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Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 2: Community Specification for A-SMGCS airport safety support service

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Contents

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Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

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

General requirements for presumption of conformity to Regulation (EU) 2018/1139 [i.4] are given in the normative annex 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 2 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 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".

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Date of withdrawal of any conflicting National Standard (dow):	31 March 2021

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) airport safety support service. This service is based on the A-SMGCS surveillance service (as specified in ETSI EN 303 213-1 [3]) and provides safety net functionalities to controllers with timely, accurate and unambiguous information and alerts covering the entire manoeuvring and movement area of aerodromes.

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.4].

NOTE 1: The ERs in Annex VIII of Regulation (EU) 2018/1139 [i.4] 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.4], 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 outside of the scope of the present document. As such the ERs of Regulation (EU) 2018/1139 [i.4] 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 chapter 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".

[3] ETSI EN 303 213-1: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 1: Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for A-SMGCS Level 1 including external interfaces".

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] ICAO Document 9830, AN/452: "Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual", First Edition, 2004.

[i.3] 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.4] 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.

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 (A-SMGCS): 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.2].

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.2].

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.2].

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.2].

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:

APL	Alert Processing Latency
APTRT	Accuracy of Predicted Time to Runway Threshold
ART	Alert Response Time
A-SMGCS	Advanced Surface Movement Guidance and Control Systems
ATM	Air Traffic Management
ATS	Air Traffic Service
CATC	Conflicting ATC clearances
CMAC	Conformance Monitoring for Controllers
EATMN	European Air Traffic Management Network
EC	European Communities
ED-87D	EUROCAE Document ED-87D
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
IMRT	Integrity Monitor Response Time
IPR	Intellectual Property Rights
MTBCF	Mean Time Between Critical Failures
MTTR	Mean Time To Repair
PDAS	Probability of Dectection of an Alert Situation
PFAS	Probability of False Alert Situation
RMCA	Runway Monitoring and Conflict Alerting
SES	Single European Sky
SMGCS	Surface Movement Guidance and Control System
TMA	Terminal Manoeuvring Area

4 Requirements for the A-SMGCS airport safety support service

4.1 Dependency on the A-SMGCS surveillance service

The A-SMGCS airport safety support service is based on the A-SMGCS surveillance service as defined in ETSI EN 303 213-1 [3].

Both, the surveillance and airport safety support services are constituents of the A-SMGCS. Hence requirements on the system level related to system safety, reliability, system security and documentation are already specified in ETSI EN 303 213-1 [3] and will not be duplicated in the present document.

The A-SMGCS surveillance service shall comply with the requirements as defined in ETSI EN 303 213-1 [3].

4.2 Airport safety support service basic functionality

4.2.1 Operating principles of the airport safety support service

The operating principles of the airport safety support service are defined in ED-87D [1], chapter 2.1.3.

The parameters of the airport safety support service shall be configurable as defined in EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[040].

The display of the airport safety support service shall be set up as defined in EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[050].

The airport safety support service shall provide INFORMATION and ALARM alerts as defined in EUROCONTROL-SPEC-171 [2], chapter 3.3.2 and chapter 6.3.1, ASMGCS-[SAFE]-[070].

The alerts of the airport safety support service shall be linked to a priority as defined in EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[080].

The airport safety support service shall comply with the requirements as defined as defined in ED-87D [1], chapter 2.1.3, requirements [REQ 4.], [REQ 5.] and [REQ 6.], and chapter 3.4, requirements [REQ 7.], [REQ 8.], [REQ 9.], [REQ 21.] and [REQ 22.].

In addition, the airport safety support service shall comply with the requirements as defined in the EUROCONTROL Specification for A-SMGCS Services [2], chapter 6.3.1, requirements ASMGCS-[SAFE]-[010], ASMGCS-[SAFE]-[020], ASMGCS-[SAFE]-[030], ASMGCS-[SAFE]-[040], ASMGCS-[SAFE]-[050], ASMGCS-[SAFE]-[060], ASMGCS-[SAFE]-[070], ASMGCS-[SAFE]-[080], ASMGCS-[SAFE]-[090], ASMGCS-[SAFE]-[100], ASMGCS-[SAFE]-[110], ASMGCS-[SAFE]-[120], ASMGCS-[SAFE]-[130], ASMGCS-[SAFE]-[140], ASMGCS-[SAFE]-[150], ASMGCS-[SAFE]-[160], ASMGCS-[SAFE]-[170], ASMGCS-[SAFE]-[190], and ASMGCS-[SAFE]-[200].

4.2.2 RMCA basic functionality

If the A-SMGCS airport safety support service provides RMCA, it shall comply with the requirements as defined in the EUROCONTROL Specification for A-SMGCS Services [2], chapter 6.3.2, ASMGCS-[SAFE]-[210], ASMGCS-[SAFE]-[220], ASMGCS-[SAFE]-[230], ASMGCS-[SAFE]-[240], ASMGCS-[SAFE]-[250], ASMGCS-[SAFE]-[260], ASMGCS-[SAFE]-[270] and ASMGCS-[SAFE]-[280].

4.2.3 CATC basic functionality

If the A-SMGCS airport safety support service provides CATC, it shall comply with the requirements as defined in the EUROCONTROL Specification for A-SMGCS Services [2], chapter 6.3.3, ASMGCS-[SAFE]-[290], ASMGCS-[SAFE]-[300], ASMGCS-[SAFE]-[310], ASMGCS-[SAFE]-[320].

4.2.4 CMAC basic functionality

If the A-SMGCS airport safety support service provides CATC, it shall comply with the requirements as defined in the EUROCONTROL Specification for A-SMGCS Services [2], chapter 6.3.4, ASMGCS-[SAFE]-[330], ASMGCS-[SAFE]-[340], ASMGCS-[SAFE]-[350], ASMGCS-[SAFE]-[360], ASMGCS-[SAFE]-[370], ASMGCS-[SAFE]-[380], ASMGCS-[SAFE]-[390], ASMGCS-[SAFE]-[400], ASMGCS-[SAFE]-[410], ASMGCS-[SAFE]-[420], ASMGCS-[SAFE]-[430], ASMGCS-[SAFE]-[440], ASMGCS-[SAFE]-[450], ASMGCS-[SAFE]-[460], ASMGCS-[SAFE]-[470], ASMGCS-[SAFE]-[480] and ASMGCS-[SAFE]-[490].

4.3 Design Requirements for the A-SMGCS airport safety support service

4.3.1 Design Requirements on System Level

The design requirements for the A-SMGCS airport safety support service regarding Modularity, System Integrity, and Safety shall be identical to the design requirements for the A-SMGCS surveillance service as defined in ETSI EN 303 213-1 [3].

The airport safety support service performance and capacity parameters shall comply with the requirements as defined in ED-87D [1], chapter 3.4, requirements [REQ 21.] and [REQ 22.] and chapter 3.3.2 [REQ 17.].

4.3.2 Software design

The Software and the design of the airport safety support service shall comply with the requirements as defined in ED-87D [1], chapter 2.1.3 [REQ 4.], [REQ 5.], [REQ 6.].

4.3.3 Service PDAS

The Service Probability of Detection of an Alert Situation of the airport safety support service shall comply with the requirements as defined in ED-87D [1], chapter 3.4.3.2 and meet the Service PDAS required in ED-87D [1], Table 3-2 [REQ 21.] and [REQ 22.].

4.3.4 System PDAS

The System Probability of Detection of an Alert Situation of the airport safety support service shall comply with the requirements as defined in ED-87D [1], chapter 3.4.3.3 and meet the System PDAS required in ED-87D [1], Table 3-2 [REQ 21.] and [REQ 22.].

4.3.5 PFAS

The Probability of False Alert Situation of the airport safety support service should comply with the requirements as defined in ED-87D [1], chapter 3.4.4 and meet the PFAS required ED-87D [1], Table 3-2 [REQ 21.] and [REQ 22.].

4.3.6 Latencies

The Alert Processing Latency (APL) of the airport safety support service shall comply with the requirements as defined in ED-87D [1], chapter 3.4.5.2 and meet the APL required in ED-87D [1], Table 3-2 [REQ 21.] and [REQ 22.].

The Alert Response Time (ART) of the airport safety support service should comply with the requirements as defined in ED-87D [1], chapter 3.4.5.3 and meet the ART required in ED-87D [1], Table 3-2 [REQ 21.] and [REQ 22.].

4.3.7 APTRT

The Accuracy of Predicted Time to Runway Threshold (APTRT) of the airport safety support service shall comply with the requirements as defined in ED-87D [1], chapter 3.4.6 and meet the APTRT required in ED-87D [1], Table 3-2 [REQ 21.] and [REQ 22.].

4.3.8 Capacity

The capacity of the airport safety support service shall comply with the requirements as defined in ED-87D [1] 3.3.2, [REQ 17.].

4.3.9 System coverage

The system coverage of the airport safety support service shall comply with the requirements as defined in ED-87D [1], chapter 3.3.3 and ED-87D [1], chapter 3.4.7 [REQ 22.].

4.3.10 Airport safety support service Interfaces

The airport safety support service shall receive ASTERIX messages as defined in ED-87D [1], chapter 2.1.2.4 [REQ 1.], [REQ 3.] and as described in ED-87D [1], chapter 2.1.3.2.

The airport safety support service shall use surveillance data input as defined in EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[020].

The data output of the airport safety support service shall comply with the requirements as defined in ED-87D [1], chapter 2.1.3.3 [REQ 5.] and [REQ 6.].

The airport safety support service shall be connected to an HMI for data input and data output as defined in EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[030].

4.3.11 HMI Requirements

The airport safety support service shall display alerts on an HMI as defined in EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[060].

The airport safety support service shall display INFORMATION alerts on an HMI as defined in EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[140].

The airport safety support service shall display ALARM alerts on an HMI as defined in EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[090].

The airport safety support service shall display alerts on an HMI with a duration and terminating conditions as defined in EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[150].

The airport safety support service shall display additional information to alerts on an HMI as defined in EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[160].

The airport safety support service shall prioritize alerts on an HMI as defined in EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[170].

4.3.12 Integrity

The Integrity of the airport safety support service shall comply with the requirements as defined in ED-87D [1], chapter 3.7.2 [REQ 27.], [REQ 28.] and [REQ 29.] and in the EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200].

As defined in ED-87D [1], chapter 3.7.2.2 and chapter 3.7.5, the airport safety support service shall comply with the IMRT requirement in ED-87D [1] Table 3-7 [REQ 32.].

4.4 Maintenance requirements for the airport safety support services of A-SMGCS Systems

4.4.1 Availability

As defined in ED-87D [1], chapters 3.7.3.1 and 3.7.5, the airport safety support service shall comply with the IMRT requirement in ED-87D [1], Table 3-7 [REQ 32.].

4.4.2 MTBCF

As defined in ED-87D [1], chapters 3.7.3.2 and 3.7.5, the airport safety support service shall comply with the MTBCF requirement in ED-87D [1], Table 3-7 [REQ 32.].

4.4.3 MTTR

As defined in ED-87D [1], chapters 3.7.3.3 and 3.7.5, the airport safety support service shall comply with the MTTR requirement in ED-87D [1], Table 3-7 [REQ 32.].

4.5 Requirements for operation of the A-SMGCS airport safety support service

4.5.1 Operational responsibility

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

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

4.5.2 Time Synchronization

The time synchronization of the airport safety support service of an A-SMGCS shall comply with the requirements as defined in ED-87D [1], chapters 3.7.4 and 3.7.5, requirements [REQ 30.] and [REQ 31.].

4.5.3 HMI and Human capabilities

The A-SMGCS airport safety support service HMI shall be designed in such a way, that the human capabilities shall be compatible with the principals described in ED-87D [1], chapter 2.2.1 as well as to the requirements defined in the EUROCONTROL Specification for A-SMGCS Services [2], chapters 5.3.1 and 6.1, requirements ASMGCS-[GENL]-[070], ASMGCS-[GENL]-[100], ASMGCS-[GENL]-[110], ASMGCS-[GENL]-[120], ASMGCS-[GENL]-[130], ASMGCS-[GENL]-[140], ASMGCS-[GENL]-[150].

4.6 Requirements on system security

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

4.7 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.

5 Testing

5.1 Acceptance testing requirements for the A-SMGCS airport safety support service

5.1.1 Acceptance testing requirements on System Level

All system level tests shall be performed identical to the requirements as defined for the A-SMGCS surveillance service, as defined in ETSI EN 303 213-1 [3], clause 5.

5.1.2 Acceptance testing requirements specific to the airport safety support service

The airport safety support service shall perform the build tests as defined in ED-87D [1], chapters 5.1. and 5.5 as well as requirements [REQ 33.], [REQ 34.] and [REQ 35.].

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.4].

The A-SMGCS airport safety support service shall comply with the Essential Requirements of Regulation (EU) 2018/1139 [i.4] as defined and described in the traceability matrixes of this annex (Table A.1 and Table A.2).

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 (EU) 2018/1139 [i.4] to clauses of the present document

Essential requirements (ERs) of Regulation (EU) 2018/1139	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 Services	The present document does not give presumption of conformity	
ER 3.1 Fit for purpose	4.1 Dependency on the A-SMGCS surveillance service 4.2.1 Operating principles of the airport safety support service 4.2.2 RMCA basic functionality 4.2.3 CATC basic functionality 4.2.4 CMAC basic functionality 4.6 Requirements on system security 5.1.1 Acceptance testing requirements on System Level 5.1.2 Acceptance testing requirements specific to the airport safety support service	The present document does not give presumption of conformity related to maintenance of the system. Requirements related to system security are specified in ETSI EN 303 213-1 [3].
ER 3.2 Integrity and safety related performance and reliability	4.5.1 Operational responsibility 4.5.2 Time Synchronisation 4.5.3 HMI and Human capabilities	Additional requirements related to ER2 are specified in ETSI EN 303 213-1 [3].
ER 3.3 Seamless operation	4.3.10 Airport safety support service Interfaces 4.3.12 Integrity	The present document does not give presumption of conformity related to maintenance of the system.
ER 3.4 Support for new concepts of operation	4.3.1 Design Requirements on System Level 4.2.1 Operating principles of the airport safety support service	
ER 3.5 Civil-military coordination	n/a	The present document does not give presumption of conformity.
ER 3.6 Design requirements	4.2.3 CATC basic functionality 4.2.4 CMAC basic functionality 4.2.2 RMCA basic functionality 4.3.1 Design Requirements on System Level 4.3.2 Software design 4.3.3 Service PDAS 4.3.4 System PDAS 4.3.5 PFAS 4.3.6 Latencies 4.3.7 APTRT 4.3.8 Capacity 4.3.9 System coverage 4.3.10 Airport safety support service Interfaces 4.3.11 HMI Requirements 4.3.12 Integrity 4.4.1 Availability 4.4.2 MTBCF 4.4.3 MTTR 4.6 Requirements on system security 4.7 Requirements on system documentation	Requirements related to documentation are specified in ETSI EN 303 213-1 [3].
ER 3.7 Continuity of service	4.3.12 Integrity 4.4.1 Availability 4.4.2 MTBCF 4.4.3 MTTR 4.6 Requirements on system security	Specified in ETSI EN 303 213-1 [3].
ER 4 Qualification of Air Traffic Controllers	The present document does not give presumption of conformity	
ER 5 Service providers and training organizations	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 Regulation (EU) 2018/1139 [i.4]

Clause(s) of the present document		(Essential) Requirements (ERs) of Regulation (EU) 2018/1139, Annex VIII	Qualifying remarks/Notes
4.1	Dependency on the A-SMGCS surveillance service	ER 3.1	
4.2.1	Operating principles of the airport safety support service	ER 1, ER 3.4	
4.2.2	RMCA basic functionality	ER 3.1, ER 3.6	
4.2.3	CATC basic functionality	ER 3.1, ER 3.6	
4.2.4	CMAC basic functionality	ER 3.1, ER 3.6	
4.3.1	Design Requirements on System Level	ER 3.4, ER 3.6	
4.3.2	Software design	ER 3.6	
4.3.3	Service PDAS	ER 3.6	
4.3.4	System PDAS	ER 3.6	
4.3.5	PFAS	ER 3.6	
4.3.6	Latencies	ER 3.6	
4.3.7	APTRT	ER 3.6	
4.3.8	Capacity	ER 3.6	
4.3.9	System coverage	ER 3.6	
4.3.10	Airport safety support service Interfaces	ER 3.3, ER 3.6	
4.3.11	HMI Requirements	ER 3.6	
4.3.12	Integrity	ER 3.3, ER 3.7	
4.4.1	Availability	ER 3.7	
4.4.2	MTBCF	ER 3.7	
4.4.3	MTTR	ER 3.7	
4.5.1	Operational responsibility	ER 3.2	
4.5.2	Time Synchronisation	ER 3.2	
4.5.3	HMI and Human capabilities	ER 3.2	
4.6	Requirements on system security	ER 3.1, ER 3.7	
4.7	Requirements on system documentation	ER 3.6	
5.1.1	Acceptance testing requirements on System Level	ER 3.1	
5.1.2	Acceptance testing requirements specific to the airport safety support service	ER 3.1	

A.2 Mapping of requirements for the A-SMGCS Surveillance Service to the relevant Essential Requirements of Annex VIII, chapter 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 chapters of the relevant Essential Requirements (ERs) of the Regulation (EU) 2018/1139 [i.4], 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.4].

The A-SMGCS airport safety support service shall comply with the relevant Essential Requirements specified in Annex VIII of the Regulation (EU) 2018/1139 [i.4] as defined and described in the tables of the present annex.

NOTE: Table A.3 to Table A.9 are related only to those Essential Requirements covered by the present document as outlined in Table A.1 above.

Table A.3

1	**ER 3.1 Fit for purpose**		
	Regulation (EU) 2018/1139 [i.4] 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**
1.1	properly designed	ETSI EN 303 213-1 [3] EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[040], ASMGCS-[SAFE]-[050], ASMGCS-[SAFE]-[080], ASMGCS-[SAFE]-[070] EUROCONTROL-SPEC-171 [2], chapter 3.3.2. ED-87D [1], chapter 2.1.3, requirements [REQ 4.], [REQ 5.] and [REQ 6.], and chapter 3.4, requirements [REQ 7.], [REQ 8.], [REQ 9.], [REQ 21.] and [REQ 22.]. 4.2.2 RMCA basic functionality 4.2.3 CATC basic functionality 4.2.4 CMAC basic functionality	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.1
1.2	produced	n/a	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.1
1.3	installed	ETSI EN 303 213-1 [3], clause 5. ED-87D [1], chapters 5.1. and 5.5 ED-87D [1], requirements [REQ 33.], [REQ 34.] and [REQ 35.]	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.1
1.4	maintained	n/a	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.1
1.5	protected against unauthorised interference	The A-SMGCS shall be protected against any unauthorized access and against any actions which would cause the normal system operation to be affected in any way.	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.1
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.4

2	**ER 3.2 Integrity and safety-related performance and reliability**		
	Regulation (EU) 2018/1139 [i.4] 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**
2	All regulatory text	EUROCONTROL Specification for A-SMGCS Services [2], chapter 2.2. The user shall be informed, and appropriate actions shall be defined, if the system performance is below specified minima. ED-87D [1], chapters 3.7.4 and 3.7.5, requirements [REQ 30.] and [REQ 31.]. ED-87D [1], chapter 2.2.1. EUROCONTROL Specification for A-SMGCS Services [2], chapters 5.3.1 and 6.1, requirements ASMGCS-[GENL]-[070], ASMGCS-[GENL]-[100], ASMGCS-[GENL]-[110], ASMGCS-[GENL]-[120], ASMGCS-[GENL]-[130], ASMGCS-[GENL]-[140], ASMGCS-[GENL]-[150].	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.2.

Table A.5

3	**ER 3.3 Seamless operation**		
	Regulation (EU) 2018/1139 [i.4] 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**
3.1	designed	ED-87D [1], chapter 3.7.2 [REQ 27.], [REQ 28.] and [REQ 29.] EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200]	
3.2	built	n/a	
3.3	maintained	The present document does not give presumption of conformity	
3.4	operated	Operation is only applicable at the system level.	
3.5	information sharing	ED-87D [1], chapter 2.1.2.4 [REQ 1.] and [REQ 3.] ED-87D [1], chapter 2.1.3.2. EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[020]. ED-87D [1], chapter 2.1.3.3 [REQ 5.] and [REQ 6.]. EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[030].	

Table A.6

4	**ER 3.4 Support for new concepts of operation**		
	Regulation (EU) 2018/1139 [i.4] 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**
4.1	Validated concepts of operation - quality	ED-87D [1], chapter 3.4, requirements [REQ 21.] and [REQ 22.] and chapter 3.3.2 [REQ 17.] EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[040], ASMGCS-[SAFE]-[050], ASMGCS-[SAFE]-[080], ASMGCS-[SAFE]-[070] EUROCONTROL-SPEC-171 [2], chapter 3.3.2. ED-87D [1], chapter 2.1.3, requirements [REQ 4.], [REQ 5.] and [REQ 6.], and chapter 3.4, requirements [REQ 7.], [REQ 8.], [REQ 9.], [REQ 21.] and [REQ 22.]	
4.2	Validated concepts of operation - sustainability	Operation is only applicable at the system level.	
4.3	Validated concepts of operation - effectiveness	Operation is only applicable at the system level.	
4.4	Validated concepts of operation - safety	Operation is only applicable at the system level.	
4.5	Validated concepts of operation - capacity	Operation is only applicable at the system level.	

Table A.7

5	**ER 3.5 Civil-military coordination**		
	Regulation (EU) 2018/1139 [i.4] 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**
5.1	Flexible use of airspace	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.
5.2	Timely sharing	n/a	The present document does not give presumption of conformity.
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.8

6	**ER 3.6 Design requirements**		
	Regulation (EU) 2018/1139 [i.4] 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**
6.1	Safety and security requirements	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.	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.6
6.2	Failure resistance and safety of service	ED-87D [1], chapter 3.4, requirements [REQ 21.] and [REQ 22.] and chapter 3.3.2 [REQ 17.] ED-87D [1], chapter 2.1.3 [REQ 4.], [REQ 5.], [REQ 6.] ED-87D [1], chapter 3.7.2 [REQ 27.], [REQ 28.] and [REQ 29.] EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200]. ED-87D [1], chapters 3.7.2.2, 3.7.3.1, 3.7.3.2, 3.7.3.3. ED-87D [1], chapter 3.7.5, Table 3-7 [REQ 32.] ED-87D [1], chapter 3.7.3.1 and chapter 3.7.5, the airport safety support service shall comply with the IMRT requirement in ED-87D [1] Table 3-7 [REQ 32.].	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.6
6.3	Usability (take into account limitations related to human capabilities and performance).	4.2.3 CATC basic functionality 4.2.4 CMAC basic functionality 4.2.2 RMCA basic functionality ED-87D [1], chapter 3.3.3, ED-87D [1], chapter 3.3.2, [REQ 17.] ED-87D [1], chapters 3.4.3.2, 3.4.3.3, 3.4.4, 3.4.5.2, 3.4.5.3, 3.4.6, ED-87D [1], Table 3-2 [REQ 21.] and [REQ 22.]. ED-87D [1], chapter 2.1.2.4 [REQ 1.] and [REQ 3.] ED-87D [1] chapter 2.1.3.2. ED-87D [1], chapter 2.1.3.3 [REQ 5.] and [REQ 6.]. EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[020], ASMGCS-[SAFE]-[030], ASMGCS-[SAFE]-[060], ASMGCS-[SAFE]-[140], ASMGCS-[SAFE]-[090], ASMGCS-[SAFE]-[150], ASMGCS-[SAFE]-[160], ASMGCS-[SAFE]-[170].	

	ER 3.6 Design requirements		
6	Regulation (EU) 2018/1139 [i.4] 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**
6.4	Robustness (protected from harmful interactions)	n/a	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.6
6.5	Documented (clear, consistent and unambiguous provision of information)	The A-SMGCS shall come with a full documentation set describing the installation, maintenance and operation in a clear, consistent and unambiguous manner.	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.6

Table A.9

	ER 3.7 Continuity of service		
7	Regulation (EU) 2018/1139 [i.4] 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**
7	All regulatory text	EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200]. ED-87D [1], chapters 3.7.2.2, 3.7.3.1, 3.7.3.2, 3.7.3.3. ED-87D [1], chapter 3.7.5, Table 3-7 [REQ 32.]. 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.	Identical evidence as for the A-SMGCS surveillance service, refer to ETSI EN 303 213-1 [3], Table A.7.

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 (EU) 1070/2009 [i.3].
- Clauses B.2 and B.3 provide a comprehensive traceability of evidence on constituents and system levels against chapters of the general Essential Requirements (ERs) of the Interoperability Regulation [i.1] as amended by Regulation (EU) 1070/2009 [i.3] 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) No 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, Part A	Clause(s) of the present document	Qualifying remarks/Notes
ER A.1 Seamless operation.	4.3.10 Airport safety support service Interfaces 4.3.12 Integrity	-
ER A.2 Support for new concepts of operation.	4.3.1 Design Requirements on System Level 4.2.1 Operating principles of the airport safety support service	
ER A.3 Safety.	4.5.1 Operational responsibility	-
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.	Depending on the installation site (indoor or outdoor) of the constituent, different requirements within the referenced chapters apply.

Essential requirements (ERs) of SES Interoperability Regulation, Annex II, Part A	Clause(s) of the present document	Qualifying remarks/Notes
ER A.6 Principles governing the logical architecture of systems.	4.1 Dependency on the A-SMGCS surveillance service 4.2.1 Operating principles of the airport safety support service 4.2.2 RMCA basic functionality 4.2.3 CATC basic functionality 4.2.4 CMAC basic functionality 4.3.1 Design Requirements on System Level 4.3.2 Software design 4.3.3 Service PDAS 4.3.4 System PDAS 4.3.5 PFAS 4.3.6 Latencies 4.3.7 APTRT 4.3.8 Capacity 4.3.9 System coverage 4.3.10 Airport safety support service Interfaces 4.3.11 HMI Requirements 4.3.12 Integrity 4.4.1 Availability 4.4.2 MTBCF 4.4.3 MTTR 4.5.1 Operational responsibility 4.5.2 Time Synchronisation 4.5.3 HMI and Human capabilities 4.6 Requirements on system security 5.1.1 Acceptance testing requirements on System Level 5.1.2 Acceptance testing requirements specific to the airport safety support service	-
ER A.7 Principles governing the construction of systems.	4.7 Requirements on system documentation	
ER 1.1 Seamless operation of airspace management.	n/a	
ER 2.1 Seamless operation of air traffic flow management.	n/a	
ER 3.1.1 Seamless operation of flight data processing.	n/a	
ER 3.1.2 Support for new concepts of operation for flight data processing.	n/a	
ER 3.2.1 Seamless operation surveillance data processing systems.	n/a	
ER 3.2.2 Support for new concepts of operation for surveillance data processing systems.	n/a	
ER 3.3.1 Seamless operation of HMI systems.	n/a	
ER 3.3.2 Support for new concepts of operation for HMI systems.	n/a	
ER 4.1 Seamless operation of Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications.	n/a	
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.	n/a	

Essential requirements (ERs) of SES Interoperability Regulation, Annex II, Part A	Clause(s) of the present document	Qualifying remarks/Notes
ER 5.1 Seamless operation of Navigation systems and procedures.	n/a	
ER 6.1 Seamless operation of Surveillance systems and procedures.	n/a	
ER 7.1 Seamless operation of Systems and procedures for aeronautical information services.	n/a	
ER 7.2 Support for new concepts of operation for systems and procedures for aeronautical information services.	n/a	
ER 8.1 Seamless operation of systems and procedures for the use of meteorological information.	n/a	
ER 8.2 Support for new concepts of operation for systems and procedures for the use of meteorological information.	n/a	

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	Dependency on the A-SMGCS surveillance service	ER A.6 Principles governing the logical architecture of systems.	
4.2.1	Operating principles of the airport safety support service	ER A.2 Support for new concepts of operation. ER A.6 Principles governing the logical architecture of systems.	
4.2.2	RMCA basic functionality	ER A.2 Support for new concepts of operation. ER A.6 Principles governing the logical architecture of systems.	
4.2.3	CATC basic functionality	ER A.6 Principles governing the logical architecture of systems.	
4.2.4	CMAC basic functionality	ER A.6 Principles governing the logical architecture of systems.	
4.3.1	Design Requirements on System Level	ER A.6 Principles governing the logical architecture of systems.	
4.3.2	Software design	ER A.6 Principles governing the logical architecture of systems.	
4.3.3	Service PDAS	ER A.6 Principles governing the logical architecture of systems.	
4.3.4	System PDAS	ER A.6 Principles governing the logical architecture of systems.	
4.3.5	PFAS	ER A.6 Principles governing the logical architecture of systems.	
4.3.6	Latencies	ER A.6 Principles governing the logical architecture of systems.	
4.3.7	APTRT	ER A.6 Principles governing the logical architecture of systems.	
4.3.8	Capacity	ER A.6 Principles governing the logical architecture of systems.	
4.3.9	System coverage	ER A.6 Principles governing the logical architecture of systems.	

Clause(s) of the present document		(Essential) Requirements (ERs) of SES Interoperability Regulation (as amended), Annex II, Parts A and B	Qualifying remarks/Notes
4.3.10	Airport safety support service Interfaces	ER A.1 Seamless operation. ER A.6 Principles governing the logical architecture of systems.	
4.3.11	HMI Requirements	ER A.6 Principles governing the logical architecture of systems.	
4.3.12	Integrity	ER A.1 Seamless operation. ER A.6 Principles governing the logical architecture of systems.	
4.4.1	Availability	ER A.6 Principles governing the logical architecture of systems.	
4.4.2	MTBCF	ER A.6 Principles governing the logical architecture of systems.	
4.4.3	MTTR	ER A.6 Principles governing the logical architecture of systems.	
4.5.1	Operational responsibility	ER A.3 Safety. ER A.6 Principles governing the logical architecture of systems.	
4.5.2	Time Synchronisation	ER A.6 Principles governing the logical architecture of systems.	
4.5.3	HMI and Human capabilities	ER A.6 Principles governing the logical architecture of systems.	
4.6	Requirements on system security	ER A.6 Principles governing the logical architecture of systems.	
4.7	Requirements on system documentation	ER A.7 Principles governing the construction of systems.	
5.1.1	Acceptance testing requirements on System Level	ER A.6 Principles governing the logical architecture of systems.	
5.1.2	Acceptance testing requirements specific to the airport safety support service	ER A.6 Principles governing the logical architecture of systems.	

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.3] requires that: *"Air traffic management systems and their constituents shall be designed, built, maintained and operated using the appropriate and validated procedures, in such a way as to ensure the seamless operation of the EATMN at all times and for all phases of flight. Seamless operation can be expressed, in particular, in terms of information sharing, including the relevant operational status information, common understanding of information, comparable processing performances and the associated procedures enabling common operational performances agreed for the whole or parts of the EATMN".*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
1.1	designed	ED-87D [1], chapter 3.7.2 [REQ 27.], [REQ 28.] and [REQ 29.] EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200]	
1.2	built	n/a	Evidence for system level conformity is out of scope of the present document.
1.3	maintained	n/a	Evidence for system level conformity is out of scope of the present document.
1.4	operated	n/a	Evidence for system level conformity is out of scope of the present document.
1.5	Information Sharing	ED-87D [1], chapter 2.1.2.4 [REQ 1.] and [REQ 3.] ED-87D [1] chapter 2.1.3.2. EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[020]. ED-87D [1], chapter 2.1.3.3 [REQ 5.] and [REQ 6.]. EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[030].	Evidence for system level conformity is out of scope of the present document.

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.3] requires that: *"The EATMN, its systems and their constituents shall support, on a coordinated basis, new agreed and validated concepts of operation that improve the quality, sustainability and effectiveness of air navigation services, in particular in terms of safety and capacity.* *The potential of new concepts, such as collaborative decision-making, increasing automation and alternative methods of delegation of separation responsibility, shall be examined taking due account of technological developments and of their safe implementation, following validation".*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
2.1	Validated concepts of operation - safety	Operation is only applicable at the system level.	The present document does not give presumption of conformity.
2.2	Validated concepts of operation - capacity	Operation is only applicable at the system level.	The present document does not give presumption of conformity.
2.3	Validated concepts of operation - quality	ED-87D [1], chapter 3.4, requirements [REQ 21.] and [REQ 22.] and chapter 3.3.2 [REQ 17.]. EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[040], ASMGCS-[SAFE]-[050], ASMGCS-[SAFE]-[080], ASMGCS-[SAFE]-[070]. EUROCONTROL-SPEC-171 [2] chapter 3.3.2. ED-87D [1], chapter 2.1.3, requirements [REQ 4.], [REQ 5.] and [REQ 6.], and chapter 3.4, requirements [REQ 7.], [REQ 8.], [REQ 9.], [REQ 21.] and [REQ 22.].	The present document does not give presumption of conformity.

Table B.5

3	**ER 3 Safety**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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	EUROCONTROL Specification for A-SMGCS Services [2], chapter 2.2. The user needs to be informed, and appropriate actions needs to be defined, if the system performance is below specified minima.	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.
3.2	Implementation	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.
3.3	Maintenance	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.
3.4	Operation	Operation is only applicable at the system level.	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.
3.5	Human capabilities	n/a	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.
3.6	Harmful interference	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.	The present document does not give presumption of conformity.

Table B.6

4	**ER 4 Civil-military coordination**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 B.7

5	**ER 5 Environmental constraints**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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.
5.2	Minimize environmental impact - materials	The present document does not give presumption of conformity	n/a	n/a

Table B.8

6	**ER 6 Principles governing the logical architecture of systems**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] requires that: *"Systems shall be designed and progressively integrated with the objective of achieving a coherent and increasingly harmonized, evolutionary and validated logical architecture within the EATMN".*		
	Keywords	**Evidence on constituent level**	**Evidence on system level**
6.1	Designed and progressively integrated.	ETSI EN 303 213-1 [3] EUROCONTROL-SPEC-171 [2], chapter 6.3.1, ASMGCS-[SAFE]-[040], ASMGCS-[SAFE]-[050], ASMGCS-[SAFE]-[080], ASMGCS-[SAFE]-[070] EUROCONTROL-SPEC-171 [2], chapter 3.3.2. ED-87D [1], chapter 2.1.3, requirements [REQ 4.], [REQ 5.] and [REQ 6.], and chapter 3.4, requirements [REQ 7.], [REQ 8.], [REQ 9.], [REQ 21.] and [REQ 22.] ETSI EN 303 213-1 [3], chapter 5 ED-87D [1], chapters 5.1. and 5.5 ED-87D [1], requirements [REQ 33.], [REQ 34.] and [REQ 35.] The A-SMGCS needs to be protected against any unauthorised access and against any actions which would cause the normal system operation to be affected in any way ED-87D [1], chapter 3.3.3, ED-87D [1], chapter 3.3.2, [REQ 17.] ED-87D [1], chapters 3.4.3.2, 3.4.3.3, 3.4.4, 3.4.5.2, 3.4.5.3, 3.4.6, ED-87D [1], Table 3-2 [REQ 21.] and [REQ 22.]. ED-87D [1], chapter 2.1.2.4 [REQ 1.] and [REQ 3.] ED-87D [1] chapter 2.1.3.2. ED-87D [1], chapter 2.1.3.3 [REQ 5.] and [REQ 6.]. EUROCONTROL-SPEC-171 [2] chapter 6.3.1, ASMGCS-[SAFE]-[020], ASMGCS-[SAFE]-[030], ASMGCS-[SAFE]-[060], ASMGCS-[SAFE]-[140], ASMGCS-[SAFE]-[090], ASMGCS-[SAFE]-[150], ASMGCS-[SAFE]-[160], ASMGCS-[SAFE]-[170]. The A-SMGCS needs to come with a full documentation set describing the installation, maintenance and operation in a clear, consistent and unambiguous manner.	Evidence for system level conformity is out of scope of the present document.

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.3] 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.	The present document does not give presumption of conformity.
7.2	High availability, Redundancy and fault tolerance.	ED-87D [1], chapter 3.4, requirements [REQ 21.] and [REQ 22.] and chapter 3.3.2 [REQ 17.]. ED-87D [1], chapter 2.1.3 [REQ 4.], [REQ 5.], [REQ 6.]. ED-87D [1], chapter 3.7.2 [REQ 27.], [REQ 28.] and [REQ 29.] EUROCONTROL Specification for A-SMGCS Services [2], requirements ASMGCS-[GENL]-[170], ASMGCS-[GENL]-[180], ASMGCS-[GENL]-[190] and ASMGCS-[GENL]-[200]. ED-87D [1], chapters 3.7.2.2, 3.7.3.1, 3.7.3.2, 3.7.3.3. ED-87D [1], chapter 3.7.5, Table 3-7 [REQ 32.]. ED-87D [1], chapter 3.7.3.1 and chapter 3.7.5, the airport safety support service needs to comply with the IMRT requirement in ED-87D [1] Table 3-7 [REQ 32.].	The present document does not give presumption of conformity.

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 1.1 Seamless operation**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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

B.3.2 Systems and procedures for air traffic flow management

Table B.11

2.1	**ER 2.1 Seamless operation**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 3.1.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 3.1.2 Support for new concepts of operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 3.2.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 3.2.2. Support for new concepts of operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 3.3.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 3.3.2. Support for new concepts of operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 4.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 4.2 Support for new concepts of operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 5.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 6.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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	n/a
6.1.2	Built	n/a	n/a
6.1.3	Maintained	n/a	n/a
6.1.4	Operated	n/a	n/a
6.1.5	Information Sharing	n/a	n/a

B.3.7 Systems and procedures for aeronautical information services

Table B.22

7.1	**ER 7.1 Seamless operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 7.2 Support for new concepts of operation**		
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 8.1 Seamless operation**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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 8.2 Support for new concepts of operation**			
	Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.3] 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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- EUROCONTROL: "European Action Plan for the Prevention of Runway Incursions".
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