



EUROPEAN STANDARD

**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**

Reference

REN/ERM-TGAERO-24

Keywords

aeronautical, air traffic management,
interoperability

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:
<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	5
Foreword.....	5
Modal verbs terminology.....	6
Introduction	6
1 Scope	7
2 References	7
2.1 Normative references	7
2.2 Informative references.....	8
3 Definitions and abbreviations.....	9
3.1 Definitions.....	9
3.2 Abbreviations	10
4 Requirements for implementing A-SMGCS Level 1	11
4.0 General Requirements	11
4.1 Constituents of an A-SMGCS Level 1 System.....	11
4.1.0 General.....	11
4.1.1 Constituent - Surface Movement Radar (SMR).....	11
4.1.1.1 Interfaces for SMR.....	11
4.1.2 Constituent - Multilateration.....	11
4.1.2.1 Interfaces for multilateration.....	11
4.1.3 Interface for Data fusion	12
4.1.4 Human Machine Interface (HMI).....	12
4.1.4.1 Interface for HMI.....	12
4.2 Design Requirements for A-SMGCS Level 1 Systems	12
4.2.1 Design Requirements on System Level	12
4.2.1.1 Modularity.....	12
4.2.1.2 System Integrity	12
4.2.1.3 Availability and Continuity of Service.....	12
4.2.1.4 Identification	12
4.2.1.5 Void.....	12
4.2.1.6 Logical architecture.....	12
4.2.1.7 Safety	12
4.2.1.7.1 Failure effect.....	12
4.2.1.7.2 Reliability	13
4.2.1.7.3 Human capabilities	13
4.2.1.7.4 Safety Assessment.....	13
4.2.1.8 Capacity and Quality.....	13
4.2.1.8.1 Handle Traffic Movements.....	13
4.2.1.8.2 System capacity	13
4.2.1.8.3 Accuracy.....	13
4.2.1.8.4 Resolution.....	13
4.2.1.8.5 Update rate	13
4.2.1.8.6 Coverage Volume.....	13
4.2.1.8.7 Classification	13
4.2.1.9 Evolution.....	14
4.2.2 Design Requirements for Surface Movement Radar	14
4.2.3 Design Requirements for Local Area Multilateration.....	14
4.2.4 Design Requirements for Data Fusion.....	14
4.2.5 Design Requirements for HMI.....	14
4.3 Acceptance testing requirements for A-SMGCS Level 1 System.....	14
4.3.1 Acceptance testing requirements on System Level.....	14
4.3.1.1 General Tests.....	14
4.3.1.2 Tests on modularity and interchangeability	14
4.3.1.3 Acceptance testing requirements for Data Fusion.....	14
4.3.1.4 Acceptance testing requirements for HMI	14

4.3.2	Acceptance testing requirements on Constituent Level	14
4.3.2.1	Acceptance testing requirements for Constituent Surface Movement Radar	14
4.3.2.2	Acceptance testing requirements for Constituent Local Area Multilateration	15
4.4	Maintenance Requirements for A-SMGCS Level 1 Systems	15
4.5	Requirements for operation of A-SMGCS Level 1 Systems	15
4.5.1	Requirements for operational responsibility	15
4.5.2	System performance below specified minima	15
5	Testing	15
Annex SA (normative): Standards Annex.....		16
SA.1	Correspondence between the present document and the Single European Sky Interoperability Regulation as amended for A-SMGCS Systems Level 1	16
Annex A (normative): Checklist		21
A.1	General	21
A.2	Interoperability Regulation Annex II Essential Requirements; Part A: General requirements	22
A.3	Interoperability Regulation Annex II Essential Requirements Part B: Specific requirements.....	28
A.3.1	Systems and procedures for airspace management.....	28
A.3.2	Systems and procedures for air traffic flow management	28
A.3.3	Systems and procedures for air traffic services	29
A.3.3.1	Flight data processing systems.....	29
A.3.3.2	Surveillance data processing systems	31
A.3.3.3	HMI systems	32
A.3.4	Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications	33
A.3.5	Navigation systems and procedures	34
A.3.6	Surveillance systems and procedures	34
A.3.7	Systems and procedures for aeronautical information services	35
A.3.8	Systems and procedures for the use of meteorological information.....	35
Annex B (informative): Bibliography.....		37
History		38

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN 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 to support 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 Interoperability Regulation.

The presumption of conformity which is linked to the full application of ETSI EN 303 213 (parts 1 to 4) can only be claimed after ETSI 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 [i.1] as amended by Regulation 1070/2009 [i.12] 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 1 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: Harmonised EN covering the essential requirements of article 3.2 of the Directive 2014/53/EU for multilateration equipment;"

Part 6: Harmonised EN covering the essential requirements of article 3.2 of the Directive 2014/53/EU 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):	6 months after doa

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The European Union launched the Legislation "Single European Sky" (SES) in 2002 which was adopted in 2004 and amended by Regulation (EC) No 1070/2009 [i.12].

The SES legislation is based on a framework of 4 regulations, which includes the Interoperability Regulation [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.8].

The present document takes into account the updated referenced documents from EUROCAE and EUROCONTROL.

1 Scope

The present document is applicable to Advanced Surface Movement Guidance and Control System (A-SMGCS) Level 1. This system provides enhanced surveillance functionalities, as well as a display to controllers with accurate and unambiguous identity and position information on the entire manoeuvring and movement area.

The present document provides a European Standard for Air Navigation Service Providers, which have to demonstrate and declare compliance of their systems and procedures 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 1: 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.

The present document does not give presumption of conformity to any current interoperability Implementing Rules.

NOTE 2: Currently there are no relevant Implementing Rules for A-SMGCS.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://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.

The following referenced documents are necessary for the application of the present document.

- [1] EUROCAE ED-87C (January 2015): "MASPS for Advanced Surface Movement Guidance and Control Systems (A-SMGCS) - Levels 1 and 2".
- [2] EUROCONTROL 10/07/15-70 (V2.1: 30/06/2010): "Operational Concept and Requirements for A-SMGCS Implementation Level 1".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [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, p. 26 as amended by Regulation (EC) No 1070/2009, OJ L 300, 14.11.2009, p. 34.
- [i.2] ETSI EN 303 213-3: "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".
- [i.3] ETSI EN 303 213-4-1: "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; Sub-part 1: Generic requirements for non-cooperative sensor".
- [i.4] ETSI EN 303 213-4-2: "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; Sub-part 2: Specific requirements for a deployed Surface Movement Radar sensor".
- [i.5] 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, p. 1 as amended by Regulation (EC) No 1070/2009, OJ L 300, 14.11.2009, p. 34.
- [i.6] EUROCAE ED-128 (08/2007): "Guidelines for surveillance data fusion in advanced surface movement guidance and control systems (A-SMGCS) levels 1 and 2".
- [i.7] ICAO Document 9830, AN/452: "Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual", First Edition, 2004.
- [i.8] 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.9] 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.10] EUROCONTROL 10/07/15-71 (V2.1: 30/06/2010): "A-SMGCS Levels 1 & 2 Preliminary Safety Case".
- [i.11] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- [i.12] 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.

3 Definitions and abbreviations

3.1 Definitions

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

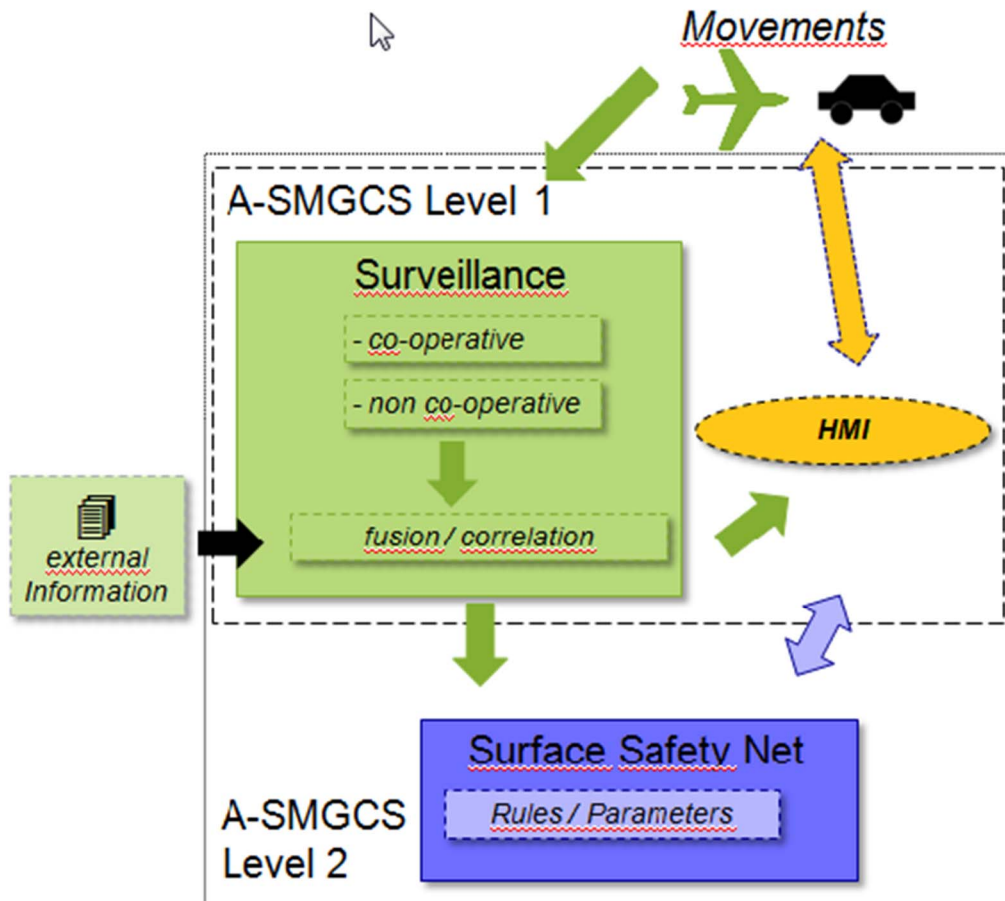


Figure 1: A-SMGCS Functional Configuration

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

NOTE: This definition is derived from the ICAO Document 9830 [i.7].

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

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

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.7].

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

NOTE 1: This definition is derived from the ICAO Document 9830 [i.7].

NOTE 2: De-icing platforms, including remote de-icing areas, are considered as apron areas.

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

NOTE: This definition is derived from EUROCAE ED-87C [1].

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.5].

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.7].

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.7].

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.5].

system: aggregation of airborne and ground based 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.5].

target: any aircraft, vehicle or obstacle, whether stationary or moving, which is located within the Coverage Volume of the A-SMGCS and which is operationally significant in the scope of A-SMGCS use

NOTE 1: Aircraft and vehicles are collectively referred to as mobiles.

NOTE 2: This definition is derived from EUROCAE ED-87C [1].

test targets: form of either fixed reflectors or active devices transponders, mounted at fixed positions within the Coverage Volume

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

3.2 Abbreviations

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

A-SMGCS	Advanced Surface Movement Guidance and Control Systems
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Service
AVOL	Aerodrome Visibility Operational Level
CS	Community Specification
DFP	Data Fusion Processor
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
HMI	Human Machine Interface

ICAO	International Civil Aviation Organization
IOP Regulation	InterOPERability Regulation
LAM	Local Area Multilateration
MASPS	Minimum Aviation Systems Performance Specification
SES	Single European Sky
SESAR	Single European Sky ATM Research
SMR	Surface Movement Radar
TMA	Terminal Manoeuvring Area

4 Requirements for implementing A-SMGCS Level 1

4.0 General Requirements

An A-SMGCS Level 1 System shall consist of the following constituents as a minimum for the implementation, operation and maintenance:

- 1) Non-Cooperative Surveillance, e.g. Surface Movement Radar.
- 2) Multilateration.

Data Fusion and HMI are considered as part of the System but are not at this time defined as constituents.

NOTE 1: Guidance for the Data Fusion can be found in EUROCAE ED-128 [i.6].

NOTE 2: The Data fusion could be part of a larger data fusion processor providing other ATS functions.

NOTE 3: The Data fusion may be a separate part of the CS in the future.

4.1 Constituents of an A-SMGCS Level 1 System

4.1.0 General

The following clauses identify the constituents of an A-SMGCS.

NOTE: Data Fusion and HMI are currently defined at System level, however they have been included here, since they may become constituents in the future.

4.1.1 Constituent - Surface Movement Radar (SMR)

4.1.1.1 Interfaces for SMR

The interfaces for SMR constituents shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 2.3.1.1.

The SMR constituent of an A-SMGCS is covered in ETSI EN 303 213-4-1 [i.3] (Generic requirements) and ETSI EN 303 213-4-2 [i.4] (Specific requirements).

4.1.2 Constituent - Multilateration

4.1.2.1 Interfaces for multilateration

The interfaces for multilateration constituents shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 2.3.1.1.

The multilateration constituent of an A-SMGCS is covered in ETSI EN 303 213-3 [i.2] (cooperative sensors).

4.1.3 Interface for Data fusion

The interfaces for the data fusion in an A-SMGCS shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 2.3.1.2.

NOTE: Guidance for the Data Fusion can be found in ED-128 [i.6].

4.1.4 Human Machine Interface (HMI)

4.1.4.1 Interface for HMI

The interface for the HMI shall be capable to exchange data with the data fusion processor.

The requirements for the HMI are further described in clauses 4.2.5 and 4.3.1.4 of the present document.

NOTE 1: The HMI could be part of a larger HMI, providing other ATS functions.

NOTE 2: The HMI could be a separate part of the CS in the future.

4.2 Design Requirements for A-SMGCS Level 1 Systems

4.2.1 Design Requirements on System Level

4.2.1.1 Modularity

The System shall comply with the design requirements as defined in EUROCAE ED-87C [1], clause 1.7.2.

4.2.1.2 System Integrity

The System integrity shall comply with the design requirements as defined in EUROCAE ED-87C [1], clause 4.1.1.

4.2.1.3 Availability and Continuity of Service

The Availability and continuity of service for A-SMGCS shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 4.1.2 and Operational Concept and Requirements for A-SMGCS Implementation Level 1 [2], Op_Perf-10-Availability and Op_Perf-12-Continuity of Service 1.

4.2.1.4 Identification

The functional requirement for identification shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 3.2.4.

4.2.1.5 Void

4.2.1.6 Logical architecture

The logical architecture of the system shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 2.1.

4.2.1.7 Safety

4.2.1.7.1 Failure effect

An A-SMGCS Level 1 system shall be designed in such a way, that erroneous data from any constituent would have an acceptable impact on safety.

NOTE: This requirement is derived from EUROCONTROL 10/07/15-70, clause 7.2.3 Requirement Op_Ds-7-Failure effect "d" [2].

4.2.1.7.2 Reliability

The reliability of the system shall comply with the requirements as defined in Operational Concept and Requirements for A-SMGCS Implementation Level 1 [2], Op_Ds-5-Self-checking system, Op_Ds-8-Self-restartable, and Op_Env-4-Adverse effects.

4.2.1.7.3 Human capabilities

An A-SMGCS Level 1 system shall be designed in such a way, that the human capabilities shall be compatible with the principals described in EUROCAE ED-87C [1], clause 2.3.2.

4.2.1.7.4 Safety Assessment

A safety assessment for A-SMGCS Level 1 system shall be provided. The safety objectives shall comply with the requirements as defined in Operational Concept and Requirements for A-SMGCS Implementation Level 1 [2], clause 2.1.

NOTE: The safety assessment may follow the methodology from A-SMGCS Levels 1&2 Preliminary Safety Case [i.10].

4.2.1.8 Capacity and Quality

4.2.1.8.1 Handle Traffic Movements

The handling of traffic movements shall comply with the requirements as defined in Operational Concept and Requirements for A-SMGCS Implementation Level 1 [2], clause 7.2.3, Op_Range-2-Capacity, Op_Range-1-Visibility conditions, Op_Range-3-Mobile types, Op_Range-4-Mobile types, Op_Range-5-Speeds and Orientation, Op_Range-6-Velocity.

4.2.1.8.2 System capacity

The system design shall take into account that capacity requirements will vary considerably from airport to airport depending on the volume of traffic and the aerodrome complexity. As a minimum, System Capacity shall be sufficient to meet the number of expected targets for the aerodrome with a specified margin of spare capacity to permit safe operation and future growth.

NOTE: This requirement is taken from EUROCAE ED-87C [1], clause 3.1.1.

4.2.1.8.3 Accuracy

The accuracy shall comply with the requirements as defined in EUROCAE ED-87C [1], clauses 3.2.6 and 3.2.8.

4.2.1.8.4 Resolution

The resolution shall comply with the requirements as defined in EUROCAE ED-87C [1], clauses 3.2.13 and 3.2.14.

4.2.1.8.5 Update rate

The update rate shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 3.2.7.

4.2.1.8.6 Coverage Volume

The coverage volume shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 3.2.1.

4.2.1.8.7 Classification

The classification shall comply with the requirements as defined in EUROCAE ED-87C [1], clauses 3.2.2.2 and 3.2.5.

4.2.1.9 Evolution

The evolution shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 1.7.3.

4.2.2 Design Requirements for Surface Movement Radar

The design requirements for Surface Movement Radar as part of an A-SMGCS are covered in ETSI EN 303 213-4-1 [i.3].

4.2.3 Design Requirements for Local Area Multilateration

The design requirements for Local Area Multilateration as part of an A-SMGCS are covered in ETSI EN 303 213-3 [i.2].

4.2.4 Design Requirements for Data Fusion

No design requirements for Data Fusion are currently available.

NOTE 1: Guidance for the Data Fusion can be found in EUROCAE ED-128 [i.6].

NOTE 2: The Data fusion could be part of a larger data fusion processor providing other ATS functions.

NOTE 3: The Data fusion may be a separate part of the CS in the future.

4.2.5 Design Requirements for HMI

The general requirements for the HMI shall comply with the requirements as defined in EUROCAE ED-87C [1], clause 2.3.2.

4.3 Acceptance testing requirements for A-SMGCS Level 1 System

4.3.1 Acceptance testing requirements on System Level

4.3.1.1 General Tests

The system shall perform the build tests as defined in EUROCAE ED-87C [1], clause 5.6.

4.3.1.2 Tests on modularity and interchangeability

The system shall perform the build tests as defined in EUROCAE ED-87C [1], clauses 5.6 and 5.7.

4.3.1.3 Acceptance testing requirements for Data Fusion

The Data Fusion shall perform the build tests as defined in EUROCAE ED-87C [1], clause 5.7.

4.3.1.4 Acceptance testing requirements for HMI

The HMI shall perform the build tests as defined in EUROCAE ED-87C [1], clause 5.10.

4.3.2 Acceptance testing requirements on Constituent Level

4.3.2.1 Acceptance testing requirements for Constituent Surface Movement Radar

The build requirements for Surface Movement Radar as part of an A-SMGCS are covered in ETSI EN 303 213-4-1 [i.3] and ETSI EN 303 213-4-2 [i.4].

4.3.2.2 Acceptance testing requirements for Constituent Local Area Multilateration

The build requirements for Local Area Multilateration as part of an A-SMGCS are covered in ETSI EN 303 213-3 [i.2].

4.4 Maintenance Requirements for A-SMGCS Level 1 Systems

The present document does not give presumption of conformity related to the maintenance requirements.

4.5 Requirements for operation of A-SMGCS Level 1 Systems

4.5.1 Requirements for operational responsibility

The operational responsibility shall be as defined in Operational Concept and Requirements for A-SMGCS Implementation Level 1 [2], clause 7.2.3, Op_Resp-1-Users, Op_Resp-2-Assignment, Op_Resp-3-A-SMGCS category.

4.5.2 System performance below specified minima

If the system performance is below specified minima, the user shall be informed and appropriate actions shall be defined.

5 Testing

The testing of an A-SMGCS Level 1 System is covered with the build requirements from clause 4.3.

Annex SA (normative): Standards Annex

SA.1 Correspondence between the present document and the Single European Sky Interoperability Regulation as amended for A-SMGCS Systems Level 1

The present annex provides a relationship between the present document and the Essential Requirements of the Single European Sky Interoperability Regulation [i.1].

A-SMGCS Systems Level 1 shall comply with the Essential Requirements of the Interoperability Regulation [i.1] as defined and described in the traceability matrixes of the present annex (see tables SA.1 and SA.2).

Table SA.1: 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.	4.1.3 Interface for Data fusion 4.1.4.1 Interface for HMI 4.2.1.1 Modularity 4.2.1.2 System Integrity 4.2.1.3 Availability and Continuity of Service 4.2.1.4 Identification 4.2.5 Design Requirements for HMI 4.3.1.1 General Tests 4.3.1.2 Tests on modularity and interchangeability 4.5.2 System performance below specified minima	The present document does not give presumption of conformity related to maintenance of the system.
ER 2 Support for new concepts of operation.	4.2.1.4 Identification 4.2.1.7.4 Safety Assessment 4.2.1.8.1 Handle Traffic Movements 4.2.1.8.2 System capacity 4.2.1.8.3 Accuracy 4.2.1.8.4 Resolution 4.2.1.8.5 Update rate 4.2.1.8.6 Coverage Volume 4.2.1.8.7 Classification 4.5.1 Requirements for operational responsibility	
ER 3 Safety.	4.2.1.7.1 Failure effect 4.2.1.7.2 Reliability 4.2.1.7.3 Human capabilities 4.2.1.7.4 Safety Assessment 4.5.2 System performance below specified minima	
ER 4 Civil-military coordination.		The present document does not give presumption of conformity.
ER 5 Environmental constraints.		The present document does not give presumption of conformity.
ER 6 Principles governing the logical architecture of systems.	4.2.1.6 Logical architecture	

(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part A	Clause(s) of the present document	Qualifying remarks/Notes
ER 7 Principles governing the construction of systems.	4.2.1.1 Modularity 4.2.1.2 System Integrity 4.2.1.3 Availability and Continuity of Service 4.2.1.7.1 Failure effect 4.2.1.7.2 Reliability 4.3.1.1 General Tests 4.3.1.2 Tests on modularity and interchangeability	
ER 1.1 Seamless operation of airspace management.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 2.1 Seamless operation of air traffic flow management.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 3.1.1 Seamless operation of flight data processing.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 3.1.2 Support for new concepts of operation for flight data processing.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 3.2.1 Seamless operation surveillance data processing systems.	4.1.1.1 Interfaces for SMR 4.1.2.1 Interfaces for 4.2.1.1 Modularity 4.2.1.2 System Integrity 4.2.1.3 Availability and Continuity of Service 4.2.1.8.4 Resolution 4.3.1.3 Acceptance testing requirements for Data Fusion 4.5.2 System performance below specified minima	

(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part A	Clause(s) of the present document	Qualifying remarks/Notes
ER 3.2.2 Support for new concepts of operation for surveillance data processing systems.	4.2.1.9 Evolution	
ER 3.3.1 Seamless operation of HMI systems.	4.2.5 Design Requirements for HMI 4.3.1.4 Acceptance Testing Requirements for HMI	
ER 3.3.2 Support for new concepts of operation for HMI systems.	4.2.1.7.3 Human capabilities	
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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 5.1 Seamless operation of Navigation systems and procedures.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 6.1 Seamless operation of Surveillance systems and procedures.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 7.1 Seamless operation of Systems and procedures for aeronautical information services.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 7.2 Support for new concepts of operation for systems and procedures for aeronautical information services.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 8.1 Seamless operation of systems and procedures for the use of meteorological information.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
ER 8.2 Support for new concepts of operation for systems and procedures for the use of meteorological information.		Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

Table SA.2: 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
4.1.1.1 Interfaces for SMR	ER 3.2.1 Seamless operation surveillance data processing systems.	
4.1.2.1 Interfaces for	ER 3.2.1 Seamless operation surveillance data processing systems.	
4.1.3 Interface for Data fusion	ER 1 Seamless operation.	
4.1.4.1 Interface for HMI	ER 1 Seamless operation.	
4.2.1.1 Modularity	ER 1 Seamless operation. ER 7 Principles governing the construction of systems. ER 3.2.1 Seamless operation surveillance data processing systems.	
4.2.1.2 System Integrity	ER 1 Seamless operation. ER 7 Principles governing the construction of systems. ER 3.2.1 Seamless operation surveillance data processing systems.	
4.2.1.3 Availability and Continuity of Service	ER 1 Seamless operation. ER 7 Principles governing the construction of systems. ER 3.2.1 Seamless operation surveillance data processing systems.	
4.2.1.4 Identification	ER 1 Seamless operation. ER 2 Support for new concepts of operation.	
4.2.1.6 Logical architecture	ER 6 Principles governing the logical architecture of systems.	
4.2.1.7.1 Failure effect	ER 3 Safety. ER 7 Principles governing the construction of systems.	
4.2.1.7.2 Reliability	ER 3 Safety. ER 7 Principles governing the construction of systems.	
4.2.1.7.3 Human capabilities	ER 3 Safety. ER 3.3.2 Support for new concepts of operation for HMI systems.	
4.2.1.7.4 Safety Assessment	ER 2 Support for new concepts of operation. ER 3 Safety.	
4.2.1.8.1 Handle Traffic Movements	ER 2 Support for new concepts of operation.	
4.2.1.8.2 System capacity	ER 2 Support for new concepts of operation.	
4.2.1.8.3 Accuracy	ER 2 Support for new concepts of operation.	
4.2.1.8.4 Resolution	ER 2 Support for new concepts of operation. ER 3.2.1 Seamless operation surveillance data processing systems.	
4.2.1.8.5 Update rate	ER 2 Support for new concepts of operation.	
4.2.1.8.6 Coverage Volume	ER 2 Support for new concepts of operation.	
4.2.1.8.7 Classification	ER 2 Support for new concepts of operation.	
4.2.1.9 Evolution	ER 3.2.2 Support for new concepts of operation for surveillance data processing systems.	
4.2.2 Design Requirements for Surface Movement Radar		Covered in ETSI EN 303 213-4-1 [i.3].
4.2.3 Design Requirements for Local Area Multilateration		Covered in ETSI EN 303 213-3 [i.2].

Clause(s) of the present document	(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part A and B	Qualifying remarks/Notes
4.2.5 Design Requirements for HMI	ER 1 Seamless operation. ER 3.3.1 Seamless operation of HMI systems.	
4.3.1.1 General Tests	ER 1 Seamless operation. ER 7 Principles governing the construction of systems.	
4.3.1.2 Tests on modularity and interchangeability	ER 1 Seamless operation. ER 7 Principles governing the construction of systems.	
4.3.1.3 Acceptance testing requirements for Data Fusion	ER 3.2.1 Seamless operation surveillance data processing systems.	
4.3.1.4 Acceptance testing requirements for HMI	ER 3.3.1 Seamless operation of HMI systems.	
4.3.2.1 Acceptance testing requirements for Constituent Surface Movement Radar		Covered in ETSI EN 303 213-4-1 [i.3] and ETSI EN 303 213-4-2 [i.4].
4.3.2.2 Acceptance testing requirements for Constituent Local Area Multilateration		Covered in ETSI EN 303 213-3 [i.2].
4.5.1 Requirements for operational responsibility	ER 2 Support for new concepts of operation.	
4.5.2 System performance below specified minima	ER 1 Seamless operation. ER 3 Safety. ER 3.2.1 Seamless operation surveillance data processing systems.	

Annex A (normative): Checklist

A.1 General

The purpose of the present annex is to provide a comprehensive traceability of evidence on constituents and system levels against clauses of the Essential Requirements (ERs) of the Interoperability Regulation [i.1] as amended by Regulation EC 1070/2009 [i.12], analysing 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 Interoperability Regulation [i.1].

A-SMGCS Systems Level 1 shall comply with the Essential Requirements of the Interoperability Regulation [i.1] as defined and described in the tables of the present annex (table A.1 to table A.23).

A.2 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.12] 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	n/a	<p>EUROCAE ED-87C [1], clause 1.7.2 Modularity, clause 2.1 Basic Functional Elements of an A-SMGCS Levels 1 and 2 clause 4.1.2 System Availability and Continuity of Service.</p> <p>EUROCONTROL 10/07/15-70 [2], clause 2.1 Objectives, clause 2.4 Benefits, clause 4.1 ATC Controllers, clause 7.3.2 Quality of Service Requirements Op_Perf-10-Availability and Op_Perf-12-Continuity of Service.</p> <p>Data Fusion Process: EUROCAE ED-87C [1], clause 2.1.1 Surveillance.</p> <p>HMI: EUROCAE ED-87C [1], clause 2.2.2 HMI, clause 2.3.2 HMI, first paragraph, clause 2.3.2.1 General Requirements for ATC Workstation HMI.</p>
1.2	Built	n/a	<p>EUROCAE ED-87C [1], clause 5.6 General Tests and clause 5.7. System Dependability and Interoperability Tests.</p> <p>DFP: EUROCAE ED-87C [1], clause 5.8 Surveillance Element Tests and clause 5.9 Surface Safety Nets Element Tests.</p> <p>HMI: EUROCAE ED-87C [1], clause 5.10HMI Tests.</p>
1.3	Maintained	The present document does not give presumption of conformity.	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.12] 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
1.4	Operated	Operation is only applicable at the system level.	EUROCAE ED-87C [1], clause 4.1.1.1 Integrity Monitor Response Time. Appropriate action needs to be defined for situations where the system performance may be below specified minima.
1.5	Information sharing	n/a	EUROCAE ED-87C [1], clause 4.1.1 System Integrity, paragraph one and two, clause 3.2.4 Identification of Targets. DFP: EUROCAE ED-87C [1], clause 2.1.1 Surveillance. HMI: The system interface for the HMI shall be capable to exchange data with the data fusion processor.

Table A.2

2	<p>ER 2 Support for new concepts of operation</p> <p>Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.12] 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.</p> <p>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".</p>		
	Keywords	Evidence on constituent level	Evidence on system level
2.1	Validated concepts of operation - safety	Operation is only applicable at the system level.	EUROCONTROL 10/07/15-71 [i.10].
2.2	Validated concepts of operation - capacity	Operation is only applicable at the system level.	EUROCAE ED-87C [1], clause 3.1.1 System capacity.
2.3	Validated concepts of operation - quality	Operation is only applicable at the system level.	<p>EUROCONTROL 10/07/15-70 [2], clause 7.2.3 Requirement Op_Range-2-Capacity, Op_Range-1-Visibility conditions, Op_Range-3-Mobile types, Op_Range-4-Mobile types, Op_Range-5-Speeds and Orientation, Op_Range-6-Velocity, Op_Resp-1-Users, Op_Resp-2-Assignment, Op_Resp-3-A-SMGCS category.</p> <p>EUROCAE ED-87C [1], clause 3.2.6 Reported Position Accuracy, clause 3.2.8 Reported Velocity Accuracy, clause 3.2.7 Target Report Update Rate, clause 3.2.1 Coverage Volume, clause 3.2.2.1 Identification, clause 3.2.5 Classification, clause 3.4.4 Accuracy and Resolution.</p>

Table A.3

3	ER 3 Safety			
<p>Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.12] 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 harmonised 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".</p>				
	Keywords	Evidence on constituent level	Evidence on system level	Evidence at procedure level
3.1	Design	n/a	EUROCONTROL 10/07/15-70 [2], clause 7.2.3, Op_Ds-5-Self-checking system, Op_Ds-8-Self-restartable, Op_Env-4-Adverse effects. EUROCONTROL 10/07/15-71 [i.10].	The present document does not give presumption of conformity.
3.2	Implementation	n/a	EUROCONTROL 10/07/15-71 [i.10].	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	EUROCONTROL 10/07/15-71 [i.10]. The user shall be informed and appropriate actions shall be defined, if the system performance is below specified minima.	The present document does not give presumption of conformity.
3.5	Human capabilities	n/a	EUROCAE ED-87C [1], clause 2.3.2 HMI.	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.12] 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	n/a	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.12] 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	The present document does not give presumption of conformity.	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 [i.1] as amended by Regulation (EC) 1070/2009 [i.12] requires that: "Systems shall be designed and progressively integrated with the objective of achieving a coherent and increasingly harmonised, 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	EUROCAE ED-87C [1], clause 2.3.

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.12] 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	EUROCAE ED-87C [1], clause 1.7.2 Modularity, clause 1.7.4 Interoperability clause 4.1.1 System Integrity. EUROCAE ED-87C [1], clause 5.8 Surveillance Element Tests.
7.2	High availability, Redundancy and fault tolerance.	n/a	EUROCONTROL 10/07/15-70 [2], clause 2.1 Objectives, clause 7.3.2 Quality of Service Requirements Op_Perf-10-Availability and Op_Perf-12-Continuity of Service, clause 7.2.3 Requirement Op_Ds-5-Self-checking system, Op_Ds-8-Self-restartable, Op_Env-4-Adverse effects. EUROCAE ED-87C [1], clause 4.1.2 System Availability and Continuity of Service, clause 4.1.1 System Integrity. EUROCAE ED-87C [1], clause 5.6 General Tests.

A.3 Interoperability Regulation Annex II Essential Requirements Part B: Specific requirements

A.3.1 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.12] 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	Evidence at procedure level
1.1.1	Pre-tactical aspects of airspace availability	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
1.1.2	Tactical aspects of airspace availability	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
1.1.3	Correct and timely way	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
1.1.4	National security requirements	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

A.3.2 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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
2.1.2	Pre-tactical	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
2.1.3	Tactical	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

A.3.3 Systems and procedures for air traffic services

A.3.3.1 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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
3.1.1.2	Performance appropriate for environment	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
3.1.1.3	Accuracy and error tolerance	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
3.1.2.2	Airborne systems - built	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
3.1.2.3	Airborne systems - maintained	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
3.1.2.4	Airborne systems - operated	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
3.1.2.5	Ground systems - design	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
3.1.2.6	Ground systems - built	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (part 1 to 4), [i.2] to [i.4] and [i.9].
3.1.2.7	Ground systems - maintained	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (part 1 to 4), [i.2] to [i.4] and [i.9].
3.1.2.8	Ground systems - operated	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

A.3.3.2 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.12] 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	EUROCAE ED-87C [1], clause 1.7.2 Modularity, clause 1.7.4 Interoperability clause 2.1.1 Surveillance. clause 4.1.1 System Integrity, paragraph one and four, clause 4.1.2 System Availability and Continuity of Service, clause 3.4.4 Accuracy and Resolution.
3.2.1.2	Built	n/a	EUROCAE ED-87C [1], clause 4.5 General Tests.
3.2.1.3	Maintained	n/a	The present document does not give presumption of conformity.
3.2.1.4	Operated	n/a	EUROCAE ED-87C [1], clause 4.1.1 System Integrity, paragraph one and four, clause 4.1.2 System Availability and Continuity of Service, paragraph four. The user shall be informed and appropriate actions shall be defined, if the system performance is below specified minima.

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.12] 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	EUROCAE ED-87C [1], clause 1.7.3 Evolution.

A.3.3.3 HMI 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.12] requires that: "HMIs 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 harmonised 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	EUROCAE ED-87C [1], clause 2.3.2 HMI.
3.3.1.2	Built	n/a	EUROCAE ED-87C [1], clause 5.10 HMI Tests.
3.3.1.3	Maintained	n/a	The present document does not give presumption of conformity.
3.3.1.4	Operated	n/a	EUROCAE ED-87C [1], clause 4.1.1 System, paragraph two.

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.12] requires that: "HMI 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	EUROCAE ED-87C [1], clause 2.3.2 HMI.

A.3.4 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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
4.1.2	Built	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
4.1.3	Maintained	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
4.1.4	Operated	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
4.1.5	Quality of service, coverage, redundancy	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

A.3.5 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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
5.1.2	Built	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
5.1.3	Maintained	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
5.1.4	Operated	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

A.3.6 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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
6.1.2	Built	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
6.1.3	Maintained	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
6.1.4	Operated	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

A.3.7 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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].
7.1.2	Standardized data set	n/a	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

A.3.8 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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

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.12] 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 ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].	Not covered by ETSI EN 303 213 (parts 1 to 4), [i.2] to [i.4] and [i.9].

Annex B (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)".

Council Resolution of 7 May 1985 on a new approach to technical harmonisation 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 Harmonised 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, Edition Date: 12/12/2006): "Functional Specification for A-SMGCS Implementation Level 1".

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

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

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).

EUROCONTROL 06/11/24-16 (V1.0: 13/10/2006): "Final Report on the Generic Cost Benefit Analysis of A-SMGCS".

History

Document history		
V1.1.1	September 2009	Publication
V1.2.1	July 2010	Publication
V1.3.1	April 2012	Publication
V1.4.0	August 2016	EN Approval Procedure AP 20161127: 2016-08-29 to 2016-11-28