suggestions for changes included:

- Restrictions on flying over private land and property and respect for Sites of Special Scientific Interest and other wildlife conservation areas.

- Exemptions for first-person view flying (FPV) should be embedded within the ANO.

- Clear definition of what constitutes commercial operations.

5.34 Some commented that current rules are not strict or comprehensive enough. Conversely, some who answered 'no' to the question did so as they suspected simplifying would result in more restrictive rules, leading to a limitation in allowed activities. Some answered 'no' as they could not support simplification without knowing what the proposed simplifications would be.

5.35 Some felt that there was no need for a change as the current rules are already clear and working well and that CAP 658 for model aircraft is also working well as currently laid out.

Proposal E: Improving deterrents

Background

5.36 This was a call for evidence as to whether the current penalties for breaking laws relating to drones should be increased, and whether a new offence for the misuse of drones is required. The intention behind this call for evidence was to deter the misuse of drones and incentivise compliance with the law, in particular safety and privacy.

Question 18

Do you support increasing deterrents for breaking any of the small drone laws in the Air Navigation Order 2016? Why?

Consultation responses

5.37 Respondents were split as to whether deterrents should be increased or not. Those who did favour increasing the penalties were concerned that the current penalty of £2500 was not sufficient to act as a deterrent.

5.38 There was a general concern from respondents about how the current or any future legislation is enforced. A consistent view was that enforcement needed to be improved and as a result this would lead to greater awareness which would act as a deterrent against breaking the small drone laws. A small number of respondents raised concerns about the level of awareness of drone laws amongst law enforcement agencies believing that this led to inconsistency and meant some offences were not effectively being dealt with. More prosecutions and media attention, it was felt, would lead to a greater deterrent.

5.39 A small number raised concerns about the level of resources available to police to enforce the drone legislation. This was supported by respondents who were concerned that reductions in police officer numbers would mean that enforcing drone laws would not be prioritised. If enforcement isn't robust and there is a belief that offenders aren't likely to be prosecuted then the level of penalty is irrelevant as any potential offenders will not be deterred.

5.40 It was suggested that a separate national body could be set up dedicated to regulating the increasing number of drones used in the UK.

5.41 One respondent suggested that in order to ensure proportionality a similar scheme to the speed awareness course could be introduced. This would ensure those who break the small drone laws are appropriately educated about the potential impact of any breach of the legislation. Other suggestions included the introduction of on-the-spot fining for drone offences, which if appropriately used would avoid the courts becoming overburdened. Several respondents raised concerns that social media was not policed and offences relating to drones were readily viewable, creating a negative image of drone users and reducing the level of deterrent.

Question 19

Is there a need to amend current legislation to better enable prosecution relating to drone misuse? Why?

Consultation response*s*

5.42 Overall most respondents believed that it wasn't necessary to amend current legislation relating to drone use. However a recurring view was that instead the quality of education and training should be improved and that this would lead to better compliance with the current legislation and negate the need for increased penalties or new legislation. Whilst there are programmes aimed at improving understanding awareness and understanding of regulations relating drones some respondents felt they were not far reaching enough.

5.43 A small number of respondents believed the current legislation needed to be made clearer. One respondent believed that a new Drone Act encompassing all offences should be introduced, to improve enforcement. They stated that as the use of drones increases this may be of benefit and provide more clarity for users and prosecutors alike. Two respondents raised concern about the lack of powers available to seize drones where an offence has occurred. Whilst police do have wider general powers of seizure where an offence has occurred a specific power could act as a deterrent.

5.44 The introduction of a registration scheme was also recommended in answer to this question by a small number of respondents, believing that this would improve the current situation. They believed it would lead to better enforcement and act as a deterrent to reduce offending. It was also suggested that registration could be linked to training and manufacturers should have a part to play in this.

Proposal F: 'No Drone Flying Zones' and enforcement

Background

5.45 This was a call for evidence as to how drone flight restrictions could be better enforced. The intention was to improve the restriction of drones flying in sensitive or dangerous areas, and empower the enforcement of safety, security and privacy at a local level.

5.46 The Government laid out its initial assessment that more needed to be done to enforce the current flying restrictions, given the breaches of drone flying restrictions that are occurring and may increase in future. The Government has already begun this work with the CAA's education campaign for drone users, which is raising awareness of the rules, and by reaching out to manufacturers to explore options for geo-fencing.

5.47 In addition to these actions, the Government set out its intention to now explore better ways of physically enforcing the flying restrictions that apply to drones.

5.48 The Government identified the following options for actions in the consultation document:

- **Proposal F, Option 1:** Working with stakeholders to better communicate on the ground where flying restrictions apply, such as around airports and prisons, as 'No Drone Flying Zones'. This could include designing and issuing standardised 'No Drone Flying Zone' or drone flying restriction signs for use by public bodies and organisations.

- **Proposal F, Option 2:** Making information of flying restrictions more readily available and accessible to drone users, working with industry to do so, and encouraging the development of apps to alert drone users to nearby restricted flying zones. If the registration of drones were implemented, drone users could also receive updates about flying restrictions relating to specific geographical areas through this process.

Question 20

Do you support Proposal F, Options 1 and/or 2? Why?

Consultation responses

5.49 There was a general consensus amongst respondents that communications with drone pilots on No Drone Flying Zones (NDFZs) and other restrictions on use was important and that both physical and electronic communication had a place, though it was felt that electronic means had the edge in a digital world.

5.50 A standard NDFZ pictogram that could be used by any organisation (such as big land owners like the National Trust) was welcomed. But it was recognised that physical signs had their limitations, for example, it would be impractical to install signs across the whole of an area covered by an airport's NDFZ, and there was a wish to avoid visual clutter particularly in rural areas. A lack of physical signage could, erroneously, be understood to mean that drone use was permitted.

5.51 Many respondents felt that using technology to make information on drone flying restrictions more readily available had greatest promise. Suggestions included a mobile phone app that showed where NDFZs and other restrictions were in place

and messages being sent direct to the pilot's control unit when a drone was approaching an NDFZ. It was noted that these and other geo-fencing techniques could not prevent deliberate incursions and some suggested that it should be a requirement for drone software to stop flight into restricted areas.

5.52 Respondents noted that the underlying data for a technological approach would be crucial to its success. The data would have to be current and detailed – one respondent proposed a single national airspace chart that would include all delimitations on drone use. It was also suggested that delimitations should include the upper altitude limit as well as the boundaries of NDFZs.

5.53 Respondents believed that more effective information on NDFZs and other limitations for drone pilots would assist enforcement action for deliberate breaches.

Question 21

Are you a public organisation or body with relevant drone flying restrictions?

Question 22

If so, would you make use of standardised signage to inform the public of restrictions on drone operations? Why?

Consultation responses

5.54 Of all the responses to the consultation, only a small number identified themselves as being public organisations or bodies with relevant drone flying restrictions.

5.55 Of these, a majority would make use of signage, but raised issues around the practicality of putting such signage in place, especially for those organisations with large estates.

5.56 In particular, responses from airports indicated that they would be in favour of using signage, but noted that this would only be practical near the airport, and achieving wider airspace coverage would be difficult.

5.57 The standardisation of signage was noted as being a positive proposal as it will provide a consistent, unambiguous message, regardless of where they are located. It was also suggested that the design of standard signage could be made consistent with the symbols used in any apps, again giving a sense of consistency.

6. Detailed summary of responses: Laying the foundations for a developed drone market

Callen-Lenz lightweight drone used in infrastructure survey.
Image copyright: Callen-Lenz

Proposal G: Registration of drones

Background

6.1 This was a proposal to introduce a registration scheme for all owners and their drones weighing 250g and above, whether bought new or second-hand or home-built. The proposal was intended to set in place the foundation for a future framework for drone regulation; create a culture of accountability amongst drone users; aid enforcement; and enable direct targeting of leisure drone users on the law and safe flying. The large data sets this policy would produce would also be used to inform future policy-making and risk assessments.

The Government identified 3 options for action:

- **Proposal G, Option 1:** Not to introduce a registration scheme for drones between 250g-20kg.

- **Proposal G, Option 2:** To introduce a registration requirement in the near future for all drones weighing 250g and over.

- **Proposal G, Option 3:** To introduce such a registration scheme in the longer term.

Question 23

At what weight should a drone be excluded from registration? Please explain your reasoning.

Consultation responses

6.2 Of those who specified a weight, a dominant view was that drones beneath 1kg exactly should be excluded from registration. Comments on those that supported the weight limit of 1kg exactly, included that this is the typical weight of 'First Person View' drones.

6.3 However, another segment of respondents supported a lower weight limit of 250g whilst some respondents did not think there should be any exclusions. Those respondents who were in favour of a weight threshold of 100g or above, focussed on how this would be effective in excluding indoor toys from having to be registered as well as mitigating the risks posed to helicopters in the event of a collision with a drone. Other comments drew attention to also restricting the maximum range a drone can fly as part of the registration process.

6.4 Some respondents commented that 1.4kg is the typical weight of a Phantom 4 drone, a popular 'leisure use' drone. Some felt that leisure drone users should not be required to register their drones, and by excluding drones below 2kg this would be an effective measure.

6.5 A small number of respondents suggested that there should be no threshold and that all drones should be registered. The reasons given were that drones of all sizes can potentially cause safety, security or privacy issues, for example very small drones equipped with cameras.

6.6 Of those respondents who did not specify a weight, attention was drawn to wider issues that should be taken into account such as whether the drone has a camera and the importance of where the drone is being flown. Comments also focussed on registering the operator of the drone, rather than the drone itself and the need to consider excluding model aircraft from registering altogether.

Question 24

Should the threshold for exclusion from registration be based on a different metric (such as how high you intend to fly the drone?)

Question 25

If you think so, what more appropriate or different threshold do you suggest and why?

Consultation responses

6.7 There was strong support for basing the threshold for exclusion from registration on weight, as proposed. However, a number of other respondents thought other metrics should be considered. A dominant view amongst these respondents was that how

high a drone is flown should be used. Comments ranged from imposing a threshold of 10 metres and up to 400ft/122m in height.

6.8 Some respondents suggested combining height with another metric such as speed, range, location or kinetic energy at maximum speed in order to give more accurate picture of the level of risk. Other suggestions included basing the threshold on flight time, wingspan or rotor diameter, the purpose to which the drone is put, or on the results of research into the effects of a collision with manned aircraft. .

6.9 Comments were also made on excluding certain groups of operators from registering such as drone racers, members of model aircraft associations and self-built drones.

6.10 Other comments included the suggestion that any exclusion threshold should complement that in European and US regulations to ensure consistency for the industry. Additionally it was suggested that the threshold should be periodically reviewed to take account of future developments in technology.

Question 26

Who should be made responsible for collecting and holding small drone registration details? The Civil Aviation Association or another body? Why?

Consultation responses

6.11 Respondents cited as key factors for their decision making for this question that it was important to keep costs low, ensure value for money and keep the process simple.

6.12 Most respondents supported the idea that the Civil Aviation Association (CAA) should be the body responsible for collecting and holding small drone registration details, due to their role as the aviation regulator and familiarity with implementing registration scheme requirements for larger manned aircraft. It was also suggested that the registration system could be maintained on the CAA's behalf through a licence agreement with a third party.

6.13 However, several other bodies also garnered some support:

- Organisations such as the DVLA - with experience of handling such large levels of data - were suggested. It was noted that model aircraft flying clubs already register their members, and could perhaps extend this registration to others.

- Some responses suggested the Police might be best placed to administer the scheme, if it was being run primarily for enforcement purposes, and to enable proper background checks to be undertaken.

- Another suggestion was made that a combination of organisations could be authorised to run registration for different segments of the drone sector, i.e. small drones could be registered by local authorities, larger drones with model flying clubs and commercial-use drones with the local Police.

6.14 Support was also given to the idea of creating an entirely new body to deliver this policy. Responses suggesting this stated that fairness, impartiality and resource would be important in delivering registration and a new organisation that understood and could represent the needs of industry would be most appropriate.

6.15 A small number of respondents pointed out that, although a body such as the CAA or DVLA may have responsibility to run a registration system delegated to it, the ultimate responsibility should lie with the Department for Transport.

Question 27

Do you support registration requirements not applying for certain owners of model aircraft below 20 kilograms in weight? Why?

Consultation responses

6.16 Responses to this question were roughly evenly split. Model aircraft flyers tended to support registration requirements not applying to themselves, due to their membership of model aircraft flying clubs who already register their members and which have built a long-standing safety culture in model aircraft flying. Those putting forward this view therefore argued that the current model aircraft flying ecosystem was fit for purpose, and did not merit more regulation to address any safety, security or privacy issues.

6.17 Other suggestions were made that perhaps the model aircraft flying clubs could collect registration data for the Government on behalf of their members, thereby reducing the burden on their members of registering both with their clubs and with the Government-mandated registration scheme. Another suggestion was that perhaps 'model flying zones' could be created, and if you flew solely in these zones you could be excluded from registration.

6.18 Those who disagreed with model aircraft flyers being excluded from any registration scheme did so because they felt there were still incidents, such as some Airprox reports, showing that not all model aircraft are flown safely and that to create an exclusion from the requirement for model aircraft would create a loophole. They stated that such an exemption would reduce the simplicity of a registration scheme, making it less effective, and created the risk that those drone flyers who wanted to avoid registering would simply call themselves 'model aircraft flyers' instead.

Question 28

Do you support the registration process proposed? Why?

Consultation responses

6.19 No consensus on the registration process proposed was achieved.

6.20 Those who supported it did so for a variety of reasons. These included that a registration system was the necessary first step to enable future systems such as flight tracking and integration with air traffic control, as well as providing useful information for enforcement purposes. They also thought it would encourage good practice, improve accountability, enable better education, ensure transparency to reassure the public, enable recovery of lost aircraft and ensure direct communication with drone owners. . Some comments on these lines also suggested that a means of identifying drones in flight would be required to make registration truly effective.

6.21 Some gave their support to the process proposed in general, but suggested certain improvements. These included that only the operator should be registered, rather than each individual drone, and that the operator's unique identification number should be visible on each device instead. Another comment was that the requirement

to renew annually was perhaps too onerous for some and that instead a requirement to notify of changes in ownership or the destruction of the drone would probably suffice.

6.22 Several respondents who supported registration mentioned their preference for a light touch process carried out via a website portal using a simple form.

6.23 Others advocated that any registration scheme introduced must be a foundation for drone traffic management. It would need to enable interoperability and connections with other systems, such as those holding data on CAA commercial permissions to operate, flying school qualifications and insurance details. Data from a registration system would also need to be accessible to approved third parties such as police services, in order to enable enforcement, and for any eventual drone traffic management system, subject to suitable data protection controls.

6.24 Those who did not support the proposed process for registration highlighted concerns that it could be an invasion of privacy, that the weight limit was too low and would capture too many toy drones, and that any registration scheme would need to be enforceable to be effective.

Question 29

Do you support a small charge being imposed on drone owners when registering their drone? Why?

Question 30

What do you think about the parameters for a charging scheme outlined above?

Consultation responses

6.25 Again, responses were split roughly in half in favour or against the concept of a small charge being imposed.

6.26 Those who supported a small fee being imposed thought this was acceptable to cover the costs of running the scheme and that the taxpayer or other sectors of the aviation industry should not be expected to fund another's hobby or commercial enterprise. They also thought a small fee might also serve to make drone users consider their responsibilities more effectively.

6.27 A fee of £5-10 was commonly suggested as being reasonable and the Federal Aviation Authority's registration scheme in the United States was often given as a good example of the level of fee they would like to see. Others suggested that a small charge proportionate to the cost and/or weight of the drone would be acceptable, which would reflect the potential risk of damage and could also encourage leisure users to purchase lighter and therefore less risky drones. It was feared that a larger fee could discourage people from registering, and inhibit innovation and growth of the sector in the UK.

6.28 Others made suggestions as to how to make the process of taking a fee less burdensome - they suggested the fee-taking be combined with the commercial permissions process for those undertaking commercial work, or that manufacturers or vendors could subsume the cost into the purchase fee and register you at point of sale.

6.29 Those who did not support a small charge for registration being imposed cited various reasons for this. This included that it would discourage people from registering, that the non-law abiding would never register anyway, and that Government or a combination of the Government and regulators should shoulder the cost.

6.30 With regards the parameters for a charging scheme that were proposed, many respondents thought these were acceptable. Numerous suggestions were also made for improving these parameters. In particular, that registered model aircraft club members should not have to register or pay twice, and that the fee should be charged per operator rather than per aircraft, so as to not unfairly penalise those who own multiple aircraft, and be one-off. Some thought that charging should be varied depending on whether you were a leisure user or commercial user. There were a number of respondents who supported some form of charging, but that the specifics of the charging scheme requires much more development work and planning by Government before coming into force.

Question 31

Should some anonymous/non-identifying data collected by registration (such as numbers of drones in a local area) be made publically available? What data and why?

Consultation responses

6.31 There was support for this idea from some, who felt that the data would be useful to inform the public, develop future strategies and policies and be of benefit to the insurance industry. It could also be of use to those planning manned aviation operations in an area, who could put in place particular mitigations based on this data. Some respondents pointed to positive uses of anonymous data which could also apply to drones, for example live traffic congestion information is currently used to help road users plan routes.

6.32 Those who did support the idea suggested a range of data that could be usefully made available, such as:

- The number of drones in an area, with the possibility of more information also on the nature of the drone, the owner's unique identifying number and whether they were a commercial or leisure operator; and

- A database of locally registered qualified pilots.

6.33 However, those who did not support the concept were more dominant amongst responses. They questioned why publishing this kind of data would be necessary or beneficial. They stated statistics would be out-of-date rapidly, and could be subject to misinterpretation and lead to scaremongering in the national press. Despite the Government's statement that any data to be released would be anonymous and non-identifying, some respondents still feared that personal data might be released, and that it would be a further disincentive for people to register. Other comments highlighted the legal requirements and obligations on data security and the need for any data collection to be properly justified.

Question 32

Having considered some elements of how the registration scheme would be implemented, which of the following options is your preferred option:

Proposal G, Option 1: Not to introduce a registration scheme;

Proposal G, Option 2: To introduce a registration scheme in the near future; or

Proposal G, Option 3: To introduce a registration scheme in the longer term.

Why?

Consultation responses

6.34 On this overall question, responses showed a preference for introducing a registration scheme.

6.35 Those who did not support it, did not believe the benefits of a registration scheme were clear or did not see a need for it, some even stating that there was a lack of evidence to show that drones were being flown unsafely in the UK. Other reasons given for not supporting a registration scheme included that it would mean only registered and compliant users would be identified, and those with malicious intent would never register anyway. A large proportion of those who identified as model aircraft flyers did not support the introduction of a registration scheme as they did not see the need for the scheme amongst model aircraft fliers and felt it would unduly penalise them.

6.36 Others had more nuanced views on a registration scheme, saying it would be more effective to implement a mandatory competency test or mandatory insurance, or to focus resource on more education and enforcement.

6.37 Of those who thought a registration scheme should be introduced, the dominant view was that it should be done in the near future rather than long term.

6.38 Those advocating for the introduction of registration in the long term did so because of the 'newness' of the drone market, because there were not yet tangible benefits and requirements for it, or because they felt a lot more development work was needed first.. They also worried that if the introduction of registration was rushed, this might mean 're-registration' at a later stage with a more future-proof scheme.

6.39 The reasons given for supporting registration in the short-term ranged widely - respondents stated that registration was needed immediately to help prevent misuse, and that to wait longer would just make the problem worse; and that registration would be a good and necessary part of licensing and drone identification systems. Registration would also help in establishing accountability and wider public confidence in drone use and users, allow the provision of education to operators when they were most receptive, would follow the precedents set in the motoring and aviation industries, and would enable the creation of a professional drone culture.

Proposal H: Electronic identification of drones

Background

6.40 This was a proposal that drones should be electronically identifiable, in order that they can be identified in flight. Potentially, this capability could be extended to include identification of the aircraft by persons on the ground, allowing the reporting of drones being misused to the Police. As a first step towards this, the Government set out in its consultation its intention to explore other ways of achieving similar impacts, such as the use of flight notification apps. The work in this area was intended to ensure accountability, improve safety for all airspace users, and aid enforcement.

6.41 The Government set out that such a requirement could be more effective if implemented at a European level as the drone market is an international one, and this would enable alignment of standards. However, the Government's understanding at the time was that the required technology for such a digital identification system is not yet readily available, or of a size that can be fitted on to a drone.

6.42 The Government set out is expectation that this technology is therefore a few years away from market readiness, but that to prepare for the future, the Government was already involved in discussions to introduce a mandatory electronic identification requirement. The Government envisaged that the eventual result of these discussions would be the implementation of a mandatory electronic identification requirement, either at domestic or European level, in the next few years. The Government stated that it would keep this assessment under review as the drone market changes and develops over the next few years, to ensure such a mandatory electronic identification requirement remains appropriate and feasible.

Question 33

Do you agree with the proposed approach to implementing an electronic identification requirement? Why?

Consultation responses

6.43 Respondents were roughly evenly split with regards this proposal.

6.44 Most respondents who disagreed with the proposal were concerned about bureaucracy and the complications/complexity arising from more regulation. They were concerned it could an unnecessary and disproportionate response to safety/security concerns, and that it would adversely affect genuine drone operators, especially model aircraft flyers. Other respondents cited concerns about who would bear the cost to implement and administer the system.

6.45 There were also questions about whether the proposals would deter illegal operators as they felt that the system could be easily circumvented i.e. registration of drones could be falsified or the transponder could be manipulated or removed.

6.46 However, those who did agree with the proposal did so because they felt it was essential to managing the safety, security and privacy risks and enforcing these, as well as enabling a pathway to drone traffic management. However, there was uncertainty about how it would implemented given the current technological constraints.

Question 34

Should all registered drones be electronically identifiable? Why?

Consultation responses

6.47 Support for this proposal was split - whilst businesses tended to support the proposal, other groups tended not to. In particular, model aircraft flyers, did not support the proposal, viewing it as impractical, overly expensive and burdensome for them to retrofit their model aircraft to be electronically identifiable.

6.48 Those who supported the concept, did so for reasons of safety, to enable the future implementation of a drone traffic management system and for enforcement and investigation purposes. There was some nuance in these responses as to whether all registered drones should be electronically identifiable, with some saying only commercial drones would need to have this capability. But others advocated for the capability being a requirement across all drone categories, including model aircraft, to enable systems to be introduced to minimise the risk of incursions into restricted airspace and low flying zones. For others, their support for the proposal was dependent on a cheap, very light transponder that could meet electronic identification requirements being developed, so as to not burden the market.

Question 35

If no, what drones should be excluded from electronic identification and why?

Consultation responses

6.49 Those who answered this question highlighted a few key categories of drones which should be excluded from the requirement. These included:

- That drones used for leisure purposes (distinct from model aircraft) should be exempt, while those used for commercial purposes should have some form of electronic identification*;*
- That drones under certain weights should be excluded. Within this, the suggested cut off weight ranged from under 250g to under 20kg*;*
- That there should be no electronic identification of any drones*;*
- That model aircraft should be exempt*.*

Question 36

Do you support a pilot scheme mandating the use of an app to notify other app users and authorities that you are flying a drone in a certain area? Why?

Consultation responses

6.50 Again respondents were split on this proposal. Those who were not in favour were concerned about the lack of technology to support the scheme. For example, a number of respondents stated that many areas where drone activity takes place are remote and as such, have poor 3G/4G coverage. Other respondents thought that mandating this would be unenforceable and would most likely affect genuine

operators and will do little to deter illegal operators. Some of these respondents instead favoured a voluntary scheme like the Drone Assist App. Privacy and security was also a concern, particularly around nefarious users utilizing the app to track and pinpoint the location of genuine drone users.

6.51 Those who were in favour thought it would be a useful tool in increasing compliance with safety, security and privacy regulation, and increase transparency and improve the public's trust in drones. There were suggestions that further scoping and consultation on the project would be required in order to understand how to overcome certain technological hurdles, and some also thought that the use of an app should not be mandated for all drones, but only larger and commercial drones.

Proposal I: Drone traffic management

Background

6.52 This part of the consultation set out that the Government is working with industry and regulatory partners to explore developing an overall national architecture for a drone traffic management system. Drone traffic management is also often referred to as UTM (Unmanned Traffic Management). The overall national architecture for UTM would ultimately set out how the system will operate, be funded and regulated. This development is currently at a very early stage, so the consultation set out an overview and underlying principles of the UK UTM solution. The financial and organisational aspects of UTM have not yet been considered in detail.

6.53 The Government and its industry partners were seeking wider input on all of these to influence the next stages of development of such a system. A drone traffic management system would be intended to ensure safety, and enable complex drone operations.

> ### Question 37
>
> Do you agree with the proposed characteristics of the drone traffic management system? Why?

Consultation responses

6.54 There was general approval for some sort of UTM and an appreciation that such a system will become essential as the sector grows, especially with increased operations wanting to fly beyond visual line of sight (BVLOS). The general characteristics as proposed were seen as sensible and necessary by most. There was an understanding that such a system would improve safety and encourage responsible behaviour. However, a number thought that such a system was unnecessary, that the need for such a system had not been proven or that there would never be sufficient drone numbers to require one.

6.55 There were some comments suggesting that the introduction of a UTM could be made incrementally, with some key features being put in being put in place initially and the other components to follow.

6.56 Several respondents highlighted the complexity of the proposal and the large number of questions and challenges that would need to be answered before it is fully operational. Examples included the types of airspace to be covered, any particular types or limits for the types of unmanned aircraft that need to use the system, the significant cyber security challenges.

6.57 Several organisations with diverse viewpoints pointed to the impracticality of requiring advanced flight planning and permissions. Instead they recommended that it should be possible to allow ad hoc flights without prior planning and approval.

6.58 Several organisations volunteered that they had been doing work on similar systems and would be keen to be involved in the Government's development of a UTM.

6.59 There was some resistance from model aircraft and hobbyist drone flyers who were concerned that the use of a UTM system would negatively affect their hobby. They called for UTM to only apply to larger, or commercial drones. Conversely, there was clearly higher support for a UTM system from commercial drone users.

Question 38

Do you agree with the proposed underlying principles for the drone traffic management system? Why?

Consultation responses

6.60 There was again, a general positive response to this question and agreement with the principles given. Several suggestions were given for further principles that could be developed on, for example, maximum and minimum altitudes for drones, types of airspace, and types of drones and applications that should be included.

6.61 There were comments from airports emphasising the point that any UTM system should not interfere with the way that manned aviation and air traffic control operate. Although there were comments from some drone using organisations that if the airspace is to remain available to all, then manned aviation must also not unduly impact drone users' use of the airspace.

6.62 There were several technical details from aerospace and technology companies on how the function of the UTM could be achieved. The focus was on using a high degree of autonomy with open data architectures and standards that would be available and encourage early development.

6.63 Arguments for the UTM having capabilities to support investigatory powers and aid in pursuing transgressions of the law were also made.

Question 39

Do you agree that it should be compulsory for a drone to be electronically identifiable in order to use the UTM system? Why?

Consultation responses

6.64 There was fairly strong support for the requirement for electronic identification. This support was slightly higher for general aviation and commercial drone users and slightly lower for leisure drone and model aircraft flyers.

6.65 Many of the respondents thought that some form of electronic identification would be essential for a UTM system, and other proposals in the consultation, to work. Some thought that this should only apply to larger drones while others pointed out that the lowest technology and capability drones would all have to fit into the UTM and need to be electronically identifiable for it to work.

6.66 Some suggested that all aircraft operating in controlled airspace should be identifiable and that leisure flying areas could be established where identification was not required.

6.67 There was some concern that making every drone in use today identifiable would not be feasible or affordable, with others of the opinion that the necessary technology is now starting to become affordable.

Question 40

Should electronic identification for manned general aviation be mandatory? Why?

Consultation responses

6.68 There was general support for requiring electronic identification for general aviation (GA) aircraft amongst most responders, with the exception of GA individuals themselves. Several non-GA respondents seemed surprised to learn that electronic identification was not already mandatory.

6.69 The arguments from the GA community against this suggestion included the expense and lack of operating power on some GA aircraft, for example, gliders and hang gliders, to operate such devices. Although there were also a number of comments which suggested that these devices are now becoming more practical and cost-effective.

6.70 Several respondents, including some from the GA community, recognised that for UTM to be effective then all aircraft, including GA, would have to be electronically identifiable and conspicuous. There was also an understanding that the use of devices on GA aircraft brings its own safety benefit for those aircraft.

6.71 Several suggested that electronic ID of all aircraft would be essential in the future, or is in fact already overdue, and that a new approach is needed to the finite airspace.

6.72 Arguments for the use of electronic identification for GA included subjects other than drones or UTM. For example, reducing the anonymous use of aircraft for criminal activities and helping to prosecute GA pilots infringing on airport control zones.

Question 41

How should a drone traffic management system be funded?

Consultation responses

6.73 There was a great deal of support for the UTM being funded by those who gain commercial benefit from it, i.e. commercial drone operating companies.

6.74 It was clear that leisure users did not want to pay and from manned aviation there was a desire that there should not be an increased cost for them or air traffic control.

6.75 Other suggestions were that the UTM should be centrally funded by Government or by fines or from fees for gaining permissions for aerial work.

7. Annex A: Additional consultation questions for manufacturers, vendors and industry experts

7.1 In addition to asking questions on certain policy proposals, the Government was keen to garner expert opinions on the current and future state of the drone market in the UK, and also to ask technical questions which would assist with producing policy impact assessments. The questions in Annex A were therefore specifically aimed at drone manufacturers, vendors and other experts in the industry.

7.2 In total, there were 125 responders who answered some or all of the questions in Annex A. Of these, around half stated they were manufacturers, vendors or industry experts, with 22 directly involved in the manufacture and/or selling of drones.

Market size questions

Question 42

Regarding market size, how many leisure drone users do you estimate are in the UK?

Question 43

How many drones do you estimate are annually sold in the UK?

Question 44

What is the scale of future expansion in the leisure drone market over the next: 1, 5, 10 years?

Question 45

How many firms operating drones do you estimate to exist in the UK as of today, 1 years' time, 5 years' time, 10 years' time, 20 years' time?

Consultation responses

7.3 The table below (Figure 1) summarises the responses to the questions on the size of the leisure and commercial drone markets in the UK. The number of responses to each question was varied and some answers were omitted due to not providing a numerical estimate.

Category (UK)	Total Responses	Median of Responses
Estimate of current annual drone sales	38	90,000
Estimate of current leisure users	44	100,000
Leisure users in 1 year	22	200,000
Leisure users in 5 years	21	300,000
Leisure users in 10 years	20	710,000
Estimate of current commercial users	36	2,000
Commercial users in 1 year	29	3,000
Commercial users in 5 years	28	5,000
Commercial users in 10 years	24	7,000
Commercial users in 20 years	24	10,000

Figure 1   Responses to questions on drone market size

7.4   In general, there was variation in the estimates of current and future drone usage, but a broad consensus that both sectors would see an increase over the next 10 - 20 years.

7.5   The Government's data on current users and estimates of annual sales and near-term forecasts are relatively similar to the median consultation responses. We expect that this is due to industry experts and drone-related businesses being aware of the CAA register of commercial operators, which forms the basis of the Government estimates.

Proposal D: Improving leisure drone user awareness of the law

Question 46

Do you already issue guidance on the Dronecode?

Consultation responses

7.6   There was a broad consensus amongst organisations involved in the manufacture or sale of drones that they currently issue guidance on the Dronecode.

7.7   While this question was mainly aimed at sellers and manufacturers, a number of responses from drone training schools and drone service providers confirmed that they also issue guidance on the Dronecode.

Consultation responses

7.8 There were comparatively few responses to the questions on the packaging process. Responses, including those from companies which already provide guidance leaflets with their products, generally indicated that the cost of including guidance leaflets with every drone sold would be negligible.

7.9 Responses in general indicated that changing packaging for a product line could be a significant cost. However, it was pointed out that this might not necessarily be a significant issue for manufacturers as they release a number of new products a year, each with its own packaging. If mandated changes to packaging were to occur, they could be phased in as part of natural product replacement cycles and not impose significant additional costs.

7.10 Concerns were raised that mandatory changes to packaging could prove to be more of an issue to retailers, who could have older models in stock.

Proposal G: Registration of drones

Consultation responses

7.11 Responses from drone sellers and manufacturers generally indicated that they were not in favour of including registration as part of the sales or activation process.

Question 51

What would you assess the financial cost to be of implementing a registration process within your activation process and/or sales process?

Question 52

What would you assess the financial cost to be of completing each individual registration during the activation process and/or sales process?

Consultation responses

7.12 Responses to these questions were mixed and with no definitive pattern to the answers. Some responders thought the financial impacts would be minimal, whereas others felt they would amount to an unsustainable cost to business. There were also some responses stating that the registration process should be between the drone user and the regulator, and not the responsibility of the manufacturer or retailer. This is what is currently proposed, as described in 3.31.

Proposal H: Electronic identification of drones

Question 53

Do you think it is currently realistic for a drone to be electronically identifiable?

If not, when do you think electronic identification of drones will be possible?

Consultation responses

7.13 There was broad agreement that electronic identification of drones is not currently a realistic scenario. However, there was no consensus as to whether electronic identification of drones would be a viable option in the future, with technological constraints and the desirability of such a system cited as potential barriers.

7.14 A number of the responses which felt that electronic identification was currently realistic expressed concerns about the security of the technology. While it is technically possible to implement electronic identification, keeping the system and data secure provides an additional technological challenge.

Question 54

If yes, on a per drone basis, how much would the technology to enable electronic identification add to the cost of manufacturing and the retail price?

Question 55

Would these costs impact the viability of your business?

Consultation responses

7.15 There was broad agreement that the costs of electronic identification of drones would have an impact on the viability of their business. There was no clear pattern of responses on details of the costs per drone.

8. Annex B: Additional consultation questions for commercial drone users and those considering using a drone for a commercial service

8.1   The Government was keen to further understand the commercial drone market in the UK, so Annex B contained questions aimed at businesses which currently use drones to deliver services, or are planning to do so in the future. This section summarises these responses, which indicate the characteristics of the commercial drone users who responded to the consultation.

8.2   In total, there were 182 responders who answered one or more questions in this section. Of these, around 60% were businesses which either use drones or are considering the use of drones. Of the businesses which responded, around 60% said they are a company currently using drones to deliver services.

Business use of drones

Question 56

If you are a company using drones to deliver services, how many drones do you currently have that fall into the 250g-20kg category?

Question 57

How many trained operators do you have per drone?

Question 61

How many drones of this weight range do you anticipate you will have in the next year, 5 years and 10 years? Why?

Consultation responses

8.3   The table below (Figure 2) summarises the responses to the questions on businesses' use of drones. Looking at the mean (excluding outliers), the consensus amongst responders is that they expect that the number of drones they own will increase over time.

8.4   In general, the firms which responded have a multiple people qualified to pilot drones, with each business that responded having an average of 1.5 trained operators per drone.

Category	Quantified Responses	Mean excluding outliers
Current drones per firm	66	5.6
Drones per firm: 1 year	88	5.6
Drones per firm: 5 years	80	6.5
Drones per firm: 10 years	58	10.4
Operators per drone	65	1.5

Figure 2 Responses to questions on businesses' drone ownership

Question 59

How regularly are the drones used?

Consultation responses

8.5　Most responders indicated that they use drones once a week or more. Of those who stated that they use their drone at least weekly, a majority stated that they use their drone at least three times a week.

Question 58

What are your main uses for drones?

Question 60

If you are a company planning to use drones to deliver services, what are your future plans for drones?

Consultation responses

Drone activity	As a current user	As a planned user
Media photography	47	77
Infrastructure inspections	45	77
Aerial surveys and planning	45	80
Surveillance and security	8	21
Emergency services	8	29
Data and communications	7	18
Package delivery	3	14
Other[1]	13	15

Figure 3 Responses to questions on current and planned drone operations

8.6　Most drone-operating firms which responded stated they use their drones for 1-3 purposes. As shown in Figure 3, the main stated reasons for using drones were filming and photography for media purposes, infrastructure inspections and aerial surveys and planning, with most firms that use drones citing at least one of these

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[1] The main use listed under "other" was training; appearing 6 out of 13 times as a current use of drones.

uses. These purposes were also prominent in firms' plans for the future, with responses indicating a similar level of interest in all three.

Question 62

Does your company currently make use of drone service providers, or do you expect to use them in future?

Consultation responses

8.7 Most responders stated that they do not currently use a drone service provider and did not have any plans to do so in the future. This consensus was roughly the same amongst all categories of responders.

Question 63

Would mandatory registration for drones make you more or less likely to purchase a drone, hire the services of a professional drone pilot, or use a drone service provider? Why?

Consultation responses

8.8 Responders were generally split on whether mandatory registration would make them more or less likely to purchase a drone, showing a slight preference toward being more likely to buy a drone.

8.9 Similarly, answers indicated that responders would be more likely to hire a drone pilot or use a drone service provider should mandatory registration be introduced, but again the responses did not overwhelmingly favour one view.

Question 64

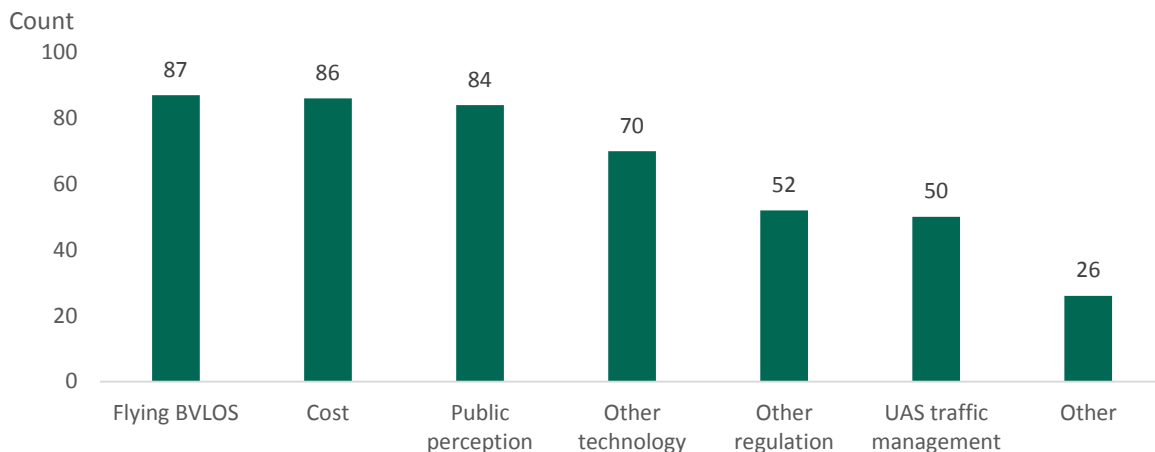What is your industry area, and how do you envisage the growth rate in drone use within your industry?

Question 65

What are the main factors this will depend on?

Consultation responses

8.10 As was indicated in 8.6, a large number of responders stated their industry area and use of drones was media, infrastructure or survey related.

8.11 There was consensus amongst responders to the questions about growth prospects in their industry that there is potential for significant growth within their industry. Agriculture and infrastructure inspections were often mentioned as areas with large potential for growth.

8.12 However, a number of responses from companies working in media industries suggested that drone use in commercial photography and filming was nearing saturation point. This means that according to these responders, growth could potentially slow down, although the demand would remain.

8.13 As shown in Figure 4, the most commonly listed factors which growth would depend on were the ability to fly beyond visual line of sight (BVLOS), cost and public perception. The majority of responses labelled "other" also discussed the limitations of regulations or technology.

Count

Factor	Count
Flying BVLOS	87
Cost	86
Public perception	84
Other technology	70
Other regulation	52
UAS traffic management	50
Other	26

Figure 4 Factors determining growth rates in the drone industry in the UK

Question 66

As an organisation providing or making use of drone services, what do you estimate to be the financial impact of a registration requirement on your firm?

Consultation responses

8.14 The majority of responders to this question indicated that mandatory registration would not have a significant financial impact on their business. Responders were generally positive about the proposal, with a number of answers saying that registration could make the industry safer and more trusted, therefore the benefits of registration would outweigh the relatively low costs.

8.15 A number of responders also pointed out that as commercial operators, they were already registered with the CAA. Therefore they assumed this requirement would have no financial impact, unless the proposed registration requirements were radically different from the current register of commercial operators.

9. Annex C: The law in the UK today

The law applicable to the use of drones in the UK includes both aviation-specific and general law. Safety is the primary focus of the relevant aviation rules which differ depending on the weight of the drone which is being flown.

Currently, the safe use of drones weighing no more than 150kg is subject to UK aviation regulation only, in particular the Air Navigation Order 2016.

The safe use of drones weighing more than 150kg is regulated by European law set out in Regulation (EC) 216/2008 (known as the Basic Regulation) and its amending acts. This Regulation, which sets the mandate of the European Aviation Safety Agency (EASA), is currently being renegotiated, and the new proposal covers all drones, regardless of weight. The Government broadly supports the proposals of the European Commission and EASA to develop clear harmonised rules to ensure the safe operation of drones across Europe and particularly the UK.

On 23 June 2016, the EU referendum took place and the people of the United Kingdom voted to leave the European Union. Until exit negotiations are concluded, the UK remains a full member of the European Union and all the rights and obligations of EU membership remain in force. During this period the Government will continue to negotiate, implement and apply EU legislation. The outcome of these negotiations will determine what arrangements apply in relation to EU legislation in future once the UK has left the EU.

The Government is considering carefully all the potential implications arising for our aviation industry from the UK's exit from the EU, including the implications for the continued participation in the EASA system. Until we leave, EU law will continue to apply to the UK, alongside national rules.

A summary of the main UK laws which drone users should be aware of are captured in the table below.

A summary of main UK laws applying to use of drones of no more than 150kg		Penalties & Enforcement
Relevant to aviation and general public safety	All drones (note this Article applies to anyone in charge of any aircraft, not just drones): Users must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft. Users must not recklessly or negligently cause or permit an aircraft (which	A person convicted of recklessly or negligently acting in a manner likely to endanger an aircraft or any person in an aircraft could be punished by an unlimited fine or by imprisonment for a term not exceeding 5 years or both.

A summary of main UK laws applying to use of drones of no more than 150kg		Penalties & Enforcement
	includes a drone) to endanger any person or property.	
Relevant to aviation and general public safety	Drones weighing not more than 20kg: Users can only fly the drone if they are reasonably satisfied that the flight can safely be made. Users must maintain direct, unaided visual contact with the drone to monitor its flight path in order to avoid collisions, unless a CAA exemption applies. Users must not fly drones with cameras within 50m of any vehicle, structure or person (that they do not have control of) without permission Users must not fly drones with cameras over or within 150m of any congested area or large crowds of people without permission. Users must not fly drones above 400ft or within certain categories of airspace without permission if the drone weighs more than 7kg. Drones weighing more than 20kg: Users must comply with the aviation regulations that apply to operating manned aircraft. These include the requirement for prior approval before the aircraft can be flown. The specific details of the approval will be depend on the type of operation that the drone is conducting to ensure appropriate management of risk.	A person convicted of recklessly or negligently causing or permitting a drone to endanger any person or property could be punished by an unlimited fine or by imprisonment for a term not exceeding two years or both. A person convicted of any of the other offences set out under the heading 'Drones weighing not more than 20kg' in the box immediately to the left could be punished by a fine not exceeding £2.5k.
Relevant to privacy	Drone operators collecting personal data must comply with the Data Protection Act 1988 (DPA) unless a relevant exemption applies.	The DPA is enforced by the Information Commissioner's Office (ICO). The ICO can take enforcement action against a person who breaches the DPA by requiring them to change their practice, by imposing fines for unlawfully obtaining or accessing personal data which is a criminal offence under the DPA. An individual who suffers damage because of a breach of the DPA could

A summary of main UK laws applying to use of drones of no more than 150kg		Penalties & Enforcement
Relevant to privacy		also make a claim for compensation.
	Drones should be flown at a height over the property of another person which is 'reasonable' in all circumstances. Failure to do so could amount to trespass if the flight interferes with another person's ordinary use and enjoyment of land and the structures upon it.	In the case of trespass, a civil claim may be brought against the drone user seeking compensation for any damage suffered as a result of the trespass. Alternatively, an injunction may be sought to prevent trespass in the future.
Relevant to security	It is a criminal offence to convey a range of prohibited items into and out of prisons without authorisation. It is a criminal offence to do anything from outside a prison that results in any article or substance (which it is not otherwise an offence to convey into a prison) being projected or conveyed over or through a boundary of a prison so as to land in a prison without authorisation. General security and terrorism laws also apply to the use of drones.	The maximum penalties for conveying items into and out of prisons depends on the classification of the item. For example, a conviction for conveying controlled drugs is punishable by an unlimited fine or a term of imprisonment not exceeding 10 years or both. Unlawfully causing an article to be projected over or through a boundary of a prison is punishable by an unlimited fine or imprisonment for a term not exceeding two years.

Government Drones Consultation Response