



# EGNOS: enhancing your UAV accuracy for free

**Alejandro Fransoy**

EGNOS Marketing and Promotion  
alejandro.fransoy@essp-sas.eu

Instituto de la Ingeniería de España  
Madrid, 28 Marzo 2017



European  
Global Navigation  
Satellite Systems  
Agency



Precise navigation,  
powered by Europe



ESSP-MOM-19478

# Contents

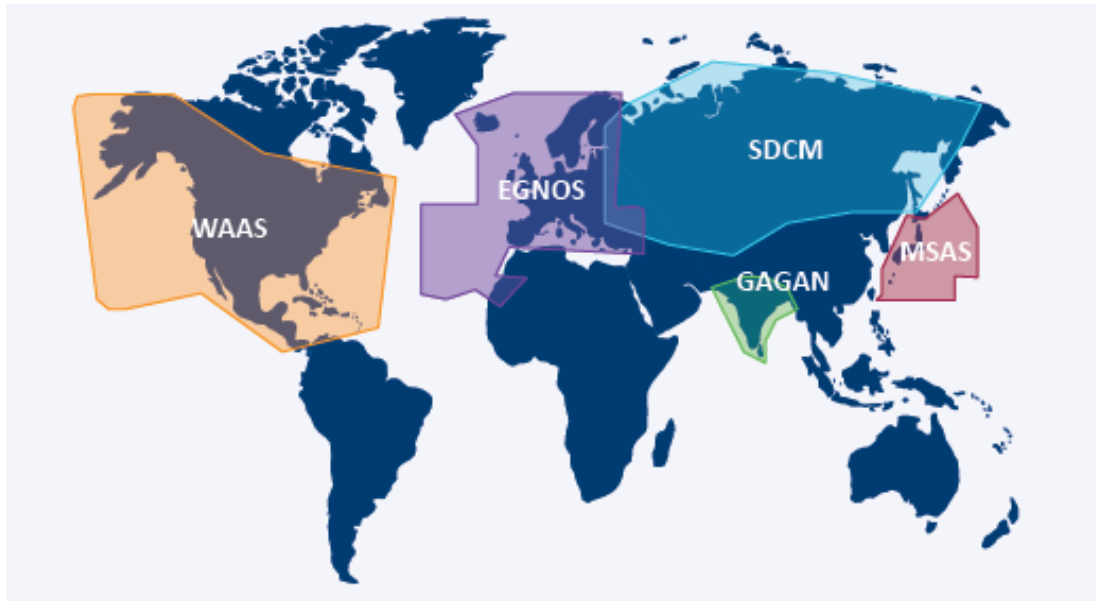
1. EGNOS and ESSP presentation
2. EGNOS Services
3. EGNOS Applications and Benefits
4. ESSP Capabilities and Support

# EGNOS was born for Aviation

**EGNOS** is the European SBAS augmenting GPS L1 signal over the ECAC area **for free**.

**EGNOS** designed to meet the ICAO Aviation requirements for all flight phases.

**EGNOS** is fully interoperable with all other SBAS worldwide.



# The EGNOS System

**2x** MCC

Mission  
Control  
Centres



**39x** RIMS

Ranging  
& Integrity  
Monitoring  
Stations



GPS signal

**4x** NLES

Navigation  
Land Earth  
Stations



**EGNOS**



2 GEO satellites

EGNOS is the European  
SBAS augmenting GPS L1  
signal over the ECAC area



ESSP premises

# Introduction to the ESSP



Our mission is to deliver **precise** and **safe** satellite positioning services

100 highly skilled professionals on 2 sites



deliver EGNOS services 24/7



operate and maintain EGNOS system



promote EGNOS and its applications



support and interface with users

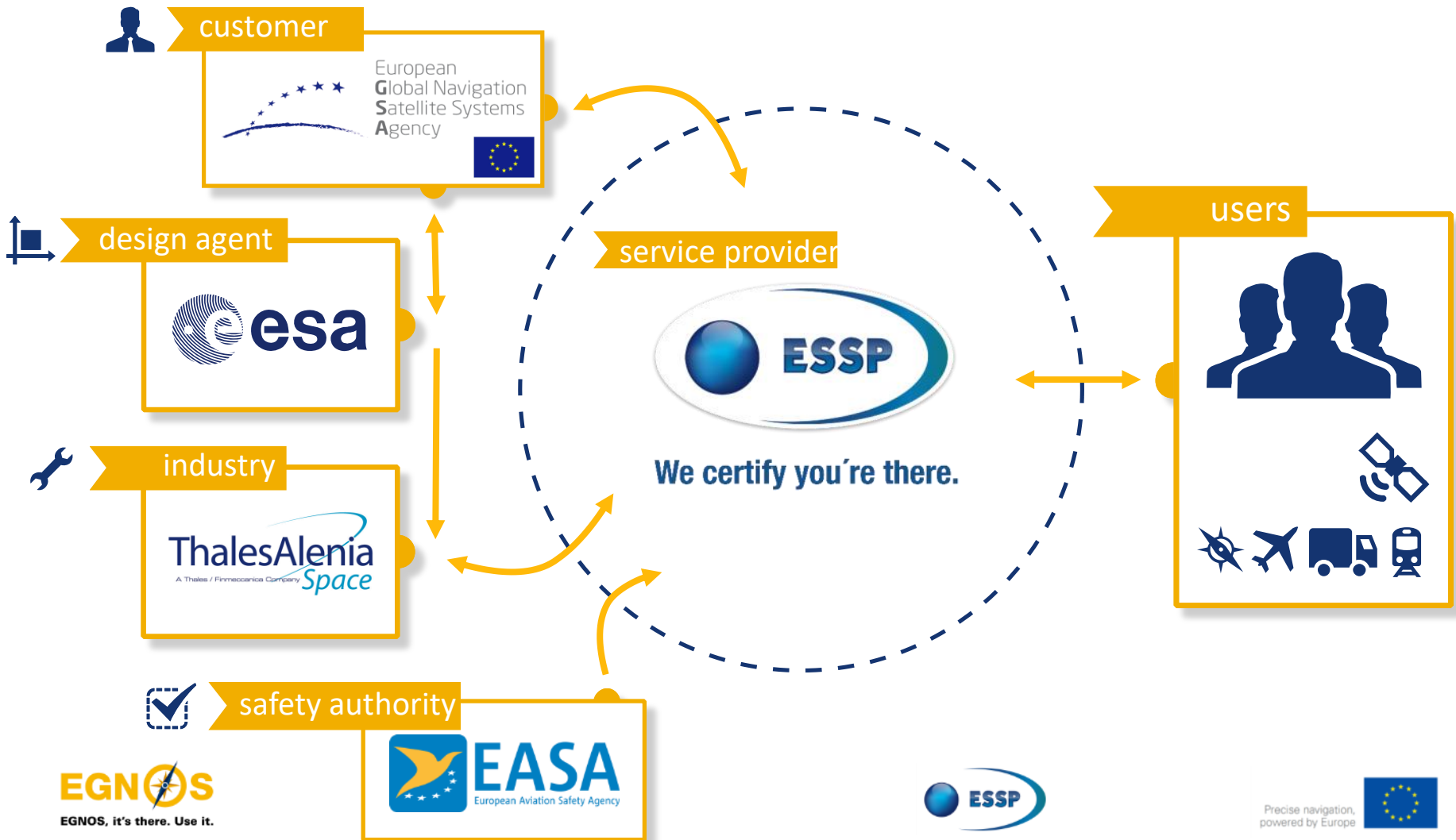


monitor & analyse EGNOS performance



support in the development of EGNOS-based applications

# ESSP within the EGNOS ecosystem



# Contents

1. EGNOS and ESSP presentation
2. EGNOS Services
3. EGNOS Applications and Benefits
4. ESSP Capabilities and Support



# Three EGNOS Services



**OS Open service**

targets mass market/general purpose applications enabling a huge variety of potential applications by improving the GPS standalone performances.  
The OS service was declared available in October 2009.

**OPEN SERVICE**

- Service Declaration: **1<sup>st</sup> October 2009.**
- [EGNOS OS Service Definition Document \(SDD\)](#)
- Agriculture, maritime, road, rail, LBS ...
- Open audience, not regulated framework applying



**SoL Safety of Life**

Provides the most stringent level of signal-in-space performance for all Safety of Life user communities in Europe, particularly defined for aviation.  
The EGNOS SoL Service is available since March 2011.

**SAFETY OF LIFE**

- Service Declaration: **2<sup>nd</sup> March 2011**
- [EGNOS SoL Service Definition Document \(SDD\)](#)
- Aviation: All phases of flight down to LPV
  - NAVIGATION Service provided under SES
  - Airspace Users equipped with EGNOS certified receivers (TSOS/ETSOs C144, C145 or C146)
  - Certified Air Navigation Service Providers (ANSPs) having signed an EGNOS Working Agreement (EWA) with ESSP
- Other domains (Rail, Maritime): under definition



**Data Access**

The EGNOS Data Access Service (EDAS): the ground based access (through the Internet) to EGNOS data in real time and also through a historical archive, which collects all the data generated by the EGNOS infrastructure. The EDAS service was declared in July 2012.

**EDAS**

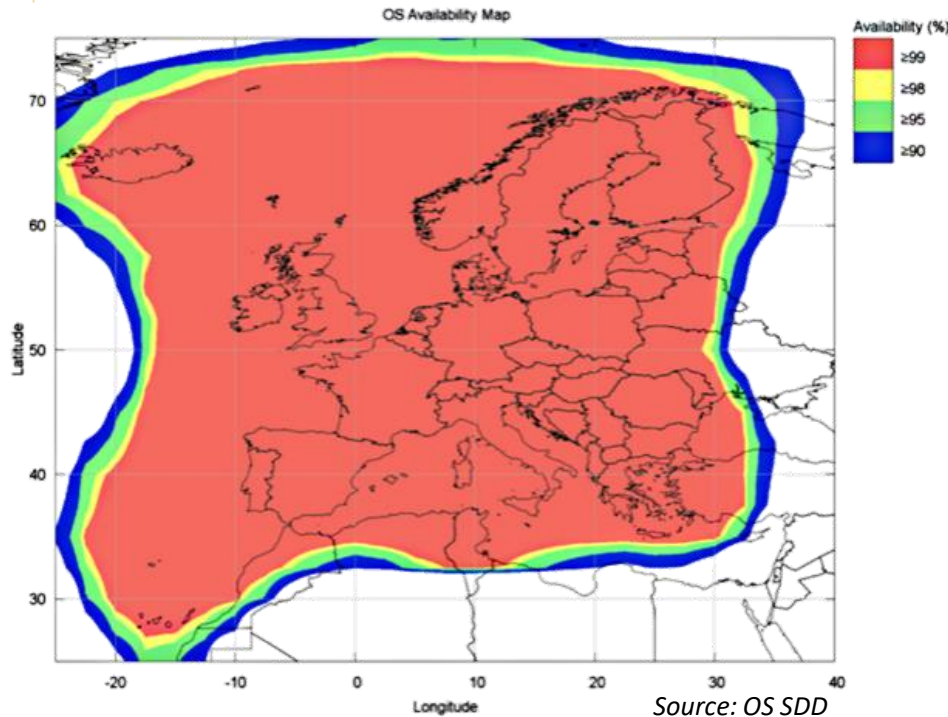
- Service Declaration: **26<sup>th</sup> July 2012**
- [EDAS Service Definition Document \(SDD\)](#)
- Commercial/professional multimodal applications
- Registered users, regulatory needs and maturity depending on application type and domain



# Open Service (OS)

## OS positioning compliance area

Figure 6.1 EGNOS OS compliance area



### Domain Accuracy

Horizontal (95%) 3m

Vertical (95%) 4m

**Commitment**

### Measured performances

Station	HNSE 95%	VNSE 95%
Aalborg	0,9	1,5
Athens	0,7	1,1
Berlin	0,9	1,3
...	...	...

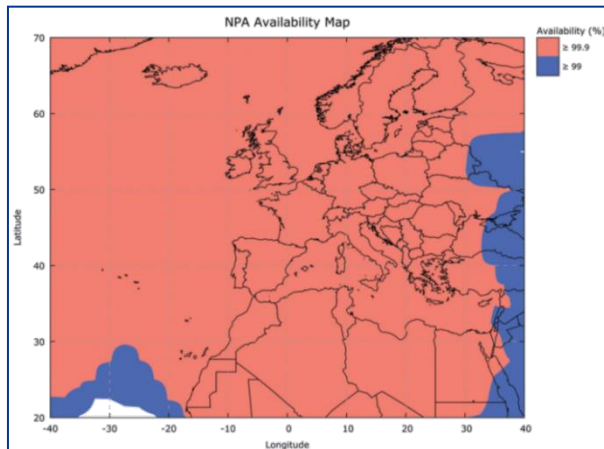
February 2017 ([link](#))

# EGNOS SoL Service Commitment

## Non Precision Approach

NPA APCH

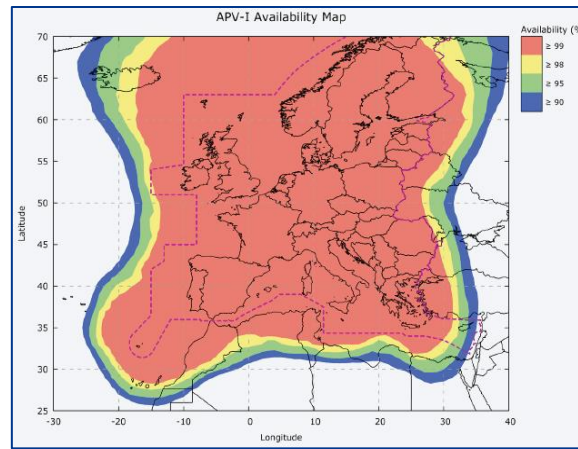
**NPA**



## Approach with Vertical Guidance

RNP APCH operations down to LPV minima (250ft)

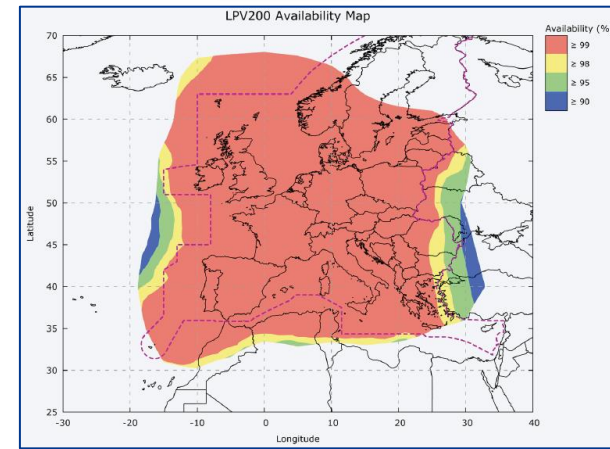
**APV-I**



## Precision Approach

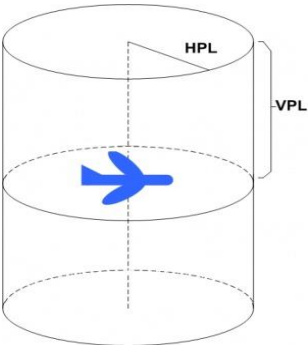
RNP APCH operations down to LPV minima (200ft). ILS CAT-I look alike.

**LPV-200**



Current SoL SDD commitment Maps (SoL SDD v3.1, Sept 2016)

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

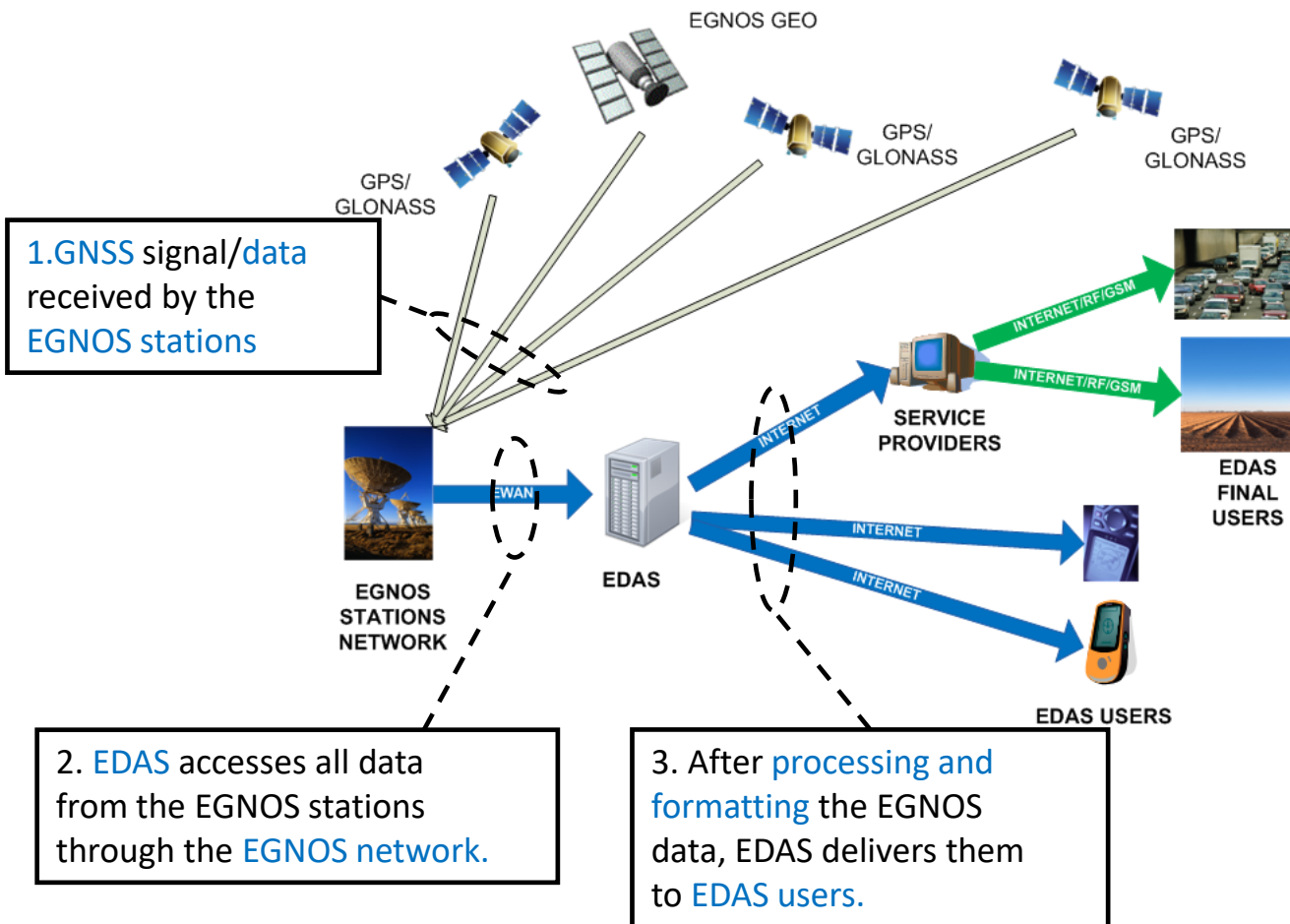


HPL = 553m  
VPL = N/A  
TTL = 10s

HPL = 40m  
VPL = 50m  
TTL = 10s

HPL = 40m  
VPL = 35m  
TTL = 6s

# EDAS (means to free RTK & DGPS network)



**DATA**  
 RIMS measurements  
 EGNOS messages  
 Ionospheric Information  
 EGNOS system status

**FORMAT / PROTOCOL**  
 ASN.1  
 RTCM (DGPS & RTK)  
 NTRIP  
 SISNET  
 RINEX  
 FTP

**TIME FRAME**  
 Real-time  
 Historical

# Contents

1. EGNOS and ESSP presentation
2. EGNOS Services
3. EGNOS Applications and Benefits
4. ESSP Capabilities and Support

# Main benefits of EGNOS for RPAS

(Courtesy: GSA)



Satellite Navigation (PinS) is an opportunity for RPAS operators



Better navigation performance through higher accuracy, specially vertical



Improved safety through position integrity in ADS-B source



Robust geofencing thanks to positioning integrity and reliability



Low-level routes, lower protection volumes, more opportunities under challenging environments



Easier integration into manned airspace through the use of compatible concept of operations



**24/7**  
service



**improved**  
safety



**more**  
efficient

# EGNOS benefits in other market segments



Makes navigation more accurate, reliable and available and thus easier and safer



Reduces infrastructure costs without compromising the safety in signalling applications



Enables high-precision spraying of fertilisers and pesticides, reducing the amount of chemicals



Improves accuracy without high investments in ground infrastructure

# Contents

1. EGNOS and ESSP presentation
2. EGNOS Services
3. EGNOS Applications and Benefits
4. ESSP Capabilities and Support



# ESSP Capabilities and Support

- In kind support to companies interested in making use of EGNOS services
- Support in accessing EC/SESAR/GSA funding schemes
- Possibility to collaborate in EU funded R&D programs

# EGNOS Generic User Interfaces

For more information on EGNOS...

- EGNOS User Support Website: <http://egnos-user-support.essp-sas.eu>
- EGNOS Helpdesk  
[egnos-helpdesk@essp-sas.eu](mailto:egnos-helpdesk@essp-sas.eu) / +34 911 236 555 (24/7)
- EGNOS Adoption  
Guidance/training material, adoption tools...  
[https://egnos-user-support.essp-sas.eu/new\\_egnos\\_ops/content/egnos-adoption](https://egnos-user-support.essp-sas.eu/new_egnos_ops/content/egnos-adoption)
- EGNOS performances  
Real-time service performances and SIS status  
[https://egnos-user-support.essp-sas.eu/new\\_egnos\\_ops/egnos\\_system\\_realtime](https://egnos-user-support.essp-sas.eu/new_egnos_ops/egnos_system_realtime)  
Monthly Performance Reports  
[https://egnos-user-support.essp-sas.eu/new\\_egnos\\_ops/content/monthly-performance-reports](https://egnos-user-support.essp-sas.eu/new_egnos_ops/content/monthly-performance-reports)  
Yearly Service Provision Reports  
[https://egnos-user-support.essp-sas.eu/new\\_egnos\\_ops/content/egnos-yearly-reports](https://egnos-user-support.essp-sas.eu/new_egnos_ops/content/egnos-yearly-reports)  
EGNOS Bulletin (quarterly)  
[https://egnos-user-support.essp-sas.eu/new\\_egnos\\_ops/content/quarterly-bulletin](https://egnos-user-support.essp-sas.eu/new_egnos_ops/content/quarterly-bulletin)



EGNOS, it's there. Use it.



**QUESTIONS?**



EGNOS, it's there. Use it.



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



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



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

+34 911 236 555 (H24/7)



Corporate Video

**THANK YOU!**