

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

1 Introduction

- 1.1 The entry for RVSM is published in accordance with European RVSM implementation.
- 1.2 Details of other UK General and Special Equipment requirements may be added once determined.

2 RVSM

2.1 Introduction

- 2.1.1 Reduced Vertical Separation Minimum (RVSM) operations are mandated in part of the upper airspace of the United Kingdom, other European Civil Aviation Conference (ECAC) member states and some adjacent states (referred to as EUR RVSM airspace). In addition RVSM operations are in place in the majority of the world's continental and oceanic airspace. RVSM airspace in the North Atlantic (NAT) region covers the same flight levels as in the EUR RVSM area. RVSM is the generic term for a reduction in vertical separation from 2000 ft to 1000 ft that can be applied to approved operators of approved aeroplanes operating between FL 290 and FL 410 inclusive. With the exception of State aircraft, Non-RVSM Approved aircraft are not permitted to operate within the EUR RVSM airspace, including in the UK FIRs, except for operators of Non-RVSM Approved aircraft wishing to transit the NAT region above RVSM airspace, that is at FL 430 or above.
- 2.1.2 The requirements for European RVSM are published in the ICAO documents **Regional Supplementary Procedures (Doc 7030 -EUR) and Procedures for Air Navigation Services Air traffic Management (PANS ATM Doc 4444) plus JAA Temporary Guidance Leaflet No. 6 Revision 1 (TGL 6)**. Detailed information on the ATS routes, associated flight level allocation and RVSM entry/exit points in the London and Scottish UIRs are published in the UK AIP.

2.2 Means of Compliance

- 2.2.1 Except for State aircraft, operators intending to conduct flights within the EUR RVSM airspace require a RVSM approval from the State in which the operator is based or from the State in which the aircraft is registered. To obtain such an RVSM approval operators shall satisfy the said State that:
 - (a) aircraft for which an approval is sought have the vertical navigation performance capability required for RVSM operations through compliance with the criteria of the RVSM minimum aviation system performance standards (MASPS);
 - (b) they have instituted procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and
 - (c) they have instituted operational procedures and a programme of flight crew training so that they have an in-depth knowledge of the criteria for operating in RVSM airspace and this should include both initial and recurrent training.
- 2.2.2 For UK based operators and the operators of civil aircraft registered in the UK the RVSM approval is to be obtained from the Civil Aviation Authority Safety and Airspace Regulation Group (SARG). Once obtained the RVSM approval is not restricted to a specific region. Instead it is valid globally, where RVSM procedures are applied, on the understanding that any operating procedures specific to a given region should be stated in the operations manual or appropriate crew guidance. Applications for approval should be made on Form CA4040 (RVSM Approval Application) which is available on the CAA website. →
- 2.2.3 Aircraft that have received State approval for RVSM operations will be referred to as 'RVSM approved aircraft' while those aircraft that have not received such approval will be referred to as 'non-RVSM approved aircraft'. State aircraft that have not been granted RVSM approval should be granted access to RVSM airspace and ATC will apply a 2000 ft separation from other traffic.

2.3 Flight Crew Operating Practices and Procedures

- 2.3.1 All RVSM airspace is defined by ICAO as 'special qualification airspace'. Accordingly it is important that all operators provide their flight crews with a resume of any special procedures or phraseology applicable to a given RVSM operation. Holders of AOCs are required to have an 'operations manual' in which all pertinent details and procedures are specified. Non-AOC holders are required to submit to the CAA for approval RVSM operations instructions/procedures for use by flight crews.
- 2.3.2 Operations manuals should include sections on:
 - (a) Equipment Requirements and Minima;
 - (b) Flight Planning;
 - (c) Pre-Flight, In-Flight and Post-Flight Procedures;
 - (d) Contingencies;
 - (e) TCAS/ACAS Alerts;
 - (f) R/T Phraseology;
 - (g) Height Monitoring Requirements.

2.4 Contingencies - Applicable to all RVSM Airspace

2.4.1 General

- 2.4.1.1 Flight crews are to report to ATC as soon as practicable any event that may affect their ability to comply with the ATC clearance, examples being: severe turbulence, loss of thrust, loss of pressurisation, need to divert, uncertainty of present position, etc. If, at any time, it is not possible to notify ATC immediately that a problem has occurred and obtain a new clearance before departing from the old, comply as accurately as possible with any procedures that may be specified for the airspace, eg NAT contingency

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Procedures. In all cases a good lookout should be maintained and if the aeroplane is equipped with TCAS/ACAS the visual display should be used to assist in the sighting of proximate traffic.

2.4.1.2 The following equipment failures must be reported to ATC:

- (a) Loss of thrust on one or more engines necessitating descent;
- (b) Loss of one or more altimetry systems;
- (c) Failure of all automatic altitude control systems;
- (d) Failure of any other equipment that could affect the ability of the aeroplane to maintain flight as cleared.

2.4.2 **Contingencies - Applicable to Specified RVSM Airspace**

2.4.2.1 **UK and EUR RVSM Airspace** - In this RVSM airspace it is expected that all aeroplanes will be in continuous radio contact with ATC either on the assigned frequency or on the distress and emergency frequency (121.500 MHz). They will therefore be able to advise ATC of any abnormal circumstances where RVSM performance requirements cannot be met, including encounters with turbulence greater than 'moderate'. ATC will then respond and issue an appropriate revised clearance before the pilot initiates a deviation from the original clearance. It is recognised, however, that there may be some circumstances (such as emergency descent following the loss of cabin pressurisation) where deviations may have to occur with little or no prior notice to ATC. In such cases the pilot will need to obtain a revised clearance as soon as possible after the deviation.

2.4.2.2 **North Atlantic and other Oceanic or Remote RVSM Airspace (if applicable)** - For oceanic and remote area RVSM application, where continuous direct controller-pilot communication may not always be possible, a range of contingencies have been considered which allow independent action by flight crews. In general they permit crews, in exceptional circumstances, to deviate from assigned clearances by selecting flight levels and/or tracks where other aeroplanes are least likely to be encountered. During such deviations crews are required to make maximum use of aeroplane lighting and to transmit relevant information on all appropriate frequencies, including the distress and emergency frequency. Once contact with ATC has been re-established, the crew will be assisted and issued with new clearances as required. Offset track procedures may be permitted if an encounter with turbulence is considered to be due to wake vortex in accordance with PANS ATM (Section 15.2.4). Specific procedures for the NAT region are contained in Section ENR 2.2 of the UK AIP.

2.5 **TCAS/ACAS Alerts and Warnings**

2.5.1 Procedures for dealing with TCAS/ACAS Alerts and Warnings are contained in Procedures for Air Navigation Services Aircraft Operations (PANS OPS, ICAO Doc 8168), Part 3, Section 3, Chapter 3.

2.6 **RT Phraseology**

2.6.1 Phraseology associated with RVSM operations has been developed for European wide use. **All** flights must use this phraseology whilst operating, or intending to operate, between FL 290 and FL 410 inclusive in the London and Scottish UIRs.

2.6.2 Aircraft operators are reminded that, within UK airspace, when responding to ATC the pilot is to append the callsign at the end of the message and not at the beginning.

2.6.3 ATC are to use the controller-controller RVSM phraseology for co-ordination between Air Traffic Service Units (ATSUs). In the event of ATC being advised by the pilot that the aircraft is no longer capable of RVSM operations, it is particularly important that the first ATSU that is made aware of the failure generates the appropriate co-ordination, eg the pilot calls for start-up and declares 'unable RVSM due equipment' and the airport ATSU then passes this message on to the first Air Traffic Control Centre involved with the flight.

2.6.4 The detailed RVSM phraseology is contained in Section 2.10.

2.7 **UK Specific RVSM Exemptions**

2.7.1 This section details the procedure for operators of civil registered aircraft to obtain an RVSM Exemption for the flights listed in paragraph 2.7.2 below. It also details Flight Planning and ATC procedures for civil registered aircraft which have obtained an RVSM Exemption to carry out specific flights in UK RVSM airspace under the control of a military or civil ATS agency as appropriate. The Exemption procedures detailed are UK specific and applicable for flights where RVSM monitoring is required, flights for test purposes and flights in support of MOD requirements. **These procedures are not applicable for EUR RVSM in general or applicable over other HMUs in Europe.**

2.7.2 **Categories of Civil Registered Aircraft Eligible for RVSM Exemption:** The following categories of flights by civil registered Non-RVSM Approved aircraft may be granted RVSM Exemptions to enter UK RVSM airspace:

- (a) Flights for the purpose of overflying the Strumble HMU for RVSM monitoring;
- (b) Aircraft using GMU equipment to complete a RVSM monitoring flight;
- (c) Flight testing, whether for the purpose of prototype testing or in association with the approval of a modification to an existing type designed aircraft (eg Trailing Cone Flights for the purpose of gaining RVSM approval);
- (d) Air Tests (eg post maintenance);
- (e) Special flights on behalf of the MOD;
- (f) Calibration flights (eg Radio Navigation Aids).

2.7.3 Aircraft conducting an Airworthiness Flight Test for the CAA are considered RVSM exempt and no application is required. This includes CAA Continued Airworthiness Flight Tests and those flight tests associated with an initial issue of a Certificate of Airworthiness for a series of aircraft. However, operators of aircraft not holding an RVSM approval should take note of the Flight

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Planning requirements provided in paragraph 2.7.5.3 Note 1, and in all cases prior notification of such a flight test should be made with the appropriate ATC agency. Note: Definition of 'State' aircraft - For the purpose of EUR RVSM, only aircraft used in military, customs or police services shall qualify as 'State' aircraft and are eligible to apply 'M' in ITEM 8 of the Flight Plan.

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2.7.4 RVSM Exemptions - Application Procedure

- 2.7.4.1 The Head of Airspace, Safety and Airspace Regulation Group (SARG) is the UK Authority for issuing RVSM Exemptions to aircraft operators for flights conducting tasks detailed in paragraph 2.7.2. An application for an RVSM Exemption will be treated on an individual basis. RVSM Exemptions will only be issued for a specific period in respect of a specific aircraft, or a series of aircraft (eg in support of MOD tasks or aircraft undergoing a CAA Airworthiness Flight Check). Operators of civil registered aircraft requiring RVSM Exemptions should apply to Head of Airspace using a proforma that can be obtained from SARG Tel: 020-7453 6553. All applications (either by E-Mail, Fax or post) are to be sent to:

Post: Head of Airspace,
K6, G1,
CAA House,
45-59 Kingsway,
London,
WC2B 6TE
Phone: 020-7453 6553
Fax: 020-7453 6565
Email: airspace@caa.co.uk

- 2.7.4.2 RVSM Exemptions will be returned to the operator by the quickest means and details copied to the relevant ACCs. It is essential that the Serial No. of the RVSM Exemption is quoted in the Remarks of the Flight Plan, otherwise entry to UK RVSM airspace will be refused.

2.7.5 Completion of Flight Plans - Additional Flight Planning Requirements

- 2.7.5.1 Normal flight planning requirements for RVSM operation are contained in Chapter 10 of the UK Flight Planning Guide (CAP 694). Flights operating under an exemption granted in accordance with the guidance above shall conform to the following additional flight planning requirements.
- 2.7.5.2 **For all flights, in Item 15** file a maximum level of FL 280 to the point where the flight wishes to enter RVSM airspace (otherwise if GAT the FPL will be rejected by DNM). Do not enter RFL details at FL 290 or above anywhere in item 15. A verbal request to ATC for flight above FL 280 will ensure the FPL is not rejected by DNM.
- 2.7.5.3 For all flights, in Item 18 include the RVSM Status and Exemption Serial No. in the Remarks, ie: **'STS/UK RVSM EXEMPTSerial No.'**

Note 1: Operators of Non-RVSM Approved aircraft **are not to enter 'W' in item 10** even with this specific exemption.

Note 2: Having an RVSM Exemption does not confer any right to enter RVSM airspace as GAT unless specifically agreed by the appropriate ATC agency on the day. Any such penetration of RVSM airspace must be subject to the prevailing traffic conditions and controller workload.

- 2.7.5.4 **Flight Testing or CAA Airworthiness Test Flights by Non-RVSM Approved Aircraft - In Item 15**, enter route details within the area in which the flight intends to operate, eg OAT, VLN, SMG, VLN and then the return joining point for the ATS route structure to destination at a level not above FL 280. If aerodrome of departure is outside the ATS route structure insert the appropriate routeing; if the final intention is to rejoin the ATS route structure, file to rejoin at the appropriate point not above FL 280. **In Item 18**, insert RVSM Status and Exemption Serial No. (if applicable) and 'RMK/Flight Testing' or 'RMK/CAA Airworthiness Flight Test' as appropriate with requested flight level in RVSM airspace.
- 2.7.5.5 **Overflight of the Strumble HMU by Non-RVSM Approved Aircraft** - Aircraft requiring RVSM monitoring over the Strumble HMU should flight plan via Strumble in accordance with standard routeing. If flying along the ATS route structure specifically to STU only, after STU insert the required routeing to destination. For flights intending to receive a service from London Radar (Military Control) for the purpose of conducting Air Tests or CAA Airworthiness Test Flights prior to overflying the Strumble HMU, or intending to fly OAT (off route) to facilitate flight over the Strumble HMU without flying along the ATS route structure, the appropriate routeing should be filed. **In Item 18 insert 'RMK/HMU FLT'** (this information will be presented to controllers on active flight progress strips).
- 2.7.6 **Notification to Air Traffic Control**
- 2.7.6.1 Pilots must pre-arrange handling in RVSM airspace by contacting the appropriate ACC Supervisor or Military Supervisor as appropriate on one of the following numbers:
- LACC Civil Supervisor. Tel: 01489-612420;
 - Swanwick Military East Supervisor. Tel: 01489-612408;
 - Swanwick Military West Supervisor. Tel: 01489-612417;
 - Swanwick Military North Supervisor. Tel: 01489-612943;
 - ScACC Civil Supervisor. Tel: 01292-692763.

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- 2.7.6.2 In addition to filing the appropriate flight plan in order to ensure correct handling, pilots should also pass the relevant flight profile details to the appropriate ATC Supervisor.
- 2.7.6.3 Operators requiring flight over the Strumble HMU should avoid peak periods as ATC need to provide 2000 ft separation between RVSM approved and Non-RVSM approved aircraft above FL 290. If in doubt suitable timings can be arranged with the LACC Civil ATC Supervisor.
- 2.7.7 **Air Traffic Control (ATC) Procedures for all Flights**
- 2.7.7.1 When Non-RVSM aircraft are ready to enter RVSM airspace, the appropriate clearance is to be obtained from ATC. Note that, due to the need to provide 2000 ft separation, controllers need to co-ordinate the flight with other RVSM approved aircraft. These flights therefore create extra workload and a slight delay in receiving such clearances should be anticipated. It would therefore be helpful if pilots can provide as much notice as possible prior to requesting flight levels above FL 280.
- 2.7.7.2 Pilots must comply with any requirements stated in the RVSM Exemption unless otherwise instructed by ATC. Pilots are also reminded to include their Non-RVSM status (callsign: NEGATIVE RVSM) in the initial call on any frequency within RVSM airspace and subsequent frequency changes, when requesting level changes pertaining to flight levels in RVSM airspace and in all read backs to flight level clearances pertaining to flight levels in RVSM airspace.
- 2.7.8 **Air Traffic Control (ATC) Procedures for Strumble HMU Flights**
- 2.7.8.1 Pilots should request a suitable flight level above FL 280 from ATC well before reaching the Strumble HMU. For the best chance of successful monitoring, aircraft should fly straight and level at an ATC assigned level between FL 290 and FL 410 throughout the area depicted on the chart at Annex B. Mode A SSR code should not be changed within that area. A single pass over the HMU is sufficient for certification purposes, though some operators may request a second. Pilots of aircraft are to comply with ATC instructions at all times.
- 2.7.8.2 Overflight of the HMU may be delayed until the flight can be integrated with other traffic and 2000 ft separation applied. ATC will therefore issue instructions as appropriate. As a reminder to ATC that the aircraft is attempting height monitoring, the crew is to transmit 'for Strumble HMU flight' on first contact with London Control or London Radar as appropriate.
- 2.8 **Height Monitoring Requirements**
- 2.8.1 There is an ongoing requirement for height monitoring within the EUR and NAT RVSM airspace in order to monitor safety levels of RVSM operations. Aircraft operators are therefore required to continue participating in ongoing monitoring activities and this may involve the re-monitoring of aircraft that have previously gone through the process. Non-participation can result in the withdrawal of RVSM approval. This monitoring requirement is, in its current form, applicable for EUR RVSM operations specifically to fulfil the requirements for ongoing EUR RVSM Safety Assessments. However, activities are under way to harmonise the detailed monitoring requirements globally. **The CAA is obliged, by ICAO, to keep a database of all UK registered RVSM approved aircraft. Therefore, operators are to inform the CAA (RVSM Approvals) both when they add aircraft to their fleet and of any aircraft they intend to remove from their fleet of RVSM approved aircraft. The CAA will pass this information to the appropriate Regional Monitoring Agency (RMA). This is in addition to any requirements to comply with any Eurocontrol notification procedures.**
- 2.8.2 In order to have sufficient confidence in safety assessment results sufficient monitoring data is required. Due to the potential changes to altimetry performance over time, there is a limitation on the age of data that can be used for the assessments. Therefore there is a need to obtain new data and this may result in the re-monitoring of certain aircraft types and airframes. Data will be obtained through monitoring by the existing ground based Height Monitoring Units (HMUs). Since much of the data is obtained automatically, no specific action is required from operators unless they are approached by the RMA. Where such an approach is made, the operator is required to cooperate by arranging a special flight to over-fly an HMU. Lack of co-operation by an operator would be reported to the state issuing the approval and could result in the withdrawal of RVSM approval for the aircraft and/or operator in question.
- 2.8.3 For aircraft operator specific information, such as how many of his/her aircraft of a particular type need to be monitored and within what time frame, the operator may contact the RMA direct.
- 2.8.4 **Organisation of Monitoring Activities**
- 2.8.4.1 On behalf of ICAO the EUROCONTROL Agency acts as the RMA. The information which will be obtained through the monitoring programme on aircraft compliance status and measured height keeping performance will be combined with the information available from monitoring agencies in other regions.
- 2.8.4.2 The RMA will support operators and approval authorities on any issue related to RVSM approval and monitoring. The RMA will require information on the aircraft which are intended to operate in EUR RVSM airspace, and which will, therefore, need to be monitored on a periodic basis as part of the continuing safety assessment. To this end the RMA will also be in contact with State approval authorities. The RMA is based at the EUROCONTROL headquarters in Brussels, Belgium.
- 2.8.4.3 The RMA will ensure the continuous operation of the monitoring systems and will manage the measured height keeping performance data. The RMA will identify any height deviations that are outside the specifications of the ICAO RVSM performance requirements, and will follow-up as required.
- 2.8.5 **Global Long Term Monitoring Requirements**
- 2.8.5.1 ICAO has identified the need for ongoing monitoring to ensure the safety objectives continue to be met and to ensure the continued maintenance of height keeping performance of approved aircraft. This longer term monitoring is seen to be essential for the ongoing safety of RVSM operations.
- 2.8.5.2 The detailed global long term monitoring requirements are continuously evolving and the procedures in place in the EUR RVSM region are designed to conform with these.

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- 2.9.1 The purpose of this section is to present information in respect of wake vortex and to notify pilots and controllers of the relevant procedures in the event of a wake vortex encounter with specific regard to EUR RVSM operations.
- 2.9.2 The Eurocontrol scheme is recording those encounters that take place in RVSM airspace and does not in any way replace the UK reporting scheme which records all wake vortex encounters in UK airspace (including those at RVSM levels).
- 2.9.3 **Wake Vortices in EUR RVSM Airspace:** Prior to the implementation of RVSM in the EUR region an independent study concluded that the 'probability of hazardous encounters with wake vortices are not expected to increase but that nuisance encounters would increase'. Since August 2000 EUROCONTROL has been collating wake vortex encounters in the European airspace at FL 245 and above. These encounters have been subject to further independent analysis which has confirmed the findings of the above mentioned study. It is vital, however, that pilots continue to provide reports of wake vortex encounters in RVSM airspace. Any pilot who encounters a wake turbulence incident when flying in EUR RVSM airspace or within an adjacent RVSM transition area should ensure that a detailed report is provided to EUROCONTROL and State Regulation Authorities.
- 2.9.4 **Wake Vortices Encounters:** ICAO Document 7030 'Regional Supplementary Procedures' recognises wake turbulence as a factor in European and North Atlantic RVSM operations. In the North Atlantic, due to the special nature of the airspace and frequent poor communications, procedures have been developed which allow action by flight crews independent of ATC involvement. These procedures are **not** applicable to EUR RVSM airspace, where direct pilot/controller communication exists together with sufficient radar coverage to enable ATC to manage required flight deviations. In addition the vertical separation between aircraft can be increased tactically should this be necessary.
- 2.9.5 **Pilot Actions:**
- 2.9.5.1 When an aircraft is operating in the EUR RVSM airspace and encounters severe turbulence due to weather or wake vortex, and the Pilot-in-Command believes the vertical navigation performance requirements for EUR RVSM airspace cannot be maintained, the pilot shall:
- (a) inform ATC as soon as possible (**'UNABLE RVSM DUE TURBULENCE'**) ;
 - (b) obtain a revised ATC clearance prior to initiating any deviation from cleared route or flight level;
 - (c) where such revised ATC clearance could not be obtained prior to such a deviation, obtain a revised clearance as soon as possible thereafter.
- 2.9.5.2 These procedures should not be interpreted in any way that prejudices the final authority and responsibility of the Pilot-in-Command for the safe operation of the aircraft.
- 2.9.6 **Controller Actions:**
- 2.9.6.1 The ATC controller:
- (a) shall establish either an appropriate horizontal separation or an increased vertical separation of 600 m (2000 ft);
 - (b) shall, to the extent possible, accommodate the pilot's request for flight level and/or route changes and pass traffic information as required;
 - (c) confirm that the pilot is ready to resume RVSM operations (**'REPORT READY TO RESUME RVSM'**) .

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2.10 Controller/Pilot RVSM Phraseology

Para	Message	Phraseology
1.	ATC ascertain the RVSM approval status of a flight	(callsign) CONFIRM RVSM APPROVED
2.	Pilot indication of non-RVSM approval Status: To be stated: (a) in the initial call on any frequency within the RVSM airspace (ATC shall provide a readback with the same phrase); and (b) in all requests for flight level changes pertaining to flight levels within the RVSM airspace; (c) in all readbacks to flight level clearances pertaining to flight levels within the RVSM airspace. As well, pilots of aircraft, other than State aircraft, shall respond to level clearances involving the vertical transit through either FL 290 or FL 410 with this phrase. See examples shown below.	NEGATIVE RVSM*
3.	Pilot indication of RVSM approval status:	AFFIRM RVSM*
4.	State aircraft, non-RVSM approved, shall indicate their status as being that of a State aircraft, in conjunction with a negative response to the RTF with the phrase:	NEGATIVE RVSM STATE AIRCRAFT*
5.	ATC denial of clearance into the RVSM airspace:	(callsign) UNABLE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN (or DESCEND TO, or CLIMB TO) FLIGHT LEVEL (number)
6.	For the case of an individual aircraft reporting severe turbulence or other severe weather related phenomenon, the pilot phraseology shall be:	UNABLE RVSM DUE TURBULENCE*
7.	The phraseology required of a pilot to communicate those circumstances which would cause an aircraft's equipment to degrade to below altimetry MASPS compliance levels shall be: The phrase is to be used to convey both the initial indication of the non-altimetry MASPS compliance and, henceforth, on initial contact on all frequencies within the lateral limits of the RVSM airspace until such time as the problem ceases to exist.	UNABLE RVSM DUE EQUIPMENT*
8.	The pilot shall communicate his/her ability to resume operation within the RVSM airspace after an equipment related contingency, or his/her ability to resume RVSM operations after a weather related contingency with the phrase:	READY TO RESUME RVSM*
9.	To solicit this information ATC shall use the phrase:	(callsign) REPORT ABLE TO RESUME RVSM
Note: * indicates a pilot transmission		

Example 1: A non-RVSM approved aircraft, maintaining FL 260, subsequently requests a climb to FL 320

Pilot RTF:	(callsign) REQUEST FL 320, NEGATIVE RVSM
Controller RTF	(callsign) CLIMB FL 320
Pilot RTF	CLIMB FL 320, NEGATIVE RVSM (callsign)

Example 2: A non-RVSM approved aircraft, maintaining FL 260, subsequently requests a climb to FL 430.

Pilot RTF:	(callsign) REQUEST FL 430, NEGATIVE RVSM
Controller RTF	(callsign) CLIMB FL 430
Pilot RTF	CLIMB FL 430, NEGATIVE RVSM (callsign)

Example 3: A non-RVSM approved aircraft, maintaining FL 360, subsequently requests a climb to FL 380.

Pilot RTF:	(callsign) REQUEST FL 380, NEGATIVE RVSM
Controller RTF	(callsign) CLIMB FL 380
Pilot RTF	CLIMB FL 380, NEGATIVE RVSM (callsign)

Example 4: A non-RVSM approved civil aircraft, maintaining FL 280, subsequently requests a climb to FL 320.

Pilot RTF:	(callsign) REQUEST FL 320, NEGATIVE RVSM
Controller RTF	(callsign) UNABLE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN FL 280

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Controller-controller RVSM Phraseology		
Para	Message	Phraseology
1.	To verbally supplement an automated estimate message exchange which does not automatically transfer Item 18 information	NEGATIVE RVSM or NEGATIVE RVSM STATE AIRCRAFT (as applicable)
2.	To verbally supplement estimate messages of non-RVSM approved aircraft:	NEGATIVE RVSM or NEGATIVE RVSM STATE AIRCRAFT (as applicable)
3.	To communicate the cause of a single aircraft contingency:	UNABLE RVSM DUE TURBULENCE (or EQUIPMENT, as applicable)

3 Area Navigation - RNAV

3.1 Introduction

3.1.1 RNAV is a method of navigation which permits aircraft operation on any desired flight path within the coverage of referenced navigation aids or within the limits of the capability of self contained navigation systems, or a combination of the two. The introduction of RNAV has allowed greater flexibility in airspace design and potential user advantages such as direct tracks, fuel savings etc.

3.1.2 All aircraft that wish to fly in RNAV designated airspace are to be equipped with the appropriate navigation equipment as specified in EASA AMC 20-4 or the AMC-20 series document appropriate to the particular RNAV specification. Specific requirements for equipment to be carried by UK registered aircraft are contained in the table in GEN 1.5, paragraph 5.2.1.

3.2 RNAV 5 / Basic Area Navigation (B-RNAV) (RNAV 5 is PBN terminology for B-RNAV)

3.2.1 **General.** All aircraft, other than State Aircraft*, operating in en-route controlled airspace** within the London and Scottish FIRs/ UIRs shall be equipped with, as a minimum, RNAV equipment meeting RNAV 5 in accordance with the requirements set out in ICAO Doc 7030 Regional Supplementary Procedures (EUR).

Note 1: * State aircraft are defined by ICAO Convention Article 3 as aircraft used in military, customs and police services.

Note 2: ** Currently the mandate for the carriage of B-RNAV equipment applies only to the en-route portion of the UK ATS route structure and does not apply to designated feeder routes (SIDs and STARs) in/out of UK TMAs unless otherwise specified. However, consideration is being given to extend the mandate for the carriage of B-RNAV equipment for TMA and feeder route operations.

3.2.2 **Flight Planning.** Operators of aircraft fitted with RNAV equipment having a navigation accuracy meeting RNAV 5 shall insert the designator letter 'R' in Item 10 of the Flight plan.

3.2.3 **Certification and Approval Requirements.** To be eligible for B-RNAV operations on-board navigation equipment will be required to provide en-route lateral track keeping accuracy of +/- 5 nm or better for 95% of the flight time (RNAV 5). For UK operators and UK registered aircraft the only approval required under the ANO is that B-RNAV equipment and its installation in the aircraft conform to the provisions outlined in ANO 2009 Article 124. No separate operational approvals are required. Note: Guidance material concerning navigation requirements associated with RNAV 5 (B-RNAV) operations is contained in EASA AMC 20-4, Airworthiness Approval And Operational Criteria For The Use Of Navigation Systems In European Airspace Designated For Basic RNAV Operations.

Note: Guidance material concerning navigation requirements associated with RNAV 5 (B-RNAV) operations is contained in EASA AMC 20-4, Airworthiness Approval And Operational Criteria For The Use Of Navigation Systems In European Airspace Designated For Basic RNAV Operations.

3.2.4 **UK Exemption Policy.** There are no general exemptions issued from the requirement to carry RNAV equipment in the relevant airspace. Aircraft operators seeking to carry out a flight for the purpose of safety of life, maintenance or delivery should, in the first instance, contact the Directorate of Airspace Policy at the address below:

Post: Head of Airspace Regulation
Directorate of Airspace Policy,
CAA House,
45-59 Kingsway,
London,
WC2B 6TE,
Phone: 020-7453 6510
Fax: 020-7453 6565

3.2.5 **Contingency Procedures.** ICAO Doc 7030 Regional Supplementary Procedures detail the procedures for RNAV operations, including contingency procedures. These contingency procedures are summarised below:

- (a) Failure of RNAV Capability Whilst Airborne - If, as a result of failure of the RNAV system or degradation of it below RNP 5, an aircraft is unable either to enter mandated RNAV airspace or continue operations in accordance with the existing ATC clearance, a revised clearance shall, wherever possible be obtained by the pilot. Subsequent ATC action in respect of that aircraft will be dependent upon the nature of the reported failure and the overall traffic situation. Continued operation with the current ATC clearance may be possible in many situations. When this cannot be achieved, a revised clearance may be required to revert to navigation using conventional aids. ATC may also provide the aircraft with radar vectors until the aircraft is capable of resuming its own navigation.

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- (b) Failure of RNAV Capability before Departure - In case of failure or degradation of the RNAV system which is detected before departure from an aerodrome where it is not practicable to effect a repair, the aircraft concerned should be permitted to proceed to the nearest suitable aerodrome where repair can be made. When granting clearance to such aircraft, ATC should take into account the existing or anticipated traffic situation and may have to modify the time of departure, flight level or route of the intended flight. Subsequent adjustments may become necessary during the course of the flight.
- (c) Flight Plan Procedures - Operators of such aircraft, where a failure or degradation is detected before departure, shall not insert the designators 'S' or 'R' in Item 10 of the Flight Plan. Since such flights require special handling by ATC, Item 18 of the Flight Plan shall contain STS/RNAV INOP. Subsequently, for a flight for which a flight plan has been submitted, a new plan should be filed and the old plan cancelled. For a flight operating on a Repetitive Flight Plan (RPL), the RPL should be cancelled and a new flight plan filed.
- (d) Phraseology - Whenever initial contact on an ATC frequency is established the pilot shall include the phrase 'UNABLE RNAV DUE EQUIPMENT' immediately after the aircraft callsign.

3.2.6 **UK ATS Routes.** Historically ATS routes have been delineated by ground-based navigation aids (today predominately VORs). Following the introduction of RNAV 5 to all UK en-route airspace, WGS 84 geographical points, which may not be coincident with a VOR, will define the ATS routes in the UK. This has the advantage that if a VOR is moved or withdrawn the alignment of the route can remain unchanged. All UK ATS routes are now RNAV routes at all flight levels. These routes are annotated accordingly in the En-Route section of the AIP.

3.2.7 **Responsibility of Operators.** The navigation system accuracy achievable by a RNAV system is dependent upon both the airspace infrastructure and the airborne equipment. It is the responsibility of the operator to ensure that the required system accuracy can be achieved when planning to operate in designated RNAV 5 airspace. Where position information derived from GPS is the only input to the RNAV system it is incumbent upon operators to confirm that the necessary coverage from GPS is provided for the intended flight.

3.3 Precision Area Navigation (P-RNAV)

3.3.1 AIP text to be developed.

4 RNAV (GNSS) Instrument Approach Procedures

4.1 RNAV (GNSS) Approach Procedures were previously published in AIP Supplement S11/2008. The supporting text and charts for those aerodrome procedures approved by the CAA have now been introduced into the AIP with effect from 31 July 2008 at which date, Supplement S11/2008 is withdrawn. The CAA approval for the use of RNAV (GNSS) Approach Procedures in the UK is detailed below and includes guidance on the calculation of aerodrome operating minima supporting the introduction of APV Baro VNAV procedures.

4.2 RNAV (GNSS) 2-Dimensional Non-Precision Approach (NPA) procedures and 3-Dimensional Barometric VNAV (APV Baro VNAV) Approach procedures are only authorised to suitable instrument runways, at appropriately equipped licensed aerodromes with Air Traffic Control (ATC) services as detailed below. However, exceptionally, the CAA may approve a procedure to a non-instrument runway, subject to a case by case assessment.

4.3 Procedures and charts for approved RNAV (GNSS) Approaches are included in the appropriate AIP AD Section 8.

4.4 General

4.4.1 Notified RNAV (GNSS) Instrument Approach Procedures will be available for use by all Instrument and IMC Rated pilots of UK and foreign registered aircraft. Aircraft must have suitably approved equipment.

4.5 Aircraft Navigation System

4.5.1 The aircraft navigation system shall include at least one GPS receiver. The navigation system must be approved to conduct :

- (a) RNAV (GNSS) Approaches or;
- (b) Approaches with RNP 0.3 or RNP-RNAV 0.3.

Note: The terminology used in Aircraft Flight Manuals may vary between aircraft types.

4.5.2 All approved installations must have the appropriate approval for RNAV (GNSS) Approach operations entered in the Aircraft Flight Manual (AFM), Pilot Operating Handbook (POH) or equivalent.

The navigation system can be as a minimum:

- (a) A system only based on GNSS having at least one GPS receiver qualified to TSO-C129a/ETSO-C129a Class A1 or TSO-C146()/ETSO-C146() Class Gamma and operational class 1, 2 or 3 or;
- (b) a multi-sensor system (eg, Flight Management System) having at least one GPS receiver qualified to TSO-C129()/ETSO-C129() Class B1, C1, B3 or C3 or TSO-C145()/ETSO-C145() class 1, 2 or 3 (with equivalent integration guidance).

Note: ()refers to any version of the equipment Technical Standard Order is acceptable eg. TSO-C129 or TSO-C129a.

4.5.3 Any operating limitations mentioned in the AFM, concerning use of the navigation system on RNAV (GNSS) Approach procedures must be observed.

4.5.4 Pilots must be able to determine that the on-board aeronautical database and software version in use for the navigation system is valid for the time of flight. The entire approach procedure must be loadable, by name, from the navigation database.

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

Manually entered and overlay procedures must not be used as the primary reference on any approach, at any time.

4.6 Pilot Training and Licensing

- 4.6.1 UK AOC holder's approval to fly these approaches will be administered under current CAA oversight arrangements. Flight Operations Division Communication 04/2008 directs the attention of AOC holders to guidance material for RNAV operations, including Instrument Approach Procedures. The document may be found on the CAA website at www.caa.co.uk/fodcom0408.
- 4.6.2 CAP 773 contains technical information on the function of GPS together with equipment requirements, human factors considerations, training and practical guidance for the use of GPS during RNAV (GNSS) Approach operations. It also contains guidance for instructors, Flight Training Organisations (FTOs) and Registered Facilities on appropriate training for RNAV (GNSS) Approaches. CAP 773 is available on the CAA website and then by following the links Publications; General Aviation.
- 4.6.3 A CAA Personnel Licensing Department policy statement entitled, 'Flight Training and Testing for RNAV (GNSS) Non-Precision Instrument Approaches' is available on the CAA website and then by following the links Safety Regulation; Personnel Licensing; What's New?
- 4.6.4 CAA Safety Sense Leaflet No.25 (Use of GPS) has been updated to include safety related guidance and information on the use of GPS in IMC and on Instrument Approaches. The leaflet may be found on the CAA website at www.caa.co.uk/safetysense.

4.7 Aerodrome Licensing

- 4.7.1 The CAA Safety Regulation Group (SRG) Aerodrome Standards Department has issued a Notice to Aerodrome Licence Holders (NOTAL) 4/2007 specifying the responsibilities and actions required of licence holders intending to introduce RNAV (GNSS) approach operations. The NOTAL may be found on the CAA website and then by following the links, Publications; Aerodrome; NOTAL.

4.8 Aerodrome Procedures

- 4.8.1 Individual aerodromes wishing to introduce RNAV (GNSS) Instrument Approach Procedures are to request the design of such procedures by completing the following form:
http://www.caa.co.uk/docs/7/dap_ta_ifprequestform.pdf
The request is to be made to the Head of Airspace Regulation at the Directorate of Airspace Policy (DAP).
- 4.8.2 To enable a design to be initiated, aerodromes must have an up-to-date obstacle survey that complies with CAP 232 Aerodrome Survey Information requirements. Where instrument flight procedures do not currently exist, or new procedures introduce markedly different flight profiles, aerodrome operators should be aware of the requirements of the Airspace Change Process published in CAP 725 Airspace Change Process Guidance Document. Both CAP 232 and 725 are available via the CAA website.

4.9 Aerodrome Operating Minima

- 4.9.1 See AD 1.1 subsection 4 for information on Aerodrome Operating Minima.

4.10 ATS Providers - Information

- 4.10.1 The CAA SRG Air Traffic Standards Division has issued an Air Traffic Services Information Notice (ATSIN) Number 108 outlining the responsibilities and actions required of ATS providers at aerodromes intending to introduce RNAV (GNSS) Instrument Approach Procedures. The ATSIN is available on the CAA website and then by following the links, Publications; Air Traffic Services; ATS Information Notices.

4.11 Pre-Flight Planning

- 4.11.1 Aircraft operators shall ensure that the appropriate coverage from GNSS is provided for the intended flight. Receiver Autonomous Integrity Monitor (RAIM) availability prediction should take into account the GPS constellation predicted for the duration of the flight, NOTAM and avionics architecture eg, Baro aiding input. Software tools available on the Internet can be used for this purpose e.g. AUGUR or through the aircraft navigation system RAIM prediction capability, if provided. In the event of a predicted, continuous loss of appropriate level of fault detection of more than five (5) minutes for any part of the RNAV (GNSS) Approach Procedure, the flight planning should be revised eg, delaying the departure or planning a different approach procedure.

Note: AUGUR has been developed by EUROCONTROL and is available at <http://augur.ecacnav.com/>

- 4.11.2 RAIM availability prediction software does not guarantee the service; they are tools to assess the expected capability to meet the required navigation performance. Because of failure of some GNSS elements, operators must be aware that RAIM, or GPS navigation altogether, may be lost while airborne which may require reversion to an alternative means of navigation. Therefore, pilots should assess their capability to navigate (potentially to an alternate destination) in case of failure of GPS navigation.

4.12 Method of Operation

- 4.12.1 Standard Air Traffic Control procedures for sequencing and separating aircraft will apply at all times during RNAV approaches.
- 4.12.2 Pilots shall request clearance to fly the procedure. Clearance to fly the procedure permits the pilot to fly in accordance with the published procedure, following the descent profile.
- 4.12.3 For APV Baro VNAV procedures, in order to minimise the potential for mis-setting of barometric reference Air Traffic Controllers must confirm QNH with flight crews prior to commencement of the approach.
- 4.12.4 The approach commences at the Initial Approach Fix (IAF).

Note: At aerodromes where aircraft are vectored to the Intermediate Fix (IF), eg. London Gatwick and London Heathrow, the RNAV (GNSS) Instrument Approach Procedure will commence at the IF.

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

- 4.12.5 **RTF Phraseology:** Pilots should request clearance to fly the procedure using the phraseology:
'(Aircraft c/s), request RNAV approach, via (Initial Approach Fix Designator), runway xx'.
Where traffic conditions permit, air traffic controllers shall clear the pilot to follow the procedure using the following phraseology:
'(Aircraft c/s), cleared RNAV approach, runway xx, (report at (Initial Approach Fix designator))'.
For traffic sequencing and to aid situational awareness, air traffic controllers may request the pilot to report when established on final approach track or to report at any other relevant point in the procedure. For example:
'(Aircraft c/s), report established on final approach track';
'(Aircraft c/s), report 2 miles from final approach fix'.
Air Traffic Controllers shall instruct the pilot to report at the final approach fix, using the phraseology:
'(Aircraft c/s), report final approach fix'.
When Air Traffic Control is aware of problems with the GNSS system, the following phraseology shall be used:
'(Aircraft c/s), GNSS reported unreliable (or GNSS may not be available (due to interference))';
In the vicinity of (location) (radius) (between (levels)).
or:
In the area of (description) (between (levels)):
'(Aircraft c/s), GNSS unavailable for (specify operation) (from (time) to (time) (or until further notice))'.
Following a RAIM indication, pilots shall inform the controller of the event and subsequent intentions.
'(Aircraft c/s), GNSS unavailable (due to (reason eg Loss of RAIM or RAIM alert)) (intentions)';
'(Aircraft c/s), Loss of RAIM or RAIM alert (intentions)'.
- 4.12.6 After reaching the final approach fix, the pilot will continue to fly the procedure towards the next waypoint, normally the runway threshold. At the appropriate time, the pilot will either continue with the air traffic clearance received or will execute the Missed Approach Procedure (MAP).
- 4.12.7 **Missed Approach Procedure:** To expedite the introduction of RNAV (GNSS) Approaches, the Missed Approach Procedures will be conventional, using ground-based navigational aids. These will be reviewed in due course and, after detailed discussions with the aerodromes to determine optimum hold locations and required tracks, will be converted to full RNAV MAPs. Environmental consultation will need to be considered for any new tracks. Until then, all MAPs will be straight ahead to a designated altitude with track guidance. At the designated altitude, the pilot should revert to conventional navigation and route to the holding beacon, ie. by making a turn to the beacon or a turn with continued climb to holding altitude at the beacon.
- 4.12.8 **Loss of Communications:** In the event of communications failure, the pilot should continue with the RNAV (GNSS) procedure in accordance with published loss of communication procedures.
- 4.13 **Point of Contact**
- 4.13.1 Pilots, ATS providers or aerodrome operators seeking further information on the establishment of RNAV (GNSS) Instrument Approach Procedures should contact:
- Post: Head of Airspace Regulation
Directorate of Airspace Policy
CAA House
45-59 Kingsway
London
WC2B 6TE
Phone: 020-7453 6510
Email: airspace@caa.co.uk
- The CAA website may be found at: <http://www.caa.co.uk>

5 Carriage of Radio and Radio Navigation Equipment

- 5.1 The requirements for the carriage of radio, radio navigation and area navigation equipment are contained in Articles 39(2), 40, 112, 124, 125 and Schedule 5 to the Air Navigation Order 2009. In the case of the Shanwick Oceanic Control Area, additional requirements are contained in Article 121 of the Air Navigation Order 2009 and Regulation 16 of the Air Navigation (General) Regulations 2006, as amended.
- 5.2 **Carriage of Communications and Navigation Equipment**
- 5.2.1 The specified circumstances in which the requirements for the carriage of radio, radio navigation and area navigation equipment shall be met by all aircraft flying in United Kingdom Airspace, together with the requirements for flight in the Shanwick Oceanic Control Area, are tabulated below. Sub-paragraphs (a) to (e) detail the radio communications requirements, sub-paragraphs (f) to (m) detail the radio navigation requirements, and sub-paragraph (n) details the case of area navigation equipment. For the purposes of Article 39 of the Air Navigation Order 2009, EU-OPS aeroplanes shall also be equipped in accordance with these requirements.



GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

Sub - para	Applicability	Requirements
Communications Equipment		
(a)	All aircraft (except gliders and SLMGs) within Controlled Airspace below FL 195.	VHF RTF capable of 25 kHz spacing for 760 channel operation in the band 118.00 MHz to 136.975 MHz.
(b)	All aircraft within airspace at and above FL 195, or within airspace Class A, B and C.	VHF RTF capable of 25 kHz and 8.33 kHz spacing operation in the band 117.975 MHz to 137.000 MHz.
(c)	All aircraft within United Kingdom Airspace notified as a Radio Mandatory Zone (RMZ) unless in compliance with alternative provisions prescribed by the airspace Controlling Authority. <i>Note: Applies to airspace classes E, F and G as appropriate.</i>	VHF RTF capable of 25 KHz spacing for 760 channel operation.
(d)	All aircraft within the Shanwick Oceanic Control Area.	HF RTF with appropriate frequencies available.
(e)	All aircraft (including EU-OPS aeroplanes but except gliders and SLMGs) registered in the United Kingdom, wherever they may be, flying for the purpose of Public Transport.	VHF RTF capable of maintaining direct two-way communication with the appropriate air traffic control units on the intended route using the frequencies notified or otherwise designated by the competent authority for that purpose. <i>Note: All notified frequencies require either a 25 kHz, 760 channel radio or a 8.33 kHz radio.</i>
(f)	All aircraft (including EU-OPS aeroplanes but except gliders and SLMGs) registered in the United Kingdom, wherever they may be, flying under IFR.	VHF RTF capable of maintaining direct two-way communication with the appropriate air traffic control units on the intended route using the frequencies notified or otherwise designated by the competent authority for that purpose. <i>Note: All notified frequencies require either a 25 kHz, 760 channel radio or a 8.33 kHz radio.</i>
(g)	All EU-OPS aeroplanes under IFR, or under VFR over routes that cannot be navigated by reference to visual landmarks.	Two independent radio communication systems necessary under normal operating conditions to communicate with an appropriate ground station from any point on the route including diversions.
Navigation Equipment		
(h)	All aircraft (except gliders and SLMGs) under IFR within Controlled Airspace below FL 245.	VOR receiver, DME and automatic DF ¹ (except aircraft with Special VFR clearance).
(i)	All aircraft (except gliders and SLMGs) at and above FL 245.	VOR receiver, DME and automatic DF ¹ (except aircraft with Special VFR clearance).
(j)	All aircraft (except gliders and SLMGs) making an approach and landing at certain aerodromes within Control Zones	ILS.
(k)	All aircraft in the Shanwick Oceanic Control Area.	Suitable long-range navigation equipment. <i>Note: Flights operating between FL 285 and FL 420 are required to meet the Minimum Navigational Performance Specifications (MNPS).</i>
(l)	All aircraft (including EU-OPS aeroplanes but except gliders and SLMGs) registered in the United Kingdom, wherever they may be, flying for the purpose of Public Transport under IFR.	Duplicated VOR receiver, DME, automatic DF ¹ , and a 75 MHz marker beacon receiver ² .
(m)	All aircraft (including EU-OPS aeroplanes but except gliders and SLMGs) registered in the United Kingdom, wherever they may be, flying for the purpose of Public Transport under IFR while making an approach to landing.	Radio navigation equipment capable of receiving signals from one or more aeronautical radio stations on the surface to enable the aircraft to be guided to a point from which a visual landing can be made at the aerodrome at which the aircraft is to land.
(n)	All multi-engined aircraft (including EU-OPS aeroplanes) registered in the United Kingdom, wherever they may be, flying for the purpose of Public Transport under VFR.	Duplicated VOR receiver, DME, automatic DF ¹ , and a 75 MHz marker beacon receiver ² .
(o)	All single-engined aircraft (including EU-OPS aeroplanes but except SLMGs) registered in the United Kingdom, wherever they may be, flying for the purpose of Public Transport under VFR over a route on which navigation is not effected solely by visual reference to landmarks.	Radio navigation equipment capable of enabling the aircraft to be navigated on the intended route including such equipment as may be prescribed.
(p)	All aircraft on the ATS Route Structure ^{3 & 4}	EASA or State approved equipment, which meets the RNAV5 requirement contained in ICAO Doc 7030 Regional Supplementary Procedures (EUR RAC). <i>Note: The term RNP5 as given in the ANO is synonymous with the terminology RNAV5 or B-RNAV</i>



GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

Sub - para	Applicability	Requirements
Communications Equipment		
1	For EU-OPS aircraft an ADF system need not be installed provided that the use of the ADF is not required in any phase of the planned flight.	
2	An aircraft may fly notwithstanding that it does not carry the equipment specified in this requirement if it carries alternative radio navigation equipment or navigational equipment approved in accordance with Article 37(9) of the Air Navigation Order 2009.	
3	The term ATS Route Structure is used to mean variously: Upper ATS Route; Airway; Advisory Route (participating aircraft only); and Arrival or Departure Route.	
4	Inbound aircraft from Oceanic Airspace are permitted to navigate to MNPS Airspace navigational accuracy requirements but are to be RNAV 5 compliant on reaching Landfall Fix.	

5.2.2 Exemptions

5.2.2.1 **8.33 kHz Radio Equipment.** With the exception of State aircraft, there are no exemptions to the requirements for the carriage and operation of 8.33 kHz spacing radio equipment. Non-equipped flights must flight plan to operate below FL 195, or outside Class A, B and C Airspace. Those State aircraft which are infrequent users of the FIR/UIR are permanently exempted from the requirements detailed at paragraph 5.2.1 (b) above, provided that they are capable of communicating on UHF, where available. Where UHF is not available, State aircraft not equipped with 8.33 kHz channel spacing equipment shall be excluded from 8.33 kHz Airspace. Provision for State aircraft exempted from the carriage of 8.33 kHz channel spaced communications equipment will be made on a tactical basis through the provision of an alternative UHF/VHF channel, the details of which will be given at time of use.

5.2.2.2 **Navigation Equipment.** State aircraft are exempt from the requirement for carriage of RNAV equipment. No other general exemption from these requirements will be granted, but, in very special circumstances, relaxation of the requirements, for a single flight, may be approved by the appropriate ATC Unit. Aircraft subject to the requirements specified in paragraphs 5.2.1 (k) and 5.2.1 (m), where not more than one item of equipment is unserviceable when the aircraft is about to begin a flight, may nevertheless take off on that flight if:

- (a) It is not reasonably practicable for the repair or replacement of that item to be carried out before the beginning of the flight;
- (b) The aircraft has not made more than one flight since the item was last serviceable; and
- (c) The commander of the aircraft is satisfied that the flight can be made safely and in accordance with any relevant requirements of the appropriate air traffic control unit, taking into account the latest information available as to the route and aerodrome to be used (including any planned diversion) and the weather conditions likely to be encountered.

5.2.3 FM Immunity

5.2.3.1 ICAO requirements for receiver FM immunity from the adjacent sound broadcast band are defined in ICAO SARPS Annex 10, Volume I, Parts 3.1.4 and 3.3.8 (ILS/VOR) and Volume III Part 2.3.3 (VHF communications). Mandatory requirements for the carriage of radio equipment is set out in Article 39(2) and Schedule 5 to the Air Navigation Order 2009. Radio equipment not meeting the immunity standard shall not be used to comply with ANO carriage requirements.

5.2.3.1.1 All aircraft flying in the UK must have the radio equipment listed in the Schedule 5 table, irrespective of where they are registered. All required radio navigation equipment must be FM immune. If the aircraft is UK-registered then any non-immune navigation set must be identified with an appropriately worded placard.

5.2.3.1.2 All UK-registered aircraft, wherever they fly, must have the radio equipment listed in the Schedule 5 table; and all required radio navigation equipment must be FM immune. Any non-immune navigation set must be identified with an appropriately worded placard.

5.2.3.1.3 UK-registered aircraft exceeding 5700 kg must also have appropriate placards on any non-immune communications set.

5.2.4 Radio Mandatory Zones

5.2.4.1 **Notified 'Radio Mandatory Zone' Airspace.** For the purposes of SERA.6005, the following airspace is notified as a 'Radio Mandatory Zone':

- Hawarden Radio Mandatory Zone (permanent).

5.2.4.2 En-route Radio Mandatory Zones are detailed at ENR 2.2, subsection 5, and aerodrome specific Radio Mandatory Zones are detailed in the Aerodrome Index – Specific.

5.2.4.3 Temporary Radio Mandatory Zones put in place to meet urgent operational requirements may not be incorporated in the AIP due to their limited duration. They will be notified through appropriate means including NOTAM and AIC.

5.3 Carriage of SSR Transponder Equipment

5.3.1 The requirements for the carriage of Secondary Surveillance Radar (SSR) transponder equipment are hereby notified for the purposes of Article 39(2) and Schedule 5 to the Air Navigation Order 2009. Aircraft shall carry SSR Mode S transponder equipment as prescribed in sub-paragraphs (a) to (g) below. Sub-paragraphs (a) and (b) detail the requirements in notified Mode S Enhanced Surveillance Airspace, and sub-paragraphs (c) to (g) detail the requirements in all other UK airspace. For the purposes of Article 40 of the Air Navigation Order 2009, EU-OPS aeroplanes shall also be equipped in accordance with these requirements.

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

Sub - para	Applicability	Requirements
SSR Transponder Equipment Within Notified Mode S Enhanced Surveillance Airspace (as notified in paragraph 5.3.2)		
(a)	All fixed-wing aeroplanes operating under IFR having a maximum take-off mass in excess of 5700 kg or having a maximum cruising true airspeed capability in excess of 250 kt.	Mode S Enhanced Surveillance
(b)	All other aircraft.	Mode S Elementary Surveillance
SSR Transponder Equipment Within Other UK Airspace		
(c)	All aircraft within United Kingdom controlled airspace of Classification A, B and C.	Mode S Elementary Surveillance
(d)	All aircraft operating under IFR within United Kingdom controlled airspace of Classification D and E.	Mode S Elementary Surveillance
(e)	All aircraft within United Kingdom airspace at and above FL 100.	Mode S Elementary Surveillance
(f)	All aircraft within United Kingdom airspace notified as a 'Transponder Mandatory Zone'. <i>Note: Applies to Airspace Classes D, E, F and G as appropriate .</i>	Mode S Elementary Surveillance
(g)	All aircraft (including EU-OPS aeroplanes) registered in the United Kingdom, flying for the purpose of Public Transport.	Mode S Elementary Surveillance

5.3.1.1 When flying outside of mandatory SSR airspace, all pilots are strongly encouraged to operate the transponder if equipped and to the full extent of its capabilities. This includes Elementary and Enhanced Mode S and Mode A/C. Pilots of Mode A/C equipped aircraft should note that Mode C should **NOT** be deselected at any time.

5.3.2 **Notified Airspace** as per (a) and (b) in the table at 5.3.1.

5.3.2.1 **Notified Mode S Enhanced Surveillance Airspace.** For the purposes of Article 39(2) and Schedule 5 paragraph 3(7) of the Air Navigation Order 2009, the following airspace is notified as Mode S Enhanced Surveillance Airspace:

- The vertical and lateral bounds of the London Terminal Control Area (TMA).

5.3.2.2 **Notified 'Transponder Mandatory Zone' Airspace.** For the purposes of Article 39(2) and Schedule 5 paragraph 3(6)(b) of the Air Navigation Order 2009 and SERA.6005, the following airspace is notified as a 'Transponder Mandatory Zone':

- The Scottish TMA between 6000 ft ALT and FL 100.
- Parts of the Scottish Terminal Control Area below 6000 ft as detailed in ENR 6-2-1-5.
- The vertical and lateral boundaries of the London Control Zone as detailed in AIP at AD2-EGLL.
- The vertical and lateral bounds of the Stansted TMZ as detailed in AIP AD2-EGSS.
- The vertical and lateral boundaries of the London Array TMZ as detailed in AIP at ENR 2.2 Paragraph 4.
- The vertical and lateral boundaries of the Humber Gateway TMZ as detailed in AIP ENR 6-1-15-3.
- The vertical and lateral boundaries of the Burbo Bank TMZ as detailed in AIP ENR 6-1-15-7 and at ENR 2.2 Paragraph 4.
- Part of Airway L602 as detailed in AIP ENR 1.4 and ENR 3.3.
- Part of Airway N560 as detailed in AIP ENR 1.4 and ENR 3.1.
- Part of Airway N562 as detailed in AIP ENR 1.4 and ENR 3.3.
- Part of Airway P600 as detailed in AIP ENR 1.4 and ENR 3.1.
- Airway Y904 as detailed in AIP ENR 1.4 and ENR 3.1.
- Airway Y905 as detailed in AIP ENR 1.4 and ENR 3.1.
- Airway Y906 as detailed in AIP ENR 1.4 and ENR 3.1.
- Airway Y911 as detailed in AIP ENR 1.4 and ENR 3.1.
- Airway Y958 as detailed in AIP ENR 1.4 and ENR 3.3.

5.3.2.3 Temporary Transponder Mandatory Zones put in place to meet urgent operational requirements may not be incorporated in the AIP due to their limited duration. They will be notified through appropriate means including NOTAM and AIC.

5.3.2.4 En-route Transponder Mandatory Zones are detailed at ENR 2.2, subsection 4, and aerodrome specific Transponder Mandatory Zones are detailed in the AIP Aerodrome Index – Specific.

5.3.3 **Mode S Capability**

5.3.3.1 **Enhanced Surveillance.** An aircraft is only considered to be compliant with the Mode S Enhanced Surveillance requirements when it can provide all the Downlinked Aircraft Parameters (DAPs) notified in Part 6 to the Air Navigation (General) Regulations 2006 and which have been certificated as compliant with the requirements of EASA AMC 20-13 or with equivalent national certification requirements.

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

- 5.3.3.2 **Elementary Surveillance.** An aircraft is only considered to be compliant with the Mode S Elementary Surveillance requirements when it meets the requirements notified in Part 6 to the Air Navigation (General) Regulations 2006 and has been certificated as compliant with the requirements of JAA TGL 13 Revision 1.
- 5.3.4 **Exceptions**
- 5.3.4.1 The requirements at sub-paragraphs 5.3.1 (c) to 5.3.1 (f) shall not apply to:
- (a) Gliders, including self-sustaining gliders and self-propelled hang gliders, and self-launching motor gliders except;
 - (i) Where operating above FL 195 outside airspace notified as TRA(G), or
 - (ii) Where operating below FL 195 outside notified Non-SSR Transponder Glider Areas.
- Note:** The requirements at sub-paragraphs 5.3.1 (c) to 5.3.1 (f) will apply to gliders and self-launching motor gliders within the United Kingdom on and after 19 October 2015.*
- (b) Aircraft below FL 100 in Controlled Airspace outside of the London Terminal Manoeuvring Area when receiving an approved crossing service;
 - (c) Aircraft operating in accordance with a clearance from an appropriate ATC unit for a particular flight, whilst complying with the appropriate Rules of the Air that apply to the airspace concerned and any specific instructions that the ATC unit may give;
 - (d) Aircraft operating in accordance with a general permission given by the appropriate ATC unit, whilst complying with the appropriate Rules of the Air that apply to the airspace concerned and any specific instructions that the ATC unit may give in relation to that particular flight operating under the general permission.
- 5.3.4.2 The requirements at sub-paragraph 5.3.1 (g) shall not apply to:
- (a) Gliders, including self-sustaining gliders and self-propelled hang gliders, and self-launching motor gliders except when flying above FL 195 outside of airspace notified as TRA(G);
 - (b) Balloons except when flying in the circumstances prescribed at paragraphs 5.3.1 (c) to 5.3.1 (f).
- 5.3.4.3 The exception at paragraph 5.3.4.1 (c) does not apply in respect of notified Mode S Enhanced Surveillance Airspace where, for safety and practical purposes, short-notice requests cannot be accommodated. This is as a result of the increased use of Mode S data in ATC Safety Net systems. In exceptional circumstances the controlling ATC Unit is to be contacted prior to departure for the specified airspace and then an exception will only be permitted at the discretion of ATC where it does not impinge on the safe operation within the airspace involved. Such short-notice exceptions will not be given to operators who require regular access to airspace in which the regulations for mandatory carriage and operation of SSR transponders apply.
- 5.3.5 **Exemptions**
- 5.3.5.1 **Mode S Enhanced Surveillance.**
- 5.3.5.1.1 **Non-Enhanced Surveillance Capable Aircraft - Temporary Exemptions.** Exemptions granted by the EUROCONTROL Exemption Coordination Cell before 31 December 2009 with respect to non-Enhanced Surveillance capable aircraft remain valid whilst the aircraft remains in the service of the operator to whom the exemption was issued. In these instances and for those airframes which have a temporary exemption granted by the CAA, the aircraft must be Mode S Elementary Surveillance compliant, as a minimum. Where the airframe is transferred to another operator, the new operator must apply to the CAA for an exemption before flight in Notified Mode S Enhanced airspace can take place.
- 5.3.5.1.1.1 No exemptions from the Mode S Enhanced Surveillance requirements will be granted for aircraft with a first certificate of airworthiness issued on or after 31 March 2012, regardless of the date of original type certification.
- 5.3.5.1.2 **Delivery and Maintenance Flights.**
- (a) Two classes of flights are affected:
 - (i) **Delivery Flights.** Direct flights for the purpose of delivery of newly manufactured aircraft:
 - (ii) **Maintenance Flights.** Direct flights by aircraft, which are not fitted with Mode S Enhanced Surveillance SSR equipment, for the purpose of maintenance and engineering at approved facilities.
 - (b) Flights operated under the provisions of these exemptions shall be equipped with ICAO Annex 10 compliant Mode S Elementary Surveillance equipment. Where the aircraft is not equipped with Mode S Elementary Surveillance equipment, the alternative exemption processes detailed below must be followed.
 - (c) Flights operated under the provisions of these exemptions must be non-revenue flights not for the purpose of public transport .
 - (d) Operators of aircraft intended to be operated under these provisions must notify CAA at least 5 working days before a flight is due to take place. CAA will then acknowledge the notification.
 - (e) A notification acknowledgement will be valid for a 3-day period from estimated departure date, and solely for the purpose for which it has been issued. If the flight is subsequently delayed beyond the maximum 3-day period a fresh notification must be submitted; this may take a further 5 working days to process. A copy of the notification acknowledgement issued by CAA must be carried on-board the aircraft.
- 5.3.5.1.3 Requests for temporary exemptions from the requirement for Mode S Enhanced Surveillance for non-compliant aircraft and delivery and maintenance flights wishing to operate within notified Mode S Enhanced Surveillance Airspace will not normally be

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

issued unless there is sufficient reason to claim that any SSR upgrade is not technically feasible or economically justifiable. All applications shall be made to:

Post: Infrastructure, Safety and Airspace Regulation Group
K6, CAA House
45-59 Kingsway
London
WC2B 6TE

Phone: +44 (0)20-7453 6536
Fax: +44 (0)20-7453 6593
Email: modes@caa.co.uk

Applications shall state details of the inability to meet the requirement, including aircraft type, registration and, where applicable, the forecast date by which installation of equipment will be complete.

- 5.3.5.2 **Exceptional Circumstance Exemptions from Mode S Elementary Surveillance.** Exemptions from the SSR transponder carriage for ELS requirements will not normally be issued. However, if it is considered that exceptional circumstances exist, an application should be made to:

Post: Infrastructure, Safety and Airspace Regulation Group
K6, CAA House
45-59 Kingsway
London
WC2B 6TE

Phone: +44 (0)20-7453 6536
Fax: +44 (0)20-7453 6593
Email: modes@caa.co.uk

Applications shall state details of the inability to meet the requirement, including aircraft type, registration and, where applicable, the forecast date by which installation of equipment will be complete. Due to the significant coordination and planning required with ATS providers, such applications must be made at least 5 days in advance of the flight.

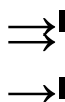
- 5.3.5.2.1 Where a non-compliant aircraft does not have an exemption as prescribed above the ATS provider is likely to refuse to provide a service within UK airspace.
- 5.3.5.3 **Transponder Failure.** Cases in respect of transponder failure are to be dealt with in accordance with the SSR Operating Procedures as promulgated in ENR 1.6.2, paragraph 4.
- 5.3.5.4 **Emergencies.** An aircraft in an emergency situation will be afforded the appropriate level of priority, which shall include implicit exemptions from the appropriate legislation for the purpose of saving life.
- 5.3.6 **Channel Islands Control Zone**
- 5.3.6.1 Requirements for the Channel Islands Control Zone are given at EGJJ AD 2.22, paragraph 1.
- 5.3.7 **State Aircraft**
- 5.3.7.1 All visiting non-compliant state aircraft require a dispensation against the AIP not to carry the required equipment as detailed at paragraph 5.3.1. All applications for dispensations to be made to:

Post: Infrastructure, Safety and Airspace Regulation Group
K6, CAA House
45-59 Kingsway
London
WC2B 6TE

Phone: +44 (0)20-7453 6536
Fax: +44 (0)20-7453 6593
Email: modes@caa.co.uk

Dispensations are only issued up to a maximum length of 3 months, after which time a new application will need to be submitted.

- 5.4 **Carriage of Airborne Collision Avoidance Systems (ACAS) in the United Kingdom FIR and UIR**
- 5.4.1 The requirements for the carriage of Airborne Collision Avoidance Systems (ACAS) are contained in Article 39(2) and Schedule 5 Scale (J) to the Air Navigation Order 2009. Traffic Alert and Collision Avoidance System (TCAS) II is accepted as a suitable ACAS system provided its installation is certificated by the State of Registry, and that its operation by flight crew is in accordance with instructions for the use of this equipment specified in their company's operations manual.
- 5.4.2 With the exception of those circumstances at paragraph 5.4.3, all turbine-powered aeroplanes with a maximum certificated take-off mass exceeding 5700 kg or authorised to carry more than 19 passengers, and all other aircraft equipped on a voluntary basis with ACAS II are to be fitted with, and operate, TCAS II software Version 7.1 with a Mode S transponder compliant with Annex 10 Mode S SARPs within UK Airspace.
- General flight procedures relating to the operation of ACAS II equipment in the United Kingdom FIR and UIR are detailed at ENR 1.1, paragraph 3, General Flight Procedures. This includes operation of aircraft when ACAS II is unserviceable.
- 5.4.3 **Exemptions**



GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

- 5.4.3.1 A General Exemption from the requirements of Article 39(2) and Schedule 5 Scale (J) to the Air Navigation Order 2009 concerning the carriage of ACAS II in UK airspace has been granted for aeroplanes operating under certain conditions. Two classes of flights are affected:
- (a) **Delivery Flights.** Aeroplanes newly manufactured within European Civil Aviation Conference (ECAC) member states, which are not fitted with ACAS II. These will be permitted to transit on direct flights only, out of the airspace of ECAC member states to regions where the carriage and operation of ACAS II is not required.
 - (b) **Maintenance Flights.** Direct flights by aeroplanes, which are not fitted with ACAS II, from outside ECAC member states, for the purpose of maintenance and engineering at facilities located within the ECAC member states.
- 5.4.3.2 Following notification approval of an ACAS II exemption for the flight, the aircraft operator should indicate on the Flight Plan that the flight is being operated under the provisions of the ACAS II Delivery and Maintenance Flight Exemption provisions, by inserting, in Field 18, the information:
- 'RMK / Delivery flight - ACAS II exemption approved', or
'RMK / Maintenance flight - ACAS II exemption approved'.
- 5.4.3.3 Flights operated under the provisions of these exemptions must be non-revenue flights. An ACAS II delivery or maintenance flight exemption is not available for those flights seeking only to transit through the airspace of ECAC member states.
- 5.4.3.4 The following conditions apply:
- (a) Where agreed Regulations and Procedures exist, these shall be maintained.
 - (b) An ICAO compliant altitude reporting transponder must be fitted and serviceable **before** departure.
 - (c) An ACAS II exemption approval will be valid for a 3-day period from estimated departure date, and solely for the purpose for which it has been issued. If the flight is subsequently delayed beyond the maximum 3-day exemption period a fresh application must be submitted; this may take a further 3 working days to process.
 - (d) An ACAS II Exemption Letter issued by the ASU, must be carried on-board the aircraft.
 - (e) Conditions may be imposed by one or more ECAC Member States: such as operating within certain restrictive hours, or via specific routes, or at stated flight levels (for safety reasons or otherwise).
 - (f) The flight must be conducted along the most direct (or permissible) route to the delivery or maintenance destination airport.
- Aircraft operators are to ensure compliance with the above conditions and that the exempted flight is in accordance with the operator's originally stated intentions, and that it must comply with any conditions laid down by the CAA and subsequently by the ATC authorities.
- 5.4.3.5 In addition, test flights are to be subject to established national regulations, procedures and authorisation. Carriage of ACAS II equipment will be addressed under the current provisions for avionics equipment required for these flights.
- 5.4.3.6 Operators of aeroplanes intended to be operated under the provisions of these exemptions must apply for an exemption on an individual, case-by-case basis, to the CAA at least 5 working days before a flight is due to depart for or from, or transit through, the UK FIRs.
- ← 5.4.3.7 A General Exemption from the requirements of Article 39(2) and Schedule 5 Scale (J) to the Air Navigation Order 2009 concerning the carriage of ACAS II in UK airspace has been granted for turbine-powered historical and ex-military aeroplanes into which it is recognized as being technically unfeasible to incorporate ACAS II. The exemption applies to aeroplanes which fall within the provisions of Annex II to the EC Regulation (EC) No. 216/2008 namely:
- (a) historic non-complex aircraft for which:
 - (i) initial design was established before 1 January 1955, and
 - (ii) production has been stopped before 1 January 1975;
 - (b) aircraft having a clear historical relevance, related to:
 - (i) participation in a noteworthy historic event; or
 - (ii) a major step in the development of aviation; or
 - (iii) a major role played in the armed forces of a Member State;
 - (c) aircraft that have been in the service of military forces, unless the aircraft is of a type for which a design standard has been adopted by the Agency;
 - (d) replicas of (a), (b) or (c).
- 5.4.3.8 This exemption is automatically invoked by the inclusion of **'RMK / Historic Aircraft - ACAS II exemption approved'** in Field 18 of the ICAO Flight Plan Form (CA48). No further exemption application action is required.
- 5.4.3.9 Owners and operators of historical and ex-military aeroplanes intended to be operated under the provisions of this exemption must seek approval for flights through the airspace of other ECAC member states from the appropriate State authorities.
- 5.4.3.10 Operators of aeroplanes that meet the carriage requirements at paragraph 5.4.2 but are not equipped and cannot be operated under the provisions of the General Exemptions described at paragraphs 5.4.3.1 and 5.4.3.7 must apply for exemptions on an

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

individual, case-by-case basis to the CAA at least 5 working days before a flight is due to depart for or from, or transit through, the UK FIRs.

- 5.4.3.11 Owners and operators of aeroplanes intended to be operated under the provisions of these exemptions must seek approval for flights through the airspace of other ECAC member states from the appropriate State authorities.

5.4.4 Departure from Air Traffic Control Clearances

- 5.4.4.1 The legal aspects of departure from an air traffic control clearance in compliance with a TCAS Resolution Advisory are clarified in AIC P 079/2011.

5.4.5 TCAS I

- 5.4.5.1 TCAS I is an airborne collision avoidance system that utilises interrogations of, and replies from, airborne radar transponders to alert pilots to close proximity traffic. Unlike TCAS II it does not generate 'Resolution Advisory' (RA) warnings. TCAS I is not intended for ICAO International implementation and standardisation and is not mandated for equipage.

5.4.6 ACAS Systems Approvals

- 5.4.6.1 Any ACAS system that operates by interrogating transponders using the 1030 and 1090 MHz frequencies must be approved to transmit by the National IFF/SSR Committee (NISC) to operate in UK airspace.

- 5.4.6.2 All TCAS II interrogators and certain TCAS I interrogators are covered by a series of generic NISC approvals to transmit. Operators of other TCAS I interrogators must apply to the NISC for approval on an individual basis.

- 5.4.6.3 A list of interrogators holding generic approvals, as well as the approval process for other TCAS interrogators is available in CAP 761 and at <http://www.caa.co.uk/iffssr>.

5.4.7 Further Information, Advice and Exemptions

- 5.4.7.1 Further information and advice concerning the carriage and operation of ACAS II equipment in UK airspace (and exemptions from these) can be obtained from:

Post: Head of Airspace Regulation
Directorate of Airspace Policy
CAA House
45-59 Kingsway
London
WC2B 6TE

Phone: +(0)20-7453 6510

Fax: +(0)20-7453 6565

Email: airspace@caa.co.uk

5.5 8.33 kHz Channel Spacing in the VHF Radio Communications Band

- 5.5.1 As required by ICAO Regional Supplementary Procedures DOC 7030/4 EUR/RAC-4 and in line with Recommendation 05/6 of the EUROCONTROL Permanent Commission, the carriage and operation of 8.33 kHz spacing radio equipment is mandatory throughout the ICAO EUR Region for flights above FL 195, or in classes of airspace A, B and C, except for flights operating between FL 195 and FL 245 outside of controlled airspace within the UK FIR.

- 5.5.2 Non-equipped flights which are flight planned to enter any FIR/UIR in the EUR Region where no exemptions have been published, except for those applicable to UHF equipped State flights (refer to AIP/Supplement of the State covering the FIR/UIR concerned), must flight plan to operate below FL 195, or outside Class A, B and C Airspace. Within the UK FIR non-equipped flights must flight plan to operate below FL 195 in controlled airspace, or outside Class A, B and C Airspace, or below FL 245 outside controlled airspace.

5.5.3 8.33 kHz Exemptions

- 5.5.3.1 With the exception of State aircraft, there are no exemptions.

5.5.4 State Aircraft

- 5.5.4.1 Those State aircraft which are infrequent users of the FIR/UIR are permanently exempted from the above carriage requirements, provided that they are capable of communicating 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.

- 5.5.4.2 Provision for State aircraft exempted from the carriage of 8.33 kHz channel spaced communications equipment will be made on a tactical basis through the provision of an alternative UHF/VHF channel, the details of which will be given at time of use.

5.6 Use of GPS for North Sea Operations

- 5.6.1 UK AOC Holders intending to use GPS for en-route navigation for North Sea flight operations are to use GPS equipment that meets or exceeds CAA Specification 22. AOC holders requiring further information should contact their assigned flight operations Inspector. Non UK AOC holders are recommended to operate to at least the CAA Specification 22 standard.

5.7 Controller-Pilot Data Link Communication Service in UK Domestic Airspace

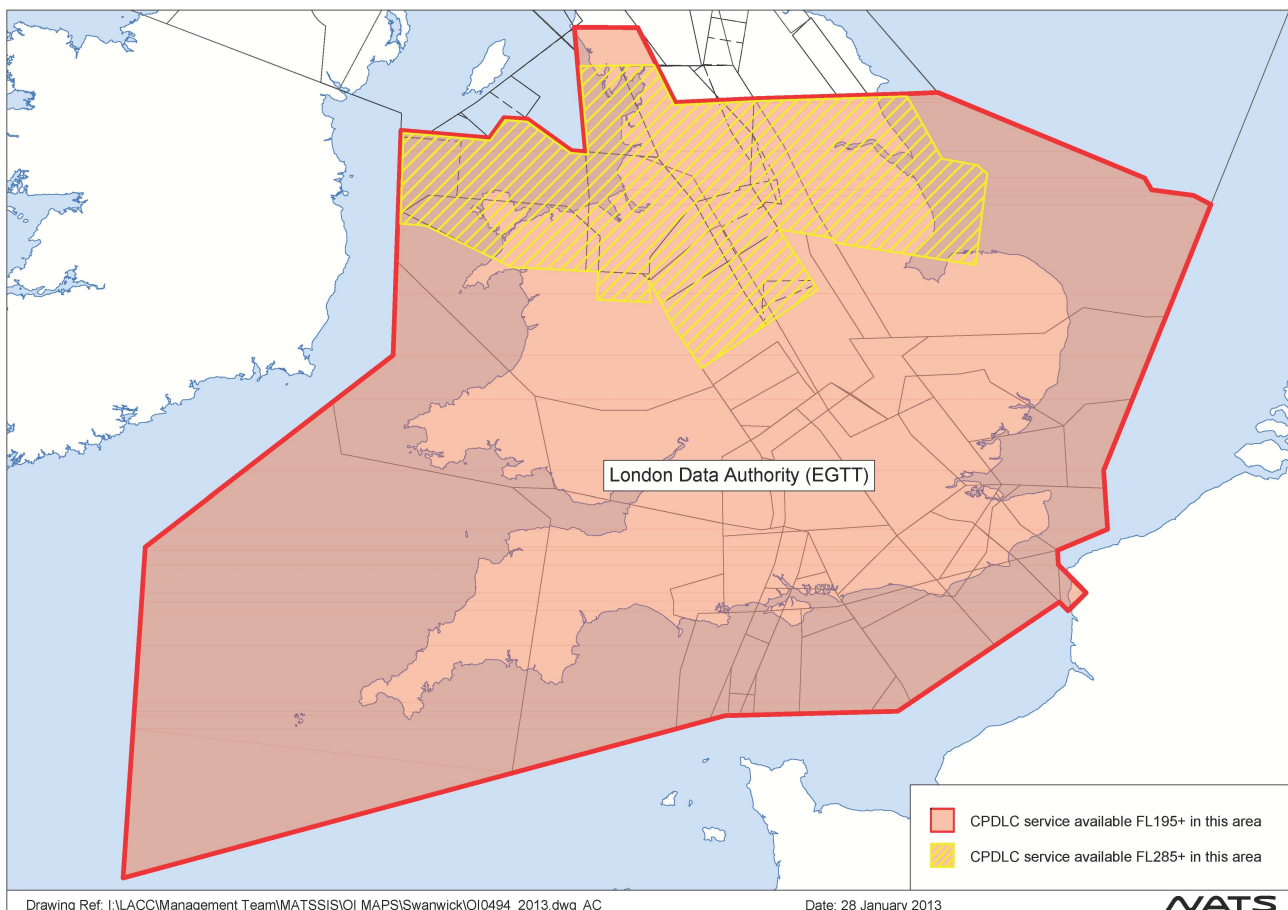
5.7.1 Introduction

- 5.7.1.1 Controller-pilot data link communication (CPDLC) provides a means of communication between the controller and pilot, using data link for ATC communication. This application includes a set of clearance/information/request message elements which

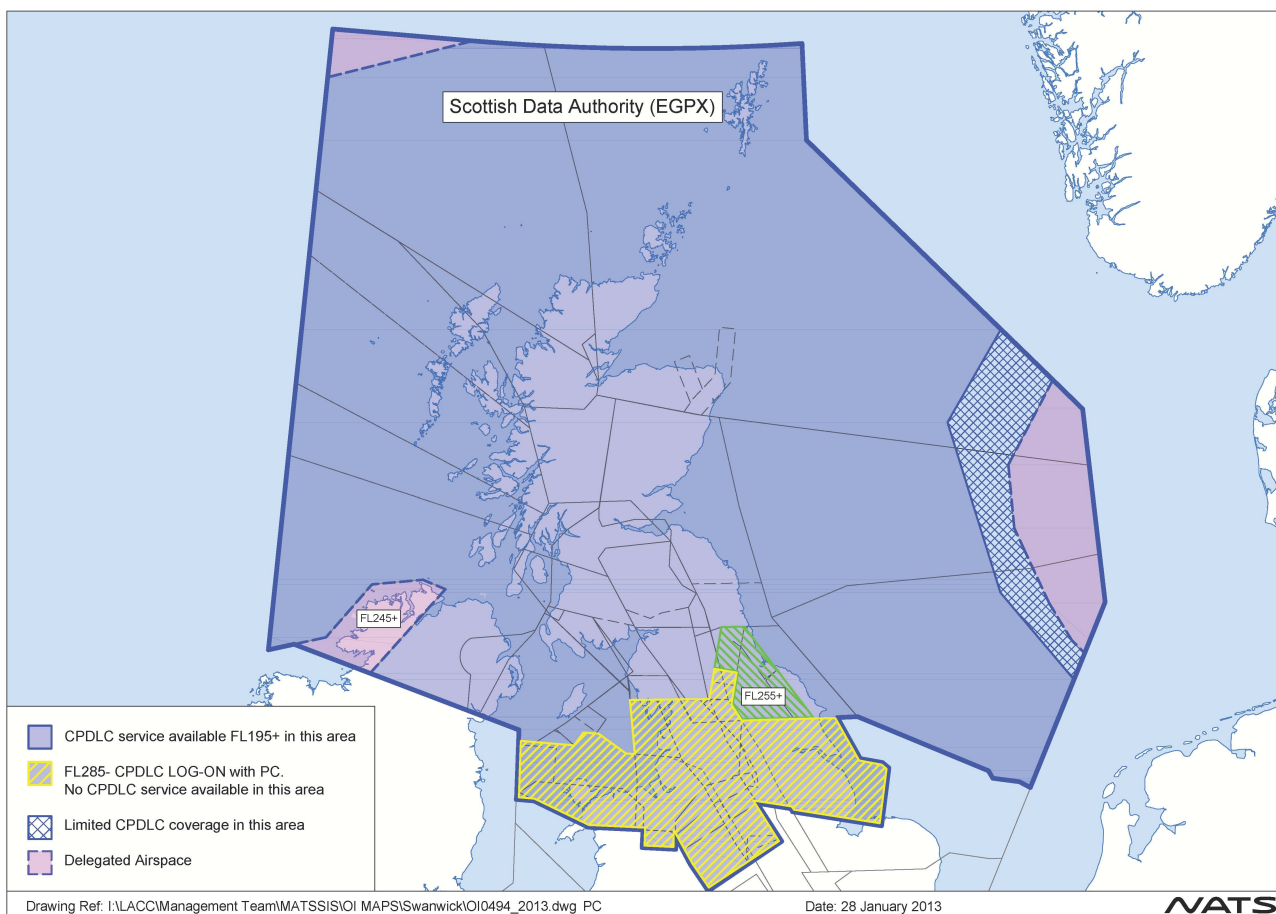
GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

corresponds to the phraseologies used in the radiotelephony environment. Standard voice radiotelephony will remain the primary means of ATC communications at all times. Any failure event concerning CPDLC will lead to a reversion to voice operation.

- 5.7.1.2 CPDLC services are available in domestic airspace and are distinct from Oceanic CPDLC procedures.
- 5.7.1.3 CPDLC services are available from FL 285 and above and will be provided at FL 195 and above where possible within the London and Scottish FIR/UIR. The following CPDLC services are provided in this airspace:
- DLIC (data link initiation capability)
 - ACL (ATC clearances and instructions)
 - ACM (ATC communications management)
 - AMC (ATC microphone check)
- 5.7.1.4 Provision of CPDLC services in the UK is based on the requirements of the COMMISSION REGULATION (EC) No. 29/2009. A CPDLC service is provided to ATN VDL 2, FANS1/A and FANS1/A+ equipped aircraft.
- 5.7.2 **Area of Applicability**
- Flight Crews should refer to the map of NATS CPDLC Data Authorities (see figures below).
- 5.7.2.1 **Aircraft Transiting Manchester and London TMAs**
- 5.7.2.1.1 Aircraft transiting the **Manchester** TMA from **London** TMA below FL285 will maintain a logon with EGPX but will not receive CPDLC service. Upon entering airspace where a logon is maintained but CPDLC is not available, the flight will be notified via CPDLC. The specific messages are detailed in the current AIC.



GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)



5.7.3 Requirements

In all CPDLC communications, the highest standard of discipline shall be observed at all times (Ref. ICAO Annex 10, Vol. II).

The use of CPDLC is not mandatory and is conducted at the discretion of ATC and the pilots concerned. Where urgent or time critical communications are required voice shall be used. Voice read-back is not required for any CPDLC instruction. In cases where uncertainty arises as a result of a data link message, communication shall revert to voice.

5.7.3.1 Flight Plan

5.7.3.1.1 In order to use the CPDLC services, pilots shall file the respective equipment in their flight plan in accordance with Flight Plan 2012 J codes. A CPDLC service will be available to operators that have filed J1: CPDLC ATN VDL Mode 2; or J3: CPDLC FANS 1/A VDL Mode A; or J4: CPDLC FANS 1/A VDL Mode 2. More details are available in the current AIC.

5.7.3.1.2 For flights granted a CPDLC exemption, the indicator DAT/CPDLCX shall be included in Item 18 of the flight plan.

5.7.3.2 Establishing a CPDLC connection

5.7.3.2.1 Establishment of a CPDLC connection through the initiation of a logon is a pre requisite for receiving CPDLC service. Prior to initiating the logon, the flight crew should verify the correctness of the logon information associated with the flight plan.

5.7.3.2.2 A CPDLC service is only established when all the required logon parameters match those contained in the ICAO flight plan:

For an ATN LOGON:

- Mode-S Aircraft-ID i.e. ICAO [Flight plan item 7] callsign
- Aircraft ID – 24bit address
- ICAO Flight plan Departure and destination airfields (not IATA codes)

For a FANS LOGON:

- Mode-S Aircraft-ID i.e. ICAO [Flight plan item 7] callsign
- Aircraft registration
- ICAO Flight plan Departure and destination airfields (not IATA codes)

5.7.3.2.3 To resolve any discrepancies, airlines will need to contact the relevant ATC data authority using the email address specified in the current AIC.

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS (continued)

5.7.3.2.4 For Dual Stacked operators equipped with both FANS 1/A or FANS 1/A + and ATN VDL 2 as separate systems the preferred mode of operation is ATN VDL 2.

5.7.3.2.5 If there is an indication that the logon procedure was unsuccessful, the flight crew should confirm that the logon information above is correct and retry a logon. If on a second attempt connection is still not successful, revert to voice.

5.7.3.3 Current Data Authority (CDA) / Next data Authority (NDA) Confirmation

5.7.3.3.1 Aircraft entering the Scottish or London Data Authority for the first time will receive a welcome message to establish CDA. The welcome message will be an uplink UM183 (with ATSU facility designator) to all CPDLC equipped aircraft. Aircraft must respond to this message for CDA to be established.

5.7.3.3.2 For more information on this process, refer to PANS ATM section 14, the ICAO GOLD version 2.0, or Eurocontrol guidance material for ATC and Flight Crews V6.0.

5.7.4 Procedures

5.7.4.1 Logon for transiting aircraft

5.7.4.1.1 The Data Authority address for London ACC is EGTT. The Data Authority address for Scottish ACC is EGPX.

5.7.4.1.2 CPDLC log on shall be established in sufficient time to ensure that the aircraft is communicating with the appropriate Data Authority. The following guidance criteria provided by GOLD is applicable to UK airspace.

Logon Timing Condition(s)	When	Logon Address of Data Authority
15 minutes or more prior to boundary estimate	When operating above FL 100	Current Data Authority for the airspace in which the aircraft is operating
Less than 15 minutes prior to boundary estimate	When operating above FL 100	Next Data Authority that provides CPDLC and/or ADS C services on that flight
Following an unsuccessful data link transfer to another ATSU	When detected by the flight crew or upon receipt of instruction from ATC	As instructed or per above

5.7.4.1.3 For flights departing aerodromes in the United Kingdom logon may also be conducted by aircraft on the ground where coverage exists.

5.7.4.1.4 Flight crews departing certain UK Airports, for example Manchester, will require additional guidance relating to initial log on addresses based on the direction of flight, which is available in the current AIC.

5.7.4.1.5 Flights transiting both London and Scottish ACC using CPDLC, the change of CDA to NDA will be initiated by the controller and will be automatically transferred seamlessly to the operator. The flight crew should not need to reinitiate a logon. The current and next data authority is notified to the aircrew by viewing the ACTIVE CENTRE and NEXT.

5.7.4.1.6 When entering the next ATSU's airspace, the flight crew should confirm the successful transfer from the Current Data Authority to the Next Data Authority by observing the change in the active centre indication provided by the aircraft system. Crews should be aware that they need to keep the CDA and the frequency aligned. THEY MUST NOT RESPOND TO UPLINK MESSAGES FROM A UNIT THAT THEY ARE NOT IN VOICE COMMUNICATION WITH.

5.7.4.2 Log-off

5.7.4.2.1 Flights leaving London or Scottish CDA to a non-CPDLC capable airspace will receive an 'End of Service' message and will be logged off automatically.

5.7.4.3 Data link failure

5.7.4.3.1 When the CDA detects a CPDLC failure, the controller will contact the aircraft using voice, inform the crew 'Disregard CPDLC [message type] message, break, [correct clearance or instruction]'. CREWS ARE REQUESTED TO RESPOND UNABLE IF THE MESSAGE REMAINS UNANSWERED. This closes the message dialogue and ensures that messages do not trigger time out alerts.

5.7.4.3.2 Due to safety concerns, there is a requirement for all FANS aircraft, following an uplink message timeout alert to disconnect from the CPDLC ground system. Controllers may instruct crews to disconnect via CPDLC using phraseology described in the current AIC.

'Disconnect CPDLC and revert to voice'

5.7.5 CPDLC message sets

5.7.5.1 Currently there are two sets of messages being used:

- to support FANS 1/A equipped aircraft:
Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard, RTCA DO-306/EUROCAE ED-122).
- and to support ATN VDL 2 equipped aircraft:
Safety and Performance Standard for Air Traffic Data Link Services in Continental Airspace (Continental SPR Standard, RTCA DO-290/EUROCAE ED-120).

5.7.5.2 Messages supported by CPDLC in UK airspace are published in the corresponding AIC.