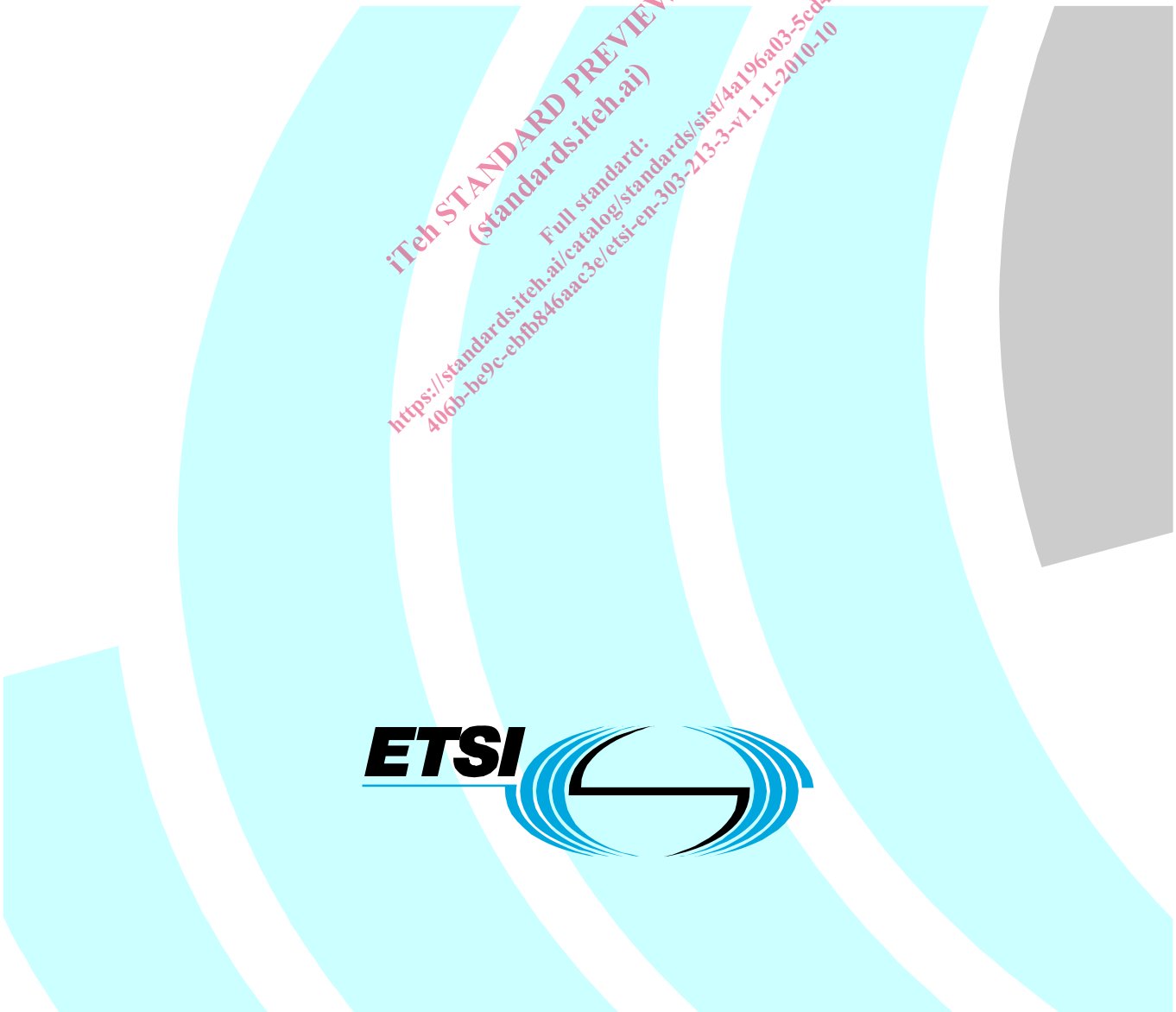
ETSI EN 303 213-3 V1.1.1 (2009-12)

European Standard (Telecommunications series)

Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 3: Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for a deployed cooperative sensor including its interfaces



Reference

DEN/AERO-00001-3

Keywords

air traffic management, aeronautical, interoperability

ETSI

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

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

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

Important notice

Individual copies of the present document can be downloaded from:
http://www.etsi.org

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
http://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
http://portal.etsi.org/chaircor/ETSI_support.asp

Contents

Intellectual Property Rights 5
Foreword 5
Introduction 6
1 Scope 7
2 References 7
2.1 Normative references 7
2.2 Informative references 8
3 Definitions and abbreviations 8
3.1 Definitions 8
3.2 Abbreviations 10
4 Requirements for implementing cooperative sensors for A-SMGCS Systems 10
4.1 Design Requirements for cooperative sensors for A-SMGCS Systems 11
4.1.1 Operating principles of the cooperative sensor 11
4.1.2 Airworthiness and certification 11
4.1.3 Software and Design 11
4.1.4 Capacity 11
4.1.5 Health and Safety 11
4.1.6 Interfaces 11
4.1.6.1 Equipment Interfaces 11
4.1.6.2 Datafusion 11
4.1.7 External time reference 11
4.1.8 System coverage 11
4.1.9 Identification 11
4.1.10 Surveillance data output 11
4.1.11 Update Rate 12
4.1.12 Integrity 12
4.1.13 Expandability 12
4.1.14 2D/3D Calculation 12
4.1.15 Mode S Interrogation 12
4.1.16 Reference transponders 12
4.1.17 Track Initiation 12
4.1.18 Probability of False Detection 12
4.1.19 Probability of False Identification 12
4.1.20 Switchover Time 12
4.1.21 Position in WGS-84 12
4.1.22 Power supplies 12
4.1.23 Lightning protection 12
4.1.24 Reliability, availability and integrity 13
4.1.25 Temperature and Humidity 13
4.2 Acceptance testing requirements for cooperative sensors for A-SMGCS Systems 13
4.2.1 Surveillance Element tests 13
4.2.2 Basic tests 13
4.2.3 Performance tests 13
4.3 Maintenance Requirements for cooperative sensors for A-SMGCS Systems 13
4.3.1 Continuity of Service 13
4.3.2 Service Life 13
4.4 Requirements for operation cooperative sensors for A-SMGCS Systems 13
4.5 Environmental Requirements for cooperative sensors for A-SMGCS Systems 13
4.5.1 Noise and Vibration 13
4.5.2 Electromagnetic Interference and Susceptibility 14
5 Testing 14
Annex SA (normative): Standards Annex 15

SA1 Correspondence between the present document and the Single European Sky Interoperability Regulation for A-SMGCS cooperative sensor constituent 15

Annex A (normative): Checklist 18

A.1 Interoperability Regulation Annex II Essential Requirements; Part A: General requirements 19

A.2 Interoperability Regulation Annex II Essential Requirements; Part B: Specific requirements 23
A.2.1 Systems and procedures for airspace management 23
A.2.2 Systems and procedures for air traffic flow management 23
A.2.3 Systems and procedures for air traffic services 24
A.2.3.1 Flight data processing systems 24
A.2.3.2 Surveillance data processing systems 25
A.2.3.3 Human-machine interface systems 26
A.2.4 Communications systems and procedures for ground-to-ground, air-to-ground and air-to-air communications 27
A.2.5 Navigation systems and procedures 28
A.2.6 Surveillance systems and procedures 28
A.2.7 Systems and procedures for aeronautical information services 29
A.2.8 Systems and procedures for the use of meteorological information 29

Annex B (informative): The EN title in the official languages 31

Annex C (informative): Bibliography 32

History 33

Intellectual Property Rights

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

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

Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Aeronautics (AERO), 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 European Commission mandate M/390 for the Interoperability of the European Air Traffic Management Network.

The present document has been developed in cooperation with Eurocae for compliance with the Essential Requirements of the Single European Sky Interoperability Regulation 552/2004 [i.1] and/or requirements given in implementing rules for interoperability based on the Single European Sky Interoperability Regulation.

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

General and specific requirements for presumption of conformity to SES Interoperability Regulation 552/2004 as amended by Regulation 1070/2009 [i.7] 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 3 of a multi-part deliverable covering Advanced Surface Movement Guidance and Control System (A-SMGCS), as identified below:

Part 1: "Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for A-SMGCS Level 1 including external interfaces";

Part 2: "Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for A-SMGCS Level 2 including external interfaces";

Part 3: "Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for a deployed cooperative sensor including its interfaces";

Part 4: "Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for a deployed non-cooperative sensor including its interfaces";

Part 5: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for transmitter used in multilateration equipment";

Part 6: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for deployed surface movement radar sensors".

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

Introduction

The European Union launched the Legislation "Single European Sky" (SES) in 2002 which was adopted in 2004 and amended with Regulation (EC) No 1070/2009 [i.7].

The SES legislation is based on a framework of 4 regulations, which includes "the Interoperability Regulation" (EC 552/2004 [i.1]). The objective of the Interoperability Regulation is to ensure interoperability of the European Air Traffic Management Network (EATMN) consistent with air navigation services. Under this regulation, the use of a European Standard referenced in the Official Journal of the European Union as Community Specification (CS) is a means of compliance to the essential requirements of the Regulation and/or the relevant implementing rules for interoperability.

The present document takes into account the Council Decision 2009/320/EC endorsing the European Air Traffic Management Master Plan of the Single European Sky ATM Research (SESAR) project [i.3].

1 Scope

The present document is applicable to deployed cooperative sensor as a constituent of an Advanced Surface Movement Guidance and Control System.

The present document provides a European Standard for manufacturers of the non-cooperative sensor constituent, who have to demonstrate and declare conformity for their constituent to the IOP regulation.

Any software elements related to the software assurance level of an A-SMGCS are outside of the scope of the present document. As such the essential requirements of the Interoperability Regulation are not considered for software elements within the present document.

The present document does not give presumption of conformity related to the maintenance requirements, environmental constraints, procedure level, effect of harmful interference and civil/military coordination.

NOTE: For these ERs, please refer to the Air Navigation Service Provider procedures.

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

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.

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 (ED-87B including Amendment No 1 published November 2009): "MASPS for Advanced Surface Movement Guidance and Control Systems".

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

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 as amended with Regulation (EC) No 1070/2009.

[i.2] 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 as amended with Regulation (EC) No 1070/2009.

[i.3] Council Decision 2009/320/EC endorsing the European Air Traffic Management Master Plan of the Single European Sky ATM Research (SESAR) project, 30.03.2009.

[i.4] ICAO Documentument 9830, AN/452 (First Edition, 2004): "Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual".

[i.5] ETSI EN 303 213-5: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 5: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for transmitter used in multilateration equipment".

[i.6] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive) (OJ L 91, 07.04.1999).

[i.7] 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.8] EUROCAE ED-128 (ED-128 published 08/2007): "Guidelines for surveillance data fusion in advanced surface movement guidance and control systems (A-SMGCS) levels 1 and 2".

[i.9] 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".

[i.10] ETSI EN 303 213-2: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 2: Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for A-SMGCS Level 2 including external interfaces".

[i.11] ETSI EN 303 213-4: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 4: Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004 for a deployed non-cooperative sensor including its interfaces".

[i.12] ETSI EN 303 213-6: "Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 6: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for deployed surface movement radar sensors".

3 Definitions and abbreviations

3.1 Definitions

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

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

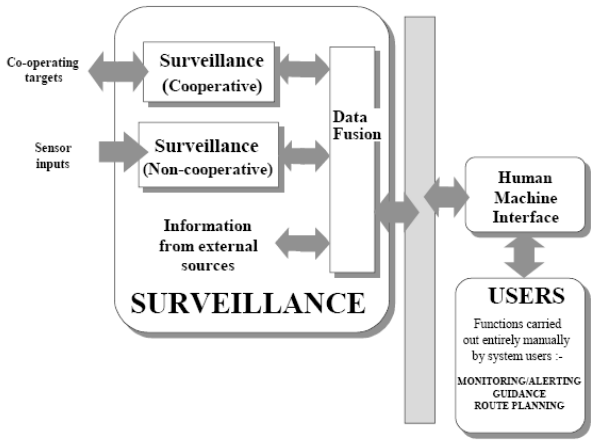


Figure 1: A-SMGCS Level 1 Functional Configuration

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

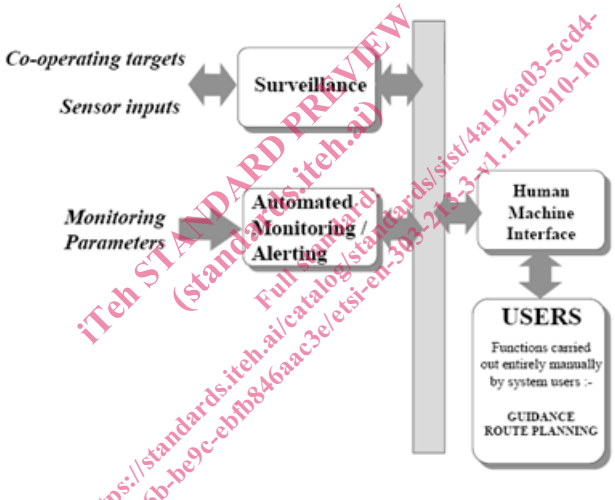


Figure 2: A-SMGCS Level 2 Functional Configuration

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

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

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 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.2].

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

NOTE: This is the legally binding definition in the context of Single European Sky [i.2].

system: aggregation of airborne and groundbased 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.2].

target: aircraft, vehicle or obstacle that is displayed on a surveillance display

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

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

Further legally binding definitions in the context of Single European Sky are given in [i.2].

3.2 Abbreviations

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

A-SMGCS	Advanced Surface Movement Guidance and Control Systems
ASTERIX	All Purpose Structured EUROCONTROL Surveillance Information Exchange
ATM	Air Traffic Management
AVOL	Aerodrome Visibility Operational Level
CS	Community Specification
doa	date of announcement
dow	date of withdrawal
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
ICAO	International Civil Aviation Organization
IOP Regulation	InterOPerability Regulation
MASPS	Minimum Aviation Systems Performance Specification
SES	Single European Sky

4 Requirements for implementing cooperative sensors for A-SMGCS Systems

This clause defines the minimum requirements for implementing a cooperative sensor into an A-SMGCS System.

4.1 Design Requirements for cooperative sensors for A-SMGCS Systems

4.1.1 Operating principles of the cooperative sensor

The operating principles of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 1.3.2.

4.1.2 Airworthiness and certification

The cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 2.2.

4.1.3 Software and Design

The Software and the design of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 2.6.

4.1.4 Capacity

The capacity of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 3.3.6.

4.1.5 Health and Safety

The Health and Safety requirement shall comply with the requirements as defined in ED-117 [2], clause 2.7.

4.1.6 Interfaces

4.1.6.1 Equipment Interfaces

The Interfaces of the constituent shall be designed as defined in ED-117 [2], clause 2.11.1.

4.1.6.2 Datafusion

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

NOTE: Guidance for the Data Fusion can be found in ED-128 [i.8].

4.1.7 External time reference

The constituent shall be designed to use an external time reference as defined in ED-117 [2], clause 2.11.5.

4.1.8 System coverage

The system coverage of the cooperative sensor shall comply with the requirements as defined in ED-117 [2], clause 2.8.

4.1.9 Identification

The identification within the cooperative sensor shall comply with the requirements as defined in ED-87B [1], clause 3.2.2.1.

4.1.10 Surveillance data output

The surveillance data output of the cooperative sensor shall comply with the requirements as defined in ED-87B [1], clause 2.5.1.1.