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European Standard (Telecommunications series)

**Advanced Surface Movement Guidance
and Control System (A-SMGCS);
Part 3: Community Specification for application under the
Single European Sky Interoperability Regulation EC 552/2004
for a deployed cooperative sensor including its interfaces**



Reference

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Aeronautics (AERO), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document has been produced by ETSI in response to European Commission mandate M/390 for the Interoperability of the European Air Traffic Management Network.

The present document has been developed in cooperation with Eurocae for compliance with the Essential Requirements of the Single European Sky Interoperability Regulation 552/2004 [i.1] and/or requirements given in implementing rules for interoperability based on the Single European Sky Interoperability Regulation.

The presumption of conformity which is linked to the full application of EN 303 213 (parts 1 to 4) can only be claimed after EN 303 213 (parts 1 to 4) has been listed in the Official Journal of the European Union as Community Specification.

General and specific requirements for presumption of conformity to SES Interoperability Regulation 552/2004 as amended by Regulation 1070/2009 [i.7] are given in the normative annexes of the present document.

NOTE: Other requirements and other EU Regulations and/or Directives may be applicable to the product(s) falling within the scope of the present document.

The present document is part 3 of a multi-part deliverable covering Advanced Surface Movement Guidance and Control System (A-SMGCS), as identified below:

- Part 1: "Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for A-SMGCS Level 1 including external interfaces";
- Part 2: "Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for A-SMGCS Level 2 including external interfaces";
- Part 3: "Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for a deployed cooperative sensor including its interfaces";**
- Part 4: "Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for a deployed non-cooperative sensor including its interfaces";
- Part 5: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for transmitter used in multilateration equipment";
- Part 6: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for deployed surface movement radar sensors".

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

Introduction

The European Union launched the Legislation "Single European Sky" (SES) in 2002 which was adopted in 2004 and amended with Regulation (EC) No 1070/2009 [i.7].

The SES legislation is based on a framework of 4 regulations, which includes "the Interoperability Regulation" (EC 552/2004 [i.1]). The objective of the Interoperability Regulation is to ensure interoperability of the European Air Traffic Management Network (EATMN) consistent with air navigation services. Under this regulation, the use of a European Standard referenced in the Official Journal of the European Union as Community Specification (CS) is a means of compliance to the essential requirements of the Regulation and/or the relevant implementing rules for interoperability.

The present document takes into account the Council Decision 2009/320/EC endorsing the European Air Traffic Management Master Plan of the Single European Sky ATM Research (SESAR) project [i.3].

1 Scope

The present document is applicable to deployed cooperative sensor as a constituent of an Advanced Surface Movement Guidance and Control System.

The present document provides a European Standard for manufacturers of the non-cooperative sensor constituent, who have to demonstrate and declare conformity for their constituent to the IOP regulation.

Any software elements related to the software assurance level of an A-SMGCS are outside of the scope of the present document. As such the essential requirements of the Interoperability Regulation are not considered for software elements within the present document.

The present document does not give presumption of conformity related to the maintenance requirements, environmental constraints, procedure level, effect of harmful interference and civil/military coordination.

NOTE: For these ERs, please refer to the Air Navigation Service Provider procedures.

Requirements in the present document which refer to "should" statements or recommendations in the normatively referenced material (clause 2.1) are to be interpreted as fully normative ("shall") for the purpose of compliance with the present document.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] EUROCAE ED-87B (ED-87B including Amendment No 1 published November 2009): "MASPS for Advanced Surface Movement Guidance and Control Systems".
- [2] EUROCAE ED-117 (November 2003): "MOPS for Mode S Multilateration Systems for Use in A-SMGCS".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] 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 (interoperability Regulation), OJ L 96, 31.03.2004 as amended with Regulation (EC) No 1070/2009.
- [i.2] Regulation (EC) No 549/2004 of the European Parliament and of the Council of 10 March 2004 laying down the framework for the creation of the single European sky (the framework Regulation), OJ L 96, 31.03.2004 as amended with Regulation (EC) No 1070/2009.
- [i.3] Council Decision 2009/320/EC endorsing the European Air Traffic Management Master Plan of the Single European Sky ATM Research (SESAR) project, 30.03.2009.
- [i.4] ICAO Document 9830, AN/452 (First Edition, 2004): "Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual".
- [i.5] ETSI EN 303 213-5: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 5: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for transmitter used in multilateration equipment".
- [i.6] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive) (OJ L 91, 07.04.1999).
- [i.7] Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October 2009 amending Regulations (EC) No 549/2004, (EC) No 550/2004, (EC) No 551/2004 and (EC) No 552/2004 in order to improve the performance and sustainability of the European aviation system, OJ L 300, 14.11.2009.
- [i.8] EUROCAE ED-128 (ED-128 published 08/2007): "Guidelines for surveillance data fusion in advanced surface movement guidance and control systems (A-SMGCS) levels 1 and 2".
- [i.9] ETSI EN 303 213-1: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 1: Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for A-SMGCS Level 1 including external interfaces".
- [i.10] ETSI EN 303 213-2: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 2: Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for A-SMGCS Level 2 including external interfaces".
- [i.11] ETSI EN 303 213-4: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 4: Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for a deployed non-cooperative sensor including its interfaces".
- [i.12] ETSI EN 303 213-6: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 6: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for deployed surface movement radar sensors".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

A-SMGCS Level 1: A-SMGCS including a comprehensive Surveillance element capable of the location and classification of all aircraft and vehicles within the area of interest and the identification of cooperative aircraft and vehicles

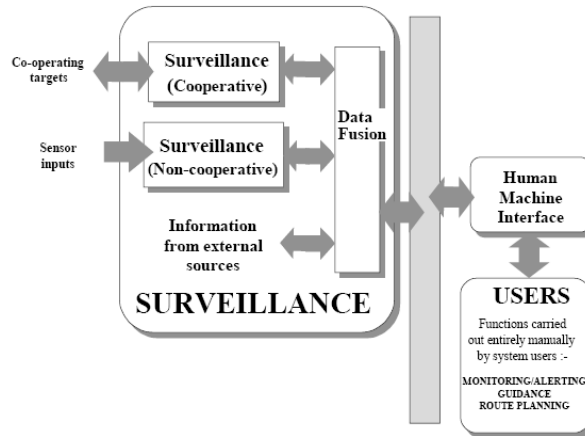


Figure 1: A-SMGCS Level 1 Functional Configuration

A-SMGCS Level 2: A-SMGCS including the capabilities of A-SMGCS Level 1 and uses the comprehensive surveillance data available to monitor the situation in the area of interest against a set of rules which will enable the system to alert the user to hazardous situations

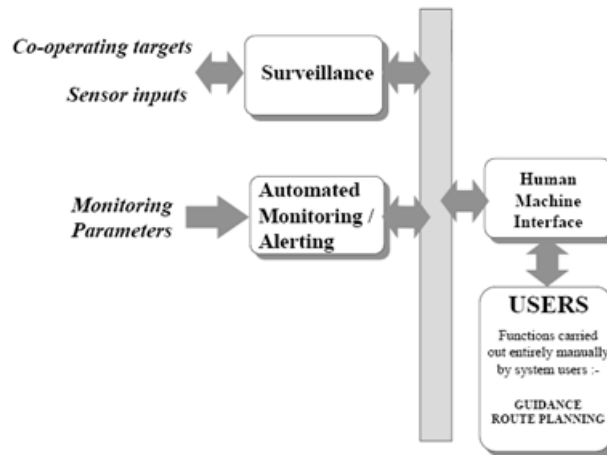


Figure 2: A-SMGCS Level 2 Functional Configuration

Advanced Surface Movement Guidance and Control Systems: systems providing routing, guidance, surveillance for the control of aircraft and vehicles in order to maintain the declared surface movement rate under all local weather conditions within the Aerodrome Visibility Operational Level (AVOL) while maintaining the required level of safety

NOTE: This definition is derived from the ICAO Document 9830 [i.4].

aerodrome: defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for arrival, departure and surface movement of aircraft

NOTE: This definition is derived from the ICAO Document 9830 [i.4].

apron: defined area on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance

NOTE: This definition is derived from the ICAO Document 9830 [i.4].

availability: probability that a system or an item is in a functioning state at a given point in time

classification: function which groups targets into various types (e.g. large, medium, small)

constituents: tangible objects such as hardware and intangible objects such as software upon which the interoperability of the EATMN depends

NOTE: This is the legally binding definition in the context of Single European Sky [i.2].

manoeuvring area: part of an aerodrome to be used for take-off, landing and taxiing of aircraft, excluding aprons

NOTE: This definition is derived from the ICAO Document 9830 [i.4].

movement area: part of an aerodrome to be used for take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and apron(s)

NOTE: This definition is derived from the ICAO Document 9830 [i.4].

procedure: standard method for either the technical or operational use of the system, in the context of agreed and validated concepts of operation requiring uniform implementation throughout the EATMN

NOTE: This is the legally binding definition in the context of Single European Sky [i.2].

system: aggregation of airborne and groundbased constituents, as well as space-based equipment, that provides support for air navigation services for all phases of flight

NOTE: This is the legally binding definition in the context of Single European Sky [i.2].

target: aircraft, vehicle or obstacle that is displayed on a surveillance display

NOTE: This definition is derived from the ICAO Document 9830 [i.4].

update: renewal of target reports relating to all targets under surveillance

Further legally binding definitions in the context of Single European Sky are given in [i.2].

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

A-SMGCS	Advanced Surface Movement Guidance and Control Systems
ASTERIX	All Purpose Structured EUROCONTROL Surveillance Information Exchange
ATM	Air Traffic Management
AVOL	Aerodrome Visibility Operational Level
CS	Community Specification
doa	date of announcement
dow	date of withdrawal
EATMN	European Air Traffic Management Network
EC	European Communities
EN	European Norm - (standard)
ER	Essential Requirement
EUROCAE	EUROpean organization for Civil Aviation Equipment
EUROCONTROL	EUROpean organization for the safety of air navigation
ICAO	International Civil Aviation Organization
IOP Regulation	InterOPERability Regulation
MASPS	Minimum Aviation Systems Performance Specification
SES	Single European Sky

4 Requirements for implementing cooperative sensors for A-SMGCS Systems

This clause defines the minimum requirements for implementing a cooperative sensor into an A-SMGCS System.

4.1 Design Requirements for cooperative sensors for A-SMGCS Systems

4.1.1 Operating principles of the cooperative sensor

The operating principles of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 1.3.2.

4.1.2 Airworthiness and certification

The cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 2.2.

4.1.3 Software and Design

The Software and the design of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 2.6.

4.1.4 Capacity

The capacity of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 3.3.6.

4.1.5 Health and Safety

The Health and Safety requirement shall comply with the requirements as defined in ED-117 [2], clause 2.7.

4.1.6 Interfaces

4.1.6.1 Equipment Interfaces

The Interfaces of the constituent shall be designed as defined in ED-117 [2], clause 2.11.1.

4.1.6.2 Datafusion

The interfaces for the data fusion in an A-SMGCS shall comply with the requirements as defined in ED-87B [1], clause 2.5.1.1.

NOTE: Guidance for the Data Fusion can be found in ED-128 [i.8].

4.1.7 External time reference

The constituent shall be designed to use an external time reference as defined in ED-117 [2], clause 2.11.5.

4.1.8 System coverage

The system coverage of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 2.8.

4.1.9 Identification

The identification within the cooperative sensor shall comply with the requirements as defined in ED-87B [1], clause 3.2.2.1.

4.1.10 Surveillance data output

The surveillance data output of the cooperative sensor shall comply with the requirements as defined in ED-87B [1], clause 2.5.1.1.

4.1.11 Update Rate

The Update Rate of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 3.3.1.

4.1.12 Integrity

The Integrity of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 2.9.

4.1.13 Expandability

The cooperative sensor shall be expandable as defined in ED-117 [2], clause 2.10.8.

4.1.14 2D/3D Calculation

The cooperative sensor shall be capable to calculate 2D/3D-multilateration position as defined in ED-117 [2], clause 3.1.1.

4.1.15 Mode S Interrogation

The cooperative sensor shall be capable of interrogating mode S transponders as defined in ED-117 [2], clause 3.1.2.

4.1.16 Reference transponders

The cooperative sensor shall provide a test and reference transponder as defined in ED-117 [2], clause 3.1.3.

4.1.17 Track Initiation

The cooperative sensor shall use a track initiation as defined in ED-117 [2], clause 3.3.9.

4.1.18 Probability of False Detection

The cooperative sensor shall comply with the Probability of False Detection requirement as defined in ED-117 [2], clause 3.3.10.

4.1.19 Probability of False Identification

The cooperative sensor shall comply with the Probability of False Identification requirement as defined in ED-117 [2], clause 3.3.11.

4.1.20 Switchover Time

The Switchover time shall comply with the requirement as defined in ED-117 [2], clause 3.3.12.

4.1.21 Position in WGS-84

The cooperative sensor shall provide the position of the target as defined in ED-117 [2], clause 2.11.1.4.

4.1.22 Power supplies

The constituent shall comply with the requirements as defined in ED-117 [2], clause 2.10.6.

4.1.23 Lightning protection

The constituent shall comply with the requirements as defined in ED-117 [2], clause 2.10.3.

4.1.24 Reliability, availability and integrity

The constituent shall comply with the requirements as defined in ED-117 [2], clause 2.10.11.

4.1.25 Temperature and Humidity

The constituent shall comply with the requirements as defined in ED-117 [2], clause 3.4.1.

4.2 Acceptance testing requirements for cooperative sensors for A-SMGCS Systems

4.2.1 Surveillance Element tests

The cooperative sensor shall perform the surveillance element tests as defined in ED-87B [1], clause 4.6.

4.2.2 Basic tests

The cooperative sensor shall perform the basic conformity tests as defined in ED-117 [2], clause 6.3.

4.2.3 Performance tests

The cooperative sensor shall perform the performance tests as defined in ED-117 [2], clause 6.4.

4.3 Maintenance Requirements for cooperative sensors for A-SMGCS Systems

4.3.1 Continuity of Service

The cooperative sensor shall comply with the Continuity of Service requirement as defined in ED-117 [2], clause 2.10.11.2.

4.3.2 Service Life

The cooperative sensor shall comply with the Service life requirement as defined in ED-117 [2], clause 2.10.11.1.

4.4 Requirements for operation cooperative sensors for A-SMGCS Systems

To ensure seamless operation, the constituent shall share and provide its information via the interfaces as defined in ED-87B [1] clause 2.5.1.1, ED-117 [2] clauses 2.6, 2.10.8.

NOTE: Guidance for the Data Fusion can be found in ED-128 [i.8].

4.5 Environmental Requirements for cooperative sensors for A-SMGCS Systems

4.5.1 Noise and Vibration

The cooperative sensor shall comply with the Noise and Vibration requirement as defined in ED-117 [2], clause 2.10.4.

4.5.2 Electromagnetic Interference and Susceptibility

The cooperative sensor shall comply with the Electromagnetic Interference and Susceptibility requirement as defined in ED-117 [2], clause 2.10.7.

NOTE: This requirement is in addition to the R&TTE directive [i.6] and considered in EN 303 213-5 [i.5].

5 Testing

The testing of cooperative sensors is covered with the build requirements from clause 4.2.

Annex SA (normative): Standards Annex

This annex provides a relationship between the present document and the Essential Requirements of the Single European Sky Interoperability Regulation.

The A-SMGCS cooperative sensor constituent shall comply with the Essential Requirements of the Interoperability Regulation as defined and described in the traceability matrixes of this annex (tables SA1 and SA2).

SA1 Correspondence between the present document and the Single European Sky Interoperability Regulation for A-SMGCS cooperative sensor constituent

Table SA1: Traceability from Interoperability Regulation to clauses of the present document

(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part A	Clause(s) of the present document	Qualifying remarks/Notes
ER 1 Seamless operation	4.1.1 Operating principles of the cooperative sensor 4.1.2 Airworthiness and certification 4.1.3 Software and Design 4.1.4 Capacity 4.1.5 Health and Safety 4.1.6.1 Equipment Interfaces 4.1.6.2 Datafusion 4.1.7 External time reference 4.1.8 System coverage 4.1.9 Identification 4.1.10 Surveillance data output 4.1.11 Update Rate 4.1.12 Integrity 4.1.13 Expandability 4.1.14 2D/3D Calculation 4.1.15 Mode S Interrogation 4.1.16 Reference transponders 4.1.17 Track Initiation 4.1.18 Probability of False Detection 4.1.19 Probability of False Identification 4.1.20 Switchover Time 4.1.21 Position in WGS-84 4.1.22 Power supplies 4.1.23 Lightning protection 4.1.24 Reliability, availability and integrity 4.1.25 Temperature and Humidity 4.4 Requirements for operation cooperative sensors for A-SMGCS Systems 4.2.1 Surveillance Element tests 4.2.2 Basic tests 4.2.3 Performance tests 4.3.1 Continuity of Service 4.3.2 Service Life	

(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part A	Clause(s) of the present document	Qualifying remarks/Notes
ER 2 Support for new concepts of operation		Operation is only applicable at the system level
ER 3 Safety	n/a	
ER 4 Civil-military coordination		The present document does not give presumption of conformity
ER 5 Environmental constraints	4.5.1 Noise and Vibration 4.5.2 Electromagnetic Interference and Susceptibility	
ER 6 Principles governing the logical architecture of systems	n/a	
ER 7 Principles governing the construction of systems	n/a	

(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part B	Clause(s) of the present document	Qualifying remarks/Notes
ER 1.1 Seamless operation of airspace management		Not covered by EN 303 213 (parts 1 to 4)
ER 2.1 Seamless operation of air traffic flow management		Not covered by EN 303 213 (parts 1 to 4)
ER 3.1.1 Seamless operation of flight data processing		Not covered by EN 303 213 (parts 1 to 4)
ER 3.1.2 Support for new concepts of operation for flight data processing		Not covered by EN 303 213 (parts 1 to 4)
ER 3.2.1 Seamless operation surveillance data processing systems	n/a	
ER 3.2.2 Support for new concepts of operation for surveillance data processing systems	n/a	
ER 3.3.1 Seamless operation of Human-machine interface systems	n/a	
ER 3.3.2 Support for new concepts of operation for Human-machine interface systems	n/a	
ER 4.1 Seamless operation of Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications		Not covered by EN 303 213 (parts 1 to 4)
ER 4.2 Support for new concepts of operation for Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications		Not covered by EN 303 213 (parts 1 to 4)
ER 5.1 Seamless operation of Navigation systems and procedures		Not covered by EN 303 213 (parts 1 to 4)
ER 6.1 Seamless operation of Surveillance systems and procedures		Not covered by EN 303 213 (parts 1 to 4)
ER 7.1 Seamless operation of Systems and procedures for aeronautical information services		Not covered by EN 303 213 (parts 1 to 4)
ER 8.1 Seamless operation of systems and procedures for the use of meteorological information		Not covered by EN 303 213 (parts 1 to 4)
ER 8.2 Support for new concepts of operation for systems and procedures for the use of meteorological information		Not covered by EN 303 213 (parts 1 to 4)

Table SA2: Traceability from clauses of the present document to Interoperability Regulation

Clause(s) of the present document	(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part A and B	Qualifying remarks/Notes
4.1.1 Operating principles of the cooperative sensor	ER 1 Seamless operation	
4.1.2 Airworthiness and certification	ER 1 Seamless operation	
4.1.3 Software and Design	ER 1 Seamless operation	
4.1.4 Capacity	ER 1 Seamless operation	
4.1.5 Health and Safety	ER 1 Seamless operation	
4.1.6.1 Equipment Interfaces	ER 1 Seamless operation	
4.1.6.2 Datafusion	ER 1 Seamless operation	
4.1.7 External time reference	ER 1 Seamless operation	
4.1.8 System coverage	ER 1 Seamless operation	
4.1.9 Identification	ER 1 Seamless operation	
4.1.10 Surveillance data output	ER 1 Seamless operation	
4.1.11 Update Rate	ER 1 Seamless operation	
4.1.12 Integrity	ER 1 Seamless operation	
4.1.13 Expandability	ER 1 Seamless operation	
4.1.14 2D/3D Calculation	ER 1 Seamless operation	
4.1.15 Mode S Interrogation	ER 1 Seamless operation	
4.1.16 Reference transponders	ER 1 Seamless operation	
4.1.17 Track Initiation	ER 1 Seamless operation	
4.1.18 Probability of False Detection	ER 1 Seamless operation	
4.1.19 Probability of False Identification	ER 1 Seamless operation	
4.1.20 Switchover Time	ER 1 Seamless operation	
4.1.21 Position in WGS-84	ER 1 Seamless operation	
4.1.22 Power supplies	ER 1 Seamless operation	
4.1.23 Lightning protection	ER 1 Seamless operation	
4.1.24 Reliability, availability and integrity	ER 1 Seamless operation	
4.1.25 Temperature and Humidity	ER 1 Seamless operation	
4.2.1 Surveillance Element tests	ER 1 Seamless operation	
4.2.2 Basic tests	ER 1 Seamless operation	
4.2.3 Performance tests	ER 1 Seamless operation	
4.3.1 Continuity of Service	ER 1 Seamless operation	
4.3.2 Service Life	ER 1 Seamless operation	
4.4 Requirements for operation cooperative sensors for A-SMGCS Systems	ER 1 Seamless operation	
4.5.1 Noise and Vibration	ER 5 Environmental constraints	
4.5.2 Electromagnetic Interference and Susceptibility	ER 5 Environmental constraints	

NOTE: Other requirements and other EU Regulations and/or Directives may be applicable to the product(s) falling within the scope of the present document.

Annex A (normative): Checklist

The purpose of this annex is to provide a comprehensive traceability of evidence on constituents and system levels against sub-clauses of the Essential Requirements (ERs) of the Interoperability Regulation (EC 552/2004 [i.1]) as amended by Regulation EC 1070/2009 [i.7], analyzing keywords of these same essential requirements.

These keywords mainly address the phases of design, build, operation and maintenance of systems and constituents as well as specifically required qualities or attributes as defined in the ERs of the SES Interoperability Regulation.

The A-SMGCS cooperative sensor constituent shall comply with the Essential Requirements of the Interoperability Regulations as defined and described in the tables of this annex.

A.1 Interoperability Regulation Annex II Essential Requirements; Part A: General requirements

Table A.1

1	ER 1 seamless operation Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Air traffic management systems and their constituents shall be designed, built, maintained and operated using the appropriate and validated procedures, in such a way as to ensure the seamless operation of the EATMN at all times and for all phases of flight. Seamless operation can be expressed, in particular, in terms of information sharing, including the relevant operational status information, common understanding of information, comparable processing performances and the associated procedures enabling common operational performances agreed for the whole or parts of the EATMN."		
	Keywords	Evidence on constituent level	Evidence on system level
1.1	Designed	ED-87B [1] Clause 3.2.2.1 Identification ED-87B [1] Clause 2.5.1.1 Surveillance ED-117 [2] Clause 1.3.2 Operating Principles of the System ED-117 [2] Clause 2.2 Airworthiness And Certification ED-117 [2] Clause 2.6 Software and Design ED-117 [2] Clause 2.7 Health And Safety ED-117 [2] Clause 2.8 MLAT System Coverage ED-117 [2] Clause 2.9 Integrity ED-117 [2] Clause 2.10.3 Lightning Protection ED-117 [2] Clause 2.10.6 Power Supplies ED-117 [2] Clause 2.10.8 Expandability ED-117 [2] Clause 2.10.11 Availability, Reliability and Maintainability ED-117 [2] Clause 2.11.1 ASTERIX Interface (Equipment Interface) ED-117 [2] Clause 2.11.1.4 Position in WGS-84 ED-117 [2] Clause 2.11.5 External Time Reference Interface ED-117 [2] Clause 3.1.1 2D/3D Calculation ED-117 [2] Clause 3.1.2 Mode S Interrogation ED-117 [2] Clause 3.1.3 Test and Reference transponders ED-117 [2] Clause 3.3.1 Update Rate ED-117 [2] Clause 3.3.6 System Capacity ED-117 [2] Clause 3.3.9 Track Initiation ED-117 [2] Clause 3.3.10 Probability of False Detection (PFD) ED-117 [2] Clause 3.3.11 Probability of False Identification ED-117 [2] Clause 3.3.12 Switchover Time ED-117 [2] Clause 3.4.1 Temperature and Humidity	The present document does not give presumption of conformity

1	ER 1 seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Air traffic management systems and their constituents shall be designed, built, maintained and operated using the appropriate and validated procedures, in such a way as to ensure the seamless operation of the EATMN at all times and for all phases of flight. Seamless operation can be expressed, in particular, in terms of information sharing, including the relevant operational status information, common understanding of information, comparable processing performances and the associated procedures enabling common operational performances agreed for the whole or parts of the EATMN."		
	Keywords	Evidence on constituent level	Evidence on system level
1.2	Built	ED-87B [1] Clause 4.6 Surveillance Element Tests ED-117 [2] Clause 6.3 Basic conformity tests ED-117 [2] Clause 6.4 Performance tests	The present document does not give presumption of conformity
1.3	maintained	ED-117 [2] Clause 2.10.11.2 Continuity of Service ED-117 [2] Clause 2.10.11.1 Service Life	The present document does not give presumption of conformity
1.4	Operated	Operation is only applicable at the system level	The present document does not give presumption of conformity
1.5	information sharing	ED-87B [1] Clause 2.5.1.1 Surveillance ED-117 [2] Clause 2.6 Software and Design ED-117 [2] Clause 2.10.8 Expandability	The present document does not give presumption of conformity

Table A.2

2	ER 2 Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "The EATMN, its systems and their constituents shall support, on a coordinated basis, new agreed and validated concepts of operation that improve the quality, sustainability and effectiveness of air navigation services, in particular in terms of safety and capacity. The potential of new concepts, such as collaborative decision-making, increasing automation and alternative methods of delegation of separation responsibility, shall be examined taking due account of technological developments and of their safe implementation, following validation."		
	Keywords	Evidence on constituent level	Evidence on system level
2.1	Validated concepts of operation - safety	Operation is only applicable at the system level	The present document does not give presumption of conformity
2.2	Validated concepts of operation - capacity	Operation is only applicable at the system level	The present document does not give presumption of conformity
2.3	Validated concepts of operation - quality	Operation is only applicable at the system level	The present document does not give presumption of conformity

Table A.3

3	ER 3 Safety			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Systems and operations of the EATMN shall achieve agreed high levels of safety. Agreed safety management and reporting methodologies shall be established to achieve this. In respect of appropriate ground-based systems, or parts thereof, these high levels of safety shall be enhanced by safety nets which shall be subject to agreed common performance characteristics. A harmonized set of safety requirements for the design, implementation, maintenance and operation of systems and their constituents, both for normal and degraded modes of operation, shall be defined with a view to achieving the agreed safety levels, for all phases of flight and for the entire EATMN. Systems shall be designed, built, maintained and operated, using the appropriate and validated procedures, in such a way that the tasks assigned to the control staff are compatible with human capabilities, in both the normal and degraded modes of operation, and are consistent with required safety levels. Systems shall be designed, built, maintained and operated using the appropriate and validated procedures, in such a way as to be free from harmful interference in their normal operational environment."			
	Keywords	Evidence on constituent level	Evidence on system level	Evidence at procedure level
3.1	Design	n/a	The present document does not give presumption of conformity	The present document does not give presumption of conformity
3.2	Implementation	n/a	The present document does not give presumption of conformity	The present document does not give presumption of conformity
3.3	Maintenance	n/a	The present document does not give presumption of conformity	n/a
3.4	Operation	n/a	The present document does not give presumption of conformity	The present document does not give presumption of conformity
3.5	Human capabilities	n/a	The present document does not give presumption of conformity	The present document does not give presumption of conformity
3.6	Harmful interference	n/a	The present document does not give presumption of conformity	n/a

Table A.4

4	ER 4 Civil-military coordination		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "The EATMN, its systems and their constituents shall support the progressive implementation of civil/military coordination, to the extent necessary for effective airspace and air traffic flow management, and the safe and efficient use of airspace by all users, through the application of the concept of the flexible use of airspace. To achieve these objectives, the EATMN, its systems and their constituents shall support the timely sharing of correct and consistent information covering all phases of flight, between civil and military parties. Account should be taken of national security requirements."		
	Keywords	Evidence on constituent level	Evidence on system level
4.1	Flexible use of airspace	The present document does not give presumption of conformity	The present document does not give presumption of conformity
4.2	Timely sharing	The present document does not give presumption of conformity	The present document does not give presumption of conformity
4.3	National security requirements	n/a	The present document does not give presumption of conformity

Table A.5

5	ER 5 Environmental constraints			
Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Systems and operations of the EATMN shall take into account the need to minimize environmental impact in accordance with Community legislation."				
	Keywords	Evidence on constituent level	Evidence on system level	Evidence at procedure level
5.1	Minimize environmental impact - ATS	n/a	The present document does not give presumption of conformity	The present document does not give presumption of conformity
5.2	Minimize environmental impact - materials	ED-117 [2] Clause 2.10.4 Noise and Vibration ED-117 [2] Clause 2.10.7 Electromagnetic Interference and Susceptibility	The present document does not give presumption of conformity	n/a

Table A.6

6	ER 6 Principles governing the logical architecture of systems		
Regulation (EC) 552/2004 as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Systems shall be designed and progressively integrated with the objective of achieving a coherent and increasingly harmonized, evolutionary and validated logical architecture within the EATMN."			
	Keywords	Evidence on constituent level	Evidence on system level
6.1	Designed and progressively integrated	n/a	The present document does not give presumption of conformity

Table A.7

7	ER 7 Principles governing the construction of systems		
Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Systems shall be designed, built and maintained on the grounds of sound engineering principles, in particular those relating to modularity, enabling interchangeability of constituents, high availability, and redundancy and fault tolerance of critical constituents."			
	Keywords	Evidence on constituent level	Evidence on system level
7.1	Modularity, interchangeability	n/a	The present document does not give presumption of conformity
7.2	High availability, Redundancy and fault tolerance	n/a	The present document does not give presumption of conformity

A.2 Interoperability Regulation Annex II Essential Requirements; Part B: Specific requirements

A.2.1 Systems and procedures for airspace management

Table A.8

1.1	ER 1.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Information relating to pre-tactical and tactical aspects of airspace availability shall be provided to all interested parties in a correct and timely way so as to ensure an efficient allocation and use of airspace by all airspace users. This should take into account national security requirements."		
	Keywords	Evidence on constituent level	Evidence on system level
1.1.1	Modularity, interchangeability	n/a	Not covered by EN 303 213 (parts 1 to 4)
1.1.2	High availability	n/a	Not covered by EN 303 213 (parts 1 to 4)
1.1.3	Redundancy and fault tolerance	n/a	Not covered by EN 303 213 (parts 1 to 4)

A.2.2 Systems and procedures for air traffic flow management

Table A.9

2.1	ER 2.1 Seamless operation			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Systems and procedures for air traffic flow management shall support the sharing of correct, coherent and relevant strategic, pre-tactical and tactical, as applicable, flight information covering all phases of flight and offer dialogue capabilities with a view to achieving optimized use of airspace."			
	Keywords	Evidence on constituent level	Evidence on system level	Evidence at procedure level
2.1.1	Strategic	n/a	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
2.1.2	Pre-tactical	n/a	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
2.1.3	Tactical	n/a	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)

A.2.3 Systems and procedures for air traffic services

A.2.3.1 Flight data processing systems

Table A.10

3.1.1	ER 3.1.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Flight data processing systems shall be interoperable in terms of the timely sharing of correct and consistent information, and a common operational understanding of that information, in order to ensure a coherent and consistent planning process and resource-efficient tactical coordination throughout the EATMN during all phases of flight. In order to ensure safe, smooth and expeditious processing throughout the EATMN, flight data processing performances shall be equivalent and appropriate for a given environment (surface, terminal manoeuvring area (TMA), en-route), with known traffic characteristics and exploited under an agreed and validated operational concept, in particular in terms of accuracy and error tolerance of processing results."		
	Keywords	Evidence on constituent level	Evidence on system level
3.1.1.1	Timely sharing	n/a	Not covered by EN 303 213 (parts 1 to 4)
3.1.1.2	Performance appropriate for environment	n/a	Not covered by EN 303 213 (parts 1 to 4)
3.1.1.3	Accuracy and error tolerance	n/a	Not covered by EN 303 213 (parts 1 to 4)

Table A.11

3.1.2	ER 3.1.2. Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Flight data processing systems shall accommodate the progressive implementation of advanced, agreed and validated concepts of operation for all phases of flight, in particular as envisaged in the ATM MasterPlan. The characteristics of automation-intensive tools must be such as to enable coherent and efficient pre-tactical and tactical processing of flight information in parts of the EATMN. Airborne and ground systems and their constituents supporting new, agreed and validated concepts of operation shall be designed, built, maintained and operated, using appropriate and validated procedures, in such a way as to be interoperable in terms of timely sharing of correct and consistent information and a common understanding of the current and predicted operational situation."		
	Keywords	Evidence on constituent level	Evidence on system level
3.1.2.1	Airborne systems - design	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
3.1.2.2	Airborne systems - built	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
3.1.2.3	Airborne systems - maintained	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
3.1.2.4	Airborne systems - operated	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
3.1.2.5	Ground systems - design	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
3.1.2.6	Ground systems - built	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
3.1.2.7	Ground systems - maintained	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)
3.1.2.8	Ground systems - operated	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)

A.2.3.2 Surveillance data processing systems

Table A.12

3.2.1	ER 3.2.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Surveillance data processing systems shall be designed, built, maintained and operated using the appropriate and validated procedures, in such a way as to provide the required performance and quality of service within a given environment (surface, TMA, en-route) with known traffic characteristics, in particular in terms of accuracy and reliability of computed results, correctness, integrity, availability, continuity and timeliness of information at the control position. Surveillance data processing systems shall accommodate the timely sharing of relevant, accurate, consistent and coherent information between them to ensure optimized operations through different parts of the EATMN."		
	Keywords	Evidence on constituent level	Evidence on system level
3.2.1.1	Designed	n/a	The present document does not give presumption of conformity
3.2.1.2	Built	n/a	The present document does not give presumption of conformity
3.2.1.3	Maintained	n/a	The present document does not give presumption of conformity
3.2.1.4	Operated	n/a	The present document does not give presumption of conformity

Table A.13

3.2.2	ER 3.2.2. Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Surveillance data processing systems shall accommodate the progressive availability of new sources of surveillance information in such a way as to improve the overall quality of service, in particular as envisaged in the ATM MasterPlan."		
	Keywords	Evidence on constituent level	Evidence on system level
3.2.2.1	Availability of new sources	n/a	The present document does not give presumption of conformity

A.2.3.3 Human-machine interface systems

Table A.14

3.3.1	ER 3.3.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Human-machine interfaces of ground air traffic management systems shall be designed, built, maintained and operated using the appropriate and validated procedures, in such a way as to offer to all control staff a progressively harmonized working environment, including functions and ergonomics, meeting the required performance for a given environment (surface, TMA, en-route), with known traffic characteristics."		
	Keywords	Evidence on constituent level	Evidence on system level
3.3.1.1	Designed	n/a	The present document does not give presumption of conformity
3.3.1.2	Built	n/a	The present document does not give presumption of conformity
3.3.1.3	Maintained	n/a	The present document does not give presumption of conformity
3.3.1.4	Operated	n/a	The present document does not give presumption of conformity

Table A.15

3.3.2	ER 3.3.2. Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Human-machine interface systems shall accommodate the progressive introduction of new, agreed and validated concepts of operation and increased automation, in such a way as to ensure that the tasks assigned to the control staff remain compatible with human capabilities, in both the normal and degraded modes of operation."		
	Keywords	Evidence on constituent level	Evidence on system level
3.3.2.1	Human capabilities	n/a	The present document does not give presumption of conformity

A.2.4 Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications

Table A.16

4.1	ER 4.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Communication systems shall be designed, built, maintained and operated using the appropriate and validated procedures, in such a way as to achieve the required performances within a given volume of airspace or for a specific application, in particular in terms of communication processing time, integrity, availability and continuity of function. The communications network within the EATMN shall be such as to meet the requirements of quality of service, coverage and redundancy."		
	Keywords	Evidence on constituent level	Evidence on system level
4.1.1	Designed	n/a	Not covered by EN 303 213 (parts 1 to 4)
4.1.2	Built	n/a	Not covered by EN 303 213 (parts 1 to 4)
4.1.3	Maintained	n/a	Not covered by EN 303 213 (parts 1 to 4)
4.1.4	Operated	n/a	Not covered by EN 303 213 (parts 1 to 4)
4.1.5	Quality of service, coverage, redundancy	n/a	Not covered by EN 303 213 (parts 1 to 4)

Table A.17

4.2	ER 4.2 Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Communication systems shall support the implementation of advanced, agreed and validated concepts of operation for all phases of flight, in particular as envisaged in the ATM MasterPlan."		
	Keywords	Evidence on constituent level	Evidence on system level
4.2.1	Support the implementation	n/a	Not covered by EN 303 213 (parts 1 to 4)

A.2.5 Navigation systems and procedures

Table A.18

5.1	ER 5.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Navigation systems shall be designed, built, maintained and operated using appropriate and validated procedures in such a way as to achieve the required horizontal and vertical navigation performance, in particular in terms of accuracy and functional capability, for a given environment (surface, TMA, en-route), with known traffic characteristics and exploited under an agreed and validated operational concept."		
	Keywords	Evidence on constituent level	Evidence on system level
5.1.1	Designed	n/a	Not covered by EN 303 213 (parts 1 to 4)
5.1.2	Built	n/a	Not covered by EN 303 213 (parts 1 to 4)
5.1.3	Maintained	n/a	Not covered by EN 303 213 (parts 1 to 4)
5.1.4	Operated	n/a	Not covered by EN 303 213 (parts 1 to 4)

A.2.6 Surveillance systems and procedures

Table A.19

6.1	ER 6.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Surveillance systems shall be designed, built, maintained and operated using appropriate and validated procedures in such a way as to provide the required performance applicable in a given environment (surface, TMA, en-route) with known traffic characteristics and exploited under an agreed and validated operational concept, in particular in terms of accuracy, coverage, range and quality of service. The surveillance network within the EATMN shall be such as to meet the requirements of accuracy, timeliness, coverage and redundancy. The surveillance network shall enable surveillance data to be shared in order to enhance operations throughout the EATMN."		
	Keywords	Evidence on constituent level	Evidence on system level
6.1.1	Designed	n/a	Not covered by EN 303 213 (parts 1 to 4)
6.1.2	Built	n/a	Not covered by EN 303 213 (parts 1 to 4)
6.1.3	Maintained	n/a	Not covered by EN 303 213 (parts 1 to 4)
6.1.4	Operated	n/a	Not covered by EN 303 213 (parts 1 to 4)

A.2.7 Systems and procedures for aeronautical information services

Table A.20

7.1	ER 7.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Accurate, timely and consistent aeronautical information shall be provided progressively in an electronic form, based on a commonly agreed and standardized data set. Accurate and consistent aeronautical information, in particular concerning airborne and ground-based constituents or systems, shall be made available in a timely manner."		
	Keywords	Evidence on constituent level	Evidence on system level
7.1.1	Accurate, timely and consistent	n/a	Not covered by EN 303 213 (parts 1 to 4)
7.1.2	Standardized data set	n/a	Not covered by EN 303 213 (parts 1 to 4)

Table A.21

7.2	ER 7.2 Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Increasingly accurate, complete and up-to-date aeronautical information shall be made available and used in a timely manner in order to support continuous improvement of the efficiency of airspace and airport use."		
	Keywords	Evidence on constituent level	Evidence on system level
7.2.1	Increasingly accurate, complete and up-to-date	n/a	Not covered by EN 303 213 (parts 1 to 4)

A.2.8 Systems and procedures for the use of meteorological information

Table A.22

8.1	ER 8.1 Seamless operation			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Systems and procedures for the use of meteorological information shall improve the consistency and timeliness of its provision and the quality of its presentation, using an agreed data set."			
	Keywords	Evidence on constituent level	Evidence on system level	Evidence at procedure level
8.1.1	Consistency and timeliness	n/a	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)

Table A.23

8.2	ER 8.2 Support for new concepts of operation			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.7] requires that: "Systems and procedures for the use of meteorological information shall improve the promptness of its availability and the speed with which it may be used, in order to support continuous improvement of the efficiency of airspace and airport use."			
	Keywords	Evidence on constituent level	Evidence on system level	Evidence at procedure level
8.2.1	Promptness, speed	n/a	Not covered by EN 303 213 (parts 1 to 4)	Not covered by EN 303 213 (parts 1 to 4)

Annex B (informative): The EN title in the official languages

Language	EN title
Bulgarian	
Czech	
Danish	
Dutch	
English	Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 3: Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for a deployed cooperative sensor including its interfaces
Estonian	
Finnish	
French	
German	
Greek	
Hungarian	
Icelandic	
Italian	
Latvian	
Lithuanian	
Maltese	
Norwegian	
Polish	
Portuguese	
Romanian	
Slovak	
Slovenian	
Spanish	
Swedish	

Annex C (informative): Bibliography

ICAO Annex 14: "Aerodrome Design and Operations, volume 1".

ICAO Annex 10: "Aeronautical communications".

ICAO Document 9476: "Manual of Surface Movements and Guidance Control Systems (SMGCS)".

ICAO EUR Manual on A-SMGCS.

Council Resolution of 7 May 1985 on a new approach to technical harmonization and standards, OJ C 136, 04.06.1985.

ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

ETSI TR 102 579: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Report providing guidance for the production of Community Specifications for application under the Single European Sky Interoperability Regulation EC 552/2004".

EUROCONTROL 07/01/11-06 (Edition 2.0, December 2006): "Functional Specification for A-SMGCS Implementation Level 1".

EUROCONTROL 06/11/27-18 (V1.1, November 2006): "Human Factor Case for A-SMGCS".

EUROCONTROL: "European Action Plan for the Prevention of Runway Incursions".

History

Document history			
V1.1.1	December 2009	Public Enquiry	PE 20100420: 2009-12-21 to 2010-04-20