House of Commons

Science and Technology Committee

Commercial and recreational drone use in the UK: Government Response the Committee's Twenty-Second Report of 2017–19

Second Special Report of Session 2019–21

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Science and Technology Committee

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Second Special Report

On 11 October 2019 the previous Committee published its Twenty-Second Report of Session 2017–19, *Commercial and recreational drone use in the UK* [HC 2021]. On 13 March 2020 we received the Government's response to the Report, which is appended below.

Appendix: Government Response

Preface

The Government thanks the Science and Technology Committee for its report on commercial and recreational drone use in the UK. Although the report uses the word 'drone', the Government will use the term 'unmanned aircraft' throughout its response. This acknowledges that there are various types of unmanned aircraft that require regulation, not just drones, and is consistent with terminology used elsewhere, such as in the Air Traffic Management and Unmanned Aircraft (ATMUA) Bill.

The term 'small unmanned aircraft' is also used when referring to unmanned aircraft of a particular mass. This term is defined in the Air Navigation Order 2016 (ANO 2016), rather than by the Civil Aviation Authority (CAA) as the report suggests, and means any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight. There is no definition within UK law of the term 'drone' or 'recreational drone'; however, where it is appropriate, the term 'drone' is still used within this response.

As stated in the report and in the Bill's impact assessment, unmanned aircraft have the potential to bring great benefits to the UK, with the police, fire, and search and rescue services all now regularly using unmanned aircraft in emergency situations to help save lives. Unmanned aircraft are also being used by those in hazardous sectors, such as the oil and gas industry, and by those constructing, inspecting and maintaining key national transport infrastructure, reducing the risk of accidents and driving industry productivity and efficiency. They are also being used across other industries, the public sector and charities to drive more efficient ways of working and monitor environmental change. In May 2018, PwC estimated that the economic benefits of unmanned aircraft, such as drones, in the UK by 2030 could be as much as £16 billion in net cost savings, adding £42 billion to GDP, with over 600,000 drone sector jobs.[1]

In addition to the benefits for industry and the general public that are set out above, the Government wants to capture the benefits of unmanned aircraft for consumers, by unlocking mobility and offering new options on how people and goods can move around. Any innovation in aviation needs to be adopted in a way that is safe, sustainable, beneficial and publicly acceptable. In addition to introducing the ATMUA Bill in January this year, the Government has taken steps to ensure the safe use of unmanned aircraft by amending the ANO 2016 in 2018 and 2019, publishing a Counter-Unmanned Aircraft Strategy in October 2019, and, through the CAA, implementing the Drone and Model Aircraft

1 PWC (2018). *Skies without limits: Drones – taking the UK's economy to new heights*. Retrieved from pwc.co.uk/dronesreport

Registration and Education Service (DMARES) in November 2019. The Government aims to provide an agile regulatory landscape, which not only keeps pace with technological development but also enables and supports new opportunities, and the CAA has established the Innovation Hub, a central function facilitating the development of innovative aviation models.

The Committee made twenty-seven recommendations that fall into six categories: current regulations, opportunities, risks, safety education, technology and the Government's vision for the future. Their specific recommendations will now be considered in detail.

It is important to note that the information contained in this response is accurate as of 13 February 2020.

Recommendation 1: The Government should commission the production of a standardised and unified system through which drone operators can request access to Flight Restriction Zones. This could be achieved by working with National Air Traffic Services on its development of an Airspace User's Portal. This should be completed no later than summer 2020. (Paragraph 25)

The Government partially agrees with this recommendation. For clarification, contrary to what the report states, the CAA does not authorise access to a flight restriction zone (FRZ) although it is closely engaged with NATS (formerly the National Air Traffic Services) on the Airspace User Portal (AUP) expansion to include unmanned aircraft airspace approvals. However, this portal is not a solution that would be necessary, or suitable, for every aerodrome FRZ. For many aerodromes, a telephone call to the Air Traffic Unit is sufficient to grant a permission, but for others a longer process may be necessary. The AUP should be expanded to include details for every aerodrome with an FRZ, but not to handle the requests for every aerodrome. The AUP should list the aerodromes that operate a different approval system and re-direct users to advice on how to obtain permissions to fly within the FRZ of those aerodromes.

Recommendation 2: The Government, or the appropriate regulatory body, such as the Civil Aviation Authority, should review the online test one year after it has been in operation. Specifically, the Government should determine if it is an adequate test for ensuring safe drone use. (Paragraph 33)

The Government partially agrees with this recommendation. The Department for Transport (DfT) and the CAA will review the online competency testing element of the DMARES on an ongoing basis to ensure that it is fit for purpose and that it reflects the current rules of the air. In particular, the CAA will be doing this ahead of EU Implementing Regulation 2019/947 becoming applicable on 1 July 2020 to ensure that the DMARES meets the similar requirements contained in the Regulation.

Recommendation 3: The Government should conduct a review of the cost of the registration scheme. If the Government believes it is appropriate for the fee to remain at £16.50, then they should clearly set out their rationale for the cost and the renewal period should be three years rather than yearly. Paragraph 38)

The Government partially agrees with this recommendation. Under the Civil Aviation Act 1982, the CAA is generally required to recover its costs from those it regulates. Since the Committee's report, the CAA has made a decision on the final charge; this followed

the consultation which it carried out from April to June 2019. The CAA decided to reduce the registration fee to £9 in line with the commitment set out in its consultation on the charge, which ultimately illustrates the Government's commitment to keeping the fee as low as possible.

The Government supports the principle of a validity period for longer than a year. However, until the actual volumes of registered users and related financial costs are known, and the requirements of the new EU unmanned aircraft Regulations (which will form part of retained EU law at the end of the transition period) established, the CAA does not think it is prudent to move to a longer validity period. An initial validity period of one year, during which the £9 charge applies, has therefore been chosen.

At present the charge is based on estimated numbers of small unmanned aircraft operators in the UK, and therefore there is a risk that these will prove to be higher or lower than the true volume of operators. The CAA will review the charges against income over the first 12 months with a view to extending the validity period in future years once the volume of operators and exact costs of running the system are known. The fee will be reviewed by the CAA in accordance with its Scheme of Charges practices, including consultation with stakeholders. More information can be found in *Charge Proposal for the UK Drone and Model Aircraft Registration and Education Scheme Consultation - CAA Response Document* (CAP1804), which is available on the CAA's website.

Recommendation 4: We recommend that the Government consider a system which allows organised clubs and societies to register as one entity, so as not to financially burden each member. However, it must be mandatory for every individual user to adhere to the required safety standards. The Government should set out in response to this Report whether this should be demonstrated by the completion of an online test or an obligation on clubs to ensure their members have appropriate safety standards. (Paragraph 41)

The Government partially agrees with this recommendation. There are legal responsibilities involved in being the operator of a small unmanned aircraft (or 'SUA operator' as defined in article 94G of the ANO 2016), and these are summarised on the CAA's website. These responsibilities are likely to make it difficult for an organisation, club or society to register as one entity on behalf of their members.

However, the Government agrees with the principle of reducing the burden for organised clubs and societies. Therefore, DfT and the CAA are pleased to have agreed an exemption from the requirement to undertake the online test for remote pilots flying in accordance with a permission, exemption or operational authorisation that has been issued to a named unmanned aircraft operator by the CAA. A similar exemption also exists for members of certain UK model aircraft associations that already have an established 'competency scheme', or subsequently establish one to the CAA's satisfaction, and who hold an appropriate achievement certificate or award under one of these schemes (such as the British Model Flying Association's 'A' certificate). This decision is in line with the CAA's review of safety and legal requirements and acts as an acknowledgement of the strong safety record the model aircraft community has exhibited over the years.

In addition to the above, the CAA has introduced an exemption from the DMARES requirements for control line model aeroplane flyers, due to the reduced risks associated with this specific activity. The full details of this exemption are available on the CAA's website.

Recommendation 5: Penalties for those who avoid registration should be set out clearly in the forthcoming Drones Bill. We recommend a sliding scale of penalties for failure to register, starting with a warning, and culminating in a fine and a prison sentence. (Paragraph 46)

The Government notes this recommendation, and agrees with the need for effective and proportionate enforcement of legislation regarding the use of unmanned aircraft. However, it is already an offence under the ANO 2016 for an operator of a small unmanned aircraft to cause or permit it to be flown, or for the remote pilot to fly it, if the operator is not registered and the remote pilot has not obtained their acknowledgement of competency.

The requirement for operators of small unmanned aircraft that have a mass of 250g or over is contained in article 94D of the ANO 2016 as inserted in 2018. Since 30 November 2019, when article 94D of the ANO 2016 entered into force, it has been an offence for these operators to cause or permit the aircraft to be flown without a certificate of registration from the CAA. The penalty for those who breach the registration requirement is already contained in article 265 of the ANO 2016 and is a fine not exceeding £1,000.

The ATMUA Bill, that completed Committee Stage in the House of Lords on 12 February, will provide greater police enforcement powers to tackle the unlawful use of unmanned aircraft. With regards to operator registration, the Bill will aid the enforcement of the offence that is already in the ANO 2016 by making it an offence not to produce evidence of registration when asked to do so by a constable. The penalty for this offence is a fine not exceeding £500.

The Bill also provides for some offences to be designated as fixed penalty offences through secondary legislation. Those offences that will be designated are currently under consideration but this provision will enable a constable to issue a fixed penalty notice, at their own discretion, as an alternative and immediate means of enforcement for certain less serious offences. To ensure that a penalty is proportionate to an offence, the Bill provides a list of scenarios where it would not be appropriate for a constable to issue a fixed penalty notice, including where an offence caused, or was intended to cause, harm, harassment, alarm or distress to any person.

The DMARES is part of a package of measures to address the safety and security challenges that unmanned aircraft pose. It will help enforcement agencies to tackle the misuse of such aircraft, alongside further police powers provided for in the Bill.

More severe penalties are attached to more serious offences within the ANO 2016 and other legislation such as the Aviation and Maritime Security Act 1990. For example, endangering the safety of an aircraft is an offence under article 240 of the ANO 2016 and, when tried on indictment, carries a penalty of either an unlimited fine and/or a maximum prison sentence of five years. Section 1(1) of the Aviation and Maritime Security Act 1990 makes it an offence to intentionally use a device to commit an act of violence at an

international airport, which causes or is likely to cause death or serious personal injury and endangers or is likely to endanger the safe operation of aerodrome or safety of persons at the aerodrome. The offence carries a maximum penalty of life imprisonment.

Recommendation 6: The Government should provide an assessment of how the growing drone industry might contribute to the UK's economy by the time of the 2020 Spring Statement. This should focus on the regulatory requirements and the technological advancements required for innovations, such as parcel delivery and human transportation. Further, it should investigate the potential environmental impact of these innovations and in particular the potential for commercial drone use to contribute to decarbonisation of the economy. It should then set out a strategy and a timeframe required for any actions it wishes to take and should publish its findings no later than Autumn 2020. (Paragraph 63)

The Government notes this recommendation and agrees that unmanned aircraft technology is expected to bring significant benefits to the UK's economy in the coming years. The Government has published information on the size of the unmanned aircraft market, including an impact assessment published in January to support the ATMUA Bill.

Through Innovate UK's Future Flight Challenge (including £125 million of investment) the Government is supporting research and development into the systems required to safely operate new aviation services such as autonomous aircraft alongside existing manned aircraft. In addition, through the Regulators' Pioneer Fund, Government has supported the establishment of the CAA's Innovation Hub which is facilitating innovative aviation companies' work with the regulator. Companies seeking to set up drone delivery services in the UK are participating in the Innovation Hub's Sandbox project.

In addition, in relation to the point about the environmental impact, the Government has announced its intention to publish a Transport De-Carbonisation Plan in 2020 to achieve net zero emissions across every single mode of transport.

Recommendation 7: The Civil Aviation Authority should make it possible for organisations which are used in emergency missions to apply for emergency service exemptions to the Air Navigation Order 2016. (Paragraph 70)

The Government notes this recommendation. The CAA recognises the value of unmanned aircraft being used during emergency missions and issued a general exemption specifically for the emergency services in 2017 (ORS4 1233). Paragraph 67 of the report states that the CAA has certain requisites for this to be used. These requisites are only applicable when the emergency service is making use of the emergency service exemption. At all other times, the usual regulations apply. Many emergency services also hold permissions to operate in congested areas, which they make use of as well.

The emergency service exemption has been carefully crafted to ensure appropriate use, based on a safety case and a number of operational mitigations. These mitigations include the 'status' of the remote pilot as being required to be a uniformed (and hence appropriately disciplined and skilled) member of the emergency services. The purpose of this exemption is to exempt the emergency services from some, not all, of the regulations for short term reactive situations aimed at preventing the immediate risk to human life, or in a major incident. It should also be noted that, although the Committee's report implies that this is a recent development, the CAA issued this exemption in July 2017.

Organisations acting on behalf of the emergency services are already able to apply to the CAA for their own exemption similar to the privileges for the emergency services exemption. This can be done using the tried and tested Operational Safety Case route, which would then be assessed for suitability by the CAA. The comparison to make is where emergency service vehicles may claim an exemption from speed limits under the Road Traffic Regulation Act 1984 when responding to an emergency. Vehicles not being used in an emergency, and therefore not hindered by observing the speed limit, may not rely on this exemption, even if acting in support of such organisations.

Recommendation 8: The Government should complete a substantive risk assessment of the risks drones pose to manned commercial aircraft and publish the findings of this assessment by the end of 2020. If it is not possible to publish the result of this assessment due to security concerns, the Government must provide this Committee with evidential assurances that this work has been done. (Paragraph 79)

The Government partially agrees with this recommendation. The Government conducts regular risk assessments into the threat scenarios involving unmanned aircraft. This is a cross-Government process. However, it would be inappropriate to share these assessments due to their sensitive nature.

Recommendation 9: The Government should introduce temporary drone flight restriction zones around helicopter landing zones. The Government should publish findings from a review on this and legislate accordingly within the next twelve months. (Paragraph 83)

The Government disagrees with this recommendation although it understands this risk and agrees with the summary of the report in relation to the risk severity. FRZs are established around all protected aerodromes, which includes some heliports and airports with helicopter landing sites. Article 94A(6)(d) of the ANO 2016 allows for designation of further protected aerodromes, which may include helipads, meaning that an FRZ would apply. Helipads would need to approach the CAA in the first instance to discuss the safety case for designation.

Clearly, the nature of a helicopter is such that it can land and take off from a variety of places which are not designated as protected aerodromes, and are therefore not afforded such protection by an FRZ. Such areas are often temporary in nature, and may only be selected by the pilot at extremely short notice, as is often the case for helicopter emergency medical services operations, which may set down almost anywhere. Clearly, introducing airspace restrictions (temporary or otherwise) for such areas is not practical or feasible; in order to do so, an almost instant restriction would need to be put in place. Temporary restricted areas may be implemented at short notice and promulgated by a notice to airmen but these are by no means instant.

The Government's view is that legislating to enforce this protection, including defining 'helicopter landing zones', is not practical. Introducing airspace around every area that is, or could be, a 'helicopter landing zone' is simply not practical or proportionate. There are many such areas around the UK, many of which are private. On private land, the landholder or the operator of the helicopter are eligible to ask the CAA for a restricted area if they deem a risk exists to their operations.

However, the overall requirements of the visual line of sight operating principle already adequately covers this because there is already a requirement to 'see and avoid' other aircraft for the purpose of avoiding collisions; this should be more than sufficient for managing short notice helicopter landings or departures at non-aviation sites. It is also important to note that the Government keeps all policy under review to ensure that it remains fit for purpose and high safety standards are maintained.

In addition to this, the EU Implementing Regulation 2019/947, on the rules and procedures for the operation of unmanned aircraft, will lead in future to the creation of unmanned aircraft geographical zones, where unmanned aircraft operations will be either facilitated, restricted or prohibited as appropriate according to safety, security, privacy or environmental concerns. Information about these zones, including their period of validity, will be publicly available. Implementing Regulation 2019/947 will form part of retained EU law at the end of the transition period, and the Government will work closely with the CAA to determine the best approach for creating these geographical zones. Our objective in the longer term is airspace in which manned and unmanned aircraft can routinely interoperate, and Government is supporting work, including the Connected Places Catapult's Open Access unified traffic management (UTM) project, to develop a framework for UTM in the UK.

Recommendation 10: The Government should consider rolling out geo-fencing as a compulsory measure around prisons and high security areas. (Paragraph 88)

The Government notes this recommendation and is considering whether geo-fencing should be rolled out as a compulsory measure around prisons and other high security sites. Unmanned aircraft are used to deliver contraband, including drugs, into prisons. Geo-fencing is being considered as part of the suite of options that are required to counter the threat posed by unmanned aircraft. This might, for example, allow prison security teams and policing to distinguish more easily between accidental and criminal use of unmanned aircraft, and take the appropriate steps.

Government will continue to work with manufacturers to ensure that safety and security measures are built into future designs of unmanned aircraft. EU Delegated Regulation 2019/945 sets out the product standards for unmanned aircraft, which manufacturers must comply with by 1 July 2022. With the exception of unmanned aircraft in class C4 (those not capable of automatic control modes), Delegated Regulation 2019/945 mandates that all unmanned aircraft with a mass greater than 250g must be equipped with a geo-awareness function. For clarity, geo-awareness detects a potential or actual breach of airspace limitations and alerts the remote pilot so that they can take effective immediate action to prevent or correct that breach. Geo-fencing physically prevents the unmanned aircraft from entering certain airspace.

To empower policing to respond to unlawful use of unmanned aircraft, the Government has included prison-related offences in the list of relevant offences for which someone can be stopped and searched under the powers of the ATMUA Bill. They are also included in the list for which interference with property and wireless telegraphy can be authorised by police and prisons as a result of provisions in this Bill.

Government keeps security measures around prisons and other high security areas under ongoing review to ensure that new and emerging threats can be tackled effectively and proportionately.

Recommendation 11: The Government should introduce the Drones Bill by November 2019. Once the Bill has been passed and come into force, the Government must keep under review the success of the legislation in enabling the police to better tackle criminal and negligent behaviour. 12 months after enactment, the Government should publish an analysis of the success of the legislation, ensuring that it asks law enforcement agencies directly if they feel that the increase in their powers has helped them to better tackle criminal drone use. The Government must then respond accordingly to any issues that are raised. (Paragraph 94)

The Government partially agrees with this recommendation. The ATMUA Bill was initially introduced into the House of Lords in October 2019 but then fell when the General Election was called shortly afterwards. The Bill was reintroduced into the House of Lords on 9 January and completed Committee Stage on 12 February. As the *Introduction of police powers and stop and search for unmanned aircraft misuse* impact assessment states, this policy will be reviewed on an ongoing basis to ensure that it is fit for purpose, is keeping pace with the advancements in unmanned aircraft technology and is being effectively implemented by the police to achieve the policy objectives.

Recommendation 12: We recommend the Government make the weaponisation of a drone a specific criminal offence within the upcoming Drones Bill and consider stringent penalties for those who take such action, such as those introduced in the USA. (Paragraph 95)

The Government notes this recommendation but at present considers current legislation to be sufficient. There are already stringent penalties for the misuse of unmanned aircraft and the new powers proposed under the ATMUA Bill will enable enforcement agencies to tackle the misuse of unmanned effectively. In addition, there is already extensive legislation in place that can be utilised to tackle the use of an unmanned aircraft as a weapon or weapons system. For example, the Firearms Act 1968 tackles the possession, purchase and acquisition of prohibited weapons, including firearms disguised as another object. Nevertheless, the Government will continue to review risks relating to unmanned aircraft and will ensure that legislation is fit for purpose.

Recommendation 13: We recommend that the Ministry of Defence make malicious drone use a top intelligence priority. (Paragraph 96)

The Government notes this recommendation. It already works across the national security and intelligence community to ensure we have a full understanding of the threat posed by the misuse of unmanned aircraft. Partners in this work include MoD, the National Police Chiefs' Council and the Joint Terrorist Analysis Centre.

Recommendation 14: The upcoming Drones Bill should clarify the legislation in relation to the privacy risks posed by drones for i) commercial users; and ii) recreational users. Furthermore, the Government should ensure that the Drones Bill makes clear that it is a criminal offence for both a private drone user and a commercial operator to

capture an individual's data without their consent, and what the penalties are for such action. This information should then be made available to both drone operators and the general public via the Drone Code. (Paragraph 103)

The Government recognises the Committee's concerns and takes seriously the need to protect people from invasions of privacy, where it is proportionate to do so. However, the Government disagrees with this recommendation as it considers it to be disproportionate given the protections available in the UK's current legal framework.

Specific unmanned aircraft legislation already exists to protect people's privacy. Article 95 of the ANO 2016 already sets out parameters for the use of small unmanned surveillance aircraft and this is also covered in the Drone Code. A small unmanned surveillance aircraft is defined in the ANO 2016 as an unmanned aircraft with a mass of up to and including 20kg which is equipped to undertake any form of surveillance or data acquisition. Unless a permission has been issued by the CAA, a small unmanned surveillance aircraft must not be flown:

a) over or within 150 metres of any congested area;

b) over or within 150 metres of an organised open-air assembly of more than 1,000 persons;

c) within 50 metres of any vessel, vehicle or structure which is not under the control of the operator or the remote pilot of the aircraft; or

d) within 50 metres of any person (or 30 metres during take-off and landing), who is not the remote pilot or under the control of the remote pilot.

This article applies to any commercial or leisure unmanned aircraft that fall within this definition. Larger unmanned aircraft (i.e. those with a mass greater than 20kg), are subject to the whole of the ANO 2016 and a specific authorisation must be sought from the CAA.

In addition, there will be circumstances where the use of an unmanned aircraft to capture personal data could constitute trespass or, depending on the use made of the data, lead to a breach of confidence, giving rise to civil law remedies.

Capturing an individual's image with an unmanned aircraft (where done for professional or commercial purposes) is also regulated by the General Data Protection Regulation and the Data Protection Act 2018. Whilst a breach of these laws is not generally a criminal offence, the Information Commissioner can impose significant financial penalties for non-compliance. Where individuals are using these devices for domestic purposes, the Information Commissioner states that it will be good practice for domestic users to be aware of the potential privacy intrusion which use of this technology can cause. This will ensure that they are using the technology in a responsible manner. It is, however, a criminal offence under section 170 of the Data Protection Act 2018 to knowingly or recklessly obtain personal data without the consent of the controller; this might apply if, for example, an unmanned aircraft with a camera were used to photograph documents containing personal data.

In addition to this, other criminal legislation already exists to protect privacy. For example, voyeurism or recording a private act for sexual gratification is a criminal offence under

the Sexual Offences Act 2003, section 67. Taking photos could also constitute stalking (watching or spying on a person in a manner amounting to harassment (Protection from Harassment Act 1997, sections 1, 2, and 2A)).

Whilst the Government remains open to considering any gaps identified in the law, it currently considers that the range of existing legal provisions and remedies strikes a proportionate balance between the need to protect privacy and the rights of unmanned aircraft users.

Recommendation 15: The Government should mandate that a copy of the Drone Code is provided with each drone sold in the UK. The Drone Code should also be publicised in common drone flying areas. This should be rolled out as quickly as possible and implemented in full no later than the end of April 2020. (Paragraph 114)

The Government agrees that it is vital to ensure that small unmanned aircraft operators and remote pilots have good quality access to operational rules, but does not agree that the Committee's recommended approach is the best way to achieve this goal. Article 94D of the ANO 2016 came into force on 30 November 2019 and requires that operators of small unmanned aircraft with a mass of 250g or more register with the CAA before allowing the aircraft to be flown. Article 94F of the ANO 2016 provides that remote pilots of small unmanned aircraft must not fly the small unmanned aircraft without an acknowledgement of competency from the CAA.

As a result of complying with this legal requirement and engaging with the DMARES, operators and remote pilots will be well-versed in the Drone Code before they fly their unmanned aircraft, thereby ensuring that they have the knowledge and understanding to fly safely and legally at all times. Indeed, as of February 2020, there have been over 81,000 registrations through the new Service. This is more than predicted at the time the Service was launched and demonstrates a good level of awareness and engagement from the public. DfT and the CAA also actively encourage unmanned aircraft retailers to ensure their customers are aware of the law and DfT continues to explore ways to deliver this information at point of sale.

There are also two European Union Aviation Safety Agency (EASA) regulations on mandatory standards for unmanned aircraft – Implementing Regulation 2019/947 on unmanned aircraft operations, and Delegated Regulation 2019/945 on product and manufacturing standards – which will both form part of retained EU law at the end of the transition period. Delegated Regulation 2019/945 mandates specific product standards for different classifications of unmanned aircraft, and provides that manufacturers must ensure that any product they place on the market is accompanied by a user's manual setting out all the characteristics of the product (including clear operational instructions and a description of all the risks associated with unmanned aircraft operations), and an information notice setting out all applicable limitations and obligations under law. Manufacturers will have until July 2022 to comply with the requirements of Delegated Regulation 2019/945.

Additionally, the UK's current DMARES will be adapted over the course of 2020 to meet similar requirements in Implementing Regulation 2019/947. Again, unmanned aircraft

operators and remote pilots who meet these mandatory requirements will be well-versed in the operational rules for unmanned aircraft, and will therefore be able to fly safely and legally at all times.

Recommendation 16: The Civil Aviation Authority needs to monitor the effectiveness and adequacy of NQEs annually and report areas of concern to the Secretary of State. If NQEs do not meet the required standard there must be a mechanism for terminating their right to operate. (Paragraph 117)

The CAA notes this recommendation and agrees with the need to monitor National Qualified Entities (NQEs) to ensure that they meet the required standards. The requirements set out in this recommendation are already in place and were implemented well before this report was produced. NQEs must renew their approval to operate on an annual basis. The initial application and the renewal both involve an extensive auditing process. The process involves an on-site visit for the initial approval and every three years thereafter. More on-site audits are conducted as necessary, in line with performance-based regulation principles.

In addition, intelligence is continuously gathered on NQEs through a variety of mechanisms, which feeds into the oversight regime and drives auditing priorities. Where an NQE is found to no longer meet the necessary standard, their approval can be suspended or revoked. Full details of this process are published in Chapter Four of *Unmanned Aircraft System Operations in UK Airspace – The UK Recognised Assessment Entity* (CAP722B) which can be found on the CAA's website.

Recommendation 17: The CAA should introduce periodic re-assessment of commercial drone users and a compulsory renewal of their licence to ensure that they are up-to-date with technology advances and legislative changes. (Paragraph 118)

The CAA notes this recommendation and agrees with the need to reassess those who use unmanned aircraft in a commercial capacity. Permissions and exemptions issued by the CAA to unmanned aircraft operators are already renewed annually and this renewal process involves an appropriate reassessment of the operator.

Recommendation 18: The Government should ensure all drones, including existing drones, are electronically conspicuous within two years. (Paragraph 124)

The Government partially agrees with this recommendation as it recognises the benefits that all aircraft being able to detect other aircraft and ground obstacles electronically would bring.

It is important to consider the proportionality of a mandate for electronic conspicuity being retrofitted to existing unmanned aircraft. Depending on the technology available, retrofitting such a system to every unmanned aircraft that has already been made over the next two years may not be achievable. Technology currently exists for electronic conspicuity but not for use on such a large scale. Given that this technology has not yet been developed, the CAA and DfT are working closely to determine the timescales within which this can be realistically achieved.

Although product standards introduced by EU Delegated Regulation 2019/945 mandate remote identification for unmanned aircraft with a mass of 250g or greater (with the

exception of unmanned aircraft in class C4, which are not capable of automatic control modes), this does not mandate electronic conspicuity. Remote identification is a short-range identification capability, for security and law enforcement purposes, whilst electronic conspicuity is a wider air traffic management network capability for the purposes of separation and trajectory deconfliction.

Recommendation 19: The Government must ensure that all manufacturers include safety features, such as geo-fencing and electronic conspicuity as standard in their drones. Further, it should be a criminal offence to disable such features. Penalties for doing so should be set out clearly in the forthcoming Drones Bill. (Paragraph 131)

The Government partially agrees with this recommendation. EU Delegated Regulation 2019/945 on unmanned aircraft product and manufacturing standards includes requirements for geo-awareness and direct remote identification for certain classifications of unmanned aircraft. This Regulation will form part of retained EU law at the end of the transition period, and manufacturers will have until July 2022 to comply with these standards.

Product standards (geo-fencing and electronic conspicuity) are not included in the ATMUA Bill because these can be legislated for using secondary legislation. It therefore follows that if the Government decides to introduce penalties for operators or remote pilots who do not comply with these features, they could also be legislated for in secondary legislation. The ATMUA Bill also contains powers at Schedule 11 to allow for the creation of criminal offences and civil penalties in relation to breaches of the requirements of the relevant EU Regulations on unmanned aircraft, including Delegated Regulation 2019/945, and to allow the police powers in the Bill to be extended to these new offences and penalties where appropriate.

Recommendation 20: The Government should also ensure that all existing drones are retrofitted with electronic conspicuity within the next two years. (Paragraph 132)

The Government's response to this recommendation is covered in the response to recommendation 18 above.

Recommendation 21: The Government should continue to pursue its ambition to stay in the European Aviation Safety Agency after Brexit. Further, the Government should seek to secure international agreement on international mandatory standards for drones. (Paragraph 136)

The Government is clear that our future relationship with the EU must not entail application of EU law in the UK. Participation in the EASA system is incompatible with this stance. We propose agreeing a Bilateral Aviation Safety Agreement with the EU to minimise regulatory burdens for industry.

The CAA currently regulates aviation safety in the UK and will continue to do so after the transition period by taking on some EASA responsibilities. UK aviation has an excellent safety record and this will continue to be a priority now that the UK has left the EU. Aviation and aerospace are critical industries to both the UK and the EU and we have a common interest in ensuring that they can continue to thrive.

The Government recognises the importance of mandatory standards in ensuring the safe and secure use of unmanned aircraft. As a result, the UK has played a key role over the past few years in developing the two EASA regulations on mandatory standards for unmanned aircraft – Implementing Regulation 2019/947 on operational standards, and Delegated Regulation 2019/945 on product and manufacturing standards. These Regulations will form part of retained EU law at the end of the transition period, and the Government is currently working on secondary legislation to correct deficiencies in the Regulations so that they operate effectively in domestic law now that the UK is no longer an EU Member State, and is also providing powers for the enforcement of their requirements through the ATMUA Bill. Additionally, the Government continues to liaise closely with international aviation safety agencies on standards for unmanned aircraft, and remains keen to learn from best practice and new developments both in the EU and beyond. The UK is working with ICAO on unmanned aircraft systems traffic management, model unmanned aircraft regulations for ICAO states to implement, and guidance for humanitarian and unmanned aircraft authorisation organisations to use. The UK has also worked with ICAO to develop an unmanned aircraft toolkit that is available online to help encourage the safe use of unmanned aircraft.

Recommendation 22: The Government must establish and fund further testing facilities in which Unmanned Traffic Management (UTM) systems and related technologies, including beyond visual line of sight operations, can be tested. Clear plans should be set out for this as soon as possible and further testing should begin no later than Summer 2020. (Paragraph 142)

The Government agrees with this recommendation and recognises the opportunities presented by the growing unmanned aircraft industry to the UK. Allowing unmanned aircraft to routinely fly beyond visual line of sight (BVLOS), including in non-segregated airspace, can help to unlock the full scale of potential benefits offered by unmanned aircraft, but it is important that such operations are conducted safely.

As set out in recent guidance published by the CAA Innovation Hub (*Beyond Visual Line of Sight in Non-Segregated Airspace*, 21 November 2019 (CAP1861)), to ensure the safety of BVLOS flights the deployment of a combination of technology solutions will be required to provide detect and avoid capability that would otherwise be provided by the remote pilot or observer. The guidance can be found on the CAA's website.

It is worth flagging that DfT has chosen to use the term 'unified' rather than 'unmanned' traffic management. Whilst the two terms are often used interchangeably, Government's position is that manned and unmanned aircraft should be able to operate alongside each other when the necessary systems are in place to allow this to happen safely and securely. UTM is one possible technical solution, with the exact combination of technology solutions likely to depend on the level of risk of the operation.

Testing and trialling of novel unmanned aircraft operations, including BVLOS flights and the supporting technology, is already being carried out in the UK. The CAA Innovation Hub, established in May last year, is supporting this activity through its Sandbox, allowing innovators to trial their solutions in a safe environment and in collaboration with the regulator. The Hub launched a BVLOS Sandbox call last August which set out the regulatory questions covering operational and technical challenges that need to be answered before routine non-segregated BVLOS is possible. Current participants of the Innovation Hub

Sandbox include the National BVLOS Experimentation Corridor Consortium, Altitude Angel, sees.ai and Amazon. Government is also supporting the Connected Places Catapult Pathfinder programme, which focuses on identifying and overcoming the technical, operational, and commercial barriers to rapidly driving progress in unmanned aircraft technology and regulation in the UK.

Recognising the need for a co-ordinated approach across the community of stakeholders developing UTM solutions in the UK, and aligned with the Government's support for Open Access principles, DfT is also sponsoring an Open Access UTM research programme. Led by the Connected Places Catapult, the programme is bringing together industry and Government to develop a possible framework for a UK UTM solution through a consensus-based approach. Building on the publication of their first report in September 2019, the programme will conclude in spring this year and outputs, including a roadmap to UTM, will be shared with the wider community and used to inform future trials and testing of BVLOS operations in the UK.

DfT's UTM Policy Group will consider the outputs of the Open Access programme in detail. This will be used to inform and develop future strategy, including the CAA Innovation Hub's high-level plan for UTM. The plan is aligned with relevant events and milestones, such as the European U-Space Regulation, and over the first half of 2020 includes industry workshops, a study analysing how UTM could be regulated in the UK including possible economic models, and the introduction of a UTM Regulatory Sandbox, offering innovators the chance to trial UTM services in collaboration with the CAA, with the aim to generate sufficient evidence for initial deployment and growth of these services.

Whilst testing and trialling is already taking place, the Government recognises the need to continue to support and scale up this activity in order to maintain the UK's competitive advantage in a growing market. It is also recognised that there is a need for a significant volume of evidence to progress the community along the path to routine approvals for BVLOS flight.

The Industrial Strategy Future Flight Challenge provides a key opportunity to scale up current levels of testing and accelerate progress along the regulatory pathway to BVLOS flights. Supported by up to £125 million of Government funding, Future Flight will bring together consortia from across the UK to mature current BVLOS capability and associated technologies such as UTM, as defined through the Challenge problem statements. Successful applicants to phase one of the Challenge attended a two-day discovery workshop in February and phase two of the Challenge will open for applications from consortia to apply for funding ahead of summer 2020.

Recommendation 23: The Government should seek to publish its counter-Unmanned Aerial Vehicle (UAVs) strategy by Spring 2020 and this should include clarifications on whether the Government intends to amend legislation to enable certain organisations such as the police to use jamming technologies. (Paragraph 149)

The Government partially agrees with this recommendation. It published its Counter-Unmanned Aircraft Strategy on 21 October 2019. This includes a commitment to the continued development of proposals for inclusion in future legislation, so that the legal framework remains meaningful and enables operational responders to deal with the threat from unmanned aircraft effectively.

The ATMUA Bill will amend the Police Act 1997 to enable interference with property or wireless telegraphy in order to prevent or detect specific offences involving the unlawful use of unmanned aircraft. The Government will continue to assess the effectiveness of this and any other new legislation.

Recommendation 24: The Government should produce a White Paper by Summer 2020 that outlines the vision for how drones will be integrated into UK communities over the coming years. At a minimum, the White Paper should cover the role of registration, regulation, maximising the opportunities, minimising the risks, drone safety education and the technology required in order to implement their vision of drone integration into society in the next 20 years. The document should also set out a clear roadmap that outlines the steps that the Government and other agencies will take to achieve this future vision. (Paragraph 156)

The Government disagrees with this recommendation. The Government does not consider it necessary to produce a White Paper on the future integration of unmanned aircraft into UK communities, as the integration of unmanned aircraft into our airspace is progressing alongside the Air Traffic Modernisation programme and the Future of Mobility Grand Challenge. The Government is seeking to align the development of unmanned aircraft use with wider changes to airspace, and the transport system as a whole, through the Future of Mobility Grand Challenge. DfT engages regularly with the unmanned aircraft sector on these issues, through the Drones Industry Action Group (mentioned in more detail below) and quarterly Drone Pathfinder Community Days.

The Government also continues to work closely with the CAA Innovation Hub to explore and find solutions to the technological challenges associated with exploiting the full potential of unmanned aircraft in the future.

The Government's approach to minimising the potential risks associated with unmanned aircraft operations is set out in its Counter-Unmanned Aircraft Strategy and is currently in the process of being implemented. Additionally, this Strategy addresses the roles of registration and regulation, which have also already been comprehensively set out in the Government's public consultation, *Taking flight: the future of drones in the UK*, conducted over the course of 2018, which can be found on the gov.uk website.

Furthermore, the UK's unmanned aircraft regulations are due to undergo a period of change after 2020 as the Government implements the operational and manufacturing requirements of the two new EU Regulations on unmanned aircraft which will form part of retained EU law at the end of the transition period. It will be necessary to take into account the impact of these new Regulations on the industry and user community (both commercial and hobbyists) as the Government develops its approach to successfully integrating unmanned aircraft into UK communities.

Recommendation 25: The Government should open a dialogue with UK universities working on drones to discuss how they might best be classified and funded to ensure that the requirement to register as commercial operators does not hamper innovation and development of the industry. A comprehensive and clear regime should be established to facilitate academic development work no later than Summer 2020. (Paragraph 159)

Recommendation 26: The Government should set out how it intends to provide support and funding to current testbeds at universities and whether there is an appetite to create more testbeds. It should announce its plans and funding expectations by the end of 2019. (Paragraph 161)

The Government notes recommendations 25 and 26 and will respond to them together. It recognises the role played by universities in developing innovative technology such as unmanned aircraft. In 2016 the Secretary of State for Business, Energy and Industrial Strategy invited Professor Iain Gray (of Cranfield University) to convene a Drones Industry Action Group, through which Government, the CAA, industry and research organisations discuss the commercial application of drone technologies.

The Government agrees that future regulations need to be clear with respect to classifying unmanned aircraft and their approach to commercial operators. Government is ensuring this clarity is in place by implementing the requirements of the two new EU Regulations on unmanned aircraft which will form part of retained EU law at the end of the transition period.

As opposed to categorising unmanned aircraft operations as either commercial or non-commercial, Implementing Regulation 2019/947 divides operations into three categories (open, specific, and certified) based on risk, and therefore removes the requirement for commercial operators to seek a Permission for Commercial Operators from the CAA in order to perform their operations. Delegated Regulation 2019/945 then sets out a comprehensive system of classifications for unmanned aircraft based on the requirements for these new risk-based categories, and the mandatory product and manufacturing standards for each classification.

Furthermore, the Regulations will introduce standard scenarios for unmanned aircraft operations in the medium-risk specific category, which will enable operators to undertake a streamlined process for achieving the necessary authorisations from the CAA for operations performed in densely populated areas or BVLOS in sparsely populated areas with visual observers, using a certain class of unmanned aircraft. Additionally, commercial operators may also benefit from the introduction via Implementing Regulation 2019/947 of the light unmanned aircraft system operator certificate, which will enable the CAA to grant certain privileges to unmanned aircraft operators (including the possibility of self-authorising operations) where such operators meet stringent safety management requirements.

UK universities working within the unmanned aircraft innovation space are encouraged to engage with the CAA Innovation Hub at an early stage as the services provided are designed to enable all innovators, including those from academia. The Hub can assist universities in understanding existing regulatory frameworks, and in turn prepare the CAA to develop a better understanding of innovations and how existing regulations may need to evolve.

There are a range of funding opportunities open to the academic sector. For example, the Connected Places Catapult Pathfinder programme provides a useful forum for socialising potential funding and projects specifically within the BVLOS space. The Future Flight Challenge is also open to UK universities, and eligibility to apply for funding within phase two of the competition will not be limited to only those who applied in the first round.

Recommendation 27: The Government should act to improve public perception and awareness of drones by launching a public awareness campaign, no later than Summer 2020, that highlights the opportunities presented by drones and informs the public on the reality of the risks posed by drones. This issue should also be addressed in the White Paper that we have called for in this Report. (Paragraph 164)

The Government partially agrees with this recommendation. Improving public awareness of unmanned aircraft is an important step in ensuring their safe and successful integration into communities, but the Government does not consider a standalone public awareness campaign to be the most effective way of achieving this goal. The DMARES aims to improve the public's understanding of the requirements for safely operating unmanned aircraft (as well as facilitating registration and competency testing), and was widely reported in the media. The Government will also be working closely with the CAA in the coming months to ensure that the public is aware of the requirements for manufacturing and operating unmanned aircraft under the new EU Regulations, which will form part of retained EU law at the end of the transition period. Additionally, the Government recognises the need to improve the public's awareness of the potential risks presented by unmanned aircraft, and the Counter-Unmanned Aircraft Strategy sets out the Government's commitment to achieving this goal.

In terms of improving the public perception of unmanned aircraft usage, the Government considers that providing a robust regulatory framework is among the most effective ways of ensuring that the public feels confident that unmanned aircraft can be operated safely and securely. Hence, in addition to existing legislation, the Government has introduced the ATMUA Bill to provide police with the powers they need to enforce existing legal requirements for the safe and secure operation of unmanned aircraft.

Moreover, the Government also engages with a range of initiatives which enable the societal benefits of unmanned aircraft to be properly explored. For example, the CAA's Regulatory Sandbox provides a capability for users to work with the CAA to test and trial innovative solutions in a safe environment. Such trials often highlight positive use cases of unmanned aircraft, such as Amazon's Prime Air project (a planned delivery system designed to safely and quickly get packages to customers using drones). Furthermore, Nesta's July 2018 report, Flying High: Shaping the Future of Drone Technology in UK Cities, also highlighted key case studies which explore the benefits of unmanned aircraft, such as their ability to move urgent medical supplies quickly between London hospitals, with the key benefits of saving time and money, and reducing congestion. The report can be found on the Nesta website.