Advanced Surface Movement Guidance and Control System (A-SMGCS);
Part 4: Community Specification for a deployed non-cooperative sensor including its interfaces;
Sub-part 2: Specific requirements for a deployed Surface Movement Radar sensor
Intellectual Property Rights

Essential patents

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

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

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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.6] 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 4, sub-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 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"
   Sub-part 1: "Generic requirements for non-cooperative sensor";
   Sub-part 2: "Specific requirements for a deployed Surface Movement Radar sensor";
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".
## National transposition dates

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<td>9 September 2020</td>
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<tr>
<td>Date of latest announcement of this EN (doa):</td>
<td>31 December 2020</td>
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### 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 **ETSİ Drafting Rules** (Verbal forms for the expression of provisions).

"must" and "must not" are NOT allowed in ETSİ deliverables except when used in direct citation.
1 Scope

The present document is applicable to deployed non-cooperative SMR sensor as a constituent of an Advanced Surface Movement Guidance and Control System (A-SMGCS).

NOTE 1: Generic requirements for a non-cooperative sensor are defined in ETSI EN 303 213-4-1 [1].

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.6].

NOTE 2: The ERs in Annex VIII of Regulation EU 2018/1139 [i.6] covered by the present document are outlined in Table A.1.

NOTE 3: Although the ERs of the SES Interoperability Regulation [i.1] have been repealed with effect from 11 September 2018 [i.6], 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.6] 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 4: 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 5: 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 30.1] to [REQ 35.1]" or, if no requirement numbers are available, by indicating the paragraph and clause of the reference material where the requirement can be found.

NOTE 6: 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] ETSI EN 303 213-4-1: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 4: Community Specification for a deployed non-cooperative sensor including its interfaces; Sub-part 1: Generic requirements for non-cooperative sensor".


NOTE: Available at https://eshop.eurocae.net/eurocae-documents-and-reports/ed-87d/.

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.3] Void.


3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in EUROCAE ED-87D [3] 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 [3].

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

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

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

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

**availability:** probability that 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 [3].

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

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

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

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

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

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

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

**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 [3].

**update:** renewal of Target Reports relating to all Targets under Surveillance

NOTE: This definition is derived from EUROCAE ED-87D [3].

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
- ANS: Air Navigation Service
- ATM: Air Traffic Management
- ATS: Air Traffic Service
- EATMN: European Air Traffic Management Network
- EC: European Communities
- EN: European Norm - (standard)
- ER: Essential Requirement
- EUROCAE: EUROpean organization for Civil Aviation Equipment
- EUROCONTROL: EUROpean organization for the safety of air navigation
- HMI: Human Machine Interface
- ICAO: International Civil Aviation Organization
- SES: Single European Sky
- SMR: Surface Movement Radar
- TMA: Terminal Manoeuvring Area

4 Requirements for implementing Surface Movement Radar (SMR) sensor for A-SMGCS Systems

4.0 General

Clause 4 defines the minimum requirements for an SMR sensor of A-SMGCS System.

4.1 Design Requirements for SMR sensor for A-SMGCS Systems

4.1.1 General Requirements

The SMR sensor shall comply with the requirements as defined in ETSI EN 303 213-4-1 [1].

4.1.2 Coverage

The constituent shall have the minimum coverage as defined in EUROCAE ED-116 [2], clause 2.8.

4.1.3 Safety interlocks

The constituent shall comply with the requirements as defined in EUROCAE ED-116 [2], clause 2.14.

4.2 Built requirements for SMR sensors for A-SMGCS Systems

4.2.1 Basic conformity tests

The basic conformity tests shall comply with the requirements as defined in EUROCAE ED-116 [2], clause 5.3.

4.2.2 Performance tests

The performance tests shall comply with the requirements as defined in EUROCAE ED-116 [2], clause 5.4.
4.3 Requirements for site testing procedures for SMR sensor for A-SMGCS Systems

4.3.1 Site testing procedures

The on-site testing procedures shall be performed as defined in EUROCAE ED-116 [2], clause 6.4.

4.4 Maintenance Requirements for SMR sensors for A-SMGCS Systems

The constituent shall comply with the maintenance requirements as defined in EUROCAE ED-116 [2], clause 2.21.
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.6].

The A-SMGCS non-cooperative SMR sensor shall comply with the Essential Requirements of Regulation (EU) 2018/1139 [i.6] 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.

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<th>Qualifying remarks/Notes</th>
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<td>4.2.1 Basic conformity tests</td>
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<td></td>
<td>4.3.1 Site testing procedures</td>
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<td></td>
<td>4.4 Maintenance Requirements for SMR sensors for A-SMGCS Systems</td>
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<td>• ETSI EN 303 213-4-1 [1], clause 4.1.7 (Reliability, availability and integrity)</td>
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<td>4.1.3 Safety interlocks</td>
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<td>ER 6 Aeromedical examiners and aeromedical centres</td>
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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.6]

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<td>ER 3.2 Integrity and safety related performance and reliability</td>
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<td>ER 3.3 Seamless operation</td>
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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 Regulation (EU) 2018/1139 [i.6] 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.6].

The A-SMGCS non-cooperative SMR sensor shall comply with the relevant Essential Requirements specified in Annex VIII of Regulation (EU) 2018/1139 [i.6] 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.

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

<table>
<thead>
<tr>
<th>2.6</th>
<th>ER 2.6 Surveillance services</th>
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</table>
| Regulation (EU) 2018/1139 [i.6] 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."

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Table A.4

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| Regulation (EU) 2018/1139 [i.6] 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."

<table>
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<td>ED-116 [2], clauses 5.3 and 5.4</td>
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<td>installed</td>
<td>ED-116 [2], clause 2.8</td>
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<td>3.1.4</td>
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<td>ED-116 [2], clause 2.21</td>
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<td>3.1.5</td>
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<td>ED-116 [2], clause 2.3</td>
</tr>
<tr>
<td>3.1.6</td>
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<td>ED-116 [2], clause 2.3</td>
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Table A.5

<table>
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<th>ER 3.2 Integrity and safety-related performance and reliability</th>
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</table>
| Regulation (EU) 2018/1139 [i.6] 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."

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<tr>
<th>Keywords</th>
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### Table A.6

3.3 **ER 3.3 Seamless operation**

Regulation (EU) 2018/1139 [i.6] 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."

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
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</thead>
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<td>designed</td>
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<td>built</td>
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<tr>
<td>maintained</td>
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<tr>
<td>operated</td>
<td>ED-116 [2], clause 2.21</td>
<td></td>
</tr>
<tr>
<td>information sharing</td>
<td>ED-116 [2], clause 2.11</td>
<td>ED-87D [3], clause 2.1.2.1</td>
</tr>
</tbody>
</table>

### Table A.7

3.4 **ER 3.4 Support for new concepts of operation**

Regulation (EU) 2018/1139 [i.6] 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."

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validated concepts of operation – quality</td>
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<tr>
<td>Validated concepts of operation – sustainability</td>
<td>The present document does not give presumption of conformity</td>
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<td>Validated concepts of operation - effectiveness</td>
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<td></td>
</tr>
<tr>
<td>Validated concepts of operation - safety</td>
<td>The present document does not give presumption of conformity</td>
<td></td>
</tr>
<tr>
<td>Validated concepts of operation - capacity</td>
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Table A.8

<table>
<thead>
<tr>
<th>3.5</th>
<th>ER 3.5 Civil-military coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regulation (EU) 2018/1139 [1,6] 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.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5.1 Flexible use of airspace</td>
<td>The present document does not give presumption of conformity</td>
<td></td>
</tr>
<tr>
<td>3.5.2 Timely sharing</td>
<td>The present document does not give presumption of conformity</td>
<td></td>
</tr>
<tr>
<td>3.5.3 No prejudice to security or defence policy interests, including requirements on confidentiality</td>
<td>The present document does not give presumption of conformity</td>
<td></td>
</tr>
</tbody>
</table>

Table A.9

<table>
<thead>
<tr>
<th>3.6</th>
<th>ER 3.6 Design requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regulation (EU) 2018/1139 [1,6] 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.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6.1 safety and security requirements</td>
<td>ED-116 [2], clause 2.15 ED-116 [2], clause 2.16</td>
<td></td>
</tr>
<tr>
<td>3.6.2 failure resistance and safety of service</td>
<td>ED-116 [2], clause 2.15 ED-116 [2], clause 2.16 ED-116 [2], clause 3.2.1</td>
<td></td>
</tr>
<tr>
<td>3.6.3 usability (take into account limitations related to human capabilities and performance)</td>
<td>ED-116 [2], clause 2.14 ED-116 [2], clause 2.21 ED-116 [2], clause 2.12 ED-116 [2], clause 2.19</td>
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<tr>
<td>3.6.4 robustness (protected from harmful interactions)</td>
<td>ED-116 [2], clause 2.15 ED-116 [2], clause 2.16 ED-116 [2], clause 3.2.1</td>
<td></td>
</tr>
<tr>
<td>3.6.5 documented (clear, consistent and unambiguous provision of information)</td>
<td>The present document does not give presumption of conformity</td>
<td></td>
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</tbody>
</table>
Regulation (EU) 2018/1139 [1,6] requires in Annex VIII, chapter 3.4 that: "Safety levels of systems and constituents shall be maintained during service and any modifications to service."

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7.1 All regulatory text</td>
<td>ED-116 [2], clause 2.20</td>
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</tr>
</tbody>
</table>
Annex B (informative):
SES Interoperability Regulation Essential Requirements mapping and Checklist

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

The present annex 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.5].

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

<table>
<thead>
<tr>
<th>(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part A</th>
<th>Clause(s) of the present document</th>
<th>Qualifying remarks/Notes</th>
</tr>
</thead>
</table>
| ER 1 Seamless operation | 4.1.2 Coverage  
4.1.3 Safety interlocks  
4.2.1 Basic conformity tests  
4.2.2 Performance tests  
4.3.1 Site testing procedures  
4.4 Maintenance Requirements for SMR sensors for A-SMGCS Systems |  |
| ER 2 Support for new concepts of operation | | Operation is only applicable at the system level |
| ER 3 Safety | n/a | The present document does not give presumption of conformity |
| ER 4 Civil-military coordination | | The present document does not give presumption of conformity |
| ER 5 Environmental constraints | | The present document does not give presumption of conformity |
| ER 6 Principles governing the logical architecture of systems | n/a |  |
| ER 7 Principles governing the construction of systems | n/a |  |

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<tr>
<th>(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part B</th>
<th>Clause(s) of the present document</th>
<th>Qualifying remarks/Notes</th>
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<td>ER 2.1 Seamless operation of air traffic flow management</td>
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<td>The present document does not give presumption of conformity</td>
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<tr>
<td>ER 3.1.1 Seamless operation of flight data processing</td>
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</tr>
<tr>
<td>ER 3.1.2 Support for new concepts of operation for flight data processing</td>
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<tr>
<td>ER 3.2.1 Seamless operation surveillance data processing systems</td>
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</tr>
<tr>
<td>ER 3.2.2 Support for new concepts of operation for surveillance data processing systems</td>
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<td></td>
</tr>
<tr>
<td>ER 3.3.1 Seamless operation of Human-machine interface systems</td>
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</tr>
<tr>
<td>Clause(s) of the present document</td>
<td>(Essential) Requirements (ERs) of SES Interoperability Regulation, Annex II, Part B</td>
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<tr>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>--------------------------</td>
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<tr>
<td>ER 3.3.2 Support for new concepts of operation for Human-machine interface systems</td>
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<td>The present document does not give presumption of conformity</td>
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<tr>
<td>ER 4.1 Seamless operation of Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications</td>
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<td>The present document does not give presumption of conformity</td>
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<tr>
<td>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</td>
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<tr>
<td>ER 5.1 Seamless operation of Navigation systems and procedures</td>
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<td>ER 6.1 Seamless operation of Surveillance systems and procedures</td>
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<tr>
<td>ER 7.1 Seamless operation of Systems and procedures for aeronautical information services</td>
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<td>ER 8.1 Seamless operation of systems and procedures for the use of meteorological information</td>
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<tr>
<td>ER 8.2 Support for new concepts of operation for systems and procedures for the use of meteorological information</td>
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Table B.2: Traceability from clauses of the present document to the Interoperability Regulation [i.1]

<table>
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<th>Qualifying remarks/Notes</th>
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<tbody>
<tr>
<td>4.1.1 General Requirements</td>
<td>ER 1 Seamless operation</td>
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</tr>
<tr>
<td>4.1.2 Coverage</td>
<td>ER 1 Seamless operation</td>
<td></td>
</tr>
<tr>
<td>4.1.3 Safety interlocks</td>
<td>ER 1 Seamless operation</td>
<td></td>
</tr>
<tr>
<td>4.2.1 Basic conformity tests</td>
<td>ER 1 Seamless operation</td>
<td></td>
</tr>
<tr>
<td>4.2.2 Performance tests</td>
<td>ER 1 Seamless operation</td>
<td></td>
</tr>
<tr>
<td>4.3.1 Site testing procedures</td>
<td>ER 1 Seamless operation</td>
<td></td>
</tr>
<tr>
<td>4.4 Maintenance Requirements for SMR sensors for A-SMGCS Systems</td>
<td>ER 1 Seamless operation</td>
<td></td>
</tr>
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</table>
B.2 Interoperability Regulation Annex II Essential Requirements; Part A: General requirements

The purpose of the present annex is to 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.5], 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.

### Table B.3

<table>
<thead>
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<th>ER 1 seamless operation</th>
<th>Evidence on constituent level</th>
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</thead>
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<td>1.1 Designed</td>
<td>ED-116 [2], clause 2.8 SMR coverage</td>
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<td></td>
<td>ED-116 [2], clause 2.9 Antenna Unit characteristics</td>
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<td></td>
<td>ED-116 [2], clause 2.10 Transmitter/Receiver characteristics</td>
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<tr>
<td></td>
<td>ED-116 [2], clause 2.14 Safety interlocks</td>
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<td>ED-116 [2], clause 2.18 Noise and vibration</td>
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<tr>
<td>1.2 Built</td>
<td>ED-116 [2], clause 6.4 Basic conformity tests (Site)</td>
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<tr>
<td></td>
<td>ED-116 [2], clause 5.3 Basic conformity tests</td>
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</tr>
<tr>
<td></td>
<td>ED-116 [2], clause 5.4 Performance tests</td>
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<td>1.3 maintained</td>
<td>ED-116 [2], clause 2.21 Maintainability</td>
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<td>1.4 Operated</td>
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<td>The present document does not give presumption of conformity</td>
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<tr>
<td>1.5 information sharing</td>
<td>Covered by ETSI EN 303 213-4-1 [1]</td>
<td>The present document does not give presumption of conformity</td>
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Table B.4

<table>
<thead>
<tr>
<th>ER 2 Support for new concepts of operation</th>
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<tr>
<td>Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 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.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
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<tr>
<td>Validated concepts of operation - capacity</td>
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<td>The present document does not give presumption of conformity</td>
</tr>
<tr>
<td>Validated concepts of operation - quality</td>
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Table B.5

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<td>Evidence on system level</td>
<td>Evidence at procedure level</td>
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<td>3.3 Maintenance</td>
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<td>3.4 Operation</td>
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<td>The present document does not give presumption of conformity</td>
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<td>3.5 Human capabilities</td>
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<td>The present document does not give presumption of conformity</td>
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<td>3.6 Harmful interference</td>
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<td>The present document does not give presumption of conformity</td>
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</table>

ER 3 Safety

Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.5] 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."
Table B.6

4 ER 4 Civil-military coordination

Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.5] 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."

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
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</thead>
<tbody>
<tr>
<td>Flexible use of airspace</td>
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<td>The present document does not give presumption of conformity</td>
</tr>
<tr>
<td>Timely sharing</td>
<td>The present document does not give presumption of conformity</td>
<td>The present document does not give presumption of conformity</td>
</tr>
<tr>
<td>National security requirements</td>
<td>n/a</td>
<td>The present document does not give presumption of conformity</td>
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</tbody>
</table>

Table B.7

5 ER 5 Environmental constraints

Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.5] requires that: "Systems and operations of the EATMN shall take into account the need to minimize environmental impact in accordance with Community legislation."

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
<th>Evidence at procedure level</th>
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<tbody>
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<td>Minimize environmental impact - materials</td>
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<td>The present document does not give presumption of conformity</td>
<td>n/a</td>
</tr>
</tbody>
</table>

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.5] 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."

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Evidence on constituent level</th>
<th>Evidence on system level</th>
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<td>Designed and progressively integrated</td>
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Table B.9

<table>
<thead>
<tr>
<th>7</th>
<th><strong>ER 7 Principles governing the construction of systems</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.5] 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.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Keywords</th>
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<td>7.1 Modularity, interchangeability</td>
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<td>7.2 High availability, Redundancy and fault tolerance</td>
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<td>The present document does not give presumption of conformity</td>
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B.3 Interoperability Regulation, Annex II Essential Requirements, Part B: Specific requirements

B.3.0 Introduction

The purpose of the present annex is to provide a comprehensive traceability of evidence on constituents and system levels against clauses of the specific Essential Requirements (ERs) of the Interoperability Regulation [i.1] as amended by Regulation (EC) 1070/2009 [i.5], 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.3.1 Systems and procedures for airspace management

#### Table B.10

<table>
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<tr>
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<th>Evidence on system level</th>
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<tr>
<td>1.1.1 Pre-tactical aspects of airspace availability</td>
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<td>1.1.3 Correct and timely way</td>
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<td>1.1.4 National security requirements</td>
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### B.3.2 Systems and procedures for air traffic flow management

#### Table B.11

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B.3.3 Systems and procedures for air traffic services

B.3.3.1 Flight data processing systems

Table B.12

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Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.5] 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."
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.5] 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."

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B.3.3.2 **Surveillance data processing systems**

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### B.3.3.3 HMI systems

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

Table B.18

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B.3.5 Navigation systems and procedures

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### B.3.6 Surveillance systems and procedures

**Table B.21**

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**Keywords**
- Evidence on constituent level
- Evidence on system level

### B.3.7 Systems and procedures for aeronautical information services

**Table B.22**

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- Evidence on constituent level
- Evidence on system level

**Table B.23**

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

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<td><strong>Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.5] requires that: &quot;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.&quot;</strong></td>
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<td><strong>Regulation (EC) 552/2004 [i.1] as amended by Regulation (EC) 1070/2009 [i.5] requires that: &quot;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.&quot;</strong></td>
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Annex C (informative):
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# History

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