

EGNOS SERVICE PROVISION

JOINT ACAC/ICAO MID WORKSHOP ON GNSS
RABAT- 07/11/2017



We certify you're there.

The **EGNOS** Service Provider¹



We certify you're there.



EGNOS System:
how does it work?



EGNOS: how
Service
Provision works



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European Geostationary Navigation Overlay Service



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



EGNOS was born to meet stringent Aviation requirements (ICAO) for all phases of flight.

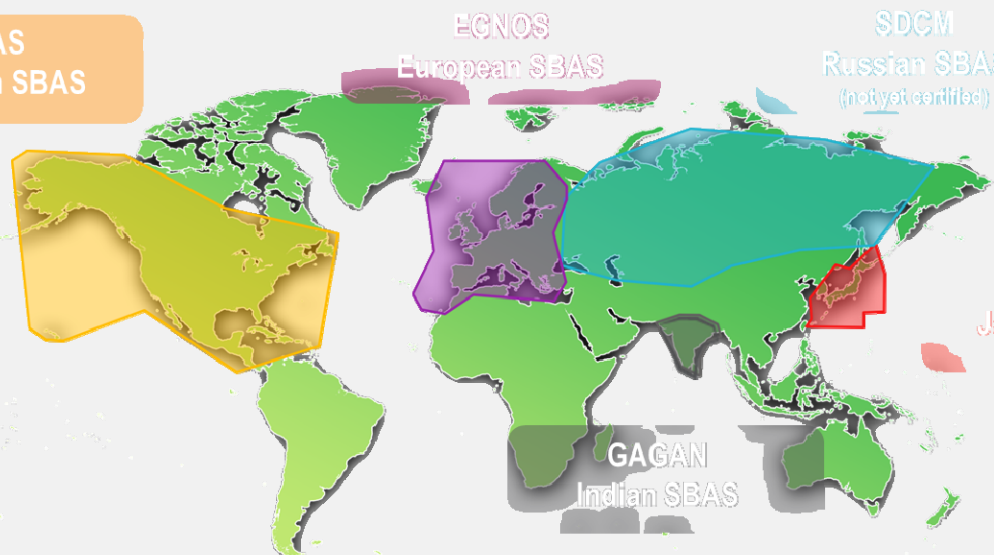


EGNOS might also be used in a wide range of other application domains.



EGNOS is fully interoperable with all other SBAS worldwide.

WAAS
American SBAS





IFR

Increases airport accessibility

SAFETY

↑ SAFETY due to INSTRUMENTAL aid

Reduces environmental impact

SBAS

Higher performances → Lower minima

Not Temperature/Pressure dependent

LPV Procedure is ILS look alike

No RAIM check

No ground infrastructure at the airport





EGNOS System overview

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2x MCC

Mission Control Centers



40x RIMS

Ranging & Integrity Monitoring Stations



GPS signal

6x NLES

Navigation Land Earth Stations



EGNOS



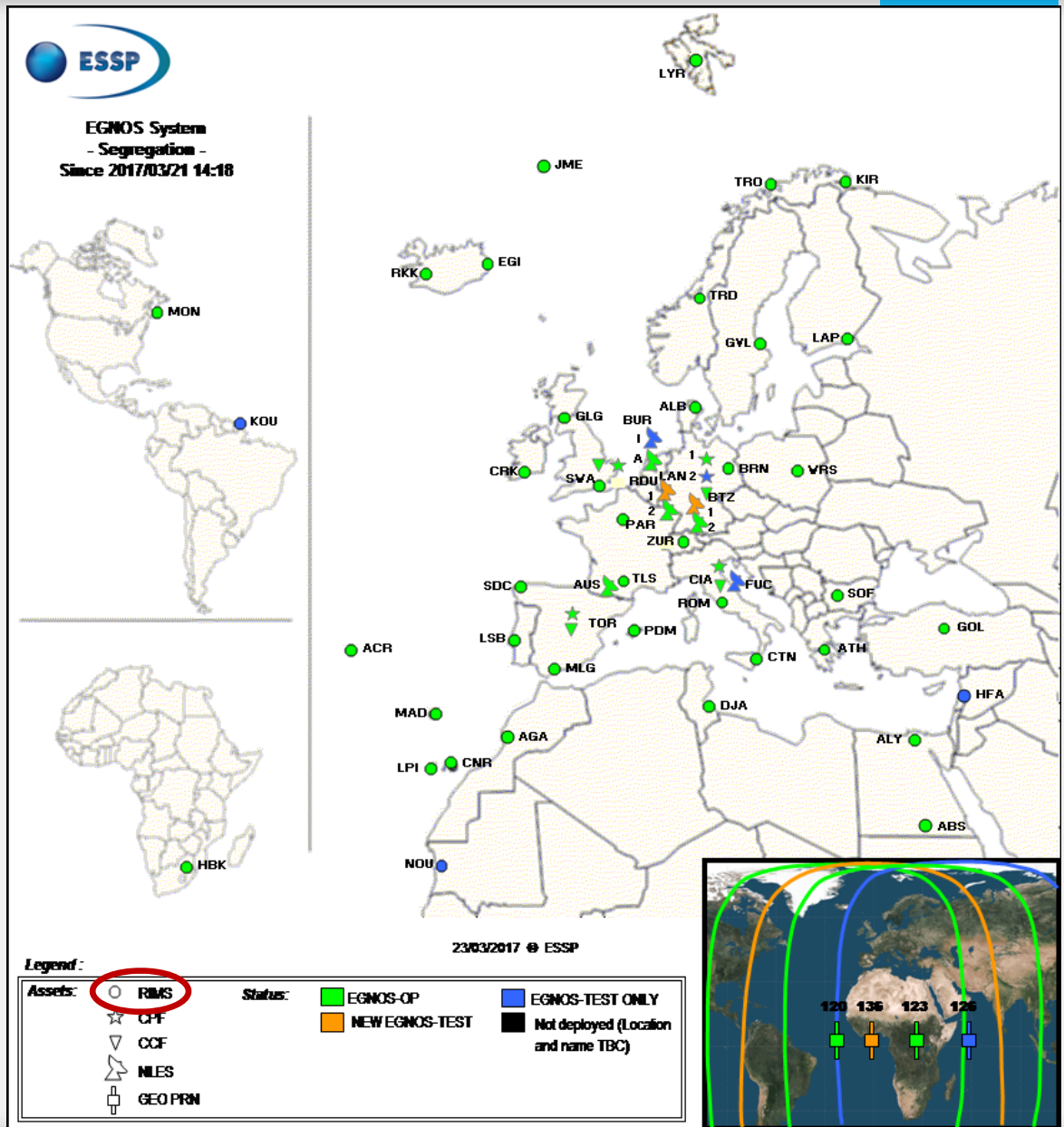
2 GEO satellites in EGNOS OP

RIMS



RIMS

The **RIMS** (*Ranging and Integrity Monitoring Stations*) receives the GPS, Glonass and GEO signals, the main source of the data used by the system, sending the information to the MCCs

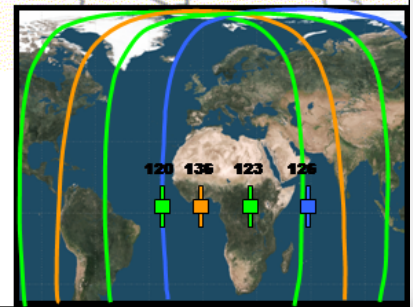
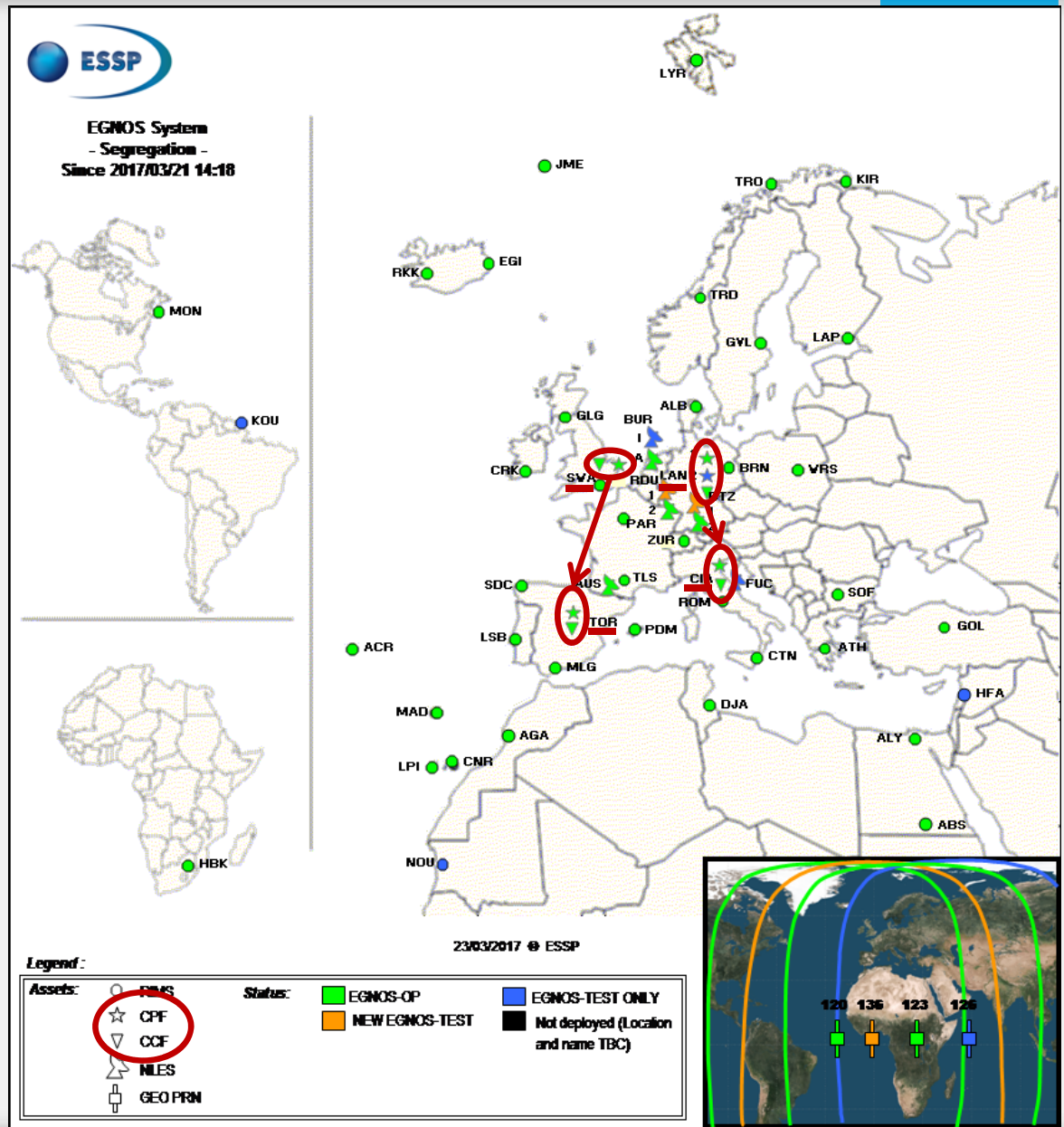


MCC



The CPF (Central Processing Facility) processes the RIMS data and constructs the correction and integrity messages sent to NLES to be uplinked to the GEO.

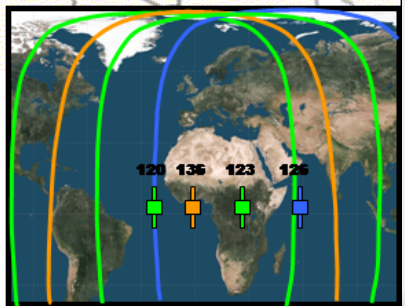
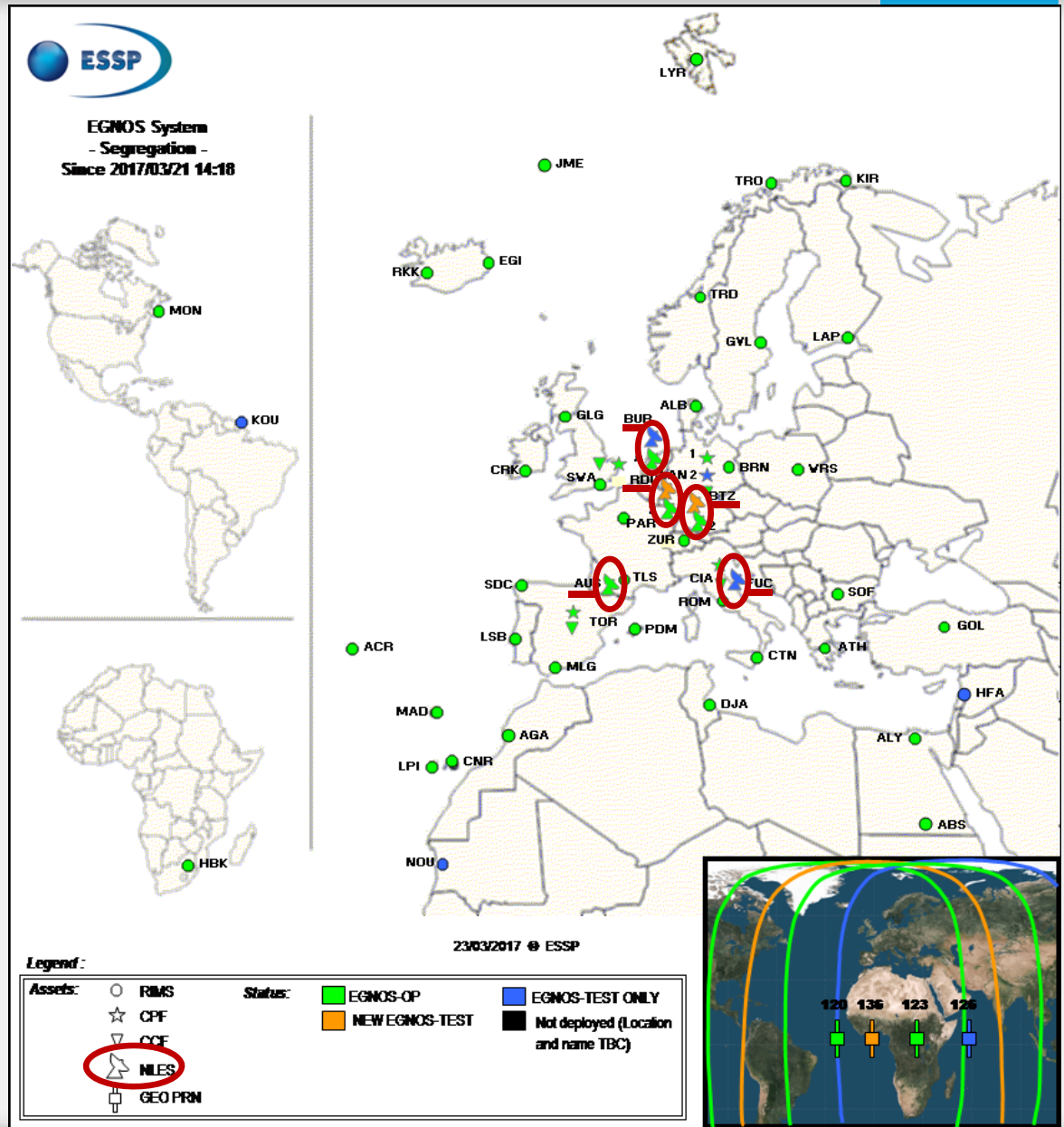
The CCF (Central Control Facility) provides Monitoring and Control of the Ground Segment and perform data archiving of all input data of the system.



NLES

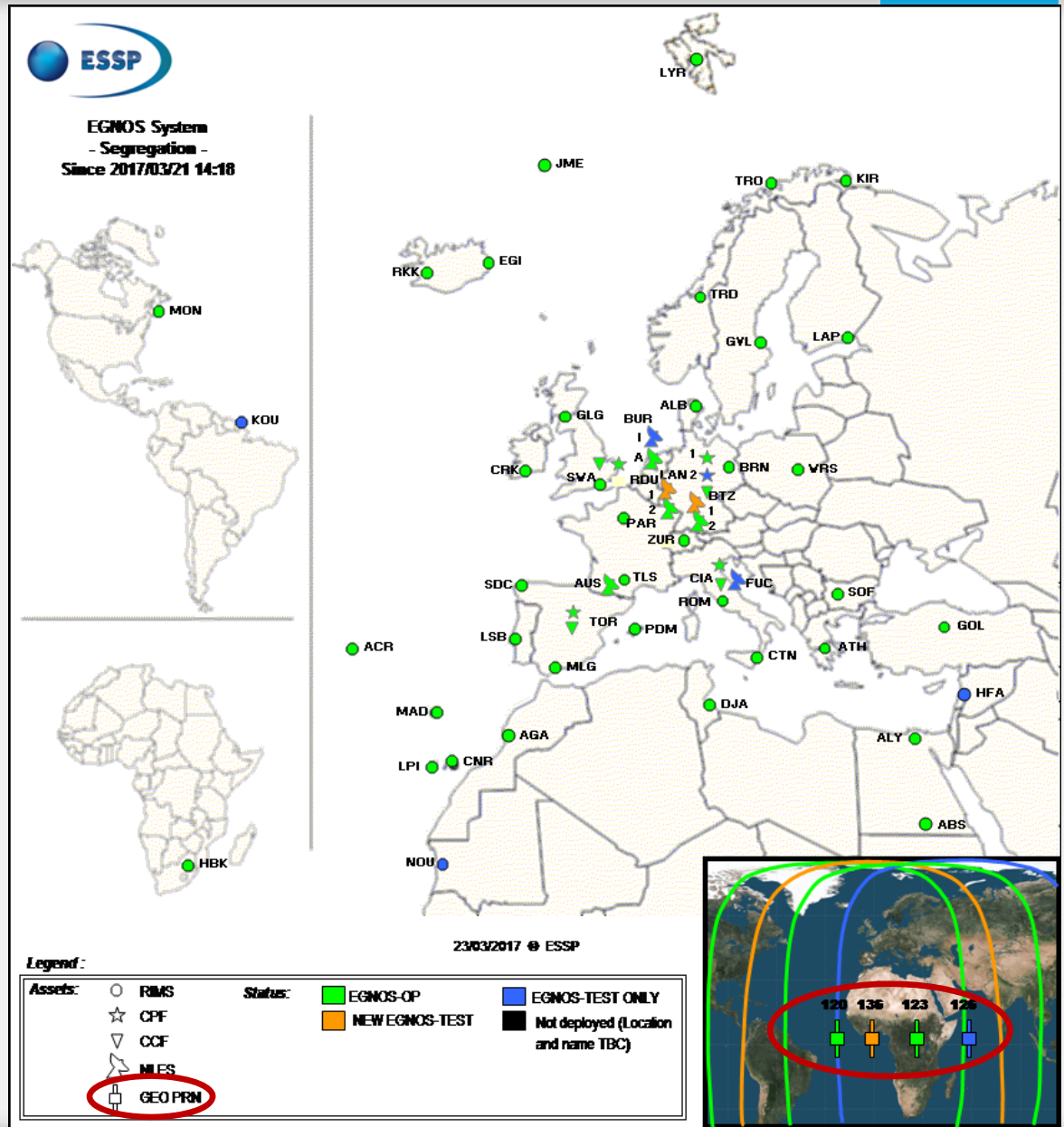


The **NLES** (Navigation Land Earth Stations) perform the transmission of the navigation message generated by the CPF to the GEO, selecting the best message of all of them.



Signal in Space

Four GEOstationary satellites (two in the OP platform and two in the TEST) broadcasting corrections and integrity information for GPS satellites in the L1 frequency band (1.575,42 MHz) over the whole service area.





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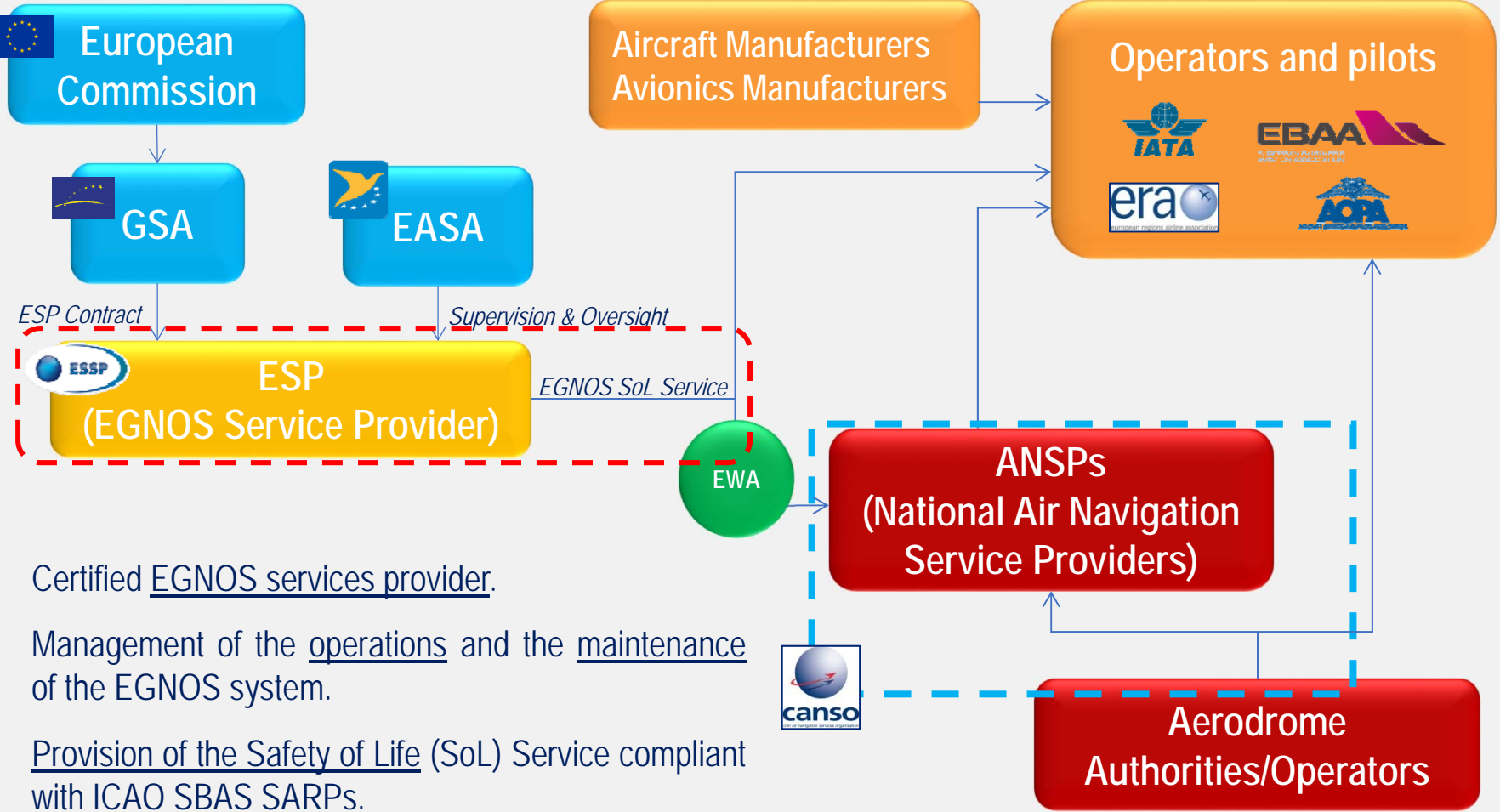
EGNOS System:
how does it work?



EGNOS: how
Service
Provision works



EGNOS Service Provider (ESP):



- Certified EGNOS services provider.
- Management of the operations and the maintenance of the EGNOS system.
- Provision of the Safety of Life (SoL) Service compliant with ICAO SBAS SARPs.



Shareholders & location

NATS



DFS Deutsche Flugsicherung



DSNA



Toulouse



Madrid

skyguide



NAV Portugal, E.P.E.



ENAV

ENAIRe

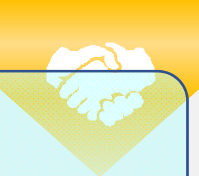




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EGNOS Services Overview

The **EGNOS** Service Provider



Since 2009

OPEN SERVICE



OS Open Service

The service for applications where human life is not at stake, such as personal navigation, goods tracking and precision farming.

Since 2011

SAFETY OF LIFE



SoL Safety of Life

The integrity message provided by EGNOS is essential when satellite navigation is used for applications where human lives could be endangered.

Unique
EGNOS SiS



Since 2012

EDAS



EDAS service

EDAS service Internet access to GNSS data in real-time and also through an historical archive



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EGNOS Services Characteristics

The **EGNOS** Service Provider

EDAS

EDAS service
EDAS service Internet access to GNSS data in real-time and also through an historical archive*

SAFETY OF LIFE

SoL Safety of Life
The integrity message provided by EGNOS is essential when satellite navigation is used for applications where human lives could be endangered.

OPEN SERVICE

OS Open Service

The service for applications where human life is not at stake, such as personal navigation, goods tracking and precision farming.



Service **D**efinition **D**ocuments



Describe the characteristics, terms and conditions of access to the corresponding EGNOS services offered to users

Service **N**otices



Temporal amendments to the EGNOS SDDs complementing their contents depending on the SN status (in-force, superseded, expired)

https://egnos-user-support.essp-sas.eu/new_egnos_ops/content/official-docs



- **EGNOS SiS is unique** compliant with ICAO standards for OS and
- EGNOS provides several approaches requiring **integrity**
- EGNOS is used by suitable users. **Integrity** is the main requirement for its use
- **EDAS** (EGNOS Data Access System) provides EGNOS data through the internet in real and non-real time to authorized users.

Position Integrity
 (bounding of the position errors)
is key for Civil Aviation and the main “differentiator” of SBAS w.r.t. GPS



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EGNOS Safety of Life service

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EGNOS NPA Service Level

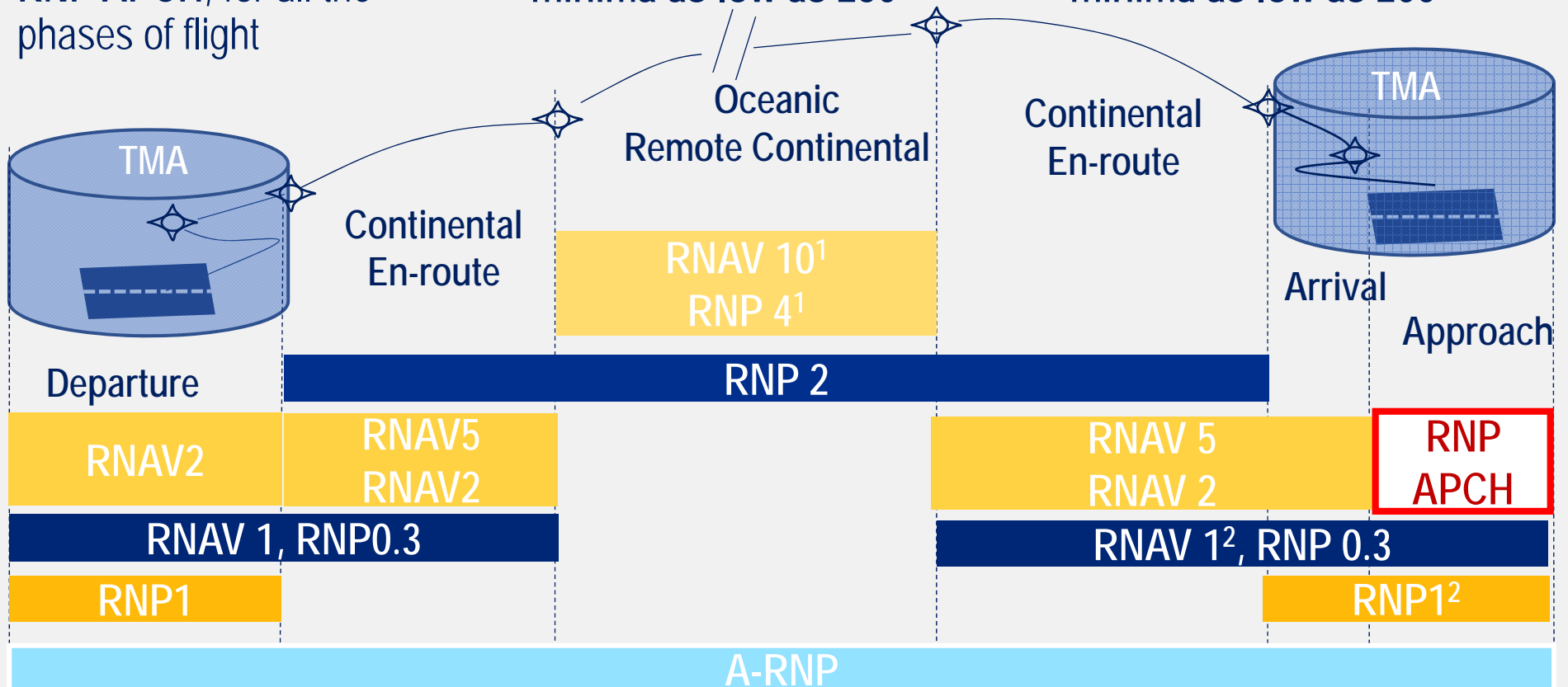
PBN navigation specifications other than RNP APCH, for all the phases of flight

EGNOS APV-I Service Level

PBN navigation specification RNP APCH down to LPV minima as low as 250'

EGNOS LPV200 Service Level

PBN navigation specification RNP APCH down to LPV minima as low as 200'



(1) Non SBAS receivers for these PBN specs

(2) The Final segment of the approach is not covered by these PBN specs



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EGNOS Safety of Life service

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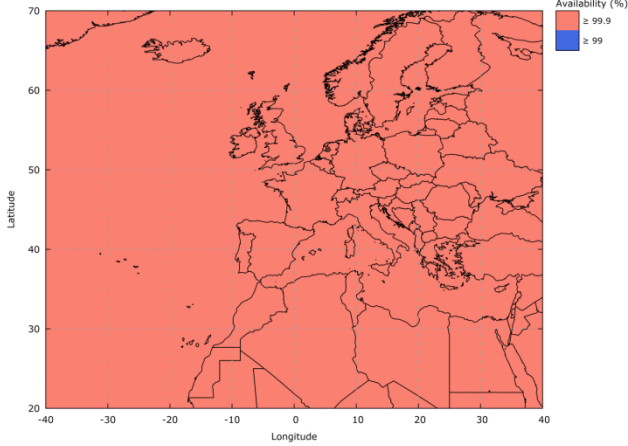
EGNOS NPA Service Level

EGNOS APV-I Service Level

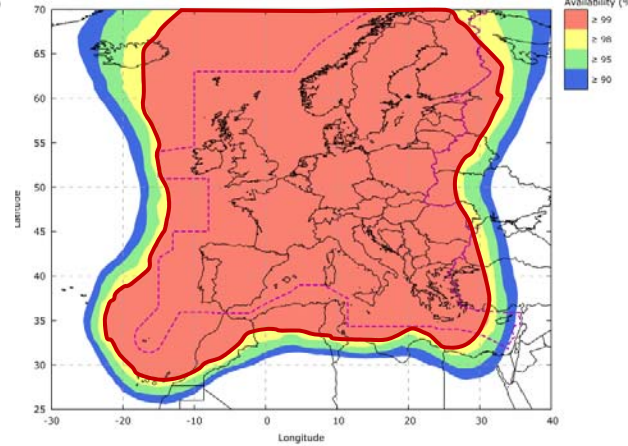
EGNOS LPV200 Service Level

Availability

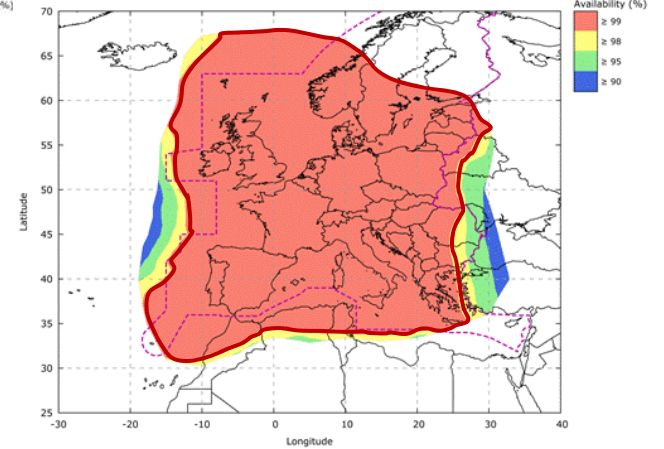
NPA Availability Map



APV-I Availability Map

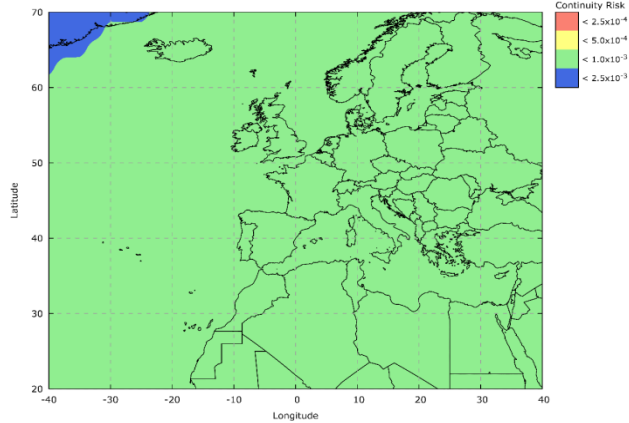


LPV200 Availability Map

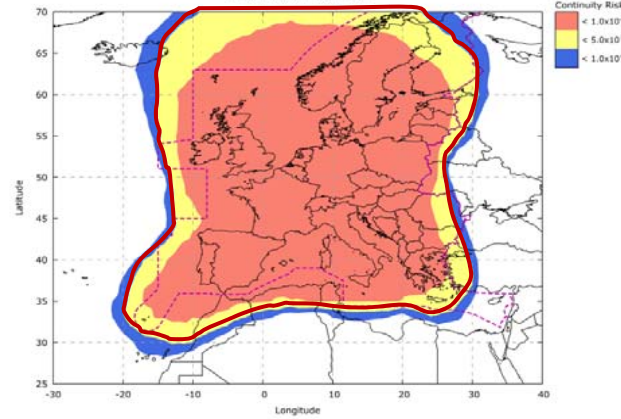


Continuity

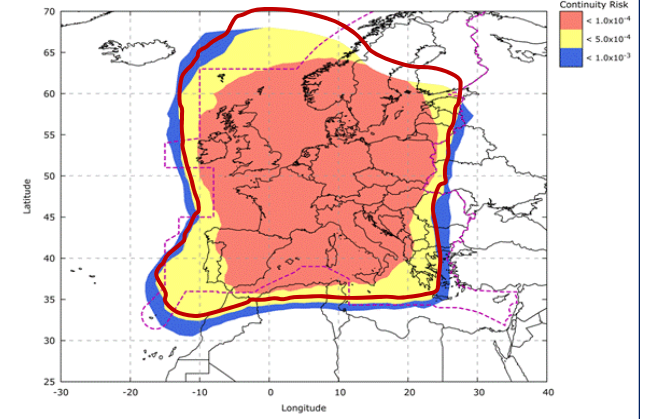
NPA Continuity Map



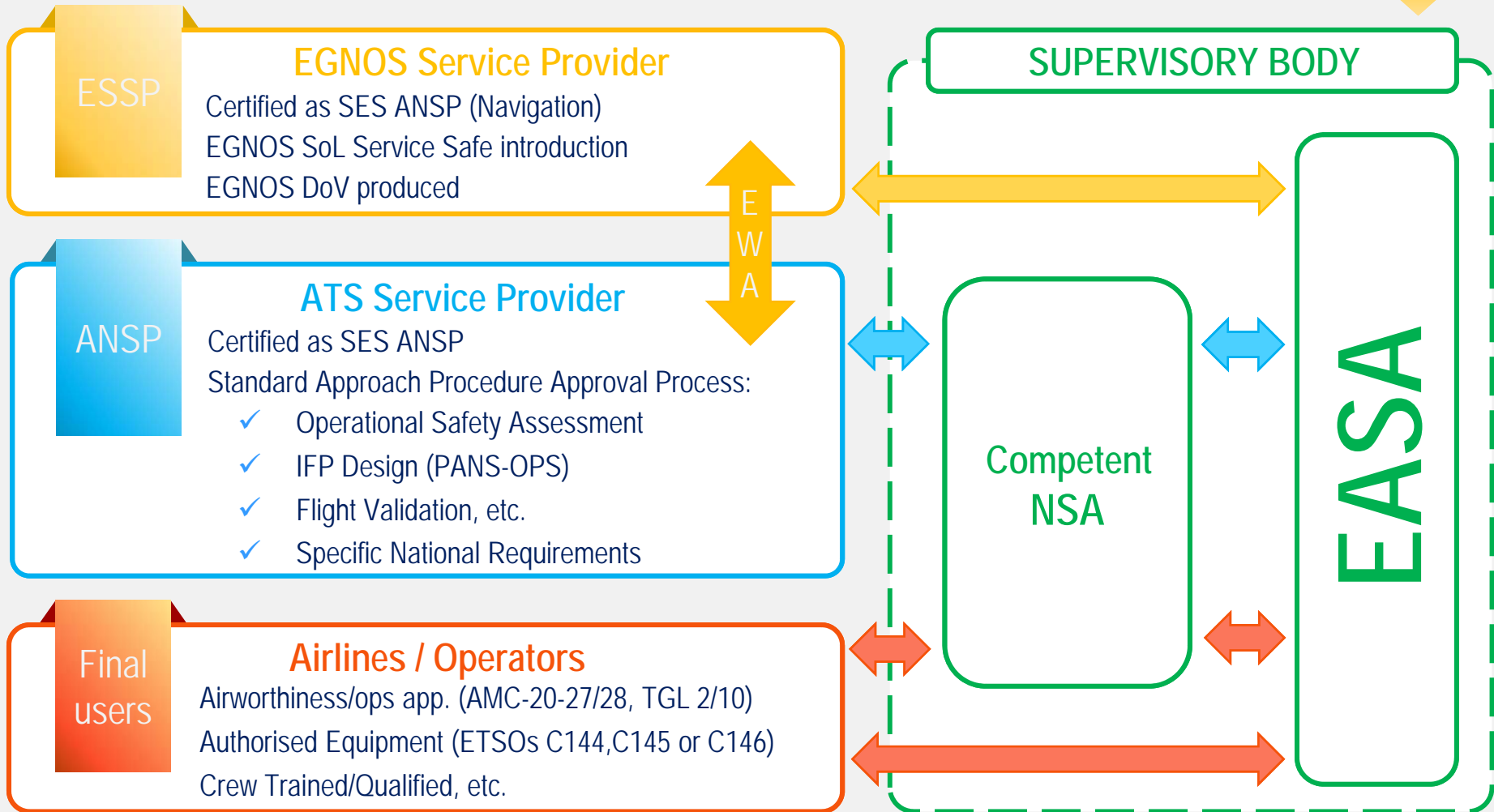
APV-I Continuity Map



LPV200 Continuity Map



LPV: Who does what?





The EGNOS Working Agreement (EWA) is the dedicated ESSP IF with the ANSPs implementing EGNOS based procedures in the Aviation Domain.

The EWA is a facilitator allowing ANSPs to:

- Comply with applicable SES regulation.
- Defining the Liability Scheme between the ANSP and ESSP (GSA/EC):
 - Only contractual liability: between the signing parties.
 - Both parties may terminate the agreement for convenience.
 - No assignment of the EWA is authorized without the prior written consent of the other party.
 - Roles and responsibilities of the parties: ANSP and ESSP as established by the applicable regulations and in Annex 1 and Annex 2 of the EWA.
 - Duration of the contract (undetermined duration, and at least until 31st Dec 2021).





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EGNOS Working Agreement

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EWA

Complies with Applicable Regulation

Provides support to ANSPs

Working Interfaces (fair and equitable treatment)

EGNOS SoL Service Definition Document (SDD)

Service Arrangements

NOTAM Proposal Origination

GNSS Data Recording (incident/accident investigation)

Collaborative Decision Making (CDM)

Contingency Management

Airport Data Tool (to register new EGNOS based procs)



Competent NSA

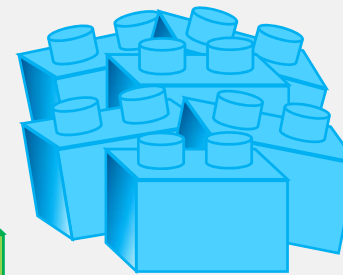
EASA



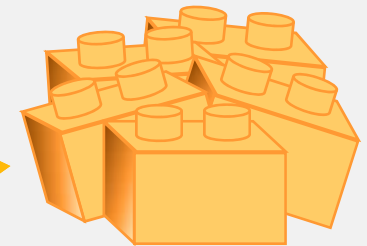
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LPV Implementation Status - EWAs

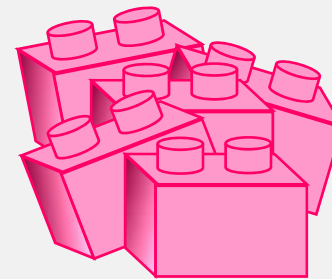
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ANSPs



Aerodrome Operator



Non-EU



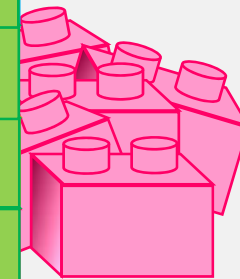
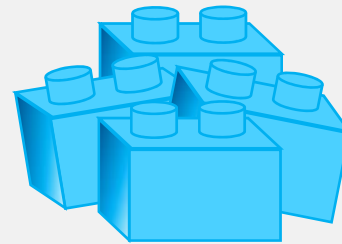
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LPV Implementation Status - EWAs

The **EGNOS** Service Provider



			Land's End	Leonardo Helicopters				
			LVNL	AAA				
			Jersey	IAA	Norwich Airport			
			Bulatsa	Saint Mary's	MATS			
	Finavia	Romatsa	HungaroControl	Sonderborg Airport	HCAA			
	LFV	LPS	RNLAF	Serco	Aircraft Industries			
	NAV PT	Wolverhampton	Biggin Hill Airport	Esbjerg Airport	Gloucestershire			
	ANS-CR	Naviair	RNLAF	Brighton City Airport	Blackbushe Airport			
DFS	ENAIRES	HAL	Storuman	Belgo-Control	CODA	HAL		
Guernsey	Austro-Control	AVINOR	Kent Airport	AVA a.s.	CAL	Waterford Airport		
skyguide	NATS	EDAL	MADG	CCL	BAE Systems	Donegal Airport		
DSNA	ENAV	PANSA	London Southend	ACR	Tallinn Airport Ltd	Sligo North West		
2011	2012	2013	2014	2015	2016	2017	2018	





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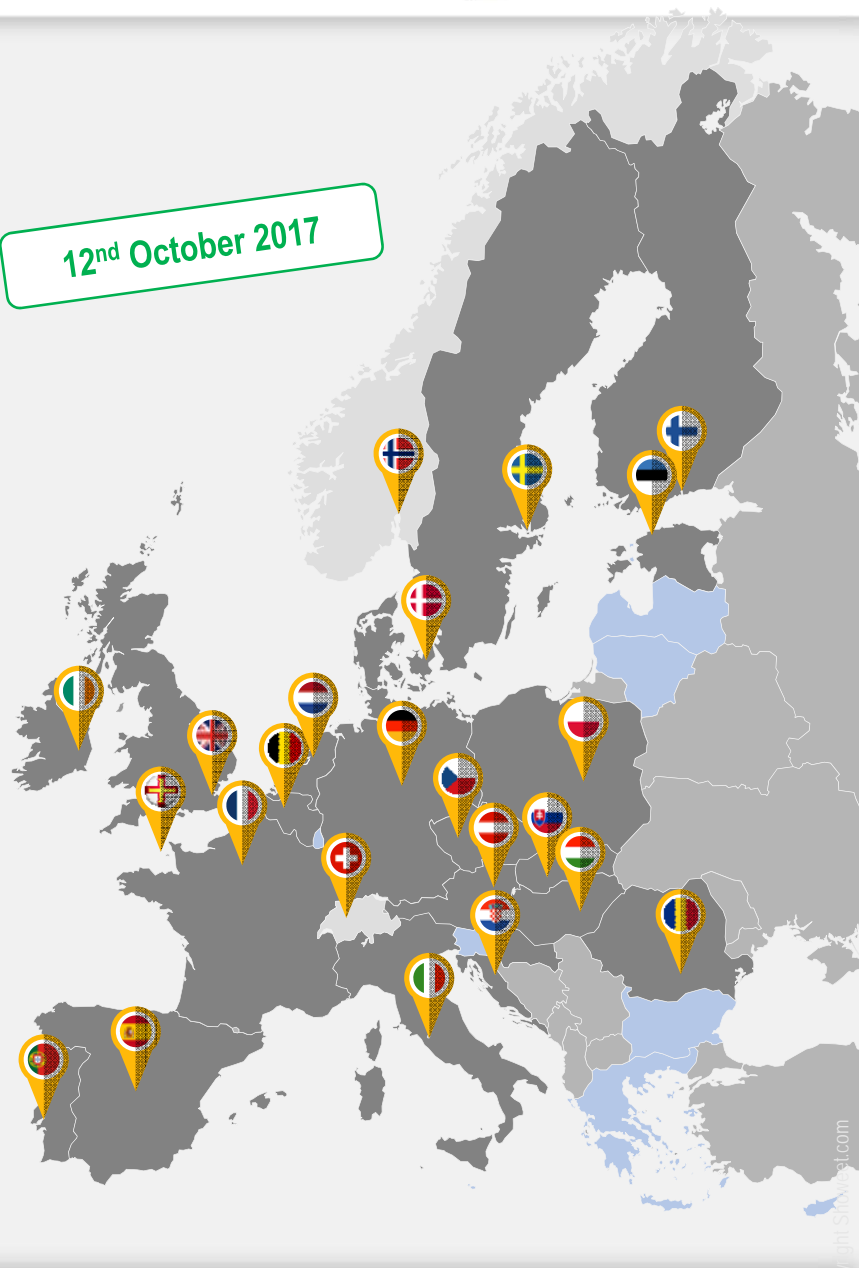
LPV Implementation Status

The **EGNOS** Service Provider

56 EWAs

COUNTRY	Airports		LPV Procedures		RNP 0.3 Procs
	APV-I	LPV-200	APV-I	LPV-200	
Austria	2	2	2	4	0
Belgium	4	0	10	0	0
Croatia	1	0	1	0	0
Czech Republic	4	0	8	0	0
Denmark	4	1	8	2	0
Estonia	1	0	2	0	0
Finland	1	0	2	0	0
France	89	10	141	18	0
Germany	22	5	35	8	0
Guernsey	1	0	2	0	0
Hungary	0	1	0	4	0
Ireland	1	0	1	0	0
Italy	10	0	20	0	0
Netherlands	2	0	3	0	0
Norway	16	8	24	15	0
Poland	5	0	9	0	0
Portugal	2	0	3	0	0
Romania	1	0	2	0	0
Slovak Republic	2	2	4	2	0
Spain	2	0	4	0	0
Sweden	1	0	1	0	0
Switzerland	7	2	9	2	5
United Kingdom	14	0	31	0	0
TOTAL	192	31	322	55	5

12nd October 2017



56 EWAs in place



Non-EU expected EWAs

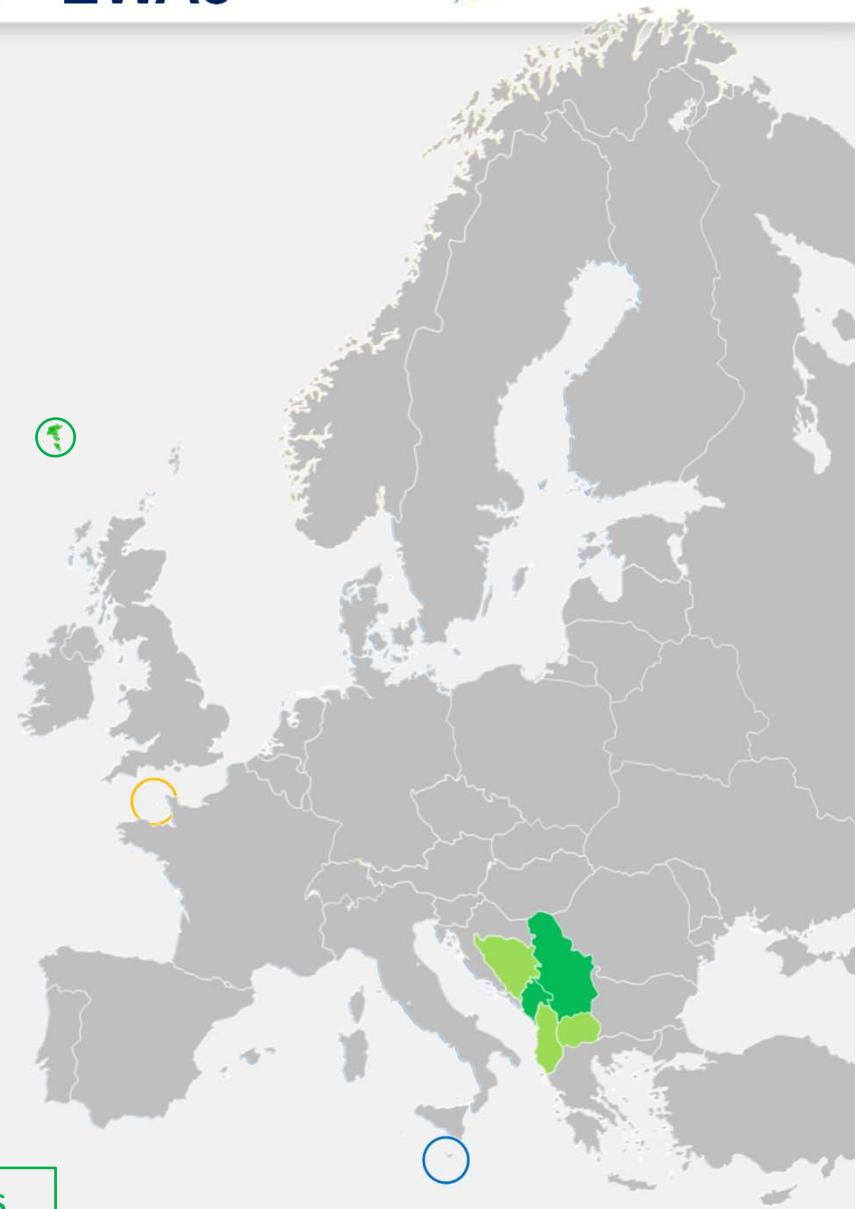
➤ Explicit interest expressed by several neighboring regions/countries:

- A Coordination Scheme (between EC and the non-EU State), defining the overall framework for the use of the EGNOS SoL Service
 - International Agreement if needed.
- A Regulatory Compliance Scheme: the National CAA has to oversight that the applicable Regulation is complied with. **22**
- EWA (EGNOS Working Agreement with ESSP): Established on the basis of the previous schemes.

■ EU Members

■ Non- EU Members

In the short time: Iceland, Serbia, Montenegro and Faroe Islands.



Conclusion

EGNOS
is there, use it



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Satellite - based system improving GPS, Galileo

Owner: the European Union
Users: European citizen

Excellent and stable performances

Application in Aviation, Maritime, Rail, Road, LBS....

Customer: European GNSS Agency (GSA)

Open, safety-of-life, EDAS services

↳ Able to cover SoL service in North African / Middle East Countries **through EWA.**

Ready for more challenges & diversification

↳ **Assist States implementing SBAS solutions**



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Thank you!



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