EGNOS

EGNOS, it's there. Use it.

EGNOS:
free accuracy for mapping and GIS applications

European Global Navigation Satellite Systems Agency

ESSP

Precise navigation, powered by Europe

Table of contents

- EGNOS basics: architecture and technical parameters
- EGNOS benefits for mapping and GIS
- EGNOS-enabled devices
- EGNOS applications and success stories
- EGNOS user support
- Questions and answers

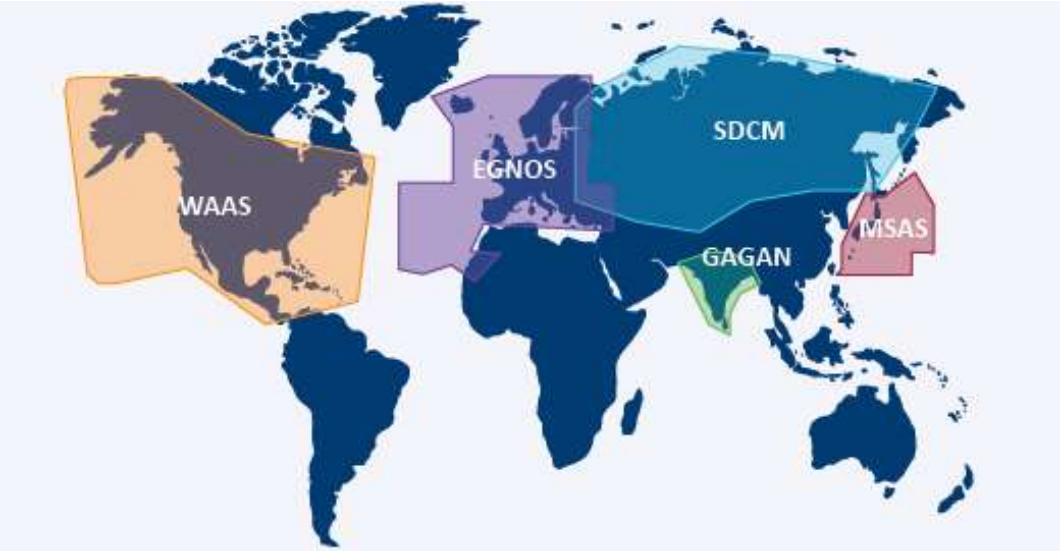
Table of contents

EGNOS background

EGNOS (European Geostationary Navigation Overlay Service) is the **free** European satellite-based augmentation system (SBAS) over the L1 signal of GPS

EGNOS was designed for aviation purposes, but it is also suitable for usage on a multitude of other ground applications

EGNOS is interoperable with other SBAS systems (map below)



In the future (>2023):

- **EGNOS** will augment also **Galileo**
- **EGNOS** will broadcast dual-frequency corrections

EGNOS system

2 x MCC

Mission Control Centres

39 x RIMS

Ranging & Integrity Monitoring Stations

GPS signals

4 x NLES

Navigation Land Earth Stations

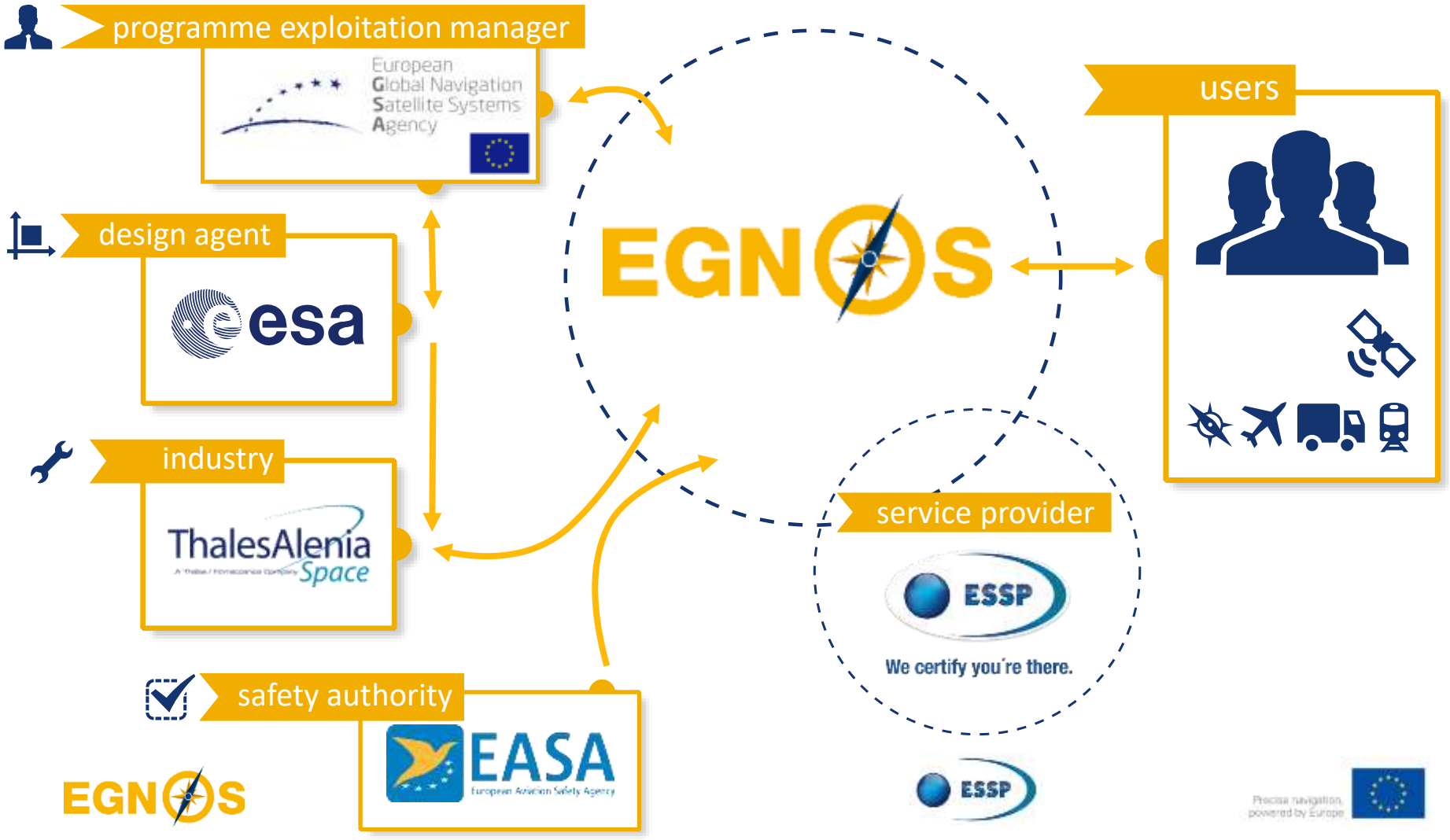
EGNOS

EGNOS application area

2 Geostationary Satellites

EGNOS signal in space (SiS) coverage footprint

EGNOS organization



EGNOS services

- OS service release: **1 October 2009**
- EGNOS OS Service Definition Document (SDD)
- Agriculture, maritime, road, rail, mapping and GIS …
- No regulatory framework

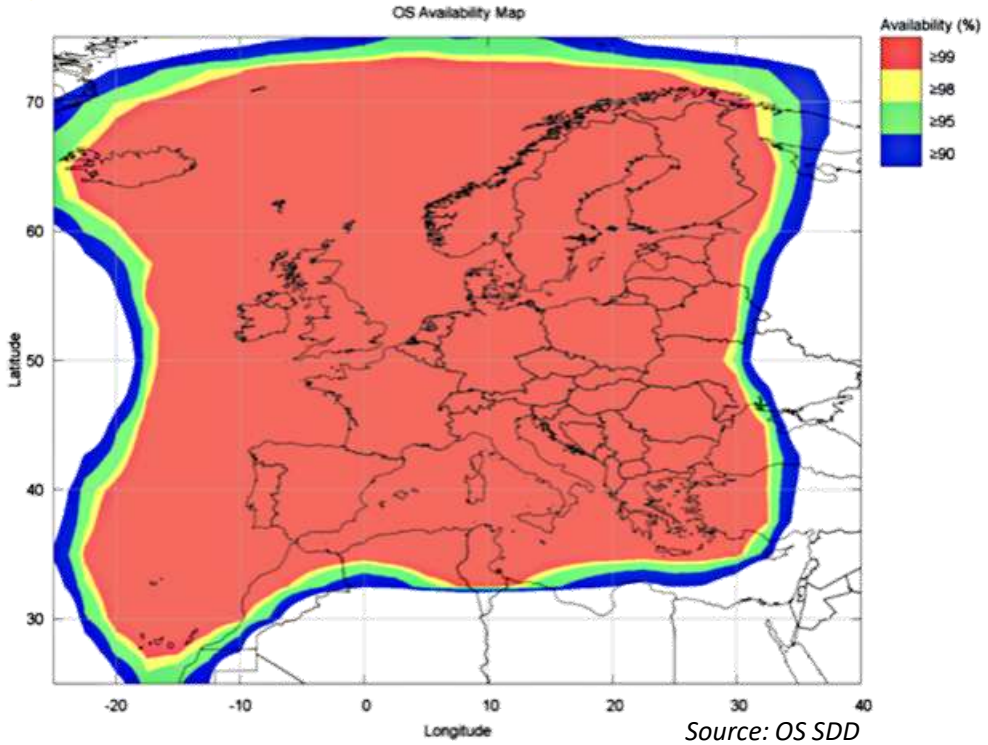
- SoL service release: **2 March 2011**
- EGNOS SoL Service Definition Document (SDD)
- Regulatory framework that obliges to use certified EGNOS equipment
- Aviation: LPV landing approaches without depending on ground infrastructure

- EDAS service release: **26 July 2012**
- EDAS Service Definition Document (SDD)
- User registration is required
- Provision of EGNOS/GPS/GLONASS data through the Internet
- DGNSS and RTK corrections in the surroundings of the RIMS

EGNOS Open Service

EGNOS Open Service application area

Figure 6.1 EGNOS OS compliance area



Source: OS SDD

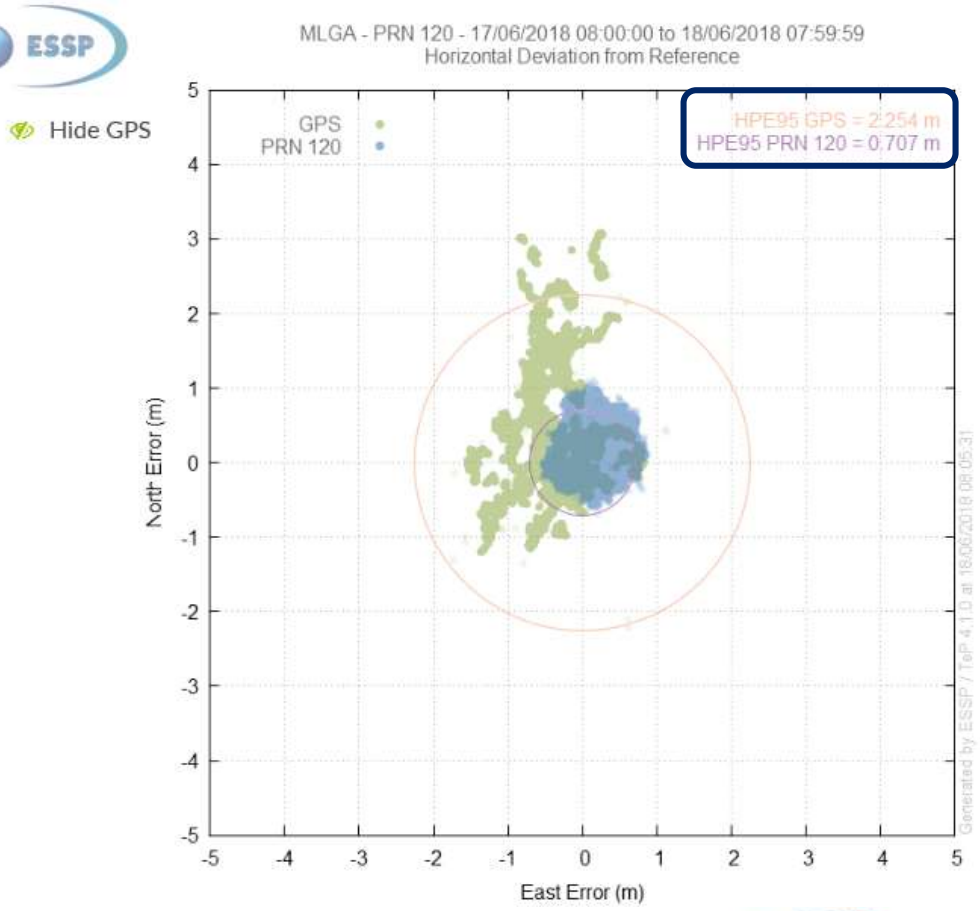
Measured accuracy

RIMS	Horizontal (95%)	Vertical (95%)
Aalborg	0.6 m	1.6 m
Berlin	0.7 m	1.3 m
Málaga	0.8 m	1.1 m
...	...	...

May 2018 (monthly report)

EGNOS augments GPS providing sub-metric horizontal accuracy

EGNOS and GPS (web)



EDAS

- Provision of EGNOS/GPS/GLONASS data through the Internet
- DGNSS and RTK corrections in the surroundings of the RIMS
- EDAS provides then four different types of data:

1) GPS and GLONASS observations and navigation data collected by the entire network of EGNOS ground stations
2) SBAS augmentation messages of EGNOS satellites
3) RTK (Real-Time Kinematic) messages
4) Differential GNSS (DGNSS) corrections

Table of contents

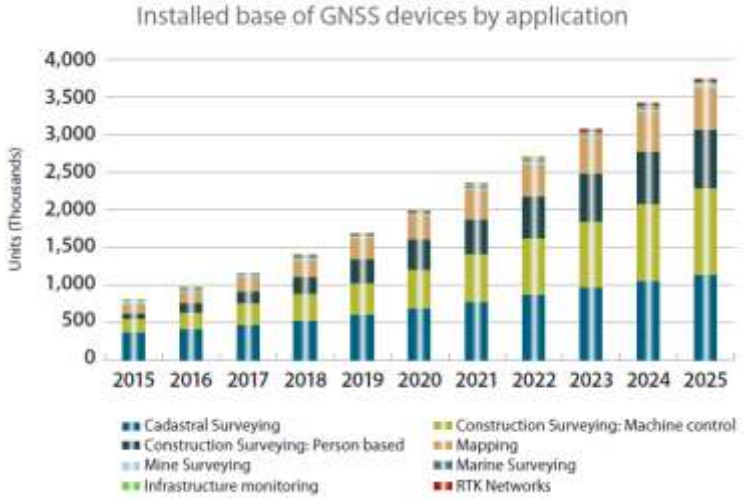
EGNOS already providing benefits for mapping and GIS professionals

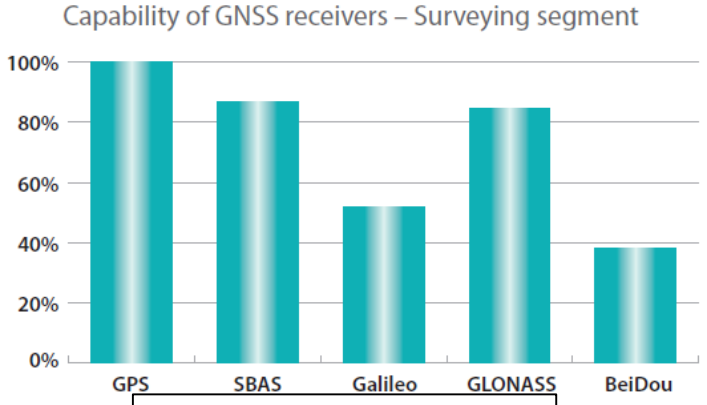
- EGNOS is a free-of-charge service
- EGNOS signal is provided by satellite: no SIM card, no base station, no radio link, etc.
- Most of the professional mapping devices are EGNOS-enabled. Users just have to activate it

Table of contents

EGNOS-enabled devices for mapping

- Substantial growth of the GNSS mapping and surveying market is expected
- 87% of GNSS receivers are EGNOS-enabled
- Different types of devices:
  - For pole
  - Handheld
  - Tablet
  - Bluetooth-based (managed by a external device)





Source: GNSS Market Report - GSA

Configuring EGNOS in your device

1. Check that the device is EGNOS-enabled

2. Activate SBAS/EGNOS

3. Set current EGNOS satellites. E.g. PRN=120 and PRN=123. Up-to-date information in the EGNOS website

How to perform the aforementioned steps?

- Product datasheet/manual
- Manufacturer/dealer assistance
- EGNOS user support: egnos-helpdesk@essp-sas.eu

Table of contents

EGNOS applications in mapping (1/2)

- Management of natural areas:
  - Forests and parks
  - Camping areas
  - Wind farms
  - etc.

- Management of utility networks:
  - Water
  - Electricity
  - Telecommunications
  - etc.

- Inventory and control of assets in open areas:
  - Urban furniture
  - Traffic signs
  - etc.

EGNOS applications in mapping (2/2)

- Taking of samples in field campaigns:
  - Environmental law force agents
  - Biologists
  - Archeologists
  - etc.

- Determination of perimeters and areas:
  - Municipality borders
  - Urban planning
  - Green cadastre
  - Construction
  - Dumping sites
  - etc.

Success story 1: Inventory of road milestones

- Customer: Geograma (mapping of borders and roads)
- Why EGNOS?:
  - Improvement of GPS positioning accuracy
  - Good wide coverage
  - Simple and low cost equipment
  - Real-time solution
  - Stable and continuous service
- All the information is here

"We chose EGNOS because it was a positioning service that fitted perfectly the needs of an inventory of hundred thousand kilometers"

Success Story 2: Management of natural areas

- Customer: ORTIZ-EULEN (maintenance of forestry parks)
- Why EGNOS?:
  - Improvement of GPS positioning accuracy
  - Less time needed for taking great number of measurements
  - Wide coverage
  - Light (handheld) equipment
- All the information is here

"When or where there is no GPRS signal, EGNOS corrections are extremely useful."

Success story 3: Management of water supply networks maintenance

- Customer: Aljarafesa (maintenance of utility networks)
- Why EGNOS?:
  - Improvement of GPS positioning accuracy
  - No cost
  - Less time needed for taking great number of measurements
  - Good wide coverage
  - Light (handheld) equipment

Success story 4: Harbour mapping (bathymetry and coastline monitoring)

- Customer: Port of Barcelona (harbour's authority)
- Why EGNOS?:
  - Improvement of GPS positioning accuracy
  - No cost
  - Good wide coverage
  - Simple and low cost equipment
- All information is here and here

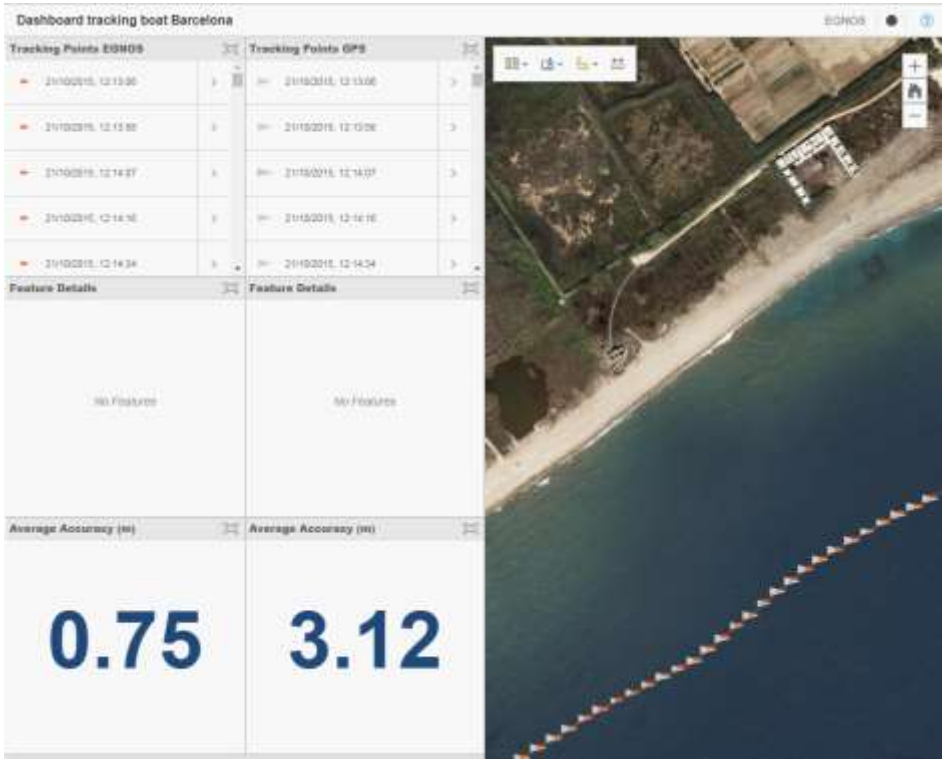
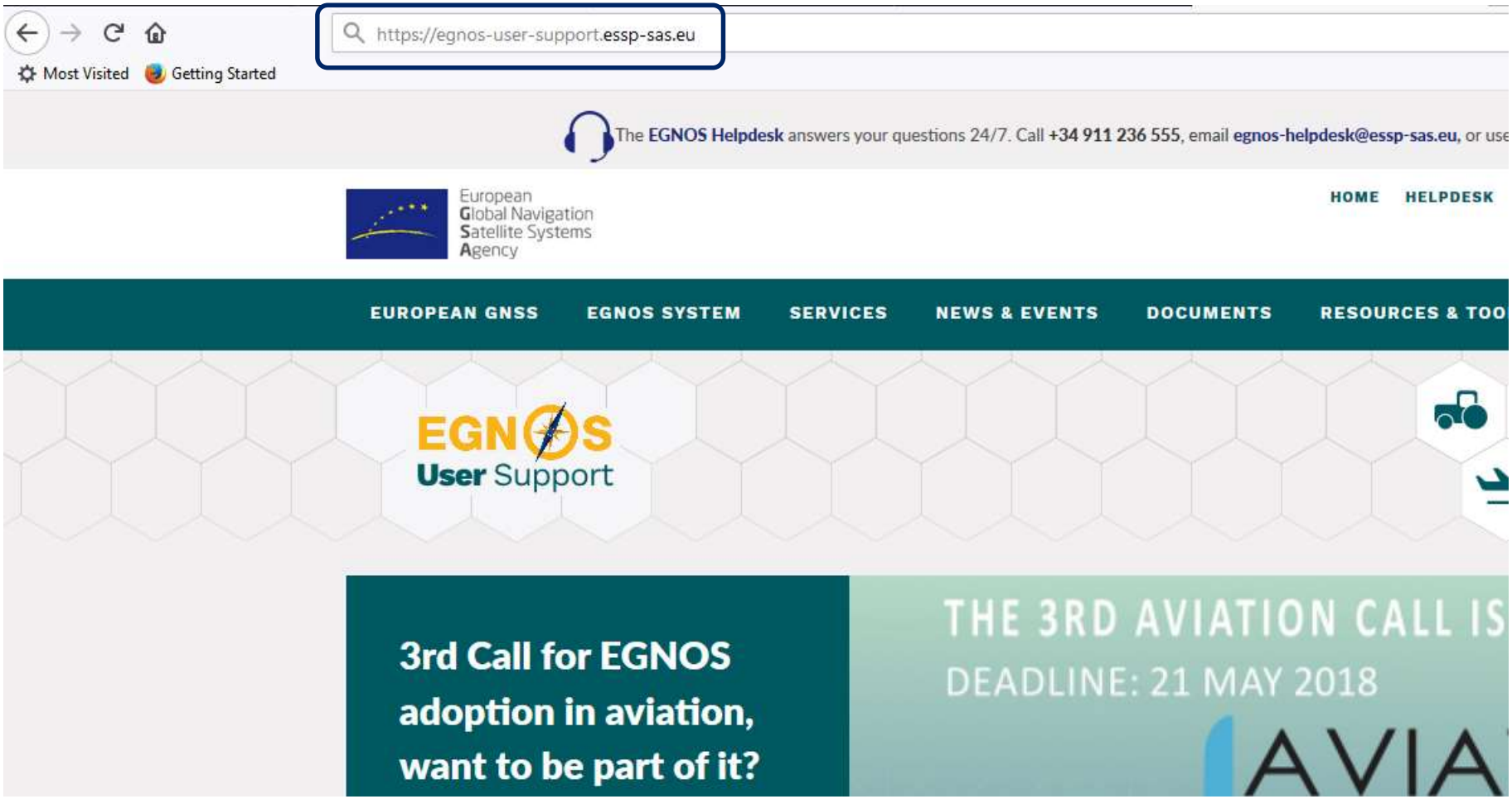


Table of contents

EGNOS user support website



EGNOS app

- Android: https://play.google.com/store/apps/details?id=com.essp.egnosapp
- iOS: https://itunes.apple.com/us/app/egnos/id1346540596?l=es&ls=1&mt=8

Summary of useful links

EGNOS User Support Website: http://egnos-user-support.essp-sas.eu

- Service Notices (e.g. PRN modifications)
- Real-time performance:
  - EGNOS vs GPS
  - EDAS
- Historical performance
- Guidance material
- Visibility maps
- EGNOS bulletin
- EGNOS helpdesk

EGNOS

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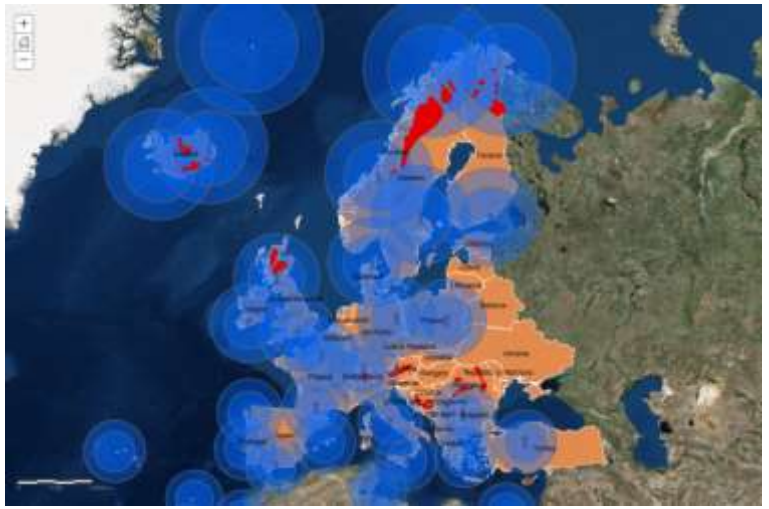
Coming soon
in the EGNOS user support website

- EDAS coverage maps



- EGNOS verification guidelines
  - If EGNOS is being applied for PVT computation
  - Using the information logged by the equipment
  - Other means in case no log data is available

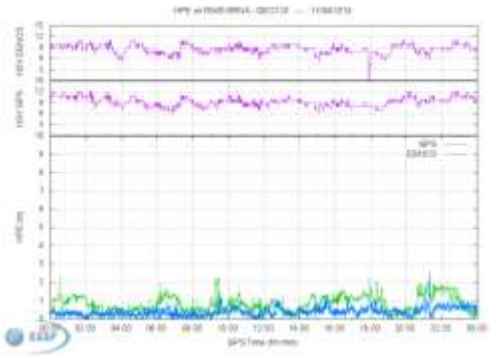


Table of contents

EGNOS

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QUESTIONS AND ANSWERS

http://egnos-user-support.essp-sas.eu

egnos-helpdesk@essp-sas.eu

+34 911 236 555 (H24/7)

www.essp-sas.eu

Corporate Video

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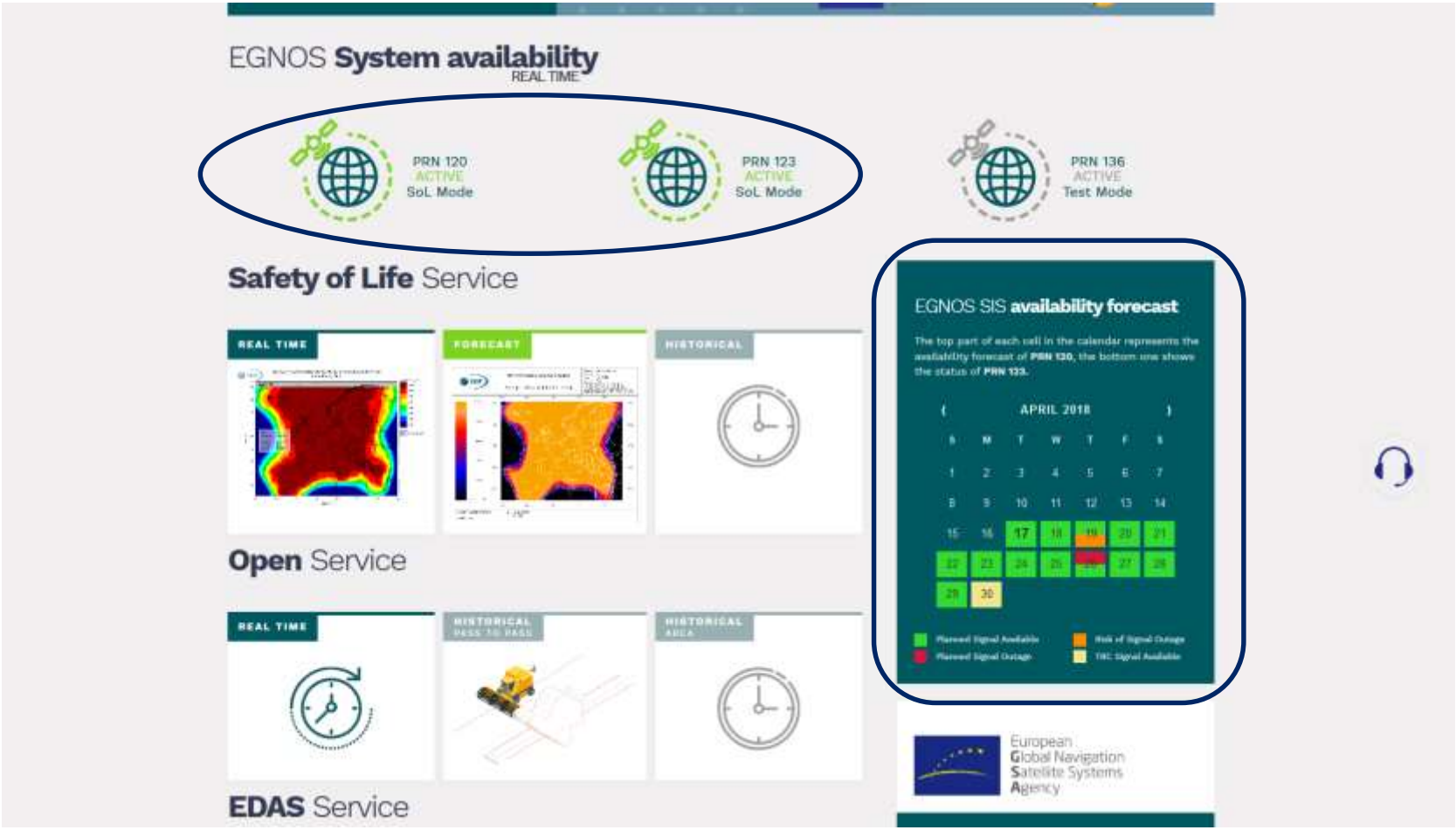
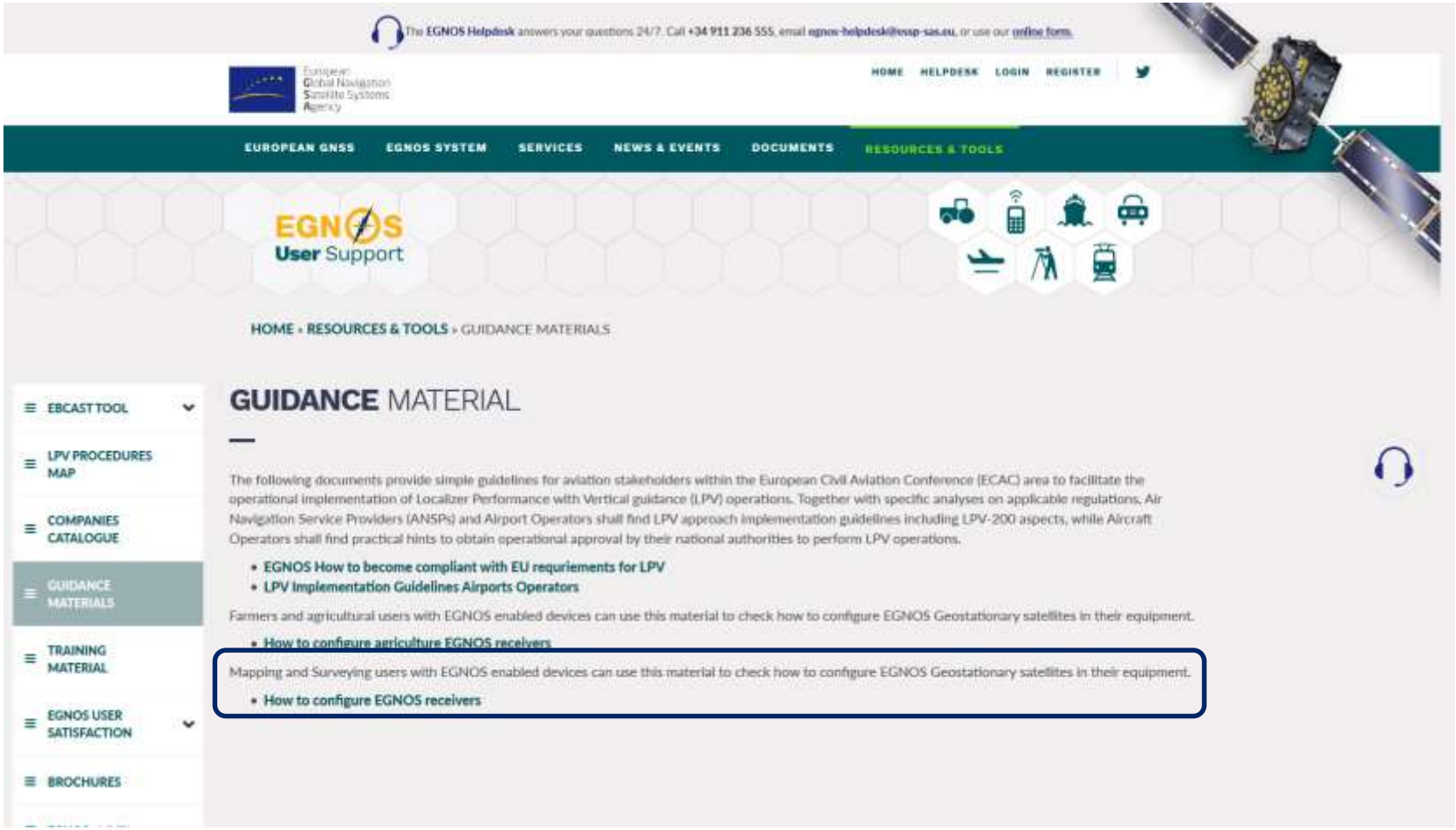
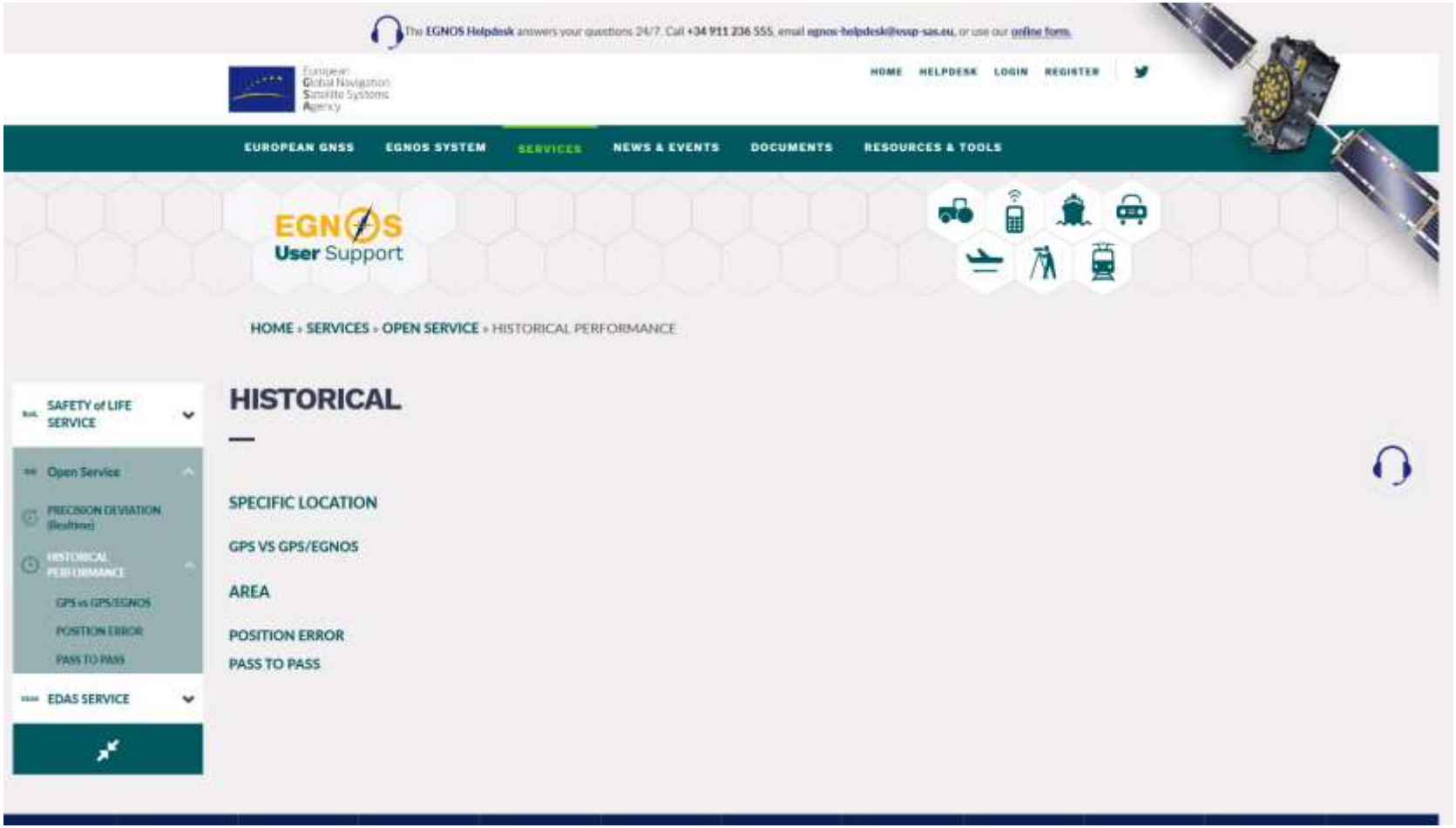
EGNOS satellites availability



EGNOS adoption material



EGNOS historical performance

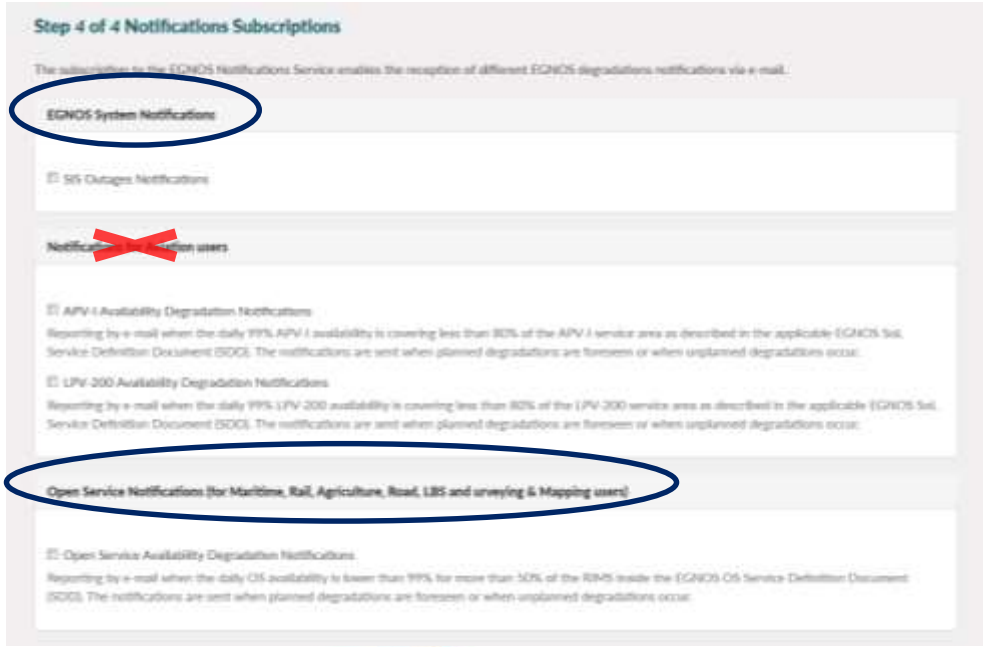


Registration and notification subscription

1. Registration in the EGNOS user support website (top right)

2. Interesting subscriptions to be selected during registration

Aviation-related (of no interest for mapping)



EGNOS visibility maps

EGNOS is available over all Europe, but the terrain orography could affect the visibility of EGNOS satellites. **Visibility maps provided in the EGNOS User Support Website.**

EDAS

	EDAS Service	Type of Data				Service Description	
		OBS & NAV	EGNOS MSG	RTK MSG	DGNSS COR	FORMAT	PROTOCOL

- GPS and GLONASS observations and navigation data collected by the entire network of EGNOS ground stations.
- SBAS augmentation messages of EGNOS satellites.
- RTK (Real-Time Kinematic) messages.
- Differential GNSS (DGNSS) corrections.

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	EDAS Service	Type of Data				Service Description	
		OBS & NAV	EGNOS MSG	RTK MSG	DGNSS COR	FORMAT	PROTOCOL
Real Time	Service Level 0 Data Filtering SL0	✖	✖			ASN.1	EDAS
	Service Level 2 Data Filtering SL2	✖	✖			RTCM3.1	EDAS
	SISNeT		✖			RTCA	SISNeT
	NTRIP	✖		✖	✖	RTCM 2.x, RTCM 3.1	NTRIP
Archive	FTP	✖	✖			RINEX, EMS, IONEX…	FTP