COMMENT RESPONSE DOCUMENT

To

Letter of Consultation (dated 15 May 2008):

A PROPOSAL TO AMEND THE AIR NAVIGATION ORDER TO BRING UNMANNED AIRCRAFT OF 7 KG MASS OR LESS WITHIN THE SCOPE OF REGULATORY OVERSIGHT

The following table contains the comments received from respondents to the Consultation. The CAA has considered these replies and provided responses. As a result of this consultation, and as indicated by the responses, the CAA will now review the original proposal and make any necessary adjustments before proceeding to the next stage of the regulatory process.

30 January 2009

Comment and Response list

Comments listed below are as provided except that some may have been modified to remove personal and/or commercially sensitive information.

Ref: Date:	Commenter:	Comment:	CAA Response:
1 21/05/2008	Gary Page Anglecam	In summary, he was very positive about the proposals. He said that he spent a great deal of money and time creating an aircraft that was safe and reliable and operating procedures that ensured the safety of those nearby and it worries him greatly when he sees the activities of some of the less conscientious individuals. He said he would welcome an audit from a CAA inspector and would support the suggestion that anyone wishing to carry out this kind of activity should be subject to an audit in the same way.	**Noted** Inspection of Unmanned Aerial System (UAS) operators will be carried out by the CAA Flight Operations Inspectorate Department when deemed necessary.
2 23/05/2008	William Hall	I am current UK PPL/IR holder, engineer and ex aero-modeller. In my opinion there should be a minimum weight below which the CAA should not be specifically involved. There is no reason why the authority would need to be consulted on vehicles weighing a few hundred grams moving at low speeds and low altitudes. What about objects weighing less than a gram? As far as I am aware these are not around much yet but soon will be. They may not be terribly desirable but do they fall within CAA's remit? If I put a camera on my toy hot air balloon do I need to ask the CAA? It is possible to buy toy rockets that have a camera.	**Noted** The CAA believes that it is inappropriate to introduce a minimum weight category because even very small aircraft can pose a significant risk, especially if they collide with another aircraft. In recognition of the lower level of risk posed by smaller, lighter aircraft, the CAA intends to proportionally reduce the requirements according to the characteristics of the aircraft and the kind of activity it is carrying out. The regulations will be designed to not interfere with genuine recreational flying activities.
3 23/05/2008	Alastair Fox MW Power Systems Ltd.	We have taken part in a great number of discussions with: The Germany manufacturers – Microdrones GmbH; and Helicopter and Fixed-wing 'competitors' along with our existing and potential customers for our microUAV. All have admitted to a lack of knowledge of the existing 'permission to fly' system operated by the CAA. Please provide as much detail of the system you process that is adopted at present ref 'permission to fly'. My interest is also how each application will be administered and relative to the type of equipment and endangerment created with the use thereof, for instance:	**Partially accepted** The existing arrangements for aircraft with a Maximum Take-Off Mass (MTOM) of more than 7 kg are contained within **CAP 722**. The CAA accepts the comment that minimising overflight of people and property reduces the risks involved in the operation. This factor, along with the general characteristics of the aircraft (weight, fuel type etc.) and the type of operation, will be taken in to account when considering an application for permission.

Ref: Date:	Commenter:	Comment:	CAA Response:
		Wing configuration – fixed, helicopter, quad-copter Fuel type – battery, petroleum-base, fuel-cell Control mechanism – RC, Semi-Autonomous, Fully-Autonomous Failure mode – affects of loss of signal, power, etc We feel that by minimizing the 'overflight' of people, roads and buildings, the Microdrone quadcopter is one of the safest UAV derivatives available. As more users take-up the product, our flight records indicate are target users ie Emergency services and (potentially) Professional photographers, take risk assessment most seriously, hence their public liability insurance cover (the premium is currently low – reflecting the 'perceived risk'), and combination of scheduled diagnostics and record keeping.	The CAA will amend the proposed regulations to introduce relaxations for flight away from people or property.
4 23/05/2008	Tom Hardie	As you know from our discussions I am fully aware of the issues that are needing to be addressed and support the consultation paper up to the point of the proposed wording for ANO Article 98 paragraph 5. As currently written I would need a CAA permission (at an estimated cost of GBP200 per year) in order to fly an aircraft, for pleasure only, that could cost as little as GBP350.00 new. This is hardly proportionate. As a solution I offer the following suggested wording for ANO Article 98 paragraph 5 as I believe that it could satisfy all the requirements: The person in charge of a small aircraft shall not fly such an aircraft: (a) when the aircraft is equipped to undertake any form of surveillance or data acquisition and the use of the data renders the flight aerial work; or (b) for the purposes of aerial work unless the flight is in accordance with a permission issued by the CAA and any conditions thereof.	**Accepted** The proposed change to the regulations would have required that any small aircraft equipped for data acquisition or surveillance will require permission from the CAA or be exempted from the regulations by becoming a member of, and abiding by the guidelines of, a recreational model flying association. The CAA accepts the comment that this approach may be disproportionate for recreational model flyers not affiliated with a flying association who operate away from people and property. Therefore the CAA will amend the proposed regulations to introduce relaxations for flight away from people or property.
5 28/05/2008	**Commenter:** Andre Clot UAVS Association	**Comment:** However from my companies' perspectives I have read the regulatory impact assessment and the proposed amendments to the ANO and can fully support the option that the CAA has chosen as far as it currently has progressed. As regards continued airworthiness and operator competency I believe that a	**Noted** At this stage the CAA has no plans to introduce specific pilot licensing requirements for UAS operators; however, pilot training and competency will be assessed during the permit

Ref: Date:	Commenter:	Comment:	CAA Response:
		significant issue will arise in the very near future as aircraft system sophistication increases. In particular the capability and training on systems is not consistent across operators and the degree of understanding as to the liabilities (damage/injury possible) is, in even large companies, surprisingly very weak. Whilst ParcAberporth as mentioned in your assessment has given insight, it is a very tightly controlled visible environment whereas many of the future operations of other operators may be "out of sight" and "out of mind" until something goes wrong. The "B Certificate" can only be gained in a "recreational environment" and those gaining it are therefore not exposed to the stress and delivery of a commercial operation. The Police and Fire Brigade may have different and better approaches though. However, having witnessed first hand the pressure that can be put on the safety of simple flight operations with relatively little "damage" possibility, I can see that the "one investigation per year" may be optimistic, unless the CAA afford additional guidelines over and above those in CAP722 and enforce some visible form of compliance until competency in trusted operators is assured. Knowing the work that must be undertaken to make even small changes to the ANO, and the fact that there will be a review of the situation before 3 years is up, perhaps the CAA could also consider something along the lines of a Safety Sense Leaflet. In the LASORS these provide down to earth guidance and one on UAS operations linked to CAP 722 in some way, would be essential reading. Since the BMFA Handbook for manual flying is already seen as essential reading for "Manual" operations (i.e. handheld transmitters), the Safety Sense leaflet could impart some view on Ground Control Station operation "use and pitfalls" and Operator competence in the "AOC" sense, especially as regards to the Safety of the crew, others engaged in the operation and the public at large. In this way, at least the CAA is protected from criticism should something ever go wrong by being seen to be "pro-active" in a very practical sense as it has been so far with CAP 722 in a regulatory sense. The insistence on a safety case is essential although the downside is that there is "more than one way to skin a cat" and knowing what is missing is as important as understanding what has been written. So to conclude, the ANO amendment is a good affordable step in the right direction for those who aspire to safe operations. I hope therefore that we can look forward to safe and wider UAS operations in the future with your help	application phase. The CAA understands the limitations of the BMFA 'B Certificate' but recognises it as a suitable basis to add UAS-specific experience. It is also recognised that for certain fully-autonomous systems manual handling skills are not relevant but if the UAS is to inter-operate with other airspace users (i.e. at or close to aerodromes) it is essential that the UAS pilot has relevant theoretical knowledge to enable him to safely interact. The CAA would welcome proposals from industry bodies for the introduction of pilot or operator competency and/or licensing provisions.

Ref: Date:	Commenter:	Comment:	CAA Response:
6 29/05/2008	Steve McDonald	I read on a Forum that the CAA are planning to destroy the HOBBY of Aerial Photography (AP) and I have to say that I am totally disgusted not to mention extremely angry that this is happening. Virtually all of the people doing AP as a hobby, do it responsibly and the aircraft used in most cases are very light and fly no higher than a few hundred feet. Why are you on a mission to stop people enjoying a hobby that is, if anything less dangerous than normal R/C Flying, because the aircraft are smaller and lighter. Sure it makes sense to ensure that anyone doing this on a commercial basis is properly insured and registered but for any regular Joe Soap that flies from a field well away from houses etc there is no need. We are all members of our respective associations who provide us with Public Liability Insurance as long as our flying is not for commercial gain, ie The British Model Flying Association, The Scottish Aeromodellers Association and the Large Model Association. All of which have close contact with the CAA to ensure regulations are adhered to to protect the general public and their property. I ask again why does the AP Hobbyist need further regulation/restriction on top of our respective association's rules and regulations?	Clarification given. **Accepted** The CAA recognises that recreational flights in unpopulated areas expose the public and their property to less risk. Therefore the CAA will amend the proposed regulations to introduce relaxations for flight away from people or property.
7 29/05/2008	Andy Harding Paintbox Studios	I am to express my concern at the above amendment, in this amendment it is assumed all UAV work in the future by UAV's under 7 kg will be flown over areas of public access and only on a commercial bases. I'm afraid this is a poor misconception, for starters there are a GREAT DEAL of users in the UK that enjoy the hobby of RC AP/AV Remote Control Aerial Photography/Aerial Video this activity as you state else where in the document in relation to model flying is also normally also carried out away from areas of built up public access the whole reason for this activity is for "aerial landscape photography" meaning it takes place well away from any city centres in order to capture the natural beauty of a rural landscape. Your proposal would not only hit this activity as a hobby but also you the CAA will find it total unenforceable. For example most AP flyers I know tend to be out and about early or late in the day for several reasons one being less people about (for safety), less traffic and less "human" clutter in the shot the other is down to the basics of photography and the use of lighting. Flights last (even with today's modern lipo batteries a max of 15 mins approx) and then can be packed up and gone from there rural launch site. Also most RC AP/AV operators are experienced flyers after all in many case it's not just the aircraft that is flying but there own investment in the latest Digital Camera, trigger unit's and in some cases video downlinks to get the photographs, which can add up to a substantial investment in money and time. Secondly on a commercial bases what will be the lead times? Lets say I apply for	**Accepted** The CAA accepts the comment that small aircraft flying away from people or property pose less of a risk and therefore the regulations for this kind of activity should be more relaxed. Therefore the CAA will amend the proposed regulations to introduce relaxations for flight away from people or property. As regards the lead times for permissions to operate, it is anticipated that multiple use permissions will be granted provided that the full scope of envisaged operations for any particular UAS is declared to the CAA.

Ref: Date:	Commenter:	Comment:	CAA Response:
		your licence of £200.00 (others in the community are already calling it a Tax) on myself flying UAV's under 7 kg for commercial work, If I get a job in on Monday how long will I have to wait for the CAA to give me the all clear for the job 1 week, 3 weeks 2 months? What do I tell my client's for delivery dates etc, what if you say yes you can fly but then give me a window to fly in and the weather is poor over this period. What then do I have to reapply and wait another month 2 months etc……. I would also like an amendment (which will cut down on the paper work for yourselves, and applications you have to approve) that if the commercial activity is carried out OVER PRIVATE LAND with limited or no public access (E.G there is a footpath 200 meters away but on the private land the UAV if flying over) with a UAV under 7 Kg the flight should be exempt from certification/assessment as the whole reason for your proposed amendment is public safety on the ground But on private land where there is no public access or very limited public access there is no safety issue to deal with. Also I think the CAA grossly under estimate the amount of commercial activity of UAV's under 7kg that is currently going on and will be going on in the future meaning you are A) Not going to cope with the number of application's. B) Loses to commercial operators (due to undelivered or late assessments) that will induce court cases against the CAA for commercial loss. C) Due to a break down and late delivery of assessments no one will bother applying for assessment in the first place and carry on working without CAA approval. To help the CAA out I would like to add some helpful pointers in order to put thing on a more even keel. 1) 1) The use of UAV's under 7 kg for none commercial work stays as it is. To allow hobby users to continue in there past time. 2) 2) Commercial work (for UAV's under 7 kg) over private land remains exempt so long as there is no public access within the flying area within 150 meters. 3) 3) A Zone System for Commercial work where areas are zoned according to risk and a map made available to the general public and flyers a like showing the zones As and Example RED No fly zone, ORANGE covered by CAP722 (covering areas of built up locations), YELLOW CAA application needed, GREEN flying as private land	

Ref: Date:	Commenter:	Comment:	CAA Response:
		(or current legislation).	
8 02/06/2008	Graham Libby Hampshire Fire & Rescue Service	I have received the letter informing me of the proposed changes to the ANO and have read the Impact Assessment and the change at annexe A. I have to agree that some form of control needs to be in place for UAV's that fall into the less than 7kg category. Although our helicopter is under 7kgs we have implemented procedures that apply for over 7kgs to ensure that we make our system as safe as possible. I personally have spoken to many people from other fire/police authorities who are interested in such a system but it is clear from these conversations that they have no idea that these "small aircraft" can lead to a prosecution (article 74, "A person shall not recklessly or negligently cause or permit an aircraft to endanger any person or property") through what they consider or perceive to be "normal use". I feel this is not due to any attempt to deliberately ignore any regulations but more of a case of simply not being made aware of them by the person or company supplying the equipment, so perhaps this might be another area to look at. Any supplier is required by law to inform the customer of any current regulations in force. I don't know how hard this would be to achieve/implement?? As you are probably aware, we have already submitted documents to yourselves (George Duncan) in relation to our observation helicopter and although it took a little time to do, during the research phase, you do learn a lot about all the regulations that become applicable to your system. It would seem to me that if other operators also had to submit guidelines/operating procedures then this can only be a good thing as it will obviously increase their knowledge as well. I am also a club flyer/BMFA member and have been flying helicopters for nearly 7 years now and I am glad to see that there is still a clear distinction between recreational/non-recreational flying and hope that it remains that way. To sum up, yes I am in favour of the proposed changes (option 4) as it will also greatly assist in improving everyone's knowledge about the ANO and help to keep this part of the industry operating in a safe manner.	**Noted** The CAA intends to work with manufacturers and the model flying associations to ensure that end-users of UAS equipment are made aware of the regulations governing their use.
9 03/06/2008	John Cunningham On-Target Software Solutions Ltd.	I have been prompted to respond to the recent announcements of intended CAA regulation over the sub-7Kg category of UAV's. There are now over 80 CARVEC systems operating on these types of vehicles all over the world (mainly in the USA) and I think I have a good 'feel' about the real-world and what people are doing already. I have been monitoring the forums and there has been some speculation over the new rules and it seems to me that a lot of it is based on existing rules rather than any new proposals. I have already had several customers in a slight panic	**Accepted** The CAA does not intend to tamper with existing recreational model flying activities and accepts that alternative methods for ensuring that small aircraft are not brought into the scope for regulation when they are flying recreationally away from people and property are needed.

Ref: Date:	Commenter:	Comment:	CAA Response:
		asking me if I know any further details. I appreciate completely the concern of the CAA around the future use of these types of aircraft by unscrupulous operators such as the press or freelance journalists where 'getting the shot' is all that matters. It concerns me too because if they have a high profile incident then it may even put my own company under investigation if they are using the CARVEC system. I do have several concerns over the proposed new regulation and would like to offer some advice over certain points which the CAA may not be aware of – or maybe even kept unaware by the current operators they have contact with. I'm sure you appreciate that most of these will actively welcome any regulations placed on the sub-7Kg category. I'm sure you agree that any regulations should be based on safety issues and not commercial. The first point I would like to make is that I know there are many amateur hobby RC pilots in the UK who have added a small camera to their aircraft to take aerial pictures of the flying field and area around it. Many of these are 'older' gentlemen who are combining their love of photography and RC flying. It saddens me that even this will become illegal under the proposed regulation. Would it not be possible to include an exclusion for recreational flights on private fields ?. The main point I would like to make is that asking for comments on this proposed amendment is almost meaningless without giving the specific details of what is needed to obtain the 'permission' from the CAA to operate. This is effectively moving the regulation from a written rule into a discretionary rule. Please can you issue the guidelines which the CAA are considering for the permission to be granted so it can be reviewed by interested parties alongside the proposed amendment ?. I think it is essential that this is done before the deadline passes – otherwise how can people make their input ?. I have some points which I feel are very important in arriving at these conditions: 1) It is vital that the conditions make a meaningful distinction between the sub-7Kg and the 7-20Kg category. It is my experience that the professional organisations who demand broadcast quality material ask for a 2Kg or more camera to be carried for at least 20-30 minutes. This in turn means a large petrol or gas turbine machine weighing 10-20Kg total. These have potential to cause serious damage and are quite scary to be near. They also tend to be loaded more heavily with fuel – especially the gas turbines which need a gallon for 15-20 minutes. If the required permissions are the same then people may as well fly the big machine as it can generate them a lot more	Therefore the CAA will amend the proposed regulations to introduce relaxations for flight away from people or property. Requirements for the issue of a permission to operate a UAS of less than 7 kg will be similar to those for UAS of more than 7 kg. It is envisaged that a simplified application process, in proportion with the characteristics of the aircraft and the level of risk involved in the flying activity, will be used. In accordance with CAA policy and Better Regulation guidelines this legislation will be subject to periodic review. Any advancements in technology will be taken in to consideration during the next review.

Ref: Date:	Commenter:	Comment:	CAA Response:
		money. As gas turbines are becoming more and more popular for big cameras (due to lower vibration than petrol machines), it should be an important consideration. 2) I believe the CAA should start on the side of leniency in the sub-7Kg category then tighten up the rules if events occur in the future. At this point in time, it is based on a 'perceived' future problem which may not arise. I agree that the annual registration is a good start because it will give the CAA an idea of the number of operators involved and also have details of their locations. I think that this along with some general written guidelines (specifically NOT flying to endanger people or other aircraft and to fly over a safe area) would be enough for the start. My own system (CARVEC) has many safety features designed into it (such as an automatic return to the take-off point in the event of a communications failure) and is the only system I am aware of which has a specific hazard analysis document written for it. It has been developed along some military aircraft principles. Will there be any provision in the future for special conditions to be available when an aircraft is fitted with some form of proven stabilisation and control system ?. While understanding the concerns of the CAA in this matter, the overall principle that it will become illegal for anybody to fit any camera or recording device to a small aircraft and fly it (even at 10 feet) without the permission of the state seems more at home in old-style Russia than in the UK. I am becoming increasingly worried by the amount of control the government want to exercise in our lives and the burden of regulation on small, innovative businesses like mine are leading me to seriously consider moving the operation elsewhere. Thank you for you time in reading my comments. I would appreciate any information you can give me around the conditions for operating permissions because I have several people asking me for the information. I would like to post them on an internet forum (with your permission) to nip some of the wild speculation which seems to be slowly accumulating in the bud.	
10 06/06/2008	Tony Hooper Large Model Association	We consider the ANO change to most appropriate and would like to give our full support to it.	**Noted**
11	David Hogg	I use a small radio-controlled helicopter (weighs approx 3kg) to take aerial photographs of events, property development sites etc. and am wondering how these new regulations will affect the work I do. I am a member of the BMFA, and	**Noted** Operators who have obtained a multiple-use

Ref: Date:	Commenter:	Comment:	CAA Response:
06/06/2008		have £5M of Public Liability Insurance through Perkins Slade for undertaking commercial aerial photography from a model helicopter, but do not hold a BMFA 'B' certificate. However, I do follow BMFA guidelines for where I fly. I notice there is to be a £200 fee "to prepare an application for a Permission" for "multiple UAS operations". Does this mean that once a Permission has been granted (for a year I assume?), the operator can undertake as many operations (or in my case, aerial photography sorties) as he chooses, provided he follows any conditions specified in the Permission? Do you have an example of a Permission which I could look at, so I can see what sort of conditions would have to be followed? So far as I can see, recreational use of model aircraft / helicopters will still continue unabated, but am I right in thinking that as soon as a digital camera is fitted to say, a model helicopter, the operator is then bound by these new regulations as the 'aircraft' is now being used for "aerial work" and is "equipped to undertake surveillance or data acquisition"? I know a very large number of people who take aerial photographs with model aircraft / helicopters purely as a hobby. If I understand them correctly, these new regulations will completely crush this relatively new branch of aero-modelling and make many R/C enthusiasts very unhappy. Shouldn't there be a demarcation between commercial and personal use of these "UAS"s? I cannot understand why a model aircraft fitted with a digital camera and flown for fun should require any more regulation than a normal model aircraft flown for fun, provided the standard guidelines for model flight as laid down by CAP 658 and the BMFA and are adhered to. I also noticed this article: http://www.caa.co.uk/application.aspx?catid=14&pagetype=65&appid=7&newstype=n&mode=detail&nid=1603 and was particularly concerned by this paragraph: "UAS operators must ensure that their aircraft can demonstrate an equivalent level of compliance with the rules and procedures that apply to manned aircraft and they must meet at least the same safety and operational standards. Until they can operate in an ‘equivalent’ way to manned aircraft then their operation will continue to be restricted. The ultimate aim is to develop a regulatory framework which will enable the full integration of UAS activities with manned aircraft operations throughout UK airspace." I notice this article points to CAP 722 where it states: "UAS that do not exceed the defined maximum speed and kinetic energy	permission will be permitted to undertake flying operations without further interaction with the CAA provided that the conditions of the permission are met. Conditions are likely to include restrictions on flight in proximity to people, property and in particular other aircraft. Applications for permission will be similar to those applied to UAS of more than 7kg MTOM but it is envisaged that the requirements will be tailored according to the characteristics of the aircraft used and the risk involved with the flying activity. Article 164 of the Air Navigation Order 2005 (ANO) details ‘exceptions from application of provisions of the Order for certain classes of aircraft’ including Small Aircraft.

Ref: Date:	Commenter:	Comment:	CAA Response:
		levels representative of the existing model aircraft fleet may be exempted from compliance with certain requirements provided that operational restrictions at least as demanding as those applied to model aircraft are complied with. The applicable operational limitations include: operating within visual line-of-sight (not more than 500 metres from the UAV-pilot); not operating at a height exceeding 400 ft above the surface, and not over or within a defined distance of any person, vehicle or structure not directly involved in the operation of the UAS." Does this mean that model aircraft / helicopters are exempt from "complying with rules and procedures that apply to manned aircraft"? Does this include model aircraft / helicopters which are fitted with a digital camera, such as the setup I use? What is the defining line in this case between a UAS and a model aircraft / helicopter?	
12 12/06/2008	Bill Parry Eagle Tree Systems	Safety must come first, and the intent of this amendment is to increase public safety - I applaud that! However, I believe there is a potential wording issue in the amendment that will actually make it less safe to fly model airplanes recreationally. The concern involves section 5(a): (5) The person in charge of a small aircraft shall not fly such an aircraft: (a) when the aircraft is equipped to undertake any form of surveillance or data acquisition; or This restriction may have unintended consequences. Many recreational modelers in the UK now fly with on-board data loggers and low power, low cost wireless telemetry, for the purpose of making sure that their model airplanes are performing safely and optimally. And, the number of modelers using this equipment is increasing rapidly. Not only is collecting data about the “health” or status of the model not a threat to safety, but actually greatly increases safety to equipment and bystanders. I have lost count of the number of customers who have emailed us saying that our equipment has “saved their model from a crash or expensive repairs.” Some examples of how these data loggers/telemetry devices are improving safety now are: • Every recreational model has a battery pack. With wireless telemetry, the modeler is able to monitor the energy remaining in his battery pack, and is alerted when the battery pack voltage falls below a critical level, thus avoiding a certain crash. • Telemetry and logging of altitude alerts the modeler if he is getting close to	**Accepted** The CAA considers that in this context, data loggers and telemetry used to monitor the systems on board model aircraft do not constitute equipage for data acquisition or surveillance. Guidance for this will be included in CAP 722 in due course.

Ref: Date:	Commenter:	Comment:	CAA Response:
		the 400 foot ceiling, preventing a violation of the CAA restriction. • Telemetry and logging of motor or battery temperature indicates to the modeler if the motor is overheating, which can lead to engine failure and a crash. • Telemetry of airspeed, which aids in landing larger models, especially model jets, which are popular in the UK. • Telemetry and logging of the status of the model's radio receiver – if the radio receiver is starting to fail, or there are "bad" RF sources at the flying field, the modeler can be alerted to this and quickly land before losing control and crashing. Many products in use by recreational modelers would wrongly come under regulation with the present wording, I believe. I respectfully propose a change in the wording of section 5(a), or perhaps a more rigorous definition of "Data acquisition," to expressly permit acquisition of model performance or "health" data, as contrasted with prohibiting collection of "environment data" or "ground data" which is I believe the intent of the regulation. Perhaps another way to stipulate this difference is to permit acquisition of data regarding the functioning of the model, rather than the model's environment.	
13 06/06/2008	Andrew Leonard Elevated Aspects Ltd.	How will we notify the CAA that we will be flying a remote control aeroplane with a camera on board? Will we have to phone up or fill out a form every time we want to fly to take a photograph, or will we be able to get blanket permission. My concern is that especially here in Northern Ireland, that windows of opportunity in the weather and the pictures have to be taken at that time. Example e.g. it is windy for a week and suddenly the wind drops one afternoon and that means one can fly - if we have to submit a form and wait for approval, then that opportunity will be missed. If blanket coverage was given then we could just fly. I think it would be better all round if companies who use remote control planes for aerial photography were licensed by the CAA. Such companies would have to carry public liability insurance, have all operators trained to an approved CAA standard and follow set procedures for take off and landing.	**Noted** The multiple-use permission will permit operators to fly their aircraft without needing to apply for individual one-off permissions provided that a safety case and/or operations manual has been submitted and that any conditions therein are met. All aircraft, including model aircraft and whether or not equipped for surveillance or data acquisition, must be flown in accordance with Article 74 of the ANO which requires that aircraft must not be flown is such a manner as to endanger any person or property. Anyone who is proven to have not acted in accordance with Article 74 is liable to prosecution.

Ref: Date:	Commenter:	Comment:	CAA Response:
		Professionals who use remote control aeroplanes to take photographs normally have BMFA membership and public liability insurance and stick within the rules of the BMFA for recreational flying. They take care not to crash their equipment, because if it crashes they not only damage their expensive equipment they also loose income whilst their plane is out of action. Also such planes should be certified to ensure they are airworthy with the cameras used. I think the potential problem lies with people who buy cheap park flyers off the internet with a camera on board (e.g. the X-Plane - Spy Plane) or add their own camera (without adjusting the plane's centre of gravity) and fly them in their local park or neighbourhood without any flying experience. They just take it out of the box and start flying it, and will probably try and do stupid things with it to try and get "funny" video to put on You Tube or impress their friends. The problem is that there will be more and more cheap aerial vehicles available over the next few years from China which will be sold as "toys". They will be operated by youngsters without any parental supervision and adults without flying experience. How is a 13 year old boy suppose to know that he could be prosecuted under CAA regulations if he causes an injury to a third party?	
14 27/05/2008	Ian Asquith	I'm a keen hobby aerial photographer in the UK, running self designed small 1.5kg UAVs and looking to turn this into a business next year filming for TV/film and doing some still photography. I've just noticed that the rules and regulations are being amended in particular the lower weight limit being reduced from 7kg to 0kg on CAP722, this is now rather confusing, and have a couple of questions. 1) Will I now (as from 2009) have to notify the CAA in advance of every camera carrying flight I make, including test flights at home? If so how do I do that phone? Forms? And how much time notice do I have to give? Bearing in mind the flights are subject to favourable weather conditions, and this would need to be flexible. 2) As my craft is unique, self designed and self built, would it be classed as 'experimental' instead of being covered by CAP722? 3) I have many friends in the UK who also do aerial photography as a hobby, using converted model RC aircraft, helicopters etc. Will everyone have to register and pay regardless, just because they have a point and shoot	**Noted** 1) A multiple-use permission will permit operators to fly an aircraft without needing to apply for individual permission provided that a safety case and/or operations manual has been submitted and that any conditions therein are met. The process for applying for permission will be similar to the current process for aircraft between 7-20 kg but the operating conditions will be applied proportionately according to the characteristics of the aircraft and the type of flying activity it intends to carry out. 2) The design and construction of aircraft of less than 7 kg MTOM is not subject to approval by the CAA or the European Aviation Safety Agency (EASA) at this time. 3) Model aircraft operated for recreational purposes away from people or property will not

Ref: Date:	Commenter:	Comment:	CAA Response:
		camera attached to their model plane etc for fun? Or is this rule change just for fee paying aerial work?	be subject to regulation, even when equipped for surveillance or data acquisition.
15 19/06/2008	Ingo Massey Remote Airworks	Safety Regulation Group letter dated 15th May 2008 with a proposal for oversight of the under 7 kg class aircraft. 1. In various forms aviation has been a recreational sport pre-existing the formation of the original UK Civil Aviation Agency, which was formed by Central Government. 2. Sport development is engendered initially generally by the parents, who provide the impetus and enthusiasm to teach their offspring, prior to moving on with various organisations, the mysteries of aviation from ages as young as 4. 3. Perusing a variety of consultations in, what can be accurately be described as our Commercial Aviation Authority website, one is immediately struck by the fact that the Consultations are all about flight restrictions, contrary to Eurocontrol's open skies policy. 4. Existing flight restrictions are already overly restrictive for the model flyer, in terms of weight (44 lbs), flight area, some of these flyers are already using data telemetry (heading, altitude, speed, engine temperature etc) and imagery downlinks (this equipment can provide advance failure information and is, therefore, a positive safety issue and has been available for a decade). 5. Some current models can transcend the restricted flight area in under 10 seconds, which shows the inadequacy of the current Rules. 6. The current Rules already preclude Commercial Work without reference to the Regulators and the safety record is satisfactory; it is, therefore, difficult to understand your reasoning to change this aspect. 7. There is a growing trend towards larger and faster aircraft, which are currently overly restricted within current supplied airspace, and, therefore, I would agree updating is overdue, for this reason. 8. Advances in technology, which have occurred between the original independent Civil Aviation Authority and today's Commercial Authority, have provided better and more reliable operating equipment, yet the Authority has currently no Independent Technical Oversite on its decisions or, indeed, on the timescale of its decisions, unlike other Government Organisations. I am	**Noted and partially accepted** However, some comments are outside the scope of this consultation. The CAA considers that, in this context, data loggers and telemetry used to monitor the systems on board model aircraft do not constitute equipage for data acquisition or surveillance. Guidance for this will be included in CAP 722 in due course. The distribution of this proposal was targeted at known UAV operators and providers, model aircraft associations and other interested parties. The full public consultation was achieved through the accepted medium of the internet on the CAA website.

Ref: Date:	Commenter:	Comment:	CAA Response:
		quite surprised that the Better Regulation Executive, referred to in para 2.3 of your document, has not expressed its own concern over the lack of independence oversite. 9. a. As a national sport the Authority does not support currently a schools and general education programme for the benefit of aviation. This is an area that could, properly managed, provide a cradle for aviation, as is the norm for other sports. b. The Current Authority has presided over the demise of Aviation to the detriment of the Country, its population and the Receiver of Revenue. c. Technically, the reciprocating/rotary propulsion limits have reached speeds in excess of 300 mph with an all up weight of 4.5 kg (10 lbs). Jet limits, which are also expanding, are double. 10. <u>Proposal Summary</u> a. The formation via the Dept of Transport of an independent technical oversite committee, previously asked for by this office, with the teeth to ensure Best Practice. (Currently, if one objects, the Authority do not even have to reply!) b. i) Current rules to remain as existing for the normal modeller. ii) An expansion of those rules, subject to conditions, covering an increase in airspace to meet the advanced modeller need, viz – height 900 ft, range 12,500 ft (from the pilot), dry weight 44 lbs. c. A National Education Programme in conjunction with the Sports and Education Ministers' Departments, to both provide awareness and educate our children. d. Surely, it is for the Manufacturer/Supplier/User to prescribe the applicational requirement and demonstrate technical, safe capability and the Regulator to frame the regulations thereafter; not the other way round. e. A conference for all interested parties to debate the issues and formulate procedures, safety issues, the practical (i.e. what is the turning circle of a jet travelling at 450 kts; 3, 5 or 7 times the	

Ref: Date:	Commenter:	Comment:	CAA Response:
		distance of the current rules) etc, etc. Consideration should be given to increasing the distribution list to include other interested parties, organisations, Government Departs i.e. Sport, Education, Cadets & other juvenile organisations (provision of activities are helpful in crime prevention).	
16 23/06/2008	Peter Norton	I have been flying radio controlled model aircraft and helicopters for almost 35 years and consider myself to be an expert in all but the most extreme forms of the sport. I was Chairman of the Aberdeen Aeromodellers Club for 8 years during which time we acquired our own private 6 acre airfield and had a membership of 125 active modellers. A few years ago, I was runner up in the Scottish National Scale Championships. There have been many technological developments over the years and one of the more interesting has been the availability of small cameras weighing just a few grams that may be affixed to the model. The cameras have one of two capabilities: • To record still and video images on a solid state card for subsequent viewing • To downlink still and video images to a portable viewing device or VCR The installed weight of these systems is minimal and in consequence they may be attached to even the smallest model. At present, the image quality is quite low but inevitably this will improve and remain very affordable for those who choose to follow this path. I have followed these developments with interest but have no first-hand knowledge of their use. I am very unhappy with the proposed ANO change at 98(5)(a): The person in charge of a small aircraft shall not fly such an aircraft when the aircraft is equipped to undertake any form of surveillance or data acquisition. Your Impact Assessment acknowledges that, in the main, model flying takes place away from areas of human activity for reasons of noise abatement and safety. It is my view that the private recreational use of surveillance equipment for personal enjoyment is harmless and that any misuse of recorded images is adequately covered elsewhere in law. I suspect that the number of installed camera systems on models may already be counted in the hundreds since those with a downlink capability over a range of 100 metres are available for just £60. I imagine that enforcement would be almost impossible and be the cause of great resentment in the model flying community. As an alternative proposal, might I suggest that, rather than placing a prohibition on the model flying community, you consider a form of words to address the activities of	**Accepted** The CAA does not intend to interfere with recreational model flying and such activity will not be subject to regulation provided that it is carried out away from people and property. Therefore the CAA will amend the proposed regulations to introduce relaxations for flight away from people or property.

Ref: Date:	Commenter:	Comment:	CAA Response:
		the light UAV operators and professional organisations such as the Police, Fire and Rescue and the press, that might wish to use such capabilities in the public interest or for gain or enforcement. There are a number of short videos available on YouTube that illustrate the present (poor) performance of camera systems on model aircraft. I would be very happy to provide you with information on how to find these and also to provide you with some details on the presently available systems	
17 27/06/2008	Ross McKinnon	What about if it is a free service & no money is used, example. Filming a mates house or filming a coastal view from the air, would these also require a fee to be paid?	**Noted** It is proposed that small aircraft equipped for data acquisition or surveillance that are the subject of this regulation will require permission regardless of whether payment is given. However, the CAA recognises that recreational activities that take place away from people and property are less of a risk and this will be reflected in the final change to legislation.
18 01/07/2008	Alan Ward Allendale Electronics Ltd.	We have had some e-mails in from concerned customers regarding the Civil aviation publication 393, We are sellers of onboard data logging equipment for RC models, please see **www.rc-log.co.uk**, my customers are concerned that this proposal will effect them, we have read through the document ourselves and we are unsure if and how this will effect us.	**Noted** The CAA considers that data loggers and telemetry used to monitor the systems on board model aircraft do not constitute equipage for data acquisition or surveillance and therefore will not require permission. Guidance for this will be included in CAP 722 in due course.
19 07/07/2008	Mick Dunn East Midlands Air Support Unit	I refer to your letter of 15 May outlining the above proposals, and herewith make comments from East Midlands Police Air Support Unit (PAOC 16) a) Para 3.1. Who is the "Operator" of such a small aircraft. Is it the person actually operating it at the time, or if an operator is either an AOC or PAOC holder, is it that licence holder? b) Para 2.1 refers to the CAA requiring knowledge of any flight to enable it to make an assessment of any potential dangers. For police operational purposes these flights are often made spontaneously, out of hours, when there would be no opportunity to consult the CAA..	**Noted** a) The term 'Operator' in this context is the organisation responsible for the safe operation of the system as a whole. Generally, the person manipulating the controls will be termed 'pilot' or in some cases the 'commander'. b) Once an operator has submitted an operations manual (or similar), operators will be granted a multiple-use permission allowing them to operate within the procedures and conditions

Ref: Date:	Commenter:	Comment:	CAA Response:
		c) If it is the intention to issue a blanket approval for Police use. Would the approval be issued to any Chief Constable, or to the PAOC holder. Bearing in mind not all individual police forces have a PAOC, and that it would be impossible, and I suggest unacceptable, for a Unit Executive Officer, as the responsible individual under a PAOC, to have any control of their operational use.	of their manual without further consultation with the CAA. c) This comment is gratefully received and will be considered during the process of issuing permission to police units.
20 08/07/2008	Andrew R Jones Thales	My personal view is that this seems very restrictive and has the potential to seriously affect the early research flying that we do with the Universities at the 7.5Kg level - and almost always with some form of data acquisition system (even if this is just a simple camera). Am I overly worried? (I can just foresee that the sign off process will be anything but simple and the learning curve to get something that the CAA will be happy with could be quite steep, thus stifling flight and development in the UK)" In essence he is worried that the amendment will overly restrict the use of small UAVs for research use by academia. Do you have any comments on this and what do you see as the extent and process of obtaining CAA permission if, at all, for this type of research activity that is clearly not recreational activity but at the same time it is not commercial data gathering?	**Noted** Aircraft of more than 7 kg are already within the scope of regulation and are not the subject of this consultation. The application process for aircraft of 7 kg or less will be simplified. For many, especially non-commercial users, it is likely that a photograph and signed declaration is all that will be required.
21 06/06/2008	Arthur Eunson On-Target Software Solutions Ltd.	I have read what has been proposed and I agree that there must be rules as there are now people coming into this with no experience with a total disregard to safety. They have not come through the model flying route and don't know what is safe or not safe and are only interested in making some quick money. I do however feel it is unfair to class all machines / operators the same as it then makes no difference whether an operator uses a 20kg turbine helicopter loaded with a gallon of fuel or a 5kg electric powered helicopter. As you know there is a significant difference in the safety aspect of these machines and also the knowledge required to operate them. You will also get some operators using the more dangerous turbine machine to do jobs that could easily be done with the much safer smaller electric machine. And just because it looks more complicated they would feel justified in charging more. This would not be the case if the regulations were set to take into account the different types and weights of machines. I.e. the <7kg electric machine is much safer than the 20kg turbine machine.	**Noted** As part of the permit application process the CAA will examine the characteristics of the aircraft and the type of flying activity it will carry out and apply the operating restrictions proportionately.

Ref: Date:	Commenter:	Comment:	CAA Response:
22 29/07/2008	Jason Searle ASM Europe	The proposal asks that all operators of UAV's of less than 20kg are to request permission to fly from the CAA before flying. Clarity required here please – does this request mean every flight or does this mean that the owner has to request the permission to fly their UAV once only as a sort of registration with the CAA that they have a UAV and intend to fly it? If the latter is true then the proposal is ok and will not impede UAV operators, however if the initial part of the statement is true then this will have a detrimental effect of the use of UAV's by services such as Fire and rescue, police etc as UAV deployment will be on an ad hoc basis rather than planned. Ad hoc deployment cannot be held up by waiting for requests to fly to be approved, as this will render the use of UAV in these situations inoperable.	**Noted** Operators who fly regularly or on an ad-hoc basis will be able to submit a simple operating manual and obtain a multiple-use permission. Provided that the procedures and conditions within the operating manual are adhered to, the operator can fly without obtaining further permission from the CAA.
23 05/08/2008	David Bond Dragonfly Aerial Photography LLP	We at Dragonfly feel that the proposal is a positive and necessary step forward as there are undoubtedly operators in this fledgling industry who are not aware of their responsibility to operate safely, or perhaps not even aware of the existence of the ANO. Our specific operation at Dragonfly is very safety orientated. We only cover architectural subjects, we do not cover events, news or emergency situations. We do not operate near gatherings of people. We have strict Standard Operating Procedures including a thorough site assessment, emergency actions should an autorotation be necessary, maintenance of a strict lookout at all times, assessment of distance from people given the circumstances and proximity to other hazards. Very frequently we have to reject commissions as our safety requirements are not met. I am sure that the preceding could be applied to the vast majority of operators in the UK. We certainly agree with the proposed changes and conditions in general as laid out in the ANO as, of course, any operator should. We think it is sensible that operators should have to demonstrate that they have a knowledge of the ANO and having to obtain a Permission seems a sensible way to achieve this. We think the mechanism of applying for a Permission and demonstrating a safety case would be an adequate and appropriate level of regulation. We are very concerned, however, that responsible operators, such as ourselves are not unduly restricted to the extent that we will not be able to continue our business. Our main concern is that the conditions which may be attached to a Permission may be inappropriate given: 1) the kind of photography carried out by us. i.e. architectural only and 2) the low mass of the UAV being used. Specifically I refer to the	**Noted** The requirements and the conditions of a permission will be applied proportionately according to the type of aircraft and its use. For example, the requirements for simple operations away from population and buildings will be less than for complex operations over busy town centres. It is also likely that many conscientious operators who have already developed operating procedures will be granted permission to continue operating without change.

Ref: Date:	Commenter:	Comment:	CAA Response:
		conditions in CAP722 Section 3, Chapter 1, Note 3 Paras b & c. These state that: 1) the aircraft may not be flown within a specified distance, normally 150 metres, of any congested area of a city, town or settlement or 2) within a specified distance, normally 50 metres, of any person, vessel, vehicle or structure not under the control of the aircraft operator except that during the takeoff or landing an aircraft to which this subparagraph applies shall not fly within 30 metres of any person other than the person in charge of the said aircraft or a person in charge of any other small aircraft or a person necessarily present in connection with the operation of such an aircraft. The "150 metre congested area" rule (1 above) has until now applied to the 7kg to 20kg mass bracket. Therefore an aircraft whose mass is 20kg may be as close as 150 metres to a congested area and be at 400 feet. This is a very different scenario to the one we normally operate, where we are typically no higher than 200 feet and of course less than 7kg. So we do not think it is sensible to apply this particular restriction to us. For similar reasons, we do not think that the "50 metre" rule (2 above) should apply to our operation. Additionally, it is sometimes the case that we may be within 50 metres of a person not directly under our control but that is generally an isolated farm worker or similar where it is not appropriate to restrict him whilst we fly from, say, an adjacent farm. One other consideration is that the scale of our operation is quite small, fewer than 50 flights per year. This means that the number of times the public is potentially put at risk is very small. If this is then multiplied by the number of times that we may operate within 150m of a congested areas or within 50m of a person, then the potential risk is very small indeed.	
24 07/08/2008	Alistair Fox MW Power Systems	We have taken a lot of time to consider your proposals and, in summary, also support Option 4. You will no doubt be aware that our current product range, microVTOL (rotary wing) all sit below the current 7kg line. Whilst we investigate the adoption of a miniSTOL (fixed wing) at around 19kg, it has become apparent that sub 7kg VTOL craft offer a significantly reduced risk to the public and property. I feel that the proposed system of Permission to Fly for this equipment may not reflect the low risk associated with typical missions. We have analysed the failure modes and potential outcomes for both rotary and	**Noted** The requirements for, and conditions of, a permission will be proportionate to the type of aircraft and operation. Line of sight between the pilot and aircraft is required to prevent collision between the aircraft and other objects. The CAA is willing to consider proposals from operators who are able to mitigate against collision risks using an alternative method but would also wish to to be convinced of the necessity for such flight

Ref: Date:	Commenter:	Comment:	CAA Response:
		fixed wing and, utilising our Emergency Services' customers Risk Assessments, and now feel it appropriate to seek clarification of the range of operations that would require a Permission to Fly and request examples of a typical Safety Cases… Overflight of a Fire Ground or Civil Disturbance is, on balance, we believe on the side of the public good and quite overt in nature. To this end, we are happy to maintain both the height restriction at 120m and keeping the unit with visible range. However, where non-Line-of-Sight flight is a required, ie during an armed siege at a Tower block, for instance, flying around to the back of the building for situational awareness purposes, then I wonder whether some other factors could be considered regarding the dynamic risk assessment currently undertaken 'on the ground' that would enable NLOS flight – even at very low level (sub 40m?). One solution here could be the presence of covert co-pilots/observers at 400-500m intervals? Our system is becoming increasingly able to flown from a pilot's-eye-view – in theory upto around 3km from an incident. Therein lies a problem for our users. At the scene of a rapidly spreading hill fire, for instance, our UAV could provide life-saving imagery at low-level whilst being very unlikely to cause injury to an individual. Could the same clear benefit be justified for Covert Policing Urban activities? Clearly NLOS for commercial and professional photography purposed could not be justified in any circumstances. In summary, then, I refer you to our first statement that Option 4 is undoubtedly the best option for the future. However, I do urge you to consider how the life-saving benefits of NLOS via sub 7kg VTOL could be encompassed within regulation. Please also clarify para 3.3 p11 regarding Permission to fly for <7kg UAV used for Aerial Work.	particularly if any data (video) link might be lost at the same time thereby negating the purpose of the flight. All Aerial Work flying of a Small Aircraft will require a permission.
25 07/08/2008	Huw Baumgartner QinetiQ	We understand the reasoning behind the use surveillance or data acquisition as criteria so as not to burden the *bone fide* recreational users but we are concerned that this allows an unnecessary loophole, inasmuch as prototypes of vehicles ultimately intended to carry such payloads may well initially fly without payloads fitted and thus escape the requirements of the legislation. It could be argued that such early flights may be more risky than the subsequent profiles when more operating experience has been acquired. We have had a lot of dialogue with the CAA Legal Adviser over the past few years on the definition of Aerial Work and we recognise that there is sufficient ambiguity in that definition for the Authority to seek a different form of words for the current purpose. If Aerial Work is precluded as phrase of choice, perhaps it may be necessary to use words along the lines of *'…..if*	**Noted** The CAA envisages that when appropriate alternatives to see and avoid are developed, alleviations to Article 98(3) will be made available to compliant operators in the short term and the requirements would be reviewed to assess whether the regulation should be amended to reflect the new technology in the long term. The comment regarding the potential for UASs

Ref: Date:	Commenter:	Comment:	CAA Response:
		the aircraft is equipped to undertake any form of surveillance or data acquisition, or is designed and/or constructed with the intention of carrying such equipment.' We have a real concern that the proposed wording of Article 92(3) [98(3)] is unnecessarily restrictive, having been overtaken by events as evidenced by the fact that beyond-line-of-sight (BLOS) operations of sub-7 Kg UAS have already been made, with Authority approval, at the ParcAberporth/West Wales UAV Centre, and possibly elsewhere, within Restricted Airspace. Those at West Wales Airport have been limited to periods when surveillance radar has been available from MoD Aberporth but there is high confidence that micro 'sense and avoid' avionics will become available in the near future so we may expect that BLOS operations in this category will become routine in due course. We would suggest that, to cover this eventuality, 92(3) might state: *'Unless a small aircraft is equipped with an approved sense and avoid system or unless it is operating within approved segregated airspace, the person in charge shall maintain direct visual contact……'.* We would hope that the mechanics of issuing Permissions will be addressed inasmuch as the volume of applications will become much greater. We believe that the Authority should recognise that an application by, or through, an established flying organisation, such as QinetiQ, will have been properly validated prior to the application and may not require the in-depth examination that the Authority would properly implement for an application from an unproven source. Whilst understanding the CAA's requirement to fund its operation from the aviation community, we would also suggest that some proportionality be exercised when deciding on the scheme of charges for sub-7 Kg Permissions. As co-operators of the West Wales UAV Centre, we are aware that there are many constructors in this category working to very tight budgets as the returns on small UAS projects are relatively modest. In summary, QinetiQ supports this change to the ANO in principle with the provisos that: • The proposed wording of Article 98(3) should be amended to allow beyond-line-of-sight operations for suitably equipped aircraft in appropriate airspace, • The proposed wording of Article 98(5)(a) be amended, as outlined above, to sweep up the case of 'working' UAVs that may not necessarily be fitted with data gathering or surveillance equipment, CAA should review the process of Permission issue and charging.	to fall outside of regulation when the data acquisition and/or surveillance equipment is removed is noted, but the UAS remains subject to the general aspects of ANO Article 98.

Ref: Date:	Commenter:	Comment:	CAA Response:
26 11/08/2008	Gordan Dickman Blue Bear Research	Of the four options identified, we are in agreement that the fourth option, including the equipment criteria is the most acceptable and has the least impact on model flyers. However, there are some major points of concern with the proposed change which we would ask you to consider. These are detailed below. 1) Ref: page 8. The analysis and evidence for each of the three options identifies an estimated cost to industry in comparison to incident investigation costs, assumes a single £200 application per operator. This does reflect the application summission fees but not the internal application preparation manpower costs that each operator must bear. In addition, it assumes one application per operator. Our experience of permission to operate applications is that we would benefit from better guidelines on the application process. In particular, additional information would be helpful on the possible scope of each application and whether one single permission certification can apply to a wider ranging family of vehicles, or is restricted to a single airframe. In the case of small vehicle developers, they are likely to operate a range of vehicles with differing configurations during a development cycle. Without this flexibility, the cost to prototype and develop such vehicles could become prohibitive. 2) Ref: page 8. Without additional guidelines on the possible scope of the permission to operate process, the number of applications that the CAA receive for this class of vehicle could be significantly more than anticipated. The industry would then be looking for assurance that the CAA has the capacity to process these applications in a timely fashion. 3) Ref: page 13. Option 4 does not account for the growing availability and use of cameras onboard recreational model aircraft. Cheap solid state video cameras (e.g. Flycam) are now readily availably and becoming widely used by hobbyists for purely recreational purposes. Option 4 would then appear to exclude such activities. 4) Ref: page 17, item (3). As technology advances, the industry is looking at alternative ways to operate the vehicles, including the use of remotely piloted vehicle stations, where the operator may be flying the vehicle through onboard camera views, rather than direct visual contact, with additional support from ground spotters, advising the operator of any airspace intrusions. Currently, we include a safety pilot on traditional radio control who can take control of the vehicle at any time. In general, such UAVs are equipped with sensors and telemetry to a ground station, providing a high degree of situational awareness, providing the team with information on the vehicle position, airspeed, attitude etc. Item (3) does not	**Noted and partially accepted** 1) The application process will be proportionate to the size and complexity of the aircraft and operation. In some cases a photograph and signed declaration may be all that is required. As the UAS industry becomes more established it is envisaged that clearer processes and guidelines will be developed. 2) The CAA recognises the need to closely monitor the rate of applications and supply staff to process them accordingly. It is envisaged that the simplified application process will reduce workload for both parties. 3) The CAA does not wish to interfere with recreational model flying when it is carried out away from people and property. Therefore the CAA will amend the proposed regulations to introduce relaxations for flight away from people or property. 4) Line of sight between the pilot and aircraft is required to prevent collision between the aircraft and other objects. Alleviation to Article 98(3) may be made available to operators who have successfully employed a satisfactory alternative. In the long term an ANO change to reflect any advancements in technology will be considered. 5) See comment 3 above. 6) As mentioned in response 1 above it is envisaged that the application process and guidelines will be simplified. However, whilst the technology is still emerging the CAA will need to take a more conservative view. The need for allowances to be made within the regulation for the development of new technology is recognised. The CAA suggests that initial development of UAVs could be carried out in

Ref: Date:	Commenter:	Comment:	CAA Response:
		account for these advances in technology. It is the goal to be able to operate such vehicles without a traditional radio control pilot, but fully automatically from an appropriately equipped ground control station. It would be worth considering whether the level of operating restriction applied could be linked to the capabilities of the system. 5) Ref: page 17, item (5) (a). See comment 2 above - this statement would prohibit the now common practise of using cameras onboard recreational vehicles. The inclusion of cameras onboard these vehicles has no significant impact on the safety of operation of the vehicles. 6) Ref: page 17, item (5) (b). This implies that every experimental vehicle that is produced must be supported by a permission to fly certificate. This has far reaching consequences for industry and our ability to prototype new small unmanned air vehicles. If UK industry is to maintain its position in the global marketplace for small UAVs, it is imperative that we are able to progress rapid prototyping techniques to enable low cost development of such vehicles. An inherent part of this process, is the ability to "build and fly" prototype vehicles in a rapid timescale. Such restrictions, requiring a "permission to operate" for each vehicle could become prohibitive. We would ask you to consider these comments before any such changes to the ANO are adopted. Possible alternative schemes that may be worth considering, in part or in whole, include: 1) Consider a scheme which provides an overall permission to operate certification for a company or organisation, similar to a design authority. The company would need to provide evidence of a level of competancy to operate such vehicles but would then have greater freedom to pursue the rapid prototyping of multiple vehicles, not requiring a separate "permission to operate" for each vehicle. 2) A change of the word "or" to "and" between clauses (5) (a) and (b) would allow the recreational flyers to continue using cameras onboard their vehicles. 3) Consider how the change to the ANO could be scoped to reflect advances in situational awareness. 4) Consider how the change to the ANO could reflect advances and aspirations in how the vehicles are operated.	accordance with guidelines for model aircraft.

Ref: Date:	Commenter:	Comment:	CAA Response:
		5) Consider whether a requirement to include system redundancy would be an alternative method to capture the vehicle type, rather than the surveillance or data acquisition discriminator. For instance, at BBSR, we include full power and radio redundancy and are looking at options for parachute recovery in failsafe. This brings some of the requirements for larger vehicles down into this class, which is now feasible with advances in technology and off-the-shelf products. 6) Consider whether the 7kg discrimator should be maintained but lowered to 3kg, perhaps in combination with point 5) above, which would maintain flexibility to operate vehicles which have very low potential energy.	