



EGNOS: free accuracy for mapping and GIS applications



European
Global Navigation
Satellite Systems
Agency



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

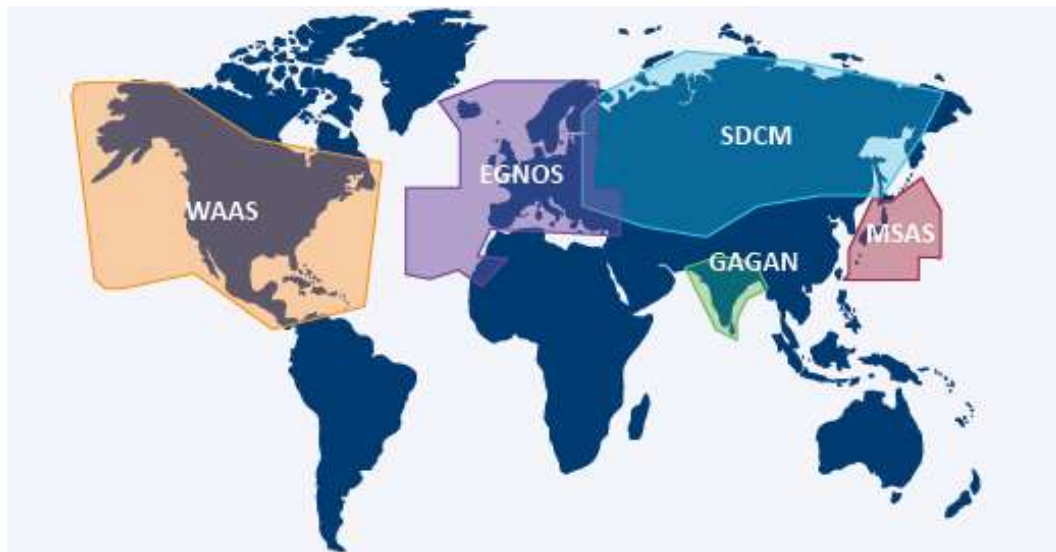
- **EGNOS basics: architecture and technical parameters**
- **EGNOS benefits for mapping and GIS**
- **EGNOS-enabled devices**
- **EGNOS applications and success stories**
- **EGNOS user support**
- **Questions and answers**

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



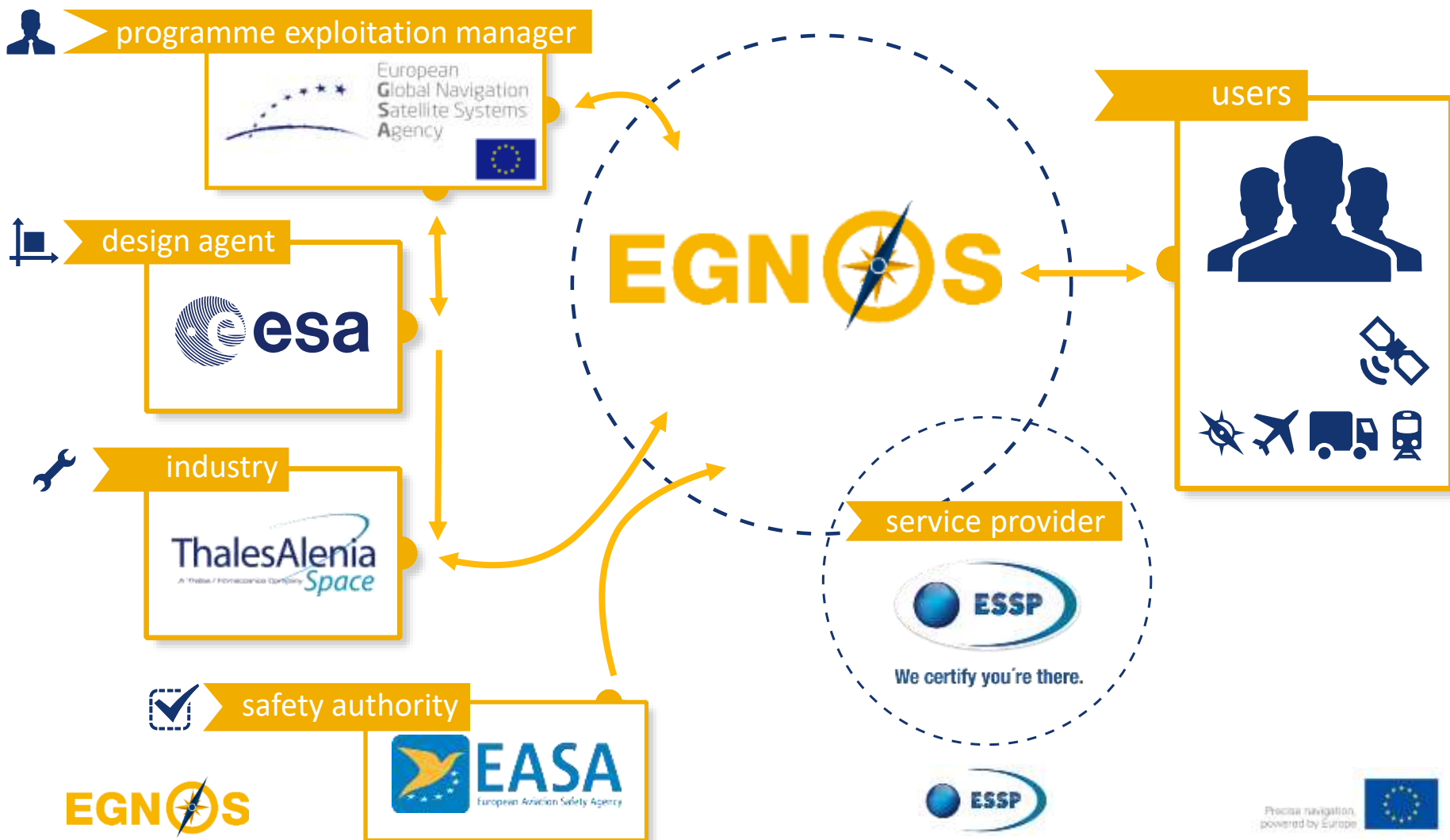
EGNOS

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

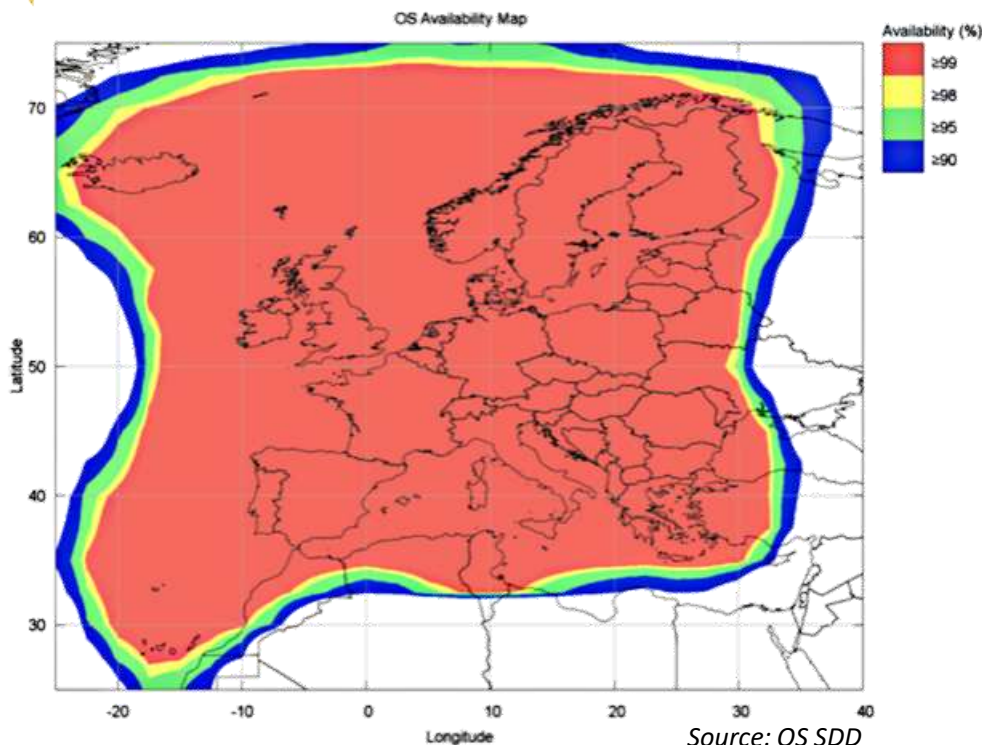


- EDAS service release: **26 July 2012**
- [EDAS Service Definition Document \(SDD\)](#)
- User registration is required
- Provision of EGNOS/GPS/GLONASS data through the Internet
- DGNSS and RTK corrections in the surroundings of the RIMS

EGNOS Open Service

EGNOS Open Service application area

Figure 6.1 EGNOS OS compliance area



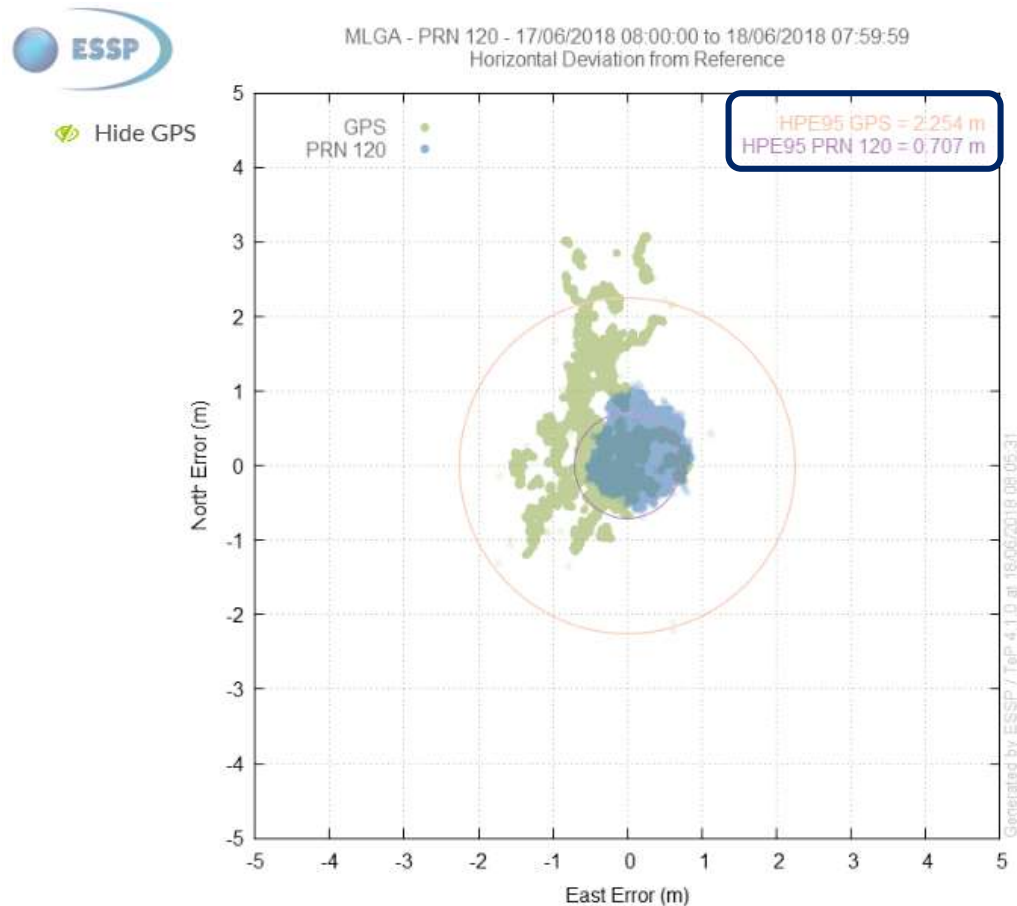
Measured accuracy

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 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

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

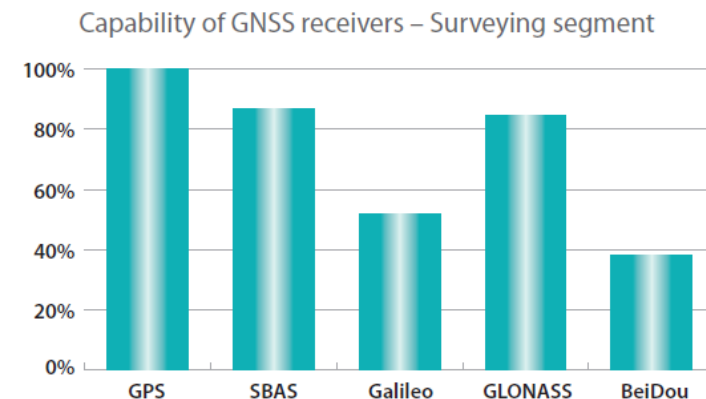
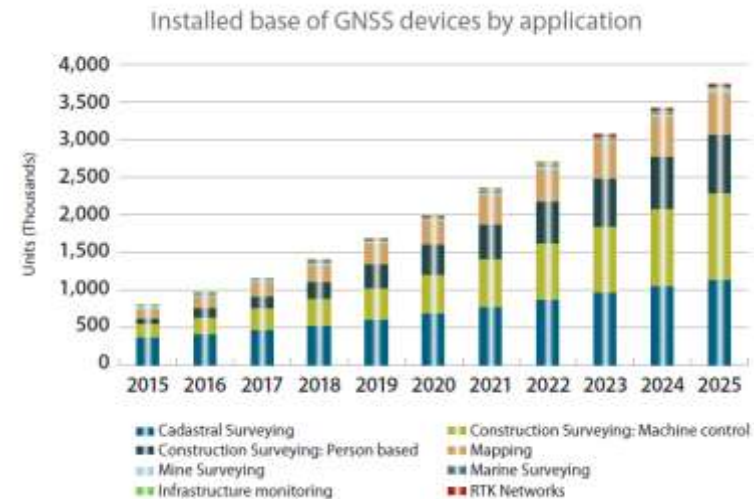


Table of contents

- EGNOS 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

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 an 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 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

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](#)

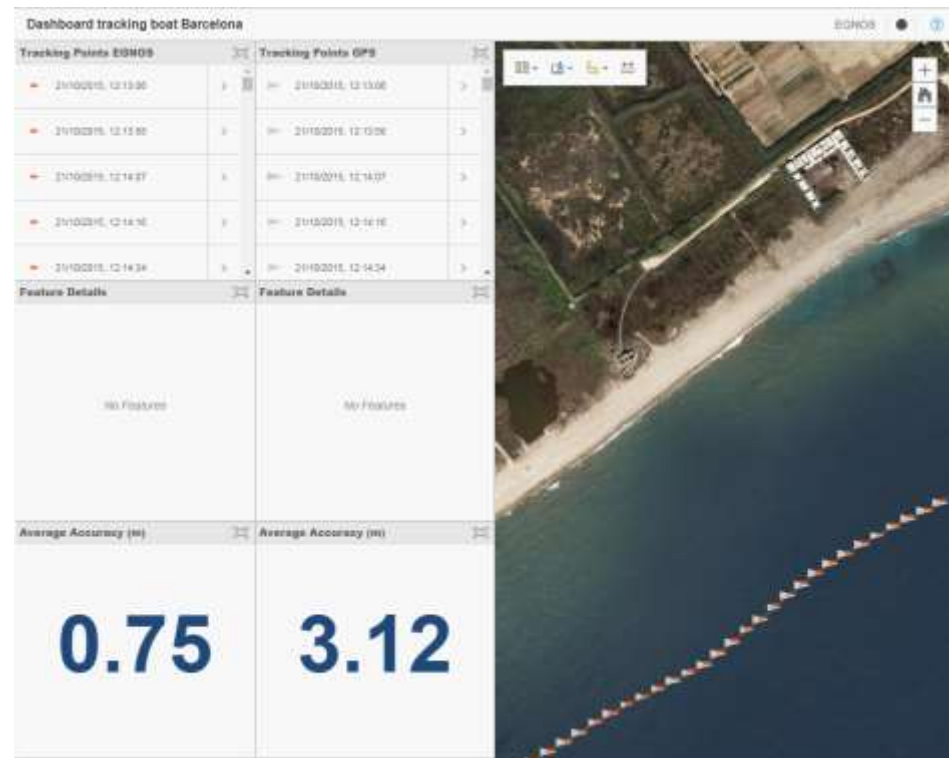
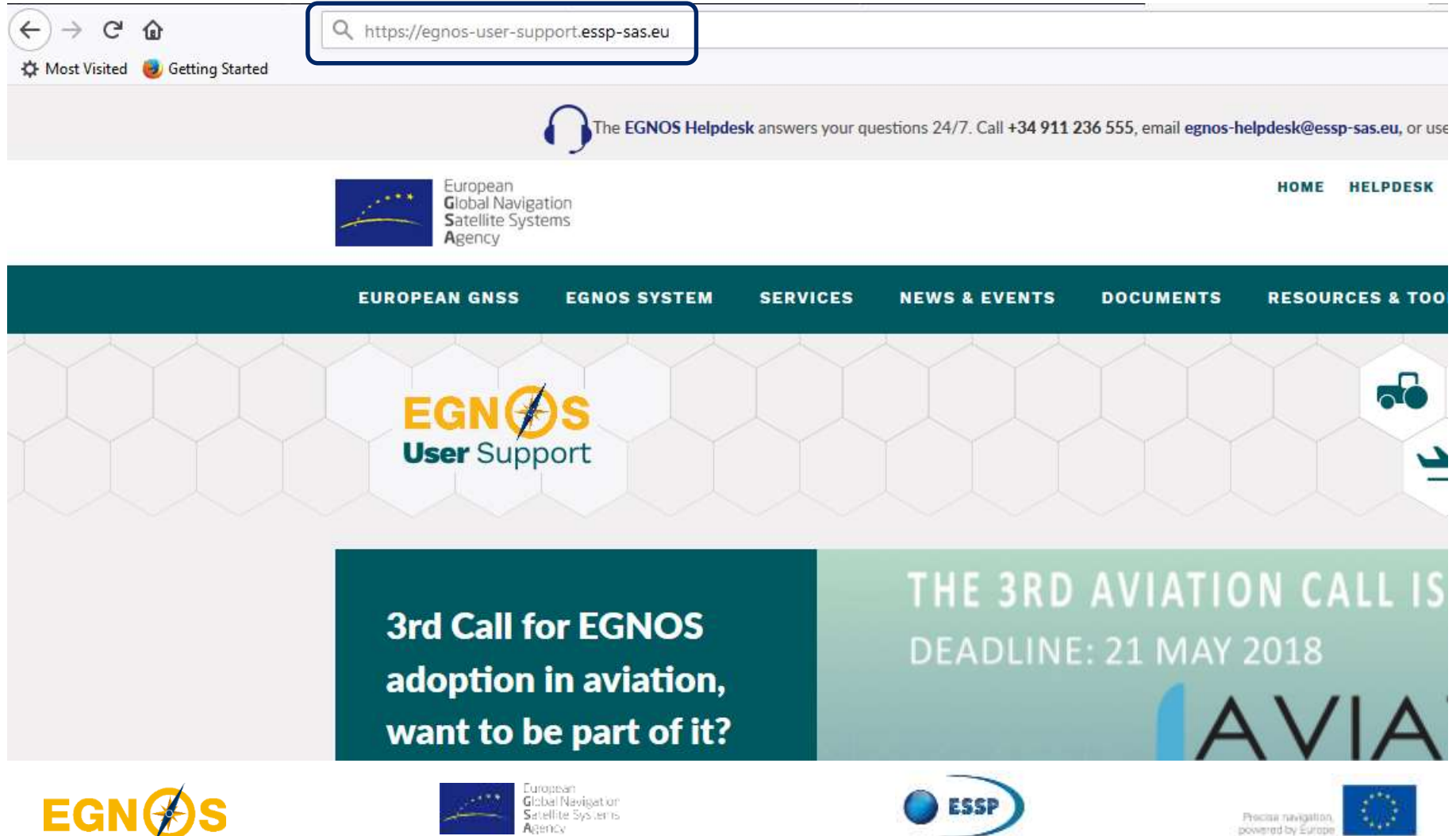


Table of contents

- EGNOS 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

EGNOS user support website



The screenshot shows a web browser window with the address bar displaying <https://egnos-user-support.essp-sas.eu>. Below the address bar, there is a navigation bar with links for **HOME** and **HELPDESK**. The main header features the European Global Navigation Satellite Systems Agency logo and a navigation menu with links: **EUROPEAN GNSS**, **EGNOS SYSTEM**, **SERVICES**, **NEWS & EVENTS**, **DOCUMENTS**, and **RESOURCES & TOOLS**. The main content area has a light gray background with a hexagonal pattern. It features the **EGNOS User Support** logo, a tractor icon, and a large banner for the **3rd Call for EGNOS adoption in aviation** with a deadline of **21 MAY 2018**. The footer includes the **EGNOS** logo, the European Global Navigation Satellite Systems Agency logo, the **ESSP** logo, and the text **Precise navigation, powered by Europe** with the European Union flag.

← → ↺ 🏠
⚙ Most Visited 🌐 Getting Started

🎧 The EGNOS Helpdesk answers your questions 24/7. Call +34 911 236 555, email egnos-helpdesk@essp-sas.eu, or use

European Global Navigation Satellite Systems Agency

HOME HELPDESK

EUROPEAN GNSS EGNOS SYSTEM SERVICES NEWS & EVENTS DOCUMENTS RESOURCES & TOOLS

EGNOS User Support

3rd Call for EGNOS adoption in aviation, want to be part of it?

THE 3RD AVIATION CALL IS DEADLINE: 21 MAY 2018

AVIA

EGNOS

European Global Navigation Satellite Systems Agency

ESSP

Precise navigation, powered by Europe

EGNOS app

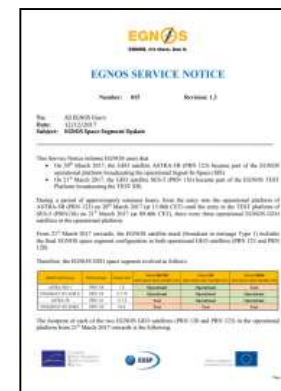


- Android: <https://play.google.com/store/apps/details?id=com.essp.egnosapp>
- iOS: <https://itunes.apple.com/us/app/egnos/id1346540596?l=es&ls=1&mt=8>

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](#)



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

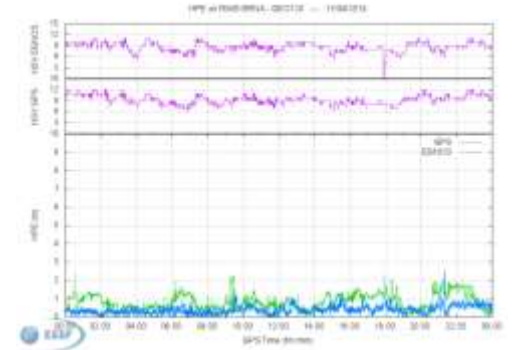
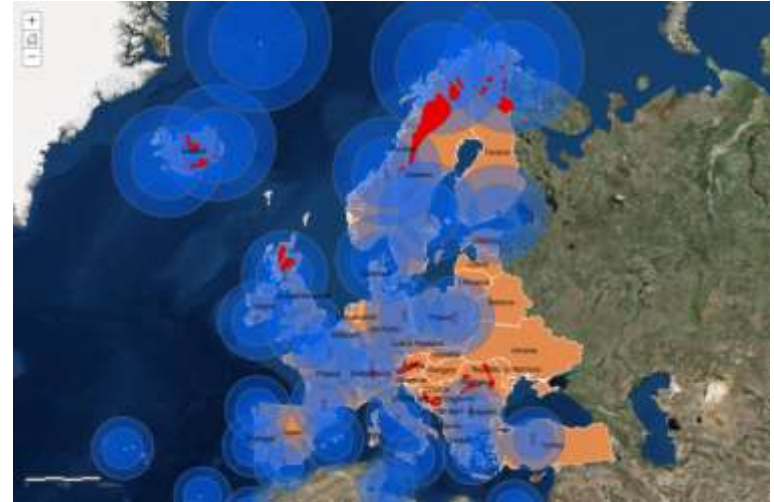


Table of contents

- EGNOS 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

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

QUESTIONS AND ANSWERS



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



egnos-helpdesk@essp-sas.eu

+34 911 236 555 (H24/7)

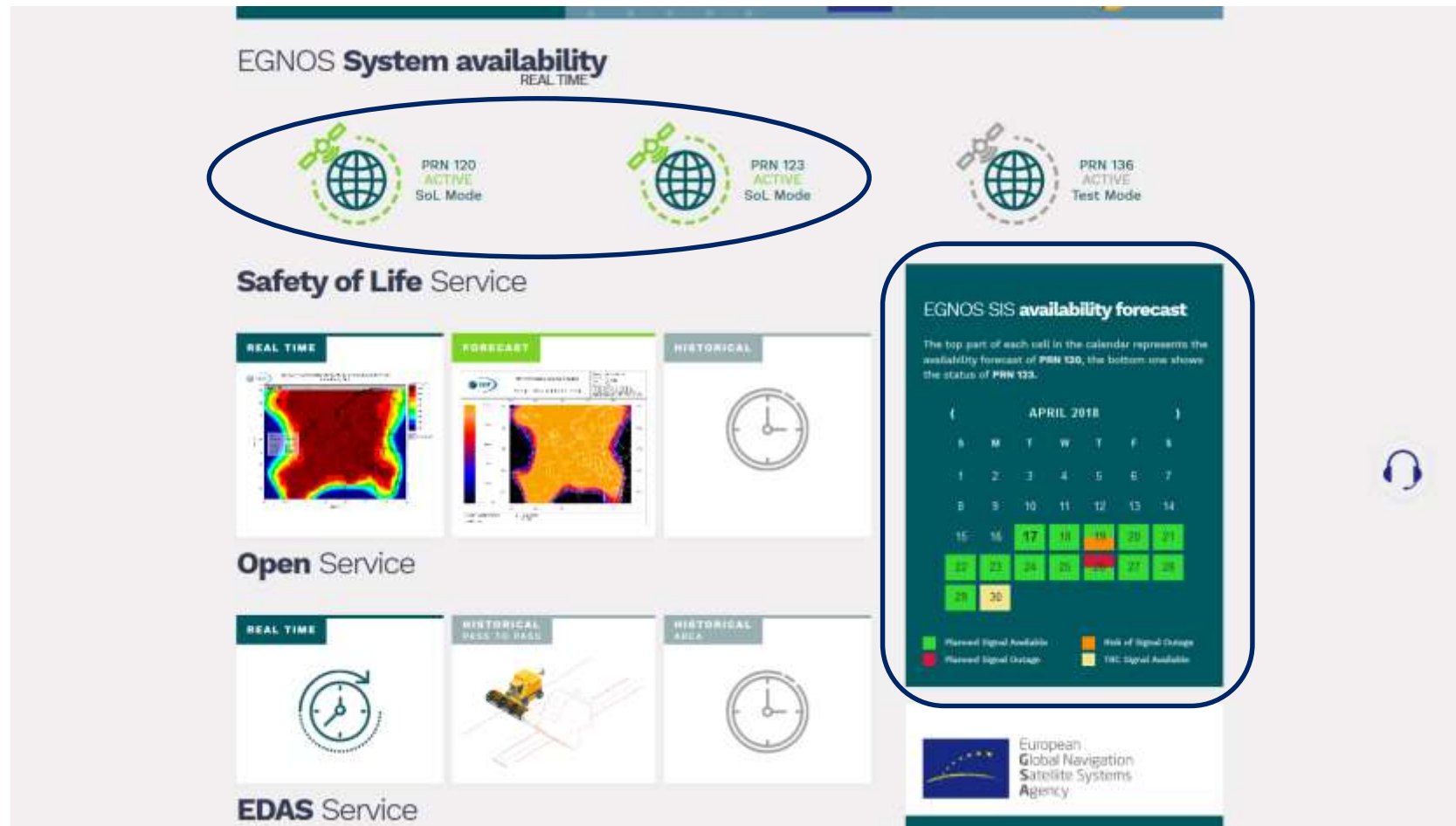


www.essp-sas.eu

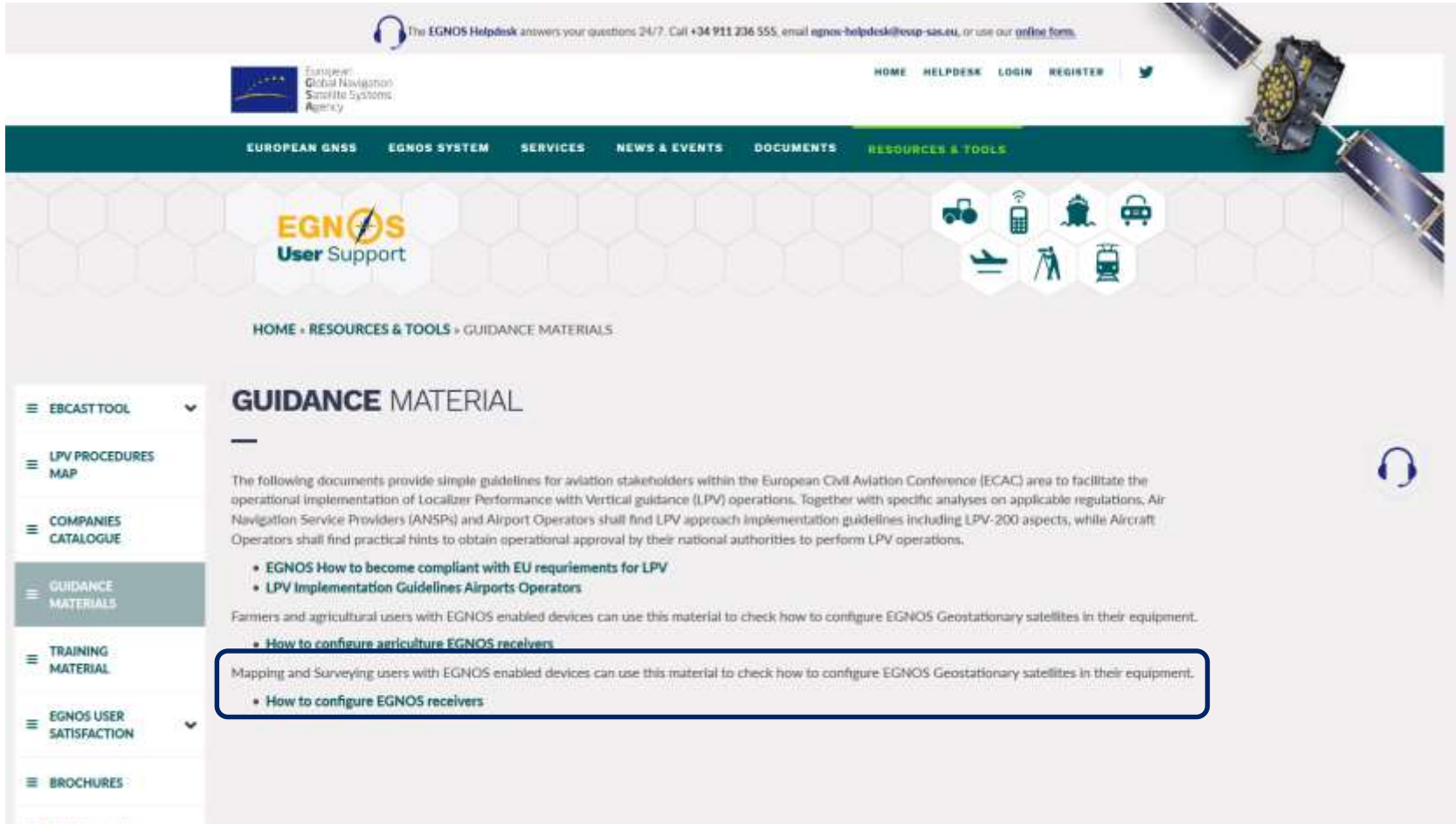


Corporate Video

EGNOS satellites availability



EGNOS adoption material



The screenshot shows the EGNOS User Support website. At the top, there is a header with the EGNOS logo and the text "EGNOS User Support". Below the header is a navigation bar with links: HOME, HELPDESK, LOGIN, REGISTER, and a Twitter icon. The main content area is titled "GUIDANCE MATERIAL" and contains a list of documents. A blue box highlights the document "How to configure EGNOS receivers".

The EGNOS Helpdesk answers your questions 24/7. Call +34 911 236 555, email egnos-helpdesk@europa-sat.eu, or use our [online form](#).

HOME HELPDESK LOGIN REGISTER

EUROPEAN GNSS EGNOS SYSTEM SERVICES NEWS & EVENTS DOCUMENTS RESOURCES & TOOLS

EGNOS User Support

HOME » RESOURCES & TOOLS » GUIDANCE MATERIALS

GUIDANCE MATERIAL

The following documents provide simple guidelines for aviation stakeholders within the European Civil Aviation Conference (ECAC) area to facilitate the operational implementation of Localizer Performance with Vertical guidance (LPV) operations. Together with specific analyses on applicable regulations, Air Navigation Service Providers (ANSPs) and Airport Operators shall find LPV approach implementation guidelines including LPV-200 aspects, while Aircraft Operators shall find practical hints to obtain operational approval by their national authorities to perform LPV operations.

- EGNOS How to become compliant with EU requirements for LPV
- LPV Implementation Guidelines Airports Operators

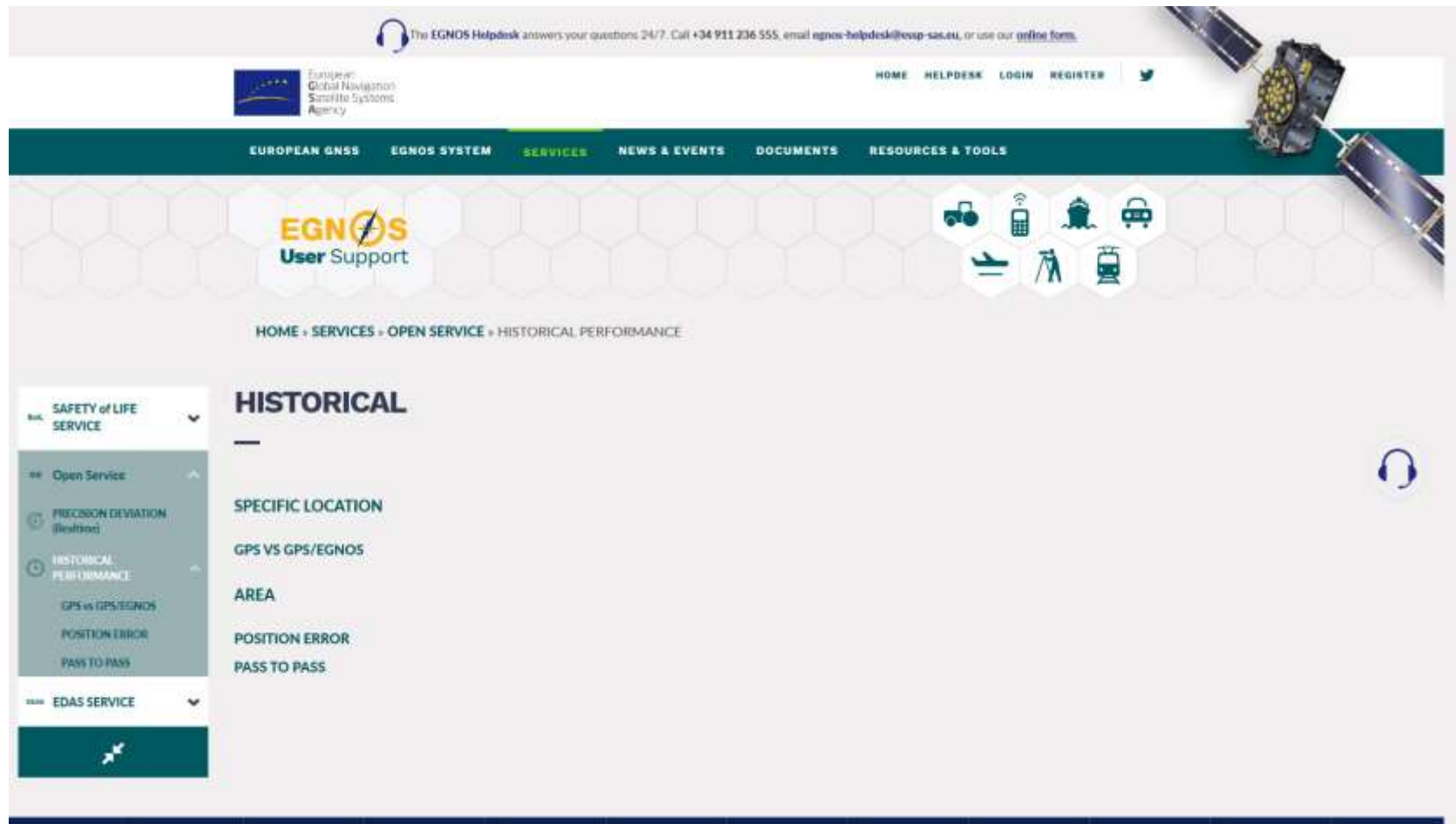
Farmers and agricultural users with EGNOS enabled devices can use this material to check how to configure EGNOS Geostationary satellites in their equipment.

- How to configure agriculture EGNOS receivers

Mapping and Surveying users with EGNOS enabled devices can use this material to check how to configure EGNOS Geostationary satellites in their equipment.

- How to configure EGNOS receivers

EGNOS historical performance



The screenshot displays the EGNOS User Support website interface. At the top, a banner features the EGNOS logo and the text "User Support". Below this, a navigation bar includes links for "HOME", "HELPDESK", "LOGIN", and "REGISTER". The main content area is titled "HISTORICAL" and contains a sidebar with a menu for "SAFETY of LIFE SERVICE" and "Open Service". The "Open Service" menu is expanded, showing options for "PRECISION DEVIATION (Realtime)", "HISTORICAL PERFORMANCE", "GPS vs GPS/EGNOS", "POSITION ERROR", and "PASS TO PASS". The "HISTORICAL PERFORMANCE" option is selected, leading to a page with the heading "HISTORICAL" and a sub-heading "SPECIFIC LOCATION". Below this, there are sections for "GPS VS GPS/EGNOS", "AREA", "POSITION ERROR", and "PASS TO PASS". The website also features a "The EGNOS Helpdesk answers your questions 24/7" banner at the top right and a "European Global Navigation Satellite Systems Agency" logo at the bottom left.

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)**

Step 4 of 4 Notifications Subscriptions

The subscription to the EGNOS Notifications Service enables the reception of different EGNOS degradations notifications via e-mail.

☒ **EGNOS System Notifications**

☐ SIS Outages Notifications

☒ ~~Aviation users~~

☐ APV-I Availability Degradation Notifications
Reporting by e-mail when the daily 99% APV-I availability is covering less than 80% of the APV-I service area as described in the applicable EGNOS Sat. Service Definition Document (SDD). The notifications are sent when planned degradations are foreseen or when unplanned degradations occur.

☐ LPV-200 Availability Degradation Notifications
Reporting by e-mail when the daily 99% LPV-200 availability is covering less than 80% of the LPV-200 service area as described in the applicable EGNOS Sat. Service Definition Document (SDD). The notifications are sent when planned degradations are foreseen or when unplanned degradations occur.

☒ **Open Service Notifications (for Maritime, Rail, Agriculture, Road, LBS and surveying & Mapping users)**

☐ Open Service Availability Degradation Notifications
Reporting by e-mail when the daily OS availability is lower than 99% for more than 50% of the RMS inside the EGNOS OS Service Definition Document (SDD). The notifications are sent when planned degradations are foreseen or when unplanned degradations occur.

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.

EDAS

	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