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►B **COMMISSION IMPLEMENTING REGULATION (EU) No 1207/2011**

of 22 November 2011

laying down requirements for the performance and the interoperability of surveillance for the single European sky

(Text with EEA relevance)

(OJ L 305, 23.11.2011, p. 35)

Amended by:

		Official Journal		
		No	page	date
►M1	Commission Implementing Regulation (EU) No 1028/2014 of 26 September 2014	L 284	7	30.9.2014

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COMMISSION IMPLEMENTING REGULATION (EU) No 1207/2011

of 22 November 2011

laying down requirements for the performance and the interoperability of surveillance for the single European sky

(Text with EEA relevance)

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) ([1]), 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) ([2]) 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.

([1]) OJ L 96, 31.3.2004, p. 26.
([2]) OJ L 96, 31.3.2004, p. 1.

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(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.

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(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 within 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;

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(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 [1] with the exception of Articles 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;

[1] OJ L 96, 31.3.2004, p. 20.

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(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;

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(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. If an air navigation service provider identifies an aircraft whose avionics exhibit a functional anomaly, he shall inform the operator of the flight of the deviation from the performance requirements. The operator shall investigate the matter before the next flight is initiated and any rectification necessary shall be introduced in line with normal maintenance and corrective procedures for the aircraft and its avionics.

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.

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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.

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4. Operators shall ensure that:

(a) aircraft operating flights referred to in Article 2(2) with an individual certificate of airworthiness first issued on or after 8 January 2015 are equipped with secondary surveillance radar transponders having the capabilities set out in Part A of Annex II;

(b) aircraft with a maximum certified take-off mass exceeding 5 700 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 8 June 2016 are equipped with secondary surveillance radar transponders having, in addition to the capabilities set out in Part A of Annex II, the capabilities set out in Part B of that Annex;

(c) fixed wing aircraft with a maximum certified take-off mass exceeding 5 700 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 8 June 2016 are equipped with secondary surveillance radar transponders having, in addition to the capabilities set out in Part A of Annex II, the capabilities set out in Part C of that Annex.

5. Operators shall ensure that:

(a) by 7 December 2017 at the latest, aircraft operating flights referred to in Article 2(2), with an individual certificate of airworthiness first issued before 8 January 2015, are equipped with secondary surveillance radar transponders having the capabilities set out in Part A of Annex II;

(b) by 7 June 2020 at the latest, aircraft with a maximum certified take-off mass exceeding 5 700 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 before 8 June 2016 are equipped with secondary surveillance radar transponders having, in addition to the capabilities set out in Part A of Annex II, the capabilities set out in Part B of that Annex;

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(c) by 7 June 2020 at the latest, fixed wing aircraft with a maximum certified take-off mass exceeding 5 700 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 before 8 June 2016 are equipped with secondary surveillance radar transponders having, in addition to the capabilities set out in Part A of Annex II, the capabilities set out in Part C of that Annex.

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6. Operators shall ensure that aircraft equipped in accordance with paragraphs 4 and 5 and having a maximum certified take-off mass exceeding 5 700 kg or having a maximum cruising true airspeed capability greater than 250 knots operate with antenna diversity as prescribed in paragraph 3.1.2.10.4 of Annex 10 to the Chicago Convention, Volume IV, Fourth Edition including all amendments up to No 85.

7. Member States may impose carriage requirements in accordance with point (b) of paragraph 4 and point (b) of paragraph 5 to all aircraft operating flights referred to in Article 2(2) in areas where surveillance services using the surveillance data identified in Part B of Annex II are provided by air navigation service providers.

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.

Article 6

Spectrum protection

1. By 5 February 2015 at the latest Member States shall ensure that a secondary surveillance radar transponder on board any aircraft flying over a Member State 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. For the purpose of paragraph 1, the sum of such interrogations shall not cause the secondary surveillance radar transponder to exceed the rates of reply per second, excluding any squitter transmissions, specified in paragraph 3.1.1.7.9.1 for Mode A/C replies and in paragraph 3.1.2.10.3.7.3 for Mode S replies of Annex 10 to the Chicago Convention, Volume IV, Fourth Edition.

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3. By 5 February 2015 at the latest Member States shall ensure that the use of a ground based transmitter operated in a Member State does not produce harmful interference on other surveillance systems.

4. In the event of disagreement between Member States regarding the measures detailed in paragraphs 1 and 3 the Member States concerned shall bring the matter to the Commission for action.

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. Operators shall ensure that a check is performed at least every two years, and, whenever an anomaly is detected on a specific aircraft, so that the data items set out in point 3 of Part A of Annex II, in point 3 of Part B of Annex II and in point 2 of Part C of Annex II, if applicable, are correctly provided at the output of secondary surveillance radar transponders installed on board their aircraft. If any of the data items are not correctly provided then the operator shall investigate the matter before the next flight is initiated and any rectification necessary shall be introduced in line with normal maintenance and corrective procedures for the aircraft and its avionics.

3. Member States 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 85.

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.

Article 8

State aircraft

1. Member States shall ensure that, by 7 December 2017 at the latest, State aircraft operating in accordance with Article 2(2) are equipped with secondary surveillance radar transponders having the capability set out in Part A of Annex II.

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2. Member States shall ensure that, by 7 June 2020 at the latest, 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, operating in accordance with Article 2(2) are equipped with secondary surveillance radar transponders having in addition to the capability set out in Part A of Annex II, the capability set out in Part B and Part C of that Annex.

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3. Member States shall communicate to the Commission by 1 July 2016 at the latest the list of State aircraft that cannot be equipped with secondary surveillance radar transponders that comply with the requirements set out in Part A of Annex II, together with the justification for non-equipage.

Member States shall communicate to the Commission by 1 July 2018 at the latest the list of 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 II, together with the justification for non-equipage.

The justification for non-equipage shall be one of the following:

(a) compelling technical reasons;

(b) State aircraft operating in accordance with Article 2(2) that will be out of operational service by 1 January 2020 at the latest;

(c) procurement constraints.

4. Where State aircraft cannot be equipped with secondary surveillance radar transponders as specified by paragraphs 1 or 2 for the reason set out in point (c) of paragraph 3 Member States shall include in the justification their procurement plans regarding these aircraft.

5. Air traffic service providers shall ensure that the State aircraft identified in paragraph 3 can be accommodated, provided that they can be safely handled within the capacity of the air traffic management system.

6. Member States 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.

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7. Air traffic service providers shall communicate on an annual basis to the Member State that has designated them 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.

Article 9

Safety requirements

1. Member States shall ensure that, by 5 February 2015 at the latest, a safety assessment is conducted by the parties concerned for all existing systems referred to in points (b), (c) and (d) of Article 2(1).

2. Member States 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 paragraphs 1 and 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 an EC 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 their authorised representatives established in the Union, 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 [1], 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 a notified 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.

[1] OJ L 79, 19.3.2008, p. 1.

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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. Member States 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

1. For the specific case of approach areas where air traffic services are provided by military units or under military supervision and when procurement constraints prevent compliance with Article 5(3), Member States shall communicate to the Commission by 31 December 2017 at the latest, the date of compliance of the cooperative surveillance chain that shall not be later than 2 January 2025.

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2. Following consultation with the Network Manager and not later than 31 December 2018, the Commission may review the exemptions communicated under paragraph 1 that could have a significant impact on the EATMN.

Article 14

Exemptions on aircraft

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1. Aircraft of specific types with a first certificate of airworthiness issued before 8 June 2016 that have a maximum take-off mass exceeding 5 700 kg or a maximum cruising true airspeed greater than 250 knots that do not have the complete set of parameters detailed in Part C of Annex II available on a digital bus on-board the aircraft may be exempted from complying with the requirements of point (c) of Article 5(5).

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2. Aircraft of specific types with a first certificate of airworthiness issued before 1 January 1990 that have a maximum take off mass exceeding 5 700 kg or a maximum cruising true airspeed greater than 250 knots may be exempted from complying with the requirements of Article 5(6).

3. The Member States concerned shall communicate to the Commission by 1 July 2017 at the latest, detailed information justifying the need for granting exemptions to these specific aircraft types based on the criteria of paragraph 5.

4. The Commission shall examine the requests for exemption referred to in paragraph 3, and, following consultation with the parties concerned, shall adopt a decision.

5. The criteria referred to in paragraph 3 shall include the following:

(a) specific aircraft types reaching the end of their production life;

(b) specific aircraft types being produced in limited numbers;

(c) disproportionate re-engineering costs.

Article 15

Entry into force and application

This Regulation shall enter into force on the 20th day following its publication in the *Official Journal of the European Union*.

Article 4, Article 5(1) and (2) and Article 7(1) shall apply from 13 December 2013.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

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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.

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ANNEX II

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

1. The minimum capability for the secondary surveillance transponder shall be Mode S Level 2 certified in accordance with paragraphs 2.1.5.1.2, 2.1.5.1.7 and 3.1.2.10 of Annex 10 to the Chicago Convention, Volume IV, Fourth Edition including all amendments up to No 85.

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).

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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 if the aircraft and equipment certification process covers the transmission of these data items via the Mode S protocol.

6. The continuity of transponder functionality supporting the Mode S protocol shall be equal to or less than 2. 10^{-4} per flight hour (i.e. mean time between failure equal to or greater than 5 000 flight hours).

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

1. The minimum capability for the secondary surveillance transponder shall be Mode S Level 2 certified in accordance with paragraphs 2.1.5.1.2, 2.1.5.1.6, 2.1.5.1.7 and 3.1.2.10 of Annex 10 to the Chicago Convention, Volume IV, Fourth Edition including all amendments up to No 85.

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 (NAC_p), 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);

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(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 (NAC_V);

(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.

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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 if the aircraft and equipment certification process covers the transmission of these data items via the extended squitter ADS-B protocol.

16. The continuity of transponder functionality supporting the ADS-B protocol shall be equal to or less than 2. 10^{-4} per flight hour (i.e. mean time between failure equal to or greater than 5 000 flight hours).

Part C: Secondary surveillance radar transponder additional surveillance data capability referred to in Article 4(3), Article 5(4)(c) and (5)(c), Article 7(2), Article 8(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 shall be made available to the transponder and 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):

▼B

(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 if the aircraft and equipment certification process covers the transmission of these data items via the Mode S protocol.

▼B

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).

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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 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 communications means used to exchange the surveillance data;

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

(h) quality requirements for the surveillance data in terms of the following:

— performance indicators or parameters used to monitor the quality of the surveillance data,

— the methods and tools to be applied to the measurement of the quality of the surveillance data,

— the frequency of measurement of the quality of the surveillance data,

— data quality reporting procedures,

— for each performance indicator the acceptable range of values shall be defined together with a procedure to be applied if the value falls outside that defined range,

— identification of the party responsible for checking and ensuring quality requirements are met;

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

— hours of availability,

— continuity,

— integrity,

— mean time between failures,

— reaction times for outages,

— procedures for planning and conducting preventative maintenance;

(j) change management procedures;

(k) reporting arrangements with respect to performance and availability including unforeseen outages;

(l) management and coordination arrangements;

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

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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 national supervisory authority 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.

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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.

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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 EC 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.

▼B

ANNEX VIII

Conditions referred to 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.

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ANNEX IX

Part A: 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 EC declaration of verification of system and submit it to the national supervisory authority together with the technical file as required by Article 6 of Regulation (EC) No 552/2004.

▼B

Part B: 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 a notified body.

6. The notified 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 notified 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 notified 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 EC declaration of verification of system and submit it to the national supervisory authority together with the technical file as required by Article 6 of Regulation (EC) No 552/2004.