



# EGNOS: free accuracy for mapping and GIS applications



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Satellite Systems  
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# 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**



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# 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)



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# EGNOS system

**2 x MCC**

Mission  
Control  
Centres

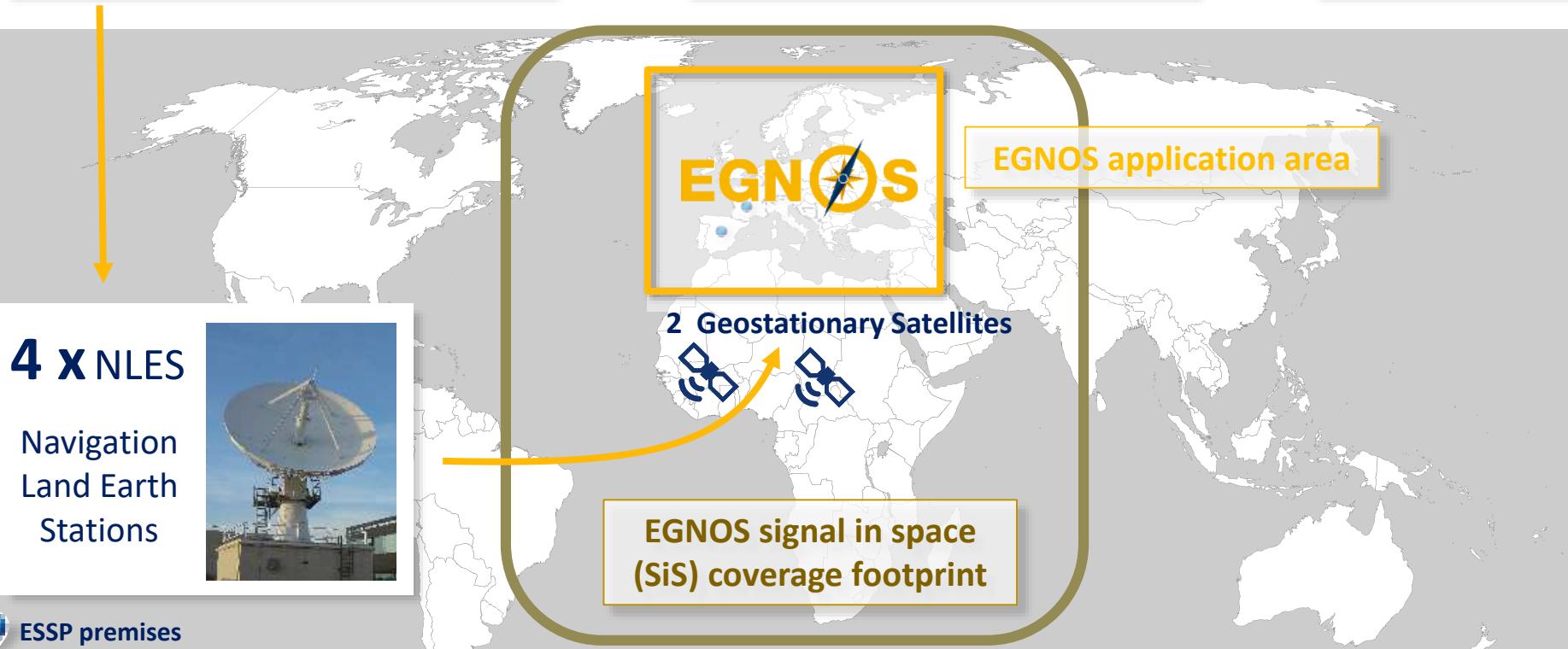


**39 x RIMS**

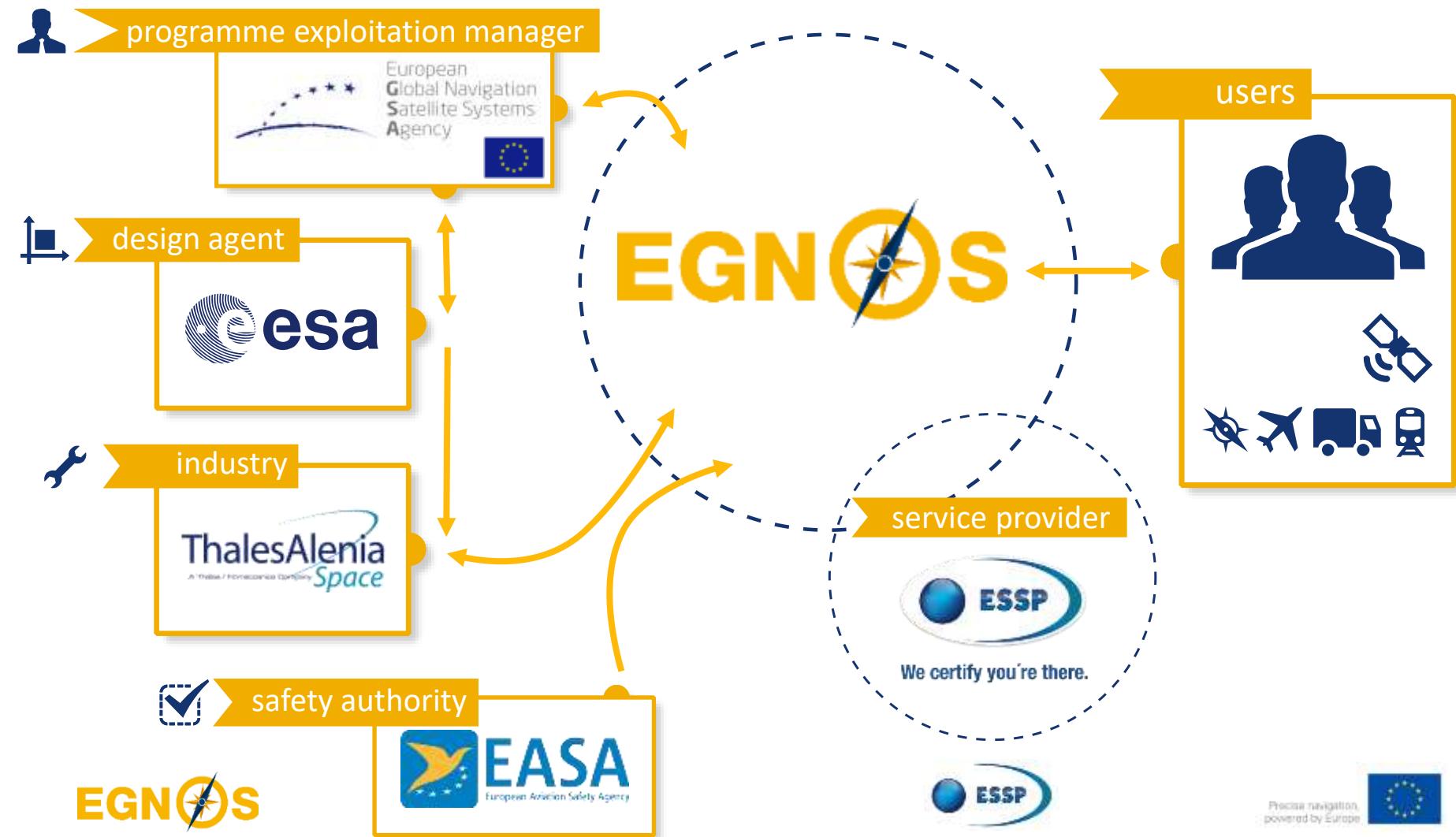
Ranging  
& Integrity  
Monitoring  
Stations



GPS signals



# 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

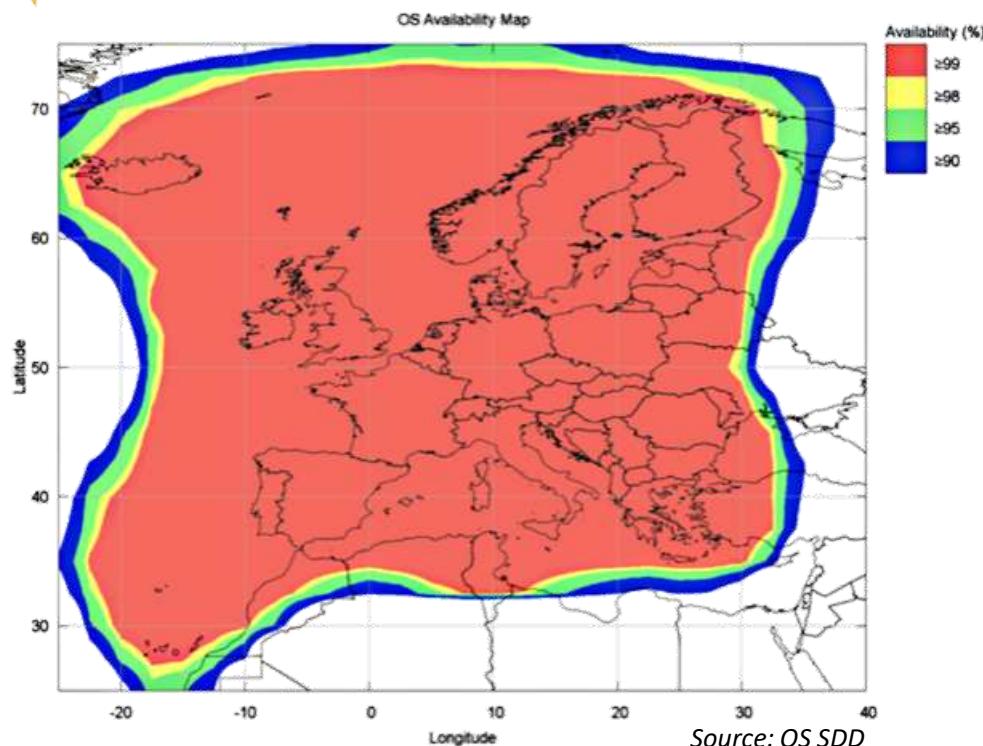


- EDAS service release: **26 July 2012**
- [EDAS Service Definition Document \(SDD\)](#)
- User registration is required
- Provision of EGNOS/GPS/GLONASS data through the Internet
- DGNSS and RTK corrections in the surroundings of the RIMS

# 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](#))



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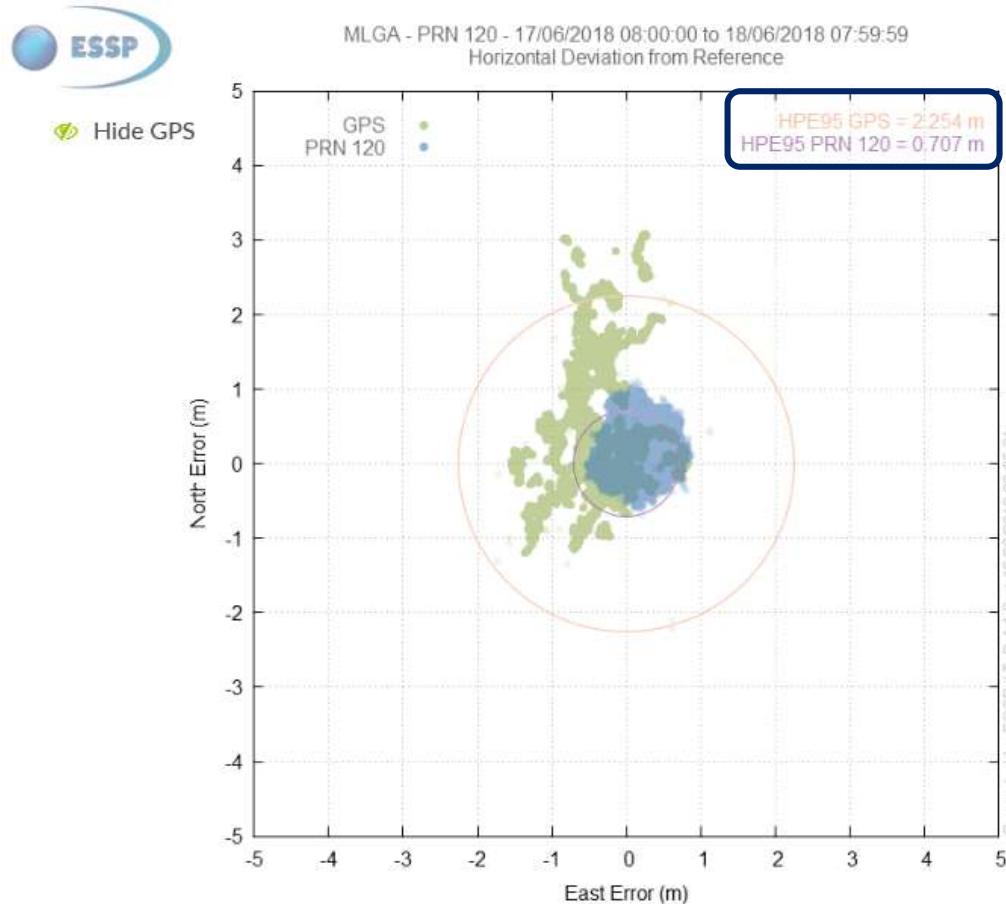


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# EGNOS augments GPS providing sub-metric horizontal accuracy

## EGNOS and GPS ([web](#))



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# 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

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# 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



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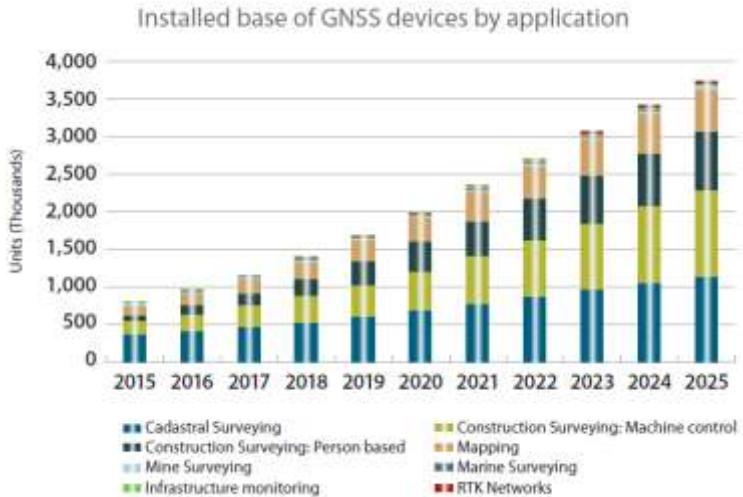


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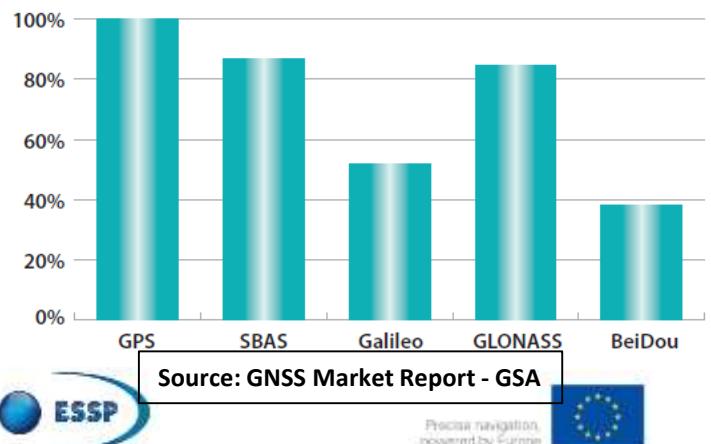


# EGNOS-enabled devices for mapping

- 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)



Capability of GNSS receivers – Surveying segment



# 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](mailto:egnos-helpdesk@essp-sas.eu)



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# 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: Georama (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. ”

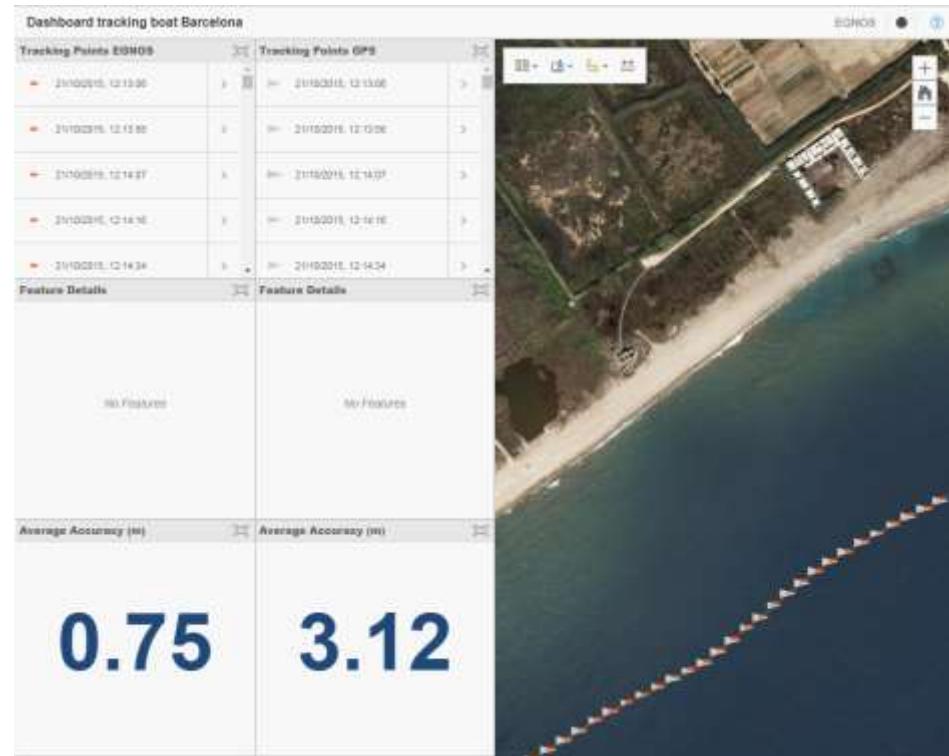
# Success story 3: Management of water supply networks maintenance

- 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](#)

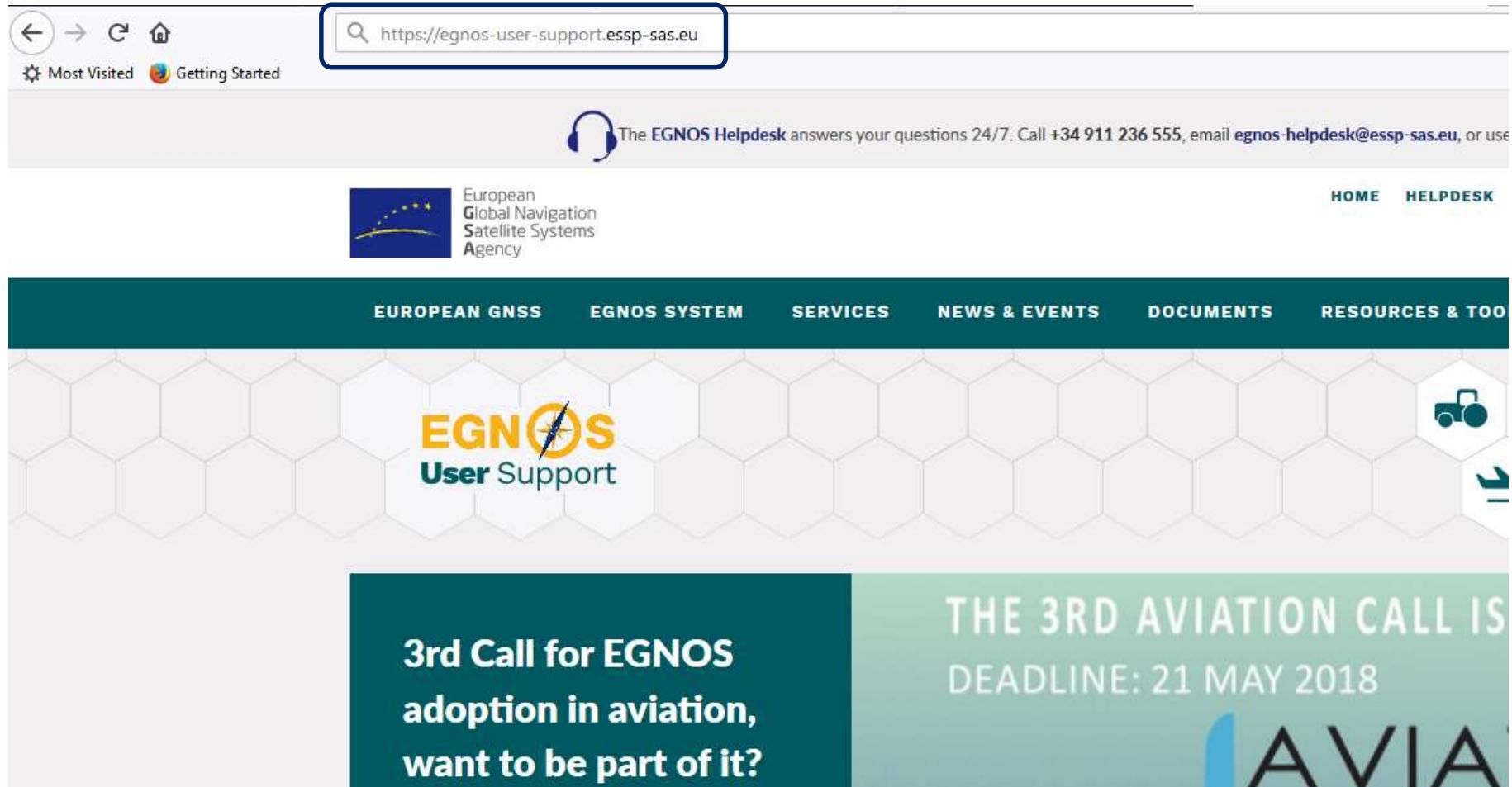


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# EGNOS user support website



The screenshot shows a web browser interface with the following details:

- Address Bar:** https://egnos-user-support.essp-sas.eu
- Toolbar:** Back, Forward, Stop, Home, Most Visited, Getting Started.
- Header:**
  - EGNOS Helpdesk:** A blue icon of a person with a speech bubble, followed by text: "The EGNOS Helpdesk answers your questions 24/7. Call +34 911 236 555, email [egnos-helpdesk@essp-sas.eu](mailto:egnos-helpdesk@essp-sas.eu), or use".
  - Navigation:** HOME, HELPDESK.
- Logo:** European Global Navigation Satellite Systems Agency (blue square with yellow stars and a green curve).
- Menu Bar:** EUROPEAN GNSS, EGNOS SYSTEM, SERVICES, NEWS & EVENTS, DOCUMENTS, RESOURCES & TOO
- Background:** A light gray hexagonal grid pattern.
- Left Column:** EGNOS User Support logo (yellow "EGNOS" with a blue "User Support" and a blue lightning bolt icon).
- Left Content:** "3rd Call for EGNOS adoption in aviation, want to be part of it?"
- Right Content:** "THE 3RD AVIATION CALL IS DEADLINE: 21 MAY 2018" followed by a large blue "AVIA" logo.
- Logos at Bottom:** EGNOS (yellow logo), European Global Navigation Satellite Systems Agency (blue square with yellow stars and a green curve), ESSP (blue logo with a blue circle and a blue swoosh), and European Union flag (blue square with yellow stars).



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# 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>



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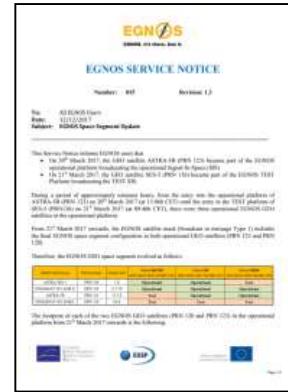
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# Summary of useful links

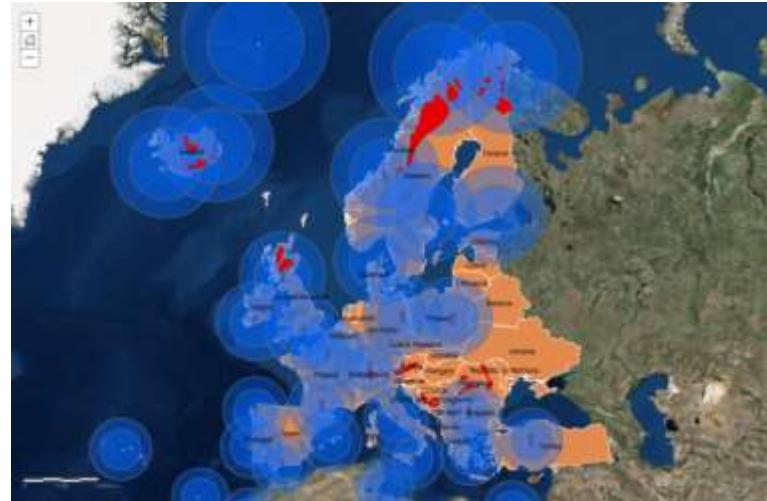
EGNOS User Support Website: <http://egnos-user-support.essp-sas.eu>

- 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



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# QUESTIONS AND ANSWERS



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



[egnos-helpdesk@essp-sas.eu](mailto:egnos-helpdesk@essp-sas.eu)

+34 911 236 555 (H24/7)



[www.essp-sas.eu](http://www.essp-sas.eu)



Corporate Video

# QUESTIONS AND ANSWERS



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[egnos-helpdesk@essp-sas.eu](mailto:egnos-helpdesk@essp-sas.eu)

+34 911 236 555 (H24/7)



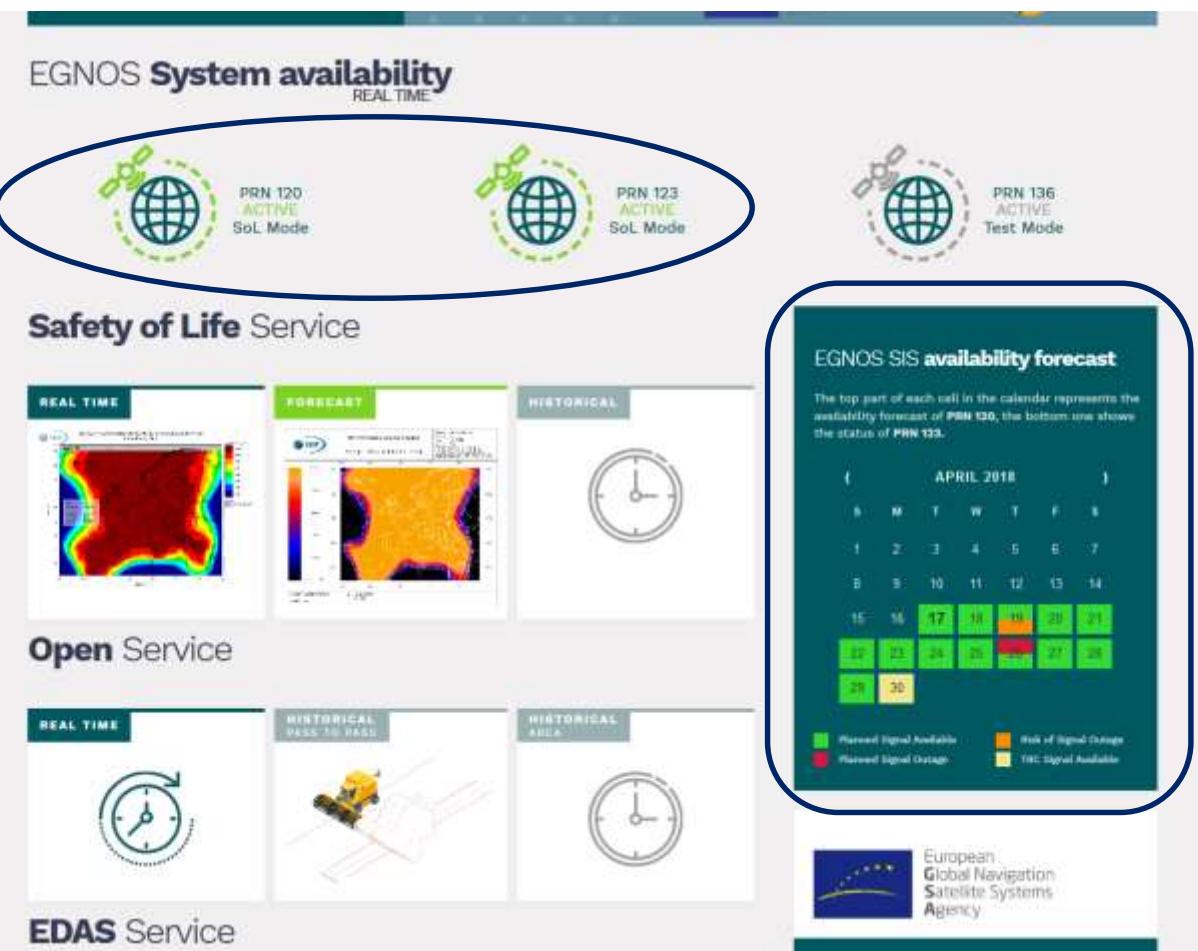
[www.essp-sas.eu](http://www.essp-sas.eu)



Corporate Video

# EGNOS satellites availability

**EGNOS System availability**  
REALTIME



APRIL 2018						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

**EGNOS System availability**  
REALTIME

**Safety of Life Service**

**Open Service**

**EDAS Service**

**EGNOS SIS availability forecast**

The top part of each cell in the calendar represents the availability forecast of PRN 130, the bottom one shows the status of PRN 133.

Legend:

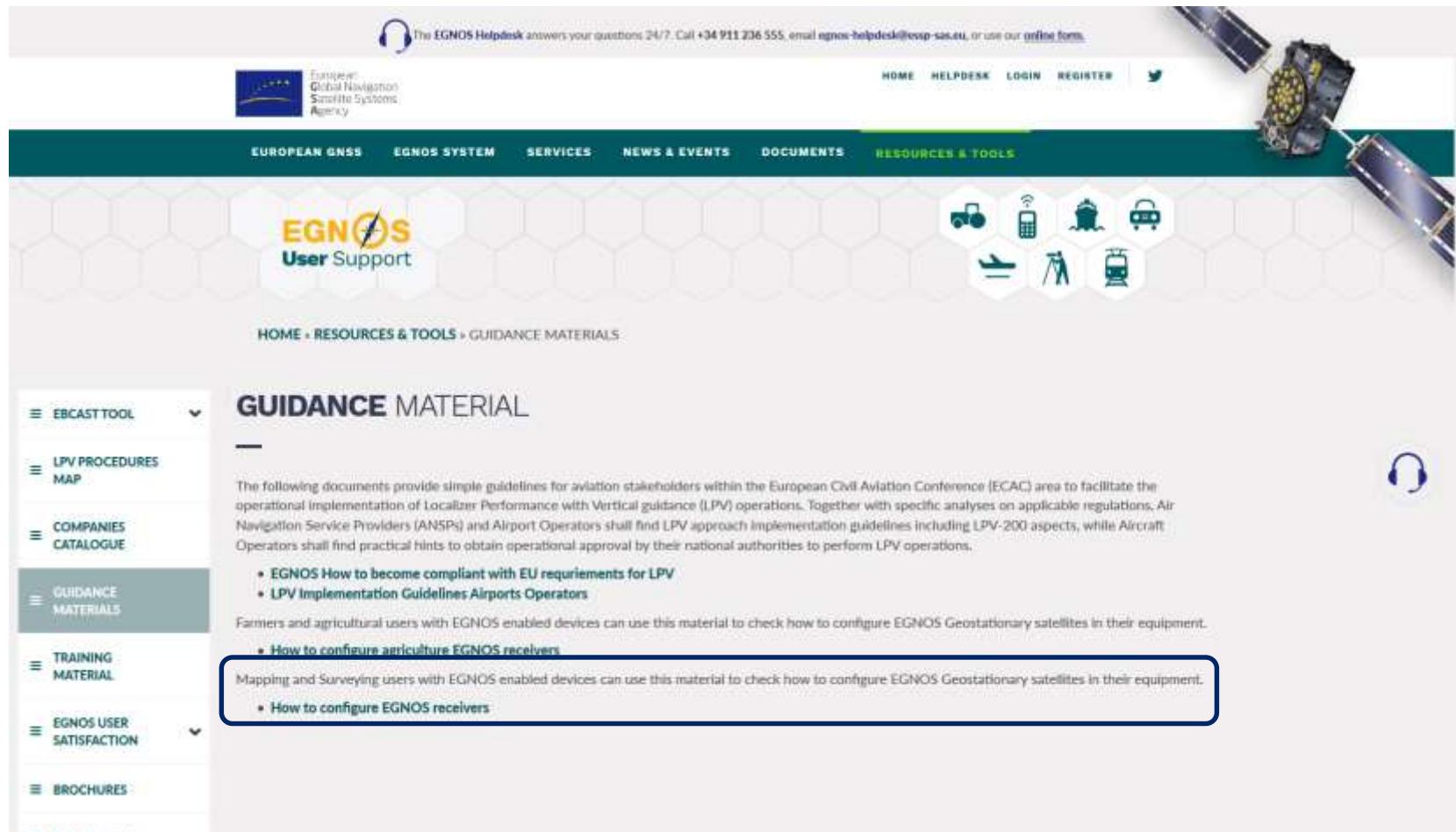
- Planned Signal Available (Green)
- Planned Signal Outage (Red)
- TEC Signal Available (Yellow)

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ESSP

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# EGNOS adoption material



The EGNOS Helpdesk answers your questions 24/7. Call +34 911 236 555, email [egnos-helpdesk@essp-sas.eu](mailto:egnos-helpdesk@essp-sas.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**

**EBCAST TOOL**

- LPV PROCEDURES MAP
- COMPANIES CATALOGUE
- GUIDANCE MATERIALS**
- TRAINING MATERIAL
- EGNOS USER SATISFACTION
- BROCHURES

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](#)





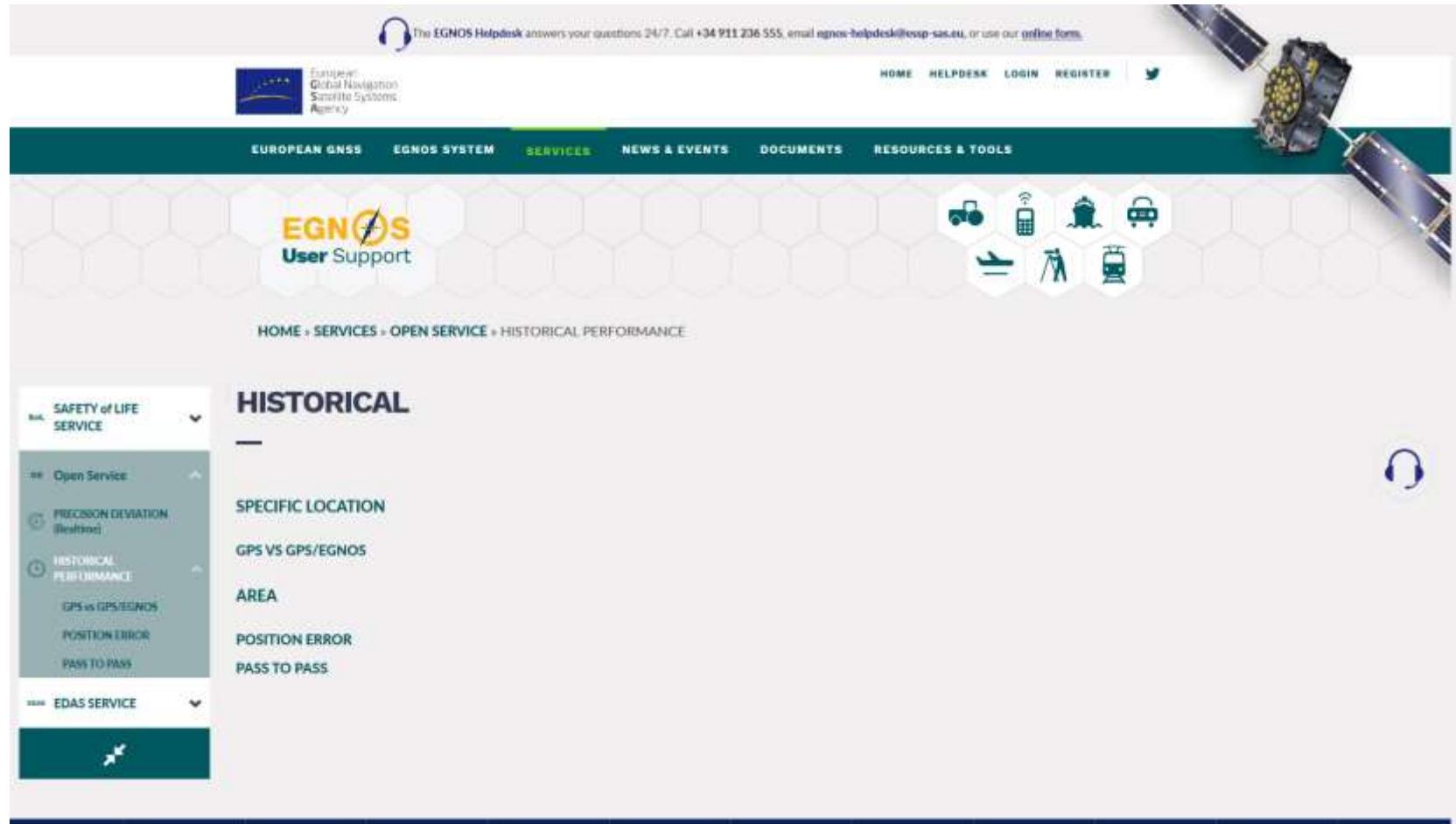
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# EGNOS historical performance



The screenshot shows the EGNOS User Support website. At the top, there is a navigation bar with links for HOME, HELPDESK, LOGIN, and REGISTER, along with a Twitter icon. The main content area features a banner for 'SAFETY of LIFE SERVICE' with icons for various applications like agriculture, mobile, energy, and transportation. Below this, a section for 'HISTORICAL' performance is displayed, with sub-sections for 'SPECIFIC LOCATION', 'GPS VS GPS/EGNOS', 'AREA', 'POSITION ERROR', and 'PASS TO PASS'. A sidebar on the left lists services: 'Open Service', 'PRECISION DEVIATION (Realtime)', 'HISTORICAL PERFORMANCE', 'GPS vs GPS/EGNOS', 'POSITION ERROR', 'PASS TO PASS', and 'EDAS SERVICE'. At the bottom, there are logos for EGNOS, the European GNSS Agency, ESSP, and the European Union.



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# 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)

A screenshot of the 'Step 4 of 4 Notifications Subscriptions' page. The page title is 'Step 4 of 4 Notifications Subscriptions'. Below it, a sub-instruction says: 'The subscription to the EGNOS Notifications Service enables the reception of different EGNOS degradations notifications via e-mail.' There are several sections with checkboxes:

- EGNOS System Notifications** (checkbox circled in blue)
- SIS Outages Notifications** (checkbox)
- Notification users** (checkbox circled in red)
- APV-1 Availability Degradation Notifications** (checkbox)
- LPV-200 Availability Degradation Notifications** (checkbox)
- Open Service Notifications (for Maritime, Rail, Agriculture, Road, LBS and surveying & Mapping users)** (checkbox circled in blue)
- Open Service Availability Degradation Notifications** (checkbox)

# 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