



**WG-28**

**Ground Based Augmentation Systems**

**TERMS OF REFERENCE – REFERENCE N°TOR WG-28**

*Approved by EUROCAE Technical Advisory Committee on 2 February*

**BACKGROUND AND SCOPE**

A main activity of EUROCAE WG-28 for the past few years has been on standards for Ground Based Augmentation Systems (GBAS). The other main activity of the group has been to track the ongoing developments within RTCA and ICAO on standards for GBAS to support Category II/III operations.

WG-28 group has recently released the revision A of ED-114 (“MOPS for Global Navigation Satellite GBAS Ground Equipment to support Category I Operations”) and the reports on review of ED-95 (“MASPS for a Global Navigation Satellite System Ground Based Augmentation System to Support Cat 1 Operation”) and ED-144 (“High Level Performance Requirements for a GNSS/GBAS to Support Precision Approach Operations”). For the moment, there is no indication on the need to update ED-95 and ED-144. On ED-114A, it is planned to perform a maintenance work to correct issues that have been detected during various GBAS CAT-I implementation programs.

Further work is now foreseen to consider the elements that are contained into the ICAO Baseline Development Standards for GBAS to support CATII/III operations issued in 2010 (known as GBAS CATII/III L1 concept) and that are notably under validation by the SESAR GBAS projects.

This ToR update covers the development of change 1 on ED-114A (CAT-I related issues) and the ED-114B delivery reflects the one year delay on GBAS CATII/III L1 ICAO SARPs validation.

It must be noted that a new update may appear again in the future if new CAT-I aspects have to be considered.

**WORKING GROUP OBJECTIVES**

The WG-28 activities are driven by the following objectives:

- a. Report on review of ED-114A including a matrix that identifies the section of ED-114A that would require an update in the context of GBAS CATII/III L1. This report will serve as an input to develop an extended ground subsystem MOPS that would include CATI/II/III L1 elements.
- b. Maintenance of ED-114A within the existing CAT-I scope
- c. Issue of a revised ED-114B covering CAT-I/II/III GPS L1 operation that would document all assumptions taken regarding the airborne side
- d. Recommendation of a future work programme related to GBAS Multi-Constellation Multi-Frequency

**Work process and methodology**

The WG-28 is required to continue developing or updating, as required, standards for Ground Based Augmentation Systems for Satellite navigation.

Additional resources and competences from the airborne industry will be required, therefore a new Call for Participation is expected.

EUROCAE rules and processes have to be applied.

Related documents developed or under development are to be considered. It concerns (not exhaustive) GBAS ground system and airborne equipment standards and specifications (e.g. ICAO, RTCA and EUROCAE).

## **DELIVERABLES**

<b>Document type</b>	<b>Document title</b>	<b>Due date</b>
Report on review of ED-114A	Report on review of the “MOPS for the GBAS ground subsystem to support Cat I precision approach and landing” in the context of GBAS CATII/III L1	Q4 2015
Change 1 to ED-114A	Update to ED-114A to correct issues detected during various GBAS CAT-I ground subsystem implementation programs	Q1 2017
MOPS ED-114B	“MOPS for the GBAS ground subsystem to support precision approach and landing” in the context of GBAS CATI/II/III L1	Q2 2018
Report	Report on status of GBAS Multi-Constellation Multi-Frequency developments in SESAR	Q4 2017

## **ENVISAGED USE OF DELIVERABLE(S)**

The report on review of ED-114A will be used as an input to an update of this document to reflect the GBAS CATII/III L1 elements introduced by the ICAO Baseline Development Standards.

Change 1 to ED-114A will be used to correct issues and error detected during various GBAS CAT-I ground subsystem implementation programs.

The primary goal for the ED-114B is to provide minimum operational performance specification for GBAS ground equipment to support all types of precision approaches operations.

The report on status of GBAS MC/MF developments in SESAR is intended to elaborate recommendations of a future WG-28 work programme related to GBAS MC/MF standardization.

## **PARTNERSHIP AND COLLABORATION**

### LIAISON WITH OTHER EUROCAE WGs

EUROCAE WG-28 shall co-ordinate its activity with WG-62 “Galileo” in the context of GBAS MC/MF.

### LIAISON WITH OTHER ORGANISATIONS

- a. EUROCAE WG-28 shall co-ordinate its activities with EASA and interested National Supervisory Authorities to ensure the suitability of its deliverables in support of approval purposes
- b. EUROCAE WG-28 shall continue to co-ordinate its activity with RTCA SC-159.
- c. EUROCAE WG-28 will continue to collaborate with the ICAO NS Panel and may propose inputs as appropriate.
- d. EUROCAE WG-28 will continue to collaborate with the EUROCONTROL LATO Focus Group as well as with the FAA/EUROCONTROL International GBAS Working Group and may propose inputs as appropriate

## **INPUT FOR CONSIDERATION**

The development of the aforementioned deliverables will use the following reference documents:

- ICAO–NSP, Proposed Amendment to International Standards and Recommended Practices, Aeronautical Telecommunications, Annex 10 to the Convention of International Civil Aviation, version approved by ICAO NSP/3 (December 2016)
- ICAO–NSP, Conceptual Framework for the Proposal for GBAS to Support CAT III Operations, December 2016
- SESAR 15.03.06, D03 “High Level Performance Allocation and Split of Responsibilities between Air and Ground”
- SESAR 15.03.06 D04 “Ground Architecture and Airport Installation”
- SESAR JU: multiple verification deliverables of the SESAR GBAS projects (OFA 01.01.01) after their release by SJU; the Data Pack for the GBAS CATII/III Solution includes the following documents:
  - OSED: Project 06.08.05 -D47 GBAS CAT II-III Functional Descriptions Update Report-update for V3- Edition 00.01.01
  - SPR: Safety Assessment Report: Project 15.03.06-D22 - Edition 00.01.00
  - Technical Specifications: Project 15.03.06-D04 ground subsystem technical specification, Edition 00.01.00;
  - Verification Report: Project 9.12-D27 executive summary, Edition: 00.01.00

## **SPECIFIC GUIDANCE OR REQUIREMENT(S):**

- **WG-28 meeting arrangements:**

Approximately 3 to 4 meetings per year are envisaged with a normal duration of 2 days.

- **Secretariat General Coordination:**

WG-28 Chairman and/or Secretary are required:

- a. to provide the Technical Programme Manager shortly after the meeting a summary (10 to 15 lines, bullet point presentation accepted) on the WG’s progress including schedule elements, and, within two weeks following each WG’s meeting, draft meeting minutes.
- b. to use the EUROCAE web space;
- c. to specifically invite the EUROCAE General Secretariat (eurocae@eurocae.net) to the “comment resolution meeting” following the Open Consultation of documents planned for publication; and
- d. to inform without delay the EUROCAE General Secretariat (eurocae@eurocae.net) of the WG’s intentions when diverging from the TORs and provide reasons for such intention.

- **Support for the Activity:**

In the course of its running activity, the WG-28 may identify and suggest complementary industry and aviation Authorities support for the proposed activity.

## **COMPLEMENTARY**

EUROCAE WG-28 is seen to be the relevant group to elaborate the appropriate standards derived from the SESAR 15.3.6 project (GBAS CATII/III L1) and SESAR 15.3.7 project (Multi GNSS CATII/III GBAS) activities when appropriate.

## **WG TERMINATION**

The duration of WG-28 activity is initially scheduled to complete the next step by the end of Q2/2018.

## **APPENDICES**

## **APPENDIX 1.**

### **EUROCAE Documents (ED) categories and definitions**

#### **1. *Minimum Aviation System Performance Specification (MASPS)***

Describes and specifies the operational and/or functional requirements of a complete end-to-end system, which may include airborne, on-ground and space segments. It should provide a high level architecture describing the individual components, and should allocate between those components the performance, safety and interoperability requirements.

#### **2. *Operational Services and Environment Definition (OSED)***

A standalone document equivalent to the part of a MASPS dedicated to the operational concept description: it provides the definition of the considered services and of the environment in which they have to be provided.

#### **3. *Safety and Performance Requirements (SPR) specification***

A standalone document equivalent to the part of a MASPS dedicated to operational safety and performance issues: it provides an allocation of the requirements between the segments for the different approval types.

#### **4. *Interoperability (INTEROP) requirements specification***

A standalone document equivalent to the part of a MASPS dedicated to interoperability issues between the different segments: for each of them, it identifies the technical interface and related functional requirements.

#### **5. *Process Specification (PS)***

Specifies generic methods which are not specific to individual components, e.g. software or hardware development, environmental testing...

#### **6. *Minimum Operational Performance Specification (MOPS)***

Specifies the performance of a component (piece of equipment, protocols, exchange formats,...) which is the minimum necessary performance to satisfy a regulatory requirement. In particular, it specifies the tests to be made to ensure that the specified performance is achieved. Intended to be referenced by an ETSO.

#### **7. *Technical Specification (TS)***

Specifies performances of a component which reflects the best industrial practice.

#### **8. *Guidance Document (GD)***

Amplifies the information contained in the types of documents described above. Usually illustrative information amplifying another EUROCAE document.

#### **9. *Report (R)***

Describes results of Working Groups which are of general interest but not appropriate to publish in the form of a specification or similar document of the types described above.

## **APPENDIX 2:**

### **Coordination principles**

#### **Liaison with other EUROCAE WGs**

This type of “internal” collaboration is organized and harmonized at the General Secretariat level.

**NOTE:** *To be considered that, through the inter-WGs collaboration, communication may be extended to EUROCAE standardization bodies partners through existing coordination or joint partnership (in other words, work on specific domains may be conducted by a network including EUROCAE WGs and RTCA and/or SAE Committees) – see next section.*

#### **Co-operation with other Standardization bodies.**

Co-operation means working together, exchanging ideas and information ... but not having at the end a word to word equivalent document (some differences could be acceptable in final developed documents as far as they are clearly identified (i.e. in documents Foreword) and not contradictory.

#### **Joint EUROCAE WG and RTCA SC or SAE committees.**

The partnership is complete and must result in a full equivalent document (only editorial differences such as document reference, Forward, Group membership ...

With RTCA in particular, the objective is to conduct all specific development phases jointly and to address key milestones at the same time (Kick Off, Final TOR approval, Final initial draft validation, Open consultation and FRAC, approval by respective EUROCAE Council and RTCA PMC).

**NOTE:** *EUROCAE and its partners must first agree on Intellectual Property and Copyrights when co-developed documents have to be provided to other bodies (e.g. ICAO).*