**EXPLANATORY MEMORANDUM TO**

**THE AIR NAVIGATION (AMENDMENT) ORDER 2007**

**2007 No. 274**

**1.** This explanatory memorandum has been prepared by the Department for Transport and is laid before Parliament by Command of Her Majesty.

**2. Description**

2.1 This Order makes a number of changes to the Air Navigation Order 2005 (ANO) [S.I. No. 2005/1970].

2.2 With regard to the operation of helicopters, amendments to articles 25 and 155 of and Schedules 4 and 8 to the ANO establish clear parameters for the training of pilots and the planning and conduct of flights carried out at night or in poor visibility, such as in low cloud or fog.

2.3 For General Aviation (i.e. non-public transport) operations, the ANO is updated to ensure that it is compliant with internationally accepted Standards and Recommended Practices, as set out in the Annexes to the Convention on International Civil Aviation (the Chicago Convention).

2.4 By virtue of article 5 of this Order, commercial helicopters capable of carrying nine or more passengers and operating in support of offshore oil and gas exploitation will be required to carry a monitoring system designed to provide early warning of problems with the aircraft's rotor or rotor drive system.

2.5 The requirement to seek Civil Aviation Authority (CAA) flying display permission in respect of balloon-only events is removed from the ANO.

2.6 To help improve the capacity of the UK's air traffic control (ATC) system, aircraft flying above 19,500 feet will be required to carry radio equipment capable of using 8.33 kHz channel spacing, rather than the current 25 kHz spacing. This is already a requirement for aircraft operating above 24,500 feet. The extension of this spacing forms part of a pan-European initiative, co-ordinated by the European Organisation for the Safety of Air Navigation (EUROCONTROL), to increase ATC capacity across Member States.

2.7 A number of miscellaneous amendments are made to the ANO, including a new article 8(6) setting out the circumstances in which an aircraft is to be deemed to be flying in accordance with the Visual Flight Rules, new definitions of the terms JAR-FCL 1, JAR-OPS 1 and JAR-OPS 3 to reflect revisions of these

documents, and changes to Schedules 4, 5 and 8 to rectify minor errors that have been identified.

2.8 Finally, in accordance with new European Aviation Safety Agency (EASA) requirements, the ANO is amended to require the carriage of an aircraft's certificate of airworthiness on every flight.

## 3. Matters of special interest to the Joint Committee on Statutory Instruments

3.1 None

## 4. Legislative Background

4.1 Section 60 of the Civil Aviation Act 1982 enables an Order in Council, known as an Air Navigation Order, to be made for the purpose of carrying out the provisions of the Chicago Convention or more generally for the regulation of air navigation. The ANO implements in UK legislation a number of fundamental rules for international aviation, as set out in the Chicago Convention and its Annexes. The ANO also contains provisions for securing the safety, efficiency and regularity of air navigation, the safety of aircraft and people and property carried in aircraft, and for preventing aircraft from endangering other people and property.

### *Helicopter Flight Visibility*

4.2 The present Order amends the rules on the operation of helicopters in low visibility conditions. This is intended to reduce the likelihood of pilots losing control of their aircraft or colliding with the ground or obstacles when visibility is significantly reduced. The amendment responds to Air Accidents Investigation Branch recommendations made in respect of helicopter flights carried out in poor weather and has been developed following a CAA review of the current rules on the weather minima for helicopter and gyroplane operations.

### *Compliance with International Civil Aviation Organisation requirements for International General Aviation*

4.3 Annexes to the Chicago Convention contain internationally accepted Standards and Recommended Practices (SARPs) for different aspects of aircraft operation. The Convention provides that each signatory nation will ensure that, save where a State has notified the International Civil Aviation Organisation (ICAO) to the contrary, aircraft registered in that State comply with minimum aviation standards set out in the Convention or its Annexes, including the adoption of relevant SARPs.

4.4 In July 2000 ICAO conducted an audit of the UK's compliance with ICAO requirements. In the field of General Aviation ICAO identified a number of

SARPs that had not been fully implemented. ICAO recommended that the UK should take steps to amend its domestic legislation to reflect these SARPs.

4.5 The CAA duly implemented a corrective action plan to address the audit findings. The present Order implements the final elements of that action plan.

***Vibration Health Monitoring for Helicopters***

4.6 Currently the CAA requires all UK registered commercial helicopters capable of carrying 9 or more passengers and operating in support of offshore oil and gas exploitation, to have monitoring systems fitted that are designed to provide early warning of rotor or rotor drive system failure. This is set out in a CAA Additional Airworthiness Directive (AAD). Since the issuing of this Directive, no accidents attributable to rotor or rotor drive failure have occurred in the UK to helicopters fitted with a Vibration Health Monitoring (VHM) system that such a system was capable of detecting.

4.7 Airworthiness became an EASA responsibility on 28 September 2003. Given the proven safety benefits of the CAA's AAD, EASA was invited to adopt and apply the same across Europe as an EASA airworthiness initiative. Unfortunately, while recognising VHM as an important safety issue, EASA considers it to be an operational matter, responsibility for which remains with national aviation authorities, rather an airworthiness one. EASA has therefore indicated that it will formally recommend to the European Commission that the AAD be cancelled. Unfortunately, the CAA has no mechanism to mandate VHM as an operational requirement and therefore in order to retain its benefits the various provisions of the AAD will need to be placed on a statutory footing.

***Balloon Flying Displays***

4.8 Article 80 of the Air Navigation Order 2005 provides for the regulation of flying displays. In particular, organisers of such events are required to obtain prior permission from the CAA before a flying display can be held, and to comply with any conditions specified in such permission. This requirement does not apply to races or contests, and most balloon-only events fall into these categories.

4.9 A small number of balloon-only events are not races or contests, such as those involving tethered balloons, and are therefore subject to the Article 80 requirements. However, exemptions have been in place since 1994 obviating the need to obtain prior permission from the CAA in such cases.

4.10 The present Order enables events consisting solely of balloons to continue to be conducted without the requirement for prior permission from the CAA and without the need for an exemption.

***8.33kHz Channel Spacing***

4.11 Schedule 5 of the ANO currently sets out the radio communication and radio navigation equipment that must be carried by aircraft in the UK. As a general rule, aircraft must carry equipment capable of maintaining communications with each of the aeronautical radio stations serving the airspace within which it intends to fly.

4.12 Air to ground communications presently operate in the Very High Frequency (VHF) spectrum between 118 and 136.975mHz, divided (or spaced) into 25kHz channels. Accordingly, there are a finite number of channel frequencies available. In order to address increasing frequency scarcity, 8.33kHz channel spacing has been mandated for aircraft operating above 24,500 feet in 29 European Countries, including the UK, since October 2002.

4.13 In December 2000, EUROCONTROL was tasked by ICAO to develop a phased approach for introducing 8.33 kHz channel spacing into the airspace below 24,500 feet. The present Order represents the first phase of this internationally co-ordinated programme by introducing 8.33 kHz channel spacing to the airspace above 19,500 feet.

***Miscellaneous Amendments***

4.14 The present Order makes a number of minor changes to the ANO, including the addition of a new article 8(6) in respect of the conditions in which the Visual Flight Rules will apply, updated definitions of the terms JAR-FCL 1, JAR-OPS 1 and JAR-OPS 3 and corrections to minor errors identified in Schedules 4, 5 and 8. Finally, Schedule 10 (Carriage of Documents) is updated to require the mandatory carriage of an aircraft's EASA or National Certificate of Airworthiness on every flight, without exception.

## 5. Extent

5.1 This instrument applies to all of the United Kingdom.

## 6. European Convention on Human Rights

6.1 As the instrument is subject to negative resolution procedure and does not amend primary legislation, no statement is required.

## 7. Policy background

***Helicopter Flight Visibility***

7.1 The concept that all helicopter pilots can safely undertake flight in conditions of low cloud and poor visibility, because the pilot can reduce height and speed and make a precautionary landing if conditions become too difficult,

has limitations. As visibility and speed reduce, the inherent instability of a helicopter, exacerbated by the reduction in available visual clues, means that a loss of control or a collision with the ground or an obstacle become increasingly probable. Currently, the holders of UK private helicopter pilot licences, when flying privately in poor visibility, are only required to hold an instrument rating, whereby the individual has been trained and tested to enable him/her to fly by reference to on board instruments rather than by visual clues (i.e. looking out of the window), in certain classes of airspace. The amendment will require these pilots to hold an instrument rating to fly in poor visibility in all classes of airspace.

7.2 Between 1997 and 2004, 27 fatal accidents involving light helicopters occurred in the UK. 41% of these accidents were attributed to pilot disorientation and loss of control in conditions of low cloud, poor visibility or at night.

7.3 The present Order aims to reduce the likelihood of inadvertent entry by helicopters into low visibility conditions, such as fog or low cloud, by providing improved rules that establish clear parameters for the training of pilots, as well as the planning and conduct of flying at night and in other circumstances of reduced visibility.

7.4 The CAA carried out two rounds of consultation on the proposed amendments. Letters of consultation were sent to over one thousand addressees, including representative organisations and associations and the aviation media. The first round of consultation generated responses from 46 correspondents. After assessing the issues raised, the CAA reconsidered some of its underlying assumptions and amended its proposals accordingly. In particular, it had been assumed that specifying a minimum flight visibility within the privileges of a helicopter pilot's licence would provide a suitable safety margin to prevent inadvertent flight into low visibility conditions. However, the consultation responses indicated little support for this, with the prevailing view that this idea would be ineffective in relation to its intended purpose. The CAA therefore refocused its proposals in order to prompt pilots into adopting appropriate strategies whenever flight into conditions of poor visibility is contemplated.

7.5 Eighteen responses were received to the second consultation. Six of these accepted the revised proposals either by express agreement, no objections or no comment. Four respondents raised specific queries that the CAA was able to answer individually and have been recorded in the CAA's comment response document.

7.6 Four correspondents expressed the view that a minimum visibility of 1500 metres for Visual Flight Rules would not, of itself, make a significant difference. However, this distance was chosen by the CAA to provide a reference point for instruction and is consistent with ICAO provisions on the issue. One correspondent commented that the proposed amendment did not provide weather

minima for night flying. The CAA pointed out that this was because the Rules of the Air Regulations specify that night flying generally has to be conducted under Instrument Flight Rules.

7.7 Finally, four respondents commented that UK pilot licence holders' privileges to fly under instrument flight rules in certain classes of airspace should be retained, particularly where these have been exercised in the past. The CAA accepted this principle and agreed that these privileges can be preserved for individual pilots who have exercised the privileges in the past, subject to appropriate knowledge and log-book evidence. Maintenance of these privileges will be subject to satisfactory demonstration of the relevant elements of the licensing proficiency check at each revalidation/renewal.

7.8 A summary of the views expressed by correspondents on both consultations, together with the CAA's responses to the points raised, can be found on the CAA's website at:

www.caa.co.uk/default.aspx?categoryid=224&pagetype=68&groupid=789

***Compliance with International Civil Aviation Organisation requirements for International General Aviation***

7.9 The Chicago Convention is an agreement between all signatory States designed to maintain acceptable levels of aviation safety so as to permit international aviation.

7.10 The recent ICAO audit of the UK identified, in the area of General Aviation, a number of SARPs that had not been fully implemented in this country. The CAA accepted ICAO's recommendation that the UK should take steps to amend its domestic legislation to reflect these SARPs and drew up a corrective action plan.

7.11 The present Order updates the ANO to ensure that it is compliant with ICAO SARPs in respect General Aviation operations. This involves amendment of the articles dealing with:

i) flights by non-public transport aircraft under Instrument Flight Rules (as described in the Rules of the Air Regulations 2007),
ii) the requirement for a qualified pilot to remain at the controls of a helicopter while the rotors are turning under power,
iii) pre-flight action by the Commander of an aircraft to include a requirement for the commander to satisfy himself that suitable survival equipment is carried on board,

iv) the additional duties of the commander of the aircraft, including a new requirement in respect of the carriage and use of oxygen above certain altitudes,
v) the marking of exit and break-in areas,
vi) a new definition of "instrument approach procedure", and
vii) changes to the Schedules dealing with the Scale of Equipment by aircraft in different circumstances.

7.12 The amendments in respect of the responsibilities of the pilot in command, equipment carriage, the marking of emergency break-in points and the instruction that a helicopter's rotors should not be turned under power without a qualified pilot at the controls will also apply to public transport operations.

7.13 Two rounds of consultation were conducted on the proposals by the CAA. Letters of consultation were sent to representative aviation organisations and associations, the aviation press, avionics companies and operators of private corporate aircraft. 132 responses were received to the first consultation, including those from 9 representative organisations and 25 companies. Following consideration of the points raised, the CAA's proposals were revised and a second round of consultation produced responses from 15 correspondents, 12 from representative organisations and three from individual companies.

7.14 Six respondents to the second consultation accepted the CAA's revised proposals, agreed in the main to the preferred option, or raised no objections. Three respondents argued that it was necessary to produce a reasoned safety case, with identifiable costs and benefits, in order to support the part of the proposal requiring the purchase of new equipment such as Emergency Locator Transmitters (ELT). The cost of such equipment was thought to be unwarranted without the demonstration of a robust safety case. Two of the respondents expressed reservations about the requirement for an ELT when flying more than 10 minutes offshore, but the MOD's response, commenting as a major provider of rescue services, expressed support for this part of the proposal. Another respondent made general observations about ELT carriage that was consistent with the CAA's proposals. Given the views expressed, the CAA has since expanded the relevant appendix to the CAA's Regulatory Impact Assessment to provide more detailed information justifying the proposal.

7.15 Finally, seven respondents expressed views on the precise wording to be used in the amendment relating to flights over water, while one further respondent emphasised the important safety issues regarding the carriage of fire extinguishers.

7.16 Copies of the CAA's Letter of Intent, a summary of the results of both rounds of consultation and a Final Regulatory Impact Assessment can be found on the CAA's web site at:

www.caa.co.uk/default.aspx?categoryid=224&pagetype=68&groupid=617

7.17 The CAA is satisfied that the views expressed by interested parties have been fully taken into account in the present Order.

***Vibration Health Monitoring for Helicopters***

7.18 Helicopters are more vulnerable to catastrophic mechanical failures than fixed wing aircraft because of the nature of the rotor and rotor drive systems and the reduced redundancy within their design. This vulnerability resulted in a high accident rate in the 1970's and 1980's that led to the development of systems able to monitor the health of helicopter rotor and rotor drive systems. These Vibration Health Monitoring (VHM) systems entered service in 1991 as a voluntary initiative by the helicopter operators and the offshore industry following a successful series of CAA funded operational trials. Carriage of this equipment was made mandatory for all commercial helicopters capable of carrying nine or more passengers in a subsequent CAA Additional Airworthiness Directive (AAD).

7.19 By 1997, studies by the CAA showed that VHM systems had provided the first warning for approximately 69% of the rotor and rotor drive system failure types and for approximately 60% of all potentially catastrophic failure cases. A further CAA study showed that incidents of serious vibration occurring in-flight had reduced dramatically within the UK fleet following the introduction of these systems.

7.20 With the creation of EASA, responsibility for airworthiness was devolved to the new Agency. The CAA is convinced of the need to maintain this proven safety benefit for affected machines and for that reason submitted its AAD to EASA and the European Commission for approval. However, while EASA indicated its support for an operational requirement, limited to operations in support of offshore oil and gas exploitation (an environment that is considered "hostile" in sea areas surrounding Northern Europe), it was unable to support the AAD and indicated that it would formally recommend to the European Commission that the AAD be cancelled. In order to retain the safety benefit of the AAD, the present Order amends the ANO to require the carriage of VHM on commercial helicopters capable of carrying nine or more passengers, operating in a hostile environment (as defined in the Order).

7.21 Unless the amendment is made the current requirement for the carriage and use of a VHM system will be lost. This would have a significant safety impact upon oil and gas exploitation flights and other significant over-water operations such as the Penzance to Isles of Scilly scheduled service and Search and Rescue operations undertaken on behalf of the Maritime Coastguard Agency.

7.22 The CAA issued three Letters of Consultation in connection with this proposal, covering all UK helicopter Air Operator Certificate holders, the Department for Transport and Home Office, and the Air Accident Investigations Branch.

***Balloon Flying Displays***

7.23 The ANO currently provides for the regulation of flying displays. As a result of an exemption issued by the CAA these requirements do not apply to races or contests, and most balloon-only events fall into this category. For the small number of non-competitive balloon events, those consisting of no more than six balloons, there was until 2002 a further general CAA exemption from the ANO requirements. Larger balloon events remained subject to the full panoply of flying display regulation. In 2002 the scope of the exemption was expanded so that no event consisting solely of balloons was subject to the regulatory arrangements that apply to flying displays.

7.24 Direct responsibility for the safe conduct of any flight rests with the commander and operator of the balloon. It remains the case that balloons are subject to the provisions of the Rules of the Air Regulations 2007, particularly those provisions relating to low flying and flight in the vicinity of large groups of people. These arrangements have proved satisfactory and the potential risk to the public is considered by the CAA to be very low.

7.25 In light of the background of satisfactory operations under the general exemption for balloons, the CAA considers that it is appropriate to amend the ANO to reflect the current general exemption so that the article 80 flying display requirements no longer apply to events consisting solely of balloons.

7.26 A letter of Consultation was sent to officers of the British Balloon and Airship Club and the British Association of Balloon Operators. No representations were received.

***8.33kHz Channel Spacing***

7.27 The inability to provide the aviation industry with suitable VHF communications frequencies in a timely manner is a serious constraint on the delivery of operational improvements aimed at providing capacity benefits and reductions in delay. Currently, air-to-ground radio communications are allocated VHF spectrum between 118 and 136.975MHz by the International Telecommunications Union. This spectrum was, until October 1999, divided into 25kHz channels. Channels are not dedicated to a single location but are re-used according to frequency planning rules derived by ICAO.

7.28 To meet the increasing demand for a greater number of communications channels within the available frequency spectrum, in October 1999 8.33kHz channel spacing was introduced in the airspace above 24,500 feet in seven European States. This was extended to a further 22 States, including the UK, in October 2002. Consequently, carriage of 8.33kHz equipment is mandatory in the UK for aircraft flying above 24,500 feet.

7.29 With the demand for new communications frequencies continuing to grow, in December 2000 EUROCONTROL was tasked by ICAO to develop a phased approach for introducing 8.33 kHz channel spacing into the airspace below 24,500 feet. The present Order represents the first phase of this internationally co-ordinated programme by introducing 8.33 kHz channel spacing to the airspace above 19,500 feet in the UK.

7.30 The Civil Aviation Authority formally consulted the aviation community on the proposals in September 2004. In total, eight responses were received, the majority of which were broadly supportive of the proposal to implement the mandatory carriage of 8.33 kHz equipment above 19,500 feet from March 2007. One respondent supported reorganisation of the European Frequency Plan. Three respondents expressed concern over the proposal to convert "designated terminal airspace" to 8.33 kHz channel spacing, but the CAA subsequently dropped this issue from the final version of the Regulatory Impact Assessment.

7.31 Finally, two respondents questioned the costs associated with the implementation of the proposal. The Air Navigation Service Provider, NATS, estimated that the cost for Ground Station Equipage would be at least twice that calculated in the partial Regulatory Impact Assessment. This costs disparity was addressed in the final RIA. The airline respondent used a type of aircraft that had yet to be upgraded to 8.33 kHz and would be one of the more expensive types to upgrade. The costs estimate given in the CAA's RIA were for a "typical" aircraft and therefore were lower than for this aircraft type.

7.32 A summary of replies received, together with the CAA's responses, has been published on the CAA website at;

www.caa.co.uk/docs/7/DAP_SSM_FullRIA_ProposalToAmendTheANO_Introduce833SpacingAboveFL195.pdf

***Miscellaneous amendments***

7.33 A number of minor amendments are made to the ANO.

7.34 The definitions of JAR-FCL 1, JAR-OPS 1 and JAR-OPS 3 in article 155 of the ANO are updated to reflect recently published updated versions of these three documents.

7.35 A minor error is corrected in Schedule 4, paragraph 6, Scale B (6), as are further minor errors in Schedules 5 and 8.

7.36 Finally, the ANO currently provides that whereas a certificate of airworthiness should normally be carried on a flight, there are some exceptions. However, a condition of the new EASA certificate of airworthiness is that it be carried on board the aircraft on each flight with no exceptions. The ANO is therefore amended so as to correct this inconsistency and to reflect the position as set out in the EASA certificate of airworthiness. This has also been extended to national certificates of airworthiness.

## 8. Impact

8.1 Regulatory Impact Assessments in respect of helicopter flight visibility, UK compliance with ICAO standards for General Aviation operations, vibration health monitoring for helicopters and 8.33 kHz channel spacing are attached to this memorandum. In the case of the vibration health monitoring of helicopters this is entitled "Flight Operations Division Communication - 9/2006. A Regulatory Impact Assessment has not been prepared in connection with balloon flying displays or the minor amendments to the existing Air Navigation Order 2005 as they have a negligible impact on business, charities or voluntary bodies.

8.2 The impact on the public sector is likely to be very low. The majority of the amendments are aimed at improving aviation safety and a reduction in accident rates will result in fewer demands being placed on the emergency services. Mechanisms for ensuring compliance with, and the enforcement of, the various provisions of the ANO already exist and the CAA anticipates no requirement for additional resources.

## 9. Contact

David Shephard at the Department for Transport Tel: 020 7944 5881 or e-mail: David.Shephard@dft.gsi.gov.uk can answer any queries regarding the instrument.

# REGULATORY IMPACT ASSESSMENTS

## PROPOSAL TO AMEND THE UNITED KINGDOM AIR NAVIGATION ORDER AND THE RULES OF THE AIR REGULATIONS TO INTRODUCE REVISED WEATHER MINIMA TO IMPROVE THE SAFETY OF HELICOPTER AND GYROPLANE OPERTIONS

### 1 Title of Proposal

1.1 Regulatory Impact Assessment (RIA) for the amendment of Article 155 and Schedules 4 and 8 of the Air Navigation Order 2005 (ANO) and Rules 25, 26 and 29(d) of the Rules of the Air 1996.

### 2 Purpose and Intended Effect

### 2.1 Objective

2.1.1 To amend Article 155 and Schedules 4 and 8 of the ANO and Rules 25, 26 and 29(d) of the Rules of the Air 1996 for the purpose of introducing revised weather minima to improve the safety of helicopter and gyroplane operations.

### 2.2 Background

2.2.1 In 1999, concern about a consistently high accident rate in small and medium size helicopters prompted the Executive Committee of the Safety Regulation Group (SRG) to set up, in collaboration with the helicopter industry, the Small Helicopter Action Group (SHAG), in order to devise a strategy for reducing the numbers of accidents and fatalities occurring each year. In the intervening period, safety measures identified by the SHAG have been progressively introduced and the accident rate has reduced. However, the Department for Transport Air Accidents Investigation Branch (AAIB), reporting on the circumstances of an accident in January 2003, made recommendations in relation to helicopter flights in poor weather conditions. The CAA accepted these recommendations and in its follow-up action report, FACTOR F4/2004, undertook to review the minimum flight visibilities authorised for flight by visual reference and to make proposals for any amendment of the regulations considered necessary.

2.2.2 The concept that all helicopter pilots can safely undertake flight in conditions of low cloud and poor visibility, because the pilot can reduce height and speed and make a precautionary landing if conditions become too difficult, has limitations. As visibility and speed reduce into the lower ranges the inherent instability of the helicopter, exacerbated by the reduction in available visual cues, means that loss of control or collision

with the ground or an obstacle becomes increasingly probable. Under the current regulations there are provisions to enable flights to be conducted by visual reference (to objects outside the aircraft), but for helicopters no visibility minima are specified. For pilots with United Kingdom helicopter licences, the requirements for holding an instrument rating do not apply generally for non-public transport flying in instrument meteorological conditions.

2.2.3 The objective is to reduce the likelihood of inadvertent entry by helicopters into conditions of degraded visual cues such as in fog or low cloud, by providing improved rules for flight by visual reference under the Visual Flight Rules (VFR) and the Instrument Flight Rules (IFR). The revised rules will provide clear parameters to enable pilots to be trained, and then to plan and conduct their flying with greater circumspection at night and in other circumstances where a reduction or degradation of visual conditions may be encountered.

## 2.3 Rationale for Government Intervention

2.3.1 In the eight-year period 1997 – 2004, it is estimated that 1.3 million hours were flown by a fleet of around 950 light helicopters. In the period under consideration, 27 fatal accidents occurred in which 50 people lost their lives and, of these, 41% of the accidents and 42% of the fatalities incurred were attributed to helicopter pilot disorientation and loss of control in conditions of low cloud and poor visibility or at night.

## 3 Consultation

### 3.1 Within Government

3.1.1 The Department for Transport, the Home Office, the Air Accidents Investigation Branch and Departments of the CAA were consulted on this proposal.

### 3.2 Public Consultation

3.2.1 Two rounds of consultation have been conducted. Letters of consultation have been posted on the CAA website and sent to more than one thousand addressees, including representative organisations and associations and the aviation press. Replies to the first Letter of Consultation were received from 46 correspondents, including 10 organisations and 6 companies. Following consideration of the points raised, the CAA proposals were revised and a second Letter of Consultation issued. Analysis of both rounds of consultation revealed 209 comments submitted. Since there was a degree of concurrence in the views being expressed, this was distilled down to 58 items, i.e. 20 general

comments and 38 points specific to different elements of the proposal. A summary of the views expressed by correspondents, together with the CAA's responses to the points raised, is provided in a comment response document which is available on the CAA website:

www.caa.co.uk

Follow the links >Safety Regulation >General Aviation >Information

3.2.2 As a result of assessing responses to the first round of consultation, some of the underlying assumptions in the initial proposal were reconsidered. Initially, an assumption had been made that specifying a minimum flight visibility within the privileges of a helicopter pilot's licence would provide a safety margin to prevent inadvertent flight into instrument meteorological conditions or loss of adequate external visual references. There was little support for this, and it was generally thought that the idea would be ineffective in relation to its intended purpose. In light of this, key elements of the proposal were refocused to concentrate on two issues. First of these is the central fact that, for flight by visual reference, it is the nature and sufficiency of the visual cue environment that is essential for safe flight. Secondly, it needs to be clearly appreciated that flight in reduced visibilities or at night involves risks that are not present to the same degree by day in visual meteorological conditions (VMC), therefore the revised rules have been designed to prompt pilots into adopting appropriate strategies whenever flight in these conditions is contemplated.

3.2.3 Commenting on the CAA's revised proposals in the second Letter of Consultation, several correspondents expressed the view that UK pilot licence holders' privileges, to fly under IFR in Class D airspace or lower, should be preserved. They considered that it would be wrong to remove a pilot's licence privileges, particularly where these have actually been exercised in the past. The CAA accepts this principle and has decided that these privileges can be preserved for individual pilots who have exercised the privileges in the past, subject to appropriate knowledge and logbook evidence. Maintenance of these privileges will thereafter be subject to satisfactory demonstration of the relevant elements of the licensing proficiency check at each revalidation/renewal.

3.2.4 The representative organisations, British Helicopter Advisory Board (BHAB) and Helicopter Club of Great Britain (HCGB), have participated in the Small Helicopter Action Group throughout the development of these proposals, and are supportive of the CAA's revised proposals, as recorded in the comment response document.

## 4 Options

4.1 Four options were considered.

Option 1. One option would have been to do nothing.

This would have had no effect on improving safety of helicopter and gyroplane operations when there was clear evidence that the current modus operandi was resulting in a significant fatal accident rate which the CAA had undertaken to address in response to AAIB recommendations.

Option 2. An option would have been to require all helicopters and gyroplanes to be equipped with blind flying instruments or be certified for instrument flight with all pilots required to hold instrument ratings. However, many helicopters and currently all gyroplanes were unsuited to flight by sole reference to instruments and could not have achieved certification for this purpose. Furthermore, the cost to an individual of obtaining an instrument rating would have been prohibitive for general application; and helicopters were difficult to fly on instruments, even under favourable conditions. Finally, few helicopter types were capable of being operated in the icing conditions, which could prevail at any level when flying in cloud. Therefore, this option was considered impractical.

Option 3. Another option would have been to introduce cloud and/or visibility minima depending upon pilot qualifications. This option would have conservatively set minima for flight visibility and would have required a pilot to divert, or make a precautionary landing before encountering conditions in which visual reference was likely to be lost. However, a distinction would have been drawn between pilots holding private licences, who are generally less experienced, and those holding professional licences, who could be expected to have had the levels of experience and skills necessary to deal more satisfactorily with adverse weather conditions, in which case, lower minima would have been appropriate.

This option formed the basis of the proposals made in the first Letter of Consultation. Based on the responses to the first round of consultation it was realised that this approach had the disadvantage of introducing scope for confusion because of the differing visibility limits that would be contained in licence privileges, as compared with the VFR rules, and the IFR rules that are used for visual flight at night. It was considered that a potential safety dividend could be obtained from simplified rules. As a result of the comments received, the CAA formulated further proposals which became Option 4.

Option 4. Amend Rules 25, 26 and 29(d) of the Rules of the Air 1996 to make explicit the need for adequate visual cues for the safe conduct of flight by visual reference. This would be equally applicable to special VFR flights. At the same time, ensure that the qualifications required for helicopter flights under IFR were appropriately specified in Schedule 8 of the Air Navigation Order 2005 (ANO). This option is designed to provide improved rules for flights conducted by visual reference under both VFR and IFR, removing ambiguity about which of these sets of rules must be applied in particular circumstances. In addition, Schedule 4 of the ANO would be amended to require a basic scale of flight instruments where flights were to be conducted by visual reference in conditions of reduced visibility.

The CAA believed that Option 4 would reduce the likelihood of inadvertent entry by helicopters into conditions of degraded visual cues such as in fog or low cloud, by providing improved rules for flight by visual reference under VFR and IFR. The revised rules will provide clear parameters to enable pilots to be trained, and then to plan and conduct their flying with greater circumspection at night and in other circumstances where a reduction or degradation of visual conditions may be encountered.

## 5 Costs and Benefits

5.1 Sectors and Groups Affected

5.1.1 The proposed amendment to the ANO will affect all operators and pilots of helicopters on flights conducted by visual reference under both VFR and IFR provisions; and any pilot intending to fly helicopters under IFR by sole reference to instruments.

5.1.2 The proposed amendment to the ANO would have no effect on voluntary organisations and charities and would not have any race equality impacts.

5.2 Benefits

Option 1. There would have been no benefits from Option 1. There would be no improvement in the safety of helicopter and gyroplane operations despite the clear evidence that the current modus operandi was resulting in a significant fatal accident rate which the CAA had undertaken to address in response to AAIB recommendations.

Option 2. The benefit of this option would have been that all helicopters and gyroplanes would be equipped with blind flying instruments and been certified for instrument flight enabling the aircraft to be operated safely in limited flight visibility. In addition, all pilots would have been required

to hold an instrument rating. While this would have been the preferred option, many helicopters and currently all gyroplanes were unsuited to flight by sole reference to instruments and could not have achieved certification for this purpose. Furthermore, few helicopter types were capable of being operated in icing conditions, which could prevail at any level when flying in cloud.

Option 3. By introducing cloud and/or visibility minima depending upon pilot qualifications, the benefit of this option would have been to set conservative minima for flight visibility based upon a distinction between pilots holding private licences, who were generally less experienced, and those holding professional licences, who could have been expected to have had the levels of experience and skills necessary to deal more satisfactorily with adverse weather conditions.

Option 4. The benefits of this option were that the proposed changes would provide a regulatory framework that would enable pilots to be trained, appropriately qualified, and plan and conduct their flying with greater circumspection at night and where a reduction or degradation of visual conditions may be encountered. Therefore, of the options proposed, Option 4 represented the most practical course of action to improve the safety of helicopter and gyroplane operations by reducing the likelihood of inadvertent entry by helicopters into conditions of degraded visual cues such as in fog or low cloud.

**5.3 Costs**

5.3.1 Compliance Costs

Option 1. There would have been no compliance costs should this option have been adopted.

Option 2. As this option would have required all helicopters and gyroplanes to be equipped with blind flying instruments and been certified for instrument flight enabling them to be operated safely in limited flight visibility, for normal general application the costs would have been unreasonable. In addition, as stated earlier, many helicopters and gyroplanes were unsuited to flight by sole reference to instruments and could not have achieved certification for this purpose. Furthermore, the cost to an individual of obtaining an instrument rating would also have been prohibitive for general application; helicopters were difficult to fly on instruments, even under favourable conditions.

Option 3. There would have been no compliance costs involved with this option other than those associated with administrative costs associated with changing the regulations.

Option 4. The proposal would require some owners, or their pilots, to invest in training for flight by sole reference to instruments. Any pilot intending to fly helicopters under IFR by reference to instruments (e.g. in cloud) would in future be required to hold, and maintain valid, an instrument rating. This is already required for pilots who hold JAR-FCL licences and wish to fly in cloud, and for any pilot flying under IFR in Class A, B or C airspace. Obtaining and maintaining an instrument rating represents a substantial expenditure, typically in the order of £35,000 initially and thereafter £6,000 per annum. This expenditure is considered to be justified by the need to secure the safety of the aircraft and its occupants in these circumstances. In practice, owners of helicopters that are certified for IFR flight will have to make a choice: whether to pay for pilot training so as to fully utilise the capabilities of the helicopter, or avoid operating in poor weather conditions. The numbers affected by this new cost are small, currently around six operators. Even allowing for growth in this sector, with an increase to say 25 operators affected, the total cost to achieve compliance should remain below £900,000.

5.3.2 Other Costs

There would be costs associated with amending the legislation but no further costs to the industry are anticipated.

5.3.3 Costs for a Typical Business

As stated above, the cost for a pilot to undertake the required training and examinations to obtain an instrument rating on their licence is of the order of £35,000 and thereafter £6,000 each year to keep the rating current. It is anticipated that most pilots involved with flights requiring an instrument rating are already compliant. The proposals would impact on around six operators who have been identified as requiring their licence to be updated to an instrument rating and therefore incurring the costs outlined above.

## 6. Small Firms Impact Test

6.1 Some private helicopter owners use their helicopters for travel in connection with their business. For these owners the costs would be as stated in paragraph 5.3.3 above. The views of small businesses, currently operating helicopters, both large and small, which were likely to be affected by this proposal, have been sought during the consultation exercise. The impact of the proposals, which were designed to improve the safety of operations generally, would potentially affect all operators dependent on whether their aircraft were certified for IFR flight and

whether the pilot was trained to fully utilise the capabilities of the helicopter. Consequential amendments have been included in the proposal to accommodate the intended changes without creating new costs or unintended effects, particularly for the smaller commercial operators, and no representations have been received in this regard.

## 7 Competition Assessment

7.1 All training establishments would have the ability to conduct instrument training and the CAA is responsible for conducting instrument rating examinations and tests, therefore there are no competition issues to record. Individuals would have the opportunity to "shop around" if costs were an issue but it is more likely that the existing arrangements for training requirements would be preserved.

## 8 Enforcement and Sanctions and Monitoring

8.1 The mechanism for enforcement through the ANO already exists, and no additional resources would be required in this regard.

## 9 Implementation and delivery plan

9.1 Details of the CAA proposals to amend the ANO and Rules of the Air 1996, including some consequential changes, are included in Appendices 1 to 7. These attachments to the RIA are as proposed in the second Letter of Consultation.

## 10 Post-implementation plan

10.1 The CAA, as part of its continuing oversight of AOC holders' operations, will assess the effectiveness of the policy. In addition, the CAA will monitor incidents involving non-public transport operations through the mandatory occurrence reporting system. Should modification to the proposals become apparent that would provide more effective improvement in the safety of helicopter and gyroplane operations, the CAA will consult further on proposals that would modify or supersede the requirements proposed by this RIA.

## 11 Summary and recommendation

11.1 The CAA believed that Option 4 would reduce the likelihood of inadvertent entry by helicopters into conditions of degraded visual cues such as in fog or low cloud, by providing improved rules for flight by visual reference under VFR and IFR. The revised rules will provide clear parameters to enable pilots to be trained, and then to plan and conduct their flying with

greater circumspection at night and in other circumstances where a reduction or degradation of visual conditions may be encountered.

11.2 Option 1 was rejected because there would be no improvement in the safety of helicopter and gyroplane operations despite the clear evidence that the current modus operandi was resulting in a significant fatal accident rate which the CAA had undertaken to address in response to AAIB recommendations. Option 2 was rejected because many helicopters and gyroplanes were unsuited to flight by sole reference to instruments and could not have achieved certification for this purpose. Furthermore, the cost to an individual of obtaining an instrument rating would have been prohibitive for general application; and helicopters were difficult to fly on instruments, even under favourable conditions. Finally, Option 3 was rejected because concerns were expressed during the first consultation period that the reduced limits could encourage pilots to depart, or continue flight into conditions only marginally better than those prescribed, on the premise that the conditions are legal and therefore safe.

Summary Costs and Benefits Table

| Option | Total benefit per annum: economic, environmental, social | Total cost per annum: - economic, environmental, social - policy and administrative |
|---|---|---|
| 1 | No benefit. | No cost. |
| 2 | The benefit of this option would have been that all helicopters and gyroplanes would be equipped with blind flying instruments and been certified for instrument flight enabling the aircraft to be operated safely in limited flight visibility. In addition, all pilots would have to have been holders of an instrument rating. Many helicopters and currently all gyroplanes were unsuited to flight by sole reference to instruments and could not have achieved certification for this purpose. Furthermore, few helicopter types were capable of being operated in icing conditions, which could prevail at any level when flying in cloud. | As this option would have required all helicopters and gyroplanes to be equipped with blind flying instruments and been certified for instrument flight enabling them to be operated safely in limited flight visibility, for normal general application the costs would have been unreasonable. Furthermore, the cost to an individual of obtaining an instrument rating would also have been prohibitive for general application. |
| 3 | By introducing cloud and/or visibility minima depending upon | There would have been no compliance costs involved with this |

| | | |
|---|---|---|
| | pilot qualifications, the benefit of this option would have been to set conservative minima for flight visibility based upon a distinction between pilots holding private licences, who were generally less experienced, and those holding professional licences, who could have been expected to have had the levels of experience and skills necessary to deal more satisfactorily with adverse weather conditions. | option other than those associated with administrative costs associated with changing the regulations. |
| 4 | The benefits of this option were that the proposed changes would provide a regulatory framework that would enable pilots to be trained, appropriately qualified, and plan and conduct their flying with greater circumspection at night and where a reduction or degradation of visual conditions may be encountered. | Any pilot intending to fly helicopters under IFR by reference to instruments (e.g. in cloud) would in future be required to hold, and maintain valid, an instrument rating. This is already required for pilots who hold JAR-FCL licences and wish to fly in cloud, and for any pilot flying under IFR in Class A, B or C airspace. Obtaining and maintaining an instrument rating represents a substantial expenditure, typically in the order of £35,000 initially and thereafter £6,000 per annum. This expenditure is considered to be justified by the need to secure the safety of the aircraft and its occupants in these circumstances. The total cost of compliance is < £900,000. |

11.3 The CAA recommends to the Secretary of State for Transport that the ANO be amended at Article 155 and Schedules 4 and 8 of the Air Navigation Order 2005 (ANO) and Rules 25, 26 and 29(d) of the Rules of the Air 1996.

## 12. Contact point

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**Appendix 1**

**PROPOSED AMENDMENT TO RULES OF THE AIR REGULATIONS1996 – RULE 1**

(New text is highlighted and shown in ***bold Italics****;* deletions shown by ~~strike through~~.)

**Interpretation**

**1** (1) In these Rules, unless the context otherwise requires:

***'with the surface in sight' means with the flight crew being able to see sufficient surface features or surface illumination to enable the flight crew to maintain the aircraft in a desired attitude without reference to any flight instrument;***

***and 'when the surface is not in sight' shall be construed accordingly.***

**Appendix 2**

**PROPOSED AMENDMENT TO RULES OF THE AIR REGULATIONS1996 - VFR**

(New text is highlighted and shown in **bold Italics**; deletions shown by ~~strike through~~.)

**SECTION V VISUAL FLIGHT RULES**

**Flight within controlled airspace**

**25** (1) Within Class B airspace:

(a) an aircraft flying in Class B airspace at or above flight level 100 shall remain clear of cloud and within a flight visibility of at least 8 km;

(b) an aircraft flying within Class B airspace below flight level 100 shall remain clear of cloud and in a flight visibility of at least 5 km.

(2) Within Class C, Class D or Class E airspace:

(a) an aircraft flying within Class C, Class D or Class E airspace at or above flight level 100 shall remain at least 1500 metres horizontally and 1000 feet vertically away from cloud and in a flight visibility of at least 8 km;

(b) subject to sub-paragraph (c), an aircraft flying in Class C, Class D or Class E airspace below flight level 100 shall remain at least 1500 metres horizontally and 1000 feet vertically away from cloud and in a flight visibility of at least 5 km;

(c) sub-paragraph (b) shall be deemed to be complied with if:

(i) the aircraft is not a helicopter and is flying at or below 3000 feet above mean sea level at a speed which, according to its airspeed indicator, is 140 knots or less and it remains clear of cloud, ~~in sight of~~ **with** the surface **in sight** and in a flight visibility of at least 5 km; or

(ii) the aircraft is a helicopter flying at or below 3000 feet above mean sea level and it remains clear of cloud, ~~and in sight of~~ **with** the surface **in sight and in a flight visibility of at least 1500 metres.**

**(3) Nothing in this rule shall apply to a helicopter that is air-taxiing[1] or conducting manoeuvres in accordance with the provisions of Rule 5(3)(i)[2].**

[1]

**Flight outside controlled airspace**

**26** (1) An aircraft flying outside controlled airspace at or above flight level 100 shall remain at least 1500 metres horizontally and 1000 feet vertically away from cloud and in a flight visibility of at least 8 km.

(2) (a) Subject to sub-paragraph (b), an aircraft flying outside controlled

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[1] 1 A definition of air-taxiing is proposed for inclusion in Article 155 of the ANO at Annex D. [1]

airspace below flight level 100 shall remain at least 1500 metres horizontally and 1000 feet vertically away from cloud and in a flight visibility of at least 5 km.

(b) Sub paragraph (a) shall be deemed to be complied with if:

(i) the aircraft is flying at or below 3000 feet above mean sea level and remains clear of cloud and ~~in sight of~~ **with** the surface **in sight** and in a flight visibility of at least 5 km;

(ii) the aircraft, is flying at or below 3000 feet above mean sea level at a speed which according to its airspeed indicator is 140 knots or less and remains clear of cloud and ~~in sight of~~ **with** the surface **in sight** and in flight visibility of at least 1500 metres.

(iii) in the case of a helicopter the helicopter is flying at or below 3000 feet above mean sea level flying at a speed, which having regard to the visibility is reasonable, and remains clear of cloud and ~~in sight of~~ **with** the surface **in sight and in a flight visibility of at least 1500 metres.**

**(c) Nothing in this rule shall apply to a helicopter that is air-taxiing or conducting manoeuvres in accordance with the provisions of Rule 5(3)(i)[3].**

[2]

[2] SI 1110/2005

3 SI 1110/2005

**Appendix 3**

**PROPOSED AMENDMENT TO RULES OF THE AIR REGULATIONS1996 - IFR**

(New text is highlighted and shown in **bold Italics**; deletions shown by ~~strike through~~.)

**SECTION VI INSTRUMENT FLIGHT RULES**
**Minimum height**

**29** (1) Without prejudice to the provisions of rule 5, in order to comply with the Instrument Flight Rules an aircraft shall not fly at a height of less than 1000 feet above the highest obstacle within a distance of 5 nautical miles of the aircraft unless:

(a) it is necessary for the aircraft to do so in order to take off or land;

(b) the aircraft is flying on a route notified for the purposes of this rule;

(c) the aircraft has been otherwise authorised by the competent authority; or

(d) the aircraft is flying at an altitude not exceeding 3000 feet above mean sea level and remains clear of cloud, ~~and in sight of~~ **with** the surface **in sight and in a flight visibility of at least 800 metres.**

**(2) Nothing in this rule shall apply to a helicopter that is air-taxiing or conducting manoeuvres in accordance with the provisions of Rule 5(3)(i)** [4].



[4] SI 1110/2005

**Appendix 4**

**PROPOSED AMENDMENT TO THE AIR NAVIGATION ORDER 2005 – ARTICLE 155**

(New text is highlighted and shown in **bold italics**; deletions shown by ~~strike through~~.)

Interpretation

**155** (1) In this Order:

**'Air-taxiing' means flight by a helicopter, or other type of aircraft capable of vertical take-off and landing, above the surface of an aerodrome at a ground speed less than 20 knots for the purpose of taxiing in accordance with normal aviation practice.**

**Appendix 5**

**PROPOSED AMENDMENT TO THE AIR NAVIGATION ORDER 2005 – SCHEDULE 4**

(New text is highlighted and shown in **bold Italics**; deletions shown by ~~strike through~~.)

**SCHEDULE 4**

**5 Table**

| | | | |
|---|---|---|---|
| (15) | Helicopters and Gyroplanes | (a) flying for purposes other than public transport; and | A(1) and (2) and B(1), (2), (3), (4), (5) and, (6) |
| | (i) when flying by day under Visual Flight Rules with ~~visual ground reference~~ **the surface in sight** | | D |
| | **(ii) when flying by day under Instrument Flight Rules with the surface in sight** | | **E** |
| | **(iii) when flying by day under Visual Flight Rules when the surface is not in sight** | | **E** |
| | (~~ii~~iv) when flying by day under Instrument Flight rules ~~or without visual ground reference~~ **when the surface is not in sight:** | | |
| | (aa) outside controlled airspace | | E with E(2) duplicated |
| | (bb) within controlled airspace | | E with both E(2) and E(4) duplicated and F ~~with F(4) for all weights~~ |
| | (~~ii~~iv) when flying at night | | |
| | (aa) with ~~visual ground reference~~ **the surface in sight** | | C, E, G(3) and G(5) and (6) |
| | (bb) ~~without visual ground reference~~ outside controlled airspace **when the surface is not in sight** | | C, E with E(2) duplicated, G(3) and G(5) and (6) |
| | (cc) ~~without visual ground reference~~ within controlled airspace **when the surface is not in sight** | | C, E with both E(2) and E(4) duplicated, F ~~with F(4) for all weights~~, G(3) and G(5) and (6) |

| | |
|---|---|
| (b) flying for the purpose of public transport; and | A, B(1), (2), (3), (4), (5), (6) and (7) and F(1) and F(4) ~~for all weights~~ |
| (i) when flying by day under Visual Flight Rules with ~~visual ground reference~~ **the surface in sight** | D |
| **(ii) when flying by day under Instrument Flight Rules with the surface in sight** | **E** |
| **(iii) when flying by day under Visual Flight Rules when the surface is not in sight** | **E** |
| (~~ii~~**iv**) when flying by day under Instrument Flight rules ~~or without visual ground reference~~ **when the surface is not in sight:** | E with both E(2) and E(4) duplicated, F(2), F(3) and F(5) |
| (~~iii~~**v**) when flying by night with ~~visual ground reference~~ **the surface in sight:** | |
| (aa) when flying with one pilot | C, E with E(2) duplicated and either E(4) duplicated or a radio altimeter, F(2), F(3) F(5) and G |
| (bb) when flying in circumstances where two pilots are required | C, E, F(2), F(3), F(5) and G for each pilot's station |
| (~~iv~~**v**) when flying by night ~~without visual ground reference~~ **when the surface is not in sight** | C, E with both E(2) and E(4) duplicated, F(2) F(3), F(5) and G |

6 The scales of equipment indicated in the foregoing Table shall be as follows –

Scale E

(1) In the case of –

(a) a helicopter or gyroplane, a slip indicator.

(b) any other flying machine, a slip indicator and either a turn indicator or, at the option of the operator, an additional gyroscopic bank and pitch indicator.

(2) A gyroscopic bank and pitch indicator.

(3) A gyroscopic direction indicator.

(4) A sensitive pressure altimeter adjustable for any sea level barometric pressure which the weather report or forecasts available to the commander of the aircraft indicate is likely to be encountered during the intended flight.

**Note** (this does not form part of the proposed amendment)

Items (1)(a) and (4) above are required in any case under Scale D, for flight by day under VFR.

**Appendix 6**

**PROPOSED AMENDMENT TO THE AIR NAVIGATION ORDER 2005 – SCHEDULE 8**

(New text is highlighted and shown in **bold Italics**; deletions shown by ~~strike through~~.)

**Section 1 – United Kingdom Licences**
**2 HELICOPTER AND GYROPLANE PILOTS**

**Private Pilot's Licence (Helicopters)**

Minimum age – 17 years

No maximum period of validity

Privileges:

(1) Subject to paragraph (2), the holder of a Private Pilot's Licence (Helicopters) shall be entitled to fly as pilot in command or co-pilot of any helicopter of a type specified in an aircraft rating included in the licence.

(2) He shall not –

(a) fly such a helicopter for the purpose of public transport or aerial work other than aerial work which consists of –

(i) the giving of instruction in flying if his licence includes a flying instructor's rating, flight instructor rating or an assistant flying instructor's rating; or

(ii) the conducting of flying tests for the purposes of this Order;

in either case in a helicopter owned, or operated under arrangements entered into, by a flying club of which the person giving the instruction or conducting the test and the person receiving the instruction or undergoing the test are both members;

(b) receive any remuneration for his services as a pilot on a flight other than remuneration for the giving of such instruction or the conducting of such flying tests as are specified in sub-paragraph (a);

(c) fly as pilot in command of such a helicopter at night unless his licence includes a night rating (helicopters) or a night qualification (helicopter);

(d) unless his licence includes an instrument rating (helicopter) fly as pilot in command or co-pilot of such a helicopter ~~flying in Class A, B or C airspace~~ in circumstances which require compliance with the Instrument Flight Rules:

**(i) in Class A, B or C airspace at any time;**

**(ii) in Class D, E, F or G airspace unless flying at night and remaining clear of cloud and with the surface in sight**; or

(e) fly as pilot in command of such a helicopter carrying passengers unless –

(i) within the preceding 90 days he has made at least three circuits, each to include take-offs and landings as the sole manipulator of the controls of a helicopter of the same type; or

(ii) if the privileges are to be exercised by night and his licence does not include an instrument rating, within the preceding 90 days he has made at least three circuits, each to include take-offs and landings by night as the sole manipulator of the controls of a helicopter of the same type.

**Commercial Pilot's Licence (Helicopters and Gyroplanes)**

Minimum age – 18 years

Maximum period of validity – 10 years

Privileges:

(1) Subject to paragraphs (2) and (5), the holder of a Commercial Pilot's Licence (Helicopters and Gyroplanes) shall be entitled –

(a) to exercise the privileges of a United Kingdom Private Pilot's Licence (Helicopters) or a United Kingdom Private Pilot's Licence (Gyroplanes) which includes respectively either a night rating (helicopters) or night qualification (helicopter) or a night rating (gyroplanes); and

(b) to fly as pilot in command of any helicopter or gyroplane on which he is so qualified and which is of a type specified in an aircraft rating included in the licence when the helicopter or gyroplane is engaged on a flight for any purpose whatsoever.

(2) He shall not –

(a) ~~unless his licence includes an instrument rating (helicopter) fly such a helicopter on any scheduled journey or on any flight for the purpose of public transport other than in visual meteorological conditions~~; **Deleted**

(b) fly such a helicopter on a flight for the purpose of public transport unless it is certificated for single pilot operation;

(c) fly such a helicopter on any flight for the purpose of public transport after he attains the age of 60 years unless the helicopter is fitted with dual controls and carries a second pilot who has not attained the age of 60 years and who holds an appropriate licence under this Order entitling him to act as pilot in command or co-pilot of that helicopter;

(d) unless his licence includes an instrument rating (helicopter) fly as pilot in command of such a helicopter ~~flying in Class A, B or C airspace~~ in circumstances which require compliance with the Instrument Flight Rules:

**(i) in Class A, B or C airspace at any time;**

**(ii) in Class D, E, F or G airspace unless remaining clear of cloud and with the surface in sight**;

(e) fly as pilot in command of a helicopter carrying passengers unless he has carried out at least three circuits, each to include take-offs and landings, as pilot flying in a helicopter of the same type or a flight simulator of the helicopter type to be used, in the preceding 90 days;

(f) as the holder of a helicopter licence which does not include a valid instrument rating (helicopter) act as pilot in command of a helicopter carrying passengers at night unless during the previous 90 days at least one of the take-offs and landings required in sub-paragraph (e) above has been carried out at night;

(g) fly such a gyroplane on a flight for the purpose of public transport unless it is certificated for single pilot operation;

(h) fly such a gyroplane at night unless he has within the immediately preceding 13 months carried out as pilot in command not less than 5 take-offs and 5 landings at a time when the depression of the centre of the sun was not less than 12º below the horizon; or

(i) fly such a gyroplane on any flight for the purpose of public transport after he attains the age of 60 years unless the gyroplane is fitted with dual controls and carries a second pilot who has not attained the age of 60 years and who holds an appropriate licence under this Order entitling him to act as pilot in command or co-pilot of that gyroplane.

(3) Subject to paragraphs (4) and (5) he shall be entitled to fly as co-pilot of any helicopter or gyroplane of a type specified in an aircraft rating included in the licence when the helicopter or gyroplane is engaged on a flight for any purpose whatsoever.

(4) He shall not –

(a) unless his licence includes an instrument rating (helicopter) fly as co-pilot of a helicopter flying ~~in Class A, B or C airspace~~ in circumstances which require compliance with the Instrument Flight Rules:

**(i) in Class A, B or C airspace at any time;**

**(ii) in Class D, E, F or G airspace unless remaining clear of cloud and with the surface in sight**;

(b) as co-pilot serve at the flying controls in a helicopter carrying passengers during take-off and landing unless he has served as a pilot at the controls during take-off and landing in a helicopter of the same type or in a flight simulator of the helicopter type to be used, in the preceding 90 days; or

(c) ~~unless his licence includes an instrument rating (helicopter) fly as co-pilot of a helicopter on any scheduled journey or on a flight for the purpose of public transport other than in visual meteorological conditions~~. **Deleted**

(5) He shall not at any time after he attains the age of 65 years act as pilot in command or co-pilot of any helicopter or gyroplane on a flight for the purpose of public transport.

**Appendix 7**

## CONSEQUENTIAL AMENDMENTS TO THE AIR NAVIGATION ORDER AND REGULATIONS

(New text is highlighted and shown in **bold italics**; deletions shown by ~~strike through~~.)

These amendments are proposed in order to accommodate the changes in the preceding annexes without creating unintended effects.

## UK RULES OF THE AIR REGULATIONS 1996

### Interpretation

**1** (1) In these Rules, unless the context otherwise requires:

'special VFR flight' means a flight made at any time in a control zone which is Class A airspace, or in any other control zone in Instrument Meteorological Conditions or at night, in respect of which the appropriate air traffic control unit has given permission for the flight to be made in accordance with special instructions given by that unit instead of in accordance with the Instrument Flight Rules and in the course of which flight the aircraft complies with any instructions given by that unit and remains clear of cloud and ~~in sight of~~ **with the surface in sight**;

### Low flying

**5** (3) Exemptions from the low flying prohibitions

**(a) Landing and taking off**

(i) Any aircraft shall be exempt from any low flying prohibition in so far as it is flying in accordance with normal aviation practice for the purpose of taking off from, landing at or practising approaches to landing at or checking navigational aids or procedures at a Government or licensed aerodrome.

(ii) Any aircraft shall be exempt from the 500 feet rule when landing and taking-off **or air-taxiing** in accordance with normal aviation practice.

**Note** (this does not form part of the proposed amendment)
A definition of air-taxiing is proposed for inclusion in Article 155 of the ANO at Annex D.

### Right-hand traffic rule

**19.**—(1) Subject to paragraph (2), an aircraft which is flying within the United Kingdom **with the surface** in sight ~~of the ground~~ and following a road, railway,

canal or coastline, or any other line of landmarks, shall keep such line of landmarks on its

left. (2) Paragraph (1) shall not apply to an aircraft flying within controlled airspace in accordance with instructions given by the appropriate air traffic control unit.

**Composition of crew of aircraft**

**25** (7) Subject to paragraph (8), a helicopter registered in the United Kingdom shall carry at least two pilots as members of its flight crew if it –

(a) has a maximum total weight authorised of 5700 kg or less;

~~(b) has a maximum approved passenger seating configuration of 9 or less;~~

(~~c~~**b**) is flying for the purpose of public transport; and

(~~d~~**c**) is flying in circumstances where the commander is required to comply with the Instrument Flight Rules ~~or is flying by night with visual ground reference~~.

(8) A helicopter described in paragraph (7) shall not be required to carry two pilots if it –

(a) is equipped with an autopilot with, at least, altitude hold and heading mode which is serviceable on take-off;

(b) is equipped with such an autopilot notwithstanding that before take-off the approved autopilot is found to be unserviceable, if the helicopter flies in accordance with arrangements approved by the CAA; ~~or~~

(c) is flying under and in accordance with the terms of a police air operator's certificate; **or**

**(d) is flying by day and remaining clear of cloud and with the surface in sight.**

**Movement of aircraft**

**95 (6) An aircraft flying clear of cloud and with the surface in sight shall, for the purposes of airworthiness (other than articles 19(2) and 20(2) of this Order), be deemed to be flying in accordance with the Visual Flight Rules.**

**Explanatory note** (this does not form part of the proposed amendment)
The above amendment is necessary to allow aircraft which are certificated for flight "under VFR only" to fly under the IFR provisions for flight with the surface in sight; for example at night, or below 3000 feet by day when the visibility is less than 1500 metres.

**Interpretation**

**155** (1) In this Order:

**'With the surface in sight' means with the flight crew being able to see sufficient surface features or surface illumination to enable the flight crew**

**to maintain the aircraft in a desired attitude without reference to any flight instrument;**
**and 'when the surface is not in sight' shall be construed accordingly.**

**Explanatory note** (this does not form part of the proposed amendment)
The same definition as that introduced in Rule 1 of the Rules of the Air Regulations.

**SCHEDULE 8**

**Section 2 – JAR-FCL Licences**

**SUB-SECTION 2**

**Helicopter pilots**

**Commercial Pilot Licence (Helicopter)**

Minimum age – 18 years

Maximum period of validity – 5 years

Privileges and conditions:

(1) Subject to any conditions specified in respect of the licence, the privileges of the holder of a Commercial Pilot Licence (Helicopter) are to –

(a) exercise all the privileges of the holder of a JAR–FCL Private Pilot Licence (Helicopter);

(b) act as pilot in command or co-pilot of any helicopter included in a type rating in Part XII of the licence on a flight other than a public transport flight;

(c) act as pilot in command on a public transport flight of any helicopter certificated for single-pilot operation included in Part XII of the licence;

(d) act as co-pilot on a public transport flight in any helicopter included in Part XII of the licence required to be operated with a co-pilot.

**(2) (a) Subject to paragraph (b)** the licence is subject to the conditions and restrictions specified in paragraph 2.175 of Section 1 of JAR–FCL 2.

**(b) The holder of a Commercial Pilot Licence (Helicopter) may fly in circumstances which require compliance with the Instrument Flight Rules in the United Kingdom in Class D, E, F or G airspace when remaining clear of cloud and with the surface in sight.**

(3) The holder shall not fly as pilot in command on a flight for the purpose of public transport unless he complies with the requirements of paragraph 3.960(a)(2) of Section 1 of JAR-OPS 3 **except when flying by day under the provisions for flight with the surface in sight in Rule 29(1)(d) of the Instrument Flight Rules.**

(4) The holder shall not –

(a) ~~unless his licence includes an instrument rating (helicopter), fly such a helicopter on any scheduled journey or on any flight for the purpose of public transport other than in visual meteorological conditions~~; **Deleted**

(b) fly as pilot in command of a helicopter carrying passengers unless he has carried out at least three circuits, each to include take-offs and landings, as pilot flying in a helicopter of the same type or a flight simulator of the helicopter type to be used, in the preceding 90 days; or

(c) as the holder of a helicopter licence which does not include a valid instrument rating (helicopter) act as pilot in command of a helicopter carrying passengers at night unless during the previous 90 days at least one of the take-offs and landings required in sub-paragraph (b) above has been carried out at night.

Curtailment of privileges of licence holders aged 60 years or more

(5) Age 60–64.

The holder of a licence who has attained the age of 60 years but not attained the age of 65 years shall not act as a pilot of a helicopter on a public transport flight except where the holder is –

(a) a member of a multi-pilot crew; and

(b) the only pilot in the flight crew who has attained the age of 60 years.

(6) Age 65.

The holder of a licence who has attained the age of 65 years shall not act as a pilot of a helicopter on a public transport flight.

**Airline Transport Pilot Licence (Helicopter)**

Minimum age – 21 years

Maximum period of validity – 5 years

Privileges and conditions:

(1) Subject to any conditions specified in respect of the licence, the privileges of the holder of an Airline Transport Pilot Licence (Helicopter) are to –

(a) exercise all the privileges of the holder of a JAR–FCL Private Pilot Licence (Helicopter) and a JAR–FCL Commercial Pilot Licence (Helicopter); and

(b) subject to paragraph (2), act as pilot in command or co-pilot in any helicopter included in a type rating in Part XII of the licence on a public transport flight.

(2) The holder shall not fly as pilot in command on a flight for the purpose of public transport unless he complies with the requirements of paragraph 3.960(a)(2) of Section 1 of JAR-OPS 3 **except when flying by day under the provisions for flight with the surface in sight in Rule 29(1)(d) of the Instrument Flight Rules.**

Curtailment of privileges of licence holders aged 60 years or more

(3) Age 60–64.

The holder of a licence who has attained the age of 60 years but not attained the age of 65 years shall not act as a pilot of a helicopter on a public transport flight except where the holder is –

(a) a member of a multi-pilot crew; and

(b) the only pilot in the flight crew who has attained the age of 60 years.

(4) Age 65.

The holder of a licence who has attained the age of 65 years shall not act as a pilot of a helicopter on a public transport flight.

- END -

# FINAL REGULATORY IMPACT ASSESSMENT CONCERNING THE PROPOSAL TO AMEND THE AIR NAVIGATION ORDER TO ENABLE COMPLIANCE WITH ICAO STANDARDS FOR GENERAL AVIATION OPERATIONS

## 1 Purpose and intended effect of the measure

### 1.1 Background to the issue

The Chicago Convention and ICAO

International aviation is principally governed by the Convention on International Civil Aviation signed at Chicago on 7 December 1944, known as the Chicago Convention.

The Convention sets out a number of fundamental rules for international aviation, provides for Annexes to be adopted specifying Standards and Recommended Practices (SARPs) for different aspects of aircraft operation, provides that signatories to the Convention should adopt the SARPs included in any annexes and establishes the International Civil Aviation Organization (ICAO).

The framework established by the Chicago Convention has been based on each nation undertaking to ensure that aircraft registered in that State comply with certain minimum standards specified in the various annexes to the convention.

The essence of the Chicago treaty

Virtually every state in the world is a signatory to the Chicago Convention (a Contracting State) and thereby a member of ICAO. The convention establishes an agreement between all these states designed to maintain acceptable levels of safety whilst permitting free passage for international air navigation. In essence this arrangement involves each State giving the following undertaking -

*We agree to regulate our aircraft to at least ICAO Standards and to allow your aircraft to come into our airspace - in return for you agreeing to regulate your aircraft to at least ICAO Standards and to allow our aircraft into your airspace.*

The ICAO Universal Safety Oversight Audit Programme

In consideration of the critical need for increased attention to global aviation safety, ICAO has established a programme for safety auditing. This comprises regular, mandatory, systematic and harmonized safety audits carried out by ICAO and applicable to all Contracting States.

### 1.2 The issue

The ICAO audit of the United Kingdom took place in July 2000 and the findings were generally positive. However, in the area of General Aviation (i.e. non-public transport flying) many SARPs contained in the Annexes had not been implemented, therefore ICAO recommended that the UK should take steps to amend the legislation instead of notifying differences.

The UK Civil Aviation Authority (CAA) has a corrective action plan, which includes the response to this audit finding, which aims to remove all significant differences by 31 January 2005. ICAO conducted a follow-up audit in July 2004 which confirmed that this was the only item in the UK's action plan that remained open.

### 1.3 The objective of the change

The proposed amendment to the Air Navigation Order (ANO) is intended to ensure that UK-registered General Aviation aeroplanes and helicopters are operated to internationally accepted standards, particularly when conducting international air navigation.

Any changes should not adversely affect domestic recreational flying.

## 2 Risk assessment

The risks being addressed are regulatory matters, many of which have flight safety and survival implications.

Many internationally accepted operating requirements are not currently implemented in UK regulatory material, which could mean that UK-registered aircraft may not be operated to acceptable minimum safety standards and, as a consequence, the safety of flights may be compromised. In most cases the implications for flight safety and survival are self-evident and, given that the consultation was addressed to a sector of the population that is already well versed in these matters (pilots and owners of general aviation aircraft), it has been considered unnecessary to provide detailed technical justification for every element of the proposal. For example, Appendix 2a deals with the use of oxygen, the subject of hypoxia and its effects is well known, therefore those risks have not been described here.

One particular aspect of the proposal is likely to require some owners to purchase new equipment, i.e. an emergency locator transmitter (ELT). The CAA considers that carriage of an ELT can be a significant aid to rescue, that increases the likelihood that lives will be saved in the event of an accident. Full details are contained in Appendix 8b.

It should also be understood that, for aircraft conducting international flights, failure to comply with the internationally agreed standards may lead pilots

inadvertently to break the laws and regulations of other countries where they fly. This could result in penalties being imposed.

Continued failure to implement the ICAO SARPs would affect the credibility and status of the United Kingdom in global aviation; and UK General Aviation aircraft could be denied freedom to navigate internationally.

## 3 Options

Option 1 Do nothing

Option 2 Require CAA permission for international flights which are not public transport; and issue a general permission for these flights in the CAA Official Record, subject to compliance with conditions (i.e. operating rules) published in a Civil Aviation Publication (CAP).

Option 3 Enable JAR-OPS 0, by reference in the Air Navigation Order.

Option 4 Make a new Statutory Instrument comprising a comprehensive code of general operating requirements, enabled under the ANO.

Option 5 Amend the Air Navigation Order (ANO) to remove ICAO differences.

Advantages and disadvantages of each of these options are illustrated in the following table and discussed in the subsequent paragraphs.

During preliminary consultations to develop the options, three significant points of concern were expressed -

- Any new requirements should not inhibit existing recreational flying activities, such as provision for permits-to-fly and non-radio operations under visual flight rules.

- Implementation of the proposals should not impose significant additional costs on domestic private flying, except where it can be seen to make good sense for flight safety.

- The proposal should not impinge on existing airworthiness and maintenance requirements in the ANO, nor cut across future provisions for these aspects under the European Aviation Safety Agency (EASA). (Note that pilot and engineer licensing is outside the scope of the operating requirements.)

These concerns are considered entirely valid and must be accommodated in the proposed solution.

| Option | Description | Advantages | Disadvantages |
|---|---|---|---|
| 1 | Do nothing. | None. | Does not address the issue. |
| 2 | Require permission for international flights which are not public transport; and issue a general permission for these flights in the CAA Official Record, subject to compliance with conditions (rules) published in a CAP. | Relatively uncomplicated.<br><br>All the requirements for international non-public transport flights would be specified in one document.<br><br>The format of the rules would be familiar to pilots if/when replaced by EU-OPS. | Perceived risk that the CAA could, at some time in the future, withhold or make charges for permission without reasonable cause.<br><br>The safety standards would not apply to flights conducted entirely over the United Kingdom. |
| 3 | Enable JAR-OPS 0 by reference, in the ANO. | Simplicity.<br><br>Harmonization with other States applying JAR-OPS 0 generally. | JAR-OPS 0 text unlikely to meet UK requirements for statutory drafting.<br><br>Will not be available in time. |
| 4 | A new Statutory Instrument comprising a comprehensive code of general operating requirements, enabled under the ANO. | Would provide a single source of operating requirements for General Aviation.<br><br>Detailed regulatory requirements would be easier to apply if set out thematically. | Many existing ANO provisions would have to be removed to avoid conflict - it is judged this legal task could not be undertaken within the desired timescales. |
| 5 | Amend the Air Navigation Order (ANO) to r3move ICAO differences. | This approach is familiar.<br>Achieves proper legal compliance. | Requirements scattered in the ANO and Schedules, therefore can be difficult to find. |

Option 1

Do nothing, i.e. simply maintain existing differences from ICAO SARPs. To do nothing is not really a possibility. United Kingdom obligations under the Chicago Convention do not allow this.

Option 2

This would rely on a requirement for permission for all international flights other than public transport flights. For this proposal to work, a general permission for these flights would have to be published in the CAA Official Record and made subject to compliance with a comprehensive code of general operating rules published in a Civil Aviation Publication. It is likely that such a course of action would be viewed with extreme scepticism by aircraft owners and pilots, who may perceive a risk that the CAA could, at some time in the future, withhold or make charges for permission without reasonable cause. This option would probably be viewed as an unusual or unexpected use of the CAA's powers.

Option 3

The CAA has been deeply involved with the Joint Aviation Authorities (JAA) in the development of JAR-OPS 0, which is a comprehensive code of general operating requirements for corporate aviation and aerial work. It has been designed to provide a means of ICAO compliance and to be suitable for application to all General Aviation activity, should this ever be considered desirable. The idea of an amendment to the ANO, to enable the use of JAR-OPS 0, is attractive in its simplicity and would provide a degree of harmonization with other States that choose to implement it. However, the JAA froze this work in June 2004 so it is now clear that the JAA Notice of Proposed Amendment (NPA) process will not be completed in time to allow this to be achieved within the agreed timescale for UK compliance with the ICAO Annexes applicable to General Aviation. It is also the case that the JAR-OPS text would be unlikely to satisfy the statutory drafting standards required for it to be enabled under UK law. This option would create a secondary task, to identify any areas of conflict with existing ANO provisions and ensure that all areas of conflict were removed.

Option 4

The Air Navigation Order is secondary legislation enabled under the Civil Aviation Act 1982. In turn, provision is made for other regulations to be enabled under the ANO. The fourth option, which has been identified, would be to make a new Statutory Instrument containing all the requirements for General Aviation operations. The work that has been done to develop JAR-OPS 0 (see option 3 above) could provide a sound basis for these requirements and this would be likely to mean that any differences from the practices of other European states

could be kept to a minimum. This would be of benefit in the future, for example in facilitating harmonization.

To provide a single source of operational requirements in this way would be beneficial both to pilots and to the regulator, as detailed regulatory requirements are easier to follow when organized into themed subparts. This would make it easier for operators to achieve compliance, with obvious benefits for flight safety, and also facilitate the regulator's duty to exercise oversight.

In common with option 3, drawing together all of the operational requirements for General Aviation in this way would create a secondary task: to identify any areas of conflict with existing ANO provisions and ensure that all areas of conflict were removed. This would be a time consuming exercise which could not be undertaken within the desired timescales, particularly in light of the existing CAA Legal Department workload in connection with transition to the European Aviation Safety Agency.

Option 5

For those ICAO Standards that address circumstances where a fatal or serious accident may occur, amending the Air Navigation Order provides the easiest and most immediate method of implementing the internationally accepted requirements. The proposed amendments are detailed in the appendices to this paper.

The implications of the European Aviation Safety Agency inception in September 2003 are such that it has been decided that nugatory effort can be avoided if standards that do not directly address a potentially hazardous condition, either in terms of flight safety or survival, are excluded from this proposal. (Such standards deal with items such as data link communications, flight data recorders and cockpit voice recorders.)

Therefore, based on all of the foregoing, the preferred course of action is to adopt option 5.

## 4 Benefits of the preferred option

Option 5 has the advantages that -

- Proper legal compliance is achieved for ICAO Standards directly affecting flight safety and/or survival.

- Implementing the ICAO Standards for general aviation will benefit flight safety because it will help pilots to ensure that flights are prepared and conducted in accordance with appropriate and internationally accepted minimum standards for flight operations.

- The proposed amendment to the Air Navigation Order is designed to meet UK obligations under the Chicago Convention, thus ensuring continuation of existing freedom of air navigation for owners and pilots of UK registered aircraft.

## 5 Compliance costs

Since the laws and regulations of other States are, under the terms of the Chicago Convention, expected to implement the ICAO requirements: ICAO SARPs must in any case be complied with whenever State boundaries are crossed. Therefore, in theory at least, the proposed amendments to the ANO should not impose any new costs for owners or pilots undertaking international flights.

Implementation of the internationally agreed standards should not impose significant additional costs on domestic private flying except perhaps in some areas where it can be seen to make good sense for flight safety or survival.

One element of the proposal would require some owners to purchase new equipment, i.e. an emergency locator transmitter (ELT). This equipment is designed to be a significant aid to rescue, that increases the likelihood that lives will be saved in the event of an accident. The cost of the equipment must also be balanced against the potential cost of a search and rescue operation for an aircraft without an ELT. The proposal set out in Appendix 8b requires either a survival ELT or an automatic ELT for extended flights over water. The cost of a survival ELT is in the region of £1,500 and there are no installation costs. The cost of an automatic ELT is around £2,000 to £2,200 to which must be added installation costs. For operators who choose to fit an automatically deployable ELT (a particular type of automatic ELT) the cost would be around £19,000, not including installation. If it is assumed that between one quarter and one third of general aviation aeroplanes and helicopters were to be equipped with a portable survival ELT (the least expensive and most flexible option), then approximately 2000 to 3000 units would be required, and the total cost to achieve compliance would be between £3m and £4.6m.

Fuller details of the cost implications of this aspect of the proposal are included with the safety justification provided in Appendix 8b. Although the calculations must be treated with caution owing to the relatively small numbers involved and the assumptions that have to be made, it appears that the cost per life saved is likely to be about £0.81m (i.e. between £0.64m and £0.98m). In making this calculation no allowance has been made for transfer of costs, e.g. savings to the rescue services resulting from shortened search times.

The proposed date for compliance, 1 January 2007, has been chosen to allow time for owners to procure new equipment and to arrange installation, where necessary, during planned maintenance to minimise any loss of utilisation.

## 6 Competition assessment

There are no competitive aspects associated with the proposed amendment, since the affected aircraft are generally privately operated. For aircraft that are used for aerial work activities, such as oil pollution control and surveying, any international flights would normally be expected to meet appropriate ICAO Standards.

As signatories to the Chicago Convention, the UK also allows foreign aircraft that comply with the ICAO Standards to fly in our airspace.

## 7 Effects on small business

During consultation, details were specifically requested of any effects that could be foreseen, either adverse or beneficial, for owners and pilots of aircraft that are used in support of small businesses. No representations were received on this matter.

## 8 Enforcement and sanctions, monitoring and review

The mechanisms for enforcement through the Air Navigation Order already exist and no additional resources will be required in this regard. Ensuring that the legislation remains appropriate, and as far as possible compliant with ICAO standards, is done by the CAA as part of a formal and regular process of review.

## 9 Formal consultation

Two rounds of consultation have been conducted. Letters of consultation have been posted on the CAA website and sent to 249 addressees, including representative organisations and associations, the aviation press, avionics companies, and operators of private corporate aircraft. Replies to the first Letter of Consultation were received from 132 correspondents, including 9 organisations and 25 companies. Following consideration of the points raised, the CAA proposals were revised and a second Letter of Consultation issued. Analysis of all the correspondence revealed a total of 885 comments submitted. Since there was a high degree of concurrence in the views being expressed, this was distilled down to 137 items, i.e. 29 general comments and 108 points specific to different elements of the proposal.

## 10 Results of consultations

The results of both rounds of consultation, including the CAA's responses to the points raised, are summarised in a comment/response document that will be made available on the CAA website: www.caa.co.uk
Follow the links >Safety Regulation >General Aviation >Information

Replies to the second Letter of Consultation were received from 15 correspondents, comprising 12 organisations and 3 companies, and indicated that the CAA's revised proposals were generally acceptable. However, three of the representative associations commented that a reasoned safety case with costs and benefits was required to support one element of the proposal that would require some owners to purchase new equipment, i.e. an emergency locator transmitter (ELT). The cost of such equipment was thought to be unwarranted without such safety justification having been demonstrated. Some reservation was also expressed with regard to the proposed 10 minutes' offshore distance rule for ELT carriage, and one of the correspondents thought this would be a significant inconvenience to many pilots. Accordingly, the appendix to the RIA dealing with this aspect of the proposal (Appendix 8b) has been expanded to provide more detailed information showing that the proposal is justified.

## 12. Contact point

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Appendices:

Appendix 1a - Responsibilities of pilot-in-command
Appendix 2a - Use of oxygen
Appendix 3a - Flight in accordance with the instrument flight rules
Appendix 4a - Aerodrome operating minima
Appendix 5a - Oxygen supply
Appendix 6a - Equipment - aeroplanes and helicopters on all flights
Appendix 7a - Marking of break-in points
Appendix 8b - Emergency locator transmitter (ELT)
Appendix 9a - Flights over water - seaplanes
Appendix 10b - Flights over water - emergency equipment
Appendix 11a - Flights over designated land areas difficult for search and rescue
Appendix 12a - Night flight - instruments and equipment
Appendix 13a - IFR flight - communication equipment
Appendix 14a - Instruction - general (helicopter rotors)
Appendix 15a - Helicopter flights over water - means of floatation

Note: References in the Appendices (e.g. 1-G-1) are to the comment numbers used in the comment response document.

**APPENDIX 1a**

## RESPONSIBILITIES OF PILOT-IN-COMMAND

### The Chicago Convention:

*Article 11 - Applicability of air regulations*
Subject to the provisions of this Convention, the laws and regulations of a contracting State relating to the admission to or departure from its territory of aircraft engaged in international air navigation, or to such aircraft while within its territory, shall be applied to the aircraft of all contracting States without distinction as to nationality, and shall be complied with by such aircraft upon entering or departing from or while within the territory of that State.

### ICAO Standards:

*Aeroplanes - ICAO Annex 6, Part II*
3.2 The pilot-in-command shall be responsible for the safety of all crew members, passengers and cargo on board when doors are closed. The pilot-in-command shall be responsible for the operation and safety of the aeroplane from the moment the aeroplane is ready to move for the purpose of taking off until the moment it finally comes to rest at the end of the flight and the engine(s) used as primary propulsion units are shut down.

*Helicopters - ICAO Annex 6, Part III, Section III*
1.2 The pilot-in-command shall be responsible for the operation and safety of the helicopter and for the safety of all persons on board, during flight time.

**Proposed ANO amendment** (deletion shown by **~~strike through~~**)

*Pre-flight action by commander of aircraft*

43 The commander of an aircraft **~~registered in the United Kingdom~~** shall reasonably satisfy himself before the aircraft takes off:

(a) that the flight can safely be made, taking into account the latest information available as to the route and aerodrome to be used, the weather reports and forecasts available and any alternative course of action which can be adopted in case the flight cannot be completed as planned;

(b)

(i) that the equipment (including radio apparatus) required by or under this Order to be carried in the circumstances of the intended flight is carried and is in a fit condition for use; or

(ii) that the flight may commence under and in accordance with the terms of a permission granted to the operator pursuant to article 16 of this Order;

(c) that the aircraft is in every way fit for the intended flight, and that where a certificate of maintenance review is required by article 10(1) of this Order to be in force, it is in force and will not cease to be in force during the intended flight;

(d) that the load carried by the aircraft is of such weight, and is so distributed and secured, that it may safely be carried on the intended flight;

(e) in the case of a flying machine or airship, that sufficient fuel, oil and engine coolant (if required) are carried for the intended flight, and that a safe margin has been allowed for contingencies, and, in the case of a flight for the purpose of public transport, that the instructions in the operations manual relating to fuel, oil and engine coolant have been complied with;

(f) in the case of an airship or balloon, that sufficient ballast is carried for the intended flight;

(g) in the case of a flying machine, that having regard to the performance of the flying machine in the conditions to be expected on the intended flight, and to any obstructions at the places of departure and intended destination and on the intended route, it is capable of safely taking off, reaching and maintaining a safe height thereafter and making a safe landing at the place of intended destination; and

(h) that any pre-flight check system established by the operator and set forth in the operations manual or elsewhere has been complied with by each member of the crew of the aircraft.

*Authority of commander and members of the crew of an aircraft*

67 Every person in an aircraft shall obey all lawful commands which the commander of that aircraft may give for the purpose of securing the safety of the aircraft and of persons or property carried therein, or the safety, efficiency or regularity of air navigation.

**Changes to the proposal**

No comments were received relating to this appendix. There are no changes to this part of the proposal.

**Explanatory note** (this does not form part of the proposed amendment)

The UK relies on the provisions of Article 43 of the Air Navigation Order (ANO) in achieving compliance with more than twenty ICAO Standards contained in the general aviation annexes. Two such standards are shown above to illustrate the sort of general duties and obligations that are set by the standards, and for which the commander of the aircraft will in most cases be responsible. The applicability of ANO Article 43 is presently limited to UK-registered aircraft.

It is a matter of concern that these general pre-flight duties do not at present apply to pilots of foreign-registered aircraft being operated within the UK. There are believed to be between 500 and 600 such aircraft permanently domiciled in this country, many of which are owned by persons whose permanent residence is in the United Kingdom. For this reason it is proposed to delete the phrase "registered in the United Kingdom" from this article. This will make clear obligations regarding the general duties the commanders of all aircraft have to ensure that a flight can be safely made. The text of ANO Article 67 has been included here for comparison, and also for its relevance in the context of the particular ICAO Standards shown above.

**APPENDIX 2a**

## USE OF OXYGEN

**ICAO Standards:**

*Aeroplanes - ICAO Annex 6, Part II*
4.10 All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in 4.9. *[See appendix 5 'Oxygen Supply'.]*

*Helicopters - ICAO Annex 6, Part III, Section III*
2.10 All flight crew members, when engaged in performing duties essential to the safe operation of a helicopter in flight, shall use breathing oxygen continuously whenever the circum-stances prevail for which its supply has been required in 2.9.1 or 2.9.2. *[See appendix 5 'Oxygen Supply'.]*

**Proposed ANO amendment** (new text shown in **bold**)

***Non public transport flights - additional duties of commander***
**45A - (1) This article shall apply to an aircraft flying for any purpose other than public transport.**

**(2) In relation to every flight to which this article applies the commander of the aircraft shall, except in a case where a pressure greater than 700 hectopascals is maintained in all passenger and crew compartments throughout the flight, take all reasonable steps to ensure that:**

**(a) before the aircraft reaches flight level 130 the method of use of the oxygen provided in the aircraft in compliance with the requirements of article 14 of and Schedule 4 to this Order is demonstrated to all passengers;**

**(b) when flying above flight level 130 all passengers are recommended to use oxygen; and**

**(c) during any period when the aircraft is flying above flight level 100 up to and including flight level 130 oxygen is used by all the flight crew of the aircraft for that part of the flight at those altitudes that is of more than 30 minutes duration; and**

**(d) during any period when the aircraft is flying above flight level 130 oxygen is used by all the flight crew of the aircraft.**

**Changes to the proposal**

Having considered the comments received (see 1-2-1 to 1-2-8), this proposal has been amended to allow a period not exceeding 30 minutes to be flown between FL100 and FL 130, without flight crew using oxygen. Note that such allowance does not apply to public transport flights.

**Explanatory note** (this does not form part of the proposed amendment)

These requirements for the use of oxygen are applicable to all aircraft, and are designed to achieve compliance with the relevant ICAO standards and guidance. For aeroplanes, the parameters are those contained in Attachment A to Annex 6 Part II. For helicopters, standards 2.9.1 and 2.9.2 of Annex 6 Part III Section 3 are met.

(See also Appendix 5a 'Oxygen Supply')

**APPENDIX 3a**

## FLIGHT IN ACCORDANCE WITH THE INSTRUMENT FLIGHT RULES

**ICAO Standards:**

*Aeroplanes - ICAO Annex 6, Part II*

4.6.2.2 *When no destination alternate aerodrome is required.* A flight to be conducted in accordance with the instrument flight rules to an aerodrome when no alternate aerodrome is required shall not be commenced unless:

a) a standard instrument approach procedure is prescribed for the aerodrome of intended landing; and

b) available current meteorological information indicates that the following meteorological conditions will exist from two hours before to two hours after the estimated time of arrival:

1) a cloud base of at least 300 m (1 000 ft) above the minimum associated with the instrument approach procedure; and

2) visibility of at least 5.5 km or of 4 km more than the minimum associated with the procedure.

*Helicopters - ICAO Annex 6, Part III, Section III*

2.6.2.2 *When no alternate is required.* A flight to be conducted in accordance with the instrument flight rules to a heliport when no alternate heliport is required shall not be commenced unless available current meteorological information indicates that the following meteorological conditions will exist from two hours before to two hours after the estimated time of arrival: or from the actual time of departure to two hours after the estimated time of arrival, whichever is the shorter period:

a) a cloud base of at least 120 m (400 ft) above the minimum associated with the instrument approach procedure; and

b) visibility of at least 1.5 km more than the minimum associated with the procedure.

***Note**.- These should be considered as minimum values where a reliable and continuous meteorological watch is maintained. When only an "area" type forecast is available these values should be increased accordingly.*

**Proposed ANO amendment** (new text shown in **bold**; deletion shown by ~~**strike through**~~.)

*Non-public transport aircraft - aerodrome operating minima* 40 - (1) This article shall apply to any aircraft which is not a public transport aircraft.

" (1A) An aircraft to which this article applies shall not:

(a) conduct a Category II, Category IIIA or Category IIIB approach and landing; or (b) take-off when the relevant runway visual range

is less than 150 metres, otherwise than under and in accordance with the terms of an approval so to do granted in accordance with the law of the country in which it is registered.

(1B) In the case of an aircraft registered in the United Kingdom, the approval referred to in paragraph (1A) shall:

(a) be issued by the CAA; (b) be in writing; and (c) contain such conditions as the CAA thinks fit.

~~(3A)~~ **(1C)** If, according to the information available, an aircraft would as regards any flight be required by the Rules of the Air to be flown in accordance with the Instrument Flight Rules at the aerodrome of intended landing, the commander of the aircraft shall select prior to take-off an alternate aerodrome unless no aerodrome suitable for that purpose is available.

**(1D) A flight to be conducted in accordance with the instrument flight rules to an aerodrome when no suitable alternate aerodrome is available shall not be commenced unless:**

**(a) a designated standard instrument approach procedure is available for the aerodrome of intended landing; and**

**(b) available current meteorological information indicates that visual meteorological conditions will exist at the aerodrome of intended landing from two hours before to two hours after the estimated time of arrival.**

*(1E) A flight shall not be continued towards the aerodrome of intended landing unless the latest available information indicates that conditions at that aerodrome, or at least one alternate aerodrome, will, at the estimated time of arrival, be at or above the specified aerodrome operating minima.*

(2) Without prejudice to the provisions of paragraph (1A) an aircraft to which this article applies when making a descent at an aerodrome to a runway in respect of which there is a notified instrument approach procedure shall not descend from a height of 1000 ft or more above the aerodrome to a height less than 1000 ft above the aerodrome if the relevant runway visual range for that runway is at the time less than the specified minimum for landing.

(3) Without prejudice to the provisions of paragraph (1A) an aircraft to which this article applies when making a descent to a runway in respect of which there is a notified instrument approach procedure shall not:

(a) continue an approach to landing on such a runway by flying below the relevant specified decision height; or

(b) descend below the relevant specified minimum descent height;

unless in either case from such height the specified visual reference for landing is established and is maintained.

~~(3A)~~ Renumbered (1C)

(4) In this article 'specified' in relation to aerodrome operating minima means such particulars of aerodrome operating minima as have been notified in respect of the aerodrome or if the relevant minima have not been notified such minima as are ascertainable by reference to the notified method for calculating aerodrome operating minima.

(4A) In this article "Category II, Category IIIA and Category IIIB approach and landing" have the same meaning as in article 39(8).

**(4B) In this article 'designated' in relation to a standard instrument approach procedure means notified, prescribed or otherwise designated by the relevant competent authority.**

Interpretation 129 - (1) In this Order:

**'Standard instrument approach procedure' means an instrument approach procedure designed in accordance with International Civil Aviation Organization Procedures for Air Navigation Services (PANS-OPS) or United States Standard for Terminal Instrument Procedures (TERPS);**

**Changes to the proposal**

Having considered the comments received (see 1-3-1 to 1-3-5), this proposal has been amended to enable easier interpretation of the forecast requirements for despatch of an IFR flight where no alternate is available. The proposal has also been amended to arrange the paragraphs of Article 40 into a more logical order, i.e. the rules for flight despatch now appear before other parts of the rule that relate to continuation of the flight. The revised proposal is considered to satisfy the ICAO standards in a way that is clear and appropriate to the needs of General Aviation pilots, without being unduly prescriptive.

**Explanatory note** (this does not form part of the proposed amendment)

On the rare occasions that a flight is to be made under IFR to a destination where there is no suitable alternate available, for the flight to be despatched there must be an instrument approach procedure available and VMC forecast at

the destination. Note that the departure aerodrome may also be used as an en-route or a destination alternate - in which event these provisions will not apply.

Once the flight has commenced, the provisions of paragraph (1E) will apply (see Appendix 4a).

**APPENDIX 4a**

## AERODROME OPERATING MINIMA

### ICAO Standards:

*Aeroplanes - ICAO Annex 6, Part II*
4.6.3.1 A flight shall not be continued towards the aerodrome of intended landing unless the latest available meteorological information indicates that conditions at that aerodrome, or at least one destination alternate aerodrome, will, at the estimated time of arrival, be at or above the specified aerodrome operating minima.

*Helicopters - ICAO Annex 6, Part III, Section III*
2.6.3.1 A flight shall not be continued towards the heliport of intended landing unless the latest available meteorological information indicates that conditions at that heliport, or at least one alternate heliport, will, at the estimated time of arrival, be at or above the specified heliport operating minima.

**Proposed ANO amendment** (new text shown in **bold**; deletion shown by ~~**strike through**~~.)

*Non-public transport aircraft - aerodrome operating minima* 40 - (1) This article shall apply to any aircraft which is not a public transport aircraft.

" (1A) An aircraft to which this article applies shall not:

(a) conduct a Category II, Category IIIA or Category IIIB approach and landing; or (b) take-off when the relevant runway visual range is less than 150 metres, otherwise than under and in accordance with the terms of an approval so to do granted in accordance with the law of the country in which it is registered.

(1B) In the case of an aircraft registered in the United Kingdom, the approval referred to in paragraph (1A) shall:

(a) be issued by the CAA; (b) be in writing; and (c) contain such conditions as the CAA thinks fit.

~~(3A)~~ *(1C)* If, according to the information available, an aircraft would as regards any flight be required by the Rules of the Air to be flown in accordance with the Instrument Flight Rules at the aerodrome of intended landing, the commander of the aircraft shall select prior to take-off an alternate aerodrome unless no aerodrome suitable for that purpose is available.

*(1D) A flight to be conducted in accordance with the instrument flight rules to an aerodrome when no suitable alternate aerodrome is available shall not be commenced unless:*

> *(a) a designated standard instrument approach procedure is available for the aerodrome of intended landing; and*
>
> *(b) available current meteorological information indicates that visual meteorological conditions will exist at the aerodrome of intended landing from two hours before to two hours after the estimated time of arrival.*

**(1E) A flight shall not be continued towards the aerodrome of intended landing unless the latest available information indicates that conditions at that aerodrome, or at least one alternate aerodrome, will, at the estimated time of arrival, be at or above the specified aerodrome operating minima.**

(2) Without prejudice to the provisions of paragraph (1A) an aircraft to which this article applies when making a descent at an aerodrome to a runway in respect of which there is a notified instrument approach procedure shall not descend from a height of 1000 ft or more above the aerodrome to a height less than 1000 ft above the aerodrome if the relevant runway visual range for that runway is at the time less than the specified minimum for landing.

(3) Without prejudice to the provisions of paragraph (1A) an aircraft to which this article applies when making a descent to a runway in respect of which there is a notified instrument approach procedure shall not:

> (a) continue an approach to landing on such a runway by flying below the relevant specified decision height; or (b) descend below the relevant specified minimum descent height;

unless in either case from such height the specified visual reference for landing is established and is maintained.

~~(3A)~~ Renumbered (1C)

(4) In this article 'specified' in relation to aerodrome operating minima means such particulars of aerodrome operating minima as have been notified in respect of the aerodrome or if the relevant minima have not been notified such minima as are ascertainable by reference to the notified method for calculating aerodrome operating minima.

(4A) In this article "Category II, Category IIIA and Category IIIB approach and landing" have the same meaning as in article 39(8).

*(4B) In this article 'designated' in relation to a standard instrument approach procedure means notified, prescribed or otherwise designated by the relevant competent authority.*

**Changes to the proposal**

There are no changes to the wording of this part of the proposal, although the paragraphs of Article 40 have been arranged into a more logical order, i.e. the rules for flight despatch now appear before this part, which relates to continuation of the flight. In light of comment 1-4-1, the explanatory note has been expanded.

**Explanatory note** (this does not form part of the proposed amendment)
This rule makes explicit one of the basic tenets of good airmanship: A flight must not be continued unless the weather at the destination, or an alternate, is likely to be suitable for making an approach and landing. Note that the departure aerodrome may also be used as an en-route or a destination alternate; and the provisions apply to all flights, whether conducted under visual flight rules (VFR) or instrument flight rules (IFR).

The proposed Article 40 (1C) uses wording closely aligned with that used in JAR-OPS 1 and 3, i.e. omitting the word "meteorological" so that a requirement to obtain a formal forecast need not be implied. Clearly in this context the information has to be available to the pilot in the aircraft therefore he could not reasonably be expected to act on it until it such time as he would normally obtain it (e.g. designated operational coverage (DOC) of aeronautical radio stations will be limiting). Thus it would be expected that application and interpretation of the requirement would be no different from the existing JAR-OPS rules.

**APPENDIX 5a**

## OXYGEN SUPPLY

### ICAO Standards:

*Aeroplanes - ICAO Annex 6, Part II*
4.9 The pilot-in-command shall ensure that breathing oxygen is available to crew members and passengers in sufficient quantities for all flights at such altitudes where a lack of oxygen might result in impairment of the faculties of crew members or harmfully affect passengers.

6.5.1 All aeroplanes intended to be operated at high altitudes shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in 4.9.

*Helicopters - ICAO Annex 6, Part III, Section III*
2.9.1 A flight to be operated at altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa shall not be commenced unless sufficient stored breathing oxygen is carried to supply:

a) all crew members and 10 per cent of the passengers for any period in excess of 30 minutes that the pressure in compartments occupied by them will be between 700 hPa and 620 hPa;
b) the crew and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa.

2.9.2 A flight to be operated with a pressurized helicopter shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the crew members and a proportion of the passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700 hPa.

4.5.1 Unpressurized helicopters intended to be operated at high altitudes shall carry equipment for storing and dispensing the oxygen supplies required in 2.9.1.

4.5.2 Pressurized helicopters

Recommendation. - *Pressurized helicopters intended to be operated at high altitudes should carry emergency oxygen storage and dispensing equipment capable of storing and dispensing the oxygen supplies required in 2.9.2.*

**Proposed ANO amendment** (new text shown in **bold**)

SCHEDULE 4

4 *Table*

| *Description of aircraft* | *Circumstances of flight* | *Scale of equipment required* |
|---|---|---|
| (2) Aeroplanes | (a) *flying for purposes other than public transport;* and | A (i) and (ii) and B (i) |
| | (i) when flying by night | C and D |
| | (ii) when flying under Instrument Flight Rules:<br><br>(aa) outside controlled airspace | D |
| | (bb) within Class A, B, or C airspace | E with E (iv) duplicated and F |
| | (cc) within Class D and E airspace | E and F |
| | (iii) when carrying out aerobatic manoeuvres | B (iii) |
| | **(iv) when flying at a height of 13 000 ft or more above mean sea level** | **L1 or L2** |

| | | |
|---|---|---|
| (15) Helicopters and Gyroplanes | (a) *flying for purposes other than public transport;* and | A (i), ~~and~~ (ii), *(iii) and (iv)* and B (i) |
| | (i) when flying by day under Visual Flight Rules with visual ground reference | D |
| | (ii) when flying by day under Instrument Flight Rules or without visual ground reference | |
| | (aa) outside controlled airspace | E with E (ii) duplicated |
| | (bb) within controlled airspace | E with both E (ii) and E (iv) duplicated and F with F (iv) for all weights |
| | (iii) when flying at night | C, E, G (iii) and G (v) |

| | | |
|---|---|---|
| | (aa) with visual ground reference | |
| | (bb) without visual ground reference<br><br>(aaa) outside controlled airspace | C, E with E (ii) duplicated G (iii) and G (v) |
| | (bbb) within controlled airspace | C, E with both E (ii) and E (iv) duplicated, F with F (iv) for all weights, G (iii) and G (v) |
| | **(iv) when flying at a height of 13 000 ft or more above mean sea level.** | **L1 or L2** |

5 The scales of equipment indicated in the foregoing Table shall be as follows:

*Scale L1*

Part I

(i) In every flying machine which is provided with means for maintaining a pressure greater than 700 hectopascals throughout the flight in the flight crew compartment and in the compartments in which the passengers are carried:

(a) a supply of oxygen sufficient, in the event of failure to maintain such pressure, occurring in the circumstances specified in columns 1 and 2 of the Table set out in Part II, for continuous use, during the periods specified in column 3 of the said Table, by the persons for whom oxygen is to be provided in accordance with column 4 of that Table; and

(b) in addition, in every case where the flying machine flies above flight level 350, a supply of oxygen in a portable container sufficient for the simultaneous first aid treatment of 2 passengers;

together with suitable and sufficient apparatus to enable such persons to use the oxygen.

(ii) In any other flying machine:

(a) a supply of oxygen sufficient for continuous use by all the crew other than the flight crew, and if passengers are carried, by 10% of the number of passengers, for any period exceeding 30 minutes during which the flying machine flies above flight level 100 but not above flight level 130 and the flight crew shall be supplied with oxygen sufficient for continuous use for any period during which the flying machine flies above flight level 100; and

(b) a supply of oxygen sufficient for continuous use by all persons on board for the whole time during which the flying machine flies above flight level 130;

together with suitable and sufficient apparatus to enable such persons to use the oxygen.

(iii) The quantity of oxygen required for the purpose of complying with paragraphs (i) and (ii) of this Part shall be computed in accordance with the information and instructions relating thereto specified in the operations manual relating to the aircraft pursuant to item (vi) of Part A of Schedule 10 to this Order.

Part II

| *Column 1*<br>*Vertical displacement of the flying machine in relation to flight levels* | *Column 2*<br>*Capability of flying machine to descend (where relevant)* | *Column 3*<br>*Period of supply of oxygen* | *Column 4*<br>*Persons for whom oxygen is to be provided* |
|---|---|---|---|
| Above flight level 100 | - | 30 minutes or the period specified at A hereunder whichever is the greater | In addition to any passengers for whom oxygen is provided as specified below, all the crew |
| Above flight level 100 but not above flight level 300 | Flying machine is either flying at or below flight level 150 or is capable of descending and continuing to destination as specified at X hereunder | 30 minutes or the period specified at A hereunder whichever is the greater | 10% of number of passengers |

| | | | |
|---|---|---|---|
| Above flight level 300 but not above flight level 350<br><br>Above flight level 350 | Flying machine is flying above flight level 150 and is not so capable | 10 minutes or the period specified at B hereunder whichever is the greater<br><br>and in addition<br><br>30 minutes or the period specified at C hereunder whichever is the greater | All passengers<br><br>10% of number of passengers<br><br>15% of number of passengers |
| | Flying machine is capable of descending and continuing to destination as specified at Y hereunder Flying machine is not so capable | 30 minutes or the period specified at A hereunder whichever is the greater<br><br>10 minutes or the period specified at B hereunder whichever is the greater<br><br>and in addition<br><br>30 minutes or the period specified at C hereunder whichever is the greater<br><br>10 minutes or the period specified at B hereunder whichever is the greater<br><br>and in addition<br><br>30 minutes or the period specified at C hereunder whichever is the greater | All passengers<br><br>15% of number of passengers<br><br>All passengers<br><br>15% of number of passengers |

A The whole period during which, after a failure to maintain a pressure greater than 700 hectopascals in the control compartment and in the compartments in which passengers are carried has occurred, the flying machine flies above flight level 100.

B The whole period during which, after a failure to maintain such pressure has occurred, the flying machine flies above flight level 150.

C The whole period during which, after a failure to maintain such pressure has occurred, the flying machine flies above flight level 100, but not above flight level 150.

X The flying machine is capable, at the time when a failure to maintain such pressure occurs, of descending in accordance with the emergency descent procedure specified in the relevant flight manual and without flying below the minimum altitudes for safe flight specified in the operations manual relating to the aircraft, to flight level 150 within 6 minutes, and of continuing at or below that flight level to its place of intended destination or any other place at which a safe landing can be made.

Y The flying machine is capable, at the time when a failure to maintain such pressure occurs, of descending in accordance with the emergency descent procedure specified in the relevant flight manual and without flying below the minimum altitudes for safe flight specified in the operations manual relating to the aircraft, to flight level 150 within 4 minutes, and of continuing at or below that flight level to its place of intended destination or any other place at which a safe landing can be made.

*Scale L2*

A supply of oxygen and the associated equipment to meet the requirements set out in Parts I and II. The duration for the purposes of this Scale shall be:

(i) that calculated in accordance with the operations manual prior to the commencement of the flight, being the period or periods which it is reasonably anticipated that the aircraft will be flown in the circumstances of the intended flight at a height where the said requirements apply and in calculating the said duration account shall be taken of:

(a) in the case of pressurised aircraft, the possibility of depressurisation when flying above flight level 100;

(b) the possibility of failure of one or more of the aircraft engines;

(c) restrictions due to required minimum safe altitude;

(d) fuel requirement; and

(e) the performance of the aircraft; or

(ii) the period or periods during which the aircraft is actually flown in the circumstances specified in the said Parts;

whichever is the greater.

Part I

Unpressurised aircraft

(i) When flying at or below flight level 100:

Nil.

(ii) When flying above flight level 100 but not exceeding flight level 120:

| *Supply for* | Duration |
|---|---|
| (a) Members of the flight crew | Any period during which the aircraft flies above flight level 100 |
| (b) Cabin attendants and 10% of passengers | For any continuous period exceeding 30 minutes during which the aircraft flies above flight level 100 but not exceeding flight level 120, the duration shall be the period by which 30 minutes is exceeded. |

(iii) When flying above flight level 120:

| *Supply for* | *Duration* |
|---|---|
| (a) Members of the flight crew | Any period during which the aircraft flies above flight level 120 |
| (b) Cabin attendants and all passengers | Any period during which the aircraft flies above flight level 120 |

Part II

Pressurised aircraft

(i) When flying at or below flight level 100:

Nil.

(ii) When flying above flight level 100 but not exceeding flight level 250:

| *Supply for* | *Duration* |
|---|---|
| (a) Members of the flight crew | 30 minutes or whenever the cabin pressure altitude exceeds 10 000 ft, whichever is the greater |
| (b) Cabin attendants and 10% of passengers | (aa) When the aircraft is capable of descending and continuing to its destination as specified at A hereunder, 30 minutes or whenever the cabin pressure altitude exceeds 10 000 ft, whichever is the greater<br><br>(bb) When the aircraft is not so capable, whenever the cabin pressure altitude is greater than 10 000 ft but does not exceed 12 000 ft |
| (c) Cabin attendants and passengers | (aa) When the aircraft is capable of descending and continuing to its destination as specified at A hereunder, no requirement other than that at (ii)(b)(aa) of this Part of this Scale<br><br>(bb) When the aircraft is not so capable and the cabin pressure altitude exceeds 12 000 ft, the duration shall be the period when the cabin pressure altitude exceeds 12 000 ft or 10 minutes, whichever is the greater |

(iii) When flying above flight level 250:

| *Supply for* | *Duration* |
|---|---|

| | |
|---|---|
| (a) Members of the flight crew | 2 hours or whenever the cabin pressure altitude exceeds 10 000 ft, whichever is the greater |
| (b) Cabin attendants | Whenever the cabin pressure altitude exceeds10 000 ft, and a portable supply for 15 minutes |
| (c) 10% of passengers | Whenever the cabin pressure altitude exceeds 10 000 ft but does not exceed 12 000 ft |
| (d) 30% of passengers | Whenever the cabin pressure altitude exceeds 12 000 ft but does not exceed 15 000 ft |
| (e) All passengers | If the cabin pressure altitude exceeds 15 000 ft, the duration shall be the period when the cabin pressure altitude exceeds 15 000 ft or 10 minutes, whichever is the greater |
| (f) 2% of passengers or 2 passengers, whichever is the greater, being a supply of first aid oxygen which must be available for simultaneous first aid treatment of 2% or 2 passengers wherever they are seated in the aircraft | Whenever, after decompression, the cabin pressure altitude exceeds 8000 ft |

A The flying machine is capable, at the time when a failure to maintain cabin pressurisation occurs, of descending in accordance with the emergency descent procedure specified in the relevant flight manual and without flying below the minimum altitudes for safe flight specified in the operations manual relating to the aircraft, to flight level 120 within 5 minutes and of continuing at or below that flight level to its place of intended destination or any other place at which a safe landing can be made.

**Changes to the proposal**

This part of the proposal has been amended in line with the proposed change to the proposal for the use of oxygen (see Appendix 2a), that allows a period not exceeding 30 minutes to be flown between FL100 and FL 130, without flight crew using oxygen. Note that such allowance does not apply to public transport flights.

**Explanatory note** (this does not form part of the proposed amendment)

The requirement for an aircraft intended to be flown above 13,000 feet to be equipped in accordance with Scale L1 or L2 is to ensure that sufficient supplies of oxygen are carried, together with suitable apparatus for its use. These provisions for oxygen apparatus do not specify whether the equipment is to be installed or portable, simply that it must be "suitable and sufficient".

**APPENDIX 6a**

## EQUIPMENT - AEROPLANES AND HELICOPTERS ON ALL FLIGHTS

**ICAO Standards:**

*Aeroplanes - ICAO Annex 6, Part II*

6.1.3.1.1 All aeroplanes on all flights shall be equipped with:

a) an accessible first-aid kit;

b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the aeroplane. At least one shall be located in:

1) the pilot's compartment; and

2) each passenger compartment that is separate from the pilot's compartment and not readily accessible to the pilot or co-pilot;

*Helicopters - ICAO Annex 6, Part III, Section III*

4.1.3.1 All helicopters on all flights shall be equipped with:

a) an accessible first-aid kit;

b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the helicopter. At least one shall be located in:

1) the pilot's compartment; and

2) each passenger compartment that is separate from the pilot's compartment and not readily accessible to the pilot or co-pilot;

**Proposed ANO amendment** (new text shown in **bold**)

SCHEDULE 4

4 *Table*

| *Description of aircraft* | *Circumstances of flight* | *Scale of equipment required* |
|---|---|---|
| (2) Aeroplanes | (a) *flying for purposes other than public transport;* and | A (i) and (ii) and B (i) |
| **(2A) Aeroplanes in respect of which there is in force a certificate of airworthiness** | ***when flying for purposes other than public transport*** | **A (iii) and (v)** |
| (15) Helicopters and | (a) *flying for purposes other than public* | A (i)**,** ~~and~~ (ii)**, (iii) and (v)** and B (i) |

| | | |
|---|---|---|
| Gyroplanes | *transport;* and | |

5 The scales of equipment indicated in the foregoing Table shall be as follows:

Scale A

(i) Spare fuses for all electrical circuits the fuses of which can be replaced in flight, consisting of 10 per cent of the number of each rating or three of each rating, whichever is the greater.

(ii) Maps, charts, codes and other documents and navigational equipment necessary, in addition to any other equipment required under this Order, for the intended flight of the aircraft including any diversion which may reasonably be expected.

(iii) First aid equipment of good quality, sufficient in quantity, having regard to the number of persons on board the aircraft, and including the following:

Roller bandages, triangular bandages, adhesive plaster, absorbent gauze, cotton wool (or wound dressings in place of the absorbent gauze and cotton wool), burn dressings, safety pins;

Haemostatic bandages or tourniquets, scissors;

Antiseptic, analgesic and stimulant drugs;

Splints, in the case of aeroplanes the maximum total weight authorised of which exceeds 5700 kg;

A handbook on first aid.

(iv) In the case of a flying machine used for the public transport of passengers [escape slides].

**(v) A hand fire extinguisher for each enclosed passenger and crew compartment, so installed that at least one extinguisher shall be conveniently located for use by a member of the flight crew.**

**Changes to the proposal**

There are no changes to this part of the proposal.

Comment 1-6-1 concerned the available quick release fittings that are not always trusted to be reliable under the full range of positive and negative Gs that are permitted on modern certificated aerobatic aircraft. The CAA considers that it would be beneficial if quick release fittings were developed, that would be reliable under such conditions. The CAA is prepared to consider granting exemptions on an individual basis, if appropriate, where compliance is not reasonably practicable.

**Explanatory note** (this does not form part of the proposed amendment)

A distinction has been made so that the requirements for carriage of fire extinguishers and first aid kit need not be applied to aeroplanes that do not have an ICAO compliant Certificate of Airworthiness (mainly microlights and other Permit to Fly aeroplanes). It is considered that, where practicable, such equipment will in any case be carried on most Permit to Fly aeroplanes, as a matter of good airmanship. For helicopters operating under Permits to Fly (e.g. Scout, Gazelle and Rotorway Exec) it is considered reasonable to require this equipment to be carried.

**APPENDIX 7a**

## MARKING OF BREAK-IN POINTS

### ICAO Standards:

*Aeroplanes - ICAO Annex 6, Part II*
6.1.4.1 If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on an aeroplane, such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.
6.1.4.2 If the corner markings are more than 2 m apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

*Helicopters - ICAO Annex 6, Part III, Section III*
4.1.4.1 If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a helicopter, such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.
4.1.4.2 If the corner markings are more than 2 m apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

**Proposed ANO amendment** (new text shown in **bold**; deletion shown by ~~strike through~~)

*Exits* ***- public transport aeroplanes and helicopters*** ~~*and break-in markings*~~

62 - (1) ~~Subject to paragraph (5)(b), this~~ **This** article shall apply to every public transport aeroplane and helicopter registered in the United Kingdom.

(2)

(a) Whenever an aeroplane or helicopter to which this article applies is carrying passengers, every exit therefrom and every internal door in the aeroplane or helicopter shall be in working order, and, subject to sub-paragraph (b), during take-off and landing and during any emergency, every such exit and door shall be kept free from obstruction and shall not be fastened by locking or otherwise so as to prevent, hinder or delay its use by passengers.

(b)

(i) An exit may be obstructed by cargo if it is an exit which, in accordance with arrangements approved by the CAA either generally or in relation to a class of aeroplane or helicopter or a

particular aeroplane or helicopter, is not required for use by passengers.

(ii) A door between the flight crew compartment and any adjacent compartment to which passengers have access may be locked or bolted if the commander of the aeroplane or helicopter so determines, for the purpose of preventing access by passengers to the flight crew compartment.

(iii) Nothing in this paragraph shall apply to any internal door which is so placed that it cannot prevent, hinder or delay the exit of passengers from the aeroplane or helicopter in an emergency if it is not in working order.

(3)

**(a)** Every exit from the aeroplane or helicopter shall be marked on interior surfaces with the words 'Exit' or 'Emergency Exit' in capital letters, which shall be red in colour and if necessary shall be outlined in white to contrast with the background.

**(b) Every exit from the aeroplane or helicopter shall be marked on exterior surfaces with the words 'Exit' or 'Emergency Exit' in capital letters, which shall be located on a background which provides adequate contrast.**

(4)

(a) Every exit from the aeroplane or helicopter shall be marked **on interior surfaces on or near the inside surface of the door or other closure of the exit** with instructions in English and with diagrams to indicate the correct method of opening the exit, which shall be red in colour and located on a background which provides adequate contrast.

**(b) Every exit from the aeroplane or helicopter which is openable from the outside shall be marked on or near the exterior surface of the door or other closure of the exit with instructions in English and with diagrams to indicate the correct method of opening the exit, which shall be located on a background which provides adequate contrast.**

~~(b) The markings shall be placed on or near the inside surface of the door or other closure of the exit and, if it is openable from the outside of the aeroplane or helicopter, on or near the exterior surface.~~

~~(5)~~

~~(a) An operator shall ensure that, if areas of the fuselage suitable for break-in by rescue crews in emergency are marked on aeroplanes and helicopters, such areas shall be marked upon the exterior surface of the fuselage with markings to show the areas (in this paragraph referred to as 'break-in areas') which can, for the purposes of rescue in an emergency, be most readily and effectively broken into by persons outside the aeroplane or helicopter.~~

~~(b) The colour of break-in markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background. If the corner markings are more than 2 metres apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 metres between adjacent marks.~~

~~(6) Deleted~~

**(5)** ~~(7)~~ The markings required by this article shall:

(a) be painted, or affixed by other equally permanent means;

(b) and (c) *Deleted*

(d) be kept at all times clean and unobscured.

**(6)** ~~(8)~~

(a) Subject to compliance with sub-paragraph (b), if one, but not more than one, exit from an aeroplane or helicopter becomes inoperative at a place where it is not reasonably practicable for it to be repaired or replaced, nothing in this article shall prevent that aeroplane or helicopter from carrying passengers until it next lands at a place where the exit can be repaired or replaced.

(b) On any flight pursuant to this paragraph:

(i) the number of passengers carried and the position of the seats which they occupy shall be in accordance with arrangements approved by the CAA either in relation to the particular aeroplane or helicopter or to a class of aeroplane or helicopter; and

(ii) in accordance with arrangements so approved, the exit shall be fastened by locking or otherwise, the words 'Exit' or 'Emergency Exit' shall be covered, and the exit shall be marked by a red disc at least 23 centimetres in diameter with a horizontal white bar across it bearing the words 'No Exit' in red letters.

*Marking of break-in areas*

**62A - (1) This article shall apply to all aircraft registered in the United Kingdom.**

**(2)**

**(a) An operator shall ensure that, if areas of the fuselage suitable for break-in by rescue crews in emergency are marked on aircraft, such areas shall be marked upon the exterior surface of the fuselage with markings to show the areas (in this paragraph referred to as 'break-in areas') which can, for the purposes of rescue in an emergency, be most readily and effectively broken into by persons outside the aircraft.**

**(b) The break-in areas shall be marked by right angled corner markings, each arm of which shall be 9 cm in length along its outer edge and 3 cm in width. If the corner markings are more than 2 metres apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 metres between adjacent marks.**

**(c) The colour of break-in markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.**

**(d) If instructions are marked on the break-in areas, the words 'Cut Here in Emergency' shall be marked across the centre of each break-in area in capital letters.**

**(3) The markings required by this article shall:**

**(a) be painted, or affixed by other equally permanent means;**

**(b) be kept at all times clean and unobscured.**

**Changes to the proposal**

In light of comment 1-7-1, changes have been made to Article 62(3) and (4) to align that article with the requirements in JAR 25. Article 62A paragraphs (b) and (c) have been rearranged. Comment 1-7-3 expressed support for Article 62A paragraph (2)(d) which has been retained.

**Explanatory note** (this does not form part of the proposed amendment)

This article does not require any aircraft to have break-in markings. However, where they are marked they must conform to the ICAO Standards. The proposed amendment removes the requirements from Article 62, which is applicable only

to public transport aeroplanes and helicopters, and makes a new article applicable to all aircraft registered in the UK. The amended text defines the dimensions of the required corner markings in accordance with the ICAO Standards. Views are sought in particular regarding the proposed paragraph 62A (2)(d) which reflects, but is not identical to, an ANO provision that was removed in Amendment 1/2002. This clause would not require instructions to be marked on any break-in areas, however it would ensure that a standard form of instruction was used where operators believed this could prove beneficial to assist rescue in an emergency.

**APPENDIX 8b**

## EMERGENCY LOCATOR TRANSMITTER (ELT)

### ICAO Definitions:

***Emergency locator transmitter (ELT)***. A generic term describing equipment which broadcast distinctive signals on designated frequencies and, depending on application, may be automatically activated by impact or be manually activated, An ELT may be any of the following:

*Automatic fixed ELT (ELT(AF)).* An automatically activated ELT which is permanently attached to an aircraft.

*Automatic portable ELT (ELT(AP)).* An automatically activated ELT which is rigidly attached to an aircraft but readily removable from the aircraft.

*Automatic deployable ELT (ELT(AD)).* An ELT which is rigidly attached to an aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided.

*Survival ELT (ELT(S)).* An ELT which is removable from an aircraft, stowed so as to facilitate its ready use in an emergency, and manually activated by survivors.

### ICAO Standards:

*Aeronautical telecommunications - ICAO Annex 10, Volume V*
2.1.3 From 1 January 2005, emergency locator transmitters carried in compliance with Standards of Annex 6, Parts I, II and III shall operate on both 406 MHz and 121.5 MHz.

*Aeroplanes - ICAO Annex 6, Part II*
6.12.3 From 1 January 2005, all aeroplanes operated on extended flights over water as described in 6.3.3 b) and when operated on flights over designated land areas as described in 6.4 shall be equipped with one automatic ELT. ***[i.e. designated KK(ii) in the Air Navigation Order]***

6.12.4 Recommendation*. - All aeroplanes should carry an automatic ELT.*

*Helicopters - ICAO Annex 6, Part III, Section III*
*[In accordance with 4.3.1 means]* when:

a) flying over water at a distance from land corresponding to more than 10 minutes at normal cruise speed in the case of performance Class 1 or 2 helicopters; or
b) flying over water beyond autorotational or safe forced landing distance from land in the case of performance Class 3 helicopters.

4.10.3 From 1 January 2005, all Performance Class 1 and 2 helicopters operating on flights over water as described in 4.3.1 a) and Performance Class 3 helicopters operating as described in 4.3.1 b) shall be equipped with at least one automatic ELT and one ELT(S) in a raft. ***[i.e. in the Air Navigation Order designated KK(ii) and KK(i) respectively]***

4.10.6 From 1 January 2005, helicopters on flights over designated land areas as described in 4.4. shall be equipped with at least one automatic ELT. ***[i.e. designated KK(ii) in the Air Navigation Order]***

4.10.7 Recommendation*. - All helicopters should carry an automatic ELT.*

**Proposed ANO amendment** (new text shown in bold.)

Article 43A, "Option B" from the second Letter of Consultation

***Non-public transport aircraft - survival equipment***

**43A - Without prejudice to Article 43(b), the commander of an aircraft registered in the United Kingdom which is not a public transport aircraft shall reasonably satisfy himself before the aircraft takes off that having regard to the circumstances of the intended flight, including in particular the operating environment, the likelihood of ditching and the availability of search and rescue facilities, the aircraft carries such additional equipment as the commander reasonably considers necessary for the purpose of facilitating the survival of the persons carried in the aircraft.**

SCHEDULE 4
4 Table

| *Description of aircraft* | *Circumstances of flight* | *Scale of equipment required* |
|---|---|---|
| (2) Aeroplanes | (a) *flying for purposes other than public transport;* and | A (i) and (ii) and B (i) |
| | (i) when flying by night | C and D |
| | (ii) when flying under Instrument Flight Rules:<br>(aa) outside controlled airspace | D |
| | (bb) within Class A, B or C airspace | E with E (iv) duplicated and F |

| | | |
|---|---|---|
| | (cc) within Class D and E airspace | E and F |
| | (iii) when carrying out aerobatic manoeuvres | B (iii) |
| | *(iv) when flying at a height of 13 000 ft or more above mean sea level.* | *L1 or L2* |
| | **(v) when flying over water:**<br>*(aa) beyond gliding distance from land suitable for an emergency landing* | *H* |
| | **(bb) on or after 1 January 2007 when at a distance of more than 10 minutes flying time at normal cruising speed away from land suitable for making an emergency landing** | **KK(i) or KK(ii)** |
| | **(vi) when flying over areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult,** and where: | **KK (ii)** |
| | *(aa) in the event of an emergency landing, tropical conditions are likely to be met* | *U (except U(i))* |
| | *(bb) in the event of an emergency landing, polar conditions are likely to be met* | *V (except V(i))* |

| | | |
|---|---|---|
| (15) Helicopters and Gyroplanes | (a) *flying for purposes other than public transport;* and | A (i), ~~and~~ (ii), *(iii) and (iv)* and B (i) |
| | (i) when flying by day under Visual Flight Rules with visual ground reference | D |
| | (ii) when flying by day under Instrument Flight Rules or without visual ground reference | |
| | (aa) outside controlled airspace | E with E (ii) duplicated |
| | (bb) within controlled airspace | E with both E (ii) and E(iv) duplicated and F with F (iv) for all |

| | | |
|---|---|---|
| | | weights |
| | (iii) when flying at night<br><br>(aa) with visual ground reference | C, E, G (iii) and G (v) |
| | (bb) without visual ground reference (aaa) outside controlled airspace | C, E with E (ii) duplicated G (iii) and G (v) |
| | (bbb) within controlled airspace | C, E with both E (ii) and E (iv) duplicated, F with F (iv) for all weights, G (iii) and G (v) |
| | *(iv) when flying at a height of 13 000 ft or more above mean sea level.* | *L1 or L2* |
| | **(v) when flying over water:**<br>*(aa) beyond autorotational gliding distance from land suitable for an emergency landing* | *H* |
| | *(bb) on all flights on which in the event of any emergency occurring during the take-off or during the landing at the intended destination or any likely alternate destination it is reasonably possible that the helicopter or gyroplane would be forced to land onto water* | *H* |
| | **(cc) on or after 1 January 2007 when at a distance of more than 10 minutes flying time at normal cruising speed away from land suitable for making an emergency landing** | **KK(i) or KK(ii)** |
| | **(vi) when flying over areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult,** *and where*: | **KK(ii)** |
| | *(aa) in the event of an emergency landing, tropical conditions are likely* | *U (except U(i))* |

| | | |
|---|---|---|
| | *to be met* | |
| | *(bb) in the event of an emergency landing, polar conditions are likely to be met* | *V (except V(i))* |

5 The scales of equipment indicated in the foregoing Table shall be as follows:

**Scale KK**

**(i) A survival emergency locator transmitter capable of operating in accordance with the relevant provisions of ICAO Annex 10, Volume III and transmitting on 121.5 MHz and 406 MHz;**

**(ii) An automatic emergency locator transmitter capable of operating in accordance with the relevant provisions of ICAO Annex 10, Volume III and transmitting on 121.5 MHz and 406 MHz;**

**Changes to the proposal**

Having considered all the comments received (1-8-1 to 1-8-21), this proposal has been amended to require either an automatic ELT or a survival ELT (ELT(S)) for extended flights over water. Since the implications for survival after ditching are similar, irrespective of the class of aircraft flown, the disparities between the ICAO standards for aeroplanes and helicopters seem unjustified. Therefore it is proposed that the circumstances in which aeroplanes and helicopters will be required to carry an ELT will be the same.

In assessing the likelihood of ditching it seems that the most important factor to be considered is the amount of time that will be spent exposed to the risk of flying over water (see 1-G-7) and this is more significant than any perceived differences between different classes of aircraft (see comments made in relation to other emergency equipment, 1-10-15 and 1-10-17). The revised proposal gives responsibility for the commander to decide if an ELT is to be carried, e.g. on shorter flights when the prescribed distances will not be exceeded and the time exposed to the risks of flight over water may be limited.

Views were sought regarding two alternative proposals for Article 43A. Option A made explicit that the survival equipment to be considered included ELTs. This option reflected the approach being developed in JAR-OPS 0; and would have more clearly demonstrated an alternative means of compliance with the relevant ICAO standards. Option B provides a more general formulation. Both of these

options had to be considered in conjunction with the other equipment (including radio apparatus) requirements specified elsewhere in the Air Navigation Order. Each option was intended to have the same substantive effect. Although views had been expressed in favour of both options, it was thought that the explicit reference to particular items of equipment in option A could lead pilots to overlook specific requirements in ANO Schedule 4. On balance it was decided that option B was preferable.

**Explanatory note** (this does not form part of the proposed amendment)

A new Article 43A is proposed, which will require the commander of the aircraft to make a judgement regarding ELT carriage for flights that remain within the distances prescribed in Schedule 4. It is anticipated that pilots will refer to, e.g. Safety Sense leaflet 21 'Ditching' in deciding what is appropriate, taking into account such factors as the operating environment and expected time for rescue in the event of ditching.

The distance beyond which it becomes mandatory to carry an ELT will inevitably be somewhat arbitrary, since it can be just as difficult for search and rescue services to locate a person in the water when close inshore as when further out to sea. It is proposed that all aeroplanes and helicopters will be required to carry either an automatic ELT or a survival ELT (ELT(S)) when flying beyond a distance of more than 10 minutes' flying time at normal cruising speed away from land suitable for making an emergency landing. Reference is made to "normal cruising speed" as over-water speed is not always quoted in the aircraft flight manual for many aircraft types used in general aviation. Please see Figure 1 at the end of this appendix, provided to illustrate possible implications of this aspect of the proposal for an example aircraft with a normal cruising speed of 90 knots.

All aeroplanes and helicopters must be equipped with an automatic ELT when flying across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult. Although no such areas have been designated in the UK, the CAA strongly recommends that, in addition to appropriate survival equipment, an ELT should be carried when flying over mountainous or sparsely populated areas (UK AIP GEN 3.6 refers).

From 1 January 2005, the standard in ICAO Annex 10 requires that all emergency locator transmitters carried in compliance with Standards of Annex 6, Parts I, II and III shall operate on both 406 MHz and 121.5 MHz. Although the SAR satellite system will no longer be able to use 121.5 MHz signals from 1 February 2009, this frequency will still be required for homing after that date. The ground and aircraft based SAR system over the United Kingdom is expected to continue to use 121.5 MHz for the foreseeable future (see comment 1-8-5). To allow a reasonable time for owners to comply with the new requirements, it is proposed that the date specified in Schedule 4 for compliance by UK General Aviation aircraft will be 1 January 2007.

**NB** All ELTs capable of transmitting on 406 MHz must be coded in accordance with ICAO Annex 10 and registered with the national agency responsible for initiating Search and Rescue or another nominated agency.

In the United Kingdom this is -

UK Mission Control Centre

Aeronautical Rescue Co-ordination Centre

RAF Kinloss

Morayshire

IV36 3UH

ukmcc@atlas.co.uk

(AIC 57/2003 (Pink 55) refers)

## SAFETY RATIONALE

### Introduction

The question as to whether or not an ELT should be carried is closely related to the likelihood of a search for survivors and their subsequent rescue being achievable within the estimated survival time. Modern ELTs meeting the ICAO Standard applicable from 1 January 2005 operate on 406 MHz for alerting purposes and on 121.5 MHz for homing. These offer the prospect of almost immediate alerting of the rescue authorities via Geostationary satellite; and the homing facility enables rescuers to proceed directly to the casualty. Some ELTs also use global positioning system (GPS) data encoded in the 406 MHz pulses, which offers the prospect of fixing the survivor's position even before the first pass of a Low Earth Orbit satellite (on average 45 minutes). These capabilities will enable ships, aeroplanes and rescue helicopters to be diverted or dispatched to the location, and a rescue to be effected without a protracted search being necessary. The alternative scenario, when an ELT is not carried, is not nearly so positive, and an air and sea search relying on visual techniques and thermal imaging can take a very long time, and even then be inconclusive.

### Discussion

Based on the data contained in the ICAO International Aeronautical and Maritime Search and Rescue Manual - Document 9731, it can be shown that in order to be more than 95% certain that a survivor is not in a particular search area, a search coverage factor of approximately 2 will be required. This means that the search area must be covered approximately twice, either with two independent

searches, or with one aircraft carrying out overlapping sweeps of the area until every point of the area has been covered twice.

If searching for a survivor in the water by visual means, even in full daylight and good visibility, or when using forward-looking infra-red (FLIR), a helicopter will not be able to sweep an area that is wider than 0.1 NM. A rescue helicopter, if flying at the preferred speed of 60 knots, will fly a distance of 1 NM every minute and it follows, that in this case, an area of 1 x 0.1 = 0.1 $NM^2$ will be searched every minute. Alternatively, if searching for a small liferaft, track spacing and sweep width might be increased to 1 NM and the area searched could be increased to 1 x 1 = 1 $NM^2$ every minute.

A circular search area based upon a most probable position (MPP), within which a survivor is believed to be, will have an area equal to $\pi \times r^2$ $NM^2$, where r = radius of the area to be searched. Consequently, search areas with the following radii and corresponding areas might be searched to a 95% level of confidence (i.e. searched twice) for a person in the water, or a person in a liferaft, in the times shown below:

| Visual Search Patterns | | | |
|---|---|---|---|
| Radius of search area (NM) | Search Area ($NM^2$) | Searching time required | |
| Person in water Sweep width 0.1 NM | | Liferaft Sweep width 1.0 NM | |
| 1 | 3.1 | 1 hr 3 min | 06 min |
| 2 | 12.6 | 4 hr 11 min | 25 min |
| 3 | 28.3 | 9 hr 26 min | 56 min |
| 4 | 50.3 | 16 hr 46 min | 1 hr 41 min |
| 5 | 78.5 | 26 hr 11 min | 2 hr 37 min |
| 10 | 314.2 | 104 hr 44 min | 10 hr 28 min |

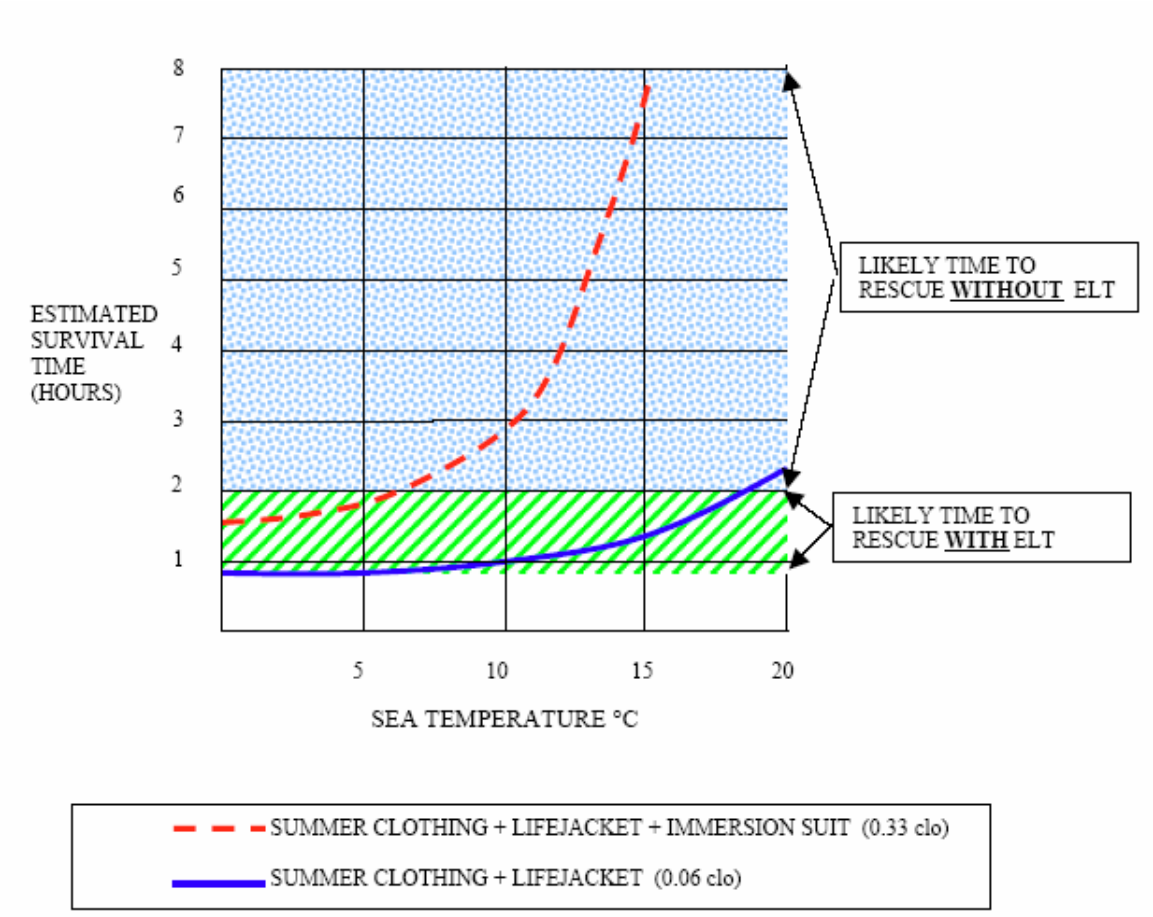
From the table above it can be seen that if an aircraft is missing over the sea without the position of the ditching being accurately known, it may take a very long time before survivors in the water can be located, and even if the survivors have managed to launch and board a liferaft, it may still take many hours before they are found.

In the period 1983 to 2003, aircraft registered in the United Kingdom were involved in 62 ditchings. 53 of these were non-public transport aircraft. Of the14 fatalities that occurred in this period, most of the deaths occurred after the ditching but before the survivors could be located and rescued.

The following graph shows the estimated time that a person can be expected to survive in European waters at various sea temperatures. The average sea

temperature around the UK is typically around 5°C in winter, only rising to 15°C in late summer. Also depicted are the likely times to rescue with and without an ELT. This illustrates the dramatic difference an ELT can make on the probability that lives will be saved, if search and rescue can be accomplished within the estimated survival times.

**SURVIVAL TIME v TIME TO RESCUE in EUROPEAN WATERS**




Note: Estimated survival times derived from Hayes and Cohen, IAM Report No. R653, 1987; based on estimated calm water survival times for thin individuals (approx. tenth percentile mean skinfold thickness). This means simply that fatter individuals will tend to survive longer than indicated before succumbing to exposure. Conversely, the effects of cold shock and drowning due to cold incapacitation will cause some people to die sooner than expected.

('clo' value = the unit used by physiologists to define the value of clothing insulation, e.g. 0.33 clo = 0.51 tog)

When an aircraft ditches within sight of land, in addition to any distress transmission from the pilot there is some expectation that the event will be seen and reported to the Coastguard and a rescue launched. Even in these circumstances the pilot's position and eyewitness reports can be notoriously inaccurate and the MPP could easily be 2 to 3 NM in error. Consequently, some time may be spent searching before the survivors are located and rescued.

In the contrasting scenario when an aircraft has to ditch on a longer sea crossing, overdue action may only be initiated a considerable time after it should have landed. Even when the pilot transmits a 'Mayday' distress message, the MPP error is likely to be greater than when close inshore. When this happens, the areas to be searched can be very large indeed and the likelihood of a search locating survivors before they die from hypothermia will be significantly reduced. One such example occurred in 1995 when the pilot of a PA-28 light aeroplane made a 'Mayday' call before ditching in the North Sea, 25 NM east of Clacton. Search and rescue services located his body 19 hours later.

**Costs and benefits**

UK general aviation aircraft do ditch: Of the 62 ditchings in the 21 year period from 1983 to 2003, 53 of these were non-public transport aircraft.

The risk is real: Records have been examined of reported engine failures or malfunctions that resulted in ditching/ forced/ precautionary landing for UK registered single-engine piston aeroplanes and helicopters in the 17 year period 1984 - 2000. Combined with available information on hours flown in the same period, it appears that such incidents occur at a rate of approximately 1 per 12,000 flying hours. Thus a pilot who flies over water for 4 hours a year in piston aircraft, over a flying career of 30 years, has a 1 in 100 probability of being involved in a ditching. Those who fly over water a lot tend to opt for twin-engine and/or turbine-powered aircraft. The increased time exposed to the risk of over-water flight means that such aircraft also feature in ditching statistics.

ELTs are effective: For example in 2002, the Cospas-Sarsat system provided assistance in rescuing 57 persons in 44 aviation distress events worldwide. The value of an ELT lies in its impact on the probability that lives will be saved. The distress alert and homing functions enable rescue services to be despatched promptly and to proceed directly to survivors. Without it, there remains the prospect of a long search with little guarantee of locating survivors before they succumb to cold and exhaustion.

In the UK-registered aircraft ditchings between 1983 and 2003, fourteen people died before help arrived. At least 4 of these, and possibly as many as 11, had survived the initial ditching. Examination of the accident circumstances suggests

that it is reasonable to suppose that 8 lives may have been saved if ELTs had been carried.

The cost of a survival ELT (ELT(S)) is in the region of £1,500 - this is the least expensive and most flexible option. If desired, it is possible to share this cost between owners as the beacon does not have to be registered to an individual aircraft. Then not all pilots wish to undertake the sort of long sea crossings where ELT carriage would become mandatory; if they make overseas trips, many prefer in any case to plan their routes to minimize the time that will be spent over water. If it is assumed that between one quarter and one third of general aviation aeroplanes and helicopters were to be equipped with an ELT, then approximately 2000 to 3000 units would be required, and the total cost to achieve compliance would be between £3m and £4.6m. Information from one manufacturer indicates that the units can be expected to have a useful life of around 20 years, and allowance must be made for batteries to be replaced after 5, 10 and 15 years at a cost of about £350 per battery. Supposing that only 8 lives would be saved over a 20 year period - then the cost per life saved would be between £0.64m and £0.98m.
Clearly, this calculation must be treated with a degree of caution owing to the relatively small numbers involved, and the assumptions that have to be made. It is possible that the actual life in service of a unit may prove to be less than 20 years; and conversely a single ditching accident involving say four people in a light aircraft could entirely alter the final figure. Note that no allowance has been made for transfer of costs (e.g. savings to the rescue services resulting from shortened search times).

**Conclusion**

The CAA believes that the case for carrying an ELT on over-water flights is overwhelming when compared to the situation when one is not available. Carriage of an ELT can ensure that rescue services will be alerted promptly and proceed directly to the accident location, enabling a rescue to be effected without a protracted search being necessary. Without an ELT, an air and sea search relying on visual techniques and thermal imaging can take a very long time, and even then be inconclusive.

Irrespective of the length of sea crossings undertaken, an ELT operating on 406 MHz and 121.5 MHz will afford a reasonable prospect of a survivor being located and rescued in 1 to 2 hours, i.e. within the survival times that can be expected in cold seas.

The CAA proposal is that all general aviation aeroplanes and helicopters will be required to carry either an automatic ELT or a survival ELT (ELT(S)) when flying beyond a distance of more than 10 minutes' flying time at normal cruising speed away from land suitable for making an emergency landing. The proposal does not require an ELT for flights that remain within that distance from land, since it is

accepted that the expense and inconvenience may not be justified for relatively short sea crossings, where the time exposed to the risk of over-water flight is limited. Therefore pilots will have the choice whether to plan their route so as to ensure a short sea crossing, or else obtain an ELT.

Since an ELT(S) can be coded and registered using the unique serial number of the ELT, this facilitates use on different aircraft, provided a 24 hour emergency contact is available. Thus there is the possibility that sharing or hiring of equipment will be an attractive option for many private fliers.

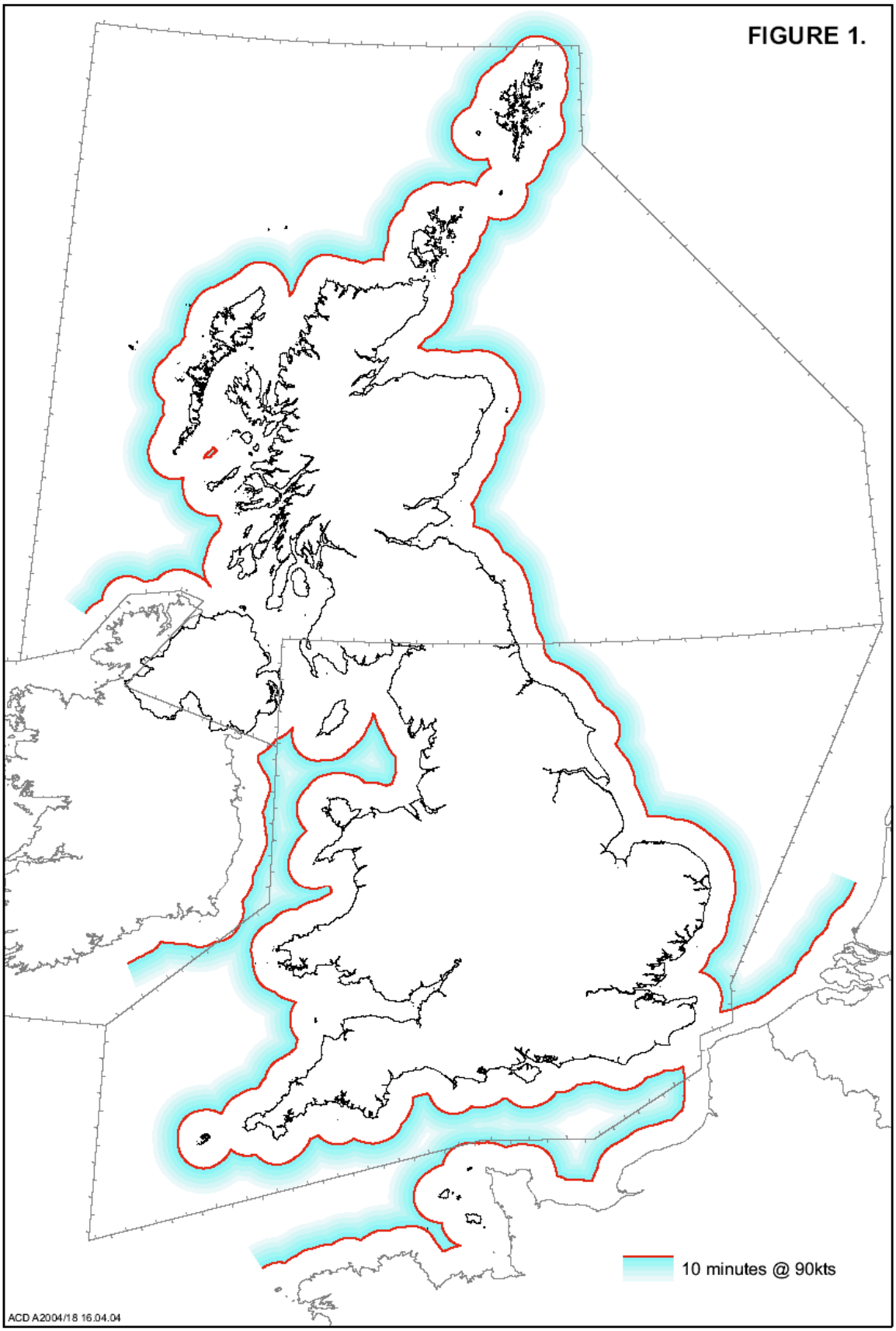


FIGURE 1.
10 minutes @ 90kts
ACD A2004/18 16.04.04

**APPENDIX 9a**

## FLIGHTS OVER WATER - SEAPLANES

**ICAO Standard:**

*Aeroplanes - ICAO Annex 6, Part II*
6.3.1 All seaplanes for all flights shall be equipped with:
a) one life jacket, or equivalent individual floatation device, for each person on board, stowed in a position readily accessible from his seat or berth;
b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable;
c) one anchor;
d) one sea anchor (drogue), when necessary to assist in manoeuvring.
***Note**. - "Seaplanes" includes amphibians operated as seaplanes.*

**Proposed ANO amendment** (new text shown in **bold**)

SCHEDULE 4
4 *Table*

| *Description of aircraft* | *Circumstances of flight* | *Scale of equipment required* |
|---|---|---|
| (2) Aeroplanes | (a) *flying for purposes other than public transport;* and | A (i) and (ii) and B (i) |
| | (i) when flying by night | C and D |
| | (ii) when flying under Instrument Flight Rules:<br>(aa) outside controlled airspace | D |
| | (bb) within Class A, B or C airspace | E with E (iv) duplicated and F |
| | (cc) within Class D and E airspace | E and F |
| | (iii) when carrying out aerobatic manoeuvres | B (iii) |
| | *(iv) when flying at a height of 10 000 ft or more above mean sea level.* | *L1 or L2* |
| | *(v) when flying over water:*<br>*(aa) beyond gliding distance from land suitable for an emergency landing* | *H* |

| | | |
|---|---|---|
| | *(bb) at a distance of more than 50 NM away from land suitable for making an emergency landing* | *KK (ii)* |
| | *(cc) away from land suitable for making an emergency landing at a distance of more than 100 NM in the case of single-engined* aeroplanes, *and more than 200 NM in the case of multi-engined aeroplanes capable of continuing flight with one engine inoperative* | *K (i) and K (ii)* |
| | *(vii) when flying over areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, and where:* | *KK (ii)* |
| | *(aa) in the event of an emergency landing, tropical conditions are likely to be met* | *U (except U(i))* |
| | *(bb) in the event of an emergency landing, polar conditions are likely to be met* | *V (except V(i))* |
| | **(viii) on all flights which involve manoeuvres on water** | **H, J and K (i), (ii) and (iii)** |

5 The scales of equipment indicated in the foregoing Table shall be as follows:

*Scale H*

(i) Subject to sub-paragraph (ii), for each person on board, a lifejacket equipped with a whistle and waterproof torch.

(ii) (ii) Lifejackets constructed and carried solely for use by children under three years of age need not be equipped with a whistle.

*Scale J*

(i) Additional flotation equipment, capable of supporting one-fifth of the number of persons on board, and provided in a place of stowage accessible from outside the flying machine.

(ii) (ii) Parachute distress rocket signals capable of making, from the surface of the water, the pyrotechnical signal of distress specified in the Rules of the Air and complying with Part III of Schedule 15 to the Merchant Shipping (Life-Saving Appliances) Regulations 1980.

(iii) (iii) A sea anchor and other equipment necessary to facilitate mooring, anchoring or manoeuvring the flying machine on water, appropriate to its size, weight and handling characteristics.

*Scale K*

(i)

(a) In the case of a flying machine, other than a helicopter or gyroplane carrying 20 or more persons, liferafts sufficient to accommodate all persons on board.

(b) In the case of a helicopter or gyroplane carrying 20 or more persons, a minimum of 2 liferafts sufficient together to accommodate all persons on board.

(ii) Each liferaft shall contain the following equipment:

(a) means for maintaining buoyancy;

(b) a sea anchor;

(c) life-lines, and means of attaching one liferaft to another;

(d) paddles or other means of propulsion;

(e) means of protecting the occupants from the elements;

(f) a waterproof torch;

(g) marine type pyrotechnical distress signals;

(h) means of making sea water drinkable, unless the full quantity of fresh water is carried as specified in sub-paragraph (i);

(i) for each 4 or proportion of 4 persons the liferaft is designed to carry:

(aa) 100 grammes of glucose toffee tablets; and

(bb) 1/2 litre of fresh water in durable containers or in any case in which it is not reasonably practicable to carry the quantity of water above specified, as large a quantity of fresh water as is reasonably practicable in the circumstances. In no case however shall the quantity of water carried be less than is sufficient, when added to the amount of fresh water capable of being produced by means of the equipment specified in sub-paragraph (h) to provide 1/2 litre of water for each 4 or proportion of 4 persons the liferaft is designed to carry.

(j) first aid equipment.

(iii) Items (ii)(f) to (j) inclusive shall be contained in a pack.

(iv) The number of survival beacon radio apparatus carried when the aircraft is carrying the number of liferafts specified in column 1 of the following Table shall be not less than the number specified in, or calculated in accordance with, column 2.

| Column 1 | Column 2 |
|---|---|
| Not more than 8 liferafts | 2 survival beacon radio apparatus |
| For every additional 4 or proportion of 4 liferafts | 1 additional survival beacon radio apparatus |

~~(v) In the case of a helicopter or gyroplane, an emergency beacon which is automatically deployed and activated in the event of a crash.~~

**Changes to the proposal**

No comments were received relating to this appendix. There are no changes to this part of the proposal.

**Explanatory note** (this does not form part of the proposed amendment)

Scale H, J and K already exist in paragraph 5 of Schedule 4 to the Air Navigation Order. The new requirement in paragraph 4 of Schedule 4 does not include Scale K (iv) because emergency locator transmitter (ELT) requirements are considered separately (see Appendix 8a).

**APPENDIX 10b**

## FLIGHTS OVER WATER - EMERGENCY EQUIPMENT

### ICAO Standards:

*Aeroplanes - ICAO Annex 6, Part II*

6.3.2.1 Single-engined aeroplanes.

Recommendation*. - All single-engined landplanes when flying en route over water beyond gliding distance from the shore should carry one life jacket or equivalent individual floatation device for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.*

*Note. - "Landplanes" includes amphibians operated as landplanes.*

6.3.3 All aeroplanes when operated on extended flights over water shall be equipped with:

a) when the aeroplane may be over water at a distance of more than 93 km (50 NM) away from land suitable for making an emergency landing:
   1) one life jacket or equivalent individual floatation device for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;
b) when over water away from land suitable for making an emergency landing at a distance of more than 185 km (100 NM), in the case of single-engined aeroplanes, and more than 370 km (200 NM), in the case of multi-engined aeroplanes capable of continuing flight with one engine inoperative:
   1) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken; and
   2) equipment for making the pyrotechnical distress signals described in Annex 2.

*Helicopters - ICAO Annex 6, Part III, Section III*

*[In accordance with 4.3.1 means]* when:

a) flying over water at a distance from land corresponding to more than 10 minutes at normal cruise speed in the case of performance Class 1 or 2 helicopters; or
b) flying over water beyond autorotational or safe forced landing distance from land in the case of performance Class 3 helicopters.

4.3.2.1 Performance Class 1 and 2 helicopters operating in accordance with the provisions of 4.3.1, shall be equipped with:

a) one life jacket, or equivalent individual floatation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;
b) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken; and
c) equipment for making the pyrotechnical distress signals described in Annex 2.

4.3.2.2 Performance Class 3 helicopters when operating beyond auto-rotational distance from land but within a distance from land specified by the appropriate authority of the responsible State shall be equipped with one life jacket, or equivalent individual floatation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.
***Note**.- When determining the distance from land referred to in 4.3.2.2, consideration should be given to environmental conditions and the availability of SAR facilities.*

4.3.2.3 Performance Class 3 helicopters when operating outside the provisions of 4.3.2.2 shall be equipped as in 4.3.2.1.

4.3.2.4 In the case of performance Class 2 and Class 3 helicopters, when taking off or landing at a heliport where the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in 4.3.2.1 a) shall be carried.

4.3.2.5 Each life jacket and equivalent individual floatation device, when carried in accordance with this 4.3, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

**Proposed ANO amendment** (new text shown in **bold**; deletion shown by ~~strike through~~)

Article 43A, "Option B" in the second Letter of Consultation

***Non-public transport aircraft - survival equipment***

**43A - Without prejudice to Article 43(b), the commander of an aircraft registered in the United Kingdom which is not a public transport aircraft shall reasonably satisfy himself before the aircraft takes off that having regard to the circumstances of the intended flight, including in particular the operating environment, the likelihood of ditching and the availability of search and rescue facilities, the aircraft carries such additional equipment**

**as the commander reasonably considers necessary for the purpose of facilitating the survival of the persons carried in the aircraft.**

SCHEDULE 4
*4 Table*

| *Description of aircraft* | *Circumstances of flight* | *Scale of equipment required* |
|---|---|---|
| (2) Aeroplanes | (a) *flying for purposes other than public transport;* and | A (i) and (ii) and B (i) |
| | (i) when flying by night | C and D |
| | (ii) when flying under Instrument Flight Rules:<br><br>(aa) outside controlled airspace | D |
| | (bb) within Class A, B or C airspace | E with E (iv) duplicated and F |
| | (cc) within Class D and E airspace | E and F |
| | (iii) when carrying out aerobatic manoeuvres | B (iii) |
| | *(iv) when flying at a height of 13 000 ft or more above mean sea level.* | *L1 or L2* |
| | **(v) when flying over water:**<br>**(aa) beyond gliding distance from land suitable for an emergency landing** | **H** |
| (15) Helicopters and Gyroplanes | *(a) flying for purposes other than public transport; and* | A (i), ~~and~~ (ii), *(iii) and (iv)* and B (i) |
| | (i) when flying by day under Visual Flight Rules with visual ground reference | D |
| | (ii) when flying by day under Instrument Flight Rules or without visual ground reference | |
| | (aa) outside controlled airspace | E with E (ii) duplicated |

| | | |
|---|---|---|
| | (bb) within controlled airspace | E with both E (ii) and E(iv) duplicated and F with F (iv) for all weights |
| | (iii) when flying at night<br><br>(aa) with visual ground reference | C, E, G (iii) and G (v) |
| | (bb) without visual ground reference<br><br>(aaa) outside controlled airspace | C, E with E (ii) duplicated G (iii) and G (v) |
| | (bbb) within controlled airspace | C, E with both E (ii) and E (iv) duplicated, F with F (iv) for all weights, G (iii) and G (v) |
| | *(iv) when flying at a height of 13 000 ft or more above mean sea level.* | *L1 or L2* |
| | **(v) when flying over water:**<br>**(aa) beyond autorotational gliding distance from land suitable for an emergency landing** | **H** |
| | **(bb) on all flights on which in the event of any emergency occurring during the take-off or during the landing at the intended destination or any likely alternate destination it is reasonably possible that the helicopter or gyroplane would be forced to land onto water** | **H** |

5 The scales of equipment indicated in the foregoing Table shall be as follows:

Scale H

(i) Subject to sub-paragraph (ii), for each person on board, a lifejacket equipped with a whistle and ~~waterproof torch~~ **a survivor locator light.**

(ii) Lifejackets constructed and carried solely for use by children under three years of age need not be equipped with a whistle.

**Changes to the proposal**

Having considered all the comments received (1-10-1 to 1-10-20), this proposal has been substantially amended in a way that is considered appropriate to the needs of General Aviation, without being unduly prescriptive. In light of general comments 1-G-6 and 1-G-7 it was concluded that pre-flight action by the commander properly includes ensuring that appropriate safety and survival equipment is available on the aircraft. Account has been taken of the difficulties that liferafts could present in small helicopters (comment 1-10-16) and the proposed solution allows the commander to decide on equipment appropriate to the aircraft and the flight to be undertaken.

The disparities between the ICAO standards for aeroplanes and helicopters seem unjustified, since the implications for survival after ditching are similar, irrespective of the class of aircraft flown. In assessing the likelihood of ditching it seems that the most important factor to be considered is the amount of time that will be spent exposed to the risk of flying over water (see 1-G-7 and 1-10-19) and this appears to be more significant than any perceived differences between different classes of aircraft (see 1-10-15 and 1-10-17).

Views were sought regarding two alternative proposals for Article 43A. Option A made explicit the various items of survival equipment to be considered, including express references to the option of wearing survival suits (either as an alternative or in addition to carriage of a liferaft) and pyrotechnical distress signals. This option reflected the approach being developed in JAR-OPS 0; and would have more clearly demonstrated an alternative means of compliance with the relevant ICAO standards. Option B provides a more general formulation. Both of these options had to be considered in conjunction with the other equipment (including radio apparatus) requirements specified elsewhere in the Air Navigation Order. Each option was intended to have the same substantive effect. Although views had been expressed in favour of both options, it was thought that the explicit reference to particular items of equipment in option A could lead pilots to overlook specific requirements in ANO Schedule 4. On balance it was decided that option B was preferable.

Scale H has been amended to refer to a 'survivor locator light' (in place of 'waterproof torch'), for consistency with the terms used in JAR-OPS and FAA TSO-C13f.

**Explanatory note** (this does not form part of the proposed amendment)

A new Article 43A is proposed, which will require the commander of the aircraft to make a judgement regarding the survival equipment to be carried on the flight. It is anticipated that pilots will refer to, e.g. Safety Sense leaflet 21 'Ditching' in

deciding what is appropriate, taking into account such factors as the operating environment and expected time for rescue in the event of ditching.

The proposed amendment to Schedule 4 will require lifejackets to be carried beyond autorotation or gliding distance from land. Compliance with UK published best practice (Safety Sense leaflet 21) requires that lifejackets be worn at all times when flying single-engine aircraft in these circumstances. Safety Sense leaflet 21 also emphasises the importance of a liferaft and/or immersion suits to increase survival times and provide a better prospect of live rescue. The CAA will maintain this advice since the ICAO Standards for carriage of liferafts in aeroplanes are not considered sufficient for flight over cold seas.

**APPENDIX 11a**

## FLIGHTS OVER LAND AREAS DESIGNATED BY THE STATE CONCERNED WHERE SEARCH AND RESCUE WOULD BE DIFFICULT

**ICAO Standards:**

*Aeroplanes - ICAO Annex 6, Part II*
6.4 All aeroplanes on flights over designated land areas
Aeroplanes when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signalling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

*Helicopters - ICAO Annex 6, Part III, Section III*
4.4 All helicopters on flights over designated land areas
Helicopters, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signalling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

**Proposed ANO amendment** (new text shown in **bold**)

SCHEDULE 4
4 *Table*

| *Description of aircraft* | *Circumstances of flight* | *Scale of equipment required* |
|---|---|---|
| (2) Aeroplanes | (a) *flying for purposes other than public transport;* and | A (i) and (ii) and B (i) |
| | (i) when flying by night | C and D |
| | (ii) when flying under Instrument Flight Rules:<br><br>(aa) outside controlled airspace | D |
| | (bb) within Class A, B or C airspace | E with E (iv) duplicated and F |
| | (cc) within Class D and E airspace | E and F |
| | (iii) when carrying out | B (iii) |

| | | |
|---|---|---|
| | aerobatic manoeuvres | |
| | *(iv) when flying at a height of 13 000 ft or more above mean sea level.* | *L1 or L2* |
| | *(v) when flying over water:*<br>*(aa) beyond gliding distance from land suitable for an emergency landing* | *H* |
| | *(bb) on or after 1 January 2006 when at a distance of more than 10 minutes flying time at normal cruising speed away from land suitable for making an emergency landing* | *KK(i) or KK(ii)* |
| | **(vi) when flying over areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, and where:** | *KK (ii)* |
| | **(aa) in the event of an emergency landing, tropical conditions are likely to be met** | **U (except U(i))** |
| | **(bb) in the event of an emergency landing, polar conditions are likely to be met** | **V (except V(i))** |
| (15) Helicopters and | *(a) flying for purposes* | A (i), ~~and~~ (ii), *(iii) and (iv)* |

| | | |
|---|---|---|
| Gyroplanes | *other than public transport;* and | and B (i) |
| | (i) when flying by day under Visual Flight Rules with visual ground reference | D |
| | (ii) when flying by day under Instrument Flight Rules or without visual ground reference | |
| | (aa) outside controlled airspace | E with E (ii) duplicated |
| | (bb) within controlled airspace | E with both E (ii) and E(iv) duplicated and F with F (iv) for all weights |
| | (iii) when flying at night<br><br>(aa) with visual ground reference | C, E, G (iii) and G (v) |
| | (bb) without visual ground reference<br><br>(aaa) outside controlled airspace | C, E with E (ii) duplicated G (iii) and G (v) |
| | (bbb) within controlled airspace | C, E with both E (ii) and E (iv) duplicated, F with F (iv) for all weights, G (iii) and G (v) |
| | *(iv) when flying at a height of 13 000 ft or more above mean sea level.* | *L1 or L2* |
| | *(v) when flying over water:*<br>*(aa) beyond autorotational gliding distance from land suitable* | *H* |

| | | |
|---|---|---|
| | *for an emergency landing* | |
| | *(bb) on all flights on which in the event of any emergency occurring during the take-off or during the landing at the intended destination or any likely alternate destination it is reasonably possible that the helicopter or gyroplane would be forced to land onto water* | *H* |
| | *(cc) on or after 1 January 2006 when at a distance of more than 10 minutes flying time at normal cruising speed away from land suitable for making an emergency landing* | *KK(i) or KK(ii)* |
| | **(vi) when flying over land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, and where:** | *KK(ii)* |
| | **(aa) in the event of an emergency landing, tropical conditions are likely to be met** | **U (except U(i))** |

| | | |
|---|---|---|
| | **(bb) in the event of an emergency landing, polar conditions are likely to be met** | **V (except V(i))** |

5 The scales of equipment indicated in the foregoing Table shall be as follows:

*Scale U*

(i) 1 survival beacon radio apparatus;

(ii) marine type pyrotechnical distress signals;

(iii) for each 4 or proportion of 4 persons on board, 100 grammes of glucose toffee tablets;

(iv) for each 4 or proportion of 4 persons on board, 1/2 litre of fresh water in durable containers;

(v) first aid equipment.

*Scale V*

(i) 1 survival beacon radio apparatus;

(ii) marine type pyrotechnical distress signals;

(iii) for each 4 or proportion of 4 persons on board, 100 grammes of glucose toffee tablets;

(iv) for each 4 or proportion of 4 persons on board, 1/2 litre of fresh water in durable containers;

(v) first aid equipment;

(vi) for every 75 or proportion of 75 persons on board, 1 stove suitable for use with aircraft fuel;

(vii) 1 cooking utensil, in which snow or ice can be melted;

(viii) 2 snow shovels;

(ix) 2 ice saws;

(x) single or multiple sleeping-bags, sufficient for the use of one-third of all persons on board;

(xi) 1 Arctic suit for each member of the crew of the aircraft.

**Changes to the proposal**

The proposal has been amended to make clear that the difficult search and rescue areas referred to are those designated as such by the State concerned.

**Explanatory note** (this does not form part of the proposed amendment)

This amendment implements the ICAO requirements for carriage of signalling devices and life-saving equipment when flying over areas which have been designated difficult for search and rescue purposes. No such areas have been designated in the UK, however carriage of appropriate equipment is required in any case by States which have designated areas for this purpose.

The ELT requirements are considered separately (see Appendix 8a).

**APPENDIX 12a**

## NIGHT FLIGHT - INSTRUMENTS AND EQUIPMENT

### ICAO Standards:

*Aeroplanes - ICAO Annex 6, Part II*

6.7 All aeroplanes, when operated at night, shall be equipped with:

a) all the equipment specified in 6.6 [IFR];

b) the lights required by Annex 2 for aircraft in flight or operating on the movement area of an aerodrome;

***Note**. - Specifications for lights meeting the requirements of Annex 2 for navigation lights are contained in the Appendix. The general characteristics of lights are specified in Annex 8. Detailed specifications for lights meeting the requirements of Annex 2 for aircraft in flight or operating on the movement area of an aerodrome are contained in the* Airworthiness Technical Manual *(Doc 9051).*

c) a landing light;

d) illumination for all flight instruments and equipment that are essential for the safe operation of the aeroplane;

e) lights in all passenger compartments; and

f) an electric torch for each crew member station.

*Helicopters - ICAO Annex 6, Part III, Section III*

4.7.1 All helicopters, when operated at night, shall be equipped with:

a) all the equipment specified in 4.6;

b) the lights required by Annex 2 for aircraft in flight or operating on the movement area of a heliport;

***Note**.- The general characteristics of lights are specified in Annex 8. Detailed specifications for lights meeting the requirements of Annex 2 for aircraft in flight or operating on the movement area of a heliport are contained in the* Airworthiness Technical Manual *(Doc 9051).*

c) a landing light;

d) illumination for all flight instruments and equipment that are essential for the safe operation of the helicopter;

e) lights in all passenger compartments; and

f) an electric torch for each crew member station.

**Proposed ANO amendment** (new text shown in **bold**)

SCHEDULE 4

4 *Table*

| *Description of aircraft* | *Circumstances of flight* | *Scale of equipment required* |
|---|---|---|

| | | |
|---|---|---|
| (2) Aeroplanes | (a) *flying for purposes other than public transport;* and | A (i) and (ii) and B (i) |
| | (i) when flying by night | C**,** ~~and~~ D**, G (ii), G (iii) and (GG)** |
| (15) Helicopters and Gyroplanes | (a) *flying for purposes other than public transport;* and | A (i)*,* ~~and~~ (ii)*, (iii) and (iv)* and B (i) |
| | (i) when flying by day under Visual Flight Rules with visual ground reference | D |
| | (ii) when flying by day under Instrument Flight Rules or without visual ground reference | |
| | (aa) outside controlled airspace | E with E (ii) duplicated |
| | (bb) within controlled airspace | E with both E (ii) and E(iv) duplicated and F with F (iv) for all weights |
| | (iii) when flying at night<br><br>(aa) with visual ground reference | C, E, **G (ii),** G (iii) and G (v) |
| | (bb) without visual ground reference<br><br>(aaa) outside controlled airspace | C, E with E (ii) duplicated **G (ii),** G (iii) and G (v) |
| | (bbb) within controlled airspace | C, E with both E (ii) and E (iv) duplicated, F with F (iv) for all weights, **G (ii),** G (iii) and G (v) |

5 The scales of equipment indicated in the foregoing Table shall be as follows:

*Scale G*

(i) In the case of an aircraft other than a helicopter or gyroplane landing lights consisting of 2 single filament lamps, or one dual filament lamp with separately energised filaments.

(ii) An electrical lighting system to provide illumination in every passenger compartment.

(iii)

(a) One electric torch for each member of the crew of the aircraft; or

(b)

(aa) one electric torch for each member of the flight crew of the aircraft; and

(bb) at least one electric torch affixed adjacent to each floor level exit intended for the disembarkation of passengers whether normally or in an emergency, provided that such torches shall:

(aaa) be readily accessible for use by the crew of the aircraft at all times; and

(bbb) number in total not less than the minimum number of cabin attendants required to be carried with a full passenger complement.

(iv) In the case of an aircraft other than a helicopter or gyroplane of which the maximum total weight authorised exceeds 5700 kg, means of observing the existence and build up of ice on the aircraft.

(v)

(a) In the case of a helicopter or gyroplane in respect of which there is in force a certificate of airworthiness designating the helicopter or gyroplane as being of performance group A, either:

(aa) 2 landing lights both of which are adjustable so as to illuminate the ground in front of and below the helicopter or

gyroplane and one of which is adjustable so as to illuminate the ground on either side of the helicopter or gyroplane; or

(bb) one landing light or, if the maximum total weight authorised of the helicopter or gyroplane exceeds 5700 kg, one dual filament landing light with separately energised filaments, or 2 single filament lights, each of which is adjustable so as to illuminate the ground in front of and below the helicopter or gyroplane, and 2 parachute flares.

(b) In the case of a helicopter or gyroplane in respect of which there is in force a certificate of airworthiness designating the helicopter or gyroplane as being of performance group B, either:

(aa) one landing light and 2 parachute flares; or

(bb) if the maximum total weight authorised of the helicopter or gyroplane exceeds 5700 kg, either one dual filament landing light with separately energised filaments or 2 single filament landing lights, and 2 parachute flares; or

**(cc) if the maximum total weight authorised of the helicopter or gyroplane is 5700 kg or less and the flight is for a purpose other than public transport:**

**(aaa) 2 landing lights, one of which is adjustable in flight so as to illuminate the ground in front of, below and on either side of the helicopter; or**

**(bbb) 2 landing lights in addition to the helicopter standard equipment, which shall be adjusted so as to illuminate the ground in front of the helicopter.**

**Scale GG**

**A landing light.**

**Changes to the proposal**

In the light of comment 1-12-2, Scale G (v) has been expanded to include the alternative combinations of helicopter landing lights currently allowed under general exemption number 450 in the CAA Official Record Series 4.

**Explanatory note** (this does not form part of the proposed amendment)

The parts of the ICAO Standards that are not presently implemented in UK legislation are shown underlined above.

The proposed amendment to Schedule 4 of the Air Navigation Order (ANO) will require general aviation aeroplanes flying at night to be equipped with a landing light, torches for all crew members and electric lighting in each passenger compartment. For general aviation helicopters flying at night the only new requirement will be for electric lighting in each passenger compartment, since landing lights and crew torches are already required under the ANO.

**APPENDIX 13a**

## IFR FLIGHT - COMMUNICATION EQUIPMENT

**ICAO Standards:**

*Aeroplanes - ICAO Annex 6, Part II*
7.1.1 An aeroplane to be operated in accordance with the instrument flight rules or at night shall be provided with radio communication equipment. Such equipment shall be capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by the appropriate authority.

*Helicopters - ICAO Annex 6, Part III, Section III*
5.1.1 A helicopter to be operated in accordance with the instrument flight rules or at night shall be provided with radio communication equipment. Such equipment shall be capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by the appropriate authority.

*Note.- The requirements of 7.1.1 and 5.1.1 (above) are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.*

**Proposed ANO amendment** (new text shown in **bold**; deletion shown by ~~**strike through**~~.)

SCHEDULE 5
Article 15

*Radio and radio navigation equipment to be carried in aircraft*

1 Every aircraft shall be provided, when flying in the circumstances specified in the first column of the Table set forth in paragraph 2 of this Schedule, with the scales of equipment respectively indicated in that Table:

Provided that, if the aircraft is flying in a combination of such circumstances the scales of equipment shall not on that account be required to be duplicated.

2 Table

| *Aircraft and circumstances of flight* | *Scale of equipment required* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | J |
| (1) All aircraft (other than gliders) within the United Kingdom: | A* | | | | E* | F*# | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| (a) when flying under Instrument Flight Rules within controlled airspace | | | | | | | | | |
| (b) when flying within controlled airspace | A* | | | | | | | | |
| (c) when making an approach to landing at an aerodrome notified for the purpose of this sub-paragraph | | | | | | | G* | | |
| (2) All aircraft within the United Kingdom:<br><br>(a) when flying at or above flight level 245 | A* | | | | | | | | |
| (b) when flying within airspace notified for the purposes of this sub-paragraph | A* | | | | | | | | |
| (3) All aircraft (other than gliders) within the United Kingdom:<br><br>(a) when flying at or above flight level 245 | | | | | E* | F* | | | |
| (b) when flying within airspace notified for the purpose of this sub-paragraph | | | | | E* | | | | |
| (c) when flying at or above flight level 100 | | | | | E* | | | | |
| (4) All aircraft (other than gliders) registered in the United Kingdom, wherever they may be:<br><br>(a) when flying for the purpose of public transport under Instrument Flight Rules:<br><br>(i) while making an approach to landing | A | | C | D | | | | H | |
| (ii) on all other occasions | A | | C | | | | | H | |
| (b) subject to sub-paragraph (d), multi-engined aircraft when flying for the purpose of public transport under | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Visual Flight Rules | | | | | | | | | |
| (c) subject to sub-paragraph (d), single-engined aircraft when flying for the purpose of public transport under Visual Flight Rules:<br><br>(i) over a route on which navigation is effected solely by visual reference to landmarks | A | | | | | | | | |
| (ii) on all other occasions | A | B | | | | | | | |
| (d) when flying under Instrument Flight Rules ~~**within controlled airspace**~~ and not required to comply with paragraph (4)(a) above | A* | | | | | | | | |
| (5) All aeroplanes registered in the United Kingdom, wherever they may be, and all aeroplanes wherever registered when flying in the United Kingdom, powered by one or more turbine jets or turbine propeller engines and either having a maximum take-off weight exceeding 15,000 kg or which in accordance with the certificate of airworthiness in force in respect thereof may carry more than 30 passengers | | | | | | | | | J |

* Unless the appropriate air traffic control unit otherwise permits in relation to the particular flight and provided that the aircraft complies with any instructions which the air traffic control unit may give in the particular case.

# Provided that non-public transport aircraft flying in Class D and E airspace shall not be required to be provided with distance measuring equipment.

3 The scales of radio and radio navigation equipment indicated in the foregoing Table shall be as follows:

*Scale A*

Radio equipment capable of maintaining direct two-way communication with the appropriate aeronautical radio stations.

**Changes to the proposal**

There are no changes to this part of the proposal.

**Explanatory note** (this does not form part of the proposed amendment)

The ICAO Standards for general aviation aeroplanes and helicopters require two-way radio communication equipment for flight under Instrument Flight Rules (IFR). Aircraft intended for IFR flight are invariably equipped with radio and it is considered to be something of an anomaly that this has not been made a requirement in Schedule 5.

Paragraph (4) of Table 2 presently applies to all aircraft registered in the United Kingdom, wherever they may be. With the inception of EASA some gliders have to be registered, therefore these gliders would become subject to a requirement to carry radio for flight under instrument flight rules if they were not expressly excluded. ICAO Annex 6 is not applicable to gliders and it is not the CAA's intention to extend regulation into other areas unless there is a justifiable safety need. The proposed amendments to paragraph (4) will bring the UK legislation in line with ICAO Standards in this regard.

**APPENDIX 14a**

## INSTRUCTION - GENERAL (HELICOPTER ROTORS)

**ICAO Standard:**

*Helicopters - ICAO Annex 6, Part III, Section III*

2.17 Instruction - general

A helicopter rotor shall not be turned under power without a qualified pilot at the controls.

**Proposed ANO amendment** (new text shown in **bold**)

*Pilots to remain at controls*

41 - (1)

(a) The commander of a flying machine or glider registered in the United Kingdom shall cause one pilot to remain at the controls at all times while it is in flight.

(b) If the flying machine or glider is required by or under this Order to carry two pilots, the commander shall cause both pilots to remain at the controls during take-off and landing.

(c) If the flying machine or glider carries two or more pilots (whether or not it is required to do so) and is engaged on a flight for the purpose of the public transport of passengers, the commander shall remain at the controls during take-off and landing.

**(d) An operator shall not permit a helicopter rotor to be turned under power for the purpose of making a flight unless there is a person at the controls entitled to act as pilot-in -command of the helicopter in accordance with the provisions of article 21 of this Order.**

(2) Each pilot at the controls shall be secured in his seat by either a safety belt with or without one diagonal shoulder strap, or a safety harness except that during take-off and landing a safety harness shall be worn if it is required by article 14 of and Schedule 4 to this Order to be provided.

**Changes to the proposal**

There are no changes to this part of the proposal.

**Explanatory note** (this does not form part of the proposed amendment)

The ICAO Standard relates to flight operations. This is reflected in the proposed amendment to Article 41 of the Air Navigation Order (ANO) since the requirement will only apply when the rotors are turned under power for the purpose of commencing a flight. Therefore this provision would not inhibit the activities of a maintenance organisation. Reference is made to ANO Article 21 which makes provision for pilots under training and the revalidation and renewal of ratings.

**APPENDIX 15a**

## HELICOPTER FLIGHTS OVER WATER - MEANS OF FLOATATION

**ICAO Standard:**

*Helicopters - ICAO Annex 6, Part III, Section III*

4.3.1 Means of floatation

All helicopters intended to be flown over water shall be fitted with a permanent or rapidly deployable means of floatation so as to ensure a safe ditching of the helicopter when:

a) flying over water at a distance from land corresponding to more than 10 minutes at normal cruise speed in the case of performance Class 1 or 2 helicopters; or

b) flying over water beyond autorotational or safe forced landing distance from land in the case of performance Class 3 helicopters.

**Proposed ANO amendment** (deleted proposal shown by ~~strike through~~)

SCHEDULE 4

4 *Table*

| | | |
|---|---|---|
| (15) Helicopters and Gyroplanes | (a) *flying for purposes other than public transport;* and | A (i)*,* ~~and~~ (ii)*, (iii) and (iv)* and B (i) |
| | (i) when flying by day under Visual Flight Rules with visual ground reference | D |
| | (ii) when flying by day under Instrument Flight Rules or without visual ground reference | |
| | (aa) outside controlled airspace | E with E (ii) duplicated |
| | (bb) within controlled airspace | E with both E (ii) and E(iv) duplicated and F with F (iv) for all weights |
| | (iii) when flying at night<br>(aa) with visual ground reference | C, E, G (iii) and G (v) |
| | (bb) without visual ground reference (aaa) | C, E with E (ii) |

| | | |
|---|---|---|
| | outside controlled airspace | duplicated G (iii) and G (v) |
| | (bbb) within controlled airspace | C, E with both E (ii) and E (iv) duplicated, F with F (iv) for all weights, G (iii) and G (v) |
| | *(iv) when flying at a height of 10 000 ft or more above mean sea level.* | *L1 or L2* |
| | (v) when flying over water:<br>*(aa) beyond autorotational gliding distance from land suitable for an emergency landing* | *H* |
| | *(bb) on all flights on which in the event of any emergency occurring during the take-off or during the landing at the intended destination or any likely alternate destination it is reasonably possible that the helicopter or gyroplane would be forced to land onto water* | *H* |
| | ~~(cc) in the case of a helicopter or gyroplane classified in its certificate of airworthiness as being of performance group B when beyond autorotational gliding distance from land suitable for an emergency landing~~ | ~~JJ~~ |
| | *(cc) on or after 1 January 2006 when at a distance of more than 10 minutes flying time at normal cruising speed away from land suitable for making an emergency landing* | *KK(i) or KK(ii)* |
| | ~~(ee) in the case of a helicopter or gyroplane classified in its certificate of airworthiness as being of performance group A when beyond 10 minutes flying time* from land~~ | ~~JJ~~ |

5 The scales of equipment indicated in the foregoing Table shall be as follows:

~~*Scale JJ*~~

~~A permanent or rapidly deployable means of floatation enabling the helicopter or gyroplane to land safely on water.~~

**Changes to the proposal**

The CAA has considered comments 1-5-1 to 1-5-10 and information available from the UK accident record. It appears that, for small helicopters at least, ditchings may be generally survivable even without floatation equipment. Although the technical requirements of floatation equipment are common to all helicopters, irrespective of the purpose of the flight, it is accepted that the requirements for General Aviation do not have to be the same as for public transport operations.

Implementation of requirements for helicopter floatation equipment would mean that many owners would be unable to comply, and would in effect be prohibited from flying to many destinations in accordance with established custom and practice. For the types of helicopter where compliance is feasible, the costs of compliance may be considered to be unjustified (see 1-15-4), particularly where owners fly over water for only a few hours each year. (See also 1-G-7 and comments made in relation to other emergency equipment, 1-10-15 and 1-10-17).

Having considered all of the foregoing, the CAA has decided that it would be inappropriate to mandate permanent or rapidly deployable means of floatation for General Aviation helicopter flights over water, although owners may of course continue to fit such equipment if they wish.

# REGULATORY IMPACT ASSESSMENT FOR THE AMENDMENT OF ARTICLE 62, ARTICLE 155, SCHEDULE 4 AND SCHEDULE 9 OF THE AIR NAVIGATION ORDER 2005 FOR THE PURPOSE OF INTRODUCING OPERATIONAL EQUIPMENT REQUIREMENTS FOR THE CARRIAGE OF A VIBRATION HEALTH MONITORING (VHM) SYSTEM ON ALL HELICOPTERS WITH A MAXIMUM APPROVED PASSENGER SEATING CONFIGURATION OF MORE THAN NINE, OPERATING IN A HOSTILE ENVIRONMENT FOR THE PURPOSE OF PUBLIC TRANSPORT AND TO PROVIDE FOR THE MANNER IN WHICH THIS VHM EQUIPMENT IS TO BE USED

## 1 Title of Proposal

1.1 Regulatory Impact Assessment for the amendment of Article 62, Article 155, Schedule 4 and Schedule 9 of the Air Navigation Order 2005 (ANO).

## 2 Purpose and Intended Effect

### 2.1 Objective

2.1.1 To amend Article 62, Article 155, Schedule 4 and Schedule 9 of the ANO for the purpose of introducing operational equipment requirements for the carriage and use of a Vibration Health Monitoring (VHM) system on all helicopters with a maximum approved passenger seating configuration (MAPSC) of more than nine, operating in a hostile environment for the purpose of public transport; to define hostile environment and to provide for the manner in which this VHM equipment is to be used.

### 2.2 Background

2.2.1 Helicopters are more vulnerable to catastrophic mechanical failures than fixed wing aircraft because of the number of single-load-path critical parts within the rotor and rotor drive systems and the reduced redundancy within their design. It was this vulnerability, and the high accident rate in the 1970s and 1980s that led to the development of systems able to monitor the health of helicopter rotor and rotor drive systems. VHM systems entered service in 1991 as a voluntary initiative by the helicopter operators and the offshore industry following a successful series of CAA funded operational trials. It was subsequently made mandatory as an Additional Airworthiness Directive (AAD) for all helicopters with a MAPSC of more than nine with a Certificate of Airworthiness (C of A) in the Transport Category (Passenger),

2.2.2 Worldwide there are now over 2 million flying hours of VHM experience (equivalent to about 20 years of UK operation). By 1997, studies by the

CAA showed that VHM systems had provided the first warning for approximately 69% of the rotor and rotor drive system failure types and for approximately 60% of all the potentially catastrophic failure cases. In 1999, a further study by the CAA's Helicopter Health Monitoring Advisory Group (HHMAG) showed that incidents of serious vibration occurring in-flight had reduced dramatically within the UK fleet following the introduction of these systems. Since 1991, no accidents have occurred in the UK on VHM equipped helicopters due to rotor or rotor drive system failures that VHM was capable of detecting.

2.2.3 A VHM system has been required to be carried on helicopters with a MAPSC of more than nine with a C of A in the Transport Category (Passenger). The requirement for VHM has been promulgated either through the UK CAA AAD 001-05-99, or by a Special Condition applied at certification. This VHM function is currently provided by equipment more commonly referred to as Health and Usage Monitoring Systems (HUMS).

2.2.4 Airworthiness became a European Aviation Safety Agency (EASA) responsibility on 28 September 2003. The CAA is convinced of the need to maintain this proven safety benefit for affected machines and for that reason submitted AAD 001-05-99 to EASA and the Commission in accordance with Article 10.1 of Regulation 1592/2002. The Commission would come to a decision on this AAD, in accordance with Article 10.2 of that same Regulation. At a meeting with the EASA Executive Director an overview of the CAA's concerns regarding the potential loss of mandatory HUMS was presented and discussed. EASA recognised that VHM was a very important safety issue and agreed to consider how best to retain this safety benefit. While, EASA indicated its support for an operational requirement, limited to operations in support of offshore oil and gas exploitation (an environment that is considered hostile in sea areas surrounding Northern Europe), it was unable to support the AAD. EASA has indicated that it will formally recommend to the European Commission that the CAA AAD 001-05-99 be cancelled. The CAA has therefore taken a pragmatic view to ensure that the safety benefit is retained, and proposes to amend Schedule 4 of the Air Navigation Order 2005 to require the carriage of VHM on helicopters with a MAPSC of more than nine, operating in a hostile environment. The CAA has proposed a similar Notice of Proposed Amendment (NPA) to the Joint Aviation Authorities (JAA).

2.2.5 There are a number of large helicopters operating in the Search and Rescue (SAR) role that will not be covered by JAR-OPS 3 rules; such operations are not considered to be for the purpose of Commercial Air Transport. In the UK they are considered to be public transport operations and will remain subject to the ANO. Therefore as well as amending JAR-

OPS 3, it is necessary to amend the ANO to require these helicopters to be fitted with a VHM system.

2.2.6 As part of this proposed amendment, the CAA intends to introduce, at Article 62, a requirement for the operators of those affected helicopters to have procedures approved by the CAA covering data collection, analysis and determination of serviceability. The aforementioned AAD and Special Condition currently require such procedures.

2.2.7 It is also proposed to introduce, at Schedule 9, the requirement for the MAPSC to be contained within the Operations Manual.

### 2.3 Rationale for Government Intervention

2.3.1 Without the proposed amendment to the ANO, the current requirement for the carriage and use of a VHM system contained in the CAA AAD will be lost. This would result in the proven safety benefit associated with the carriage and use of this equipment, also being lost. The loss of this requirement would have a significant safety impact upon oil and gas exploitation flights and other significant over-water operations such as the Penzance to Isles of Scilly scheduled service, and SAR operations undertaken on behalf of the Maritime Coastguard Agency. The CAA believes that the ANO should be amended, such that those proven safety benefits afforded by the carriage and use of VHM equipment, and described in paragraph 2.2 above, will be preserved.

## 3 Consultation

### 3.1 Within Government

3.1.1 The Department for Transport, the Home Office, the Air Accidents Investigation Branch and Departments of the CAA were consulted on this proposal.

### 3.2 Public Consultation

3.2.1 All relevant UK helicopter Air Operator Certificate (AOC) holders operating in a hostile environment were specifically consulted on the third Letter of Consultation (L of C). The L of C and RIA were also made available to all helicopter AOC holders on the CAA Safety Regulation Group (SRG) website. As a result of the first L of C, four replies were received. The second L of C containing the amended proposals attracted three responses, two of which also responded to the initial Letter. Three replies

were received as a result of the third L of C and once again the two who responded to both the first and second L of C replied to the third.

## 4 Options

4.1 Four options were considered.

Option 1. One option would have been to do nothing. This would have resulted in the removal of a requirement for carriage of a VHM system on those helicopters previously affected by the AAD or Special Conditions. This could have resulted in the loss of the proven safety benefits associated with the use of these systems. Even if VHM was voluntarily retained on helicopters in current service, it would not require the fitment of such a system to new helicopters entering service nor would it require any such equipment to be serviceable.

Option 2. An option would have been to amend Article 62, Article 155, Schedule 4(4)(15) and Schedule 9 Part A to the ANO to require the carriage and use of a VHM system on helicopters with a MAPSC of more than nine with a C of A in the Transport Category (Passenger) and thereby maintain the requirements previously required by the AAD. It was considered unlikely that such a proposal would find acceptance within Europe as a whole.

Option 3. Another option would have been to amend Article 62, Article 155, Schedule 4(4)(15) and Schedule 9 Part A to the ANO to require the carriage of a VHM system on all helicopters with a MAPSC of more than nine operating for the purpose of public transport and in support of, or in connection with, the offshore exploitation of mineral resources (including gas), and for the operators of those affected helicopters to have procedures approved by the CAA covering all aspects of data collection, analysis and determination of serviceability. This option would have reflected the rule that EASA initially indicated they could support as an operational requirement. When proposed to offshore helicopter operators informally, this option was vigorously opposed as being overly selective and non-inclusive of SAR helicopters and other non-oil/gas exploitation related operations currently required to have VHM installed (e.g. the Isles of Scilly/Penzance scheduled service and operations in support of the MoD in the Falkland Islands).

Option 4. Amend Article 62, Article 155, Schedule 4(4)(15) and Schedule 9 Part A to the ANO to require the carriage of a

VHM system on all helicopters with a MAPSC of more than nine operating in a hostile environment and for the purpose of public transport, and for the operators of those affected helicopters to have procedures approved by the CAA covering all aspects of data collection, analysis and determination of serviceability. This option closely reflects the current rule that UK industry has accepted and operated under for a number of years and includes the operational requirement EASA have indicated they could support.

The CAA believed that Option 4 would provide the most comprehensive and effective benefit in that helicopters of the class indicated operating in a hostile environment would be equipped with a VHM system.

## 5 Costs and Benefits

### 5.1 Sectors and Groups Affected

5.1.1 The proposed amendment to the ANO will affect all operators of helicopters with a maximum approved passenger seating configuration (MAPSC) of more than nine, operating in a hostile environment for the purpose of public transport, (hostile environment is defined in Attachment 2). However, all helicopters registered in the UK and affected by the proposal should already be equipped with a VHM system that complies with the proposed requirement. The proposed amendment to the ANO would have no effect on voluntary organisations and charities and would not have any race equality impacts.

### 5.2 Benefits

Option 1. There would have been no benefits, and would have resulted in the possible loss of the proven safety benefits that operation with a VHM system provided. In addition, whilst a VHM requirement might be adopted by either EASA or the JAA as an operational requirement, without this amendment helicopters not covered by EASA or JAA rules would no longer be required to install VHM. For example SAR helicopters, police helicopters and helicopters operating on the UK register in support of the military. If the UK were not to mandate for VHM it would also be difficult to require equipment carried on a voluntary basis, to be included as a required item in the Minimum Equipment List (MEL), or to object to any proposed UK operation by an overseas registered helicopter not so equipped.

Option 2. The VHM system has been shown to provide the first warning for approximately 69% of the rotor and rotor drive system failure types being monitored and approximately 60% of all the potentially catastrophic rotor drive system failure cases. The rate of accidents due to rotor or rotor drive system failures reduced dramatically in the UK since VHM was introduced, initially voluntarily and subsequently by mandate. Incidents of serious vibration occurring in-flight have also reduced. The retention of this requirement would ensure that the improvement in the accident rate experienced by these helicopters since they have been equipped with VHM is maintained. In addition to reducing the accident rate, it would also result in avoidance of the costs related to accidents (including those due to fatalities, injuries, helicopter damage/loss, rescue, salvage and accident investigation, third party liability, loss of revenue, loss of customer confidence and disruption to customer operations). Furthermore, the VHM systems currently employed offered operational cost savings due to fewer maintenance test flights, reduced component maintenance and increased maintenance insight.

Option 3. The benefits would have been the same as Option 2 and in addition would have been in accord with the position initially indicated by EASA that would have been acceptable as a future operational rule. However these benefits would apply only to helicopters in support of gas and oil exploitation and thus not include other significant operations.

Option 4. The benefits were the same as Option 2 and in addition took into account the concerns expressed by UK industry and at the same time accord with the general rule that EASA have indicated they could support when adopting operating rules. Furthermore it includes helicopters not subject to EASA (or JAA) operating rules, such as SAR helicopters and civil registered helicopters operating in the service of the military.

## 5.3 Costs

### 5.3.1 Compliance Costs

Option 1. There were no compliance costs should this option have been adopted.

Option 2. As all affected helicopters registered in the UK should already have been equipped with a VHM system that complies with the proposed requirement, there should be no immediate

additional cost to operators. Should an operator wish to operate a new JAR/CS 29 certificated helicopter type, additional costs would be incurred as described below.

Option 3. The compliance costs would be the same as Option 2.

Option 4. The compliance costs would be the same as Option 2.

Costs will vary according to the capabilities of the system selected as well as the complexity of its installation and the helicopter type. However suppliers of VHM systems have provided an estimate of the costs of establishing such a programme for new operators of helicopters affected by the requirement that were not already equipped with a VHM system. Helicopters affected by the proposal have already fitted acceptable VHM installations and there are no significant additional costs involved for operators of those helicopters. Depending on the capabilities and complexity of the system, the costs for a new operator are anticipated to be within the following:

Cost of VHM aircraft hardware: £35k - £70k.

Cost of ground based equipment (data reading/analysis): < £8k - £20k, (depending on fleet size).

Cost of installation of VHM on aircraft: £4k plus lost availability (80 man-hours labour): up to £35k.

Total non-recurring cost of VHM: £47k – £105k.

The current VHM systems also offer a Rotor Track and Balance capability that was alternatively performed by ground test equipment costing £7k.

It should be noted that these costs would be the same for an operator installing VHM on a voluntary basis and that there are no additional costs accrued through mandating VHM.

### 5.3.2 Other Costs

There would be costs associated with personnel training and labour spent addressing VHM alerts, however the cost benefits of VHM should outweigh these costs and would apply equally for mandated and voluntary fitment.

### 5.3.3 Costs for a Typical Business

Operators were invited to submit their estimates of the initial costs of establishing a VHM system, the ongoing annual costs of a VHM programme and the cost savings achieved by the carriage and use of VHM systems. The installation costs were described in paragraph 5.3.1. The subsequent costs for a start-up operator would have included the setting-up of a system for the downloading and analysis of information. The ongoing cost would be any additional manpower costs associated with the analysis. The costs of operating the VHM programme should be more than offset by the cost saving achieved in the reduction of maintenance test flights, reduced maintenance and increased maintenance insight. As all helicopter operators affected already have such systems in place there should be no significant additional costs involved.

## 6 Small Firms Impact Test

6.1 Small businesses, currently operating helicopter types affected by this proposal, would already comply with this requirement in accordance with CAA AAD 001-05-99. This proposal would not result in any increased burden or increased direct costs. All helicopter Air Operator's Certificate (AOC) holders, both large and small, have been targeted during the consultation exercise.

## 7 Competition Assessment

7.1 In order to assess whether or not the proposed regulatory options would have an impact on competition within the UK, the CAA identified two markets that may be affected. The first market was for a system capable of monitoring the vibration of critical helicopter rotor and rotor drive system components. As the CAA had Approved systems from five manufacturers, and there was no change to the criteria of Approval resulting from this legislation, the CAA did not expect any competition concerns to arise in this market.

7.2 The second market that may have been affected was the operators of all helicopters with a MAPSC of more than nine operating in a hostile environment and for the purpose of public transport. As all operators of helicopters, which were included in this category, are already required to fit a VHM system, the regulation was not expected to have had an adverse impact on any. It is accepted that some operators might perceive commercial disadvantage when competing for operator or international contracts, however this is not a new situation as the proposal effectively maintains the status quo.

## 8 Enforcement and Sanctions and Monitoring

8.1 The mechanism for enforcement through the ANO already exists, and no additional resources will be required in this regard. The CAA's Safety Regulation Group, as part of its safety oversight function, will monitor and review the effectiveness of the legislation.

## 9 Implementation and Delivery Plan

9.1 The draft proposal addresses what is already understood by the UK industry who are compliant because of the requirement promulgated either through the UK CAA AAD 001-05-99, or by a Special Condition applied at certification. Therefore, the necessity for an implementation and delivery plan is not relevant. When in future, helicopters are introduced onto the UK register for the purpose defined in the RIA, then the operator can expect a minimum of 12 weeks to comply with the legislation.

## 10 Post-implementation Review

10.1 The CAA, as part of its continuing oversight of aircraft operations, will assess the effectiveness of the policy requiring the fitting of a VHM system to the subject helicopters. Should modifications to the equipment become available that would provide a more effective safety monitoring system, the CAA will consult further on proposals that would modify or supersede the requirements proposed in this RIA.

## 11 Summary and Recommendation

11.1 The CAA believes that Option 4 would provide the most comprehensive and effective benefit in that helicopters of the class indicated operating in a hostile environment would be equipped with a VHM system. This option closely reflects the current rule that UK industry has accepted and operated under for a number of years and includes the operational requirement EASA have indicated they could support.

11.2 Option 1 was rejected because this would have resulted in the removal of a requirement for carriage of a VHM system on those helicopters previously affected by the AAD or Special Conditions. This could have resulted in the loss of the proven safety benefits associated with the use of these systems. Option 2 was rejected because, after initial approaches to European regulators, it was considered unlikely that such a proposal would find acceptance within Europe as a whole. Finally, Option 3 was rejected because when proposed to offshore helicopter operators informally, this option was vigorously opposed as being overly selective and non-inclusive of SAR helicopters and other non-oil/gas exploitation related operations currently required to have VHM installed.

**Summary Costs and Benefits Table**

| Option | Total benefit per annum: economic, environmental, social | Total cost per annum: - economic, environmental, social - policy and administrative |
|---|---|---|
| 1 | No benefit | No cost |
| 2 | In addition to reducing the accident rate, the fitting of VHM systems would also result in avoidance of the costs related to accidents (including those due to fatalities, injuries, helicopter damage/loss, rescue, salvage and accident investigation, third party liability, loss of revenue, loss of customer confidence and disruption to customer operations). Furthermore, the VHM systems offered operational cost savings due to fewer maintenance test flights, reduced component maintenance and increased maintenance insight. | There would be no environmental, social costs. As all affected helicopters registered in the UK should already have been equipped with a VHM system, there should be no immediate additional cost to operators. There would be costs associated with personnel training and labour spent addressing VHM alerts, however the cost benefits of VHM should outweigh these costs. Compliance costs for new helicopters are described in paragraph 5.3.1 and the non-recurrent cost range between £47k - £105k dependant on the capabilities and complexity of the system. |
| 3 | As Option 2 above. | As Option 2 above. |
| 4 | As Option 2 above. | As Option 2 above. |

11.3 The CAA is minded to recommend to the Secretary of State for Transport that the ANO be amended at Article 62, Article 155 Schedule 4 and Schedule 9 as detailed in Attachment 2.

## 12 Contact Point

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**ATTACHMENT 2**

**DETAILED PROPOSALS FOR AMENDING THE ANO**

1. Add Article 62A as follows:

**Use of vibration health monitoring systems**

**62A The operator of a helicopter on which a vibration health monitoring system is required by paragraph 5(15) of Schedule 4 to the Order to be carried, shall operate that equipment in accordance with procedures approved by the CAA.**

2. Add to Article 155 as follows:

**'Hostile environment' as it applies to helicopters operating for the purposes of public transport means an environment in which:**

**(a) a safe forced landing cannot be accomplished because the surface is inadequate; or**

**(b) the helicopter occupants cannot be adequately protected from the elements; or**

**(c) search and rescue response/capability is not provided consistent with anticipated exposure; or**

**(d) there is an unacceptable risk of endangering persons or property on the ground.**

3. Amend Schedule 4 as follows:

Paragraph 5. Table

| **Helicopters and Gyroplanes** | | |
|---|---|---|
| (15) Helicopters and Gyroplanes | (b) flying for the purpose of public transport; and<br>(xvii) with a maximum approved passenger seating configuration of more than 9 and operating in a hostile environment, | SS(6) |

4. Amend Schedule 4 as follows:

Scale SS

Insert

**(6) a vibration health monitoring system capable of monitoring the vibration of critical helicopter rotor and rotor drive system components.**

5. Amend Schedule 9 Part A as follows:

Insert:

**(t) in the case of a helicopter, the maximum approved passenger seating configuration.**

# FULL REGULATORY IMPACT ASSESSMENT

## PROPOSAL TO AMEND THE AIR NAVIGATION ORDER 2005 FOR THE PURPOSE OF INTRODUCING 8.33kHz RADIO CHANNEL SPACING IN UK AIRSPACE ABOVE FL 195

## 1. Purpose and Intended Effect of the Measure

### The Objective

1.1. The inability to provide the aviation industry with suitable VHF communications frequencies in a timely manner is a serious constraint on the delivery of operational improvements aimed at providing capacity benefits and reductions in delay. This consultation document explores the options available to alleviate the scarcity of aeronautical VHF radio communications spectrum.

### The Background

1.2. The increased demand for airspace usage from all sectors of aviation is expected to continue. Current forecasts carried out by Eurocontrol show an annual traffic growth of 4-6% throughout Europe up to 2015. Calculations and historical data show that this will give a significant increase in the demand for communications between aircraft and ground-based air traffic services.

1.3. To ensure world-wide interoperability, air-to-ground radio communications (referred to by International Telecommunications Union, ITU, as the Aeronautical Mobile Service) are allocated VHF spectrum between 118 and 136.975MHz by the ITU. Until 1999, the spectrum was divided into 25kHz channels. Channels are not dedicated to a single location but are re-used according to frequency planning rules derived by International Civil Aviation Organisation (ICAO). In Europe, this process requires technical coordination between State civil aviation authorities.

1.4. The issue of spectrum scarcity was recognised some 10-15 years ago and a number of technical solutions were considered. Studies concluded that the most effective solution, able to be achieved within the required timescale was the introduction of 8.33kHz channel spacing in congested airspace, thereby fitting a greater number of channels into the available spectrum. This would require modification to, or replacement of, existing 25kHz channel spacing radios in both aircraft and groundstations operating within the affected airspace.

1.5. As a result, 8.33kHz channel spacing was introduced in the airspace above FL 245 in seven European States in October 1999. A further 22 States, including the UK, commenced implementation above FL 245 from October 2002. Consequently, carriage of 8.33kHz equipment is mandatory in the UK FIR for aircraft flying above FL 245. There are special provisions for non-equipped State (Military) aircraft that require occasional access to this airspace providing that communications can be established over a UHF radio channel. This procedure is promulgated in Supplementary

Instruction No 1 of 2002 of the Manual of Air Traffic Services Part 1 (CAP 493) and is reproduced at Appendix A.

1.6. Despite the above actions, the scarcity of VHF frequencies in Europe continues to potentially limit airspace capacity and efficiency. For example, frequencies for UK en-route airspace changes required for improved airspace efficiency have taken some 2 years to acquire and there is every reason to believe that this situation can only deteriorate as spectrum congestion increases.

1.7. At its 42nd meeting in December 2000, the ICAO European Air Navigation Planning Group (EANPG) agreed a number of conclusions relating to VHF frequency capacity problems. It invited EUROCONTROL to urgently undertake the necessary studies to identify solutions which would resolve the capacity shortage expected by 2008. At its 43rd and 44th meetings, in December 2001 and 2002, the EANPG concluded that a phased approach should be developed for introducing 8.33 channel spacing into the airspace below FL 245. This has been addressed by the EUROCONTROL 8.33 Vertical Expansion (VEX) Programme, the key features of which are as follows:

a) To expand the area of 8.33 kHz operation and in doing so, take all practical measures available to minimise the impact on General Aviation (GA) VFR and all State Aircraft.

b) Undertake the expansion in the following phases, with the understanding that individual States have the right to grant exemptions for aircraft and/or airspace volumes on the basis of the requirement and/or the ability to participate;

• Phase 1: Above FL 195 in the ICAO EUR Region from 2006.

• Phase 2: In particular terminal control areas and control zones, from 2006, where this is determined to be a practical measure for alleviating VHF congestion.

• Phase 3: In designated controlled airspace in the ICAO EUR Region from 2009 onwards.

1.8. The EUROCONTROL Programme for Performance Enhancement in European Air Traffic Management (EATM) aims to create a seamless ATM system across 41 participating states. Its programme of activities is designed to facilitate the enhancement of European ATM performance and service provision. The programme enables the provision of ATM services and operations in Europe, by increasing the interoperability of air navigation systems and delivering operational improvements in ATM. The

scope of EATM work extends to the Air Traffic Service authorities of the ECAC States and includes actions at European and national level. The strategic direction of EATM is taken from the EUROCONTROL ATM 2000+ Strategy and the Single European Sky Initiative of the European Commission.

1.9. One activity currently being progressed by the EATM programme is the investigation of the use of 8.33kHz channels operating in carrier offset / climax mode - a key part of the System Convergence and R&D body of work. The expected results are Safety, Capacity, Efficiency, Security and Environment benefits for the European ATM Network. For the period 2005-2010, the 8.33 expansion programme aims to alleviate VHF congestion in the band 118-137 MHz, thus acting as an important enabler for re-sectorisation.

1.10. The European Commission Directorate-General for Energy and Transport has mandated Eurocontrol to develop an interoperability implementing rule for the deployment of air-ground communications based on 8.33kHz channel spacing. Pursuant to article 8 of the Single European Sky Framework Regulation, and the Memorandum of Co-operation (MoC) between Eurocontrol and the European Commission, the Commission has issued a mandate to Eurocontrol for the development of implementing rules in order to achieve the interoperability of the European Air Traffic Management network (EATMN). This mandate has been issued in order to address VHF congestion in core area Member States, and in view of the present non-availability of new alternative systems, there is a need to define the requirements for air-ground voice channel spacing, including the deployment of reduced 8.33 kHz channel spacing.

**Risk Assessment**

1.11. The following risks to civil aviation resulting from a lack of available communications frequencies have been identified.

1.11.1. **Ability To Meet Predicted Traffic Growth**. Lack of available air traffic control communications frequencies will reduce the ability to implement the airspace design changes necessary to meet the predicted growth in air traffic in the UK. The greatest difficulties are in identifying new frequencies for ATS Routes and TMAs due to the altitude and size of airspace covered by these services.

1.11.2. **Ability To Make Necessary Frequency Changes**. There are occasions when it is necessary or desirable to make frequency changes quickly. Examples include the resolution of unforeseen radio interference and demands for frequency assignments to meet specific temporary airspace requirements. The lack of available frequencies seriously impinges on the

ability to provide timely solutions to such problems. In the 12 months to September 2004 there have been 4 occasions where frequency changes were urgently required to resolve interference problems and 8 occasions where frequencies were required at short notice for temporary airspace changes. In one case it has taken three months to allocate a suitable frequency due to spectrum congestion.

1.11.3. **Ability To Improve Spectral Efficiency**. The severe lack of available frequencies reduces the ability to improve spectral efficiency by internationally coordinated planned modifications to the European frequency plan. This process, known as block planning, seeks to meet new frequency requirements by coordinating necessary frequency shifts in adjacent States. In the 12 months to September 2004 46 European frequency requirements were submitted to the Block planning meeting which could not be met through the routine ad-hoc assignment procedure. The success rate in meeting new requirements has been continuously falling. Results from the block planning round from June-December 2003 show that only 7% of requirements were met in the European high traffic density core area which includes the UK.

1.11.4. **Frequency Re-use – Separation Criteria**. Each frequency will be allocated to a number of aeronautical services across Europe. The criteria for re-use are determined by formulae based on maximum operating altitude and distance between the volumes of airspace served by the frequency assignment. Whilst reducing separation distances between users on the same frequency would yield more radio spectrum, it would increase the probability of interference caused by breakthrough from an adjacent user. This would lead to an unacceptable reduction in air safety.

**Impact on Industry**

1.12. Frequency availability is already a significant constraining factor in capacity-driven airspace re-design. It is extremely difficult to assess the total cost to aviation of being unable to respond to an increase in demand for aeronautical frequencies. In the worst-case analysis, it could be considered that through lack of available radio frequencies, none of the revenues resulting from the predicted 5% growth figure would be gained. Based only on the operating revenues of the major UK airlines of approximately £14Bn/anum, the annual lost revenues could be up to £700M. However, it is likely that some improvements in airspace utilisation would still be achieved, partly through the residual flexibility remaining in the existing frequency management process and partly by other means.

1.13. In addition to the costs to aviation, the inability to meet growing demand for air travel will have a negative affect on associated market sectors, such as tourism, and the UK economy as a whole.

## 2. Options

### Overview of Frequency Assignment

2.1. There are a limited number of frequencies (approximately 750 in the 25kHz spaced frequency plan) which can be assigned for use by the aeronautical mobile service. Each frequency is normally allocated at several locations within Europe. This is achieved by international coordination and the application of complex planning rules designed to minimise the risk of interference and breakthrough from services operating on the same or adjacent frequencies. Thereby, each ATS frequency allocation is afforded a protection area within which a specific frequency may not be re-used. Due to the 'straight-line' nature of VHF radio propagation, the required protection area increases in proportion to the altitude and area of the air traffic service. As a result, in the existing congested spectrum, identifying and allocating new frequencies for use at high altitude and over large areas causes the most difficulty. These are typically, but not exclusively, frequency allocations serving commercial air routes. Currently there are fewer difficulties allocating new frequencies for smaller aerodromes, such as those used by General Aviation, as these have small service volumes and can often be interspersed between larger volume assignments on the same frequency.

2.2. The available spectrum in the core area of Europe is close to saturation. Based on an annual growth figure for air traffic of 5%, studies carried out at Eurocontrol[1] have predicted a requirement for approx 168 new ATS frequencies per year across Europe. As UK frequencies assignments comprise approximately 9% of the total allocation, this suggests that up to 15 new frequencies per year will be required for ATS services. For comparison, Appendix C gives a simple analysis of UK frequency demands over the two years 2002-2004. This shows a net demand for approximately 11.5 new assignments per year, a relatively close correlation with the Eurocontrol estimate.

2.3. The only technologies likely to be available in the required time frame are the existing 25kHz and 8.33kHz VHF AM systems. Thus the only potential methods available to meet the growth in demand will be major reorganisation of the existing 25kHz frequency plan or further implementation of the more spectrally efficient 8.33kHz systems. Consequently, the following implementation options have been identified:

### Option 1 - Do Nothing

[1] Eurocontrol Vertical Expansion Study Report DIS/833/23

2.4. Although there will be no costs for the re-equipage or modification of radios, the do nothing option will be the most costly to UK aviation because it would limit the ability to respond to an increased demand for the frequencies required to meet the predicted growth in aviation. In addition, as the CAA strive to maximise the utilisation of the remaining available spectrum, the amount of necessary frequency changes required at ground-stations is likely to increase, with resultant cost implications.

**Option 2 – Reorganise The European Frequency Plan**

2.5. Studies have suggested that 20-30% improvement in utilisation could be achieved by reorganising the European frequency plan. This assertion is not universally accepted. However, if it were proven to be the case, the spare spectrum gained would probably be sufficient to allow for the planned growth in aviation until more spectrally efficient technologies become available in the 2015-2020 timeframe.

2.6. Unfortunately, there are significant difficulties with this suggestion, namely:

• It would be necessary to develop a Europe-wide frequency plan before there is any certainty that such a system is feasible.

• A ‘big bang’ implementation with no transition period would be required. This is because it is not technically possible to make provision for the concurrent availability of the old and new frequency plans within the same frequency band.

• It is doubtful that sufficient technical resource exists to carry out the rapid retuning or replacement of ground-stations and consequential testing and certification.

• At the point in time that the system becomes operational, it is likely that interference problems will occur that could not reasonably be predicted during the planning phases.

2.7. Almost certainly therefore, it would be necessary to duplicate many of the 2000 or so ground-stations in the UK, and re-commission them prior to the implementation date.

2.8. The number of technical and logistical intangibles in totally re-organising the frequency plan makes this a high-risk option, both in terms of maintaining safety and minimising disruption of the VHF communications system. Consequently, a robust and suitably-funded reversion plan would be necessary to mitigate the risks.

2.9. As a result of the above, the CAA does not favour this option. However, it has been included within this consultation document for comparison purposes.

**Option 3 - Introduction of 8.33kHz Phases 1 & 2**

2.10. This option seeks to implement mandatory carriage of 8.33 equipment in UK airspace above FL 195 from March 2007. It is anticipated that between 10 and 15 existing frequency assignments will initially be suitable for conversion. These are en-route assignments operating wholly above FL 195.

2.11. Currently, Supplementary Instruction No1 of 2002 to the Manual of Air Traffic Services Part1 (see Appendix A) allows State (Military) aircraft not equipped with an 8.33 capable radios to operate in 8.33 designated airspace providing they are infrequent users of that airspace (less than 30 hrs per year) and are equipped with military UHF radios as the means of communication. It is envisaged that a similar rule would be applied to Phase 1 (above FL 195). It will be necessary to consult NATO and/or the MOD to establish whether the existing 30 hours rule is adequate. It will also be necessary to consult the MOD and NATS to ensure that the UHF-radio ground infrastructure can support the lower airspace requirement. A Eurocontrol Military Business Division study on this issue is already in progress.

**Option 4 - Await The Maturity Of Alternative Technologies**

2.12. VHF Datalink (VDL) services are in the early stages of implementation. They are intended to address functions such as ATC clearances, trajectory negotiations, downlink of aircraft parameters and flight plan verification, some of which are currently provided by VHF voice communication services. It might be assumed therefore that there will be some future reduction in demand for VHF voice communications frequencies. However, as VDL services use the same frequency spectrum, and as demand for frequencies for other VDL-based services is likely to grow, it is considered probable that the introduction of VDL with have little overall effect on demand for radio frequencies in the short to medium term.

2.13. Instantaneous voice communications between pilot and controller is central to European ATC strategy in the short and medium term. New, more spectrally efficient technologies are being evaluated but this work is immature. Agenda item 1.6 to the next World Radio Conference in 2007 will seek to identify spectrum for a future aeronautical communications system. In addition to this ICAO Standards and Recommended Practices (SARPs) will need to be developed for the new technology in order to guarantee worldwide interoperability. As notification periods of at least 5

years are the norm, it is unlikely that a replacement technology could be mandated before 2012-2015 at the very earliest. Consequently, in the timeframe under review in this document, the availability of new technologies can be ignored and this option can be considered as identical to Option 1.

## 3. Benefits

### Economic

3.1. **Option 1 – Do-nothing**. The benefit of this option is that there will be no costs associated with the modification or re-equipage to 8.33 capable equipment. This will apply to both the ground-stations operated by the Air Traffic Service providers and the affected aircraft owners/operators. Conversely, the overall cost to UK aviation of failing to take action will be many times larger that the re-equipage costs and will affect all sectors of the industry as outlined in Paragraph 4.1.1.

3.2. **Option 2 – Reorganise The European Frequency Plan.** The potential benefit of this option is that it will be unnecessary for any more aircraft or ground stations to install 8.33 channel-spaced equipment. However, it must be borne in mind that it is by no means certain that this option is technically and practically feasible.

3.3. In the event that the outcome of further studies proved positive, the reorganisation of the European frequency plan might release sufficient spectrum to enable the existing 25kHz/8.33kHz channel-spacing mix to be retained until new technologies become available. As with Options 1 and 4, there will be no costs associated with the modification or re-equipage to 8.33 capable equipment (Air Traffic Service providers and the affected aircraft equipment owners/operators). However, it would almost certainly be necessary to duplicate all ground-stations and commission them prior to the implementation date. Thus all air traffic service providers would be negatively affected.

3.4. **Option 3 - Introduction of 8.33kHz Phases 1 & 2.** It is envisaged that initially 10-15 frequency allocations will be converted as a result of the introduction of 8.33kHz channel spacing for frequency assignments above FL 195. These are all owned/operated by NATS Ltd. Along with outstanding conversions under the 8.33 Horizontal Expansion (HEX) programme, these conversions will release sufficient spectrum to permit the introduction of up to 25 new frequency assignments. The CAA estimates that this will be sufficient to support the required growth in commercial aviation up to Phase 3 in 2009. Further benefits of taking this option are that:

3.4.1. It is a tried and tested extension of an existing programme that has already provided tangible benefits.

3.4.2. It will have minimal affect on general aviation (GA) (including sporting and recreational users) and most air traffic service providers. It will predominantly affect regional passenger airlines, cargo carriers and NATS Ltd.

3.4.3. Further conversions of NATS Ltd frequencies may become possible when infrastructure changes associated with the planned Scottish En-Route Centre have been made.

3.5. Additionally, 8.33 conversions are not currently possible in sectors which operate multiple transmitters in a mode, known as offset-carrier, which is designed to enable greater radio coverage. Eurocontrol are in the process of conducting technical studies to assess the feasibility of operating 8.33 in offset-carrier mode. If this proves to be practical, there will be the opportunity to convert further UK frequency assignments.

3.6. **Option 4 - Await The Maturity Of Alternative Technologies.** As with option 1, the benefit of this option is that there will be no costs associated with the modification or re-equipage to 8.33 capable equipment but this must be offset against the potential cost of being unable to satisfy future demand. It is essential that planned timescales for alternative technologies are known in order that two re-equipages within a relatively short time period can be avoided. This gives further credence to the decision to consult separately on Phase 3 of the 8.33kHz VEX plan.

**Environmental**

3.7. The CAA does not believe there will be any environmental impact arising from any of the proposed options.

**Social**

3.8. The lack of availability of suitable radio spectrum is a constraint to the delivery of operational improvements to airspace. Consequently, this proposal is potentially a factor in reducing delays in aircraft schedules for the travelling public. With this exception, the CAA does not believe there will be any social impact arising from the proposed measure.

## 4. Costs

**Economic**

### 4.1. Business Sectors Affected

4.1.1. **Options 1 & 4 – Do Nothing and Await Alternative Technologies**. Under Options 1 & 4, all aviation business sectors will be affected. Although there are no implementation costs associated with these options, the lack of available frequencies will restrict commercial growth, increase delays in scheduled services and limit the ability to allocate new frequencies for use by general aviation.

4.1.2. **Option 2 – Reorganise the European Frequency Plan.** Under Option 2, the affected business sectors will be air-traffic service providers and small aerodrome air/ground services. These will be required to modify or replace ground stations.

4.1.3. **Option 3 – Introduction of 8.33kHz Phases 1 & 2**. Under Option 3 the following business sectors are potentially affected by the introduction of mandatory carriage of 8.33 capable radio equipment in lower airspace:

• Regional passenger airlines which do not operate some or all of their fleet above FL 245.2

• Cargo carriers which do not operate some or all of their fleet above FL 245[1].

• NATS En-Route Ltd (NERL) who provide en-route air traffic services.

• State (mainly military) aircraft which require frequent access to 8.33 CAS above FL 195.

• State (mainly military) aircraft which require occasional access to 8.33 CAS above FL 195.

• Manufacturers and maintenance organisations of aeronautical radio equipment.

4.1.4. There is evidence that a small number of general aviation aircraft make occasional use of airspace above FL 195. It is unclear whether this proposal will have a significant effect on their business as there has been no relative feedback, including those approached directly (see Appendix F).

4.1.5. Under Option 3, the proposed regulatory change would result in an increase in demand for new and modified aeronautical radio installations.

[1] It is assumed that larger commercial carriers which operate above FL 245 will already be equipped with 8.33 capable radios as it is mandatory in that airspace. It is considered that these businesses will be major beneficiaries of the 8.33 VEX programme as their frequency requirements in the airspace in which they operate are the most difficult to meet.

It is considered that this work would be undertaken by aircraft maintenance and support businesses. No distortion of the healthy competition already existing within this market is anticipated. Nevertheless, it is recognized that this regulatory change would generate a small increased demand for 8.33 capable equipment.

## 4.2. Compliance Costs for a Typical Business

4.2.1. **Options 1 & 4 – Do Nothing and Await Alternative Technologies.** Under Options 1 & 4, all aviation sectors will be affected. Although there are no implementation costs associated with these options, the lack of available frequencies will restrict commercial growth, increase delays in scheduled services and limit the ability to allocate new frequencies for use by general aviation.

4.2.2. **Option 2 – Reorganise the European Frequency Plan**. Under Option 2, ground stations would require modification or replacement, installation, commissioning and approval. The average cost of equipment replacement and associated human resource will vary from £2-5K for a small aerodrome to around £30k for an en-route facility, (however, please note the comments made by the UK's ANSP, NATS En-Route Ltd, that put this figure at approximately £78,000 per frequency, with reasons given in 4.3.).

4.2.3. **Option 3 – Introduction of 8.33kHz Phases 1 & 2**.

### Costs for Aircraft Equipage

The typical cost, in Euros, of avionic equipage has been estimated in the Eurocontrol 8.33kHz Vertical Expansion Study report Ref DIS/833/23 Dated 17 June 2002, as follows:

• Commercial, business and large GA aircraft (i.e. business jets and turbopropos) - €10,000[1] (approx £7000[2]) per aircraft

• GA IFR (2 radios) - €7,500[3] (approx £5500[2]) per aircraft

• GA VFR (1 radio) - €4,500[4] (approx £3200[2]) per aircraft

• Gliders etc (1 radio) - €3,200[4] (approx £2300[2]) per aircraft

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[1] On some aircraft in this category it may be necessary to change the navigation /communication avionics with a resultant cost increase above that given.

[2] Conversion based on an exchange rate of approximately £1= €1.4.

[3] Those aircraft meeting the equipment requirements for IFR flight laid down in Schedule 4 and 5 of the Air Navigation Order.

[4] It is believed that most GA VFR and Gliders will be unaffected by this proposal

• Military €30,000[1] (approx £22000[2]) per aircraft

It must be stressed that the costs given above for aircraft equipage for each particular type of user are averages.

**Cost of Ground Station Equipage**

The cost of ground station equipage will only affect NATS En-Route Ltd. The subject is addressed in the Eurocontrol 8.33kHz Vertical Expansion Study report Ref DIS/833/23 Dated 17 June 2002. The unit costs for radio replacement is given at €20,000 / £14,2504 and for radio modification is given at €750 / £5354. The report makes assumptions that 50% of radios can be upgraded through modification and 50% through replacement. The calculations provided also assumed there is only one radio required for each frequency conversion. This is unlikely to be the case because full equipment redundancy is required for safety reasons. Consequently it was considered that the cost of conversion per frequency will be in the order of €40,000 (approx £28000). NATS Ltd was requested to comment on the accuracy of this figure. In its reply to the invitation to comment on the Partial RIA, NATS stated that the need to change from CLIMAX operations may require the relocation of transmitter sites. There is also a cost associated with the need to adjust the backup radio system. These factors impact on the estimated Compliance costs given in paragraph 4.2.2, with an estimated cost of £78,000 per frequency.

4.2.4. **Cost Comparison**

The table below provides a cost comparison for the various options listed above.

| | Option 1 | Option 2 | Option 3 | Option 4 |
|---|---|---|---|---|
| Aircraft Equipage Unit cost (£) | | | | |
| Commercial & large GA | N/A | N/A | £7.0k | N/A |
| GA IFR | N/A | N/A | £5.5k | N/A |
| GA VFR | N/A | N/A | N/A | N/A |
| Gliders | N/A | N/A | N/A | N/A |

[1] Provisions will be made for military aircraft transiting affected airspace by means cross-coupled UHF radios (see Paragraph 8).

| | | | | |
|---|---|---|---|---|
| Military | N/A | N/A | £22.0k | N/A |
| Ground-station equipage | | | | |
| En-route radio | N/A | £78.0k | £78.0k | N/A |

**4.3. Total Compliance Costs**

To establish estimates for the total cost of compliance it is necessary to estimate the numbers of aircraft and ground stations affected for each of the options.

**Aircraft**

Only Option 3 requires certain aircraft to be equipped with 8.33 capable radios. Appendix D gives details of UK air movements for the first 11 months of 2003, broken down by aircraft type, flying routes with a ceiling altitude between FL 195 and FL 245 and above FL 245. To estimate the numbers of aircraft requiring equipage of 8.33 capable radios, the following assumptions have been made:

• Any aircraft types which fly predominantly (more than 50% of movements) above FL 245 will already be 8.33 equipped.

• Any aircraft types which fly predominantly (more than 50% of movements) between FL 195 and FL 245 will not already be equipped. The number of UK registered aircraft likely to be affected by mandating 8.33 capable radios in UK airspace above FL195 is detailed in Appendix D. Appendix D shows that there is likely to be approximately 215 affected aircraft. The estimated numbers of affected aircraft of each type is as follows:

• Commercial, business and large GA (IFR) - 145

• GA IFR (2 radios) - 68

• Ex-military – 2

These estimates are derived from UK flight plans. To confirm the figures, in the partial RIA the CAA asked for information from users who fly above FL 195 and do not file a flight plan - no information on this was received.

Based on the costings given in Paragraph 4.2.3, the total cost of equipage with 8.33 capable radios will be in the order of £2.02M. It appears that the

majority of the cost will fall on regional passenger airlines and cargo carriers.

In order to improve the accuracy of the estimate, the CAA asked to hear from any operators who would be required to modify their aircraft radios should Option 3 be taken. Only one operator replied with expected costs for conversion.

**Ground Stations**

The number of UK ground stations is in the order of 2000. These break down approximately as follows:

• Aeronautical operational control (OPC) – 1000

• En-route air-traffic services – 150

• Aerodrome air-traffic services – 550

• Air-ground radios at small airfields - 280

Under Option 2, it is likely that the OPC ground-stations will not need to change frequency as they are contained within an unprotected sub-band within the aeronautical spectrum. It is considered likely that all radios providing an air-traffic or air-ground service will need to be duplicated to enable instantaneous switch-over to the new frequency plan. Based on the estimated unit costs in section 5.2, the total costs are:

• En-route 150 78k = £11.7M (see paras. 4.2.2 & 4.2.3.2)

• Total £11.7M

Under Option 3, it is envisaged that initially up to 15 frequency allocations will be able to be converted to 8.33kHz. These are all owned/operated by NATS (NERL or NSL). Based on the initial maximum number of conversions of 12 and the unit costs in section 4.2, the total cost of implementation will be approximately £936k.

## 4.4. Identifying Other Costs

**Additional costs to the CAA**

4.4.1. Under Option 2 the CAA would incur major costs for re-approval of ground-stations. The volume of work and short timescales would be likely to require a large number of additional temporary engineering staff. The cost of each of these staff is estimated to be in excess of £40k per annum.

4.4.2. Under Option 3, there would be some additional workload for the CAA in frequency management, and ground station and aircraft equipment approval. However, as the number of affected ground stations and aircraft is relatively small, it is not anticipated that staffing costs will increase above existing levels.

**Additional costs to NATS**

4.4.3. The estimated cost of equipment programmes for NATS Ltd ground stations is shown above. There may be additional infrastructure and project costs that have not been identified in this document. The CAA asked NATS Ltd for comments on the estimated costs which they duly provided - see paras. 4.2.2 & 4.2.3.

**Additional costs to the Ministry Of Defence (MOD)**

4.4.4. As stated in paragraph 1.5, State aircraft are expected to comply with the requirement to equip with 8.33 kHz channel radios, or make alternative arrangements, i.e. UHF channel allocation, where practicable, or will be excluded from the relevant airspace. The cost of equipment required to maintain communications with State aircraft operating within 8.33kHz channelised controlled airspace is to be met by the MOD - this equipment may include UHF ground station radios or fitting compliant VHF radio in aircraft. Where there is no UHF means of communicating with a non-compliant aircraft, the (MOD) will incur all extra operational costs in dealing with such an occurrence.

**Environmental**

4.5. The CAA does not believe there will be any environmental costs arising from the proposed measure.

**Social**

4.6. The CAA does not believe there will be any social costs arising from the proposed measure.

## 5. Equity and Fairness

5.1. It is envisaged that the introduction of 8.33 capable radio equipment into lower airspace will mainly affect regional passenger airlines and cargo carriers who have not already installed 8.33 capable radios in their aircraft. It is recognised that this will be a cost burden to this sector. By recommending the solution proposed in Option 3, the CAA is seeking to minimise the number of airspace users affected by implementing 8.33

channelisation only in airspace where the rate of 8.33 aircraft equipage is already very high.

## 6. Consultation with small business: the Small Firms' Impact Test

6.1. Option 2 would have a significant affect on small businesses, particularly small aerodrome operators who may be required to buy duplicate equipment to enable continued operation during the frequency changeover period. The CAA considers this option to be non-viable as it carries the greatest technical risk and also the highest cost. Consequently, the CAA does **not** recommend this option.

6.2. The CAA considers that Option 3 will affect few small businesses as the majority do not use the particular airspace under consideration. The CAA contacted some small businesses and business organisations in order to validate this assertion. The CAA asked for information from any small businesses that considered they could be affected by the introduction of Option 3, however, only three organisations that represent the interests of smaller business replied.

## 7. Competition Assessment

7.1. In order to assess whether the proposed regulatory change (Option 3) will have an impact on competition within the UK, the CAA has identified the markets affected and applied the Office of Fair Trading (OFT) Competition Filter. This analysis is given at Appendix E. It is concluded that the affect on competition in an already competitive environment is minimal. The CAA asked for comments from those who may be affected by the markets considered at Appendix E and from those who consider that other markets may be affected.

## 8. Enforcement and Sanctions

8.1. The mechanism for enforcement through the Air Navigation Order already exists and no additional resources will be required in this regard.

8.2. A modification will be required to Schedule 5 of the Air Navigation Order 2005. The text of Paragraphs 2 and 3, Scale A will be amended in accordance with the Proposed Amendments To The Air Navigation Order section of this document.

## 9. Monitoring and Review

9.1. Where an air traffic service using 8.33kHz channel-spacing is planned, the CAA, using existing equipment approval and frequency management processes, will ensure that the radio station location, equipment and

supporting ground infrastructure is able to meet the requirements of the air traffic service.

9.2. Flight plans submitted to the Eurocontrol Central Flow Management Unit (CFMU) contain a field to confirm that the aircraft is equipped with an 8.33 capable radio. If this field is not asserted, the aircraft will not be allowed into 8.33 airspace.

9.3. Cases of radio interference or communications failure resulting from the non-carriage of 8.33 radios within designated airspace should be captured through the CAA Safety Regulation Group's Mandatory Occurrence Reporting (MOR) scheme. The scheme applies to any public transport and turbine powered aircraft and as such is likely to include all potential users of the applicable airspace. Incorrect transmission and significant deterioration of radio services are reportable. Information and Guidance on the MOR scheme is given in document CAP 382.

## 10. Consultation

10.1. A partial RIA document was issued for formal consultation on 22 September 2004. A total of 8 external replies were received during this consultation period and a summary of these responses is at Appendix F. The replies from industry were generally in favour of the proposal for Option 3, with one notable exception that was in favour of Option 2.

10.2. Concern expressed by 3 that responded over the proposal to convert 'designated terminal airspace' to 8.33 kHz channel spacing will hopefully be allayed by this aspect of the partial RIA being dropped in this final version of the RIA.

10.3. The costs associated with the implementation of 8.33 kHz channelisation above FL195 were questioned by 2 of the responders, one being the national ATSP, NATS En-Route Ltd, and the other an airline operator. The cost for Ground Station Equipage was deemed to be at least twice that calculated in section 4.2.3. of the partial RIA, and the airline operator uses aircraft that have not yet been made the subject of a service Bulletin for 8.33 kHz channel conversions.

## 11. Summary and Recommendation

11.1. The inability to provide the aviation industry with suitable VHF communications frequencies in a timely manner is a serious constraint on the delivery of operational improvements aimed at providing capacity benefits and reductions in delay. This consultation document explores the options available to alleviate the scarcity of aeronautical VHF radio communications spectrum.

11.2. Frequency availability is already a significant constraining factor on the delivery of operational improvements aimed at providing capacity benefits and reductions in delay. As this is just one of the constraints, it is extremely difficult to assess the cost to aviation of being unable to respond to an increase in demand for aeronautical frequencies, but the total loss of revenues could be up to £700M/annum. The current 25kHz and 8.33kHz channel-spaced radios are the only technologies available in the timeframe up to at least 2015. Consequently the CAA does not consider Option 1 (do-nothing) or Option 4 (await maturity of alternative technologies) to be a viable option.

11.3. Due to the uncertainty and risks associated with reorganising the European frequency plan, the CAA does not consider Option 2 to be a viable solution.

11.4. Consequently, the CAA is minded to propose the introduction of 8.33kHz channel spacing from 15 March 2007, in UK airspace above FL 195. This is in accord with the Eurocontrol 8.33kHz vertical expansion plan and as such is being coordinated across the Eurocontrol states. Any further expansion of 8.33kHz channel spacing into other airspace within Europe will be the subject of separate consultation at a later date.

## 12. Contact Point

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**Appendix A**

**Supplementary Information No 1 of 2002 to the Manual of Air Traffic Services (MATS) Part 1**

**A copy of the supplementary information in the MATS Part 1 relating to the introduction of**
**8.33 kHz channel spacing in the VHF Radio Communications band above FL245 in the ICAO**
**EUR region is reproduced below.**

**Supplementary Instruction No. 1 of 2002**

**Implementation of 8.33 kHz Channel Spacing in the VHF**
**Radio Communications Band**

As an interim solution to regions experiencing severe VHF frequency spectrum congestion, the International Civil Aviation Organisation has decided that the VHF communications band should be further split from 25 kHz to 8.33 kHz channel spacing. The implementation of 8.33 kHz channel spacing in the ICAO EUR Region commenced at 0001 UTC on 7 October 1999. From this date, the mandatory carriage of 8.33 kHz channel spacing capable radio equipment throughout the ICAO EUR Region applied to all flights above FL245 unless they were operating in accordance with published exemptions as notified in the relevant State AIP.

In the United Kingdom, the implementation of mandatory carriage and operation of 8.33 channel spacing capable radio equipment for flights above FL245 was deferred until October 2002. From October 2002 the UK will issue no exemptions except to State aircraft covered by the following clause:

Those State aircraft which are infrequent users of the FIR/UIR are permanently exempted from the above carriage requirements, provided that they are able to communicate on UHF, where available. Where UHF is not available, State (Military) aircraft not equipped with 8.33 kHz channel spacing equipment shall be excluded from 8.33 kHz Airspace.

**NOTE:** Infrequent user is one defined as not exceeding 30 hours flying time per airframe per year, within the airspace concerned.

Provision for State aircraft exempted from the carriage of 8.33 hHz channel spaced communications equipment will be made on a tactical basis through the provision of an alternative UHF channel, the details of which will be given at time of use.

Operators are reminded that it may be necessary for ATS providers to exercise

discretionary powers in the handling of non 8.33 aircraft in order to avoid operational difficulties at the boundaries of the UK FIR and adjacent States. Any non-8.33 equipped aircraft that attempts to fly into 8.33 airspace shall be descended or diverted away from the 8.33 airspace to ensure that ATC communications can be safely maintained. In this regard, procedures detailing the interface arrangements between ATC units in the UK and other States are contained in the MATS Part 2 of the relevant units.

Current procedures require that, in the filed flight plan (FPL) of an aircraft planned to operate in the ICAO EUR Region above FL245:

• the letter-'Y' shall be inserted infield 10 of the flight plan, for aircraft equipped with 8.33 kHz capable radio equipment; or

• the indicator 'STS/EXM833' shall be inserted in field 18, for flights which are not equipped but which are planned to operate in accordance with published exemption from the mandatory carriage requirement.

**NOTE:** Absence of the letter Y shall be taken as a lack of 8.33 kHz capable equipment.

All flights subject to a repetitive flight plan (RPL) are assumed to be 8.33 kHz equipped.
In case a flight is operated with a non-equipped aircraft, a change message for the day of operation shall be sent not earlier than 20 hours before the estimated off blocks time (EOBT).

To determine whether the indicator 'STS/EXM833' may be inserted in the flight plan, it will be necessary for operators to consult the exemptions published in the relevant State(s) AIP.

Operators of 8.33 equipped aircraft are to ensure that 'Y' is inserted in Field 10 of the flight plan even if the flight is planned to be operated outside 8.33 airspace.

In case of a change in the 8.33 kHz capability status for a flight planned to operate in the ICAO EUR Region above FL 245, a modification message shall be sent with the appropriate indicator inserted and, in the case of an RPL, this shall be sent not earlier than 20 hours before the EOBT. Aircraft normally capable of operating above FL245, but planning to fly below these levels shall, nevertheless, insert the appropriate indicator; e.g. for an aircraft which is 8.33 equipped but is flight planned to remain below FL245, the letter 'Y' is to be inserted in Field 10.

Where UHF ground infrastructure permits, State (Military) aircraft equipped with UHF, but not equipped with an 8.33 kHz capable radio will be allowed to operate in the airspace designated for 8.33 kHz channel spacing operations. State (Military) aircraft, equipped with UHF, which are infrequent users of the airspace

above FL 245 of the 8.33 States will be provided with UHF coverage where possible. However, if UHF cover is not available, non-8.33 equipped State (Military) aircraft will not be permitted above FL245. State (Military) aircraft equipped with UHF, but not equipped with 8.33 kHz capable radio shall insert the letter 'U' in field 10 of the flight plan.

The parallel operation of 25 and 8.33 kHz spaced VHF channels for the same airspace sector will not be possible. Accordingly, from 7 October 1999, the flight plan of all aircraft requiring the provision of a GAT air traffic service in the airspace designated for 8.33 kHz channel spacing operation will be rejected by IFPS if the aircraft does not carry radio equipment compatible with the new reduced channel spacing.

Aircraft VHF radio equipment in the ICAO EUR Region will still be required to be able to tune to 25 kHz spaced channels and receive in an environment which uses offsetcarrier systems.

For the purpose of uniformity and to avoid confusion, the phraseology given below shall be used.

| **Circumstances** | **Phraseology**<br>* denotes pilot transmission |
|---|---|
| To request the capability of the radio Equipment | ADVISE EIGHT POINT THREE THREE EQUIPPED |
| To indicate 8.33 kHz capability | *AFFIRM EIGHT POINT THREE THREE |
| To indicate lack of 8.33 kHz capability | *NEGATIVE EIGHT POINT THREE THREE |
| To indicate UHF capability | UHF EQUIPPED |
| To request the status in respect of Exemption | ADVISE EIGHT POINT THREE THREE<br>EXEMPTION STATUS |
| To indicate 8.33 exempted status | **(Aircraftcallsign)EXEMPTED* EIGHT POINT<br>THREE THREE |
| To indicate that a certain clearance is given<br>because otherwise a non-equipped aircraft | *Clearancelinstruction)* DUE EIGHT POINT THREE<br>THREE REQUIREMENT |

| | |
|---|---|
| would enter the airspace of mandatory carriage | |
| To request the pilot to confirm the 8.33 Selection | a) CONFIRM EIGHT POINT THREE THREE CHANNEL *(name)*<br>b*) AFFIRM EIGHT POINT THREE THREE CHANNEL *(name)* |
| Transfer of control and/or channel change | a) CONTACT *(unit call sign) CHANNEL (name)*<br><br>b) AT (or OVER) *(time or place) CONTACT (unit call sign) CHANNEL (name)*<br><br>c) IF NO CONTACT *(instructions)*<br><br>d) STAND BY CHANNEL *(name) FOR (unit call sign)*<br><br>*e*) REQUEST CHANGE TO CHANNEL *(name)*<br><br>f) CHANNEL CHANGE APPROVED<br><br>g) MONITOR *(unit call sign)* CHANNEL *(name)*<br><br>h*) MONITORING CHANNEL *(name)*<br><br>i) WHEN READY CONTACT (unit *call sign)* CHANNEL *(name)*<br><br>j) REMAIN THIS CHANNEL |

Example: 'AIR FRANCE TWO SEVEN FOUR CONTACT FRANCE CONTROL CHANNEL ONE THREE TWO DECIMAL ZERO ONE ZERO'

Instructions regarding the transfer of communications outlined in Appendix E, CAP 493 Manual of Air Traffic Services Part 1 paragraph 5 remain valid and are unaffected by the introduction of 8.33 kHz channel spacing procedures.

In summary, the main changes to phraseology associated with the introduction of 8.33 kHz spacing are:

8.33 frequencies are to be referred to as 'channel'.

There is a sixth digit at the end of the channel designation. Controllers transferring aircraft to channels shall use all six digits.

Current R/T frequency change phraseology shall be used when controllers transfer aircraft to a non 8.33 kHz sector.

Reference AIC 102/1999 (Yellow 344)
AIC 17/2002 (Yellow 75)
Eurocontrol 8.33 User Guide Edition 5.0
This cancels and replaces SI 5/99

## Appendix B

## Outstanding Questions And Issues Relating To The Introduction Of 8.33kHz Radio Channel Spacing In UK Airspace Above FL195 And Specified Terminal Control Areas

1. The body text of the Regulatory Impact Assessment (RIA) for the further implementation of 8.33kHz channel spacing identified a number of issues for which the CAA sought further information or opinions. These are reproduced below for ease of reference.

2. The CAA welcomed information and views from any stakeholders that consider they would be affected by the introduction of 8.33kHz channel spacing in airspace above FL195 and the London TMA/CTZ. . A number of businesses, listed in Appendix F, were specifically consulted for their views on the proposals

**Question 1**. The RIA assumes that larger commercial carriers which operate above FL-245 will already be equipped with 8.33 capable radios on their entire fleet. Confirmation of this assumption is sought.

**Question 2**. The RIA assumes that the only affected airspace users will be the smaller regional passenger and cargo carriers. Information is sought from any other airspace users who consider they may be affected.

**Question 3**. The RIA assumes approximate costs for aircraft equipage as follows:

- Commercial, business and large GA (IFR) £7,000 per aircraft
- GA IFR (2 radios) £5,500 per aircraft
- GA VFR (1 radio) £3,200 per aircraft
- Gliders etc (1 radio) £2,300 per aircraft

Confirmation of the above figures is sought.

**Question 4**. The CAA would like to hear from any stakeholders who consider that there is a viable alternative to Option 3 (the introduction of 8.33kHz channel spacing in UK airspace above FL195 and specified terminal control areas) to alleviate VHF aeronautical spectrum congestion.

**Question 5**. The cost of ground station equipage is believed to be in the order of €40,000 (£28000) per frequency conversion. NATS Ltd is requested to comment on the accuracy of this figure.

**Question 6**. The CAA would like to hear from those who fly above FL-195 and do not normally file a flight plan. This will assist in refining the number of aircraft potentially affected by the proposals.

TABLE 1

| SER NO | RESPONDENT | SECTOR | Appendix B Question Number | Respondent's reply |
|---|---|---|---|---|
| 02 | British Airways | Airline | Question 1 | Q1. Agreed that there is no additional equipage cost |
| 04 | British Association of Aviation Consultants | Aviation Organisation | Question 4. | Q4. Suggest Option 2, and is willing to provide expert assistance in discovering a more innovative solution – invited to submit more evidence in support of Option 2 solution, but nothing received to date. |
| 05 | Eastern Airways | Airline | Question 3. | Q3. Reported equipage costs for the particular type of aircraft they operate that are much higher than the 'typical' costs given in Eurocontrol's findings. |
| 09 | National Air Traffic Services En-Route Ltd | Air Navigation Service Provider | Question 5. | Q5. NATS estimates that the per frequency cost of ground station equipage to be £78,000, |

| | | | | |
|---|---|---|---|---|
| | | | | the original estimate for<br>the consultation phase<br>was £28,500. |

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**Appendix C**

**Ground Station Frequency Assignments 2002-2004**

1. Paragraph 3.2 of the Regulatory Impact Assessment for the introduction of 8.33kHz channel spacing in UK airspace above FL195 and specified terminal control areas, discusses the predicted future demand for VHF radio frequencies. It states that the Eurocontrol Vertical Expansion Study Report, DIS/833/23, implies a future requirement of about 15 new frequencies per annum. For comparative purposes, this Appendix has examined the demand for new frequencies for air traffic services over the past two years, as these may be expected to be of the same order as the predicted future growth.

2. Table 1 contains a list of the air traffic service additions, modifications and deletions carried out by the CAA Directorate of Airspace Policy, Spectrum and Surveillance Management section, in the 2-year period April 02-March 04. The table identifies whether the service is en-route or aerodrome and whether it is a new frequency assignment, a modification to the service volume/frequency or a deletion. The quantity of assignments is shown in each column and a total is given at the bottom of the table.

| **Location** | **En-route / Aerodrome** | **New Requirement** | **Service Volume Modification** | **Freq Change** | **Deletion** |
|---|---|---|---|---|---|
| Finningley A 4 | A | 4 | | | |
| Newcastle A 1 | A | 1 | | | |
| East Fortune | A | 1 | | | |
| Yeovil | A | 1 | | | |
| Cardiff | A | | 1 | | |
| Cardiff | A | | 1 | | |
| Bourn | A | | | 1 | |
| Benson | A | 1 | | | |
| Bristol | A | | | 1 | |
| London ACC | E | | 4 | | |
| Prestwick | A | | | 1 | |

| | | | | | |
|---|---|---|---|---|---|
| Lakenheath | A | | | 1 | |
| Manchester ACC | E | | 1 | | |
| Chiltern Park | A | 1 | | | |
| Nottingham | A | | | | 1 |
| Various | A | | | | 4 |
| Mildenhall | A | 1 | | | |
| Heathrow | A | | | | 1 |
| Wroughton | A | | | | 1 |
| London ACC | E | | 1 | | |
| High Peaks | A | | 1 | | |
| Stoke Golding | A | 1 | | | |
| Chatteris | A | 1 | | | |
| Sandown | A | | | 1 | |
| Lower Upham | A | 1 | | | |
| Chatteris | A | | 1 | | |
| Clacton | E | | 3 | | 1 |
| Scottish ACC | E | | 5 | | |
| London City | A | | 2 | | |
| Little Staughton | A | | | | 1 |
| Farway Common | A | 1 | | | |
| Benson & Wyton | A | 2 | | | |
| London ACC | E | 1 | 2 | 1 | |
| Newcastle | A | 1 | | | |
| Wattisham | A | | | | 1 |
| Woodford Park | A | 1 | | | |
| Cosford | A | 1 | | | |
| Humberside | A | | | 1 | |
| North Sea | E | | 1 | | |
| Great Oakley | A | 1 | | | |
| Mildenhall | A | | | 1 | |
| Heathrow | A | | | | 1 |
| Ashbourne | A | 1 | | | |
| London ACC | E | | 1 | | |
| Scillies | A | | | 1 | |
| Dunstable | A | 1 | | | |
| Cardiff | A | | | 1 | |
| Inskip | A | | | | 1 |
| London ACC | E | | 1 | | |
| Exeter | A | | 1 | | |
| Skegness | A | | | | 1 |

| | | | | | |
|---|---|---|---|---|---|
| North Sea | E | | 2 | | |
| Tilstock | A | | | 1 | |
| Sheffield | A | | 1 | | |
| Middle Wallop | A | 1 | | | |
| Scottish ACC | E | 1 | | | |
| London ACC | E | | 1 | | |
| Scottish ACC | E | | 1 | | |
| London ACC | E | | 1 | | |
| London ACC | E | | 1 | | |
| London ACC | E | | 1 | | |
| London ACC | E | | 1 | | |
| Scottish ACC | E | | 1 | | |
| Scottish ACC | E | | 1 | | |
| Scottish ACC | E | | 1 | | |
| Manchester | A | | | 1 | |
| London ACC | E | 1 | | | |
| Carlisle | A | 1 | | | |
| London ACC | E | 2 | | | |
| Lydd | A | 1 | | | |
| Liverpool | A | 1 | | | |
| Deenethorpe | A | | 1 | | |
| London ACC | E | | 1 | | |
| Nottingham | A | 1 | | | |
| Mona | A | | | 1 | |
| London ACC | E | 1 | | | |
| Jersey | A | | 2 | | |
| Elvington | A | | 1 | | |
| Ince | A | 1 | | | |
| Manchester ACC | E | | 1 | | |
| Scottish ACC | E | | 1 | | |
| Scottish ACC | E | | 1 | | |
| Scottish ACC | E | | 1 | | |
| Bristol | A | | 1 | | |
| Southend | A | | 1 | | |
| Aldergrove | A | | | 1 | |
| Cardiff | A | | 1 | | |
| London ACC | E | | 1 | | |
| Enniskillen | A | | | | 1 |
| Branscombe | A | 1 | | | |
| Barkstone Heath | A | 1 | | | |
| Welshpool | A | 1 | | | |
| Wattisham | A | | | 1 | |
| North Sea | A | 1 | | | |

| | | | | | |
|---|---|---|---|---|---|
| Londonderry | A | | | 2 | |
| Raveningham | A | | | | 1 |
| **Total (En-route)** | | 6 | 36 | 1 | 1 |
| **Total (Aerodrome)** | | 32 | 15 | 16 | 14 |
| **Grand Total** | | 38 | 51 | 17 | 15 |

**Table 1 - Air Traffic Services Frequency Assignment Changes April 02 to March 04**

**3. From the information in Table 1, the following conclusions can be drawn:**

3.1. The net increase in frequency assignments (new requirements minus deletions) is 23 in the 2-year period, an average of 11.5 per annum. This compares relatively closely to estimate of 15 net requirements in the UK which can be extrapolated from the Eurocontrol 8.33 Vertical Expansion Study report, DIS/833/23.

3.2. The modifications in service volume of existing frequency assignments apply predominantly to en-route services. Although details are not provided in this document, it is the case that the overall change gives an increase in the volume of airspace served.

3.3. Most of the frequency changes to existing assignments have been necessitated either to eliminate radio interference or to facilitate the Eurocontrol Block Planning process described in Para 2.2.3 of the Regulatory Impact Assessment.

## Appendix D

## Flight Database Data Information - 2003

1. The Appendix seeks to identify the numbers of UK registered aircraft potentially affected by the introduction of 8.33kHz channel spacing in UK airspace above FL195 and specified terminal control areas. This has been estimated by examining flight plans files in the UK flight database between 1 Jan – 30 November 2003.

2. Tables 1 and 2 show the total plans filed, listed by aircraft type. Both tables contain flight plans where the altitude ceiling falls between FL 195 and 245.

2.1. Table 1 contains only aircraft types that have not filed plans with a ceiling above FL245 during the same 11 month period.

2.2. Table 2 contains those aircraft types which have filed some plans above FL245 but where the majority (>50%) of plans are for flights with a ceiling between FL 195 and 245.

3. As aircraft who operate in controlled airspace above FL245 must already be equipped with 8.33 capable radios, it is considered that the combined total of aircraft types in tables 1 and 2 will provide a good estimate of those that will need to be modified if 8.33 is mandated in airspace above FL195.

**Table 1 – Aircraft Types With Altitude Ceiling Only Between FL195 & 245**

| AircraftType | No of occasions | No of UK registered civil acft | Comments |
|---|---|---|---|
| HP-137 JETSTREAM 200 | 46 | 1 | |
| FOKKER 60 | 29 | 0 | |
| SWEARINGEN MERLIN 2 | 21 | 0 | |
| EMBRAER XINGU-121 | 20 | 0 | |
| EXTRA 400 | 14 | 0 | |
| TUCANO | 12 | 0 | |
| ATR 42-400 | 11 | 0 | |
| CASA CN-235 | 10 | 0 | |
| AEROSTAR | 7 | 0 | |
| CASA C295 | 7 | 0 | |
| SHORT 360 | 6 | 0 | |
| MOONEY M-20K/M | 6 | 13 | |
| CESSNA P210 CENTURION | 3 | 2 | |

| | | | |
|---|---|---|---|
| HS 748 | 3 | 13 | |
| TRAVELAIR | 2 | 1 | |
| AIRLINER | 2 | 0 | |
| CESSNA 208 | 2 | 7 | |
| CASA C-101 AVIOJET | 2 | 0 | |
| AERO COMMANDER 680T 680V | 2 | 0 | |
| BEECH KINGAIR 100 | 2 | 0 | |
| BEECH 19 | 2 | 4 | |
| CESSNA 182 SKYLANE | 2 | 105 | |
| HAWKER HUNTER | 1 | 32 | |
| BONANZA 36 | 1 | 0 | |
| CESSNA SKYWAGON | 1 | 5 | |
| CESSNA P210 | 1 | 2 | |
| LANCAIR 4 | 1 | 0 | |
| FAIRCHILD A-10 | 1 | 0 | |
| PIPER PA-30/39 | 1 | 28 | |
| LOCKHEED F104 STARFIGHTER | 1 | 0 | |
| PIPER PA-28R CHEROKEE ARROW | 1 | 221 | |
| PIPER PA28-140 - 181 CHEROKEE | 1 | 5 | |
| CANADAIR CL44 | 1 | 0 | |
| ANTONOC AN-30 | 1 | 0 | |
| REIMS F406 | 1 | 10 | |
| AERO ALBATROSS | 1 | 4 | |
| VFW-FOKKER VFW 614 | 1 | 0 | |
| DORNIER 228 | 1 | 4 | |
| LOCKHEED F-117 NIGHTHAWK | 1 | 0 | |
| TOTAL | 228 | 457 | |

**Table 2 – Aircraft Types With 50% Or More Plans Filed Below FL245**

| **AircraftType** | **No of occasions** | **% Flights below FL245** | **No of UK registered civil acft** | **Comments** |
|---|---|---|---|---|
| BAE JETSTREAM SUPER 31 | 2694 | 99.9 | 11 | |

| | | | | |
|---|---|---|---|---|
| DE HAVILLAND CANADA DHC-8-200 | 3067 | 99.8 | 3 | |
| SAAB 340 | 903 | 99.5 | 11 | |
| BAE JETSTREAM 41 | 2916 | 99.4 | 13 | |
| BOEING 737-900 | 1411 | 98.8 | 0 | |
| DE HAVILLAND CANADA DHC-8-300 | 3839 | 98.4 | 16 | |
| ATR 42-200/300/320 | 4373 | 98.4 | 7 | |
| MERLIN 2B | 122 | 98.3 | 0 | |
| TRANSALL C160 | 163 | 98.1 | 0 | |
| CESSNA 340 | 54 | 98.1 | 11 | |
| BEECH BARON | 49 | 98 | 13 | |
| BAE JETSTREAM 31 | 461 | 97.4 | 1 | |
| ANTONOV AN-26 | 18 | 94.7 | 0 | |
| ATR 72 | 905 | 93.9 | 5 | |
| FOKKER F-27 | 28 | 93.3 | 15 | |
| ATR 42-500 | 13 | 92.8 | 0 | |
| MERLIN 4 METRO | 148 | 90.7 | 0 | |
| DE HAVILLAND CANADA DHC-8-400 | 8722 | 89.6 | 7 | |
| CESSNA TITAN | 8 | 88.8 | 8 | |
| BEECH 60 DUKE | 6 | 85.7 | 1 | |
| CESSNA CENTURION | 6 | 85.7 | 6 | |
| CESSNA 425 CORSAIR | 73 | 84.8 | 1 | |
| ATLANTIC | 21 | 84 | 0 | |
| BEECH 1900 | 450 | 83.9 | 0 | |
| PIPER PA-31T1-500 CHEYENNE 1 | 31 | 83.7 | 0 | |
| CONVAIR CV-540/580/600/640 | 10 | 83.3 | 0 | |
| PIPER PA-31NAVAJO | 10 | 83.3 | 1 | |
| FOKKER 50 | 2233 | 82.6 | 0 | |
| MALIBU | 133 | 82.6 | 0 | |
| CESSNA 421 | 104 | 82.5 | 6 | |
| EMBRAER BRASILIA | 372 | 81.9 | 0 | |
| CESSNA 414 | 8 | 80 | 2 | |
| ATP | 168 | 76.7 | 39 | |
| BEECH 90 KING AIR | 183 | 74.6 | 6 | |
| HERCULES | 2169 | 74.3 | 0 | |
| FIAT/AERITALIA/ALENIA G-222 | 8 | 72.7 | 0 | |

| | | | | |
|---|---|---|---|---|
| BEECH F90 KING AIR | 128 | 67.3 | 0 | |
| SAAB 105 | 2 | 66.6 | 0 | |
| ROCKWELL B-1 LANCER | 2 | 66.6 | 0 | |
| PIPER PA-31T-620 CHEYENNE 2 | 58 | 61.7 | 0 | |
| AIRBUS A318 | 22 | 57.8 | 0 | |
| PIPER PA-34 | 4 | 57.1 | 146 | |
| DE HAVILLAND CANADA DHC-8-100 | 13 | 54.1 | 0 | |
| LEARJET 24 | 4 | 50 | 0 | |
| TOTAL | 36112 | | 329 | |

4. From tables 1 and 2 it can be seen that there are a total of 83 aircraft types potentially affected by reducing mandatory carriage of 8.33 radios above FL195. The maximum number of UK registered civil aircraft potentially affected cannot exceed the sum of the registered aircraft of each type. However, in some cases the number of flight plans filed for an aircraft type is less than the number of registered aircraft. In these cases, the number of flight plans can be taken to be equal to the number of aircraft potentially affected. Using this method, the total number of UK registered civil aircraft affected is 215.

## Appendix E

## OFT Competition Assessment

### 1. General

1.1. The Office of Fair Trading and Cabinet Office publish guidelines for assessing competition within Regulatory Impact Assessments. The purpose of the assessment is to analyse the impact of the proposed regulation on UK companies in the relevant markets.

1.2. The initial step in carrying out the assessment is to apply a competition filter test to each market affected by the proposals. If the test results show that the risk is low, a simple assessment can be applied which describes the markets, the effects of competition and the reasoning behind the conclusions.

1.3. The markets potentially affected by the introduction of 8.33kHz channel spacing in UK airspace above FL195 and specified terminal control areas are as follows:

- Regional passenger airlines
- Cargo carriers
- Aeronautical Radio Manufacturers and Maintenance Organisations

1.4. The proposed regulatory change would result in an increase in demand for new and modified aeronautical radio installations. It is considered that this work would be undertaken by existing aircraft maintenance and support businesses. No distortion of the healthy competition already existing within this market is anticipated. As the increased workload would be relatively small compared to market size, and as any affect on aeronautical radio manufacturers and maintenance organizations would increase revenues, the OFT competition filter test has not been applied to these markets.

1.5. Tables 1 and 2 apply the standard OFT competition test filter for each of these markets.

### 2. Competition Filter Test For Regional Passenger Airlines

| **TABLE 1 -<br>THE COMPETITION FILTER TEST FOR REGIONAL PASSENGER AIRLINES** | |
|---|---|
| **Question** | **Answer<br>yes or no** |
| Q1: In the market(s) affected by the new regulation, does any firm | N |

| | |
|---|---|
| have more than 10% market share? | |
| Q2: In the market(s) affected by the new regulation, does any firm have more than 20% of the market share? | N |
| Q3: In the market(s) affected by the new regulation, do the largest three firms together have at least 50% market share? | N |
| Q4: Would the costs of the regulation affect some firms substantially more than others? | N |
| Q5: Is the regulation likely to affect the market structure, changing the number or size of firms? | N |
| Q6: Would the regulation lead to higher set-up costs for new or potential firms that existing firms do not have to meet? | N |
| Q7: Would the regulation lead to higher ongoing costs for new or potential firms that existing firms do not have to meet? | N |
| Q8: Is the sector characterised by rapid technological change? | N |
| Q9: Would the regulation restrict the ability of firms to choose the price, quality, range or location of their products? | N |

**Questions 1, 2 & 3 - . Market share**

2.1. An analysis has been carried out based on individual airline utilisation figures (2002) in passenger-kilometres, produced by the CAA Economic Regulation Group. This covers all airlines, not just the smaller regional carriers believed to be affected by the regulatory proposals. The top 10 carriers on this list have been omitted from the analysis, as they are believed to already be fully equipped with 8.33 capable radios. The largest market share of any of the remaining airlines is 2.5%. Even in this case, it is considered likely that some of their fleet will already be equipped. The analysis does not include public transport air taxi services but these are a very small proportional of the total.

2.2. The largest three of the smaller regional carriers combined have approximately 6.6% of the market.

**Question 4 – Compliance Cost**

2.3. The cost of compliance for aircraft in this category will be in the region of £7200. This is an average cost, and it has been shown that in exceptional cases on specific aircraft types this compliance cost my be a lot higher.

**Question 5 – Effect on Market Structure**

2.4. It is considered that the market structure will be unaffected as the cost of implementing the proposed regulation will an insignificant proportion (<<1%) of the overall set-up and operational costs.

**Questions 6 & 7 – Set-up and Ongoing Costs for New Businesses**

2.5. Set-up and ongoing costs for new businesses will be the same as for existing businesses. The cost of 8.33kHz capable radios is similar to that for non-8.33kHz capable units. Most businesses would choose an 8.33kHz capable radio when replacing existing equipment as there is little or no additional cost for the added functionality.

**Question 8 – Technological Change**

2.6. Aeronautical radio equipment is not subject to rapid change because world-wide interoperability is required. This means that all technological changes undergo long consultation and implementation periods. A future communications system is likely to emerge which will supersede the existing systems, but it is likely to be 10-15 years after the introduction of this regulation.

**Question 9 – Product Choice**

2.7. The regulation should not restrict the ability of firms to choose the price and quality of the equipment they install. Most manufacturers offer 8.33kHz capable radios as part of their standard range at little or no price increase.

**Competition Filter Test For Regional Cargo Airlines**

| **TABLE 2 -**<br>**THE COMPETITION FILTER TEST FOR REGIONAL CARGO CARRIERS** | |
|---|---|
| **Question** | **Answer yes or no** |
| Q1: In the market(s) affected by the new regulation, does any firm have more than 10% market share? | N |
| Q2: In the market(s) affected by the new regulation, does any firm have more than 20% of the market share? | N |
| Q3: In the market(s) affected by the new regulation, do the largest three firms together have at least 50% market share? | N |
| Q4: Would the costs of the regulation affect some firms substantially more than others? | N |
| Q5: Is the regulation likely to affect the market structure, changing the number or size of firms? | N |
| Q6: Would the regulation lead to higher set-up costs for new or potential firms that existing firms do not have to meet? | N |
| Q7: Would the regulation lead to higher ongoing costs for new or potential firms that existing firms do not have to meet? | N |
| Q8: Is the sector characterised by rapid technological change? | N |
| Q9: Would the regulation restrict the ability of firms to choose the price, quality, range or location of their products? | N |

**Questions 1, 2 & 3 - . Market share**

3.1. In 2001 over two million tonnes of air cargo were carried to and from UK airports. Of the total cargo carried by all transport modes in and out of the UK, air cargo accounts for less than 1% by weight but over 30% by value. Airfreight normally has a high value-to-weight ratio such as computer and telecommunications equipment and parts or is economically or physically perishable or has an unpredictable demand pattern. There are also exceptional loads such as aircraft engines, dangerous goods, or livestock that require specialist handling.

3.2. About a third of UK air cargo in 2001 was carried in dedicated freighters (all-cargo aircraft) and the remainder was carried on aircraft primarily intended for passenger service (normally referred to as belly-hold cargo although in the case of combi aircraft, cargo is also carried on part of the main aircraft deck). 80% was carried on scheduled services, 95% was international as opposed to domestic, and 77% was handled at London airports. The available statistics cover only the freight that is transported by air at some stage in its journey.

3.3. As a result of the above, it is believed that no cargo carrier has more than 10% of the market and the largest three combined cannot have 50% as the majority of cargo is carried by passenger airlines.

**Question 4 – Compliance Cost**

3.4. The cost of compliance for aircraft in this category will be in the region of £7200. This is an average cost, and it has been shown that in exceptional cases on specific aircraft types this compliance cost my be a lot higher.

3.5. It is probable that the ratio of equipage costs against revenue is higher for small all cargo aircraft operators. However, as equipage costs are not great for the majority of types, it is suggested that there will not be a significant impact on competition.

**Question 5 – Effect on Market Structure**

3.6. It is considered that the market structure will be unaffected as the cost of implementing the proposed regulation will an insignificant proportion (<<1%) of the overall set-up and operational costs.

**Questions 6 & 7 – Set-up and Ongoing Costs for New Businesses**

3.7. Set-up and ongoing costs for new businesses will be the same as for existing businesses. The cost of 8.33kHz capable radios is similar to that for non-8.33kHz capable units. Most businesses would choose an

8.33kHz capable radio when replacing existing equipment as there is little or no additional cost for the added functionality.

**Question 8 – Technological Change**

3.8. Aeronautical radio equipment is not subject to rapid change because world-wide interoperability is required. This means that all technological changes undergo long consultation and implementation periods. A future communications system is likely to emerge which will supersede the existing systems, but it is likely to be 10-15 years after the introduction of this regulation.

**Question 9 – Product Choice**

3.9. The regulation should not restrict the ability of firms to choose the price and quality of the equipment they install. Most manufacturers offer 8.33kHz capable radios as part of their standard range at little or no price increase.

**Appendix F**

**SUMMARY OF THE RESULTS FROM THE CONSULTATION**

**Businesses Specifically Targeted For Consultation**

1. A number of businesses were specifically written to and asked to give feedback on the proposals put forward in the Partial RIA. The list of businesses consulted directly is given below. Details of the replies received, along with all other comments from those responding to the Partial RIA's request for comments are contained in Table 1.

**Air Wales Limited**
**British Association of Aviation Consultants**
**Air Atlantique Limited**
**BMI BRITISH MIDLAND**
**Bridgetown Plant Limited**
**Britannia Airways Limited**
**British Cargo Airline Alliance**
**British Regional Airlines Limited**
**British Women Pilots Association**
**Context GB Ltd**
**Eastern Airways (UK) Limited**
**Excel Airways Ltd**
**Flying Farmers Association**
**GB Airways Limited**
**Harpin Limited**
**Independent Pilots Association**
**LOGAN AIR LIMITED**
**MyTravel Airways Limited**
**Shell Aircraft Ltd**
**Air Southwest Limited**
**Standard Aviation Limited**
**Thomas Cook Airlines UK Limited**
**Titan Airways Limited**

**TABLE 1**

| SER NO | RESPONDENT | SECTOR | SUMMARY OF COMMENT | CAA RESPONSE |
|---|---|---|---|---|
| 02 | British Airways | Airline | 1. Supportive of | 1. Noted, and |

| | | | | |
|---|---|---|---|---|
| | | | proposals to extend of 8.33 kHz to above FL195 and within given TMAs.<br><br>2. Keen to see that best practice is employed in frequency use in order to maximise benefit from investment in 8.33 kHz. | informed of removal of the proposal to implement 8.33 kHz channels within TMAs.<br><br>2. Noted. |
| 03 | The Independent Pilots Association | Aviation Organisation | 1. Supportive of proposal to extend of 8.33 kHz to above FL195.<br><br>2. Concern over possible R/T confusion by the use of 6 digit frequencies. | 1. Noted.<br><br>2. Noted, the RTF phraseology is currently under ICAO review. |
| 04 | British Association of Aviation Consultants | Aviation Organisation | 1. The members are against the implementation of the proposals, believing the proposed change to be for the benefit of the ATC service providers to the detriment of the customers. | 1. Noted, and asked to provide any further information to support Option 2 as a more appropriate solution bearing in mind its unique logistical and technical aspects. |
| 05 | Eastern Airways | Airline | 1. Believe that the cost of modification per aircraft, (specifically | 1. The report commissioned by Eurocontrol to evaluate the retrofit impact discusses |

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| | | | Jetstream 31/32) is significantly underestimated.<br><br>2. Concern over the possible impact of 8.33 kHz channels in the TMAs on their charter flying. | the fleets affected by the 8.33 KHz implementation above FL195, and describes the retrofit and certification issues with "typical" cost for aircraft equipage based on the report's findings. BAe Systems are unique in Eurocontrol's report in stating that no operator of the Jetstream 31/32 has ever requested a Service Bulletin for 8.33 upgrade. The Jetstream 31/32 is one of the more expensive types to upgrade, taking it well above the "typical" upgrade cost given.<br><br>2. Operator informed of removal of the proposal to implement 8.33 kHz channels within TMAs in this current phase of 8.33 kHz channelisation, however this aspect of 8.33 expansion will be revisited at a later date. |
| 06 | Guild Of Air Traffic Control | Air Traffic Controller | 1. Supportive of proposals to | 1. Informed that the RIA proposes the |

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| | Officers | User Group | extend of 8.33 kHz to above FL195 within controlled air space and within given TMAs. Concerned over the possibility to require 8.33 kHz use outside controlled air space. | introduction of 8.33 kHz radio channel spacing in all airspace above FL 195. A further RIA would be required for any proposal to mandate the use and equipage of 8.33 below FL 195. |
| 07 | Ministry Of Defence | Government Department | 1. Would be content with the reduction in flight level from FL245 to FL195 for the use of 8.33kHz channels. Until the specific TMA locations are known they are unable to provide feedback on any possible impact.<br><br>2. It is essential that an exemption for state aircraft is maintained throughout European air space. | 1. Informed of removal of the proposal to implement 8.33 kHz channels within TMAs in this current phase of 8.33 kHz channelisation, however this aspect of 8.33 expansion will be revisited at a later date.<br><br>2. Noted |
| 08 | British Business and General Aviation Association | Aviation Organisation | 1. Does not foresee this sector of the aviation community having any major concerns about the proposals. | 1. Noted.<br><br>2 Informed of removal of the proposal to implement 8.33 kHz channels within TMAs in this current phase |

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| | | | 2. Seek assurance that a new RIA will be completed before any application of the proposals to other terminal areas before 2009. | of 8.33 kHz channelisation, however this aspect of 8.33 expansion will be revisited at a later date. |
| 09 | National Air Traffic Services En-Route Ltd | Air Navigation Service Provider | 1. All TC frequencies are operated in CLIMAX mode to provide coverage and redundancy. CLIMAX operation is not compatible with 8.33kHz in its current form. Doubt about being able to support anything other than short range communications on 8 33<br><br>2. NATS estimate a cost of £78,000 per frequency change (to 8.33 kHz), based on 2 transmitter legs per frequency. | 1. Noted. It is understood that NATS will report on the issues raised and discussed as a result of Erocontrol's presentation last on (2 leg) 8.33KHz CLIMAX study findings.<br><br>2. This cost disparity has been addressed in the Final RIA. |

## Appendix G

## LIST OF REFERENCES


1. Eurocontrol 8.33 Vertical Expansion Study Report, DIS/833/23

2. Appendix E, CAP 493 Manual of Air Traffic Services Part 1 paragraph 5

3. AIC 102/1999 (Yellow 344)

4. AIC 17/2002 (Yellow 75)

5. Eurocontrol 8.33 User Guide Horizontal expansion Edition 5.0

6. MATS Part 2, published by the relevant ATC units (approved by the Safety regulation Group of the UK CAA) – contains procedures detailing the interface arrangements between ATC units in the UK and other States.

7. Individual airline utilisation figures (2002) in passenger-kilometres (Table 1 11 2 Aircraft Utilisation Individual Airlines), produced by the CAA Economic Regulation Group and published on www.caa.co.uk web site.

8. Aerodata's document Avionics & Aircraft Retrofit Support to the 8.33 kHz Programme, 298300-d1/2-R0, Eurocontrol Control reference. No.C/1.192/00/HQ/LD/TRS141/03.