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Advanced Surface Movement Guidance and Control System (A-SMGCS);
Part 1: Community Specification for A-SMGCS surveillance service including external interfaces

Reference

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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
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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 presumption of conformity which is linked to the full application of ETSI EN 303 213 (parts 1 to 4,7 and 8) can only be claimed after ETSI EN 303 213 (parts 1 to 4, 7 and 8) have been listed in the Official Journal of the European Union as Community Specifications.

General requirements for presumption of conformity to Regulation (EU) No 2018/1139 [i.10] 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 A-SMGCS surveillance service including external interfaces";**

Part 2: "Community Specification for A-SMGCS airport safety support service";

Part 3: "Community Specification for a deployed cooperative sensor including its interfaces";

Part 4: "Community Specification for a deployed non-cooperative sensor including its interfaces;";

Part 5: "Harmonised Standard for access to radio spectrum for Multilateration (MLAT) equipment;";

Part 6: "Harmonised Standard for access to radio spectrum for deployed surface movement radar sensors";

Part 7: "Community Specification for A-SMGCS routing service";

Part 8: "Community Specification for A-SMGCS guidance service".

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.

1   Scope

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

The present document provides a European Standard for manufacturers, Air Navigation Service Providers and/or Airport Operators, who have to demonstrate and declare compliance of their systems and constituents to the Essential Requirements (ERs) of Annex VIII of Regulation EU 2018/1139 [i.10].

> NOTE 1:   The ERs in Annex VIII of Regulation EU 2018/1139 [i.10] covered by the present document are outlined in Table A.1.

> NOTE 2:   Although the ERs of the SES Interoperability Regulation [i.1] have been repealed with effect from 11 September 2018 [i.10], a mapping of the requirements for the A-SMGCS Surveillance Service to this same regulation [i.1] is provided in Annex B.

Any software elements related to the software assurance level of an A-SMGCS are out of scope of the present document. As such the ERs of Regulation EU 2018/1139 [i.10] 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 3:   For these ERs, the Air Navigation Service Provider will need to provide supplementary compliance within their Interoperability Technical Files.

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

> NOTE 4:   Currently there are no relevant Implementing Rules for A-SMGCS.

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 if they are unambiguously referred to from the present document.

The reference to particular requirements is done either by citing the unambiguous requirement number or range of numbers (e.g. "[REQ 30.] to [REQ 35.]") or, if no requirement numbers are available, by indicating the paragraph and clause of the reference material where the requirement can be found.

> NOTE 5:   Other requirements and other EU Regulations and/or Directives may be applicable to the product(s) falling within the scope of the present document.

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-87D (June 2019): "Minimum Aviation System Performance Standard for Advanced Surface Movement Guidance and Control Systems (A-SMGCS)".

[2]   EUROCONTROL-SPEC-171 (Edition 1.0, 01/03/2018): "EUROCONTROL Specification for Advanced-Surface Movement Guidance and Control System (A-SMGCS) Services".

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 (the 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 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 (10/2007): "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]   EUROCONTROL 10/07/15-71 (V2.1: 30/06/2010): "A-SMGCS Levels 1 & 2 Preliminary Safety Case".

[i.9]   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.10]   Regulation (EU) No 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91, OJ L 212, 22.08.2018.

3   Definition of terms, symbols and abbreviations

3.1   Terms

For the purposes of the present document, the terms given in EUROCAE ED-87D [1] and the following apply.

Advanced Surface Movement Guidance and Control System: system providing as a minimum Surveillance and which can include Airport Safety Support, Routing and Guidance to aircraft and vehicles in order to maintain the airport throughput under all local weather conditions whilst maintaining the required level of safety

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

aerodrome: defined area (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 the system will operate satisfactorily at a given point in time when used under stated conditions in an ideal support environment

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

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

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 aprons

> 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

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

target: aircraft, vehicle or other obstacle, whose image is displayed on a surveillance display

> NOTE: This definition is derived from EUROCAE ED-87D [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

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

3.2   Symbols

Void.

3.3   Abbreviations

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

A-SMGCS	Advanced Surface Movement Guidance and Control Systems
AERO	Technical Committee Aeronautics
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
EU	European Union
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
IPR	Intellectual Property Rights
MASPS	Minimum Aviation Systems Performance Specification
MLAT	MultiLATeration
PRA	Position Registration Accuracy
SARPS	Standards and Recommended Practices
SES	Single European Sky
SESAR	Single European Sky Area Responsibility
SMR	Surface Movement Radar
TMA	Terminal Manoeuvring Area

4   Requirements for the A-SMGCS Surveillance Service

4.1   Requirements for A-SMGCS Surveillance Service Constituents

4.1.1   General guidance on A-SMGCS Surveillance Service Constituents

Data Fusion and HMI are considered as part of the System but are not at this time defined as constituents. However, Data Fusion and HMI are currently defined at System level and they have been included here, since they may become constituents in the future.

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

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

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

4.1.2   Constituent types for the A-SMGCS Surveillance Service

The A-SMGCS Surveillance Service shall consist of the following constituents as a minimum for the implementation, operation and maintenance:

  1)   Non-Cooperative Surveillance Sensor (e.g. Surface Movement Radar).

2)   Cooperative Surveillance Sensor (Multilateration System).

4.1.3   Constituent - Surface Movement Radar (SMR)

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).

4.1.4   Interfaces for SMR

The interfaces for SMR constituents shall comply with the requirements as defined in ED-87D [1], chapter 2.1.2.3.

4.1.5   Constituent - Multilateration

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

4.1.6   Interfaces for Multilateration

The interfaces for multilateration constituents shall comply with the requirements as defined in ED-87D [1], chapter 2.1.2.3.

4.1.7   Interface for Data fusion

The interfaces for the data fusion in an A-SMGCS shall comply with the requirements as defined in ED-87D [1], chapter 2.1.2.4.

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

4.1.8   Human Machine Interface (HMI)

The requirements for the HMI are further described in clause 4.2.5 and clause 5.1.1.4 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.

4.1.9   Interface for HMI

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

4.2   Design Requirements for the A-SMGCS Surveillance Service

4.2.1   Design Requirements on System Level

4.2.1.1   Modularity

The System shall comply with the design requirements as defined in ED-87D [1], chapter 1.8.

4.2.1.2   System Integrity

The System integrity shall comply with the design requirements as defined in ED-87D [1], chapter 3.7.2, requirements [REQ 27.], [REQ 28.], [REQ 29.].

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 ED-87D [1], chapters 3.7.3, 3.7.4 and 3.7.5, requirements [REQ 30.], [REQ 31.], [REQ 32.] and in the EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200].

4.2.1.4 Identification

The functional requirement for identification shall comply with the requirements as defined in ED-87D [1], chapter 3.3.7, Table 3-1 and requirements [REQ 19.] and [REQ 20.].

4.2.1.5 Position Registration Accuracy

The functional requirement for position registration accuracy shall comply with the requirements as defined in ED-87D [1], chapter 3.3.8, Table 3-1 and requirements [REQ 19.] and [REQ 20.].

4.2.1.6 Logical architecture

The logical architecture of the system shall comply with the requirements as defined in ED-87D [1], chapter 1.8.

4.2.1.7 Safety

4.2.1.7.1 Failure effect

The A-SMGCS Surveillance Service 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 the EUROCONTROL Specification for A-SMGCS Services [2], requirement ASMGCS-[GENL]-[180].

4.2.1.7.2 Reliability

The reliability of the system shall comply with the requirements as defined in the EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190], ASMGCS-[GENL]-[200], and ED-87D [1], chapters 3.7.3, 3.7.4 and 3.7.5, requirements [REQ 31.], [REQ 31.], [REQ 32.].

4.2.1.7.3 Human capabilities

The A-SMGCS Surveillance Service shall be designed in such a way, that the human capabilities shall be compatible with the principals described in ED-87D [1], chapter 3.6, requirement [REQ 26.].

4.2.1.7.4 Safety Assessment

A safety assessment for an A-SMGCS Surveillance Service shall be provided and updated after modifications to the service. The safety objectives shall comply with the requirements as defined in ED-87D [1], chapter 1.8.6.

> NOTE: The safety assessment may follow the methodology from A-SMGCS Levels 1&2 Preliminary Safety Case [i.8].

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 the EUROCONTROL Specification for A-SMGCS Services [2], chapters 3.2, 6.1 and 6.2.

4.2.1.8.2   System capacity

The system capacity shall comply with the requirements as defined in ED-87D [1], chapters 3.2 and 3.3.2, requirement [REQ 17.].

4.2.1.8.3   Accuracy

The accuracy shall comply with the requirements as defined in ED-87D [1], chapters 3.3.8, 3.3.10, 3.3.18 as well as with Table 3-1 and requirements [REQ 19.] and [REQ 20.].

4.2.1.8.4   Resolution

The resolution shall comply with the requirements as defined in ED-87D [1], chapters 3.3.15, 3.3.16 and 3.3.17 as well as with Table 3-1 and requirements [REQ 19.] and [REQ 20.].

4.2.1.8.5   Update rate

The update rate shall comply with the requirements as defined in ED-87D [1], chapter 3.3.9 as well as with Table 3-1 and requirements [REQ 19.] and [REQ 20.].

4.2.1.8.6   Coverage Volume

The coverage volume shall comply with the requirements as defined in ED-87D [1], chapter 3.3.3.

4.2.1.9   Evolution

The evolution shall comply with the requirements as defined in ED-87D [1], chapter 1.8.3.

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 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 ED-87D [1], chapters 2.2.1 and 3.6, requirement [REQ 26.] as well as the EUROCONTROL Specification for A-SMGCS Services [2] chapters 5.3.1, 5.3.2 and requirements ASMGCS-[GENL]-[130], ASMGCS-[GENL]-[140], ASMGCS-[GENL]-[150], ASMGCS-[SURV]-[070], ASMGCS-[SURV]-[100].

4.3   Maintenance Requirements for the A-SMGCS Surveillance Service

The present document does not give presumption of conformity related to the maintenance requirements as there are no such requirements specified in the normative reference material (clause 2.1).

4.4   Requirements for operation of the A-SMGCS Surveillance Service

4.4.1   Requirements for operational responsibility

4.4.1.1   Operational responsibility

The operational responsibility shall be as defined in the EUROCONTROL Specification for A-SMGCS Services [2], chapter 2.2.

4.4.1.2   System performance below specified minima

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

4.5   Requirements on system security

The A-SMGCS shall be protected against any unauthorised access and against any actions which would cause the normal system operation to be affected in any way.

4.6   Requirements on system documentation

The A-SMGCS shall come with a full documentation set describing the installation, maintenance and operation in a clear, consistent and unambiguous manner.

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5   Testing

5.1   Acceptance testing requirements for the A-SMGCS Surveillance Service

5.1.1   Acceptance testing requirements on System Level

5.1.1.1   General Tests

The system shall perform the build tests as defined in ED-87D [1], chapter 5.1, requirements [REQ 33.], [REQ 34.], [REQ 35.].

5.1.1.2   Tests on modularity and interchangeability

The system shall perform the build tests as defined in ED-87D [1], chapter 5.2.

5.1.1.3   Acceptance testing requirements for Data Fusion

The Data Fusion shall perform the build tests as defined in ED-87D [1], chapter 5.3.

5.1.1.4   Acceptance testing requirements for HMI

The HMI shall perform the build tests as defined in ED-87D [1], chapter 5.6.

5.1.2   Acceptance testing requirements on Constituent Level

5.1.2.1   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].

5.1.2.2   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].

Annex A (normative):
Regulation EU 2018/1139 Essential Requirements mapping and Checklist

A.1   Correspondence between the present document and the relevant Essential Requirements of Annex VIII of Regulation EU 2018/1139

This annex provides a relationship between the present document and the Essential Requirements of Annex VIII of Regulation (EU) 2018/1139 [i.10].

The A-SMGCS surveillance service shall comply with the Essential Requirements of Regulation EU 2018/1139 [i.10] as defined and described in the traceability matrixes of this annex (Table A.1 and Table A.2 below).

NOTE: Whenever "n/a" is used, that means that a given ER and/or an associated "keyword" is not applicable for presumption of conformity.

Table A.1: Traceability from the Essential Requirements of Annex VIII of Regulation 2018/1139 [i.10] to clauses of the present document

Essential requirements (ERs) of EU 2018/1139 Regulation	Clause(s) of the present document	Qualifying remarks/Notes
ER 1 Use of the airspace	The present document does not give presumption of conformity	
ER 2.1 Aeronautical information and data for airspace users for the purpose of air navigation	The present document does not give presumption of conformity	
ER 2.2 Meteorological information	The present document does not give presumption of conformity	
ER 2.3 Air traffic services	The present document does not give presumption of conformity	
ER 2.4 Communication services	The present document does not give presumption of conformity	
ER 2.5 Navigation services	The present document does not give presumption of conformity	
ER 2.6 Surveillance services	4.1.3 Constituent -Surface Movement Radar (SMR) 4.1.5 Constituent - Multilateration 4.2.1.2 System Integrity 4.2.1.3 Availability and Continuity of Service 4.2.1.4 Identification 4.2.1.5 Position Registration Accuracy 4.2.2 Design Requirements for the A-SMGCS Surveillance Service 4.2.3 Design Requirements for Local Area Multilateration 4.2.5 Design Requirements for HMI 4.4.1.2 System performance below specified minima 5.1.1.2 Tests on modularity and interchangeability 5.1.1.3 Acceptance testing requirements for Data Fusion 5.1.1.4 Acceptance testing requirements for HMI 5.1.2 Acceptance testing requirements on Constituent level	The present document does not give presumption of conformity related to the position of aircraft in the air.
ER 2.7 Air traffic flow management	The present document does not give presumption of conformity	
ER 2.8 Airspace management	The present document does not give presumption of conformity	

Essential requirements (ERs) of EU 2018/1139 Regulation	Clause(s) of the present document	Qualifying remarks/Notes
ER 2.9 Flight procedure design	The present document does not give presumption of conformity	
ER 3.1 Fit for purpose	4.2.1.1 Modularity 4.1.4 Interfaces for SMR 4.1.6 Interfaces for Multilateration 4.1.7 Interface for Data fusion 4.1.8 Human Machine Interface (HMI) 4.2.5 Design Requirements for HMI 4.5 Requirements on system security 5.1.1.1 General Tests 5.1.1.2 Tests on modularity and interchangeability 5.1.1.3 Acceptance testing requirements for Data Fusion 5.1.1.4 Acceptance testing requirements for HMI	
ER 3.2 Integrity and safety related performance and reliability	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 4.2.1.8.1 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 4.4.1.2 System performance below specified minima	
ER 3.3 Seamless operation	4.1.7 Interface for Data fusion 4.1.9 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 4.2.1.5 Position Registration Accuracy 4.2.5 Design Requirements for HMI 4.4.1.1 Operational responsibility 4.4.1.2 System performance below specified minima 5.1.1.1 General Tests 5.1.1.2 Tests on modularity and interchangeability 5.1.1.3 Acceptance testing requirements for Data Fusion 5.1.1.4 Acceptance testing requirements for HMI	The present document does not give presumption of conformity related to maintenance of the system.
ER 3.4 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 4.2.1.9 Evolution 4.4.1.1 Operational responsibility 4.4.1.2 System performance below specified minima	
ER 3.5 Civil-military coordination		The present document does not give presumption of conformity.
ER 3.6 Design requirements	4.2.1.1 Modularity 4.2.1.2 System Integrity 4.2.1.3 Availability and Continuity of Service 4.2.1.6 Logical architecture 4.1.8 Human Machine Interface (HMI) 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 4.2.4 Design Requirements for Data Fusion 4.2.5 Design Requirements for HMI	

Essential requirements (ERs) of EU 2018/1139 Regulation	Clause(s) of the present document	Qualifying remarks/Notes
	4.5 Requirements on system security 4.6 Requirements on system documentation	
ER 3.7 Continuity of service	4.2.1.7.4 Safety Assessment	
ER 4 Qualification of Air Traffic Controllers	The present document does not give presumption of conformity	
ER 5 Service providers and training organisations	The present document does not give presumption of conformity	
ER 6 Aeromedical examiners and aeromedical centres	The present document does not give presumption of conformity	

Table A.2: Traceability from clauses of the present document to the Essential Requirements of Annex VIII, chapter 3, of regulation EU 2018/1139 [i.10]

Clause(s) of the present document	(Essential) Requirements (ERs) of EU 2018/1139, Annex VIII	Qualifying remarks/Notes
4.1.3 Constituent – Surface Movement Radar (SMR)	ER 2.6	
4.1.4 Interfaces for SMR	ER 3.1, ER 2.6	
4.1.5 Constituent – Multilateration	ER 2.6	
4.1.6 Interfaces for Multilateration	ER 3.1, ER 2.6	
4.1.7 Interface for Data fusion	ER 3.1, ER 3.3, ER 2.6	
4.1.9 Interface for HMI	ER 3.3, ER 2.6	
4.2.1.1 Modularity	ER 3.1, ER 3.3, ER 3.6, ER 2.6	
4.2.1.2 System Integrity	ER 3.3, ER 3.6, ER 2.6	
4.2.1.3 Availability and Continuity of Service	ER 3.3, ER 3.6, ER 2.6	
4.2.1.4 Identification	ER 3.3, ER 3.4, ER 2.6	
4.2.1.5 Position Registration Accuracy	ER 3.3, ER 2.6	
4.2.1.6 Logical architecture	ER 3.6, ER 2.6	
4.2.1.7.1 Failure effect	ER 3.2, ER 3.6	
4.2.1.7.2 Reliability	ER 3.2, ER 3.6	
4.2.1.7.3 Human capabilities	ER 3.2, ER 3.6	
4.2.1.7.4 Safety Assessment	ER 3.2, ER 3.4, ER 3.6, ER 3.7	
4.2.1.8.1 Handle Traffic Movements	ER 3.2, ER 3.4	
4.2.1.8.2 System capacity	ER 3.2, ER 3.4	
4.2.1.8.3 Accuracy	ER 3.2, ER 3.4	
4.2.1.8.4 Resolution	ER 3.2, ER 3.4	
4.2.1.8.5 Update rate	ER 3.2, ER 3.4	
4.2.1.8.6 Coverage Volume	ER 3.2, ER 3.4	
4.2.1.9 Evolution	ER 3.4	
4.2.2 Design Requirements for Surface Movement Radar	ER 2.6	Covered in ETSI EN 303 213-4-1 [i.3].
4.2.3 Design Requirements for Local Area Multilateration	ER 2.6	Covered in ETSI EN 303 213-3 [i.2].

Clause(s) of the present document	(Essential) Requirements (ERs) of EU 2018/1139, Annex VIII	Qualifying remarks/Notes
4.2.5 Design Requirements for HMI	ER 3.1, ER 3.3, ER 3.6, ER 2.6	
4.4.1.1 Operational responsibility	ER 3.3, ER 3.4, ER 2.6	
4.4.1.2 System performance below specified minima	ER 3.2, ER 3.3, ER 4, ER 2.6	
4.5 Requirements on system security	ER 3.1, ER 3.6	
4.6 Requirements on system documentation	ER 3.6, ER 2.6	
5.1.1.1 General Tests	ER 3.1, ER 3.3, ER 2.6	
5.1.1.2 Tests on modularity and interchangeability	ER 3.1, ER 3.3, ER 2.6	
5.1.1.3 Acceptance testing requirements for Data Fusion	ER 3.1, ER 3.3, ER 2.6	
5.1.1.4 Acceptance testing requirements for HMI	ER 3.1, ER 3.3, ER 2.6	
5.1.2.1 Acceptance testing requirements for Constituent Surface Movement Radar	ER 2.6	Covered in ETSI EN 303 213-4-1 [i.3] and ETSI EN 303 213-4-2 [i.4].
5.1.2.2 Acceptance testing requirements for Constituent Local Area Multilateration	ER 2.6	Covered in ETSI EN 303 213-3 [i.2].

A.2   Mapping of requirements for the A-SMGCS Surveillance Service to the relevant Essential Requirements of Annex VIII, chapters 2.6 and 3 of Regulation EU 2018/1139

The purpose of the present annex is to provide a comprehensive traceability of evidence on constituents and system levels against clauses of the relevant Essential Requirements (ERs) of the EU 2018/1139 Regulation [i.10] Annex VIII, 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 regulation EU 2018/1139 [i.10].

The A-SMGCS Surveillance Service shall comply with the relevant Essential Requirements specified in Annex VIII of Regulation 2018/1139 [i.10] as defined and described in in Table A.3 to Table A.10. With the applicability determined in clause A.1 the traceability in this clause covers only chapters 2.6 and 3 of Regulation EU 2018/1139 [i.10].

NOTE: Table A.3 to Table A.10 are related only to those Essential Requirements covered by the present document as outlined in Table A.1 above.

Table A.3

2.6	**ER 2.6 Surveillance services**		
	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 2.6, first paragraph, that: *"Surveillance services shall determine the respective position of aircraft in the air and of other aircraft and ground vehicles on the aerodrome surface, with sufficient performance with regard to their accuracy, integrity, legitimacy of the source, continuity and probability of detection."*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
2.6.1	accuracy	n/a	ED-87D Table 3-1 [REQ 19], [REQ 20] ED-87D chapter 5.3 ED-87D chapter 3.7.4 [REQ 30], [REQ 31]
2.6.2	integrity	n/a	ED-87D [REQ 27], [REQ 28], [REQ 29] ED-87D chapter 3.7.5 [REQ 32] ED-87D Table 3-1 [REQ 19], [REQ 20] ED-87D chapter 5.2
2.6.3	legitimacy of source	n/a	ED-87D [REQ 26]. ED-87D [REQ 27], [REQ 28], [REQ 29] ED-87D Table 3-1 [REQ 19], [REQ 20] ED-87D chapter 5.6 ETSI EN 303 213-1 clause 4.4.1.2 EUROCONTROL Specification for A-SMGCS Services ASMGCS-[SURV]-[70] EUROCONTROL Specification for A-SMGCS Services ASMGCS-[GENL]-[180] ETSI EN 303 213-3 [i.2] ETSI EN 303 213-4-1 [i.3] ETSI EN 303 213-4-2 [i.4]
2.6.4	continuity	n/a	ED-87D Table 3-1 [REQ 19], [REQ 20] ED-87D chapter 5.2 ED-87D chapter 5.3 ED-87D chapter 3.7.5 [REQ 32] EUROCONTROL Specification for A-SMGCS Services ASMGCS-[GENL]-[190]
2.6.5	probability of detection	n/a	ED-87D Table 3-1 [REQ 19], [REQ 20] ED-87D chapter 5.3

Table A.4

3.1	ER 3.1 Fit for purpose		
	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 3.1, first paragraph, that: *"ATM/ANS systems and ATM/ANS constituents providing related information to and from the aircraft and on the ground shall be properly designed, produced, installed, maintained, protected against unauthorised interference and operated to ensure that they are fit for their intended purpose."*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
3.1.1	properly designed	n/a	EUROCAE, ED-87D [1]: 1.7.2 The A-SMGCS relationship with other systems within the ATM, 1.8 Fundamental System Design Concepts. EUROCONTROL Specification for A-SMGCS Services [2]: chapters 3.2 Surveillance Service, 5.1 System Overview, 4.2.1 Controllers, 4.3.1 Flight Crew, 4.4.1, vehicle drivers,6.1 General Requirements, ASMGCS-[GENL]-[070], ASMGCS-[SURV]-[090]
3.1.2	produced	n/a	EUROCAE, ED-87D [1]: 5.1.2 A-SMGCS Test Methodology, 5.2 System Dependability Tests [REQ 33.], [REQ 34.], [REQ 35.]
3.1.3	installed	n/a	EUROCAE, ED-87D [1]: 5.3 Surveillance Service Tests
3.1.4	maintained	n/a	EUROCAE, ED-87D [1]: 2.3.1 Recording and Playback, 2.3.2 Technical Control and Monitoring, 2.3.3 System Configuration Management, [REQ 14.], [REQ 15.], [REQ 16.] EUROCONTROL Specification for A-SMGCS Services [2]: ASMGCS-[GENL]-[160], ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190], ASMGCS-[GENL]-[200]
3.1.5	protected against unauthorised interference	n/a	4.5 Requirements on system security
3.1.6	operated	Operation is only applicable at the system level	n/a - this is an operational requirement that needs to be proven by the system operator

Table A.5

3.2	**ER 3.2 Integrity and safety-related performance and reliability**		
	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 3.2, first paragraph, that: *"The integrity and safety-related performance of systems and constituents whether on aircraft, on the ground or in space, shall be fit for their intended purpose. They shall meet the required level of operational performance for all their foreseeable operating conditions and for their whole operational life."*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
3.2	All regulatory text	n/a	EUROCAE, ED-87D [1]: 2.3.2 Technical Control and Monitoring, 1.8.6 Safety case, 3.3 Surveillance Service Performance, 3.7.2 System Integrity, 3.7.3 System Availability, 3.7.4 Time Synchronisation, 3.7.5 Dependability Requirements [REQ 14.], [REQ 15.], [REQ 27.], [REQ 28.], [REQ 29.], [REQ 17.], [REQ 18.], [REQ 19.], [REQ 20.], [REQ 30.], [REQ 31.], [REQ 32.], EUROCONTROL Specification for A-SMGCS Services [2]: 6.2 Surveillance Service ASMGCS-[GENL]-[030], ASMGCS-[SURV]-[010]

Table A.6

3.3	**ER 3.3 Seamless operation**		
	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 3.2, second paragraph, that: *"ATM/ANS systems and ATM/ANS 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 European air traffic management network (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**
3.3.1	designed	n/a	EUROCAE, ED-87D [1]: 1.7.2 The A-SMGCS relationship with other systems within the ATM, 1.8 Fundamental System Design Concepts. EUROCONTROL Specification for A-SMGCS Services [2]: clauses 3.2 Surveillance Service, 5.1 System Overview, 4.2.1 Controllers, 4.3.1 Flight Crew, 4.4.1, vehicle drivers, 6.1 General Requirements, ASMGCS-[GENL]-[070], ASMGCS-[SURV]-[090]
3.3.2	built	n/a	EUROCAE, ED-87D [1]: 2.1 A-SMGCS Services, 2.2 Core Functions [REQ 2.], [REQ 3.], [REQ 12.], [REQ 13.] EUROCONTROL Specification for A-SMGCS Services [2]: clauses 5.1 System Overview, 5.2 Databases, 5.5 Surveillance Service, 6.1 General Requirements
3.3.3	maintained	The present document does not give presumption of conformity	EUROCAE, ED-87D [1]: 2.3 Supporting Functions, 3.7.3 System Availability, 3.7.4 Time Synchronisation, 3.7.5 Dependability Requirements [REQ 14.], [REQ 15.], [REQ 16.], [REQ 30.], [REQ 31.], [REQ 32.], EUROCONTROL Specification for A-SMGCS Services [2]: clause 3.2 Surveillance Service

3.3	**ER 3.3 Seamless operation**		
	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 3.2, second paragraph, that: *"ATM/ANS systems and ATM/ANS 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 European air traffic management network (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**
3.3.4	operated	Operation is only applicable at the system level.	EUROCAE, ED-87D [1]: 2.2.1 Human Machine Interface, 3.6 Human-Machine Interface [REQ 26.] EUROCONTROL Specification for A-SMGCS Services [2]: clauses 2.2 Surveillance Service, 4.2.1 Controllers, 4.3.1 Flight Crew, 4.4.1, vehicle drivers, ASMGCS-[GENL]-[100]
3.3.5	information sharing	n/a	EUROCAE, ED-87D [1]: 2.4 External System Interfaces, 1.8.4 Interoperability, 4. Interoperability Requirements EUROCONTROL Specification for A-SMGCS Services [2]: clauses 5.1 System Overview, 5.2 Databases, 5.3.2 Electronic Clearance Input, 5.5 Surveillance Service, ASMGCS-[GENL]-[060], ASMGCS-[GENL]-[070]

Table A.7

3.4	**ER 3.4 Support for new concepts of operation**		
	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 3.2, third paragraph 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."*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
3.4.1	Validated concepts of operation – quality	Operation is only applicable at the system level.	EUROCONTROL Specification for A-SMGCS Services [2]: 4.5 All Weather Operations, ASMGCS-[GENL]-[020], ASMGCS-[SURV]-[040]
3.4.2	Validated concepts of operation – sustainability	Operation is only applicable at the system level.	EUROCONTROL Specification for A-SMGCS Services [2]: 4.5 All Weather Operations, ASMGCS-[GENL]-[020], ASMGCS-[SURV]-[040]
3.4.3	Validated concepts of operation - effectiveness	Operation is only applicable at the system level.	EUROCONTROL Specification for A-SMGCS Services [2]: 4.5 All Weather Operations, ASMGCS-[GENL]-[020], ASMGCS-[SURV]-[040]
3.4.4	Validated concepts of operation - safety	Operation is only applicable at the system level.	EUROCAE, ED-87D [1]: 1.8.6 Safety case
3.4.5	Validated concepts of operation - capacity	Operation is only applicable at the system level.	EUROCAE, ED-87D [1]: 3.2 System Capacity, 3.3.2 Surveillance Capacity, [REQ 17.], EUROCONTROL Specification for A-SMGCS Services [2], chapters 3.2, 6.1 and 6.2, EUROCONTROL Specification for A-SMGCS Services [2]: 4.5 All Weather Operations, ASMGCS-[GENL]-[020], ASMGCS-[SURV]-[040]

Table A.8

	ER 3.5 Civil-military coordination		
3.5	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 3.2, fourth and fifth paragraph 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 those 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, without prejudice to security or defence policy interests, including requirements on confidentiality."*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
3.5.1	Flexible use of airspace	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.
3.5.2	Timely sharing	n/a	The present document does not give presumption of conformity.
3.5.3	No prejudice to security or defence policy interests, including requirements on confidentiality.	n/a	The present document does not give presumption of conformity.

Table A.9

	ER 3.6 Design requirements		
3.6	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 3.3 that: *"Systems and constituents shall be designed to meet applicable safety and security requirements. Systems and constituents, considered collectively, separately and in relation to each other, shall be designed in such a way that an inverse relationship exists between the probability that any failure can result in a total system failure and the severity of its effect on the safety of services. Systems and constituents, considered individually and in combination with each other, shall be designed taking into account limitations related to human capabilities and performance. Systems and constituents shall be designed in a manner that protects them and the data they convey from harmful interactions with internal and external elements. Information needed for production, installation, operation and maintenance of the systems and constituents as well as information concerning unsafe conditions shall be provided to personnel in a clear, consistent and unambiguous manner."*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
3.6.1	safety and security requirements	n/a	4.5 Requirements on system security EUROCAE, ED-87D [1]: 1.8.5 Software design, 1.8.6 Safety Case, 3.7.2 System Integrity [REQ 27.], [REQ 28.], [REQ 29.]
3.6.2	failure resistance and safety of service	n/a	EUROCAE, ED-87D [1]:, 2.3 Supporting Functions, 3.7.3 System Availability, 3.7.4 Time Synchronisation, 3.7.5 System Dependability [REQ 14.], [REQ 15.], [REQ 16.], [REQ 30.], [REQ 31.], [REQ 32.] EUROCONTROL Specification for A-SMGCS Services [2]: 4.6 Use of A-SMGCS in Degraded Mode
3.6.3	usability (take into account limitations related to human capabilities and performance).	n/a	EUROCAE, ED-87D [1]: 2.2.1 Human Machine Interface, 3.6 Human Machine Interface, [REQ 26.] EUROCONTROL Specification for A-SMGCS Services [2]: 5.3.1 Human-Machine Interface (HMI), ASMGCS-[GENL]-[100], ASMGCS-[GENL]-[110], ASMGCS-[GENL]-[120], ASMGCS-[GENL]-[130], ASMGCS-[GENL]-[140], ASMGCS-[GENL]-[150], ASMGCS-[GENL]-[160]
3.6.4	robustness (protected from harmful interactions)	n/a	EUROCAE, ED-87D [1]: 3.7.2 System Integrity, 3.7.4 Time Synchronisation, 3.7.5 Dependability Requirements, [REQ 27.], [REQ 28.], [REQ 29.], [REQ 30.], [REQ 31.], [REQ 32.]
3.6.5	documented (clear, consistent and unambiguous provision of information)	n/a	4.6 Requirements on system documentation

Table A.10

	ER 3.7 Continuity of service		
3.7	Regulation (EU) 2018/1139 [i.10] requires in Annex VIII, chapter 3.4 that: *"Safety levels of systems and constituents shall be maintained during service and any modifications to service."*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
3.7	All regulatory text	n/a	EUROCAE, ED-87D [1]: 1.8.6 Safety case

Annex B (informative): SES Interoperability Regulation Essential Requirements mapping and Checklist

B.0 Introduction

This annex is structured as follows:

Clause B.1 provides a relationship between the present document and the Essential Requirements of the Single European Sky Interoperability Regulation [i.1] as amended by Regulation (EC) 1070/2009 [i.9].

Clause B.2 and clause B.3 provide a comprehensive traceability of evidence on constituents and system levels against clauses of the general Essential Requirements (ERs) of the Interoperability Regulation [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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].

NOTE: Whenever "n/a" is used, that means that a given ER and/or an associated "keyword" is not applicable for presumption of conformity.

B.1 Correspondence between the present document and the Essential Requirements of the Interoperability Regulation as amended by Regulation EC 1070/2009

Table B.1: Traceability from the Interoperability Regulation [i.1] to clauses of the present document

Essential requirements (ERs) of SES Interoperability Regulation, Annex II	Clause(s) of the present document	Qualifying remarks/Notes
ER A.1 Seamless operation.	4.1.4 Interfaces for SMR 4.1.6 Interfaces for Multilateration 4.1.7 Interface for Data fusion 4.1.9 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 4.2.1.5 Position Registration Accuracy 4.2.1.6 Logical architecture 4.2.5 Design Requirements for HMI 4.4.1.1 Operational responsibility 4.4.1.2 System performance below specified minima 4.6 Requirements on system documentation 5.1.1.1 General Tests 5.1.1.2 Tests on modularity and interchangeability 5.1.1.3 Acceptance testing requirements for Data Fusion 5.1.1.4 Acceptance testing requirements for HMI	-

Essential requirements (ERs) of SES Interoperability Regulation, Annex II	Clause(s) of the present document	Qualifying remarks/Notes
ER A.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 4.2.1.9 Evolution 4.4.1.1 Operational responsibility 4.4.1.2 System performance below specified minima	
ER A.3 Safety.	4.2.1.7.4 Safety Assessment 4.4.1.1 Operational responsibility 4.4.1.2 System performance below specified minima 4.5 Requirements on system security	-
ER A.4 Civil-military coordination.	The present document does not give presumption of conformity	
ER A.5 Environmental constraints.	The present document does not give presumption of conformity	
ER A.6 Principles governing the logical architecture of systems.	4.2.1.1 Modularity 5.1.1.2 Tests on modularity and interchangeability	
ER A.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	
ER B 1.1 Seamless operation of airspace management.	The present document does not give presumption of conformity	
ER B 2.1 Seamless operation of air traffic flow management.	The present document does not give presumption of conformity	
ER B 3.1.1 Seamless operation of flight data processing.	The present document does not give presumption of conformity	
ER B 3.1.2 Support for new concepts of operation for flight data processing.	The present document does not give presumption of conformity	
ER B 3.2.1 Seamless operation surveillance data processing systems.	The present document does not give presumption of conformity	
ER B 3.2.2 Support for new concepts of operation for surveillance data processing systems.	The present document does not give presumption of conformity	
ER B 3.3.1 Seamless operation of HMI systems.	The present document does not give presumption of conformity	
ER B 3.3.2 Support for new concepts of operation for HMI systems.	The present document does not give presumption of conformity	
ER B 4.1 Seamless operation of Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications.	The present document does not give presumption of conformity	
ER B 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.	The present document does not give presumption of conformity	
ER B 5.1 Seamless operation of Navigation systems and procedures.	The present document does not give presumption of conformity	

Essential requirements (ERs) of SES Interoperability Regulation, Annex II	Clause(s) of the present document	Qualifying remarks/Notes
ER B 6.1 Seamless operation of Surveillance systems and procedures.	4.1.4 Interfaces for SMR 4.1.6 Interfaces for Multilateration 4.1.7 Interface for Data fusion 4.1.9 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 4.2.1.5 Position Registration Accuracy 4.2.1.6 Logical architecture 4.2.5 Design Requirements for HMI 4.4.1.1 Operational responsibility 4.4.1.2 System performance below specified minima 4.6 Requirements on system documentation 5.1.1.1 General Tests 5.1.1.2 Tests on modularity and interchangeability 5.1.1.3 Acceptance testing requirements for Data Fusion 5.1.1.4 Acceptance testing requirements for HMI	
ER B 7.1 Seamless operation of Systems and procedures for aeronautical information services.	The present document does not give presumption of conformity	
ER B 7.2 Support for new concepts of operation for systems and procedures for aeronautical information services.	The present document does not give presumption of conformity	
ER B 8.1 Seamless operation of systems and procedures for the use of meteorological information.	The present document does not give presumption of conformity	
ER B 8.2 Support for new concepts of operation for systems and procedures for the use of meteorological information.	The present document does not give presumption of conformity	

**Table B.2: Traceability from clauses of the present document
to the Interoperability Regulation [i.1]**

Clause(s) of the present document	(Essential) Requirements (ERs) of SES Interoperability Regulation (as amended), Annex II, Parts A and B	Qualifying remarks/Notes
4.1.4 Interfaces for SMR	ER A.1, ER B 6.1	
4.1.6 Interfaces for Multilateration	ER A.1, ER B 6.1	
4.1.7 Interface for Data fusion	ER A.1, ER B 6.1	
4.1.9 Interface for HMI	ER A.1, ER B 6.1	
4.2.1.1 Modularity	ER A.1, ER A.6, ER A.7, ER B 6.1	
4.2.1.2 System Integrity	ER A.1, ER A.7, ER B 6.1	
4.2.1.3 Availability and Continuity of Service	ER A.1, ER A.7, ER B 6.1	
4.2.1.4 Identification	ER A.1, ER A.2, ER B 6.1	
4.2.1.5 Position Registration Accuracy	ER A.1, ER B 6.1	
4.2.1.6 Logical architecture	ER A.1, ER B 6.1	
4.2.1.7.1 Failure effect	ER B.3.1.1	
4.2.1.7.2 Reliability	ER B.3.1.1	
4.2.1.7.3 Human capabilities	ER A.3	
4.2.1.7.4 Safety Assessment	ER A.2, ER A.3	
4.2.1.8.1 Handle Traffic Movements	ER A.2	
4.2.1.8.2 System capacity	ER A.2	
4.2.1.8.3 Accuracy	ER A.2	

Clause(s) of the present document	(Essential) Requirements (ERs) of SES Interoperability Regulation (as amended), Annex II, Parts A and B	Qualifying remarks/Notes
4.2.1.8.4 Resolution	ER A.2	
4.2.1.8.5 Update rate	ER A.2	
4.2.1.8.6 Coverage Volume	ER A.2	
4.2.1.9 Evolution	ER A.2	
4.2.2 Design Requirements for Surface Movement Radar	The present document does not give presumption of conformity	
4.2.3 Design Requirements for Local Area Multilateration	The present document does not give presumption of conformity	
4.2.5 Design Requirements for HMI	ER A.1, ER B 6.1	
4.4.1.1 Operational responsibility	ER A.1, ER A.2, ER A.3	
4.4.1.2 System performance below specified minima	ER A.1, ER A.2, ER A.3	
4.5 Requirements on system security	ER A.3	
4.6 Requirements on system documentation	ER A.1, ER B 6.1	
5.1.1.1 General Tests	ER A.1, ER B 6.1	
5.1.1.2 Tests on modularity and interchangeability	ER A.1, ER A.6, ER B 6.1	
5.1.1.3 Acceptance testing requirements for Data Fusion	ER A.1, ER B 6.1	
5.1.1.4 Acceptance testing requirements for HMI	ER A.1, ER B 6.1	
5.1.2.1 Acceptance testing requirements for Constituent Surface Movement Radar	The present document does not give presumption of conformity	
5.1.2.2 Acceptance testing requirements for Constituent Local Area Multilateration	The present document does not give presumption of conformity	

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

Table B.3

1	**ER 1 seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	The present document does only give evidence on system level for this ER	ED-87D [1], chapter 1.8, ED-87D [1], chapter 2.1.2.3, ED-87D [1], chapter 2.1.2.4, ED-87D [1], chapter 2.2.1, ED-87D [1], chapter 3.6, requirement [REQ 26.] ED-87D [1], chapter 3.7.2., requirements [REQ 27.], [REQ 28.], [REQ 29.] ED-87D [1], chapter 3.3.7, ED-87D [1], chapter 3.3.8, ED-87D [1] Table 3-1 and requirements [REQ 19.] and [REQ 20.] EUROCONTROL Specification for A-SMGCS Services [2] chapters 5.3.1, 5.3.2 EUROCONTROL Specification for A-SMGCS Services [2] requirements ASMGCS-[GENL]-[130], ASMGCS-[GENL]-[140], ASMGCS-[GENL]-[150], ASMGCS-[SURV]-[070], ASMGCS-[SURV]-[100]
1.2	Built	The present document does only give evidence on system level for this ER	ED-87D [1], chapter 5.1., requirements [REQ 33.], [REQ 34.], [REQ 35.] ED-87D [1], chapter 5.2, ED-87D [1], chapter 5.3, ED-87D [1], chapter 5.6.
1.3	Maintained	The present document does only give evidence on system level for this ER	ED-87D [1], chapters 3.7.3, 3.7.4 and 3.7.5, requirements [REQ 30.], [REQ 31.], [REQ 32.] EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200] The A-SMGCS will have to come with a full documentation set describing the installation, maintenance and operation in a clear, consistent and unambiguous manner

1	**ER 1 seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	The present document does only give evidence on system level for this ER	EUROCONTROL Specification for A-SMGCS Services [2], chapter 2.2. The user will have to be informed, and appropriate actions will have to be defined, if the system performance is below specified minima. The A-SMGCS will have to come with a full documentation set describing the installation, maintenance and operation in a clear, consistent and unambiguous manner
1.5	Information Sharing	The present document does only give evidence on system level for this ER	The interface for the HMI will have to be capable to exchange data with the data fusion processor

Table B.4

2	ER 2 Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	EUROCAE, ED-87D [1]: 1.8.6 Safety case, EUROCONTROL 10/07/15-71 [i.7], EUROCONTROL Specification for A-SMGCS Services [2], chapter 2.2. The user will have to be informed, and appropriate actions will have to be defined, if the system performance is below specified minima
2.2	Validated concepts of operation - capacity	Operation is only applicable at the system level	EUROCAE, ED-87D [1]: 3.2 System Capacity, 3.3.2 Surveillance Capacity, [REQ 17.] EUROCONTROL Specification for A-SMGCS Services [2], chapters 3.2, 6.1 and 6.2, EUROCONTROL Specification for A-SMGCS Services [2]: 4.5 All Weather Operations, ASMGCS-[GENL]-[020], ASMGCS-[SURV]-[040]
2.3	Validated concepts of operation - quality	Operation is only applicable at the system level	EUROCONTROL Specification for A-SMGCS Services [2]: 4.5 All Weather Operations, ASMGCS-[GENL]-[020], ASMGCS-[SURV]-[040], ED-87D [1], chapters 3.3.8, 3.3.10, 3.3.18 as well as with Table 3-1 and requirements [REQ 19.] and [REQ 20.], ED-87D [1], chapters 3.3.15, 3.3.16 and 3.3.17 as well as with Table 3-1 and requirements [REQ 19.] and [REQ 20.], ED-87D [1], chapter 3.3.9 as well as with Table 3-1 and requirements [REQ 19.] and [REQ 20.], ED-87D [1], chapter 3.3.3, ED-87D [1], chapter 1.8.3

Table B.5

3	**ER 3 Safety**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	The present document does not give presumption of conformity	The present document does not give presumption of conformity	Evidence for system level conformity is out of scope of the present document
3.2	Implementation	The present document does not give presumption of conformity	ED-87D [1], chapter 1.8.6	Evidence for system level conformity is out of scope of the present document
3.3	Maintenance	The present document does not give presumption of conformity	The present document does not give presumption of conformity	Evidence for system level conformity is out of scope of the present document
3.4	Operation	Operation is only applicable at the system level	The user will have to be informed, and appropriate actions will have to be defined, if the system performance is below specified minima EUROCONTROL Specification for A-SMGCS Services [2], chapter 2.2	Evidence for system level conformity is out of scope of the present document
3.5	Human capabilities	n/a	The present document does not give presumption of conformity	Evidence for system level conformity is out of scope of the present document
3.6	Harmful interference	The present document does not give presumption of conformity	The A-SMGCS will have to be protected against any unauthorised access and against any actions which would cause the normal system operation to be affected in any way	Evidence for system level conformity is out of scope of the present document

Table B.6

<table>
<tr><td rowspan="2">4</td><td colspan="4">ER 4 Civil-military coordination</td></tr>
<tr><td colspan="4">Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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."</td></tr>
<tr><td></td><td>Keywords</td><td colspan="2">Evidence on constituent level</td><td>Evidence on system level</td></tr>
<tr><td>4.1</td><td>Flexible use of airspace</td><td colspan="2">The present document does not give presumption of conformity</td><td>Evidence for system level conformity is out of scope of the present document</td></tr>
<tr><td>4.2</td><td>Timely sharing</td><td colspan="2">n/a</td><td>Evidence for system level conformity is out of scope of the present document</td></tr>
<tr><td>4.3</td><td>National security requirements</td><td colspan="2">n/a</td><td>Evidence for system level conformity is out of scope of the present document</td></tr>
</table>

Table B.7

<table>
<tr><td>5</td><td colspan="4">ER 5 Environmental constraints</td></tr>
<tr><td></td><td colspan="4">Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] requires that: "Systems and operations of the EATMN shall take into account the need to minimize environmental impact in accordance with Community legislation "</td></tr>
<tr><td></td><td>Keywords</td><td>Evidence on constituent level</td><td>Evidence on system level</td><td>Evidence at procedure level</td></tr>
<tr><td>5.1</td><td>Minimize environmental impact - ATS</td><td></td><td>n/a</td><td>Evidence for system level conformity is out of scope of the present document</td></tr>
<tr><td>5.2</td><td>Minimize environmental impact - materials</td><td>The present document does not give presumption of conformity</td><td>n/a</td><td>Evidence for system level conformity is out of scope of the present document</td></tr>
</table>

Table B.8

<table>
<tr><td>6</td><td colspan="3">ER 6 Principles governing the logical architecture of systems</td></tr>
<tr><td></td><td colspan="3">Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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 "</td></tr>
<tr><td></td><td>Keywords</td><td>Evidence on constituent level</td><td>Evidence on system level</td></tr>
<tr><td>6.1</td><td>Designed and progressively integrated.</td><td></td><td>ED-87D [1], chapter 1.8
ED-87D [1], chapter 5.2</td></tr>
</table>

Table B.9

7	**ER 7 Principles governing the construction of systems**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	The present document does not give presumption of conformity	ED-87D [1], chapter 1.8 ED-87D [1], chapter 3.7.2., requirements [REQ 27.], [REQ 28.], [REQ 29.]
7.2	High availability, Redundancy and fault tolerance		ED-87D [1], chapters 3.7.3, 3.7.4 and 3.7.5, requirements [REQ 30.], [REQ 31.], [REQ 32.], EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200]

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

B.3.1   Systems and procedures for airspace management

Table B.10

1.1	**ER B 1.1 Seamless operation**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a	n/a
1.1.2	Tactical aspects of airspace availability	n/a	n/a	n/a
1.1.3	Correct and timely way	n/a	n/a	n/a
1.1.4	National security requirements	n/a	n/a	n/a

Requirements for systems and procedures for airspace management are not applicable for deployed cooperative sensors in A-SMGCS and are not covered by the present document.

B.3.2   Systems and procedures for air traffic flow management

Table B.11

2.1	**ER B 2.1 Seamless operation**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a	n/a
2.1.2	Pre-tactical	n/a	n/a	n/a
2.1.3	Tactical	n/a	n/a	n/a

B.3.3   Systems and procedures for air traffic services

B.3.3.1   Flight data processing systems

Table B.12

3.1.1	**ER B 3.1.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a
3.1.1.2	Performance appropriate for environment	n/a	n/a
3.1.1.3	Accuracy and error tolerance	n/a	n/a

Table B.13

3.1.2	**ER B 3.1.2. Support for new concepts of operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a	n/a
3.1.2.2	Airborne systems - built	n/a	n/a
3.1.2.3	Airborne systems - maintained	n/a	n/a
3.1.2.4	Airborne systems - operated	n/a	n/a
3.1.2.5	Ground systems - design	n/a	n/a
3.1.2.6	Ground systems - built	n/a	n/a
3.1.2.7	Ground systems - maintained	n/a	n/a
3.1.2.8	Ground systems - operated	n/a	n/a

B.3.3.2 Surveillance data processing systems

Table B.14

3.2.1	**ER B 3.2.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a
3.2.1.2	Built	n/a	n/a
3.2.1.3	Maintained	n/a	n/a
3.2.1.4	Operated	n/a	n/a

Table B.15

3.2.2	ER B 3.2.2. Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a

B.3.3.3   HMI systems

Table B.16

3.3.1	ER B 3.3.1 Seamless operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a
3.3.1.2	Built	n/a	n/a
3.3.1.3	Maintained	n/a	n/a
3.3.1.4	Operated	n/a	n/a

Table B.17

3.3.2	ER B 3.3.2. Support for new concepts of operation		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a

B.3.4 Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications

Table B.18

4.1	**ER B 4.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a
4.1.2	Built	n/a	n/a
4.1.3	Maintained	n/a	n/a
4.1.4	Operated	n/a	n/a
4.1.5	Quality of service, coverage, redundancy	n/a	n/a

Table B.19

4.2	**ER B 4.2 Support for new concepts of operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a

B.3.5   Navigation systems and procedures

Table B.20

5.1	**ER B 5.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a
5.1.2	Built	n/a	n/a
5.1.3	Maintained	n/a	n/a
5.1.4	Operated	n/a	n/a

B.3.6   Surveillance systems and procedures

Table B.21

6.1	**ER B 6.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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		ED-87D [1], chapter 1.8 ED-87D [1], chapter 2.1.2.3 ED-87D [1], chapter 2.1.2.4 ED-87D [1], chapter 2.2.1 ED-87D [1], chapter 3.6, requirement [REQ 26.] ED-87D [1], chapter 3.7.2, requirements [REQ 27.], [REQ 28.], [REQ 29.] ED-87D [1], chapter 3.3.7 ED-87D [1], chapter 3.3.8 ED-87D [1] Table 3-1 and requirements [REQ 19.] and [REQ 20.] EUROCONTROL Specification for A-SMGCS Services [2] chapters 5.3.1, 5.3.2 EUROCONTROL Specification for A-SMGCS Services [2] requirements ASMGCS-[GENL]-[130], ASMGCS-[GENL]-[140], ASMGCS-[GENL]-[150], ASMGCS-[SURV]-[070], ASMGCS-[SURV]-[100]

	Keywords	Evidence on constituent level	Evidence on system level
6.1.2	Built		ED-87D [1], chapter 5.1, requirements [REQ 33.], [REQ 34.], [REQ 35.] ED-87D [1], chapter 5.2 ED-87D [1], chapter 5.3 ED-87D [1], chapter 5.6
6.1.3	Maintained		ED-87D [1], chapters 3.7.3, 3.7.4 and 3.7.5, requirements [REQ 30.], [REQ 31.], [REQ 32.] EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200] The A-SMGCS needs to come with a full documentation set describing the installation, maintenance and operation in a clear, consistent and unambiguous manner.
6.1.4	Operated		EUROCONTROL Specification for A-SMGCS Services [2], chapter 2.2. The user needs to be informed, and appropriate actions will have to be defined, if the system performance is below specified minima. The A-SMGCS needs to come with a full documentation set describing the installation, maintenance and operation in a clear, consistent and unambiguous manner.
6.1.5	Information Sharing		The interface for the HMI needs to be capable to exchange data with the data fusion processor

B.3.7   Systems and procedures for aeronautical information services

Table B.22

7.1	**ER B 7.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a
7.1.2	Standardized data set	n/a	n/a

Table B.23

7.2	**ER B 7.2 Support for new concepts of operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a

B.3.8   Systems and procedures for the use of meteorological information

Table B.24

8.1	**ER B 8.1 Seamless operation**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a	n/a

Table B.25

8.2	**ER B 8.2 Support for new concepts of operation**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.9] 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	n/a	n/a

Annex C (informative):
Bibliography

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