Surveillance Performance Interoperability

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List of Revisions

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Disclaimer

This version is published by the Civil Aviation Authority in order to provide a consolidated and sequential presentation of current regulations with the related acceptable means of compliance (AMC) and guidance material (GM), as well as certification specifications (CS) as appropriate.

It has been prepared by combining the UK Government published regulations with the adopted AMC, GM and CS, made and issued by CAA under Official Records Series 9 decisions in accordance with Article 76 of the UK Basic Regulation.

There may be a period of time between the regulations and AMC, GM and CS being updated and the amendment to this consolidated version. Users must bear in mind that this is an unofficial version of the legislation, AMC, GM and CS. The authoritative versions (which Courts of Law will refer to) are:

(i) the King's Printer's Edition of Statutory Instruments available at www.legislation.gov.uk; and

(ii) Official Record Series 9 decisions published by the CAA available at https://publicapps.caa.co.uk/.

Note from the Editor

The content of this document is arranged as follows: the cover regulation (recitals and articles) of the implementing rule (IR) appear first, then the IR annex points, followed by the related acceptable means of compliance (AMC) and guidance material (GM) paragraph(s).

In case of certification specifications (CS), a CS paragraph is followed by the related AMC paragraph.

All references to EU Regulations referenced in this text are to be read as the UK law bearing that title or number, being EU retained law as retained (and amended by UK domestic law) pursuant to the European Union (Withdrawal) Act 2018

All elements (i.e. cover regulation, IRs, CS, AMC and GM) are colour-coded and can be identified according to the illustration below.

Cover Regulation

Implementing Rule

Certification Specification

Acceptable Means of Compliance

Guidance Material

An ellipsis in square brackets [...] indicates that text has been intentionally left out, such as the result of an earlier amendment to the regulation, AMC, GM or CS.

Note that the Regulations text may refer to the 'old', repealed, Basic Regulation legislation reference (Regulation (EC) 216/2008) rather than 2018/1139. The law specified in UK Regulation (EU) 2018/1139 is in force but the update to references to the old Basic Regulation in other regulations requires legislation to be passed by Parliament. This is proposed to be addressed by the Retained EU Law (Revocation and Reform) Bill that is being progressed through Parliament.

You can copy and use this text but please ensure you always use the most up to date version and use it in context so as not to be misleading, and credit the CAA.

Performance and the Interoperability of Surveillance

UK Regulation (EU) No. 1207/2011

Preamble

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EC) No 552/2004 of the European Parliament and of the Council of 10 March 2004 on the interoperability of the European Air Traffic Management network (the interoperability Regulation), and in particular Article 3(5) thereof,

Whereas:

(1) The Commission has issued a mandate to Eurocontrol in accordance with Article 8(1) of Regulation (EC) No 549/2004 of the European Parliament and the Council of 10 March 2004 laying down the framework for the creation of the single European sky (the framework Regulation) to develop requirements for the performance and the interoperability of surveillance within the European air traffic management network (EATMN). This Regulation is based on the resulting mandate report of 9 July 2010.

(2) Seamless operations are dependent on the coherence of the minimum requirements for the separation of aircraft applied within the airspace of the single European sky.

(3) In order to ensure interoperability, common principles should be applied when surveillance data are exchanged between systems. In addition, minimal capabilities and performance applicable to airborne constituents of surveillance systems should be identified.

(4) The capabilities of the airborne constituents of surveillance systems should give the flexibility to the air navigation service providers to choose the most appropriate ground based surveillance solutions for their particular environments.

(5) The implementation of this Regulation should be without prejudice to the deployment of other surveillance applications and technologies bringing benefits in specific environments.

(6) Operators need sufficient notice to equip new aircraft and existing fleets with new capabilities. This should be taken into account when defining dates for mandatory equipage.

(7) Criteria for possible exemptions, based in particular on economic or compelling technical consideration, should be identified allowing operators exceptionally not to equip specific types of aircraft with some of the required capabilities. Appropriate procedures should be established to allow the Commission to take decisions in this respect.

(8) The 24-bit ICAO aircraft address should be assigned and operated in compliance with the International Civil Aviation Organisation (ICAO) requirements in order to ensure the interoperability of the air and ground surveillance systems.

(9) The foundation established through the implementation of ADS-B 'Out' capabilities by aircraft operators should enable the deployment of ground applications and should also facilitate the deployment of future airborne applications.

(10) The EATMN systems should support the implementation of advanced, agreed and validated concepts of operation for all phases of flight, in particular as envisaged in the ATM Master Plan for the development of the new generation European air traffic management system (SESAR).

(11) The performance of the systems within the scope of this Regulation and of their constituents should be regularly assessed taking into account the local environment in which they operate.

(12) The uniform application of specific procedures within the airspace of the single European sky is critical for the achievement of interoperability and seamless operations.

(13) Spectrum used by surveillance systems should be protected to prevent harmful interferences. Member States should take the necessary measures in this respect.

(14) This Regulation should not cover military operations and training as referred in Article 1(2) of Regulation (EC) No 549/2004.

(15) With a view to maintaining or enhancing existing safety levels of operations, Member States should be required to ensure that the parties concerned carry out a safety assessment including hazard identification, risk assessment and mitigation processes. Harmonised implementation of these processes to the systems covered by this Regulation requires the identification of specific safety requirements for all interoperability and performance requirements.

(16) In accordance with Regulation (EC) No 552/2004, implementing rules for interoperability should describe the specific conformity assessment procedures to be used to assess either the conformity or the suitability for use of constituents as well as the verification of systems.

(17) In the case of air traffic services provided primarily to aircraft flying as general air traffic under military supervision, procurement constraints could prevent compliance with this Regulation.

(18) The measures provided for in this Regulation are in accordance with the opinion of the Single Sky Committee,

HAS ADOPTED THIS REGULATION:

Article 1 Subject matter

This Regulation lays down requirements on the systems contributing to the provision of surveillance data, their constituents and associated procedures in order to ensure the harmonisation of performance, the interoperability and the efficiency of these systems of the United Kingdom Air Traffic Management System (UK ATMS) in relation to the European air traffic management network (EATMN) and for the purpose of civil-military coordination.

Article 2 Scope

1. This Regulation shall apply to the surveillance chain constituted of:

(a) airborne surveillance systems, their constituents and associated procedures;

(b) ground- based surveillance systems, their constituents and associated procedures; (c) surveillance data processing systems, their constituents and associated procedures; (d) ground-to-ground communications systems used for distribution of surveillance data, their constituents and associated procedures.

2. This Regulation shall apply to all flights operating as general air traffic in accordance with instrument flight rules within the airspace provided for in Article 1(3) of Regulation (EC) No 551/2004 of the European Parliament and of the Council with the exception of Article 7(3) and 7(4) which shall apply to all flights operating as general air traffic

3. This Regulation shall apply to air traffic service providers which provide air traffic control services based on surveillance data, and to communication, navigation or surveillance service providers which operate systems laid down in paragraph 1.

Article 3 Definitions

For the purpose of this Regulation, the definitions in Article 2 of Regulation (EC) No 549/2004 shall apply.

The following definitions shall also apply:

(1) ‘surveillance data’ means any data item, time stamped or not, within the surveillance system that pertains to:

(a) aircraft 2D position;

(b) aircraft vertical position;

(c) aircraft attitude;

(d) aircraft identity;

(e) 24-bit ICAO aircraft address;

(f) aircraft intent;

(g) aircraft velocity;

(h) aircraft acceleration;

(2) ‘operator’ means a person, organisation or enterprise engaged in or offering to engage in an aircraft operation;

(3) ‘ADS- B’ means automatic dependent surveillance — broadcast, a surveillance technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and position-fixing systems;

(4) ‘ADS-B Out’ means the provision of ADS-B surveillance data from an aircraft transmit perspective;

(5) ‘harmful interference’ means interference that prevents the achievement of the performance requirements;

(6) ‘surveillance chain’ means a system composed of the aggregation of airborne and ground-based constituents used to determine the respective surveillance data items of aircraft, including the surveillance data processing system, if deployed;

(7) ‘cooperative surveillance chain’ means a surveillance chain requiring both ground and airborne components to determine surveillance data items;

(8) 'surveillance data processing system' means a system that processes all surveillance inputs received to form a best estimate of the current aircraft surveillance data;

(9) 'aircraft identification' means a group of letters, figures or a combination thereof which is either identical to, or the coded equivalent of, the aircraft call sign to be used in air-to-ground communications, and which is used to identify the aircraft in ground-to-ground air traffic services communications;

(10) 'State aircraft' means any aircraft used for military, customs and police purposes;

(11) 'transport type State aircraft' means fixed wing State aircraft that are designed for the purpose of transporting persons and/or cargo;

(12) 'extrapolate' means to project, predict or extend known data based upon values within an already observed time interval;

(13) 'coasted' means extrapolated for a period longer than the ground surveillance systems update period;

(14) 'time of applicability' means the time at which the data item has been measured by the surveillance chain or the time for which it has been calculated by the surveillance chain;

(15) 'accuracy' means the degree of conformity of the provided value of a data item with its actual value at the time when the data item is output from the surveillance chain;

(16) 'availability' means the degree to which a system or component is operational and accessible when required for use;

(17) 'integrity' means the degree of undetected (at system level) non-conformity of the input value of the data item with its output value;

(18) 'continuity' means the probability that a system will perform its required function without unscheduled interruption, assuming that the system is available at the initiation of the intended operation;

(19) 'timeliness' means the difference between the time of output of a data item and the time of applicability of that data item.

Article 4 Performance requirements

1. Air navigation service providers shall ensure seamless operations within the airspace under their responsibility and at the boundary with adjacent airspaces by applying appropriate minimum requirements for the separation of aircraft.

2. Air navigation service providers shall ensure that systems referred to in points (b), (c) and (d) of Article 2(1) are deployed as necessary to support the minimum requirements for the separation of aircraft applied in accordance with paragraph 1.

3. Air navigation service providers shall ensure that the output of the surveillance chain referred to in Article 2(1) complies with the performance requirements set out in Annex I provided that the airborne constituent functions used are compliant with the requirements set out in Annex II.

4. Provision repealed before document was retained.

AMC1 Article 4 Performance requirements

ORS9 Decision No.1

SEAMLESS OPERATIONS

In order to ensure seamless operations at the boundary of their airspace, air navigation service provider should apply 5 NM horizontal separation minimum or 3 NM horizontal separation minima at the boundary with high density airspace.

The nominal performance of the surveillance system that supports the applicable separation minima should be in accordance with EUROCONTROL-SPEC-147.s

GM1 Article 4 Performance requirements

CAA ORS9 Decision No.1

SEAMLESS OPERATIONS

Information and guidance for air navigation service providers (ANSPs) on how to establish the applicable separation minima can be found in the following ICAO documents:

— Doc 9689-AN/953 ‘Manual on Airspace Planning Methodology for the Determination of

Separation Minima’, 1st edition incorporating Amendment 1, 1998; and

— Doc 9426-AN/924 ‘Air Traffic Services Planning Manual’, in particular Section 2, 1st (provisional)

edition incorporating Amendment 4, 1984.

Article 5 Interoperability requirements

1. Air navigation service providers shall ensure that all surveillance data transferred from their systems identified in points (b) and (c) of Article 2(1) to other navigation service providers complies with the requirements set out in Annex III.

2. Air navigation service providers when transferring surveillance data from their systems identified in points (b) and (c) of Article 2(1) to other air navigation service providers, shall establish formal arrangements with them for the exchange of the data in accordance with the requirements set out in Annex IV.

3. Air navigation service providers shall ensure that, by 2 January 2020 at the latest, the cooperative surveillance chain has the necessary capability to allow them to establish individual aircraft identification using downlinked aircraft identification made available by aircraft equipped in accordance with Annex II.

4. Provision repealed before document was retained.

5. By 7 December 2020 operators shall ensure that:

(a) aircraft operating flights referred to in Article 2(2) are equipped with serviceable secondary surveillance radar transponders that comply with the following conditions:

(i) they have the capabilities set out in Part A of Annex II;

(ii) they have the continuity sufficient to avoid presenting an operational risk;

(b) aircraft with a maximum certified take-off mass exceeding 5700 kg or having a maximum cruising true airspeed capability greater than 250 knots, operating flights referred to in Article 2(2), with an individual certificate of airworthiness first issued on or after 7 June 1995, are equipped with serviceable secondary surveillance radar transponders that comply with the following conditions:

(i) they have the capabilities set out in Parts A and B of Annex II;

(ii) they have the continuity sufficient to avoid presenting an operational risk;

(c) fixed wing aircraft with a maximum certified take-off mass exceeding 5700 kg or having a maximum cruising true airspeed capability greater than 250 knots, operating flights referred to in Article 2 (2), with an individual certificate of airworthiness first issued on or after 7 June 1995, are equipped with serviceable secondary surveillance radar transponders that comply with the following conditions:

(i) they have the capabilities set out in Parts A, B and C of Annex II;

(ii) they have the continuity sufficient to avoid presenting an operational risk.

Points (b) and (c) of the first subparagraph shall not apply to aircraft that operate within the airspace provided for in Article 1(3) of Regulation (EC) No 551/2004 of the European Parliament and of the Council and that belong to one of the following categories:

(i) they are being flown to undergo maintenance;

(ii) they are being flown for export;

(iii) their operations will be ceased by 31 October 2025.

Operators of aircraft with a first certificate of airworthiness issued before 7 December 2020 shall comply by 7 June 2023 with the requirements set out in points (b) and (c) of the first subparagraph, subject to the following conditions:

(i) they have established before 7 December 2020 a retrofit programme demonstrating compliance with points (b) and (c) of the first subparagraph;

(ii) those aircraft have not benefitted from any Union funding granted to bring such aircraft in compliance with the requirements set out in points (b) and (c) of the first sub-paragraph.

For aircraft where the capability of the transponders to comply with the requirements of points (b) and (c) of the first sub- paragraph is temporarily inoperative, operators shall be entitled to operate that aircraft in the airspace provided for in Article 1(3) of Regulation (EC) No 551/2004 of the European Parliament and of the Council for a maximum of 3 consecutive days.

6. Operators shall ensure that aircraft equipped in accordance with paragraph 5 and having a maximum certified take-off mass exceeding 5700 kg or having a maximum cruising true airspeed capability greater than 250 knots, operate with antenna diversity, with a minimum performance as prescribed in paragraph 3.1.2.10.4 of Annex 10 to the Chicago Convention, Volume IV, Third Edition, including all amendments up to No 77.

7. Provision repealed before document was retained.

8. Air navigation service providers shall ensure that, before putting into service the systems referred to in points (b), (c) and (d) of Article 2(1), they are implementing the most efficient deployment solutions taking into account the local operating environments, constraints and needs as well as airspace users capabilities.

AMC1 Article 5 Interoperability requirements

CAA ORS9 Decision No. 1

TRANSFER OF SURVEILLANCE DATA

When transferring surveillance data to other air navigation service providers (ANSPs), ANSPs should use the ASTERIX data format as specified in Part 1 of EUROCONTROL-SPEC-0149 on the basis of the appropriate ASTERIX Data Categories.

Note: Further information on the use of the ASTERIX data format as well as the list of available ASTERIX Data Categories and their respective specifications can be found at https://www.eurocontrol.int/asterix.

AMC2 Article 5 Interoperability requirements

CAA ORS9 Decision No. 1

SECONDARY SURVEILLANCE RADAR TRANSPONDERS

With regard to the requirements for secondary surveillance radar transponders, aircraft operators that are subject to UK Regulation (EU) No 965/2012 should ensure that their aircraft comply with the UK Certification Specifications for Airborne Communications, Navigation and Surveillance (CS- ACNS), Subpart D — Surveillance (SUR), and particularly:

— Section 2 ‘Mode S elementary surveillance (ELS)’;

— Section 3 ‘Mode S Enhanced Surveillance (EHS)’; and

— Section 4 ‘1090 MHz Extended Squitter ADS-B (ADSB), as applicable.

Aircraft that only require the ELS capability and were certified according to JAA TGL 13, Revision 1, or installations that comply with CS-STAN, CS-SC002b (or later versions), are considered an acceptable alternative to compliance with CS-ACNS.

Third-country-operator (TCO) aircraft that operate within the Single European Sky (SES) airspace should comply with national requirements equivalent to the requirements of CS-ACNS, Subpart D, Sections 2, 3, and 4, as applicable.

AMC3 Article 5 Interoperability requirements

CAA ORS9 Decision No. 1

TRANSITIONAL ARRANGEMENTS

Operators of aircraft whose certificate of airworthiness (CofA) was first issued before 7 December 2020 and their aircraft cannot be equipped with secondary surveillance radar transponders that have Mode S EHS and/or ADS-B capabilities by 7 December 2020, may defer the required modification until 7 June 2023. To defer the modification, aircraft operators should comply with both of the following conditions:

— demonstrate, by means of a retrofit plan, full commitment to achieving compliance by 7 June 2023; and

— have not received European Union funding to retrofit their aircraft with Mode S EHS and/or ADS-B capabilities as required by Article 5 of UK Regulation (EU) No 1207/2011.

The retrofit plan should contain installation dates for all affected aircraft, including the necessary supporting documentation to show that the planned installation dates are viable. The supporting documentation should include:

— the required engineering documentation;

— the contractual agreements and delivery schedules for the applicable equipment; and

— the contractual agreements with maintenance organisations for the installation.

For operators of aircraft for which no approved engineering documentation that meets the requirements of CS-ACNS is available on the market prior to 7 December 2020, the retrofit plan may consist of a plan to identify and establish the appropriate engineering documentation and contractual agreements to have the required equipment installed on the affected aircraft and approved by 7 June 2023.

As the retrofit plan requires supporting evidence that demonstrates the aircraft operators' firm commitment, amendments to such a plan should not be necessary. However, in principle, duly justified amendments to the plan may be possible if the completion of the installation prior to 7 June 2023 is evident in the revised supporting documentation, such as a revised contractual arrangement with avionics suppliers and maintenance organisations.

To benefit from the transitional arrangements, aircraft operators are not formally required to submit the retrofit plans to their competent authority or to any other entity. Aircraft operators should have such a plan in place prior to 7 December 2020 and make it available upon request to their competent authority.

Aircraft operators that have received European Union funding to retrofit specific aircraft, should complete the installation of the required systems prior to 7 December 2020. However, if aircraft operators wish to benefit from the transitional arrangements until 7 June 2023, they should return that funding to the European Union prior to 7 December 2020. Furthermore, those aircraft operators should fulfil the conditions for the establishment of a retrofit plan.

GM1 Article 5 Interoperability requirements

CAA ORS9 Decision No. 1

CONTINUITY OF SECONDARY SURVEILLANCE RADAR TRANSPONDERS

The continuity requirement for secondary surveillance radar transponders ('they have the continuity sufficient to avoid presenting an operational risk', as stated in Article 5 of UK Regulation (EU) No 1207/2011) states that such equipment should function without unscheduled interruption so as not to pose a hazard to other airspace users. The required continuity to ensure continued operation of that equipment in the airspace is established by CS-ACNS. Continuity figures that are less stringent than those specified in CS-ACNS for Mode S ELS and/or ADS-B may be acceptable. Typically, continuity figures not exceeding 2×10^{-4} per flight hour may be acceptable.

GM2 Article 5 Interoperability requirements

CAA ORS9 Decision No. 1

COOPERATIVE SURVEILLANCE CHAIN

UK Regulation (EU) No 1206/2011 sets out the application and use of the individual aircraft identification capability and requires air navigation service providers (ANSPs) to ensure that the cooperative surveillance chain has the necessary capability to allow them to establish individual aircraft identification using the downlinked aircraft identification feature.

GM3 Article 5 Interoperability requirements

CAA ORS9 Decision No. 1

SERVICEABLE SECONDARY SURVEILLANCE RADAR TRANSPONDERS

A secondary surveillance radar transponder is considered serviceable when it transmits all the data and parameters required by paragraphs 5(a), (b) and (c) of Article 5 of UK Regulation (EU) No 1207/2011. The transponders should be operated in accordance with Section 13 'SSR Transponder' of the Annex to UK Regulation (EU) No 923/2012 and the related AMC and GM.

GM4 Article 5 Interoperability requirements

CAA ORS9 Decision No. 1

CONTINUED OPERATIONS

Operators may continue to operate their aircraft within the SES airspace without the Mode S EHS and/or the ADS-B capability, irrespective of the date of issue of the first certificate of airworthiness (CofA), if aircraft are flown for:

— maintenance; or

— export.

For the purpose of maintenance, i.e. routine or non-routine checks and modification action, flights into, out of, or over the SES airspace should be operated as non-revenue flights. For the purpose of export, flights out of or over the SES airspace should also be operated as non-revenue flights.

Operators may also continue to operate their aircraft within the SES airspace without the Mode S EHS and/or the ADS-B capability if aircraft:

— are first issued with a CoA prior to 7 June 1995; or

— will cease to be operated by 31 October 2025.

The later condition is applicable to aircraft whose operators have determined prior to 7 December 2020 that they will cease their operation within the SES airspace prior to 31 October 2025. The operators should have evidence, such as a fleet planning document, of their intention to cease operation of their aircraft prior to 31 October 2025, and make it available upon request to their competent authority. This condition is not intended to provide a means to extend the compliance date for the Mode S EHS and/or the ADS-B capability.

GM5 Article 5 Interoperability requirements

CAA ORS9 Decision No. 1

EFFICIENT DEPLOYMENT SOLUTION

The surveillance system should meet the performance requirements that are necessary to support the provision of air traffic services (ATS). Therefore, before commissioning a new or modified surveillance system, air navigation service providers (ANSPs) should develop a business case to demonstrate that the proposed surveillance system is the most effective solution that safely supports the required operations and among other elements considers efficiency issues (e.g. through-life cost (TLC) and the 1030/1090-MHz radio frequencies (RF) band usage).

One option for the business case would be the use of ADS-B data. When comparing options regarding the 1030/1090-MHz RF band usage, ANSPs should consider the impact not only on their own surveillance systems but also on neighbouring ones.

Article 6 Spectrum protection

1. By 2 January 2020 at the latest the CAA shall ensure that a secondary surveillance radar transponder on board any aircraft flying over the United Kingdom is not subject to excessive interrogations that are transmitted by ground-based surveillance interrogators and which either elicit replies or whilst not eliciting a reply are of sufficient power to exceed the minimum threshold level of the receiver of the secondary surveillance radar transponder.

2. Provision repealed before document was retained.

3. By 2 January 2020 at the latest the CAA shall ensure that the use of a ground based transmitter operated in the United Kingdom does not produce harmful interference on other surveillance systems.

[...]

GM1 Article 6 Spectrum protection

CAA ORS9 Decision No. 1

EXCESSIVE INTERROGATIONS

To maintain an effective surveillance service that supports the provision of air traffic services (ATS) and the safe separation of aircraft, the ground-based interrogators should not excessively interrogate aircraft. Excessive interrogation may result in the loss of transponder data and the subsequent loss of the surveillance service; therefore, surveillance service providers should maintain the interrogation rates as low as necessary and the surveillance coverage to the minimum required for the safe operation of the system.

Surveillance service providers are required to comply with Annex VIII (Part-CNS) to UK Regulation (EU) 2017/373 by demonstrating that their working methods and operating procedures comply with the international Standards and Recommended Practices (SARPs) of Annex 10 ‘Aeronautical Telecommunications’ to the Chicago Convention on International Civil Aviation. Surveillance service providers should compute the reply rates per second of the transponder on board aircraft flying over the UK and compare them to the minimum reply rates of International Civil Aviation Organization (ICAO) Annex 10, Volume IV. As specified in Section 3.1.1.7.9.1 for Mode A/C replies, and in Section 3.1.2.10.3.7.3 for Mode S replies, the minimum reply rates are as follows:

— for Mode A/C replies:

‘3.1.1.7.9.1 All transponders shall be capable of continuously generating at least 500 replies per second for a 15- pulse coded reply. Transponder installations used solely below 4 500 m (15 000 ft), or below a lesser altitude established by the appropriate authority or by regional air navigation agreement, and in aircraft with a maximum cruising true airspeed not exceeding 175 kt (324 km/h) shall be capable of generating at least 1 000 15-pulse coded replies per second for a duration of 100 milliseconds. Transponder installations operated above 4 500 m (15 000 ft) or in aircraft with a maximum cruising true airspeed in excess of 175 kt (324 km/h), shall be capable of generating at least 1 200 15-pulse coded replies per second for a duration of 100 milliseconds.

Note 1. A 15-pulse reply includes 2 framing pulses, 12 information pulses, and the SPI pulse.

Note 2. The reply rate requirement of 500 replies per second establishes the minimum continuous reply rate capability of the transponder. As per the altitude and speed criteria above, the 100 or 120 replies in a 100-millisecond interval defines the peak capability of the transponder. The transponder must be capable of replying to this short-term burst rate, even though the transponder may not be capable of sustaining this rate. If the transponder is subjected to interrogation rates beyond its reply rate capability, the reply rate limit control of 3.1.1.7.9.2 acts to gracefully desensitize the transponder in a manner that favours closer interrogators. Desensitization eliminates weaker interrogation signals.’; and

— for Mode S replies:

‘3.1.2.10.3.7.3 Minimum reply rate capability, Mode S. A transponder capable of transmitting only short Mode S replies shall be able to generate replies at the following rates:

50 Mode S replies in any 1-second interval

(…)[11]

In addition to any downlink ELM transmissions, a level 2, 3 or 4 transponder shall be able to generate as long replies at least:

16 of 50 Mode S replies in any 1-second interval

(…)[12]

(…)[13]

In addition, a transponder within an ACAS installation shall be able to generate as ACAS coordination replies at least 3 of 50 Mode S replies in any 1-second interval.'

11 Not applicable. This section is omitted as this GM specifies only rates of reply per second. However, surveillance service providers may consider other time intervals as specified in Annex 10.

12 Not applicable. This section is omitted as this GM specifies only rates of reply per second. However, surveillance service providers may consider other time intervals as specified in Annex 10.

13 Section related to ELM is omitted as not relevant due to ELM not being implemented in the Single European Sky airspace.

Therefore, the reply rates of aircraft transponders should be computed per second, in compliance with ICAO Annex 10, Volume IV, and satisfy the following conditions:

— be less than or equal to 500 Mode A/C replies per second;

— be less than or equal to 50 Mode S replies in any 1-second interval; and

— be less than or equal to 16 Mode S long replies in any 1-second interval. To verify compliance, several methods may be used:

— simple theoretical calculation;

— simulation of the 1030/1090-MHz RF environment;

— periodic (offline) analysis of the 1030/1090-MHz RF environment recorded on the ground; and

— permanent (online) analysis of the 1030/1090-MHz RF environment on the ground.

For the analysis of the 1030/1090-MHz RF environment, airborne recordings may complement the analysis of the 1030/1090-MHz RF environment on the ground.

The choice of the most appropriate method depends on the estimated reply rates of transponders on board aircraft that fly within a given service area.

Further information may be found in EUROCONTROL-GUID-178.

To maintain low interrogation rates outside the ANSPs' area of surveillance interest, the interrogator output power should be as low as possible and as necessary for the safe performance of the system as specified in ICAO Annex

10, Volume IV, paragraph 3.1.1.8.2. In addition, the provisions of UK Regulation (EC) No. 262/2009 regarding Mode S surveillance and lockout restrictions should be observed. If an active MLAT system is utilised, the spectrum protection measures as defined in ICAO Annex 10, Volume IV, paragraph 6.2, should be observed.

As per Article 7 (3) (g) (iii) of UK Regulation (EU) 2019/123, the Network Manager is required to monitor the performance of the infrastructure relevant for the execution of the network functions, i.e. surveillance interrogators and avionics. The application of this central analysis tool, which is intended to provide statistics and alerts with respect to transmission rates, does not relieve surveillance service providers of the responsibility to ensure initial and continued compliance with Annex VIII (Part- CNS) to UK Regulation (EU) 2017/373. Such statistics and alerts provided by the Network Manager could be used to monitor the continued operation of the interrogators.

GM2 Article 6 Spectrum protection

CAA ORS9 Decision No. 1

AVOIDANCE OF HARMFUL INTERFERENCE

The harmful interference of other systems may jeopardise the functioning of radio navigation services or other safety services, or seriously degrade, obstruct or repeatedly interrupt radio communication services. To avoid harmful interference with surveillance or other systems, the configuration of ground-based interrogators (including fixed and mobile military radars for permanent or temporary operation, test radars, wide area multilateration (WAM) systems, etc.) should be correct.

Prior to transmitting from any civil or military ground-based surveillance interrogator, surveillance service providers should verify that the configuration of the interrogator is such to prevent harmful interference with other surveillance systems. The assessment and verification of the configuration of ground-based surveillance interrogators that is performed in the context of the conformity assessment as per Article 139 (2) of the UK Basic Regulation (UK Regulation (EU) 2018/1139) should be sufficient evidence of an appropriate configuration.

In addition, the appropriate implementation of the Radio Equipment Regulations 2017 (UK Statutory Instrument 2017/1206) can minimise harmful interference from other air traffic management/air navigation services (ATM/ANS) and non-ATM/ANS systems.

As part of their frequency management, Ofcom has a process to report and manage unexpected and incorrect transmissions available at: Ofcom report interference. To ensure the effective elimination of any detected interference, surveillance service providers should be familiar with those processes. Furthermore, surveillance service providers should report via their mandatory reporting systems, which are established as per UK Regulation (EU) No 376/2014, the events that are listed in Annex III 'Occurrences related to air navigation services and facilities' to UK Regulation (EU) 2015/1018, such as those that cause a failure of a surveillance service or external interference.

Further information on the topic can be found in EUROCONTROL-GUID-178.

Article 7 Associated procedures

1. Air navigation service providers shall assess the level of performance of ground based surveillance chain before putting them into service as well as regularly during the service, in accordance with the requirements set out in Annex V.

2. Provision repealed before document was retained.

3. The CAA shall ensure that the assignment of 24-bit ICAO aircraft addresses to aircraft equipped with a Mode S transponder complies with Chapter 9 and its appendix of Annex 10 to the Chicago Convention, Volume III, Second Edition including all amendments up to No 90.

4. Operators shall ensure that on board the aircraft they are operating, any Mode S transponder operates with a 24-bit ICAO aircraft address that corresponds to the registration that has been assigned by the State in which the aircraft is registered.

GM1 Article 7 Associated procedures

CAA ORS9 Decision No. 1

SEAMLESS OPERATIONS

To ensure seamless operations at the boundary of their airspace, air navigation service providers (ANSPs) should apply radar-/surveillance-based horizontal separation minima of 5 NM, or 3 NM for high-density airspace. Separation minima of other than 3 or 5 NM may be applied, provided that ANSPs perform an assessment that shows no negative impact on safety, traffic flows, and capacity of the adjacent airspace.

The nominal performance of the surveillance system that supports the applicable separation minima should be in accordance with EUROCONTROL-SPEC-147.

Article 8 State aircraft

1. The Secretary of State shall ensure that, by 7 December 2020 at the latest, State aircraft comply with point (a) of Article 5(5).

2. The Secretary of State shall ensure that, by 7 December 2020 at the latest, transport-type State aircraft comply with point (c) of Article 5(5).

[...]

5. Air traffic service providers shall ensure that :

(a) State aircraft that cannot be equipped with secondary surveillance radar transponders that comply with the requirements set out in Part A of Annex 2, and

(b) transport-type State aircraft with a maximum certified take-off mass exceeding 5 700 kg or having a maximum cruising true airspeed capability greater than 250 knots, that cannot be equipped with secondary surveillance radar transponders that comply with the requirements set out in Part B and Part C of Annex 2, can be accommodated, provided that they can be safely handled within the capacity of the air traffic management system.

6. The Secretary of State shall publish the procedures for the handling of State aircraft which are not equipped in accordance with paragraphs 1 or 2 in national aeronautical information publications.

7. Air traffic service providers shall communicate on an annual basis to the CAA their plans for the handling of State aircraft which are not equipped according with paragraphs 1 or 2. Those plans shall be defined by taking into account the capacity limits associated with the procedures referred to in paragraph 6.

8. For State aircraft where the capability of the transponders to comply with the requirements of paragraphs 1 and 2 is temporarily inoperative, The Secretary of State shall be entitled to allow the operation of that aircraft in the airspace provided for in Article 1(3) of Regulation (EC) No 551/2004 of the European Parliament and of the Council for a maximum of 3 consecutive days.

Article 9 Safety requirements

[...]

2. The CAA shall ensure that any changes to the existing systems referred to in points (b), (c) and (d) of Article 2(1) or the introduction of new systems are preceded by a safety assessment, including hazard identification, risk assessment and mitigation, conducted by the parties concerned.

3. During the assessments identified in paragraph 2 , the requirements set out in Annex VI shall be taken into consideration as a minimum.

Article 10 Conformity or suitability for use of constituents

Before issuing a declaration of conformity or suitability for use provided in Article 5 of Regulation (EC) No 552/2004, manufacturers of constituents of the systems referred to in Article 2(1) of this Regulation or if the manufacturer is not established in the United Kingdom their authorised representatives established in the [United Kingdom] , shall assess the conformity or suitability for use of those constituents in compliance with the requirements set out in Annex VII.

However, certification processes complying with Regulation (EC) No 216/2008 of the European Parliament and of the Council, shall be considered as acceptable procedures for the conformity assessment of constituents if they include the demonstration of compliance with the applicable interoperability, performance and safety requirements of this Regulation.

Article 11 Verification of systems

1. Air navigation service providers which can demonstrate or have demonstrated that they fulfil the conditions set out in Annex VIII shall conduct a verification of the systems referred to in points (b), (c) and (d) of Article 2(1) in compliance with the requirements set out in Part A of Annex IX.

2. Air navigation service providers which cannot demonstrate that they fulfil the conditions set out in Annex VIII shall subcontract to an appointed body a verification of the systems referred to in points (b), (c) and (d) of Article 2(1). This verification shall be conducted in compliance with the requirements set out in Part B of Annex IX.

3. Certification processes complying with Regulation (EC) No 216/2008 shall be considered as acceptable procedures for the verification of systems if they include the demonstration of compliance with the applicable interoperability, performance and safety requirements of this Regulation.

Article 12 Additional requirements

1. Air navigation service providers shall ensure that all personnel concerned are made duly aware of the requirements laid down in this Regulation and that they are adequately trained for their job functions.

2. Air navigation service providers shall:

(a) develop and maintain operations manuals containing the necessary instructions and information to enable all personnel concerned to apply this Regulation;

(b) ensure that the manuals referred to in point (a) are accessible and kept up to date and that their update and distribution are subject to appropriate quality and documentation configuration management;

(c) ensure that the working methods and operating procedures comply with this Regulation.

3. Operators shall take the necessary measures to ensure that the personnel operating and maintaining surveillance equipment are made duly aware of the relevant provisions of this Regulation, that they are adequately trained for their job functions, and that instructions about how to use this equipment are available in the cockpit where feasible.

4. The CAA shall ensure compliance with this Regulation including the publication of the relevant information on surveillance equipment in the national aeronautical information publications.

Article 13 Exemptions on the cooperative surveillance chain

Repealed

Article 14 Exemptions on aircraft

Provision repealed before document was retained.

Article 14a Flight Plans

Operators of non-equipped State aircraft [...] and operators of aircraft not equipped in accordance with Article 5(5) operating within the airspace provided for in Article 1(3) of Regulation (EC) No 551/2004 of the European Parliament and of the Council , shall include the indicators SUR/EUADSBX or SUR/EUEHSX or SUR/EUELSX or a combination thereof, in Item 18 of the flight plan.

AMC1 Article 14a Flight Plans

CAA ORS9 Decision No. 1

As UK Regulation (EU) No 1207/2011 requires all qualifying aircraft to be equipped with Mode S and/or ADS-B systems to access UK airspace, information on the equipage and the operational status should be available to ATS units. As required by point SERA.4001 of the Annex to UK Regulation (EU) No 923/2012, information related to an intended flight should be provided to ATS units in the form of a flight plan. The information required is specified in UK Regulation (EC) No 1033/2006.

Aircraft to which UK Regulation (EU) No 1207/2011 does not apply or aircraft that use the non-equipage or exemption provisions are authorised to access UK airspace when conducting instrument flight rules (IFR) / general air traffic (GAT) operations. The appropriate equipage and operational status, including the correct designator for the functioning surveillance systems, should be inserted in Items 10b and 18 of the flight plan.

Operators of State aircraft that are not equipped with Mode S ELS and who have notified the CAA as per Article 8(3) of UK Regulation (EU) No 1207/2011 should insert the designator ‘SUR/EUELSX’ in Item 18 of the flight plan.

Operators of aircraft, including State aircraft, which are not equipped with Mode S EHS and/or ADS-B, or are equipped with Mode S EHS and/or ADS-B that are temporarily inoperative, should insert the designators ‘SUR/EUADSBX’ or ‘SUR/EUEHSX’, or a combination of them, in Item 18 of the flight plan.

Note 1: ‘operation with Mode S EHS and/or ADS-B that are temporarily inoperative’ is a UK Regulation (EU) No 1207/2011 Article 5(5) requirement; therefore, when such operation is required, the requirements of Article 14a of UK Regulation (EU) No 1207/2011 also apply, and the flight plan should include the designators ‘SUR/EUADSBX’ or ‘SUR/EUEHSX’, as appropriate, in Item 18.

Note 2: GM3 Article 5 Interoperability requirements — SERVICEABLE SECONDARY SURVEILLANCE RADAR TRANSPONDERS explains the conditions under which a transponder is considered serviceable.

Article 15 Entry into force and application

Repealed

Signatures

[...]

Done at Brussels, 22 November 2011.

For the Commission

The President

José Manuel Barroso

Annexes

Annex I Performance requirements referred to in Article 4 (3)

1. Surveillance data requirements

1.1. All surveillance chains referred to in Article 4(3) shall provide as a minimum the following surveillance data:

(a) 2D positional data (aircraft horizontal position);

(b) surveillance data status:

- — cooperative/non-cooperative/combined;
- — coasted or not;
- — time of applicability of 2D positional data.

1.2. In addition, all cooperative surveillance chains referred to in Article 4(3) shall provide as a minimum the following surveillance data:

(a) vertical positional data (based upon pressure altitude received from the aircraft);

(b) operational identification data (aircraft identity received from the aircraft like aircraft identification and/or Mode A code);

(c) supplemental indicators:

— emergency indicators (i.e. unlawful interference, radio failure and general emergency);

— special position indicator;

(d) surveillance data status (time of applicability of vertical position data).

2. Surveillance data performance requirements

2.1. The air navigation service providers shall define performance requirements for the accuracy, availability, integrity, continuity and timeliness of the surveillance data provided by the systems referred to in Article 4(3) and used to enable the surveillance

applications conducted.

2.2. The evaluation of the accuracy of the horizontal position provided by the systems referred to in Article 4(3) shall include, as a minimum, the assessment of horizontal position error.

2.3. The air navigation service providers shall verify compliance with the performance requirements defined in accordance with points 2.1 and 2.2.

2.4. Verification of compliance shall be performed on the basis of the surveillance data provided at the output of the surveillance chain, to the surveillance data user.

Annex II Transponder Capability

Part A: Secondary surveillance radar transponder capabilities referred to in Article 4(3), point (a) of Article 5(5), Article 7(2) and Article 8(1) and (3)

1. The minimum capability for the secondary surveillance transponder shall be Mode S Level 2 meeting the performance and functionality criteria of Annex 10 to the Chicago Convention, Volume IV, Third Edition including all amendments up to No 77.

2. Each implemented transponder register shall be compliant with the corresponding section of ICAO document 9871 (2nd edition).

3. The following data items shall be made available to the transponder and be transmitted by the transponder via the Mode S protocol and in accordance with the formats specified in ICAO document 9871 (2nd edition):

(a) 24-bit ICAO aircraft address;

(b) Mode A code;

(c) pressure altitude;

(d) flight status (on the ground or airborne);

(e) data link capability report;

- airborne collision avoidance system (ACAS) capability,
- Mode S specific services capability,
- aircraft identification capability,
- squitter capability,
- surveillance identifier capability,
- common usage Ground Initiated Comms.-B (GICB) capability report (indication of change),
- Mode S subnetwork version number;

(f) common usage GICB capability report;

(g) aircraft identification;

(h) special position indication (SPI);

(i) emergency status (general emergency, no communications, unlawful interference) including the use of specific Mode A codes to indicate different emergency states;

(j) ACAS active resolution advisories when the aircraft is equipped with Traffic alert and collision avoidance system II (TCAS II).

4. Other data items may be made available to the transponder.

5. The data items referred to in point 4 shall only be transmitted by the transponder via the Mode S protocol. The aircraft and equipment certification process shall cover the transmission of those data items.

6. Provision repealed before document was retained.

Part B: Secondary surveillance radar transponder capabilities referred to in Article 4(3), point (b) of Article 5(5), Article 5(7), Article 7(2) and Article 8(2) and (3)i

1. The minimum capability for the secondary surveillance transponder shall be Mode S Level 2 meeting the performance and functionality criteria of Annex 10 to the Chicago Convention, Volume IV, Third Edition including all amendments up to No 77.

2. Each implemented transponder register shall be compliant with the corresponding section of ICAO document 9871 (2nd edition).

3. The following data items shall be made available to the transponder and be transmitted by the transponder via Version 2 of the extended squitter (ES) ADS-B protocol in accordance with the formats specified in ICAO document 9871 (2nd edition):

(a) 24-bit ICAO aircraft address;

(b) aircraft identification;

(c) Mode A code;

(d) special position indication (SPI) using the same source as for the same parameter specified in Part A;

(e) emergency status (general emergency, no communications, unlawful interference) using the same source as for the same parameter specified in Part A;

(f) ADS-B version number (equal to 2);

(g) ADS-B emitter category;

(h) geodetic horizontal position in accordance with the world geodetic system revision 1984 (WGS84) latitude and longitude, both while airborne or on the ground;

(i) geodetic horizontal position quality indicators (corresponding to the integrity containment bound (NIC), 95 % navigation accuracy category for position (NACp), source integrity level (SIL) and system design assurance level (SDA));

(j) pressure altitude using the same source as for the same parameter specified in Part A;

(k) geometric altitude in accordance with the world geodetic system revision 1984 (WGS84), provided in addition and encoded as a difference to pressure altitude;

(l) geometric vertical accuracy (GVA);

(m) velocity over ground, both while airborne (east/west and north/south airborne velocity over ground) or on the ground (surface heading/ground track and movement);

(n) velocity quality indicator corresponding to navigation accuracy category for velocity (NACv);

(o) coded aircraft length and width;

(p) global navigation satellite system (GNSS) antenna offset;

(q) vertical rate: barometric vertical rate using the same source as for the same parameter specified in the data item in point 2 (g) of Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol, or Global Navigation Satellite System (GNSS) vertical rate;

(r) mode control panel/flight control unit (MCP/FCU) selected altitude using the same source as for the same parameter specified in Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol;

(s) barometric pressure setting (minus 800 hectoPascals) using the same source as for the same parameter specified in Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol;

(t) ACAS active resolution advisories when the aircraft is equipped with TCAS II using the same source as for the same parameter specified in Part A.

4. Surveillance data items (the data items in point 3(h), (k) and (m)) and their quality indicator data items (the data items in point 3(i), (l) and (n)) shall be provided to the transponders on the same physical interface.

5. The data source connected to the transponder and providing the data items in point 3 (h) and (i) shall meet the following data integrity requirements:

(a) horizontal position (data item in point 3 (h)) source integrity level (SIL, expressed with respect to NIC) shall be equal to or less than 10-7 per flight-hour;

(b) horizontal position (data item in point 3(h)) integrity time to alert (leading to a change of the NIC quality indicator), if on-board monitoring is required to meet the horizontal position source integrity level, shall be equal to or less than 10 seconds.

6. The primary data source providing the data items in point 3(h) and (i) shall be at least compatible with GNSS receivers that perform receiver autonomous integrity monitoring (RAIM) and fault detection and exclusion (FDE), along with the output of corresponding measurement status information, as well as integrity containment bound and 95 % accuracy bound indications.

7. The system integrity level of the data sources providing the data items in point 3(f), (g), (k) to (p) shall be equal to or less than 10-5 per flight-hour.

8. The quality indicator information (NIC, NACp, SIL, SDA, NACv and GVA) (the data items in point 3(i), (l) and (n)) shall express the actual performance of the selected data source as valid at the time of applicability of the measurement of the data items in point 3 (h), (k) and (m)).

9. With respect to the processing of the data items in point 3(a) to (t), the transponder system integrity level for the extended squitter ADS- B protocol, including any interconnecting avionics to the transponder, shall be equal to or less than 10-5 per flight-hour.

10. The total latency of the horizontal position data (the data items in point 3(h) and (i)) shall be equal to or less than 1,5 second in 95 % of all transmissions.

11. The uncompensated latency of the horizontal position data (data item in point 3(h)) shall be equal to or less than 0,6 second in 95 % of the cases and shall be equal to or less than 1,0 second in 99,9 % of all transmissions.

12. The total latency of the ground speed data items (the data items in point 3(m) and (n)) shall be equal to or less than 1,5 second in 95 % of all transmissions.

13. If the transponder is set to use a Mode A conspicuity code of 1000 then the broadcast of Mode A code information via the extended squitter ADS-B protocol shall be inhibited.

14. Other data items may be made available to the transponder.

15. Except for military reserved formats, the data items referred to in point 14 shall only be transmitted by the transponder via the extended squitter ADS-B protocol. The aircraft and equipment certification process shall cover the transmission of these data items.

16. Provision repealed before document was retained.

Part C: Secondary surveillance radar transponder additional surveillance data capability referred to in Article 4(3), point (c) of Article 5(5), Article 7(2), Article 8(2) and (3) and Article 14(1)

1. Each transponder register that is implemented shall be compliant with the corresponding section of ICAO document 9871 (2nd edition).

2. The following data items, where available on a digital bus, shall be transmitted by the transponder as requested by the ground-based surveillance chain, via the Mode S protocol and in accordance with the formats specified in ICAO document 9871 (2nd edition):

(a) MCP/FCU selected altitude;

(b) roll angle;

(c) true track angle;

(d) ground speed;

(e) magnetic heading;

(f) indicated airspeed (IAS) or mach number;

(g) vertical rate (barometric or baro-inertial);

(h) barometric pressure setting (minus 800 hectoPascals);

(i) track angle rate or true airspeed if track angle rate is not available.

3. Other data items may be made available to the transponder.

4. The data items referred to in point 3 shall only be transmitted by the transponder via the Mode S protocol. The aircraft and equipment certification process shall cover the transmission of these data items.

Annex III Surveillance data exchange requirements referred to in Article 5(1)

1. Surveillance data exchanged between the systems referred to in points (b) and (c) of Article 2(1), shall be subject to a data format that is agreed between the parties concerned.

2. The surveillance data transferred outside the systems referred to in points (b) and (c) of Article 2(1) to other air navigation service providers shall allow:

(a) identification of the data source;

(b) identification of the type of data.

3. Surveillance data transferred outside the systems referred to in points (b) and (c) of Article 2(1) to other air navigation service providers shall be time stamped and expressed as coordinated universal time (UTC).

Annex IV Requirements for the establishment of formal arrangements referred to in Article 5(2)

Formal arrangements between air navigation service providers for the exchange or provision of surveillance data shall include the following minimum content:

(a) the parties to the arrangements;

(b) the period of validity of the arrangements;

(c) the scope of the surveillance data;

(d) the sources of the surveillance data;

(e) the exchange format of the surveillance data;

(f) the service delivery point of the surveillance data;

(g) agreed service levels in terms of the following;

- surveillance data performance as established by Article 4(3)
- procedures in case of unserviceability;

(h) change management procedures;

(i) reporting arrangements with respect to performance and availability including unforeseen outage;

(j) management and coordination arrangements;

(k) ground-based surveillance chain safeguarding and notification arrangements.

Annex V Requirements for the assessment of the level of performance of surveillance chains referred to in Article 7(1)

1. The assessment of the level of the ongoing performance of the systems referred to in points (b), (c) and (d) of Article 2(1) shall be performed in the volume of airspace where the corresponding provision of surveillance services utilising the systems is undertaken.

2. Air navigation service providers shall periodically check the system and its components and develop and enforce a performance validation regime. The periodicity shall be agreed with the CAA taking into account the specificities of the system and its components.

3. Before the implementation of airspace design modification the systems referred to in points (b), (c) and (d) of Article 2(1) shall be verified in order to check that they still meet the required performance in the new volume of operation.

Annex VI Requirements referred to in Article 9

1. The performance requirements specified in Article 4.
2. The interoperability requirements specified in Article 5(2), (3) and (7).
3. The spectrum protection requirements specified in Article 6.
4. The associated procedures requirements specified in Article 7.
5. The State aircraft requirement specified in Article 8(5).
6. The additional requirements specified in Article 12(3).
7. The surveillance data exchange requirements set out in point 3 of Annex III.

Annex VII Requirements for the assessment of the conformity or suitability for use of constituents referred to in Article 10

1. The verification of compliance activities shall demonstrate the conformity or suitability for use of constituents with the applicable requirements of this Regulation whilst these constituents are in operation in the test environment.

2. The manufacturer shall manage the conformity assessment activities and shall in particular:

(a) determine the appropriate test environment;

(b) verify that the test plan describes the constituents in the test environment;

(c) verify that the test plan provides full coverage of applicable requirements;

(d) ensure the consistency and quality of the technical documentation and the test plan;

(e) plan the test organisation, staff, installation and configuration of test platform;

(f) perform the inspections and tests as specified in the test plan;

(g) write the report presenting the results of inspections and tests.

3. The manufacturer shall ensure that the constituents referred to in Article 10, integrated in the test environment meet the applicable requirements of this Regulation.

4. Upon satisfying completion of verification of conformity or suitability for use, the manufacturer shall under its responsibility draw up the [...] declaration of conformity or suitability for use, specifying notably the applicable requirements of this Regulation met by the constituent and its associated conditions of use in accordance with point 3 of Annex III to Regulation (EC) No 552/2004.

Annex VIII referred to Conditions in Article 11(1) and (2)

1. The air navigation service provider must have in place reporting methods within the organisation which ensure and demonstrate impartiality and independence of judgement in relation to the verification activities.

2. The air navigation service provider must ensure that the personnel involved in verification processes, carry out the checks with the greatest possible professional integrity and the greatest possible technical competence and are free of any pressure and incentive, in particular of a financial type, which could affect their judgment or the results of their checks, in particular from persons or groups of persons affected by the results of the checks.

3. The air navigation service provider must ensure that the personnel involved in verification processes, have access to the equipment that enables them to properly perform the required checks.

4. The air navigation service provider must ensure that the personnel involved in verification processes, have sound technical and vocational training, satisfactory knowledge of the requirements of the verifications they have to carry out, adequate experience of such operations, and the ability required to draw up the declarations, records and reports to demonstrate that the verifications have been carried out.

5. The air navigation service provider must ensure that the personnel involved in verification processes, are able to perform their checks with impartiality. Their remuneration shall not depend on the number of checks carried out, or on the results of such checks.

Annex IX

Requirements for the verification of systems referred to in Article 11(1)

1. The verification of systems identified in points (b), (c) and (d) of Article 2(1) shall demonstrate the compliance of these systems with the interoperability, performance and safety requirements of this Regulation in an assessment environment that reflects the operational context of these systems.

2. The verification of systems identified in points (b), (c) and (d) of Article 2(1) shall be conducted in accordance with appropriate and recognised testing practices.

3. Test tools used for the verification of systems identified in points (b), (c) and (d) of Article 2(1) shall have appropriate functionalities.

4. The verification of systems identified in points (b), (c) and (d) of Article 2(1) shall produce the elements of the technical file required by point 3 of Annex IV to Regulation (EC) No 552/2004 including the following elements:

(a) description of the implementation;

(b) the report of inspections and tests achieved before putting the system into service.

5. The air navigation service provider shall manage the verification activities and shall in particular:

(a) determine the appropriate operational and technical assessment environment reflecting the operational environment;

(b) verify that the test plan describes the integration of systems identified in points (b), (c) and (d) of Article 2(1) in an operational and technical assessment environment;

(c) verify that the test plan provides full coverage of the applicable interoperability, performance and safety requirements of this Regulation;

(d) ensure the consistency and quality of the technical documentation and the test plan;

(e) plan the test organisation, staff, installation and configuration of the test platform;

(f) perform the inspections and tests as specified in the test plan;

(g) write the report presenting the results of inspections and tests.

6. The air navigation service provider shall ensure that the systems identified in points (b), (c) and (d) of Article 2(1) operated in an operational assessment environment meet the interoperability, performance and safety requirements of this Regulation.

7. Upon satisfying completion of verification of compliance, air navigation service providers shall draw up the [...] declaration of verification of system and submit it to the CAA together with the technical file as required by Article 6 of Regulation (EC) No 552/2004.

Requirements for the verification of systems referred to in Article 11(2)

1. The verification of systems identified in points (b), (c) and (d) of Article 2(1) shall demonstrate the compliance of these systems with the interoperability, performance and safety requirements of this Regulation in an assessment environment that reflects the operational context of these systems.

2. The verification of systems identified in points (b), (c) and (d) of Article 2(1) shall be conducted in accordance with appropriate and recognised testing practices.

3. Test tools used for the verification of systems identified in points (b), (c) and (d) of Article 2(1) shall have appropriate functionalities.

4. The verification of systems identified in points (b), (c) and (d) of Article 2(1) shall produce the elements of the technical file required by point 3 of Annex IV to Regulation (EC) No 552/2004 including the following elements:

(a) description of the implementation;

(b) the report of inspections and tests achieved before putting the system into service.

5. The air navigation service provider shall determine the appropriate operational and technical assessment environment reflecting the operational environment and shall have verification activities performed by an appointed body.

6. The appointed body shall manage the verification activities and shall in particular:

(a) verify that the test plan describes the integration of systems identified in points (b), (c) and (d) of Article 2(1) in an operational and technical assessment environment;

(b) verify that the test plan provides full coverage of the applicable interoperability, performance and safety requirements of this Regulation;

(c) ensure the consistency and quality of the technical documentation and the test plan;

(d) plan the test organisation, staff, installation and configuration of the test platform;

(e) perform the inspections and tests as specified in the test plan;

(f) write the report presenting the results of inspections and tests.

7. The appointed body shall ensure that the systems identified in points (b), (c) and (d) of Article 2 (1) operated in an operational assessment environment meet the interoperability, performance and safety requirements of this Regulation.

8. Upon satisfying completion of verification tasks, the appointed body shall draw up a certificate of conformity in relation to the tasks it carried out.

9. Then, the air navigation service provider shall draw up the declaration of verification of system and submit it to the CAA together with the technical file as required by Article 6 of Regulation (EC) No 552/2004.