



EGNOS Services Performance & Roadmap

EGNOS Service Provision Workshop 2016

27TH SEPTEMBER 2016



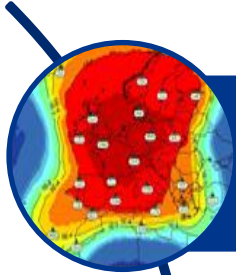
European
Global Navigation
Satellite Systems
Agency



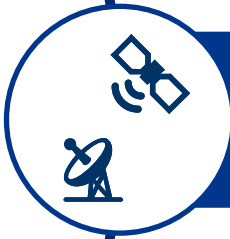
Precise navigation,
powered by Europe



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EGNOS Performance Overview

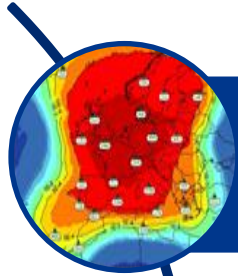


EGNOS Status

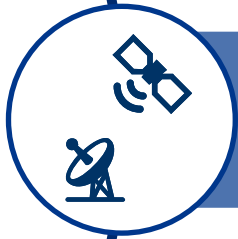


EGNOS Services Evolution

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EGNOS Performance Overview



EGNOS Status



EGNOS Services Evolution

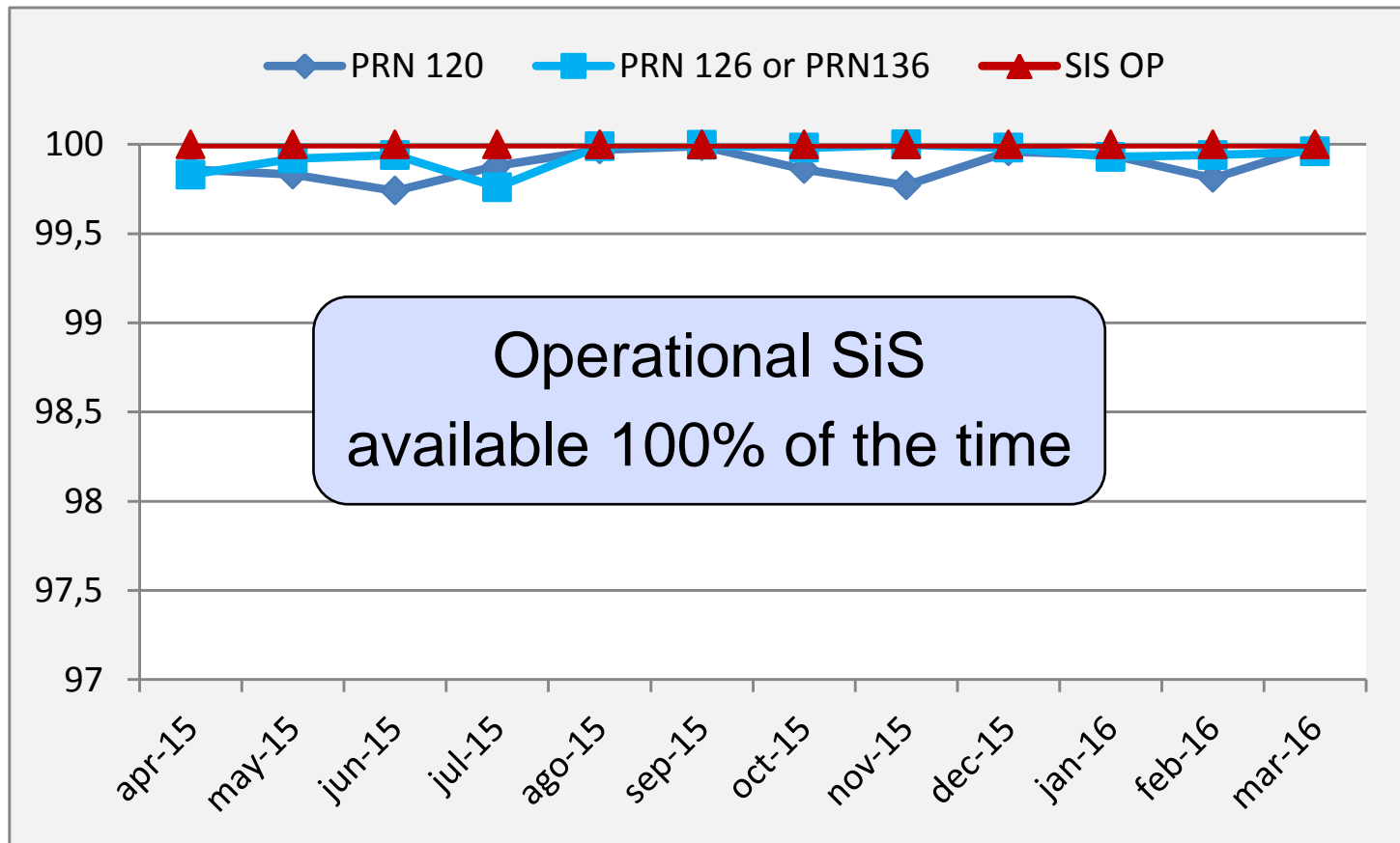
Service Performance Overview (ToC)

- Signal in Space Availability
- EGNOS Safety of Life Service
- EGNOS Open Service
- EDAS Service

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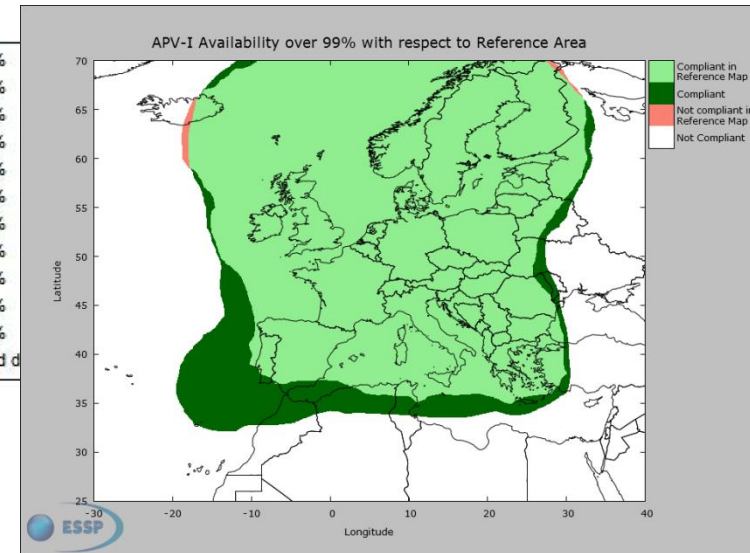
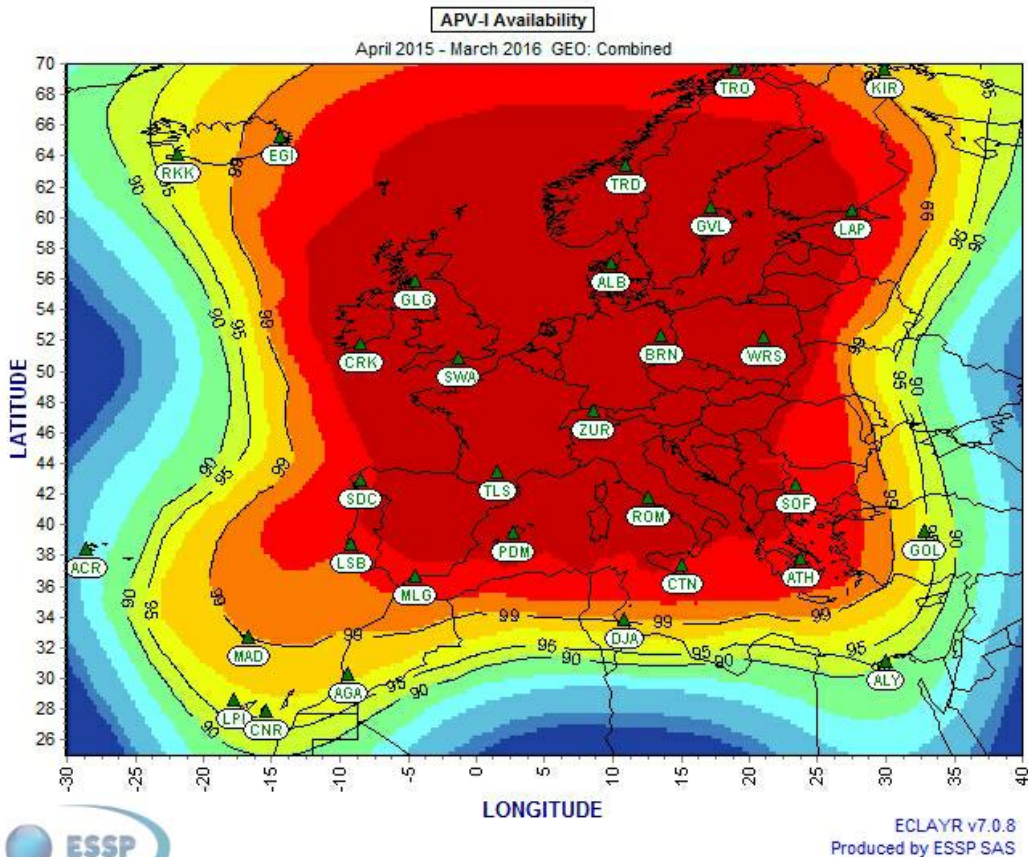
Signal in Space Availability



Service Performance Overview (ToC)

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EGNOS SoL: APV-1 Availability

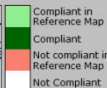
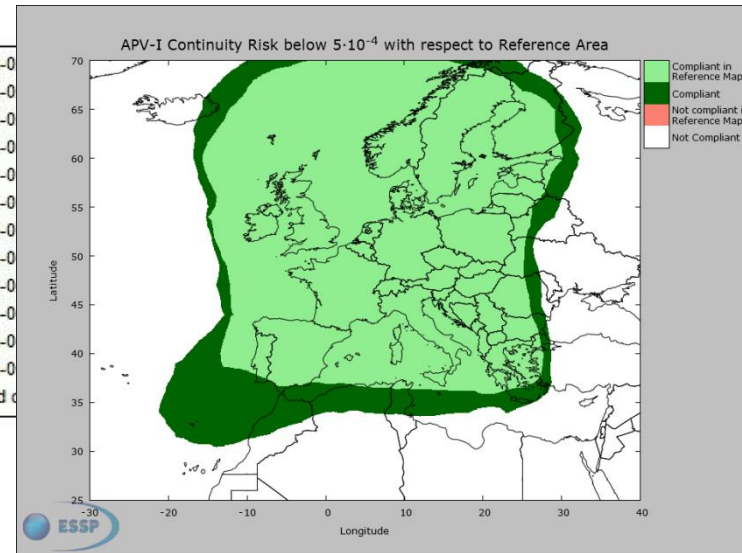
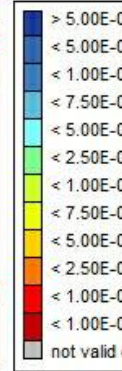
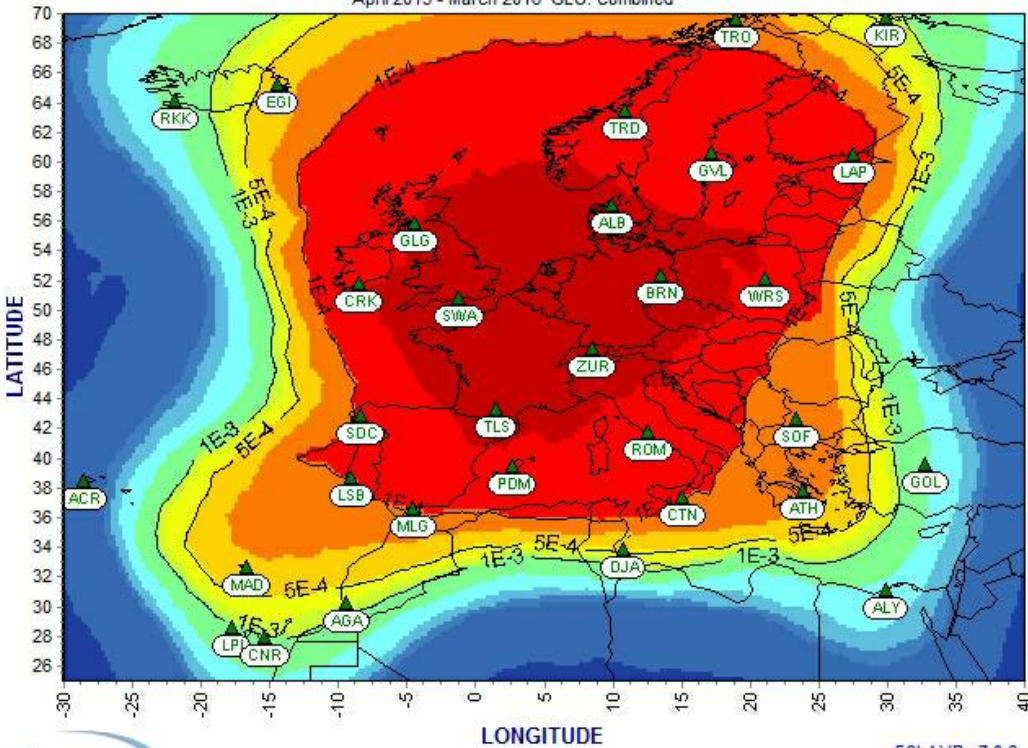


Compliance beyond the Service Area (dark green)

EGNOS SoL: APV-1 Continuity

APV-I Continuity Risk

April 2015 - March 2016 GEO: Combined

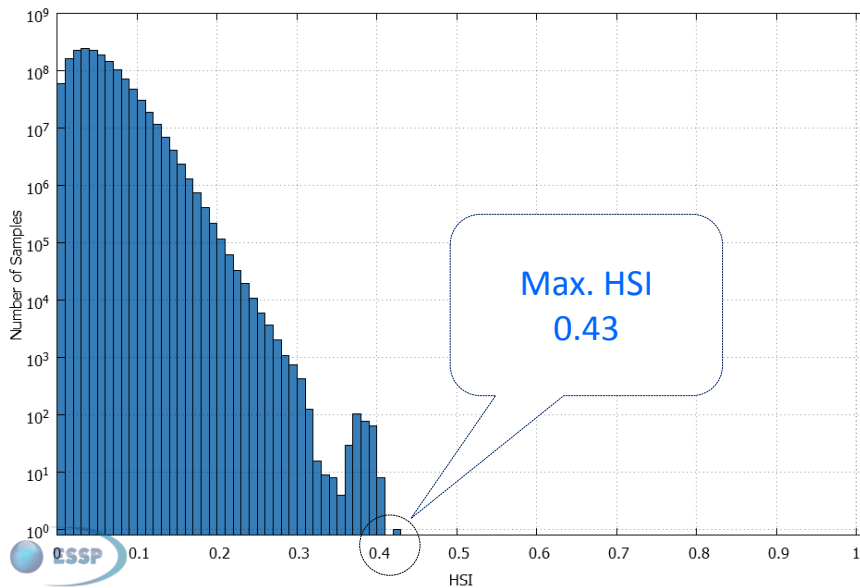


Compliance beyond the Service Area (dark green)

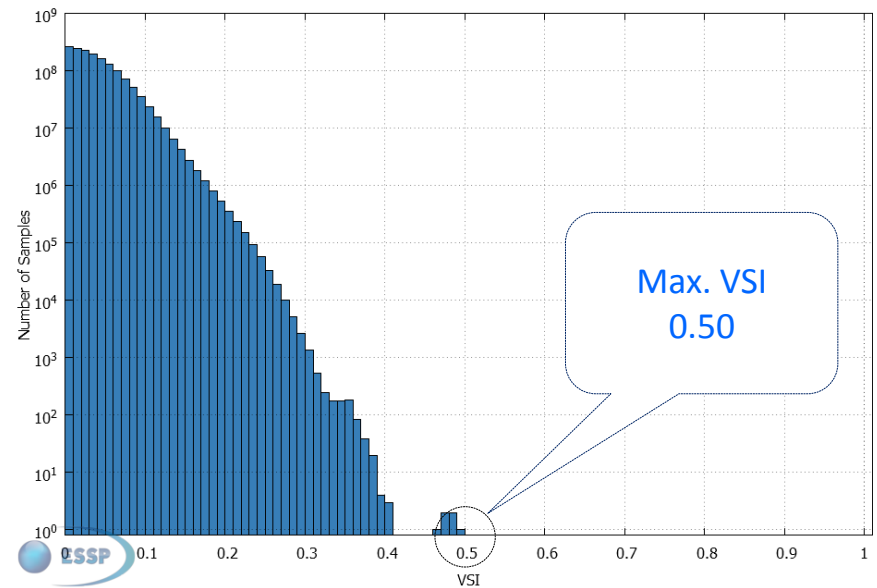
EGNOS SoL: APV-1 Integrity

- The measurements of the **Safety Index** demonstrate very **good confidence**.
- Safety index (PE/PL):

APV1 HSI Histogram
01/04/2015 - 31/03/2016



APV1 VSI Histogram
01/04/2015 - 31/03/2016



EGNOS SoL: APV-1 Availability at airports with LPV procedures

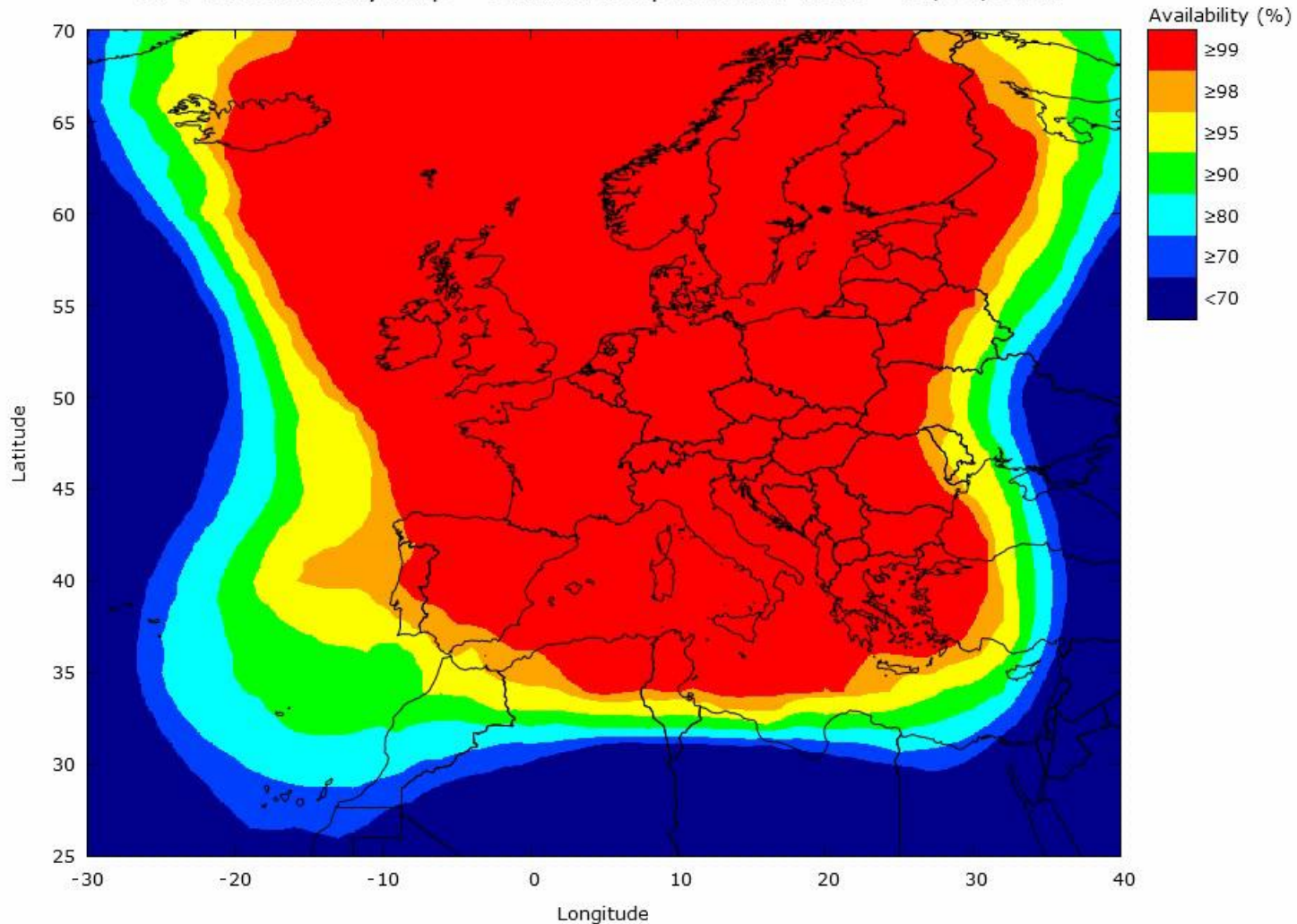
Compliance at all airports during the whole period
(01-Apr-15 to 31-Mar-16)



EGNOS SoL: APV-1 Availability trend (1/2)

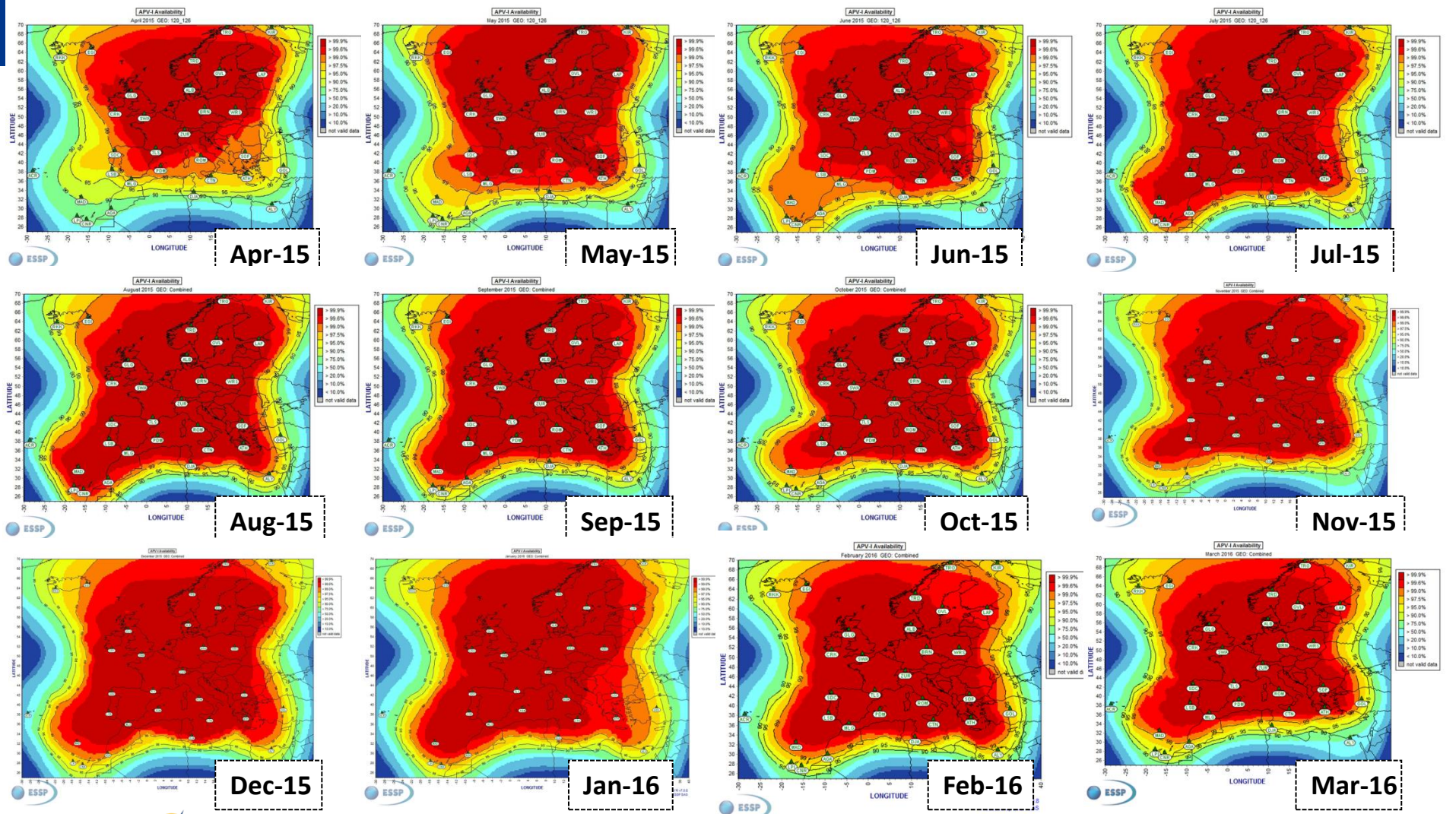
Video daily maps

APV-I Availability Map - Combined Operational PRNs - 01/04/2015



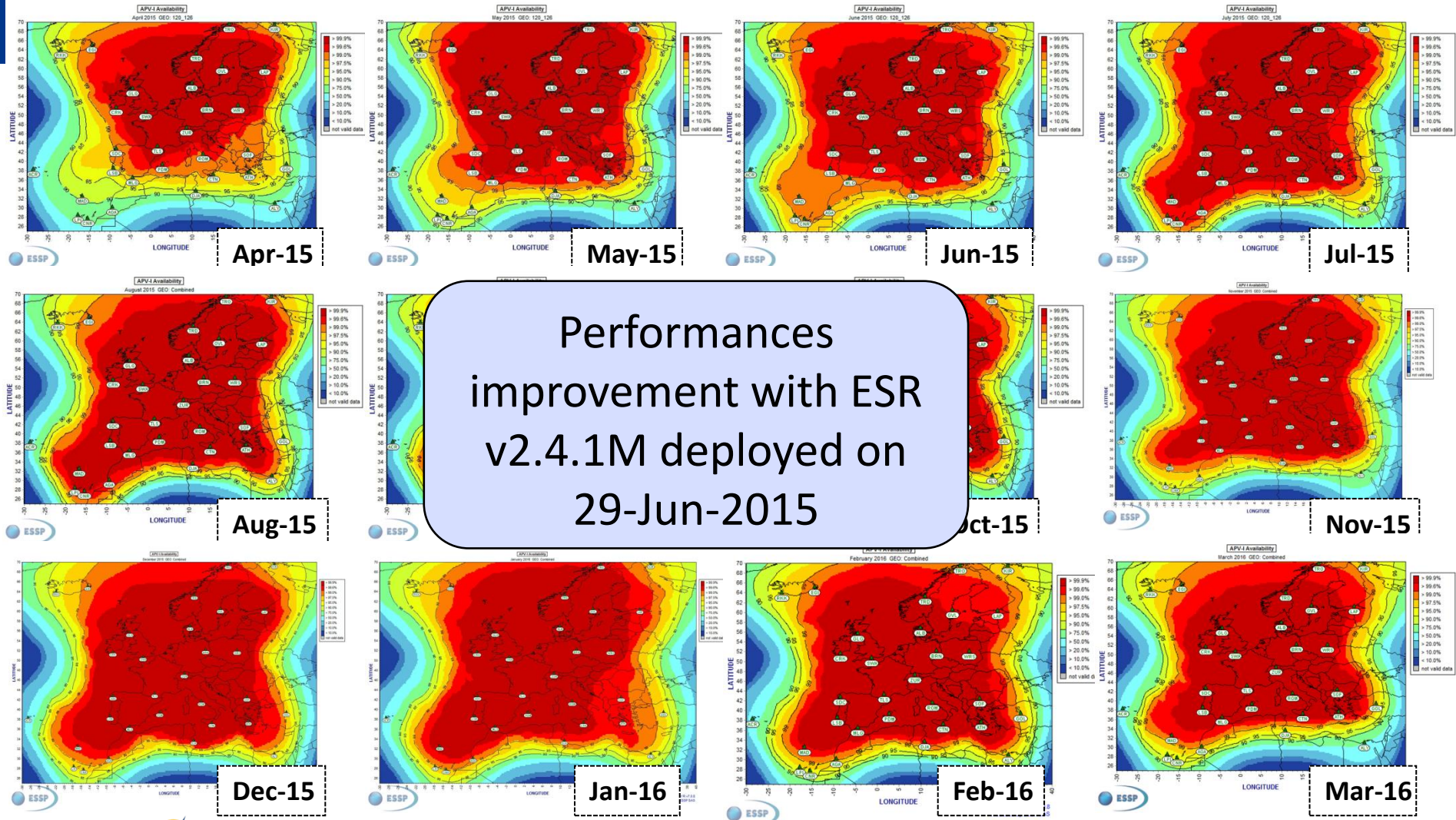
EGNOS SoL: APV-1 Availability trend (2/2)

Monthly maps

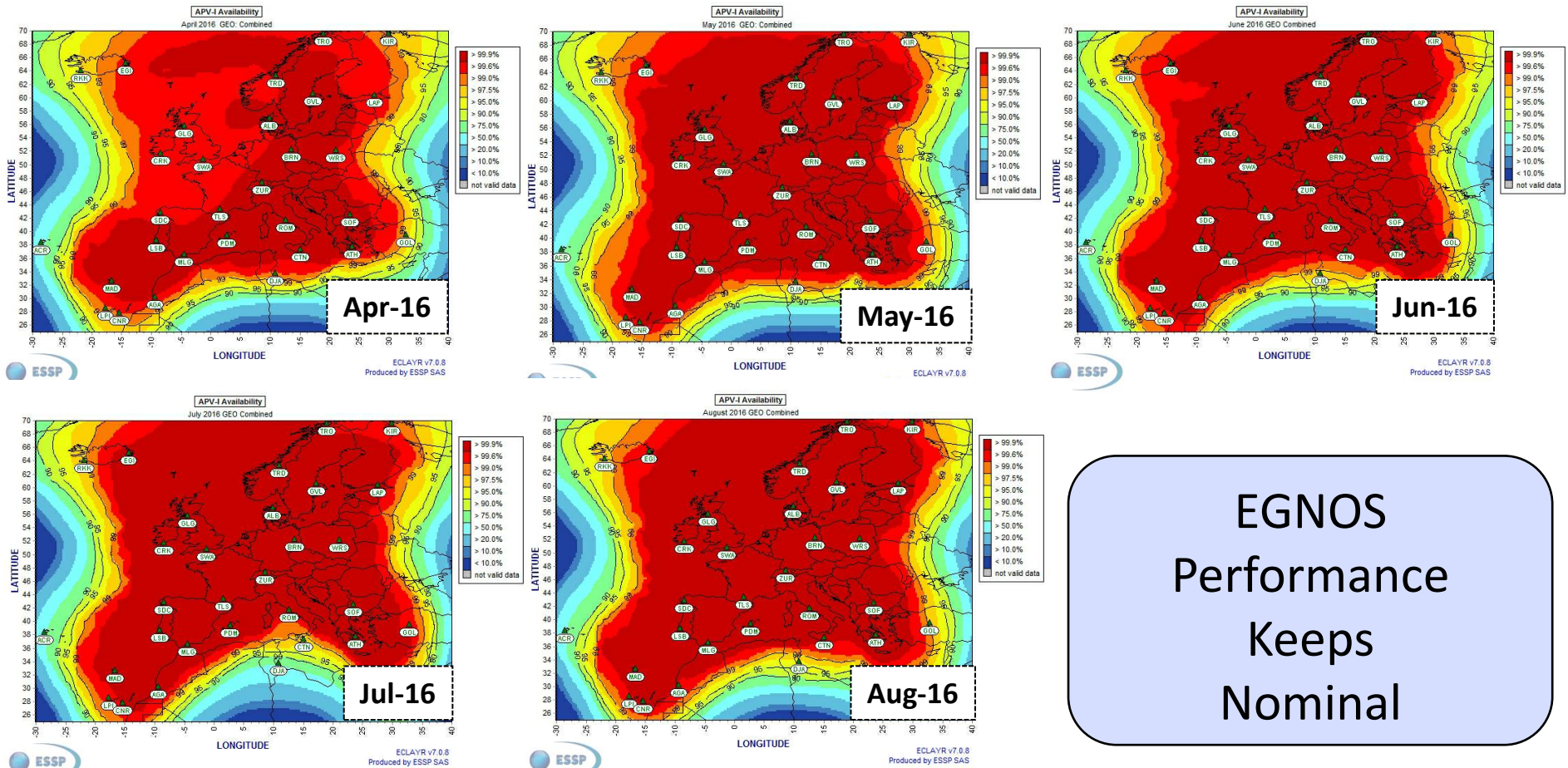


EGNOS SoL: APV-1 Availability trend (2/2)

Monthly maps

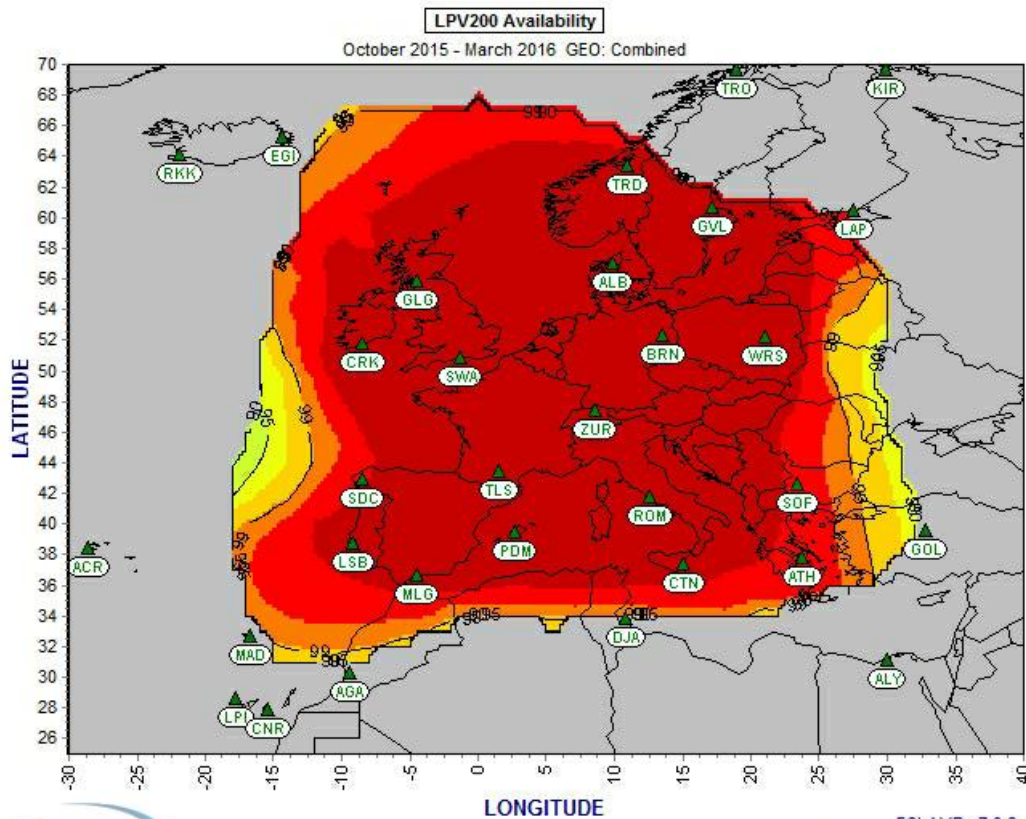


EGNOS SoL: APV-1 Availability latest months

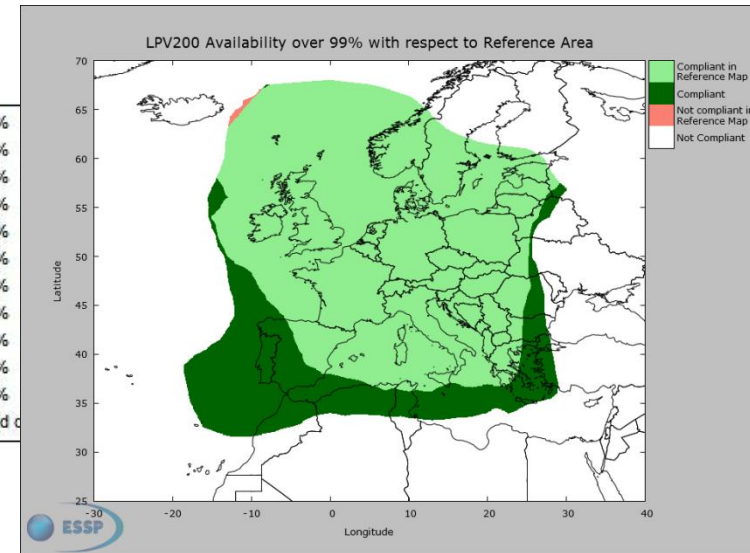


EGNOS
Performance
Keeps
Nominal

EGNOS SoL: LPV200 Availability



ECLAYR v7.0.8
Produced by ESSP SAS



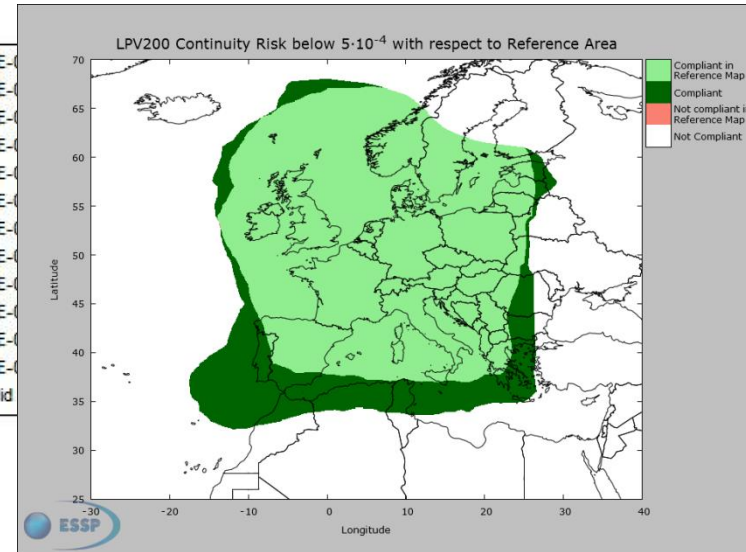
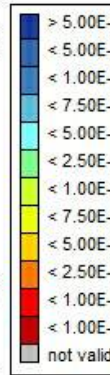
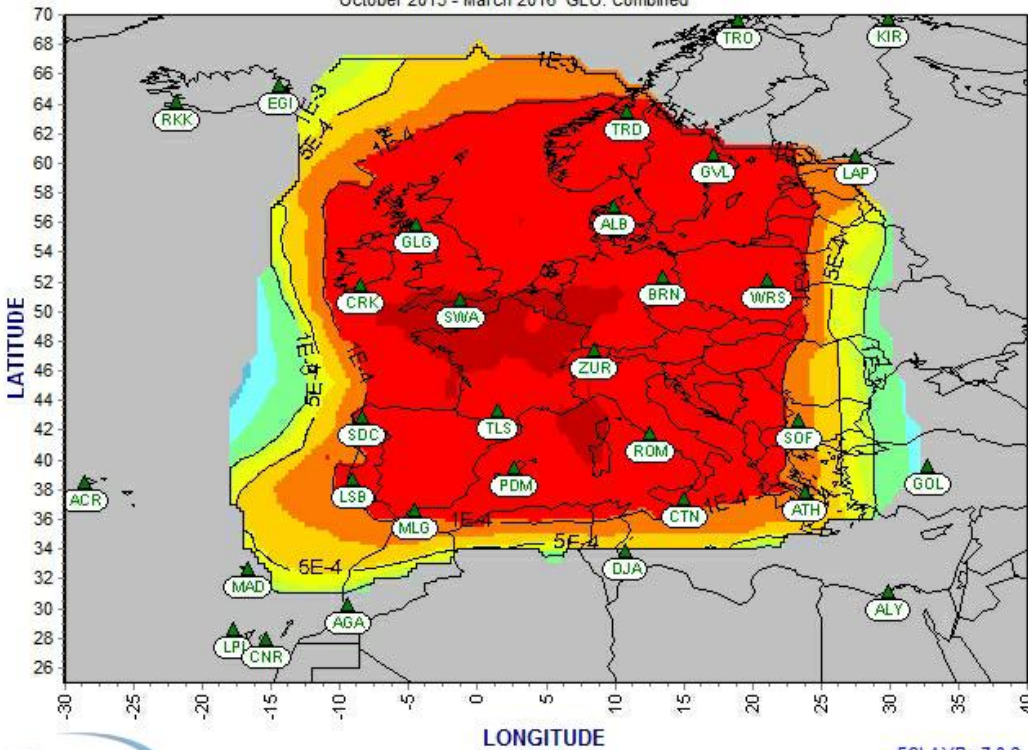
Compliance beyond the Service Area (dark green)



EGNOS SoL: LPV200 Continuity

LPV200 Continuity Risk

October 2015 - March 2016 GEO: Combined



Compliance beyond the Service Area (dark green)



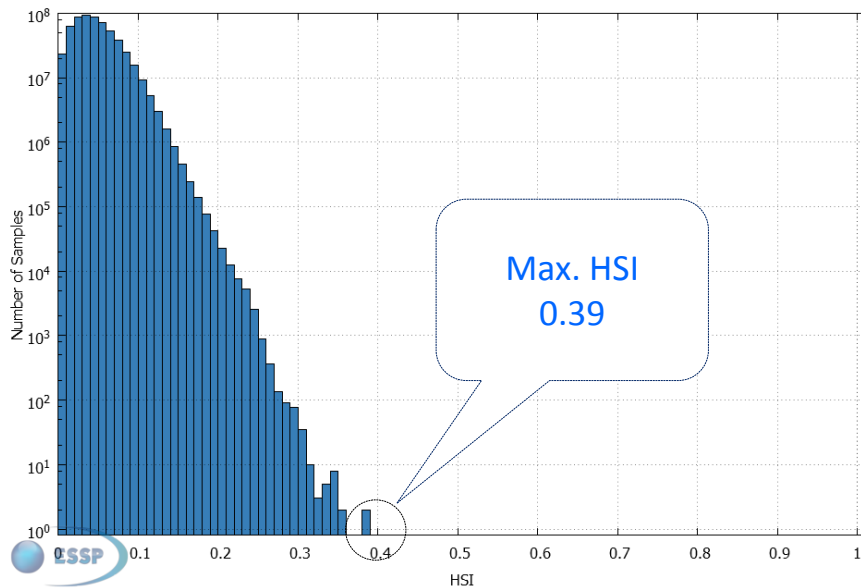
ECLAYR v7.0.8
Produced by ESSP SAS



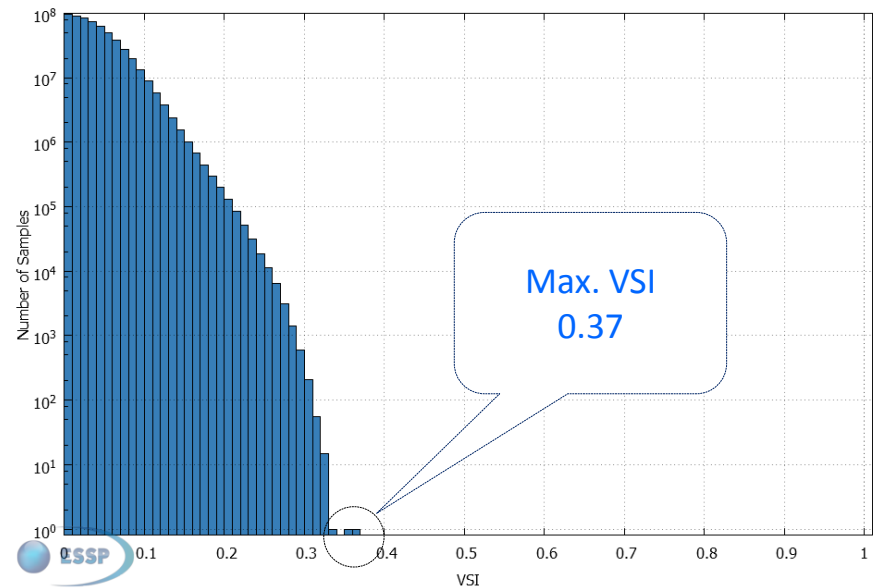
EGNOS SoL: LPV200 Integrity

- The measurements of the **Safety Index** demonstrate very **good confidence**.
- Safety index (PE/PL):

LPV-200 HSI Histogram
01/10/2015 - 31/03/2016



LPV-200 VSI Histogram
01/10/2015 - 31/03/2016

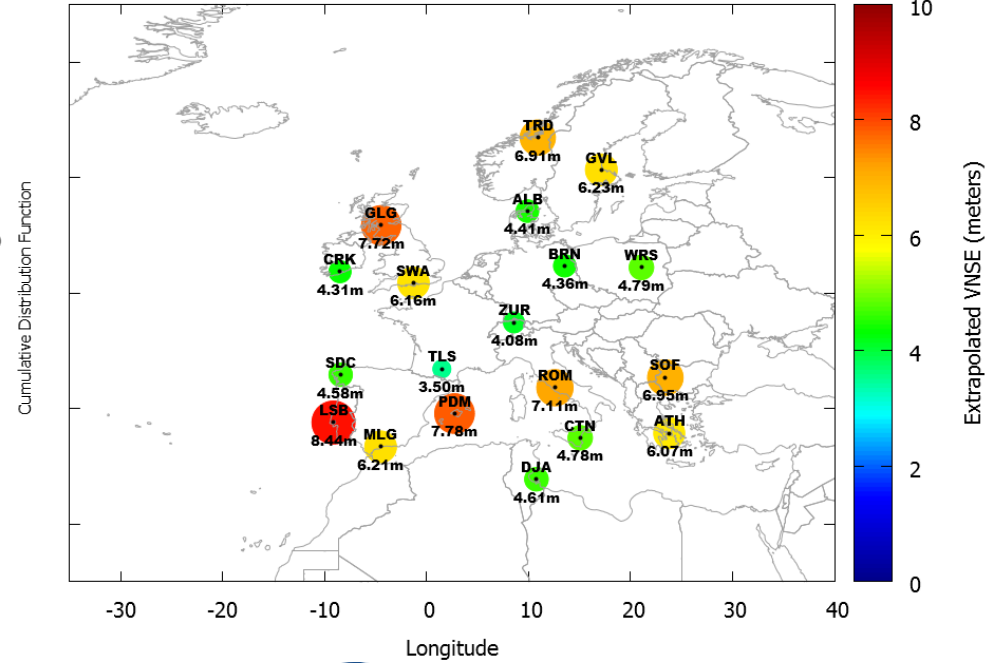
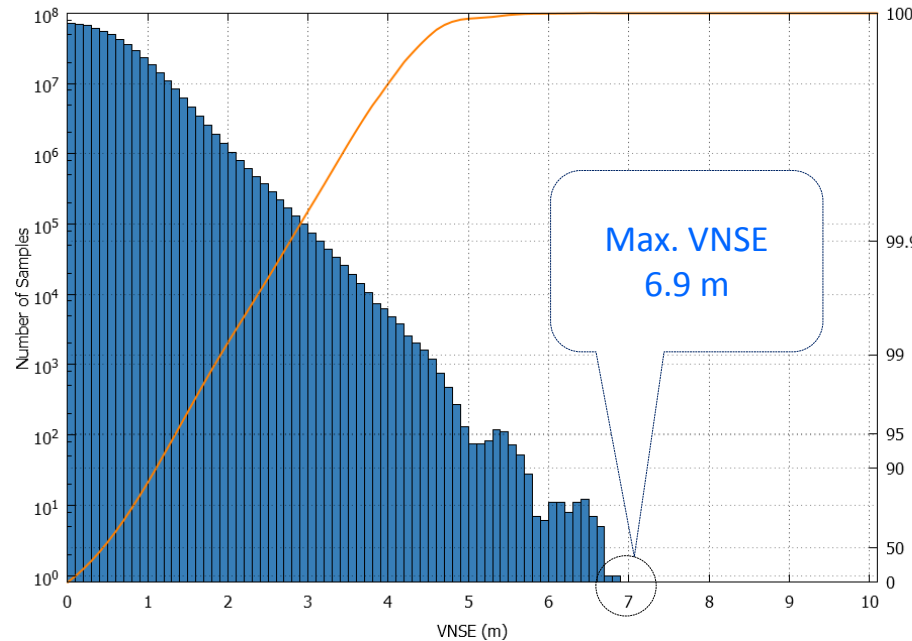


EGNOS SoL: LPV200 Vertical Accuracy

LPV200 instantaneous accuracy and extrapolated accuracy ($\text{Prob}(\text{VNSE} > 10\text{m}) < 10^{-7}/150\text{s}$) below 10m requirement

LPV-200 VNSE Histogram
01/10/2015 - 31/03/2016

PRN120 Accuracy extrapolated 10-7/150s
22/09/2015 - 31.12.2015



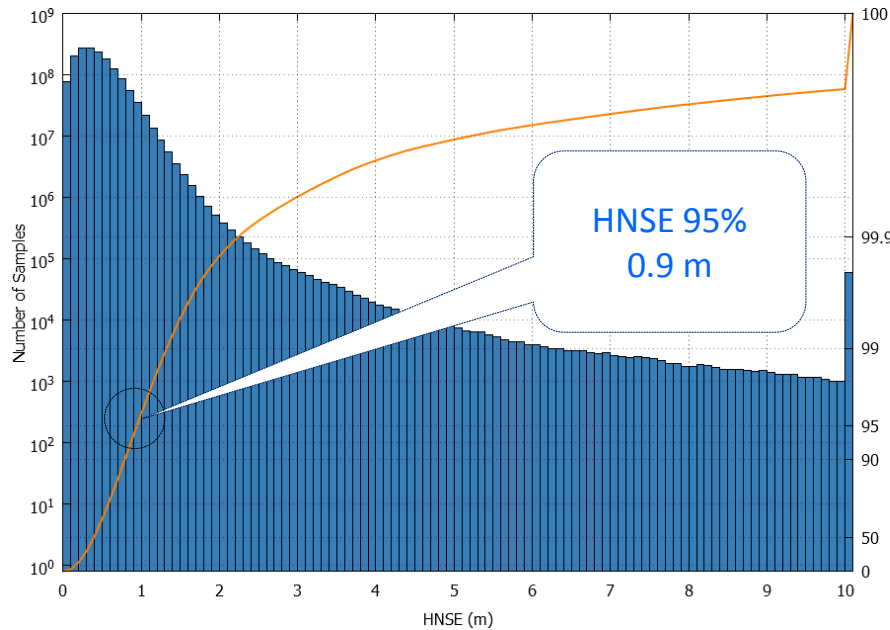
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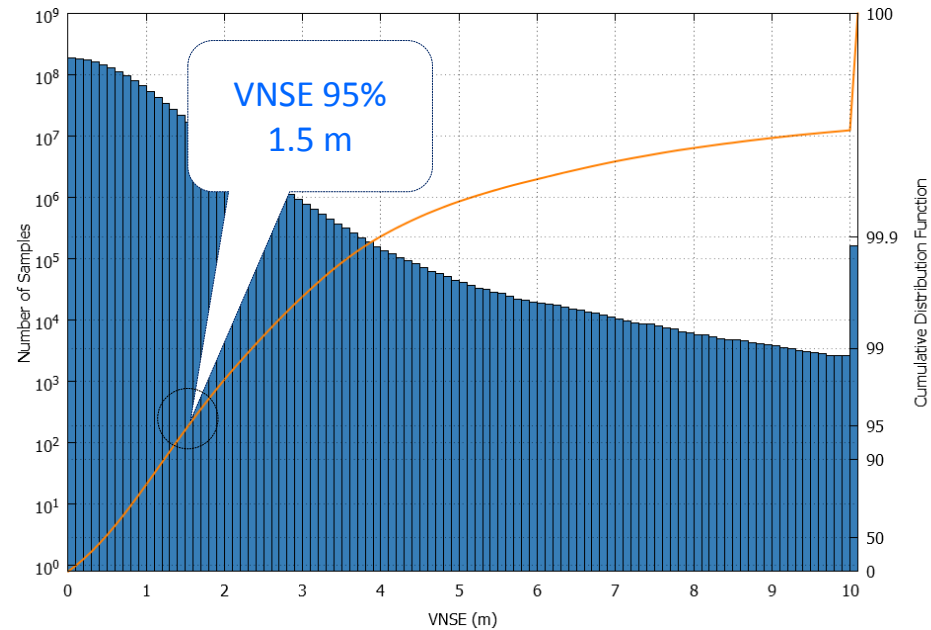
EGNOS Open Service: Accuracy

- **Open Service available** with horizontal and vertical error below 3m and 4m respectively (measured in RIMS stations)

PA HNSE Histogram
01/04/2015 - 31/03/2016



PA VNSE Histogram
01/04/2015 - 31/03/2016

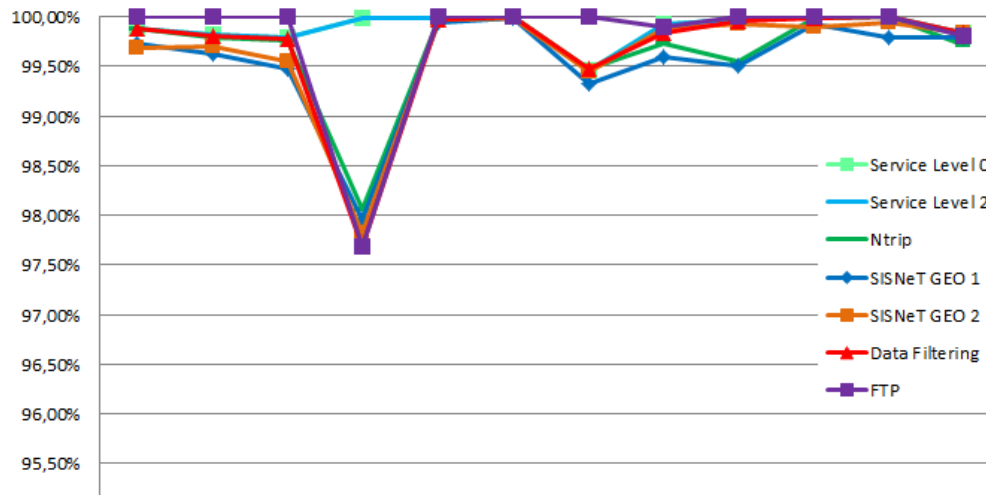


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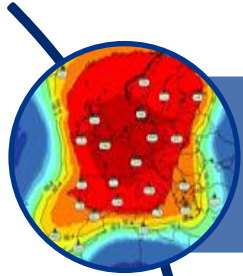
EDAS Service

EDAS Services Availability (%)

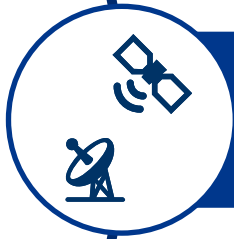


Above 98% commitment except
isolated anomaly in July

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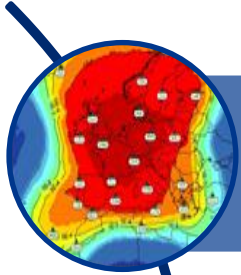


EGNOS Status

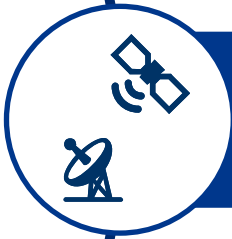


EGNOS Services Evolution

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EGNOS Performance Overview



EGNOS Status



EGNOS Services Evolution

EGNOS Services Status



Service Definition Documents



describe the characteristics, terms and conditions of access to the corresponding EGNOS services

Service Notices



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

EGNOS Services Status

EDAS

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



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.

SAFETY OF LIFE



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

OPEN SERVICE



Service Definition Documents

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SAFETY OF LIFE

Essential
September
SDD Publication
2016



EGNOS Services Status

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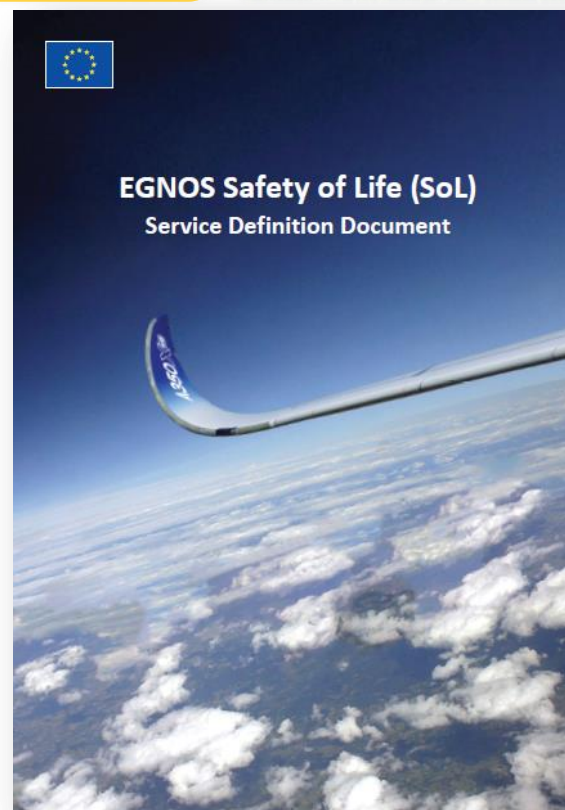
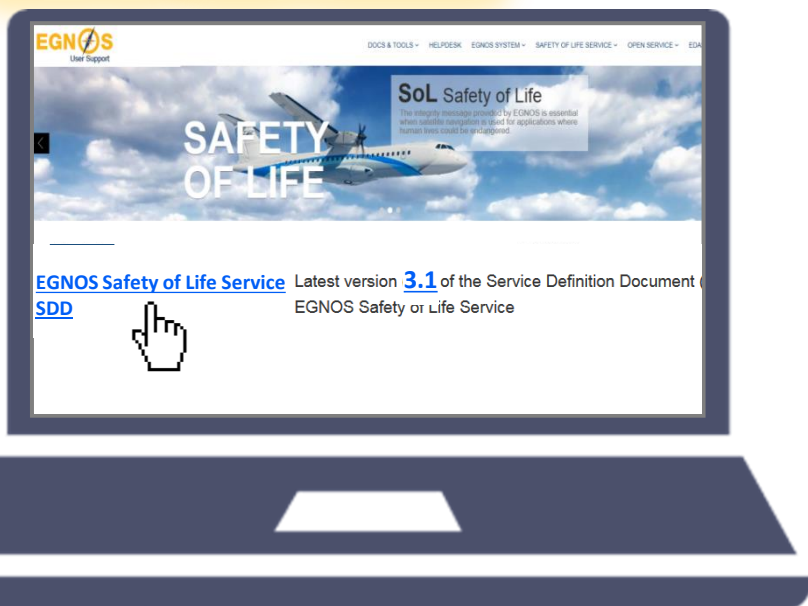
OPEN SERVICE

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EGNOS

SDD *new version*



EGNOS Services Status

EDAS

EGNOS

SDD *new version*



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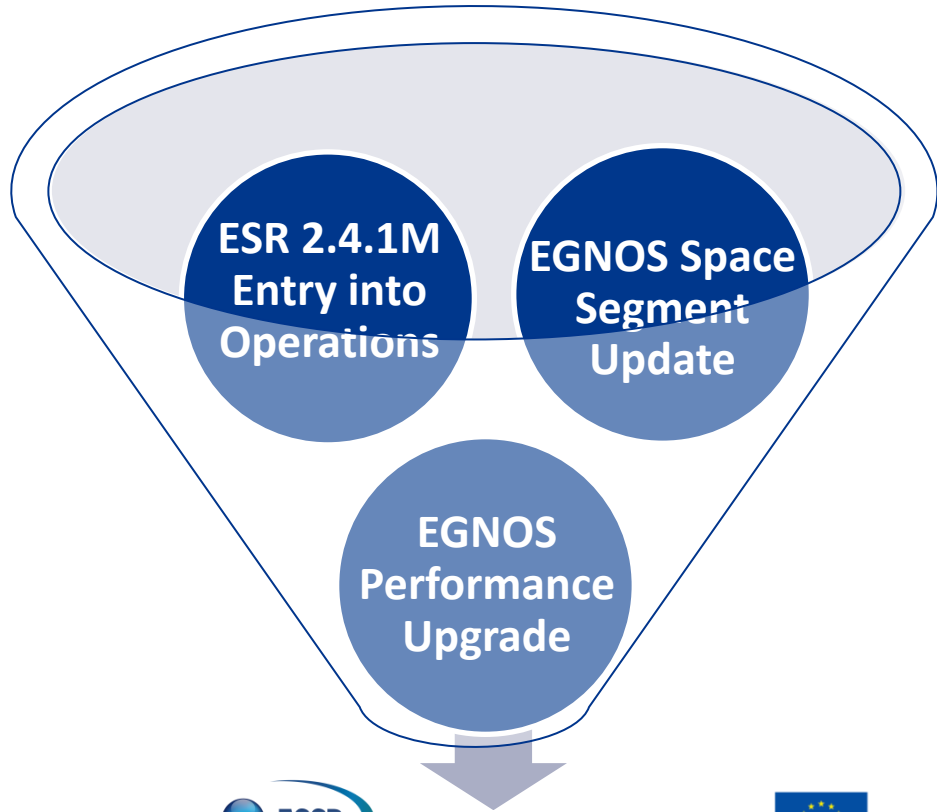
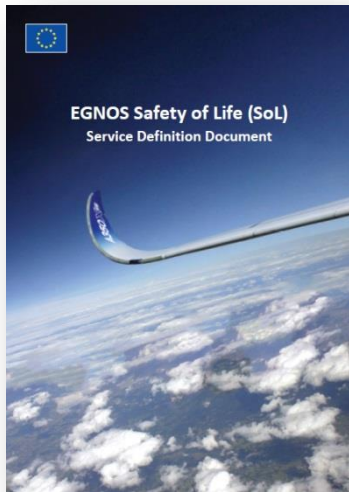
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EGNOS Services Status

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SAFETY OF LIFE



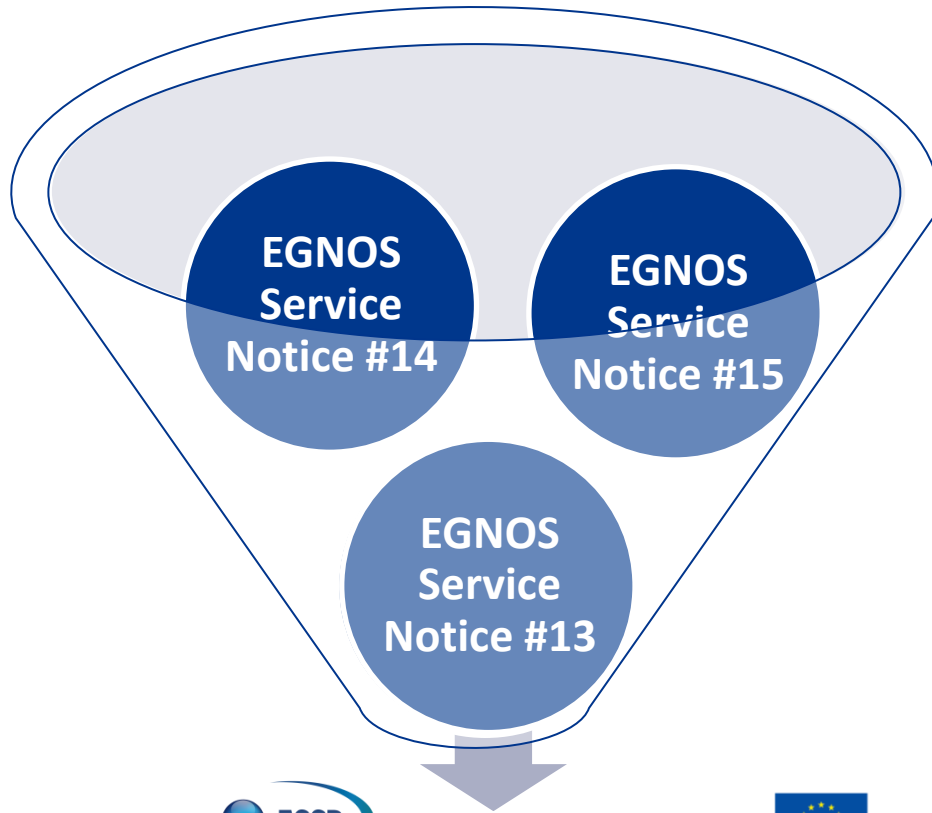
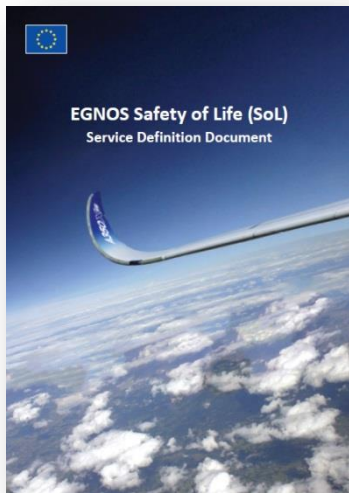
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EGNOS
SDD *new version*



EGNOS Services Status



Updated Commitment Maps for all EGNOS SoL Service Levels

With a global increase in the service areas:

- ✓ APV-I & LPV-200 service levels: Global Extension in the south specially in the south-west for availability and in all border areas for continuity
- ✓ NPA service level: Global Extension in the south and east areas for availability to cover ENI territories up to 20°N Latitude & 40°W Longitude

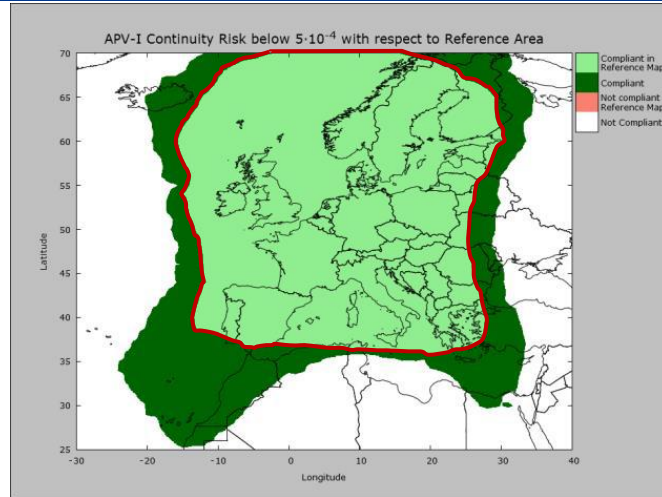
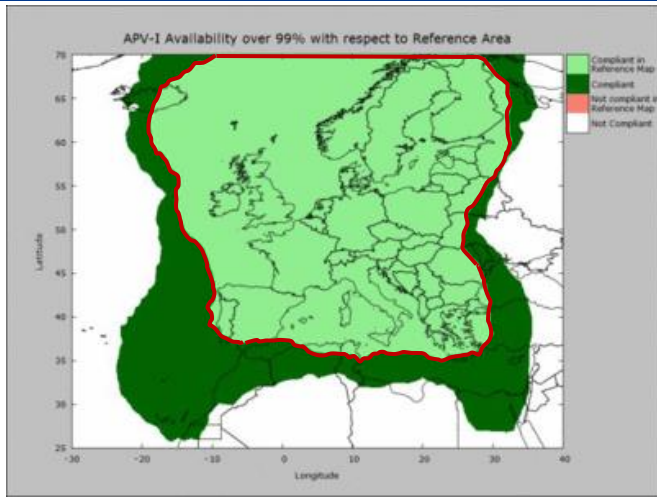
More performance stability in the whole service areas:

due to increased robustness against IONO activity
and improvement in GPS Monitoring

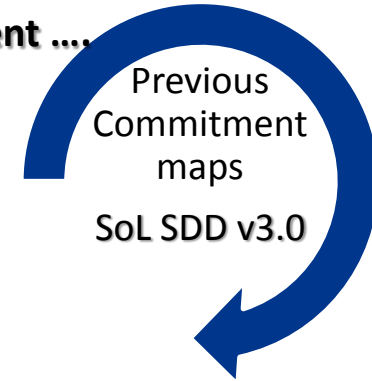


EGNOS Services Status

APV-I service level

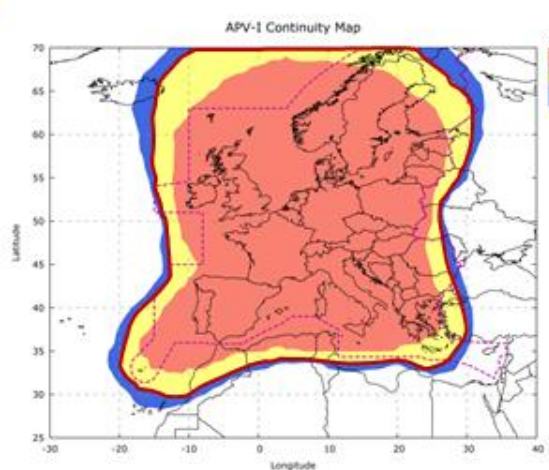
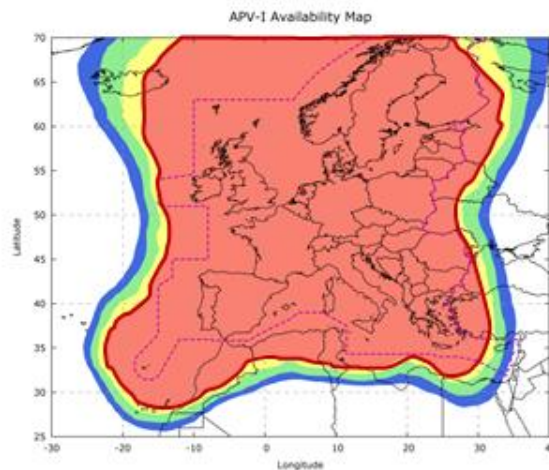
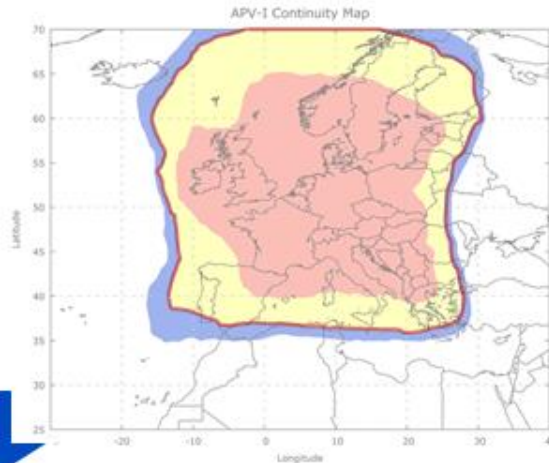
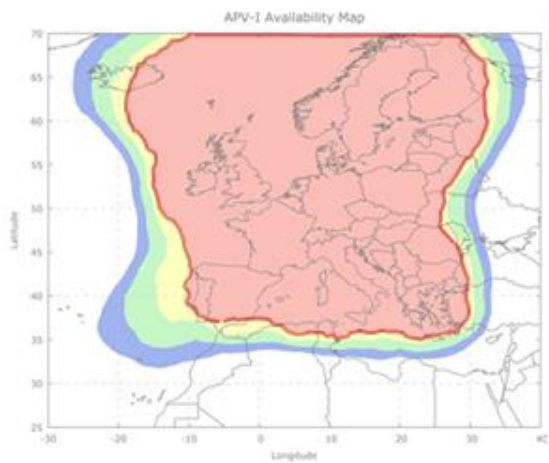


Since ESR 2.4.1M
Deployment

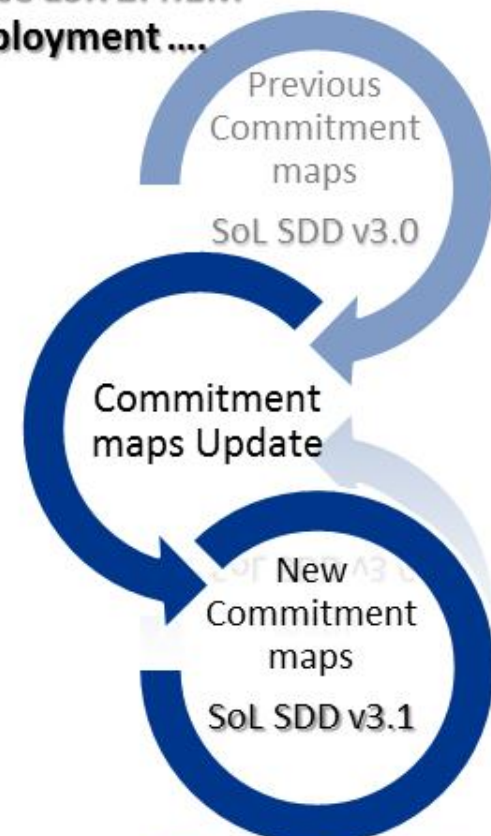


EGNOS Services Status

APV-I service level



Since ESR 2.4.1M
Deployment



SN 13 SN 14 SN 15

EGNOS Services Status

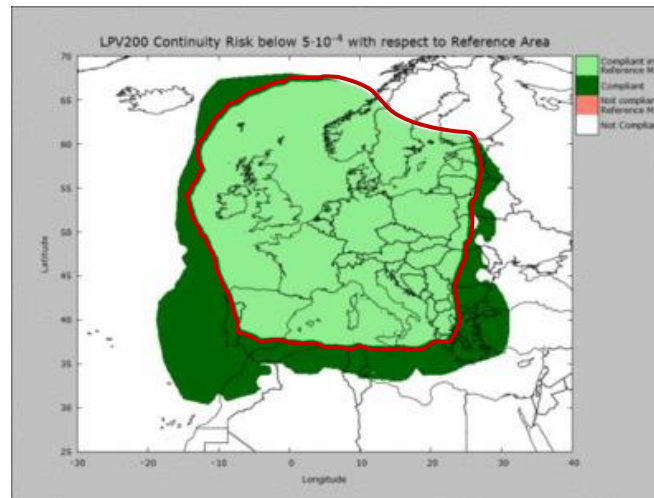
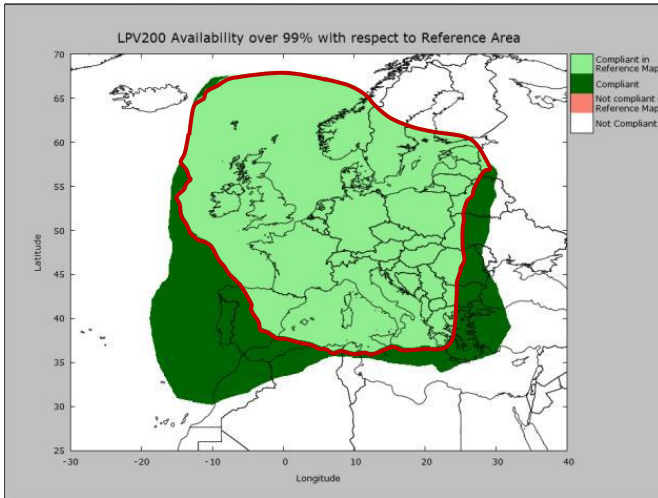
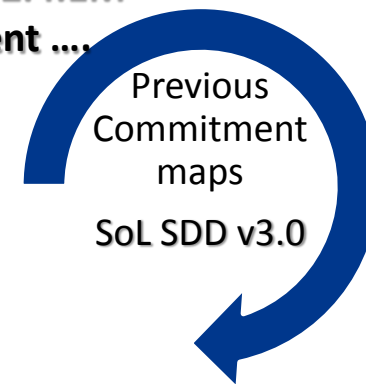
LPV-200 service level



Since ESR 2.4.1M
Deployment

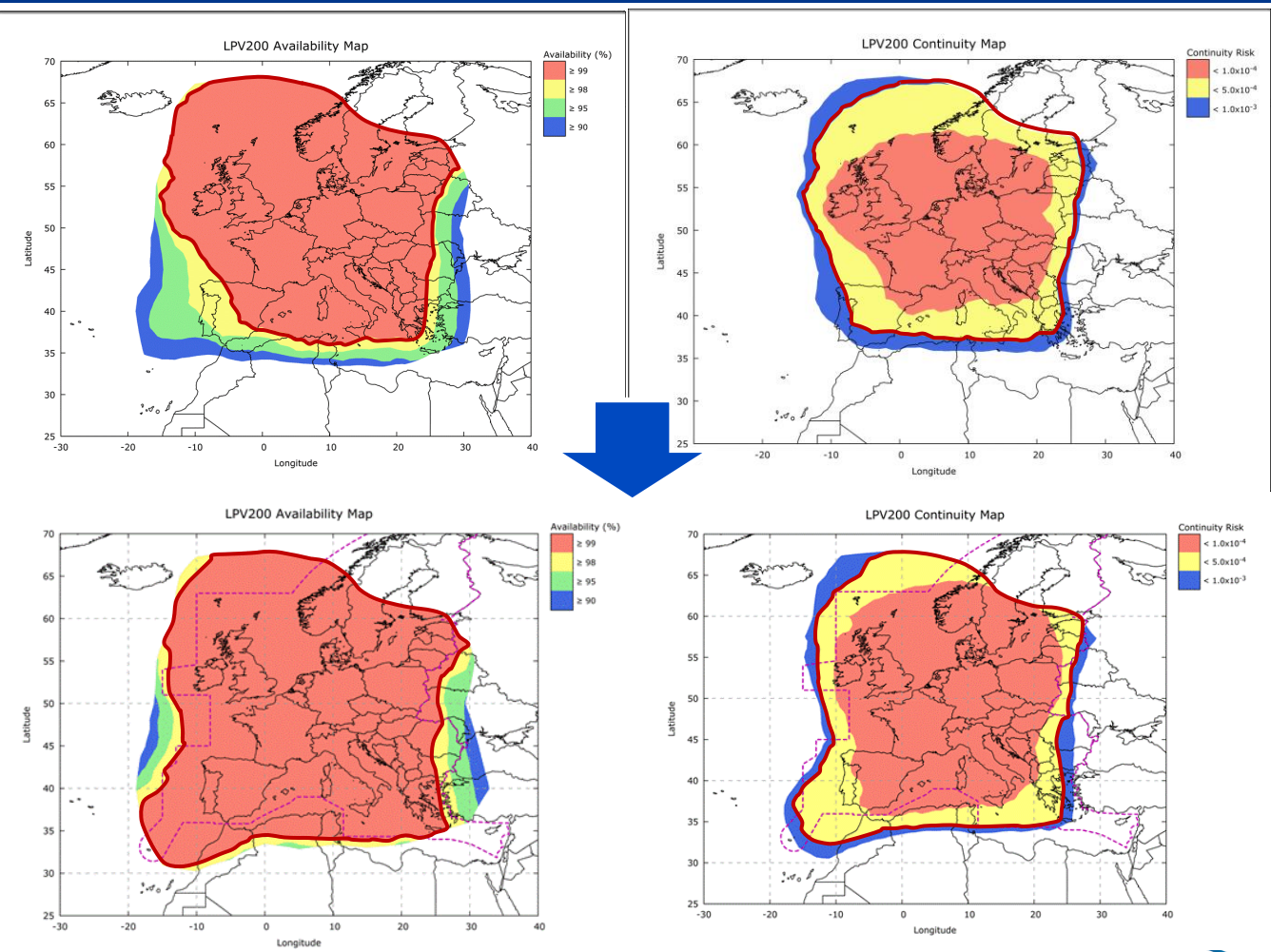
Previous
Commitment
maps

SoL SDD v3.0

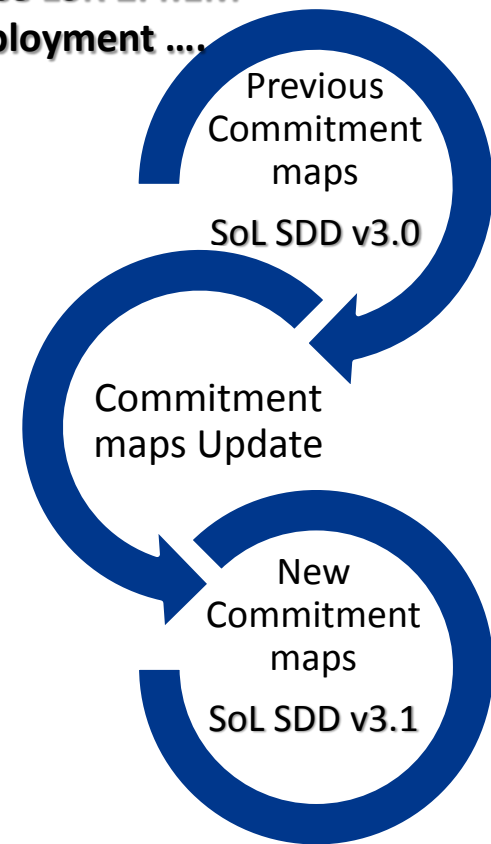


EGNOS Services Status

LPV-200 service level



Since ESR 2.4.1M
 Deployment ...



EGNOS Services Status

2x MCC

Mission Control Centers



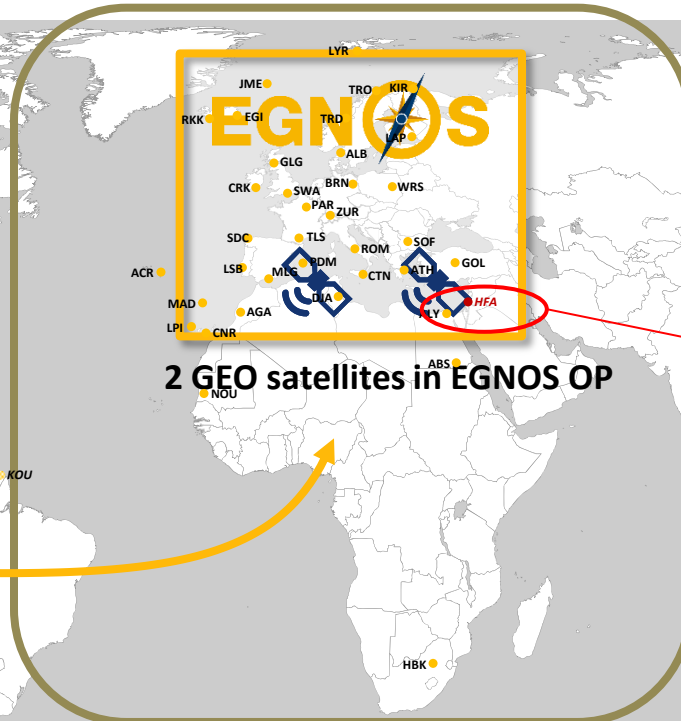
40x RIMS

Ranging & Integrity Monitoring Stations



6x NLES

Navigation Land Earth Stations



2 GEO satellites in EGNOS OP



Haifa RIMS



EGNOS Services Status



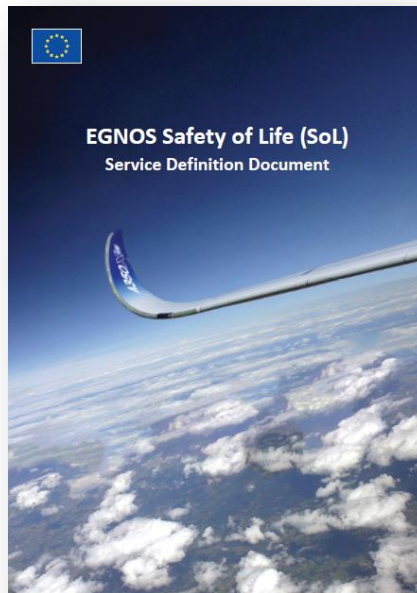
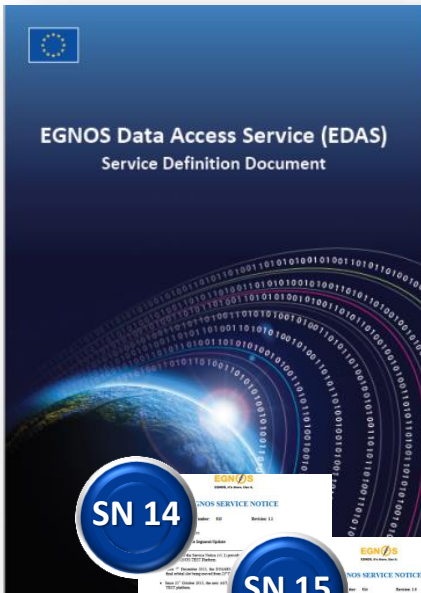
EDAS service
EDAS service Internet access to GNSS data in real-time and also through an historical archive*



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
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SN 14

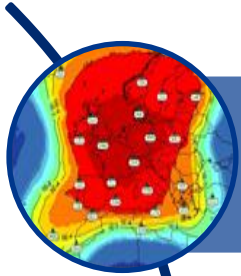
SN 15

SN 13

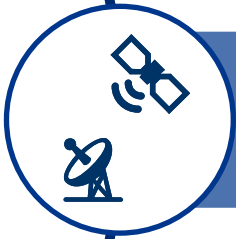
SN 14

SN 15

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EGNOS Performance Overview



EGNOS Status



EGNOS Services Evolution

EGNOS Service Evolution



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



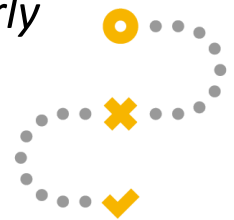
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Service **I**mplementation **R**oadmaps

high-level overview of the EGNOS Services current status and expected evolutions in a 3-year timeframe linked to the EGNOS System / Yearly Releases' deployments and information/interfaces evolutions



EGNOS Service Evolution

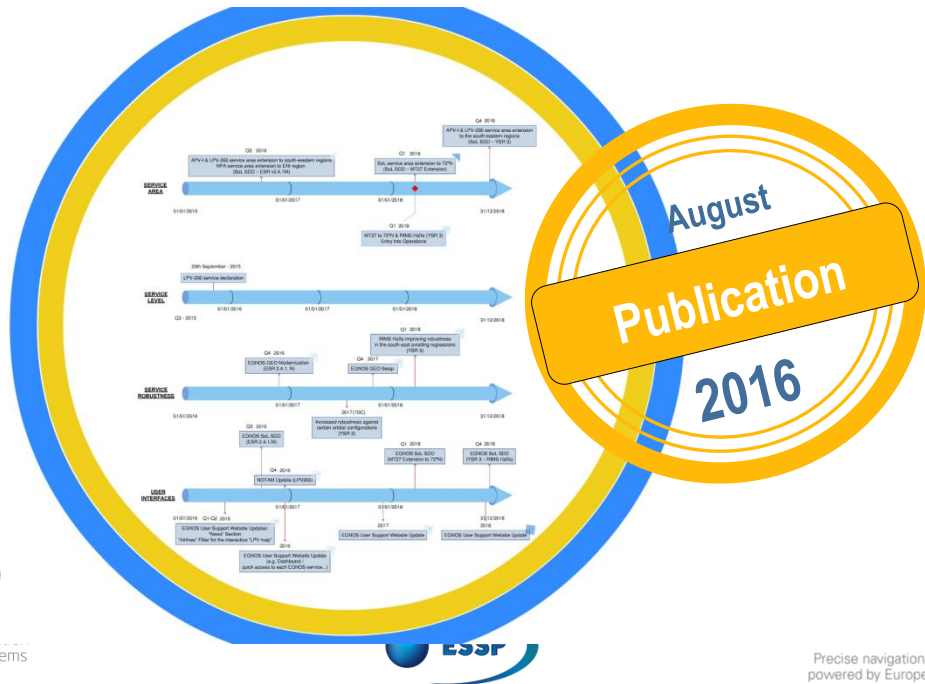
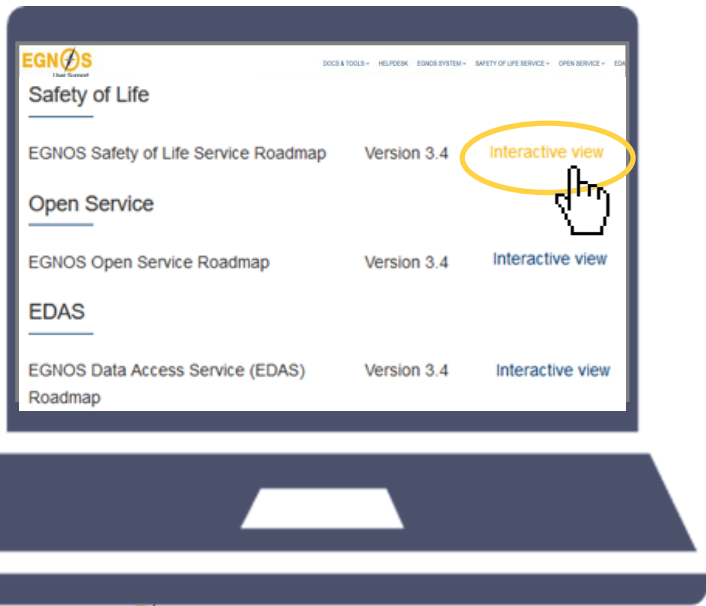
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Service Implementation Roadmaps



EGNOS Service Evolution

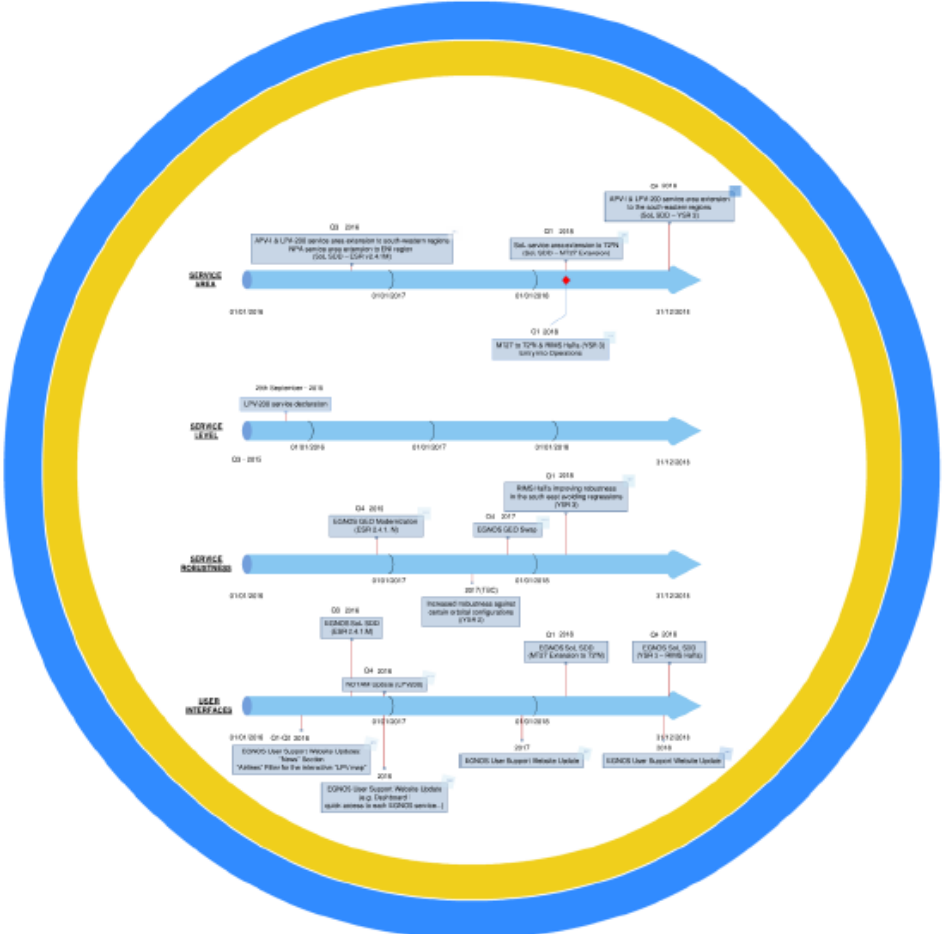


EGNOS SAFETY OF LIFE SERVICE ROADMAP August 2016 Version: 3.4

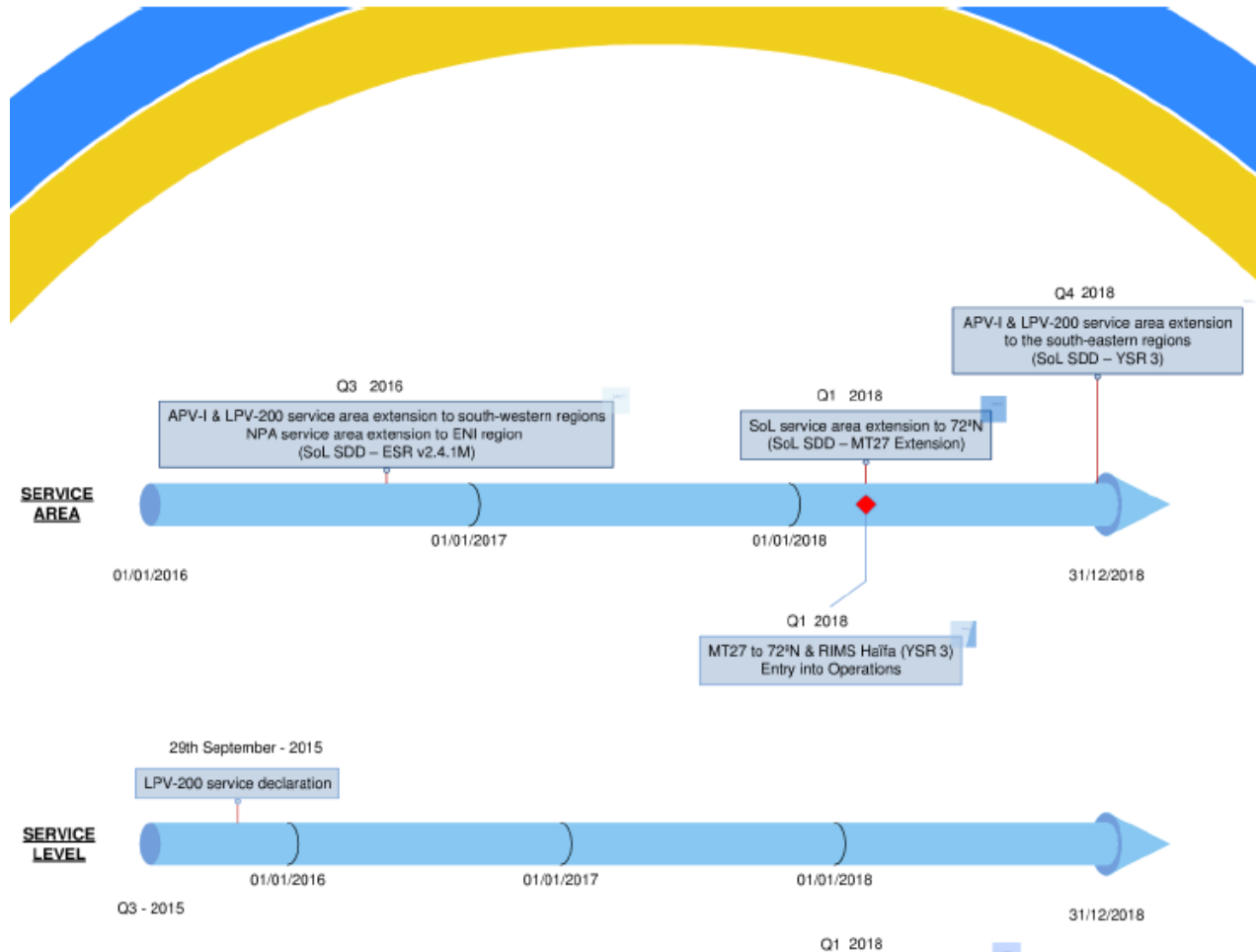
Click here to **START** →



EGNOS Service Evolution



EGNOS Service Evolution



EGNOS Service Evolution

Q3 2016

APV-I & LPV-200 service area extension to south-western regions
NPA service area extension to ENI region
(SoL SDD – ESR v2.4.1M)

01/01/2017

EGNOS Service Evolution

New commitment areas for NPA, APV-I and LPV-200 based on the recently deployed ESR v2.4.1M release and reflected in the SoL SDD:

- NPA Availability extension to fully cover ENI countries with 99.9% availability
 - APV-I availability extension to fully cover again Spain and Portugal (excluding Madeira, Azores and Canary Islands)
 - APV-I extension of continuity level 10-4 to most EU landmasses areas
 - LPV-200 coverage extension is foreseen to behave similarly to the APV-I coverage trend
- *Target Service area Entry into Operational use: Q3 2016*



EGNOS BULLETIN

Issue 16, Q3 2015

airBaltic
BOMBARDIER

PHOTO: AIR.B



EGNOS BULLETIN

Issue 19, Q2 2016

PHOTO: DASSAULT AVIATION



Precise navigation,
powered by Europe



Precise navigation,
powered by Europe



<http://egnos-portal.gsa.europa.eu/>



We certify you're there.

<http://www.essp-sas.eu>

<http://egnos-portal.gsa.europa.eu/>



We certify you're there.

<http://www.essp-sas.eu/>



29-30 Sept 2015
Copenhagen

The EGNOS Service Provision workshop

#agriculture

#aviation

#maritime

#rail

presentations
showcases
success stories

The yearly meeting for:
EGNOS stakeholders
users
application developers

egnos-workshop@essp-sas.eu

www.essp-sas.eu



We certify you're there.



GSA

EGNOS services LPV-200 DECLARED



During the EGNOS Service Provision Workshop, a new EGNOS SoL service level, called LPV-200, was officially declared. On behalf of the European Commission, the European GNSS Agency (GSA) acting as the EGNOS programme Manager together with ESSP SAS, the EGNOS Services Provider, declared the onset of the LPV-200 service provision to users. LPV-200 service level enables EGNOS-based operations in compliance with ICAO Annex 10 Category I precision approach signal-in-space performance requirements and supports RNP APCH PBN navigation specification down to LPV minima as low as 200 ft.



save the date

27-28 Sept 2016
Warsaw

The **EGNOS**
Service Provision
workshop



register for free



<https://egnosws.essp-sas.eu>

EGNOS Services Highlights

Measuring accuracy as farmers do:

Pass to Pass Accuracy

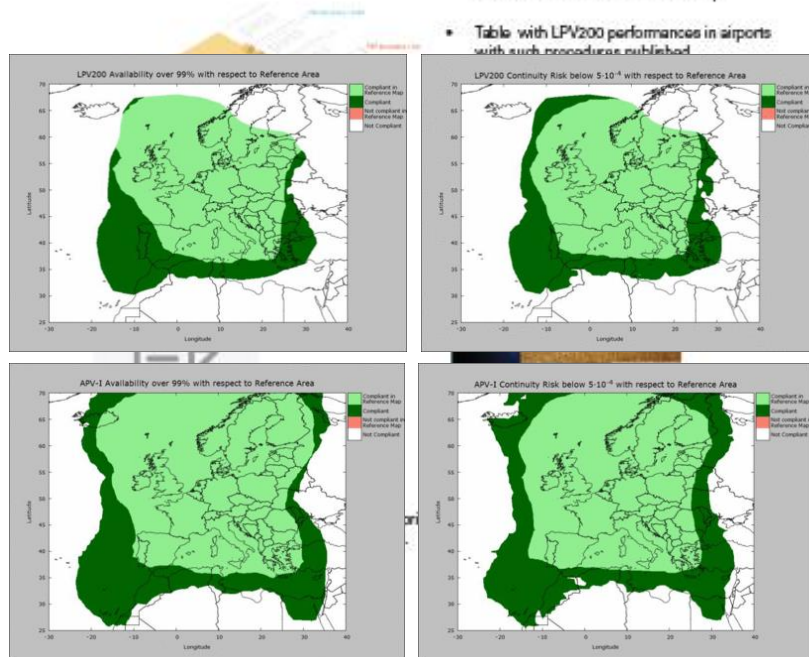
Since beginning May, the EGNOS User Support Website provides information on the accuracy provided by EGNOS measured as farmers do; using the pass to pass concept.

Please visit [here](#) to find this information on line.

New Performance Reporting

In the last months a number of improvements have been done in the monthly performance reports. Namely, these are:

- New graphs showing the daily compliance trend for APV1 & LPV200 availability.
- Table with LPV200 performances in airports with such procedure published.



EGNOS Services Evolution

ESR
2.4.1M

ESR 2.4.1M LPV-200

2015

EGNOS

EGNOS, it's there. Use it.

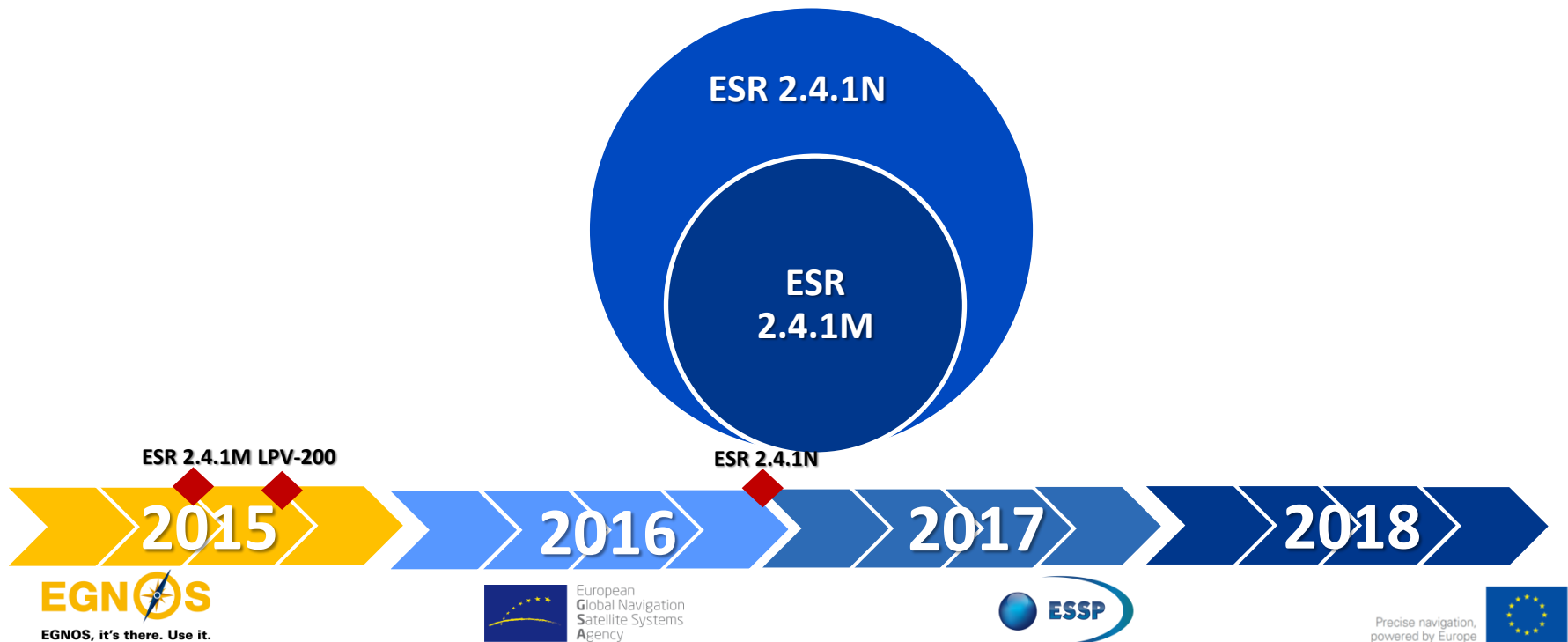
 European
Global Navigation
Satellite Systems
Agency



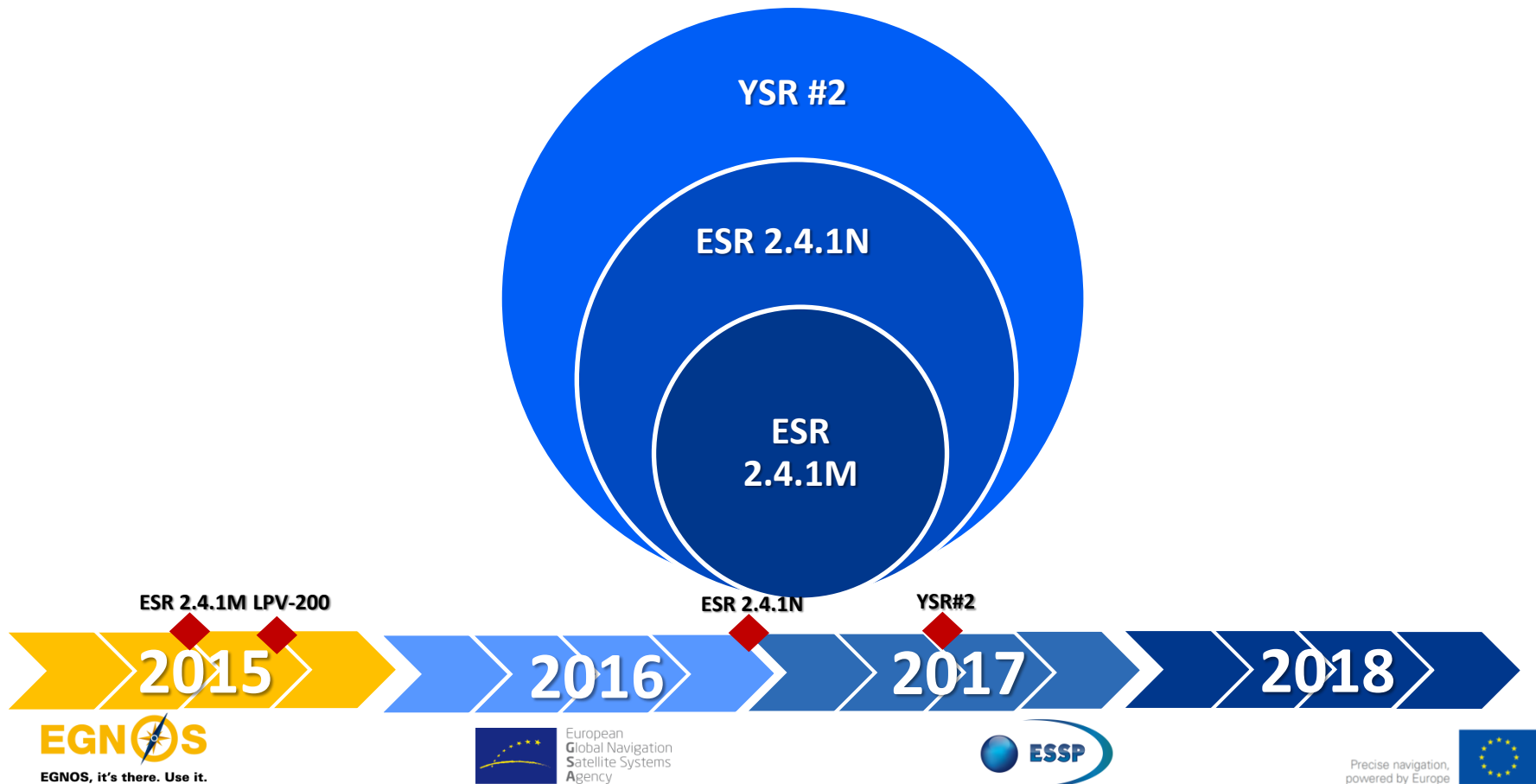
Precise navigation,
powered by Europe



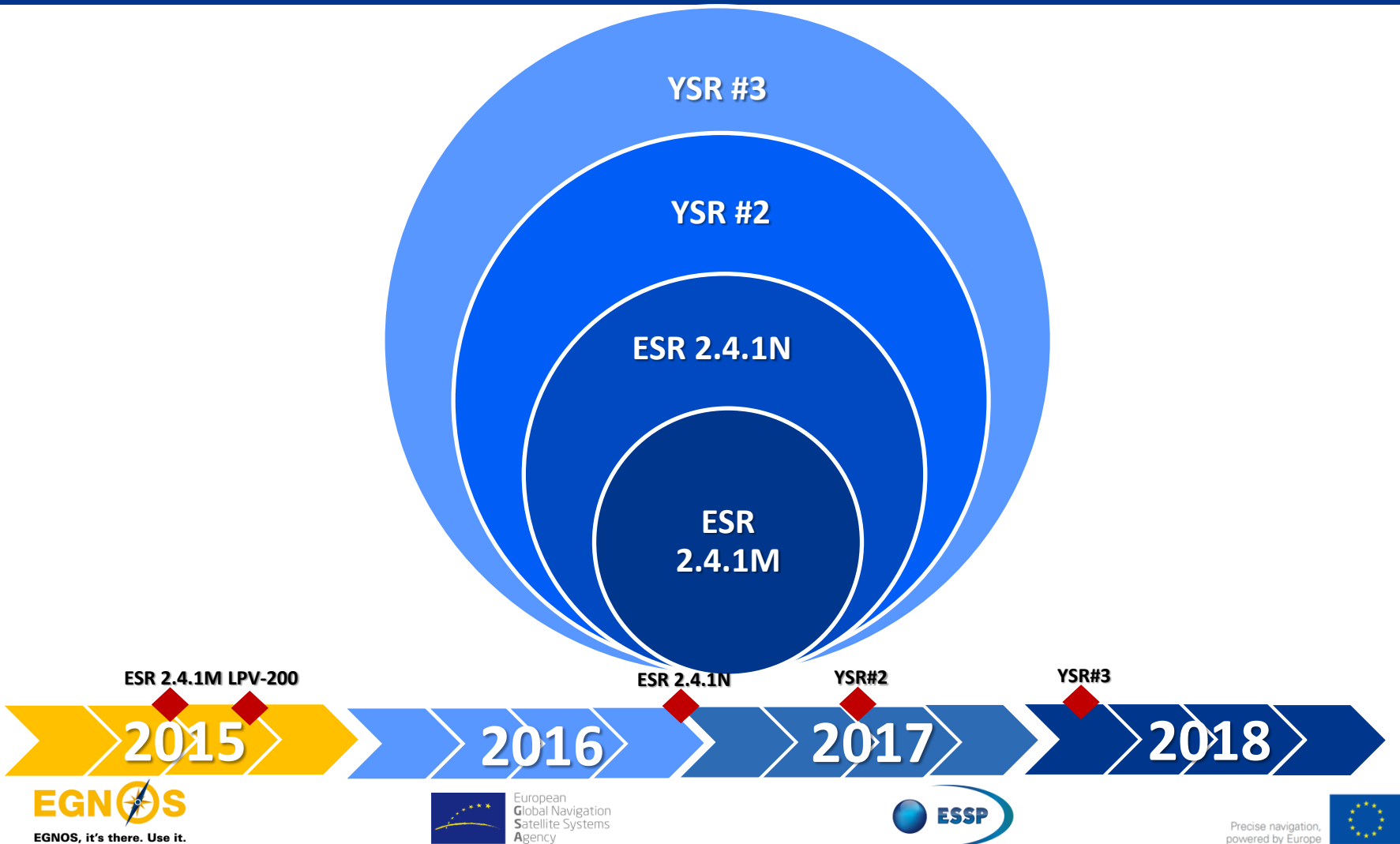
EGNOS Services Evolution



EGNOS Services Evolution



EGNOS Services Evolution



EGNOS Services Evolution Within this year ...



SERVICE AREA

APV-I/LPV200: Global extension in border areas, specially in south-west for availability
NPA: Availability extension to ENI
SoL

SERVICE ROBUSTNESS

USER INTERFACES

SoL SDD publication
ESR 2.4.1M



EGNOS Services Evolution Within this year ...



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SoL

Service coverage extension to the southern regions
—
OS

SERVICE ROBUSTNESS

USER INTERFACES

SoL SDD publication
—
ESR 2.4.1M

OS SDD publication
—
ESR 2.4.1M



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EGNOS User Support Website updates

—
All EGNOS Services

OS SDD publication

—
ESR 2.4.1M

ESR 2.4.1M LPV-200

2015

ESR 2.4.1N

2016

YSR#2

2017

YSR#3

2018

EGNOS Services Evolution Within this year ...



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New Data Available from EGNOS space segment Update: PRN123
—
EDAS

SERVICE ROBUSTNESS

EGNOS GEO Modernization:
ASTRA-5B (PRN123) into the
EGNOS OP
—
All EGNOS Services

USER INTERFACES

SoL SDD publication
—
ESR 2.4.1M

EGNOS User Support Website updates
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ESR 2.4.1N

YSR#2

YSR#3

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2018



EGNOS Services Evolution ... next years



SERVICE AREA

SERVICE ROBUSTNESS

USER INTERFACES

Increased performance stability
against certain orbital configurations
—
SoL & OS



EGNOS Services Evolution ... next years



SERVICE AREA

Extension in Norway and Finland
up to 72°N Latitude
—
All SoL Service Levels

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MT27 Extension to 72°N



EGNOS Services Evolution

... next years



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YSR#3 - RIMS Haifa



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... next years



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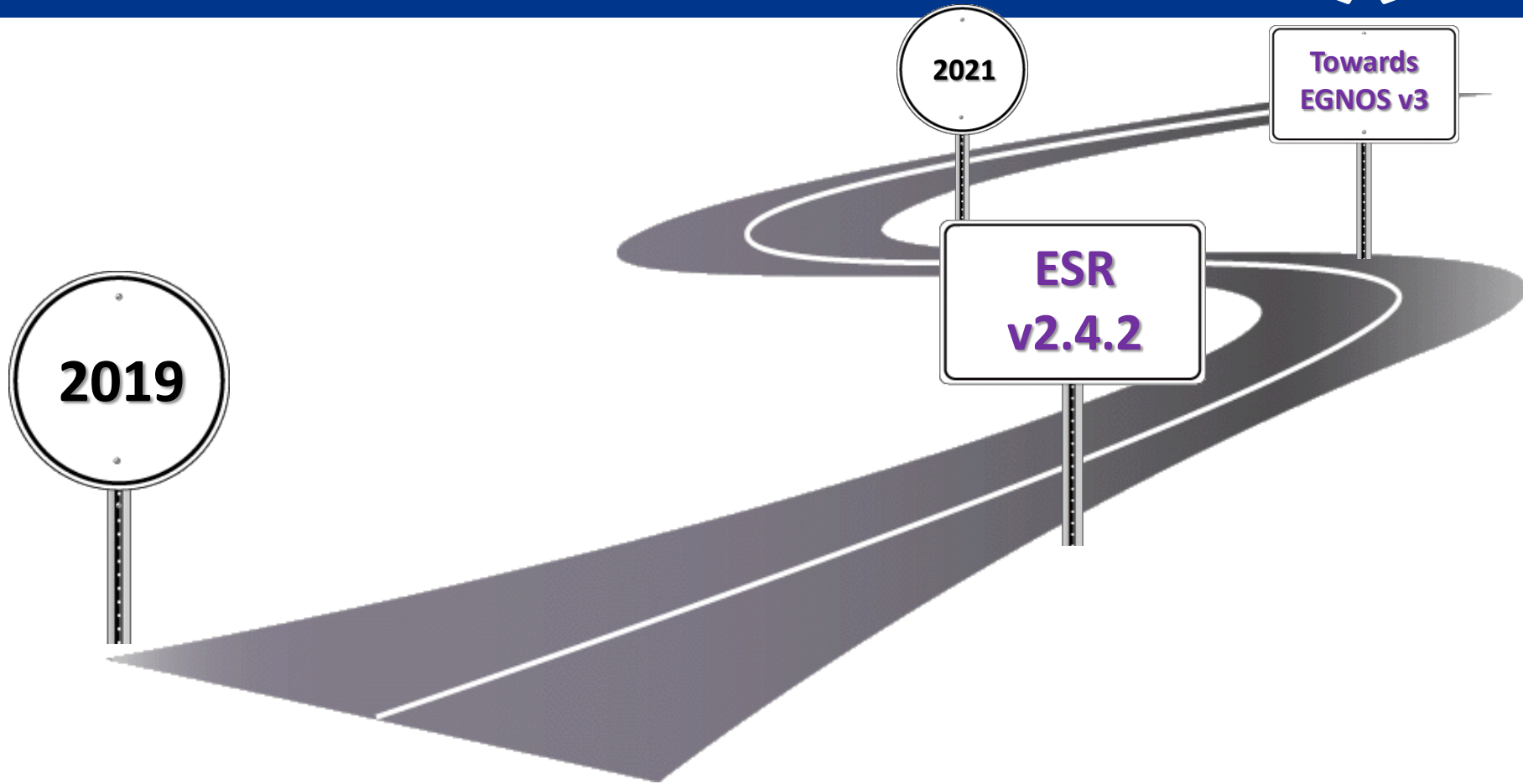
2015

2016

2017

2018

EGNOS Services Evolution Beyond 2018 ...



EGNOS Services Evolution Beyond 2018 ...



1

EGNOS Service area extension, e.g. for APV-I service level covering full EU-28 except Azores, Canary & Madeira islands (these last two with Av > 95%)

Resolution of system obsolescence

2

Service Performance Stability, specially increased robustness against IONO activity

System evolution at CPF level

3

Paving the way towards the **transition from EGNOS V2 to V3**

GEO modernization: new GEO-3



EGNOS, it's there. Use it.



USER SUPPORT WEBSITE

Multidevice



Find the support you need !

Greater

New

Better

Usability

Look & Feel

Accessibility

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

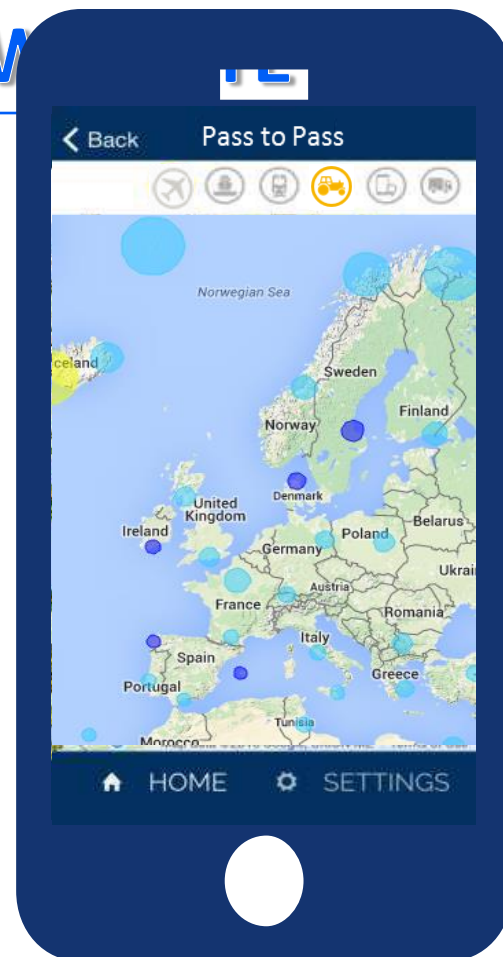




EGNOS, it's there. Use it.



USER SUPPORT W





EGNOS, it's there. Use it.



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Corporate Video

THANK YOU!