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Maritime service status

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EGNOS Safety of Life assisted service for Maritime users (ESMAS)

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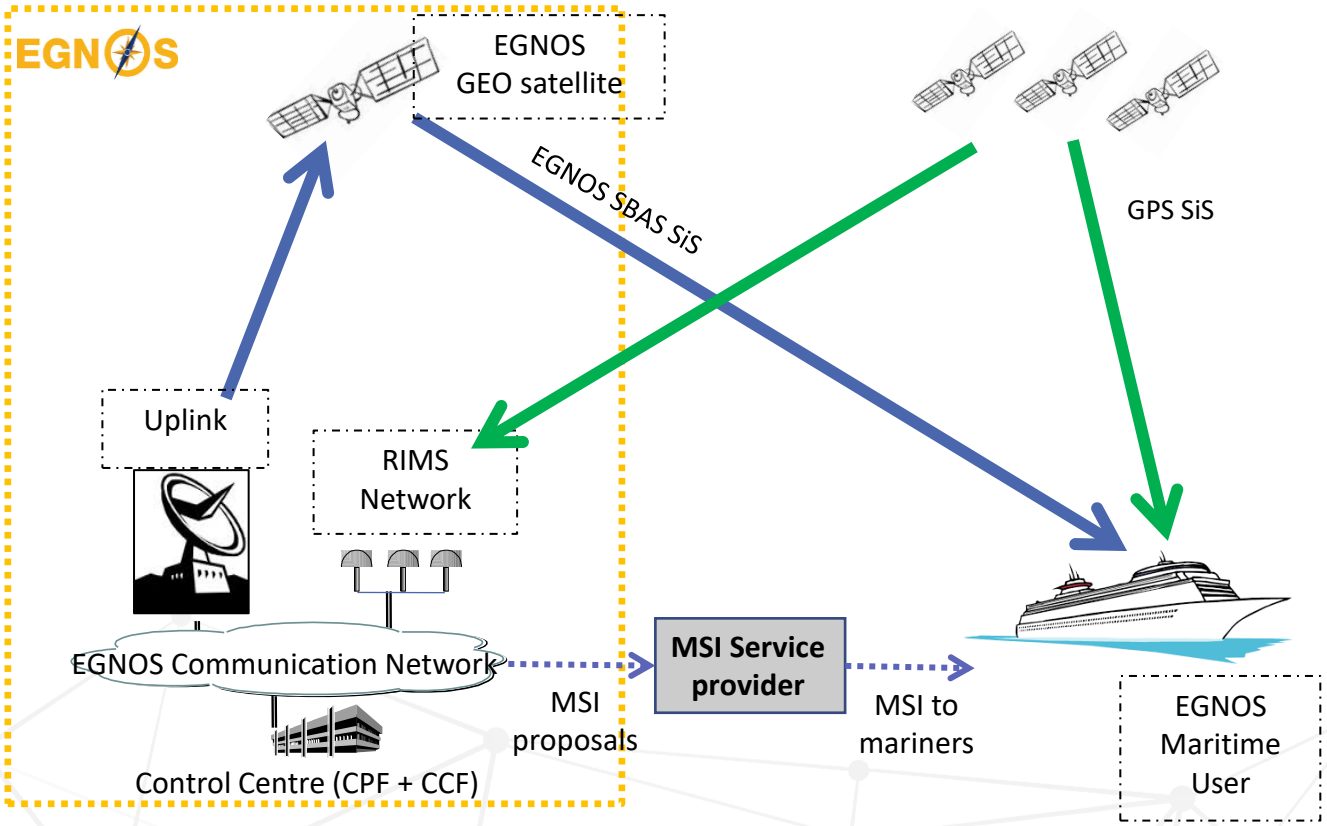
Maritime is relying more and more on GNSS for applications that are critical for sustainable economic growth, safety of life at sea and protection of the environment

- The EGNOS Safety of Life (SoL) assisted service for Maritime users (ESMAS) offers an alternative to national DGNSS services using existing EGNOS L1 SIS.
- Target users are merchant vessels navigating in ocean waters, harbour entrances, harbour approaches and coastal waters.

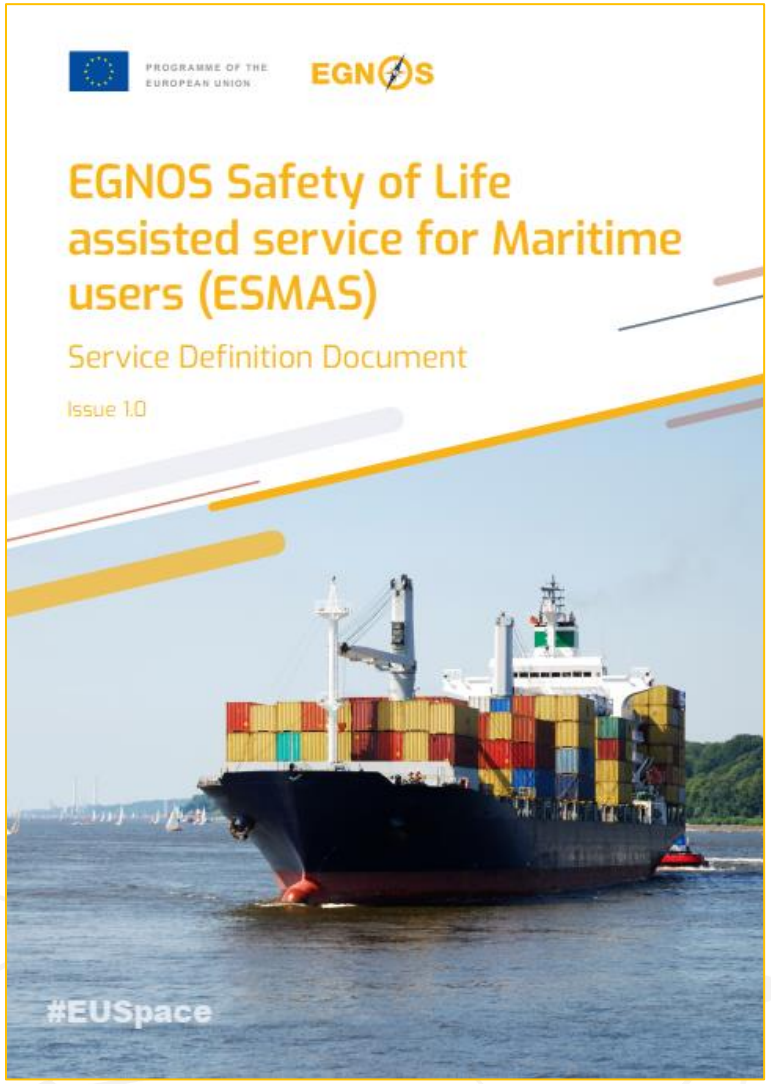


New! ESMAS Service Definition Document

The Service Definition Document – SDD:

- Establishes the terms and conditions of use of the ESMAS service.
- Describes the EGNOS system architecture and Signal-In-Space (SIS) characteristics and user segment.
- Describes the ESMAS service performance.
- Provides information on the established technical and organizational framework, at European level, for the provision of this particular service.

Link to the published SDD: https://edas-maritime.gsc-europa.eu/sites/default/files/documents/egnos_esmas_sdd_in_force.pdf



Terms and Conditions of use

The SDD Target users are merchant maritime users that:

- Use a type-approved shipborne receiver according to GPS L1 standard **IEC 61108-1** and SBAS L1 standard **IEC 61108-7**
- Use receivers compliant to the requirements in ESMAS SDD and follow the IMO MSC.1/ Circ. 1575 guidelines for shipborne position, navigation and timing (PNT) data processing.
- Carry the on-board equipment required for the SOLAS ships to be able to receive Maritime Safety Information (MSI) (i.e. Notice to Mariners / Navigational Warnings)

IEC International Electrotechnical Commission

IMO SOLAS

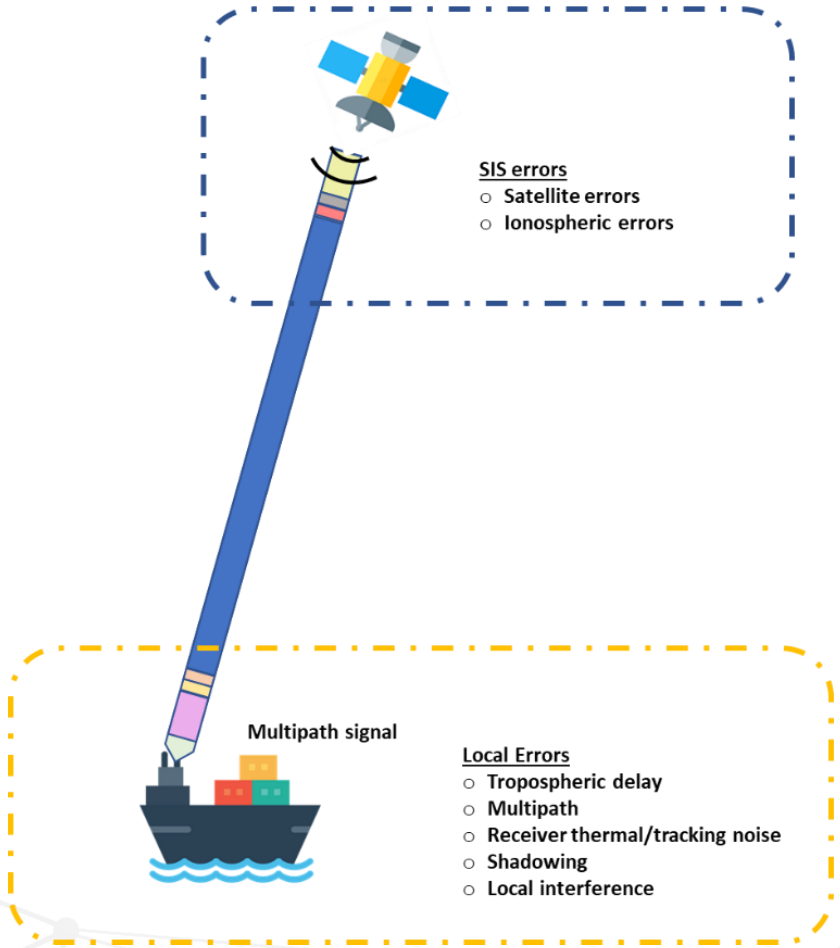
SOLAS convention: https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-(SOLAS),-1974.aspx

ESMAS service commitment (1/4) overview

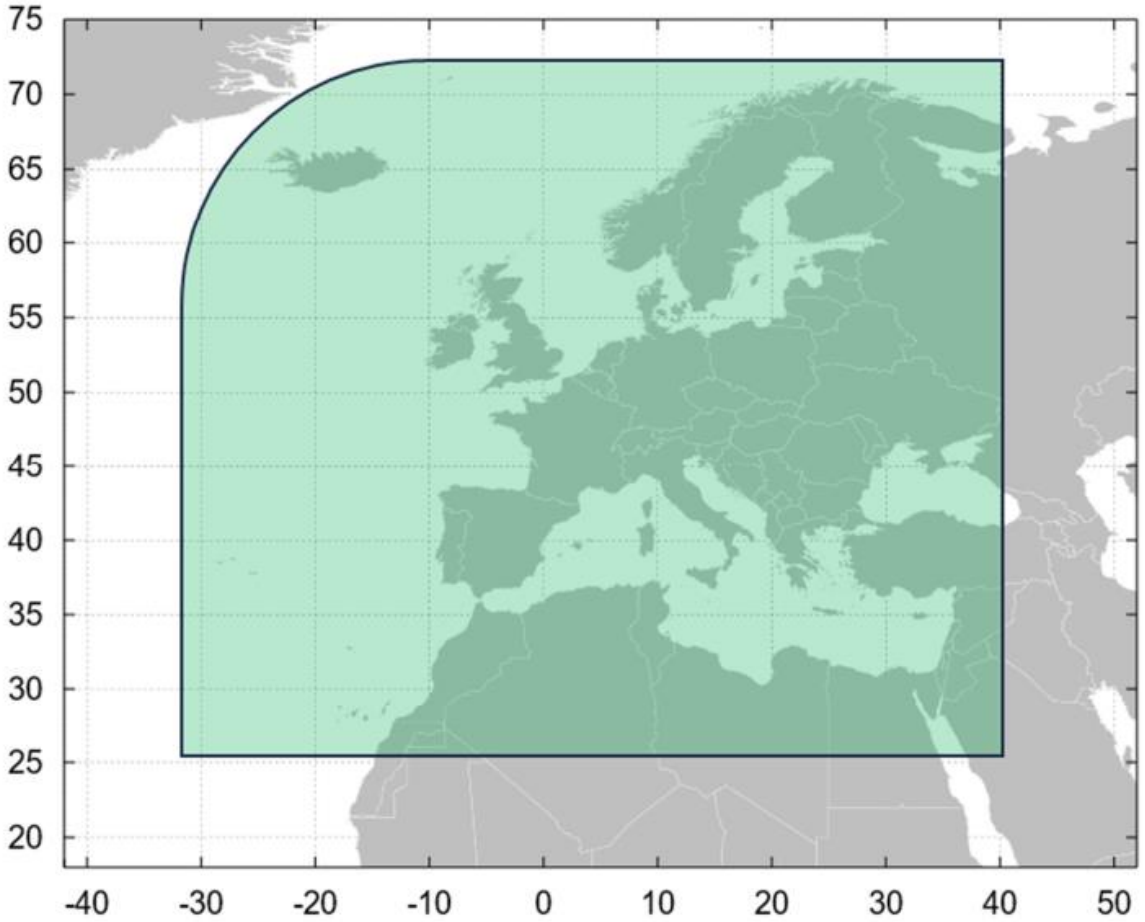
ESMAS is provided openly and is freely accessible without direct charge.

It provides:

- pseudorange and ionospheric corrections to GPS L1 signal via EGNOS GEO SIS, allowing to reach increased accuracy in the position domain with respect to GPS L1 standalone solutions
- integrity Alerts (system alerts, satellite alerts, ionospheric alerts) via EGNOS GEO SIS
- Maritime Safety Information proposals notification to MSI service providers to inform about EGNOS planned/unplanned outages



ESMAS service commitment (2/4)
Service area



ESMAS Service Area

The ESMAS service area is defined as the geographical area within the waters of the European Union Member States and EGNOS participant states (Iceland, Norway and Switzerland) in which the ESMAS users can expect the fulfilment of the minimum performance levels specified in the SDD for signal availability, time to alert and MSI proposal notifications

ESMAS service commitment (3/4)
SIS availability and alerts

The signal availability is the percentage of time the EGNOS SIS is provided by the EGNOS GEOs through messages that can be processed by an EGNOS receiver compliant with IEC 61108-7 standard

ESMAS Signal Availability commitment	Conditions and constraints
99.8%	• Calculated over a period of 30 days • Received from at least one EGNOS operational GEO • At any point over the service area • With a receiver aligned with receiver standards [RD-05] [RD-15]

- System Alerts (Message Type 0 which shall result in the cessation of the use of that SBAS GEO for all maritime applications)
- Satellite alerts (informing within less than 5.2 seconds that a GPS satellite shall not be used)
- Ionosphere alerts (informing within less than 5.2 seconds when ionospheric corrections at specific grid points shall not be used)

ESMAS Time to Alert commitment	Conditions and constraints
≤5.2s	• Between the onset of the alarm condition and the time that the last bit of the alert message reaches the antenna of the user receiver • Received from at least one EGNOS operational GEO • At any point over the service area • With a receiver aligned with receiver standards [RD-05] [RD-15]

ESMAS service commitment (4/4) Maritime Safety Information proposal notification

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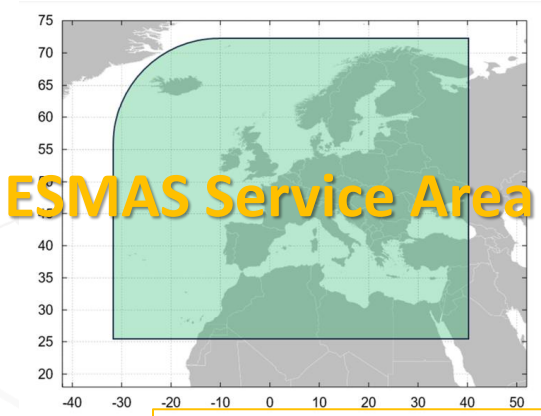
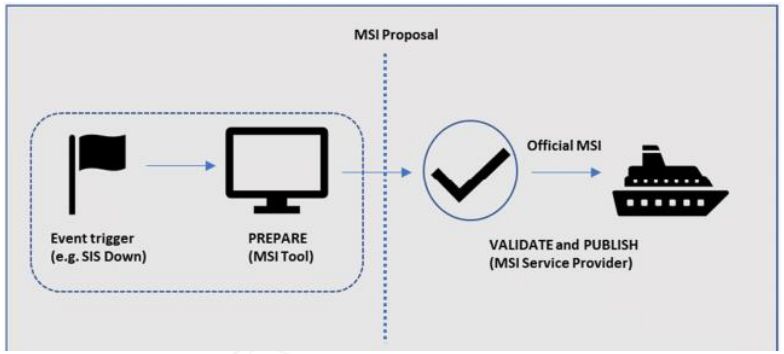
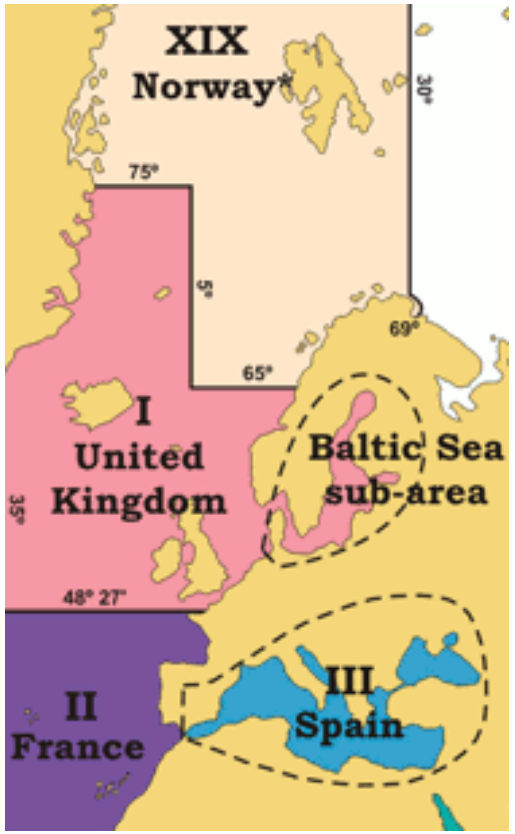
ESMAS MSI proposal notification commitment	Conditions and constraints
Planned events affecting the service • ≥ 72 hours before the service is affected	• Events affecting the service area • MSI proposal notification limited to NAVAREAs[5] I, Ib, II, III and XIX coordinators covering the waters of the European Union Member States and EGNOS participant states (Iceland, Norway and Switzerland) • Only considers unavailabilities longer than 15 minutes
Unplanned events affecting the service • ≤ 2 hours after the event affecting the service is detected	







ESMAS Service Provider (EUSPA)

NAVAREA I, Ib, II, III, XIX coordinators

ESMAS typical performance (1/2)
SIS ranging accuracy

Satellite Residual Error (SRE) is the difference between the reconstructed orbit and clock after applying SBAS orbit and clock corrections to the GNSS navigation messages, and real SV orbit and clock projected in the direction of the user line of sight.

ESMAS SRE typical performance	Conditions and constraints
At Average User Location (AUL) • ≤ 0.68m (95%) • ≤ 0.77m (99%) • ≤ 0.93m (99.9%) • ≤ 1.47m (99.999%)	• Calculated over a period of 30 days. • Percentiles calculated over the overall constellation dataset. • Average (RMS), over a 2x2 grid as per Figure A-1.
At Worst User Location (WUL) • ≤ 1.96m (95%) • ≤ 2.36m (99%) • ≤ 2.98m (99.9%) • ≤ 4.73m (99.999%)	• Calculated over a period of 30 days. • Percentiles calculated over the overall constellation dataset. • Maximum, over a 2x2 grid as per Figure A-1.

ESMAS typical performance (2/2)
SIS ranging accuracy

Vertical Ionospheric Residual Error (VIRE) at Ionospheric Grid Points (IGPs) is defined as the difference between the estimated (reconstructed) vertical ionospheric delay and the real vertical ionospheric delay at IGP.

ESMAS VIRE typical performance	Conditions and constraints
At Average IGP: • ≤ 1.18m (95%) • ≤ 1.36m (99%) • ≤ 1.53m (99.9%) • ≤ 1.81m (99.999%)	• Calculated over a period of 30 days. • Percentiles calculated over the overall constellation dataset. • Average (RMS), over the IGP grid as per Figure A-2.
At Worst IGP: • ≤ 5.58m (95%) • ≤ 7.77m (99%) • ≤ 10.26m (99.9%) • ≤ 13.43m (99.999%)	• Calculated over a period of 30 days. • Percentiles calculated over the overall constellation dataset. • Maximum, over the IGP grid as per Figure A-2.

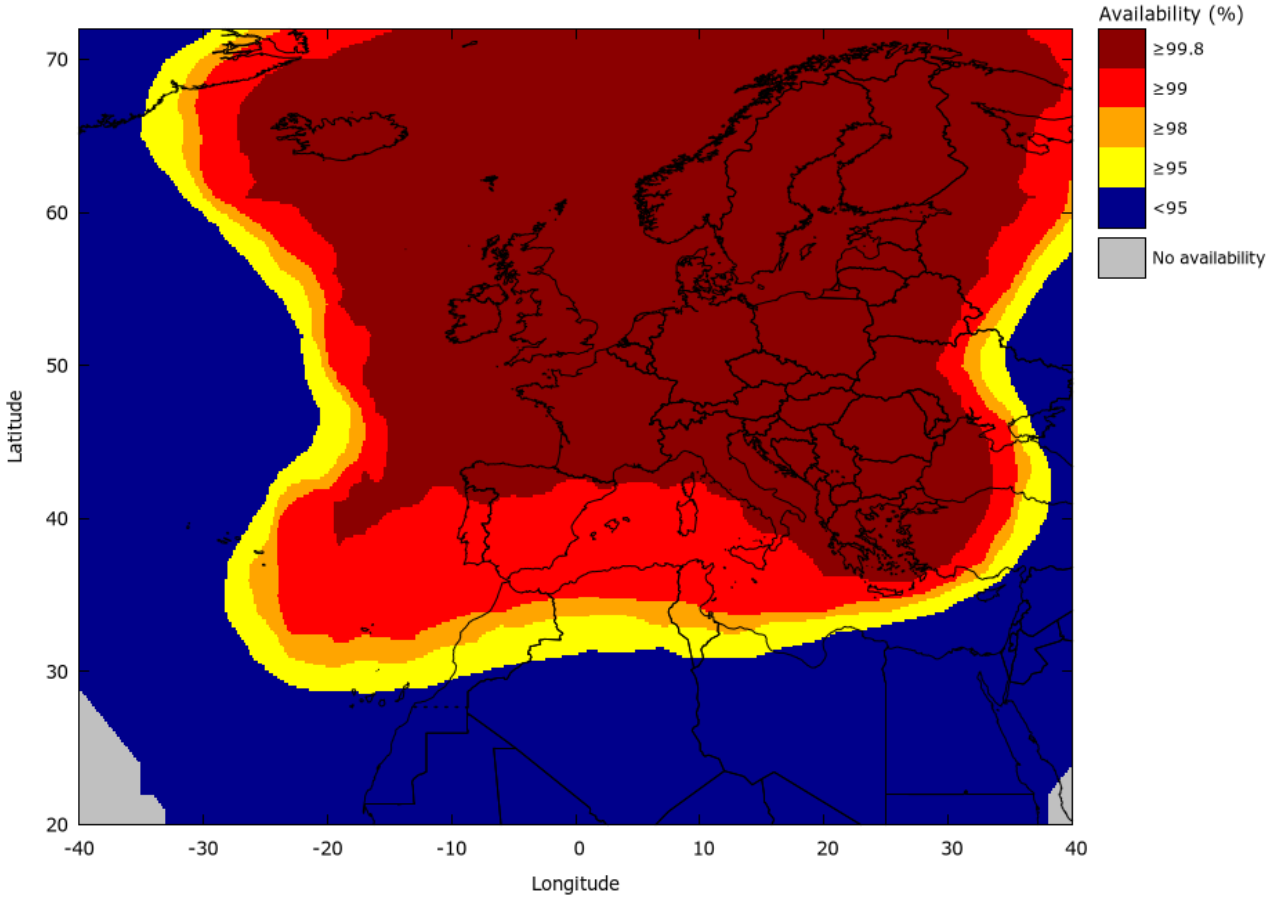
ESMAS typical performance
Positioning-level performance

Horizontal Accuracy of a vessel at a given time is the degree of conformance of the estimated or measured position with the true position of the vessel.

ESMAS Horizontal Accuracy is computed as the 95th percentile of the estimated horizontal position error observed by a user - equipped with a fault-free receiver using EGNOS corrections- over a period of time of 24 hours.

Conditions and constraints

- Percentage of time when the horizontal position error is equal or lower than 10 meters.
- Considering healthy signals above 5deg elevation.
- Calculated over a period of 30 days.
- Calculated at virtual grid nodes using a fixed 1°x1° user grid in the ESMAS service area.



ESMAS typical performance ongoing activities

- **SIS Ranging Availability**
- The characterisation of ESMAS in terms of SIS Ranging Availability is an on-going activity.
- **SIS Ranging Continuity**
- The characterisation of ESMAS in terms of SIS Ranging Continuity is an on-going activity.
- **Position-level Continuity**
- The characterization of ESMAS in terms of service continuity is an on-going activity.

ESMAS information and support available for users

- ESMAS Users Support webpage

  Main source of information for ESMAS status and performance, system description, historical and real time services performance, forecasts, applicable documentation, etc.

  https://edas-maritime.gsc-europa.eu

- Helpdesk accessible 24/7

  helpdesk@edas-maritime.gsc-europa.eu

  Helpdesk line : +34 911 236 555

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