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European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Community Specification Advanced Surface Movement Guidance and Control System (A-SMGCS) for application under the Single European Sky Interoperability Regulation EC 552/2004 Part 1: Level 1 including external interfaces

Reference

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Foreword

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

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [i.2] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Community Specification, the reference of which will be published in the Official Journal of the European Communities referencing the Regulation 552/2004 [i.1] of the European Parliament and of the Council relating to the interoperability of the European Air Traffic Management network ("Interoperability Regulation EC 552/2004").

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

The present document is part 1 of a multi-part deliverable covering Community Specification Advanced Surface Movement Guidance and Control System (A-SMGCS) Level 1 and 2, as identified below:

Part 1: "Level 1 including external interfaces";

Part 2: "Level 2 including external interfaces";

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

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

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

Introduction

The European Union launched the Legislation "Single European Sky" (SES) in 2002 which was adopted in 2004.

The SES legislation is based on a framework of 4 regulations, which includes "the Interoperability Regulation" (EC 552/2004 [i.1]). According to the "First Report on the implementation of the Single Sky legislation" issued on the 20th of December 2007, the EC will adopt a new proposal for a second Single Sky package. Depending on the content of this package, there will be an impact on the development work of the present document.

The objective of the Interoperability Regulation is to ensure interoperability of the European Air Traffic Management Network (EATMN) consistent with air navigation services. Under this regulation, the use of a Community Specification (CS) is a means of compliance to the essential requirements of the Regulation and/or the relevant implementing rules for interoperability.

This European Standard has been prepared under a mandate given to the ESOs by the European Commission and developed in cooperation with Eurocae to support Essential Requirements of the Single European Sky Interoperability Regulation [i.1] and/or requirements given in implementing rules for interoperability based on the Single European Interoperability Regulation.

1 Scope

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

The present document provides a European Standard for Air Navigation Service Providers, who have to demonstrate and declare compliance of their systems and procedures to the IOP regulation.

Furthermore, the present document provides a European Standard for manufacturers of the HMI constituents and the Data Fusion Processor constituent, who have to demonstrate and declare conformity for their constituent to the IOP regulation.

Any software elements related to software assurance level of an A-SMGCS System are outside of the scope of the present document and should be subjected to the [i.3] Community Specification for Software Assurance Level, developed by CEN under the Mandate M/390. The essential requirements of the Interoperability Regulation [i.1] 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 and effect of harmful interference.

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

2 References

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

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

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

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

2.1 Normative references

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

[1] EUROCAE ED-87B (01/2008): "MASPS for A-SMGCS Level 1 and 2".

[2] EUROCAE ED-116 (01/2004): "MOPS for Surface Movement RADAR Sensor Systems for Use in A-SMGCS".

[3] EUROCAE ED-117 (11/2003): "MOPS for Mode S Multilateration Systems for Use in A-SMGCS".

[4] EUROCAE ED-128 (08/2007): "Guidelines for surveillance data fusion in advanced surface movement guidance and control systems (A-SMGCS) levels 1 and 2".

[5] EUROCONTROL (07/01/11-04 V2.0: 12/12/2006): "Operational Concept and Requirements for A-SMGCS Implementation Level 1".

[6] EUROCONTROL (07/01/09-01 V2.0: 11/2006): "A-SMGCS Levels 1 & 2 Preliminary Safety Case".

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

[8] COMMISSION REGULATION (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace.

[9] Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE).

2.2 Informative references

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

[i.1] Regulation (EC) No 552/2004 of the European Parliament and of the Council of 10 March 2004 on the interoperability of the European Air Traffic Management network (interoperability Regulation), OJ L 96, 31.03.2004.

[i.2] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations, OJ L 204, 21.07.1998 (modified by Directive 98/48/EC, OJ L 217, 05.08.1998).

[i.3] Community Specification Software Assurance Levels (SWAL) for application under the Single European Sky Interoperability Regulation EC 552/2004 (Ground-based systems and constituents only).

[i.4] ETSI EN 303 213-3: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Advanced Surface Movement Guidance and Control System (A-SMGCS) for application under the Single European Sky Interoperability Regulation EC 552/2004; Part 3: Specification for a deployed cooperative sensor including its interfaces".

[i.5] ETSI EN 303 213-4: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic compatibility and Radio spectrum Matters (ERM); Advanced Surface Movement Guidance and Control System (A-SMGCS) for application under the Single European Sky Interoperability Regulation EC 552/2004; Part 4: Specification for a deployed non-cooperative sensor including its interfaces".

[i.6] Regulation (EC) No 549/2004 of the European Parliament and of the Council of 10 March 2004 laying down the framework for the creation of the single European sky (the framework Regulation), OJ L 96, 31.03.2004.

3 Definitions and abbreviations

3.1 Definitions

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

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

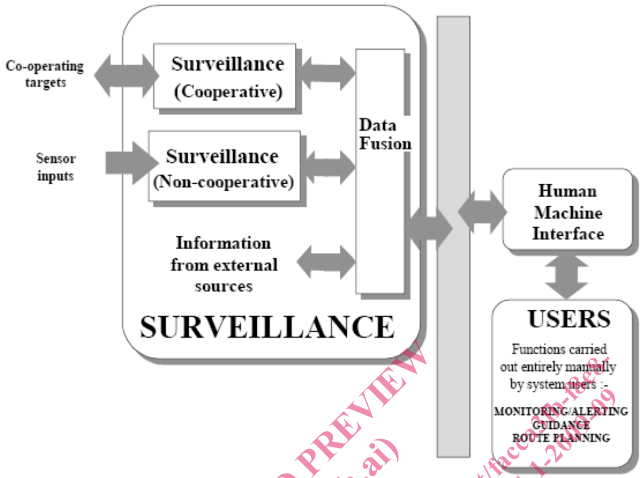

Figure 1: A-SMGCS Level 1 Functional Configuration

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

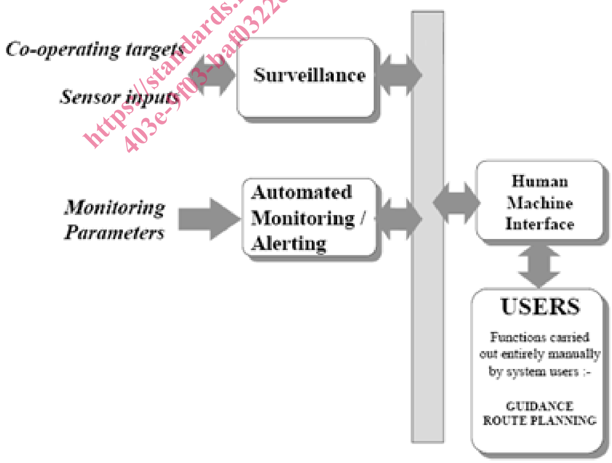

Figure 2: A-SMGCS Level 2 Functional Configuration

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

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

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

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

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

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

NOTE: This is the legally binding definition in the context of Single European Sky [i.6].

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

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

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

NOTE: This is the legally binding definition in the context of Single European Sky [i.6].

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

NOTE: This is the legally binding definition in the context of Single European Sky [i.6].

target: any aircraft, vehicle or obstacle, whether stationary or moving, which is located within the coverage area of the SMR and which is of sufficient size to be operationally significant

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

NOTE: Further legally binding definitions in the context of Single European Sky are given in [i.6].

3.2 Abbreviations

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

A-SMGCS	Advanced Surface Movement Guidance and Control Systems
ATC	Air Traffic Control
ATM	Air Traffic Management
AVOL	Aerodrome Visibility Operational Level
CEN	Comité Européen de Normalization
CS	Community Specification
DFP	Data Fusion Processor
doa	date of announcement
dow	date of withdrawal
EATMN	European Air Traffic Management Network
EC	European Communities
EN	European Norm - (standard)
ER	Essential Requirement
ESO	European Standardization Organization
EUROCAE	EUROpean organization for Civil Aviation Equipment
EUROCONTROL	EUROpean organization for the safety of air navigation
HMI	Human Machine Interface
ICAO	International Civil Aviation Organization
IOP Regulation	InterOPerability Regulation
MASPS	Minimum Aviation Systems Performance Specification
MLAT	MultiLATeration
PRA	Position Registration Accuracy
SES	Single European Sky
SMR	Surface movement radar

4 Requirements for implementing A-SMGCS Level 1

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

1) Surface Movement Radar
2) Multilateration (MLAT)
3) Data fusion processor
4) Human Machine Interface

4.1 Constituents of an A-SMGCS Level 1 System

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

4.1.1 Constituent - Surface Movement Radar (SMR)

The Surface Movement Radar constituent of an A-SMGCS System is covered in EN 303 213-4 [i.5] (non-cooperative sensors).

4.1.1.1 System Interfaces for SMR

The system interfaces to SMR constituents shall comply with the requirements as defined in ED-116 [2], clause 2.11.

4.1.2 Constituent - Multilateration (MLAT)

The Multilateration constituent of an A-SMGCS System is covered in EN 303 213-3 [i.4] (cooperative sensors).

4.1.2.1 System Interfaces for MLAT

The system interfaces to MLAT constituents shall comply with the requirements as defined in ED-117 [3], clause 2.10.5.

4.1.3 Constituent - Data fusion processor

The data fusion processor of an A-SMGCS System shall comply with the requirements and recommendations as defined in ED-128 [4], clause 3.

4.1.3.1 System Interface for Data fusion processor

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

4.1.4 Constituent - Human Machine Interface (HMI)

The requirements for the Human Machine Interface are further described in clauses 4.2.5 and 4.3.2.4 of the present document.

4.1.4.1 System Interface for HMI

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

4.2 Design Requirements for A-SMGCS Level 1 Systems

4.2.1 Design Requirements on System Level

4.2.1.1 Modularity

The System shall comply with the design requirements as defined in ED-87B [1], clause 1.8.2.

4.2.1.2 System Integrity

The System integrity shall comply with the design requirements as defined in ED-87B [1], clause 3.1.1.1, second and fifth paragraphs.

4.2.1.3 Availability and Continuity of Service

The Availability and continuity of service for A-SMGCS Systems shall comply with the requirements as defined in ED-87B [1], clause 3.1.1.2.

4.2.1.4 Identification

The functional requirement for identification shall comply with the requirements as defined in ED-87B [1], clause 3.2.2.1.

4.2.1.5 Position Registration Accuracy

The functional requirement for position registration accuracy shall comply with the requirements as defined in ED-87B [1], clause 3.4.1.2.

4.2.1.6 System Availability and Continuity of Service

The System Availability and Continuity of Service shall comply with the requirements as defined in Operational Concept and Requirements for A-SMGCS Implementation Level 1 [5], Op_Perf-10-Availability and Op_Perf-12-Continuity of Service 1.

4.2.1.7 Safety

4.2.1.7.1 Objectives

The safety objectives shall comply with the requirements as defined in Operational Concept and Requirements for A-SMGCS Implementation Level 1 [5], clause 2.1.

4.2.1.7.2 Benefits

The safety benefits shall be obtained from the methodology as defined in Operational Concept and Requirements for A-SMGCS Implementation Level 1 [5], clause 2.4, Final Report on the Generic Cost Benefit Analysis of A-SMGCS [7], clause 2.2 and clause 5.2.3.

4.2.1.7.3 ATC Controllers

The use of A-SMGCS Level 1 system shall support ATC Controllers in terms of safety as defined in Operational Concept and Requirements for A-SMGCS Implementation Level 1 [5], clause 4.1.

4.2.1.7.4 Failure effect

An A-SMGCS Level 1 system shall be designed in such a way, that erroneous data from any constituent would not impact safety.

NOTE: This requirement is taken from clause 7.2.3 Requirement Op_Ds-7-Failure effect "d" [5].