Input paper: [[1]](#footnote-1) ENG17-3.1.2.7

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM X ENG **□** PAP **□** Input

**□** DTEC **□** VTS **□** Information

Agenda item [[2]](#footnote-2) n.n

Technical Domain / Task Number 2 …………………………………

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Upcoming IEC standard for SBAS L1 shipborne receivers

# Summary

Standard for SBAS L1 shipborne receivers IEC 61108-7 [2] is currently under ballot for the final publication up to 29th September. Members with representation in IEC TC 80 are encouraged to provide a positive vote to support the harmonised and safe adoption of SBAS in the maritime domain.

Once SBAS receiver equipment standard (IEC 61108-7 [2]) is published, vessels will be able to equip type-approval receivers using SBAS and RAIM to ensure a safe navigation in harbour entrances/approaches and coastal waters according to operational requirements (IMO Res. 1046(27) [1]). Vessels should be equipped with type approval receivers in order to navigate using the EGNOS maritime service over Europe, which is planned to be shortly available (end 2023 – beginning 2024).

## Purpose of the document

The purpose of the document is to inform that the standard for SBAS L1 shipborne receivers IEC 61108-7 [2] is planned to be published by end 2023-beginning 2024.

Members with representation in IEC TC 80 are encouraged to provide a positive vote before 29th September to support the harmonised and safe adoption of SBAS in the maritime domain.

Receivers manufactures are invited to upgrade their receivers according to upcoming SBAS receiver equipment standard (IEC 61108-7 [2]). They are welcome to contact us (ESSP and EUSPA) in order to find free-of-charge technical support for this potential update.

# Background

* ENG13-3.1.3.12: IEC Standardisation for SBAS maritime receivers
* ENG15-3.1.3.2: IEC Standardisation for SBAS maritime receivers
* IALA Conference 2023: Standardisation Process for SBAS Maritime receiver in the International Electrotechnical Commission

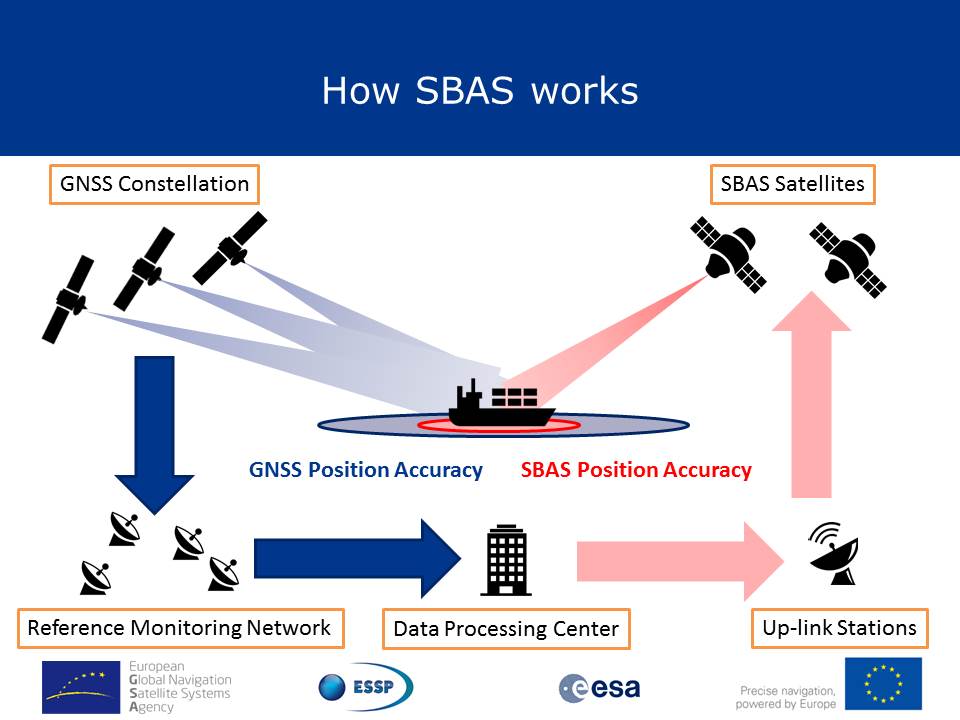
# Discussion

Comments related to SBAS L1 shipborne receivers’ standard IEC 61108-7 [2] are welcome.

# IEC standard for SBAS L1 shipborne receivers

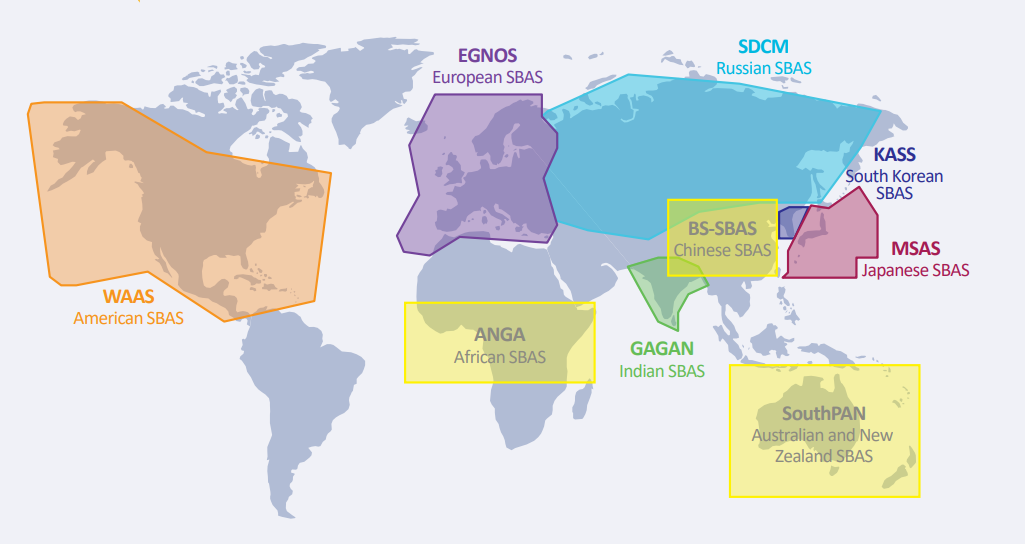
## Purpose

Maritime community is interested in using SBAS (Satellite Based Augmentation System), especially where there is no back-up infrastructure or in poorly covered environments. SBAS enhances GNSS (Global Navigation Satellite System) standalone navigation by broadcasting additional signals from geostationary (GEO) satellites over a specific service area (e.g. EGNOS is the SBAS system over Europe). Using a reference monitoring network that receive GNSS signals, the SBAS systems broadcast satellite and ionospheric correction messages that improve accuracy against GNSS standalone solution along with some integrity data that increase the confidence in the navigation position.



1. SBAS architecture

Apart from EGNOS, several other SBAS system are currently defined or under definition around the world.



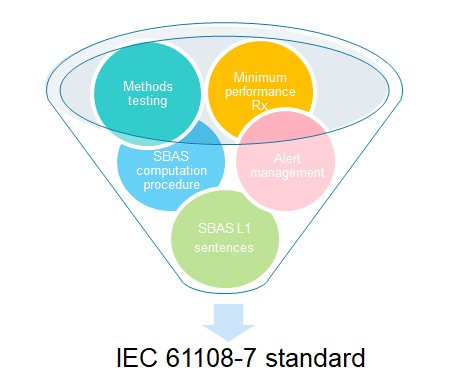
1. Existing and planned SBAS systems. Source: [EDAS SDD](https://egnos-user-support.essp-sas.eu/sites/default/files/documents/egnos_edas_sdd_in_force.pdf)

Currently, GNSS systems (i.e. GPS, Galileo, GLONASS and BeiDou) are recognised by the International Maritime Organization (IMO) as components of the World Wide Radio Navigation System, but they are not suitable for harbour entrances/approaches and coastal waters without augmentation. For this type of operations, differential services, like DGPS/DGLONASS, are used to broadcast augmentation data in order to fulfil the performance level required by IMO Res A.1046(27) [1] . Similarly, SBAS can be used as a suitable augmentation system for harbour entrances/approaches and coastal waters. To support its adoption, a new standard is about to be approved and published by IEC Technical Committee 80 for the implementation of SBAS L1 in shipborne receivers.

## Content

The title proposal for this under development standard IEC 61108-7 is “Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) – Part 7: Satellite Based Augmentation Systems (SBAS) L1 – Receiver Equipment – Performance requirements and method of testing”.

The CDV (Committee Draft for Vote) submitted for IEC 61108-7 standard [2] addresses the use of SBAS L1 to provide augmentation to the GPS shipborne receiver. This standard, as done for all the standards belonging to the IEC 61108 series, is composed by a set of minimum performance requirements, method of testing and the required test results.



1. IEC 6118-7 content

IEC 61108-7 includes the minimum performance for SBAS L1 maritime receivers to be obtained by the equipment under coverage of SBAS service in order to be compliant with the IMO Resolution A.1046(27) [1], describing operational requirements for ocean waters, coastal waters and harbour entrances/approaches.

Firstly, the requirements included in the standard define the specifications for the following aspects:

* General
* Equipment output
* Accuracy
* Acquisition
* Availability
* Dynamic range
* Effects of specific interfering signals
* Position update
* SBAS input and processing
* Navigational status indications
* Operation under typical interference conditions
* Output of COG, SOG and UTC

In addition, it includes a high level procedure for SBAS L1 navigation computation to ensure that receivers correctly process and uses the SBAS data, the receiver output sentences to support SBAS L1 operation and bridge alert management compliant with IEC 62923-1 [3]and IEC 62923-2 [4].

Finally, to ensure that the receiver correctly implements the requirements, a set of tests are also included in the standard describing the method of testing and the required test results. The receiver equipment (composed by receiver and antenna) shall perform and pass these tests in an accredited laboratory:

* SBAS L1 receiver equipment
* Configuration
* Position output
* Equipment output
* Static accuracy and availability
* Static accuracy with angular movement of the antenna
* Dynamic accuracy
* Acquisition
* Sensitivity and dynamic range
* Effects on specific interfering signals
* Position update
* SBAS input and processing
* SBAS message processing
* SBAS GEO satellite selection and switching
* Navigational status indications
* Test for typical interference conditions
* Accuracy of COG and SOG
* Validity of COG and SOG information
* Output of UTC
* Validation material for tropospheric model

It should be clarified that the current standard under development only covers the SBAS L1 systems augmenting GPS constellation. The future SBAS Dual-Frequency and Multi-Constellation (DFMC) services and other GNSS systems are out of scope of this version of the IEC 61108-7 standard (see section 4.4, future work)

## Schedule

The standardisation process to produce the new standard IEC 61108-7 started on February 2021 and it is now on the final steps.

The Committee Draft for Voting (CDV) was launched for members to vote the approval of the standard. The ballot has been opened from the 7th of July up to 29th September 2023. Interested parties are welcome to participate to support the standard publication.

In case comments are received for CDV, the Final Draft International Standard (FDIS) will take place, where comments will be implemented and new draft will be provided within 16 weeks. Then, a new ballot of 6 weeks periods will be launched for this final draft. In this case, the publication of the IEC 61108-7 standard will be by beginning of 2024.

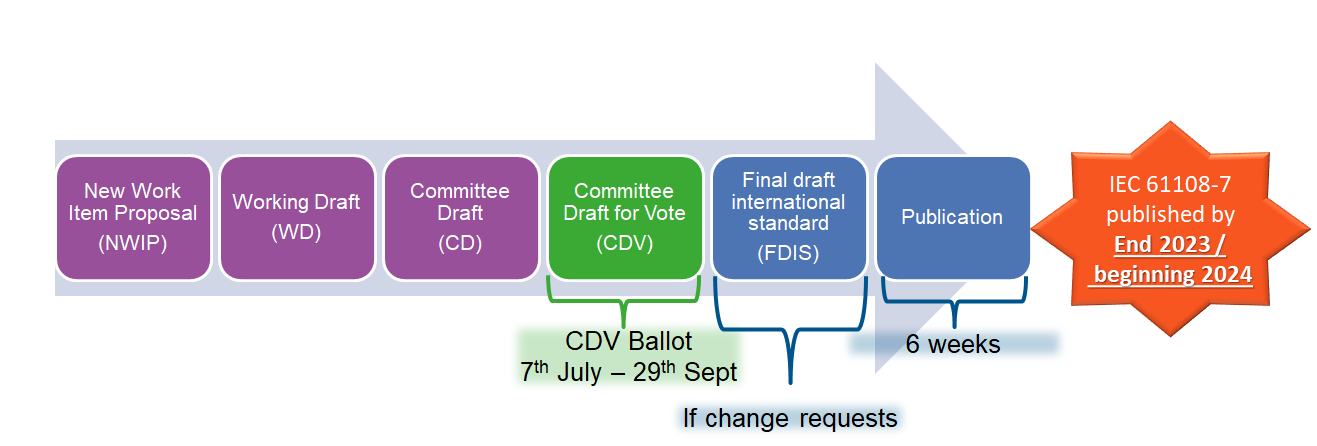
If there are no technical change requests and CDV is approved, the CDV can be published directly. In this case, the publication of the IEC 61108-7 standard will be by end of 2023.

It is noted that the publication process usually takes around 6 weeks after approval.

For CDV approval, it is required:

* a majority of 2/3 of votes cast by Participating members in favour; and
* the number of negative votes from all national committees does not exceed 25% of total votes.

Figure below shows the IEC 61108-7 standard schedule:



1. IEC 61108-7 standard schedule

## Future work

IALA, in coordination with EUSPA/EC, together with EU Member States, Australia, China, New Zealand, ICS and the NI, co-sponsored the submission to IMO of a request for a new output for the development of minimum performance standards for Dual-Frequency Multi-constellation SBAS and Advanced-RAIM in shipborne radionavigation receivers. The request was approved, IMO will start developing the new standard in 2026. After that, IEC will be approached to develop the standard to define the methods of testing, building as well on IEC-61108-7 for SBAS L1 and RAIM.

# References

1. IMO Resolution A.1046(27) (2011), Worldwide Radionavigation System.
2. Standard under development IEC 61108-7: Maritime navigation and radio-communication equipment and systems – Global navigation satellite systems (GNSS) - Part 7: Satellite Based Augmentation System (SBAS) L1 – Receiver equipment – Performance standards, methods of testing and required test results
3. IEC 62923-1: Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 1: Operational and performance requirements, methods of testing and required results.
4. IEC 62923-2: Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 2: Alert and cluster identifiers and other additional features.

# Action requested of the Committee

The Committee and its members are requested to:

1. Support the process of approval of this standard.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)