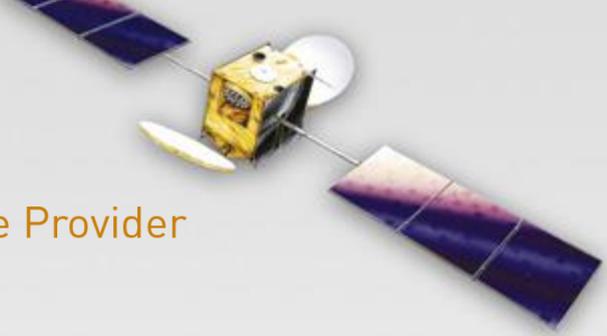


The **EGNOS** Service Provider



Service Provision Yearly Report (April 2020 - March 2021)



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EGNOS performance
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1 A WORD FROM THE ESSP CEO

This year has been marked by the COVID-19 crisis, which has had a lasting effect on the way we work, both internally and with the EGNOS stakeholders. At ESSP, we have responded quickly, adapted to the situation, and maintained first-class services.

The European Geostationary Navigation Overlay Service (EGNOS) Safety of Life (SoL) Service celebrates its 10th Anniversary this year. Nowadays, with over 700 EGNOS-based procedures at 367 airports and helipads, we can all celebrate this European success.

As in past years, the EGNOS performance observed during the last period (April 2020 to March 2021) remained high.

The operations side saw the integration of GPS Block III satellites (two space vehicles in July, one in December, and one in March 2021) which provided an improvement in the EGNOS service performance, degraded between March and July 2020 due to the decommissioning of some GPS-II satellites.

On the service provision side, an EWA was signed with the Cyprus ANSP in February 2021, so that all 27 EU countries are now covered by such an agreement. On the other hand, following the withdrawal of the United Kingdom (UK) from the European Union (EU), the UK ANSPs were informed on 24 December that the EGNOS Safety of Life and EDAS services would no longer be supported in the UK after 25 June 2021.

The EGNOS Programme's efforts towards implementing an EGNOS-based SBAS L1 maritime navigation service continued. Such service is now envisaged for 2023.

As was the case in 2018, the EGNOS annual event took place in December 2020 in the frame of the European Space Week. The event was 100% digital and gathered hundreds of participants. The EGNOS user satisfaction reached a score of 8.5 out of 10, again over 8 this year.

ESSP works on "EGNOS export programmes" continued for ASECNA and KARI (the Korean Aerospace & Research Institute), with a third contract signed with the future Korean Service Provider (IntoSpace) in March 2021.

It is also worth noting that ESSP's certificate as an ANSP was renewed by EASA in July 2020, in the context of the new 373 regulation.

Lastly, the year was also marked by the "ATM Magazine" award in the service provision category, received by ESSP and Norsk Luftambulans AS (a rotorcraft operator flying HEMS - Helicopter Emergency Medical Services), in recognition of EGNOS help in saving lives.

In these troubled times, I would like to thank the ESSP teams for their commitment, our partners and subcontractors for adapting to the situation and helping to maintain first-class services, and our customer EUSPA for their continued trust.



Thierry Racaud
CEO, ESSP SAS



2 EXECUTIVE SUMMARY

This document covers the period from 1 April 2020 to 31 March 2021.

2.1 EGNOS Service Performance

The EGNOS service performance has been good, providing consistent values with those committed in the Open Service, Safety-of-Life, and EDAS [Service Definition Documents](#).

EGNOS Safety of Life (SoL) Service – Non-Precision Approach (NPA)		
NPA Availability	96.93% coverage of the 99.9% NPA Service Area (EGNOS SoL SDD v3.3)	
NPA Integrity	No integrity event for any of the monitoring sites	
NPA Continuity	Values below $5 \cdot 10^{-4}$ /h in continental Europe	
EGNOS Safety of Life (SoL) Service – Approach with Vertical Guidance (APV-I)		
APV-I Availability	96.53% coverage of the 99% APV-I Service Area (EGNOS SoL SDD v3.3)	
APV-I Integrity	No APV-I integrity event	
APV-I Continuity	98.21% coverage of the $5 \cdot 10^{-4}$ APV-I Service Area (EGNOS SoL SDD v3.3)	
EGNOS Safety of Life (SoL) Service – LPV-200		
LPV-200 Availability	93.16% coverage of the 99% LPV-200 Service Area (EGNOS SoL SDD v3.3)	
LPV-200 Integrity	No LPV-200 integrity event	
LPV-200 Continuity	94.33% coverage of the $5 \cdot 10^{-4}$ LPV-200 Service Area (EGNOS SoL SDD v3.3)	
LPV-200 Accuracy Tails	No events happened during the period	
EGNOS Open Service (OS)		
Horizontal Accuracy	1.0 metres (95 th percentile of the cumulative data for all stations)	
Vertical Accuracy	1.5 metres (95 th percentile of the cumulative data for all stations)	
Open Service Availability	Above 99% for all locations	
EGNOS Data Access Service (EDAS)		
Service	Availability	Latency
Service Level 0	99.98% vs 98.5% target (EDAS SDD)	702.46 ms vs 1300 ms target (EDAS SDD)
Service Level 2	99.98% vs 98.5% target (EDAS SDD)	703.09 ms vs 1450 ms target (EDAS SDD)
Ntrip	99.98% vs 98% target (EDAS SDD)	666.19 ms vs 1750 ms target (EDAS SDD)
SISNeT	99.97% vs 98% target (EDAS SDD)	64.42 ms vs 1150 ms target (EDAS SDD)
Data Filtering	99.99% vs 98% target (EDAS SDD)	486.50 ms vs 1750 ms target (EDAS SDD)
FTP	99.96% vs 98% target (EDAS SDD)	N/A
Signal-In-Space (SIS) Availability		
PRN123	99.947%	
PRN 136	99.990%	
Grouped GEO Availability (at least one SIS)	100%	

Table 1: EGNOS service performance during April 2020 – March 2021 period

The leading causes for the observed EGNOS Service performance degradations were:

- EGNOS OS and SoL services:

- **GPS monitoring:** Problems related to monitoring one or more GPS satellites (e.g. non-monitored satellites due to the lack of visibility from the EGNOS reference stations, satellites set to 'Don't use'/'Not Monitored') are one of the most frequent causes for observed underperformance. This loss of monitoring of some satellites has been especially significant in performance impact during periods with degraded ionosphere monitoring conditions.

The main issue impacting EGNOS performance was related to the in-progress GPS block II decommissioning and the time needed to qualify and configure GPS block III in the EGNOS PRN mask (the first ones introduced in EGNOS by the end of July 2020), which degraded the EGNOS performance over the borders (in particular the north) of the Service Area and led to the corresponding communications to the concerned ANSPs, in line with the applicable mechanisms as per the EWAs

The importance of this type of issues has significantly increased compared to the previous year (approximately 59% of the daily underperformance events vs 40% in the preceding period) mainly due to the impact associated to the time needed to introduce GPS-III satellites in the EGNOS GPS mask.

- **RIMS/EWAN unavailability events:** The unavailability of data from the RIMS sites due to failures of maintenance activities has impacted the EGNOS service performance on specific days in areas near the affected station. The most significant event of this kind was the lack of RIMS ALY from the end of October 2020 to the beginning of March 2021 that degraded APV-I and LPV200 performance over the southeast of the Service Area.

Globally, these events have been the second cause for underperformance (approximately 18% of the daily underperformance events).

- **Ionosphere monitoring:** the EGNOS ionospheric monitoring issues affected mainly the north and west of the Service Area. In general, the impact of this kind of events is limited to specific areas and short periods, without having a significant effect on the monthly performance. Although still one of the main causes of observed underperformance, the impact of this kind of events has significantly decreased compared to the previous year period (around 14% of the daily underperformance events vs 22% in the last period).

- EDAS:

Very stable services with monthly performances consistently exceeding the committed values defined in the EDAS SDD (Service Definition Document). All EDAS services were available more than 99.95% of the time of the period considered, with transit delays largely below the one-second threshold.

During the reported period, the main service outage took place on 29 September 2020. EDAS services were unavailable for a period ranging between 50 minutes and 1 hour 30 minutes, depending on the service, due to a power supply issue. The nominal system and services status were recovered during the day without any specific action required on the users' side.

2.2 Service Provision and Development

- **Service Evolution:**

- **Service Definition Documents (SDD):**

Activities towards the publication of several versions of the SoL SDD are ongoing in the SoL service: the first version as a consequence of an update of the SoL service region actively pursued by the EGNOS Programme (magenta line), following the withdrawal of the United Kingdom from the European Union officially published on 4 May 2021 (SoL SDD v3.4); a second version with the service extension for APV-I and LPV200 in the southeast of Europe, observed since the introduction of RIMs Haifa in 2019. More information can be found in section 4.2.



[EGNOS Service Definition Documents](#)

- **Services Notices:**

Several templates and drafts were prepared to anticipate changes and potential impact to the EGNOS Services SDDs contents, such as the COVID-19 situation. Gladly, no publication was finally necessary. Section 4.2 includes the main information on these Service Notices.

- **EGNOS Service Implementation Roadmap:**

The EGNOS Services Roadmaps were updated to v4.3 in April 2020, with improvements in content and format.

- **EGNOS Workshop:**

- The EGNOS Annual Workshop was held online during the European Space Week on 9 December 2020, with 1,300 people registering for the hour and a half-long session.

Information was provided on the status and roadmap of the EGNOS Programme and the evolution of its implementation in different markets, maintaining a practical approach with real and new examples of the benefits that EGNOS continues to offer to European users.

- The 2021 EGNOS Annual Workshop will also take place online on 02 December 2021.

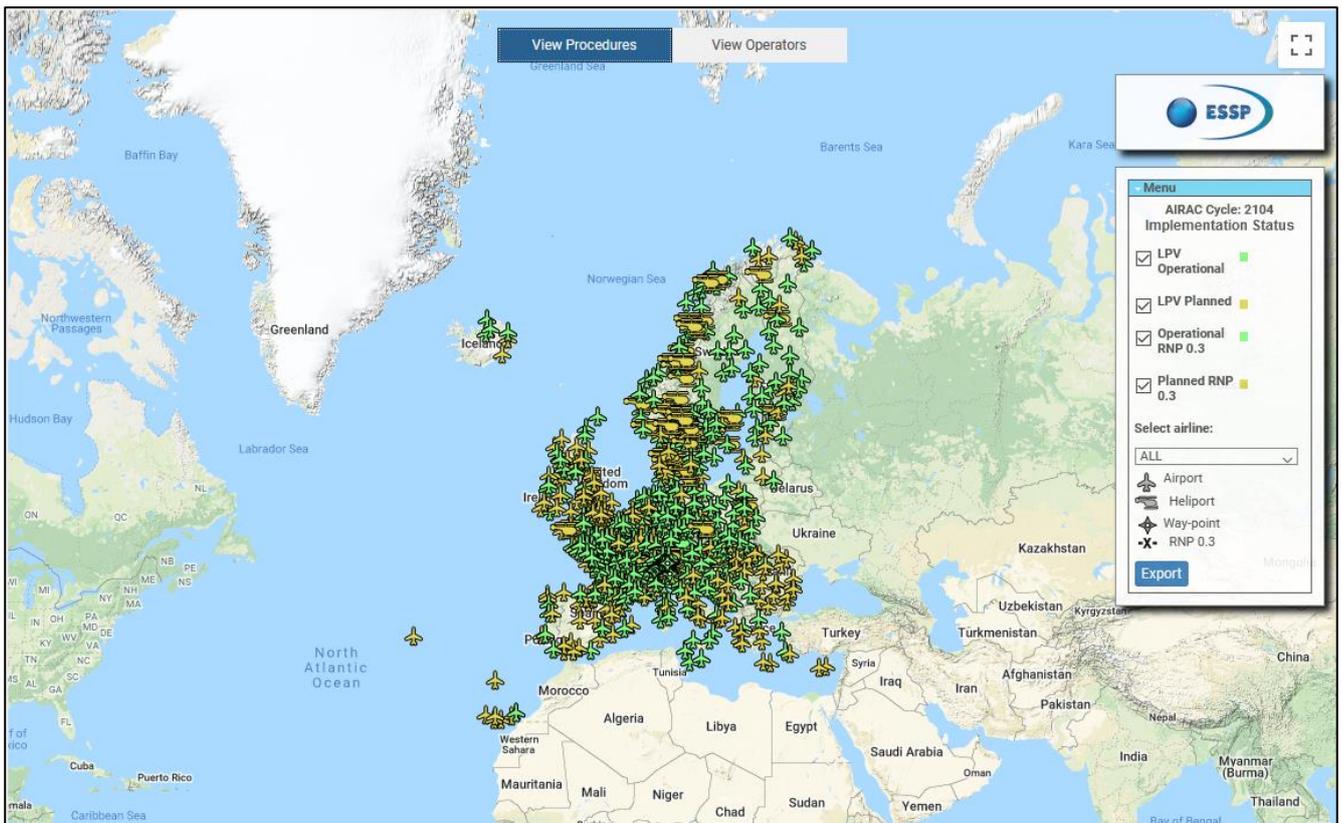
- **EGNOS User Satisfaction surveys:**

- The EGNOS User Satisfaction Survey was launched on an online platform in December 2020 and closed on 06 April 2021, receiving a total of 124 responses.

The outputs from this survey will be included in the [EGNOS Bulletin Summer 2021](#) and published on the EGNOS User Support Website. The global user satisfaction score for this period was 8.5.

- **EGNOS SoL Implementation in aviation:**

- EGNOS procedures: At the end of the period included in the report (31 March 2021), ESSP was supporting the EGNOS-based operations for 35 countries (+2 versus the period April 19-March 2020), 394 airports (+34 versus the period April 19-March 2020), and a total of 766 EGNOS-based operations (426 APV-I, 293 LPV-200, 47 APV-Baro EGNOS-based approach procedures, and 5 RNP 0.3 routes. Altogether +66 versus the period April 19-March 2020). In total, 56.40% of the instrumental runways in Europe implement EGNOS approaches.



EGNOS Procedures map ([EGNOS User Support Website](#))

- **User Service Implementation:**

- EGNOS Multimodal Adoption:

All the activities planned to be executed during 2020 were successfully conducted. The market segments where more effort was devoted were aviation and maritime, followed by agriculture & geomatics, and rail.

Despite the difficult situation the aviation market has suffered due to COVID-19, ESSP has continued engaging aerodromes to publish the EGNOS-based procedures and operators to get equipped and certified. During the period reported in this document, 119 procedures to the LPV minima (being distributed as 68 LPV, 45 LPV200, 4 LPV200(Hel), and 2 PinS) were published, and 86 aircrafts have been certified or have achieved operational approval.

In the maritime domain, the EGNOS L1 Maritime Service activities have continued and those linked to the use of the EGNOS V2 SiS or EDAS as a positioning source for Aids to Navigation (IALA DGNS stations and AIS stations). Contact has been established with Slovakian authorities to offer our support (by elaborating a customised technical feasibility assessment and cost benefit analysis) to recapitalise their AIS stations.

The contacts network has notably increased in agriculture and geomatics, and customised EGNOS information for those market segments has been prepared and disseminated. Precision Farming has achieved more presence in specialised forums and closer contact with a significant number of Universities.

In the rail sector, ESSP has continued supporting the EUSPA with a special focus on assessing the market size of European freight wagons envisaged to be equipped with GNSS devices (non-SoL market). With the information gathered it has been estimated that the market size of freight cargo cars to retrofit with EGNSS devices is nearly 200,000 units, and the timeframe to achieve this figure is 2022. Approximately 156,000 smart wagons have already been equipped with EGNSS telematics devices, and 88,000 wagons are already using EGNOS-enabled devices.

- **User Support:**

- The EGNOS App was updated for [Android](#) and [Apple](#) markets, including the new Satellite finder feature, in December 2020.
- The EGNOS User Support website continued its evolution, adding new tools, such as:
 - A new Aviation Portal design (restyle from the existing portal), where the EWA signatories can manage their documentation and information relevant to the EGNOS Working Agreements.
 - Environmental assessment in the EBCAST Tool.
 - SBAS Avionics.
 - Login for authenticated pages.
- The EGNOS Helpdesk managed 292 user requests and an awareness campaign targeting social networks was launched.

Also, during this period, 51 new articles covering all market segments were published in coordination with several ESSP departments and the EUSPA.

- EGNOS User Support Website activities:
 - The EGNOS User Support Web has 3,837 registered users. There were 321 new registered users in this period.
 - The number of visits vastly increased during this period: from 133,740 sessions in the previous period to a total of 222,030.

2.3 System Operations and Maintenance

During the past period, EGNOS operations were managed to avoid COVID-19 restrictions impacting EGNOS services. Four GPS-III PRNs were integrated within the EGNOS GPS PRN mask (PRN04 and PRN18 in July 2020, PRN23 in December 2020, and PRN14 in March 2021).

3 SERVICE PERFORMANCE

3.1 EGNOS SIS Availability

Definition
<p>Individual GEO availability: Percentage of time each geostationary satellite broadcasts a valid EGNOS SIS. A valid SIS is defined as a Signal-In-Space compliant with ICAO SARPS and RTCA MOPS.</p>
<p>Grouped GEO Availability: Percentage of time in which at least one geostationary satellite in the EGNOS operational configuration (EGNOS-OP) broadcasts a valid EGNOS SIS. A valid SIS is defined as a Signal-In-Space compliant with ICAO SARPS and RTCA MOPS.</p>

This section presents the yearly performance of the SIS availability. It provides the yearly average performances for each GEO PRN in operational mode, namely PRN123 and PRN136, and the grouped GEO availability (at least one SIS is available).

- PRN136: 99.990%
- PRN123: 99.947%
- Grouped GEO Availability (at least one SIS): 100%

Monthly results are depicted in the following figure:

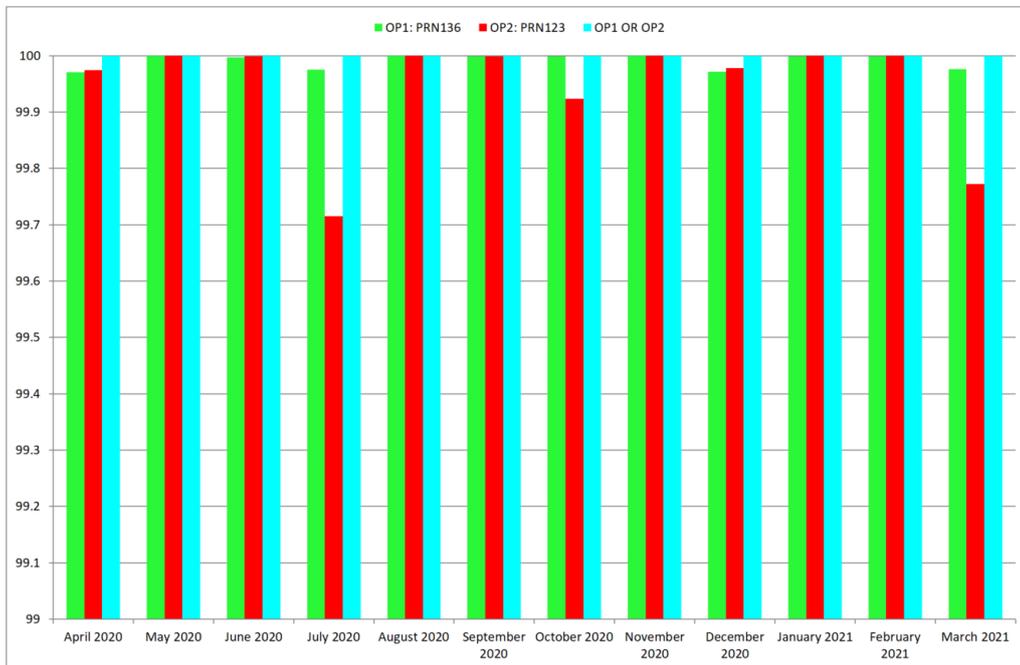


Figure 1: EGNOS SIS OP availability trend: April 2020 to March 2021 (%)

Information on the EGNOS GEOs’ footprint is available on the [EGNOS User Support Website](#).

Numerical values for each month and each PRN are given in the following Table:

DATE	OP1: PRN136	OP2: PRN123	OP1 OR OP2
April 2020	99.9711	99.9742	100
May 2020	100	100	100
June 2020	99.9971	99.999	100
July 2020	99.9754	99.7151	100
August 2020	100	99.9996	100
September 2020	99.9985	99.999	100
October 2020	99.9987	99.9234	100
November 2020	100	100	100
December 2020	99.972	99.9777	100
January 2021	99.9986	99.9995	100
February 2021	99.999	100	100
March 2021	99.9761	99.7719	100
Average Monthly availability	99.9905	99.9466	100

Table 2: EGNOS SIS OP Monthly availability From April 2020 to March 2021 (%)

3.2 SoL Service - Non-Precision Approach (NPA)

The following figures depict the minimum performance for the Non-Precision Approach (NPA) availability and continuity that can be expected from EGNOS, as defined in the EGNOS SoL Service Definition Document (see [EGNOS SoL Service Definition Document](#)). Version v3.3 of the SoL SDD was published on 26/03/2019 and remained applicable for the whole reported period.

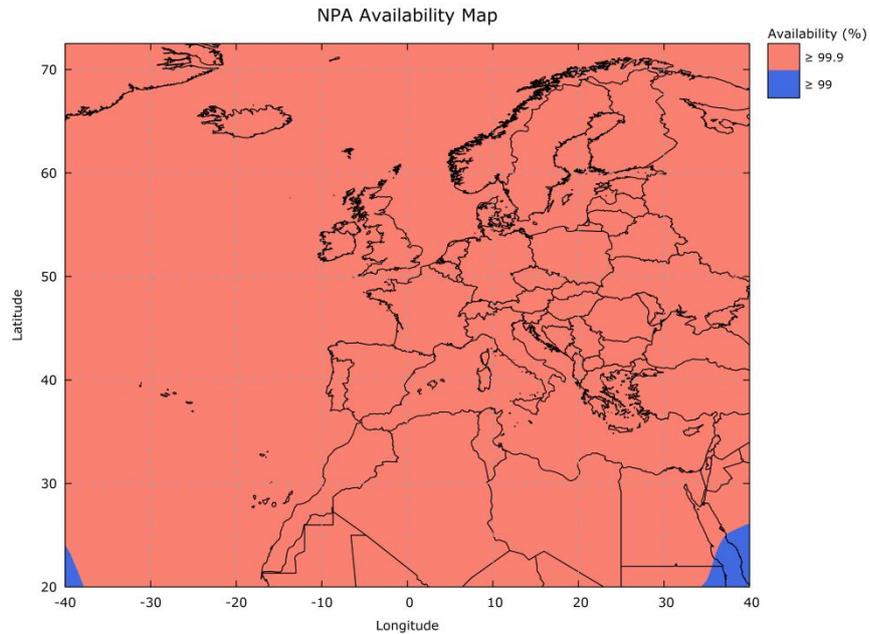


Figure 2: NPA Availability map- Expected minimum performance (SoL SDD v3.3)

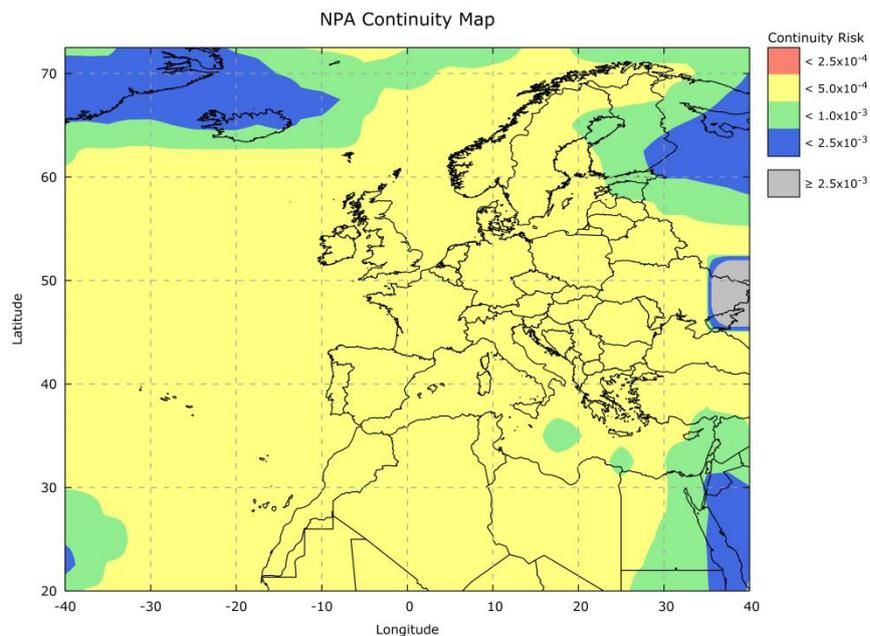


Figure 3: NPA Continuity map - Expected minimum performance (SoL SDD v3.3)

These values correspond to the expected performance measured by a fault-free receiver using all GPS satellites in view for one month, using all the operational EGNOS GEOs.

The NPA performance achieved during the reporting period is reported below. Additionally, the NPA performance is conveyed through the EGNOS Monthly Performance reports, available on the [EGNOS User Support website](#).

3.2.1 NPA availability

EGNOS NPA Availability is defined as the percentage of samples in which the Horizontal Protection Level (HPL) is below the Alert Limit for NPA (HAL: 556m), computed over the total period.

The following figure provides the NPA availability for the reported period for combined GEO (understood as the use of corrections from either one of the two operational GEOs, switching between each one of them in the event an SIS outage longer than three seconds is observed):

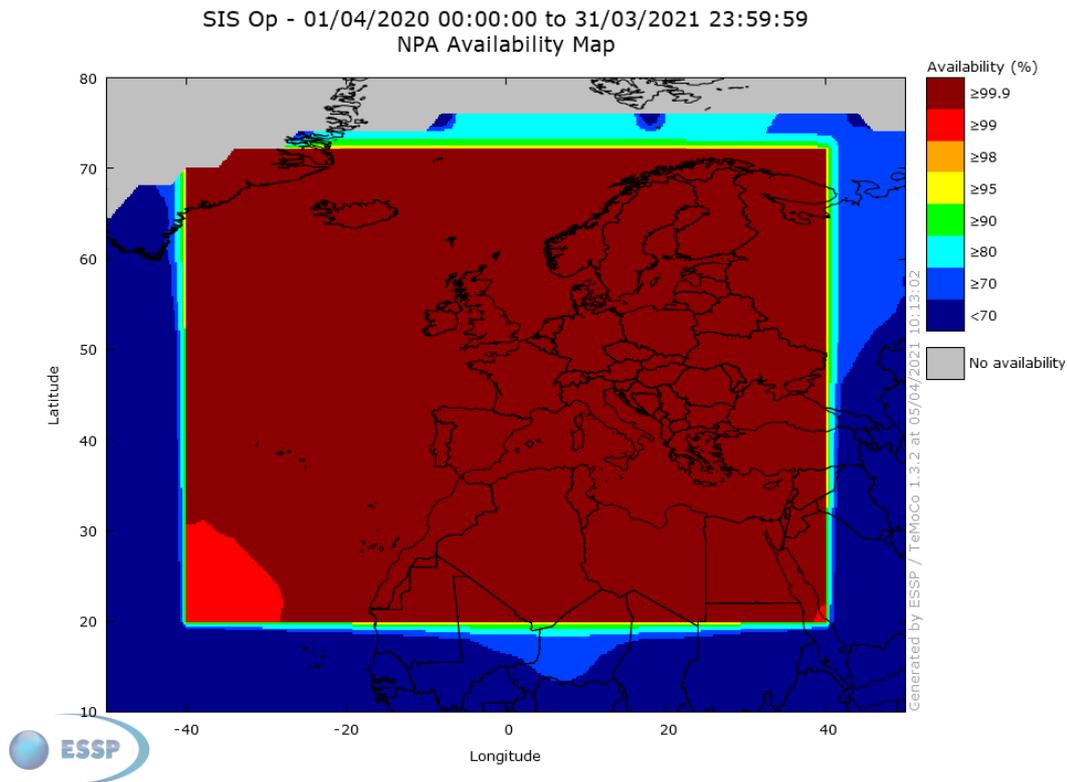


Figure 4: NPA Availability from 01/04/20 to 31/03/21

The NPA availability performance has been excellent during the reporting period: greater than 99.9% over the entire NPA Service Area¹ except a very small region over Greenland due to the lack of visibility of the EGNOS operational GEO satellites (GEO-1/PRN136 and GEO-2/PRN123).

¹ The NPA Service Area is the 99% NPA availability area depicted in Figure 2 from the [EGNOS Safety of Life SDD](#). It corresponds to the MT27 area.

3.2.2 NPA availability - Achievement against target

The combination of the 99% NPA Availability map and the NPA Service Area¹ is shown in the following figure. It should be noted that thanks to the excellent NPA service performance within the GEO satellites footprint, the north-west corner was not covered by the GEO footprint during the reporting period.

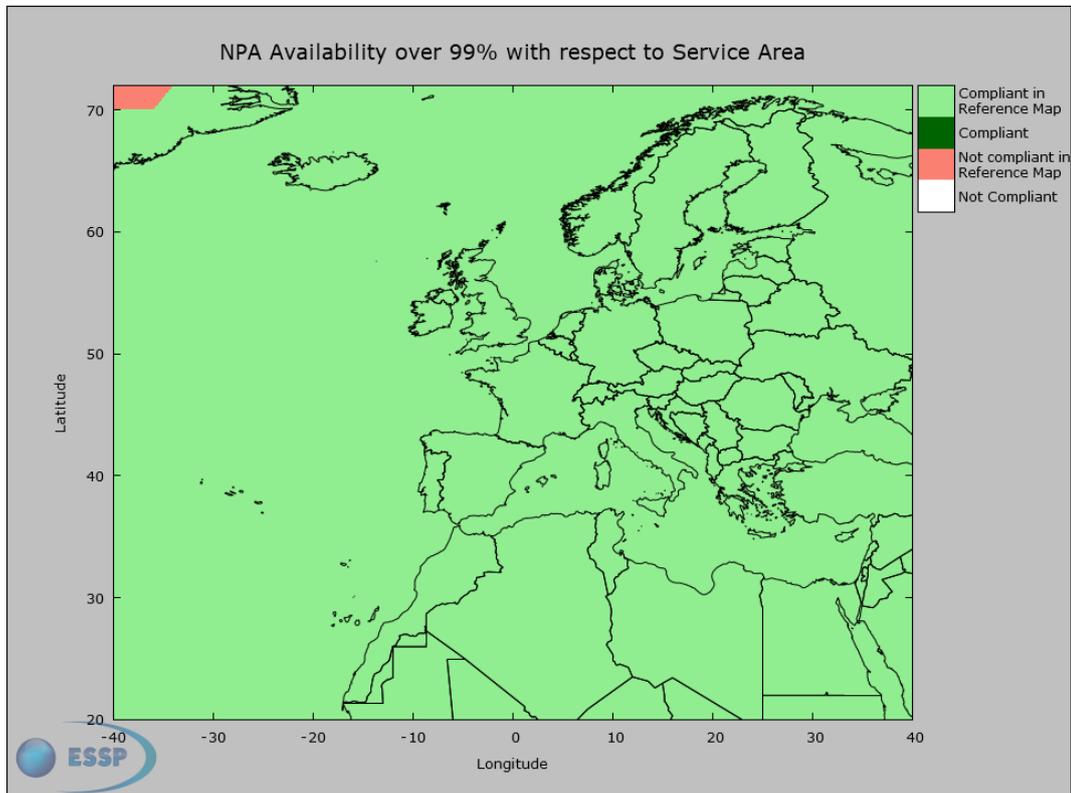


Figure 5: NPA Availability map with respect to the Service Area – 01/04/20 - 31/03/21

The picture should be understood as follows:

- **Compliant in Reference Map:** This is the part of the Service Area² where the NPA availability was above 99%.
- **Not compliant in Reference Map:** This is the part of the Service Area² where the NPA availability was lower than 99%.

As shown in the figure above, the NPA availability was greater than 99% over the area in which the EGNOS GEOs were visible for the reporting period.

Considering the SoL SDD v3.3 commitments as the reference, the percentage of compliant points with the commitment is **99.73%** (this figure corresponds to 100% of the 99% NPA Service Area not affected by the lack of visibility of EGNOS GEOs). Note that the comparison with respect to the SDD SoL commitment map is included for information purposes. The commitment map is a monthly reference, while the reported period is one year. Therefore, this comparison must be interpreted with care.

² The NPA Service Area is the 99% NPA availability area depicted in Figure 2 from the [EGNOS Safety of Life SDD](#). It corresponds to the MT27 area.

3.2.3 NPA Integrity

EGNOS NPA Integrity Event is defined as an event in which the Navigation System Error is greater than or equal to the corresponding Protection Level for NPA.

The **Safety index** is defined as the Navigation System Error versus the Protection Level ratio (assuming the NPA algorithms to compute $xNSE$ and xPL) for each second. If the $xNSE/xPL$ ratio is over 1, it indicates that a Misleading Information situation has occurred.

Table 3 shows the maximum HSI at each RIMS inside the NPA Service Area (Figure 2).

Station	HSI	Station	HSI
Abu Simbel	0.18	Kirkenes	0.22
Azores	0.19	Lappeenranta	0.20
Agadir	0.25	La Palma	0.26
Aalborg	0.20	Lisbon	0.26
Alexandria	0.21	Madeira	0.27
Athens	0.18	Malaga	0.19
Berlin	0.22	Palma de Mallorca	0.20
Canary Islands	0.25	Reykjavik	0.17
Cork	0.30	Roma	0.21
Catania	0.18	S. de Compostela	0.30
Djerba	0.18	Sofia	0.26
Egilsstadir	0.19	Swanwick	0.26
Glasgow	0.23	Toulouse	0.22
Golbasi	0.18	Trondheim	0.21
Gävle	0.20	Tromsoe	0.27
Haifa	0.21	Warsaw	0.23
Jan Mayen	0.29	Zürich	0.20

Table 3: NPA Safety Index (maximum) at reference stations

None of the RIMS stations inside the SDD commitment area was impacted by integrity events in the position domain during the analysed period.

The following figure provides the HSI (Horizontal Safety Index) histogram, collecting measurements from the different EGNOS stations and for the operational GEOs over the entire period.

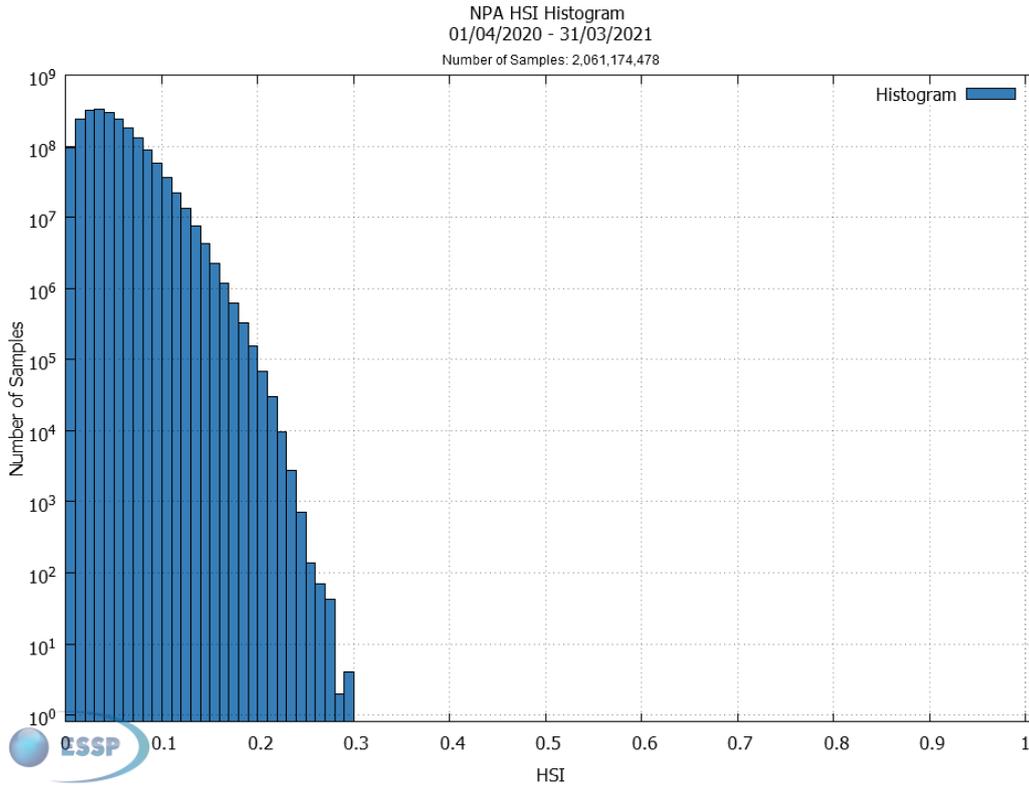


Figure 6: NPA Horizontal Safety Index³

³ Note that some periods may have been removed for the computation of the different histograms presented in this document, corresponding to stations showing bad quality of data linked to the local environment. Data extracted from histograms correspond to data from RIMS in which any OR affecting data quality has been observed, the presence of cycle slips affecting performance have been detected, or other data quality issues have been traced as cause of daily degradations.

3.2.4 NPA Continuity

EGNOS NPA Continuity is computed by dividing the total number of single continuity events, using a time-sliding window of one hour, by the number of samples with a valid and available NPA navigation solution. A single continuity event occurs if the system is available at the start of the operation and, in at least one second within the following time-sliding window of one hour, the system becomes unavailable.

The following figure shows the NPA Continuity Risk obtained for the GEO, combined over the entire analysed period.

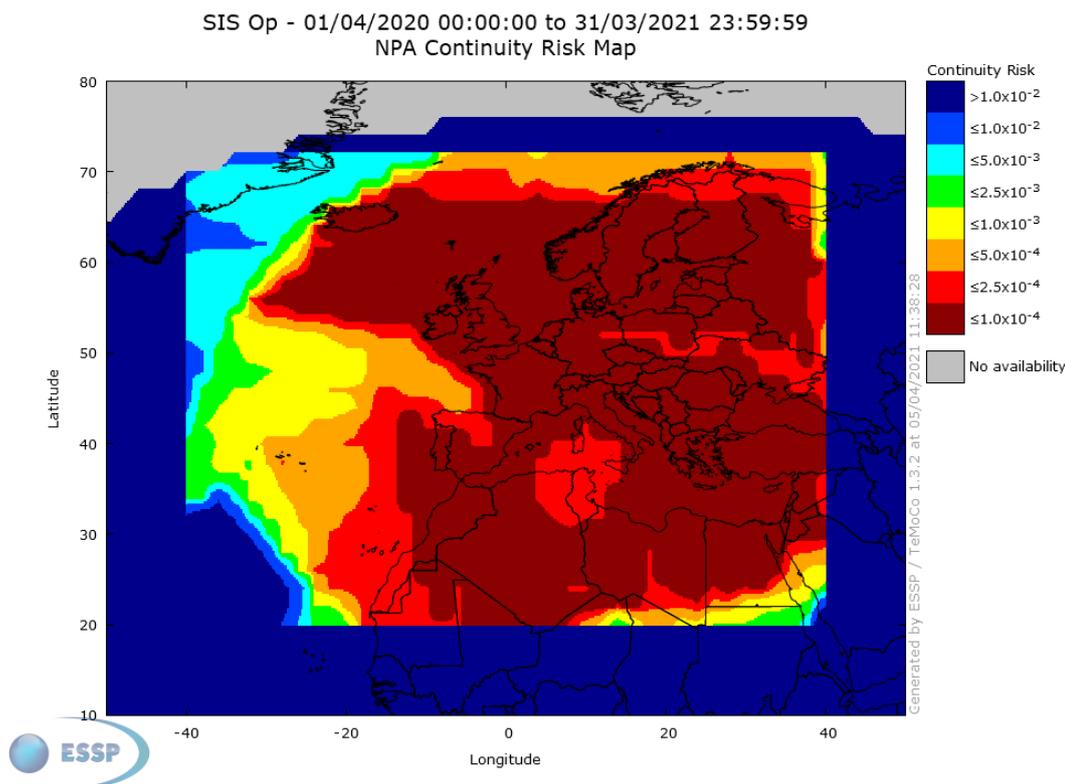


Figure 7: NPA Continuity Risk from 01/04/20 to 31/03/21

As shown in the previous figure, most of the MT27 Service Area presents a continuity risk lower than $1 \cdot 10^{-3}$ except for the corners where the performance achieved is slightly worse, mainly due to the lower number of GPS satellites monitored from these regions.

3.3 SoL Service - Approach with Vertical guidance (APV-I)

The following figures depict the minimum performance expected from EGNOS for Approach with Vertical guidance (APV-I) availability and continuity, as defined in the [EGNOS SoL Service Definition Document](#). Version v3.3 of the SoL SDD was published on 26/03/2019 and remained applicable for the whole reported period.

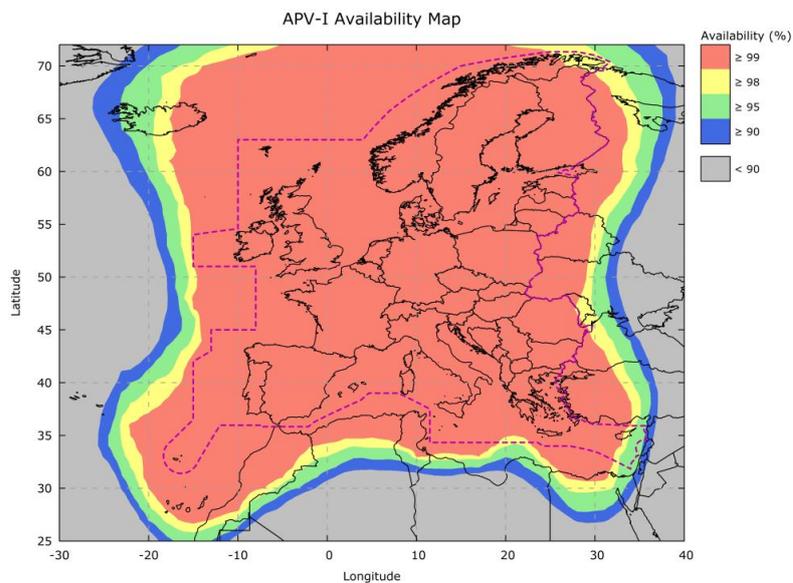


Figure 8: APV-I Availability map- Expected minimum performance (SoL SDD v3.3)

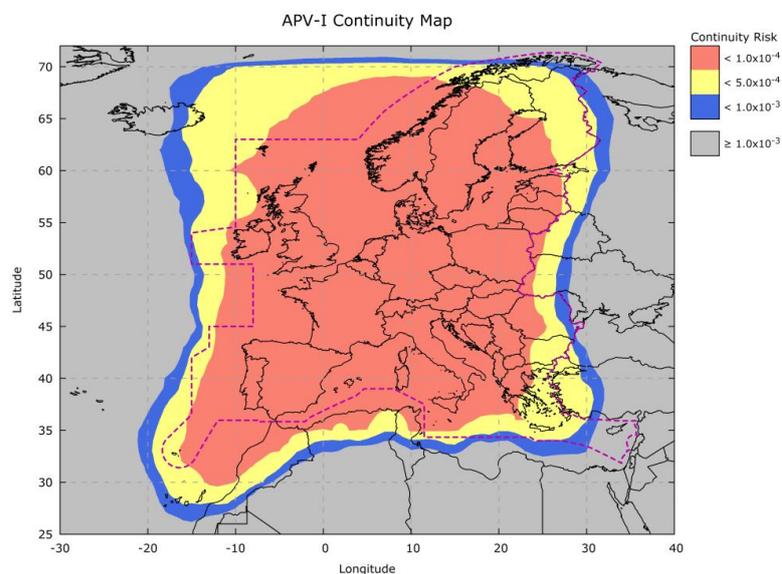


Figure 9: APV-I Continuity map - Expected minimum performance (SoL SDD v3.3)

These values correspond to the expected performance measured by a fault-free receiver using all satellites in view for one month, using all the operational EGNOS GEOs.

The achieved APV-I performance during the reporting period is reported below. Additionally, APV-I performance is reported through the EGNOS Monthly Performance reports, available on the [EGNOS User Support website](#).

3.3.1 APV-I availability

EGNOS APV-I Availability is defined as the percentage of epochs in the period in which the Protection Level (both HPL and VPL) is below Alert Limits for this APV-I service (HAL: 40m; VAL: 50m) over the total period.

The following figure provides the combination of the operational GEOs, the GEO APV-I availability for the reported period:

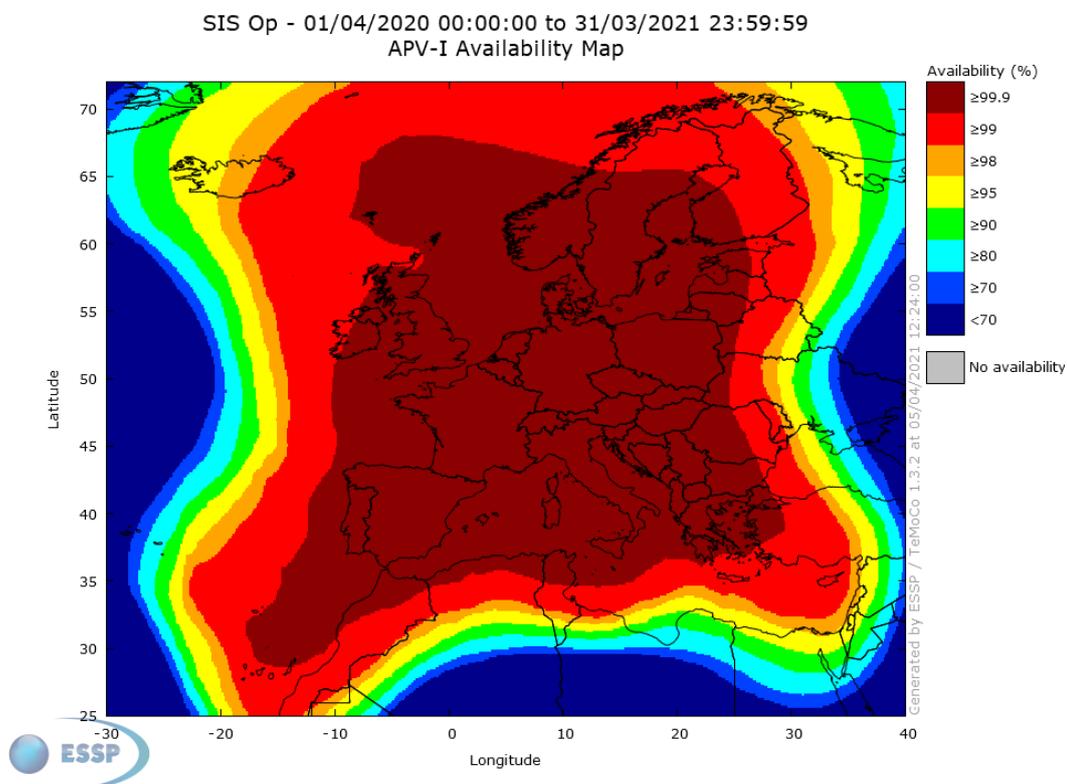


Figure 10: APV-I Availability from 01/04/20 to 31/03/21

The APV-I availability performance has been excellent during the reporting period: the coverage of the 99% APV-I Service Area⁴ is complete, except for some areas in the borders.

⁴ 99% APV-I Service Area is the 99% APV-I availability area depicted in Figure 8 obtained from the [EGNOS Safety of Life SDD](#).

The following figure shows the annual APV-I availability compliance concerning the target at airports with published the EGNOS-based operations:

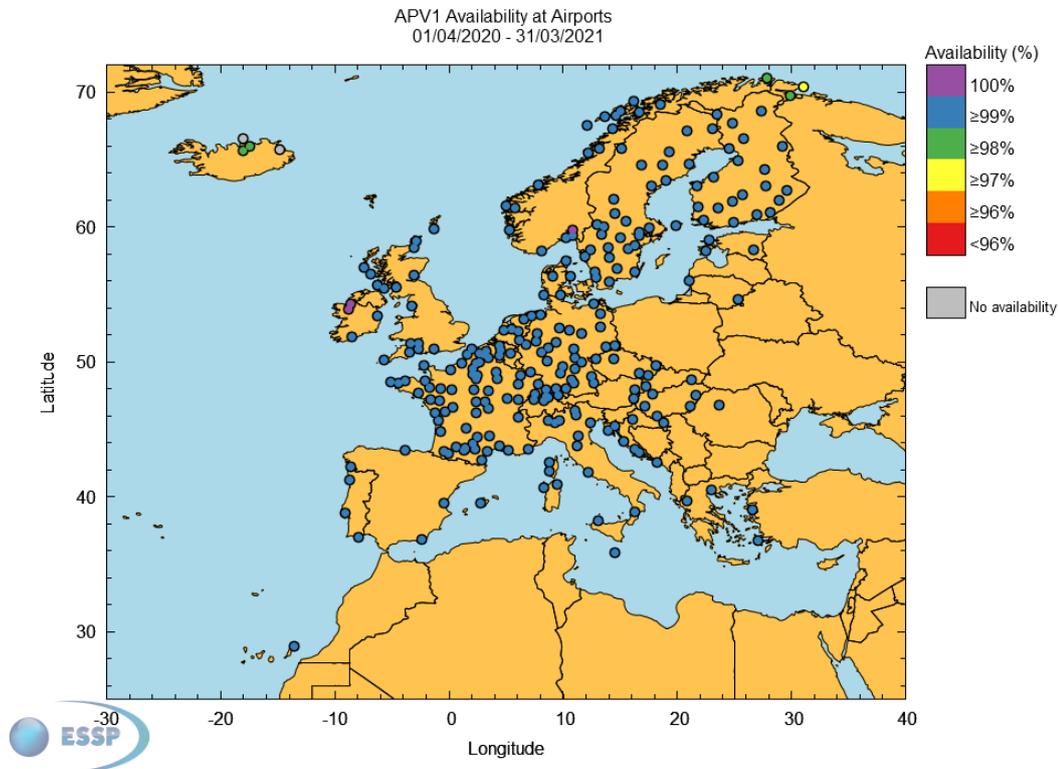


Figure 11: Annual APV-I Availability compliance at airports with published EGNOS-based operations

Moreover, the SoL SDD v3.3 commitment was fulfilled monthly for the APV-I service availability during the entire reporting period at all airports with the EGNOS-based operations, apart from:

- Kirkenes (ENKR) Airport (Norway) in April, May, and July 2020.
- Mehamn (ENMH) Airport (Norway) in April, May, June, and July 2020.
- Kuusamo (EFKS) and Ivalo (EFIV) Airports (Finland) in April, May, June, and July 2020.
- Akureyri (BIAR) and Husavik (BIHU) Airports (Iceland) in January 2021.
- Andøya/Andenes (ENAN) Airport (Norway) in May 2020.
- Joensuu (EFJO), Kajaani (EFKI), Kittilä (EFKT), Kuopio (EFKU), Lappeenranta (EFLP), Rovaniemi (EFRO), and Savonlinna (EFSA) Airports (Finland) in July 2020.
- Vardø/Svartnes (ENSS) Airport (Norway) in December 2020 and January 2021.

For additional information, please refer to the corresponding [Monthly Performance Reports](#).

3.3.2 APV-I availability - Achievement against target

The combination of the 99% APV-I Availability map and the 99% APV-I Service Area⁵ gives the following:

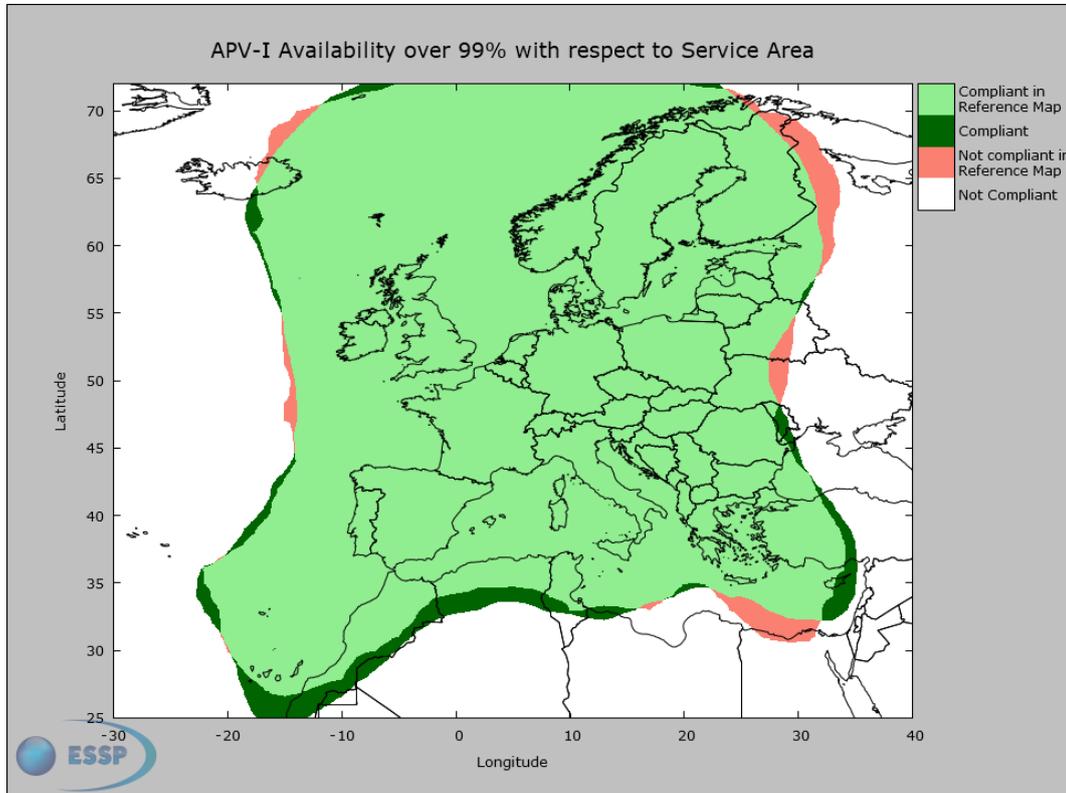


Figure 12: APV-I 99% Availability map with respect to the 99% APV-I Service Area⁵ - 01/04/20 to 31/03/21

In the picture, the legend should be read as follows:

- **Compliant in Reference Map**: This is the part of the Service Area⁵ where APV-I availability was above 99%.
- **Compliant**: This is the zone out of the Service Area⁵ where APV-I availability was also above 99% (coverage extension with respect to the commitment).
- **Not compliant in Reference Map**: This is the part of the Service Area⁵ where APV-I availability was lower than 99%.
- **Not compliant (white)**: This is any other zone out of the Service Area⁵ where APV-I availability is lower than 99%.

The percentage of points compliant with the 99% APV-I Service Area⁵ is **96.53%**. Some areas in the west, northwest, northeast, east and southeast presented underperformance, mainly linked to weak GPS constellation geometry (partly solved when GPS-III satellites were introduced into EGNOS). Focusing on the southeast of the Service Area, the reduced coverage in this region was mainly due to the lack of RIMS Alexandria data between October 2020 and March 2021.

⁵ 99% APV-I Service Area is the 99% APV-I availability area depicted in Figure 8 obtained from the EGNOS Safety of Life SDD v3.3.

Note that the comparison with respect to the SDD SoL commitment map is included for information purposes. The commitment map is a monthly reference, while the reported period is one year, and, therefore, this comparison must be interpreted with care.

3.3.3 APV-I Integrity events

EGNOS APV-I Integrity Event is defined as an event in which the Navigation System Error is greater than or equal to the corresponding Protection Level for APV-I.

No integrity events were detected.

The **Safety Index** is defined as the Navigation System Error versus the Protection Level ratio (assuming PA algorithms to compute $xNSE$ and xPL) for each second. If the xPE/xPL ratio is over 1, it indicates that a Misleading Information situation has occurred.

Table 4 shows the maximum HSI and VSI at each RIMS inside the APV-I Service Area (see Figure 8 and Figure 9). Moreover, Stanford plots are available on the [EGNOS User Support Website](#).

Station	HSI	VSI	Station	HSI	VSI
Agadir	0.26	0.30	Lappeenranta	0.21	0.24
Aalborg	0.20	0.23	La Palma	0.27	0.25
Alexandria	0.22	0.25	Lisbon	0.27	0.30
Athens	0.18	0.22	Madeira	0.28	0.22
Berlin	0.22	0.25	Malaga	0.20	0.22
Canary Island	0.26	0.25	Palma de Mallorca	0.21	0.20
Cork	0.23	0.23	Reykjavik	0.18	0.22
Catania	0.18	0.24	Roma	0.21	0.28
Djerba	0.19	0.21	S. de Compostela	0.26	0.36
Egilsstadir	0.19	0.25	Sofia	0.27	0.34
Glasgow	0.24	0.24	Swanwick	0.27	0.35
Golbasi	0.19	0.18	Toulouse	0.22	0.24
Gävle	0.21	0.24	Trondheim	0.21	0.25
Haifa	0.21	0.24	Tromsoe	0.27	0.29
Jan Mayen	0.30	0.34	Warsaw	0.24	0.27
Kirkenes	0.23	0.24	Zürich	0.20	0.25

Table 4: EGNOS APV-I Safety Index (maximum) at reference stations

The following figures provide the HSI (Horizontal Safety Index) and the VSI (Vertical Safety Index) histograms for each second when collecting measurements from the different EGNOS stations and for both operational GEOs over the reported period.

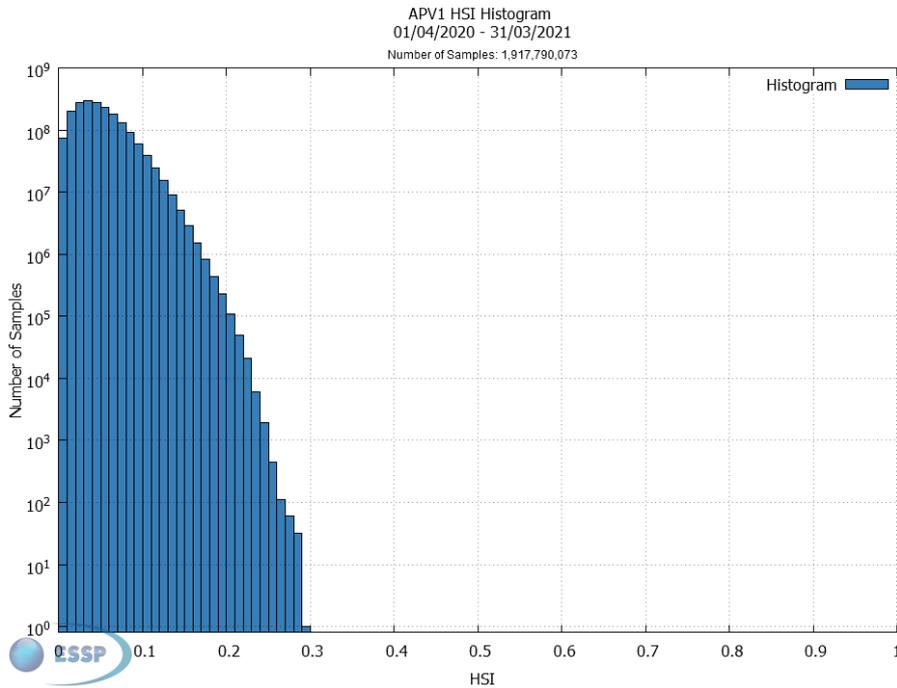


Figure 13: EGNOS APV-I Horizontal Safety Index⁶

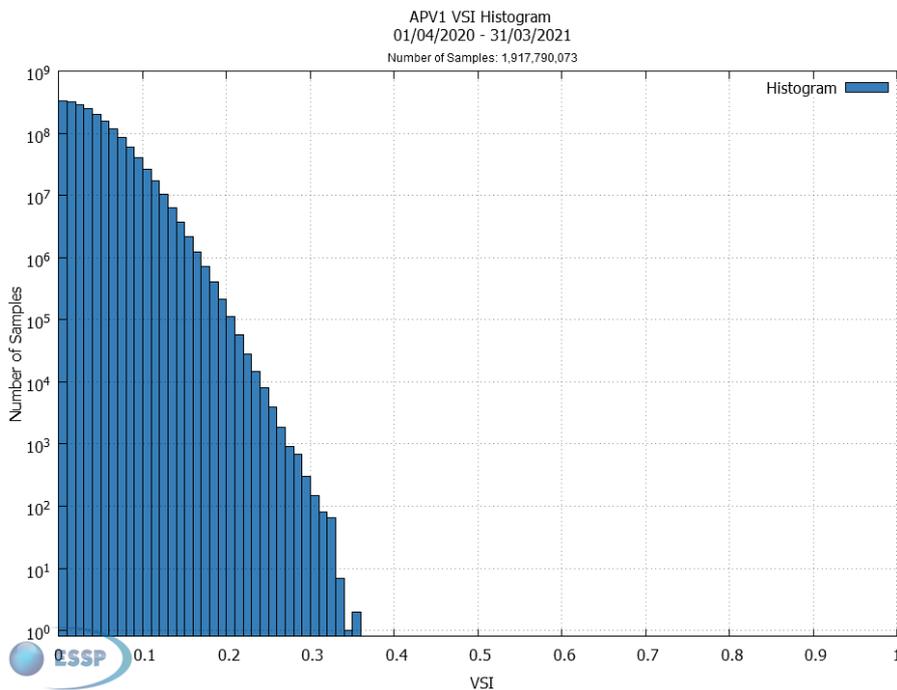


Figure 14: EGNOS APV-I Vertical Safety Index⁶

Previous figures show that the horizontal and vertical safety index for APV-I remained below 0.30 and 0.36 respectively for all stations, representing a particularly good safety margin.

⁶ Note that some periods may have been removed to compute the different histograms presented in this document, corresponding to stations showing bad quality of data linked to the local environment. Data removed from histograms correspond to data from RIMS in which any OR affecting data quality has been observed, where the presence of cycle slips affecting performance is detected, or other data quality issues have been traced as cause of daily degradations.

3.3.4 APV-I Continuity risk

EGNOS APV-I Continuity Risk is defined as the result of dividing the total number of single continuity events, using a time-sliding window of 15 seconds, by the number of samples with a valid and available APV-I navigation solution. A single continuity break occurs if the system is available at the start of the operation and becomes unavailable during one of the following 15 seconds.

The following figure provides the GEO combined APV-I continuity risk for the reported period:

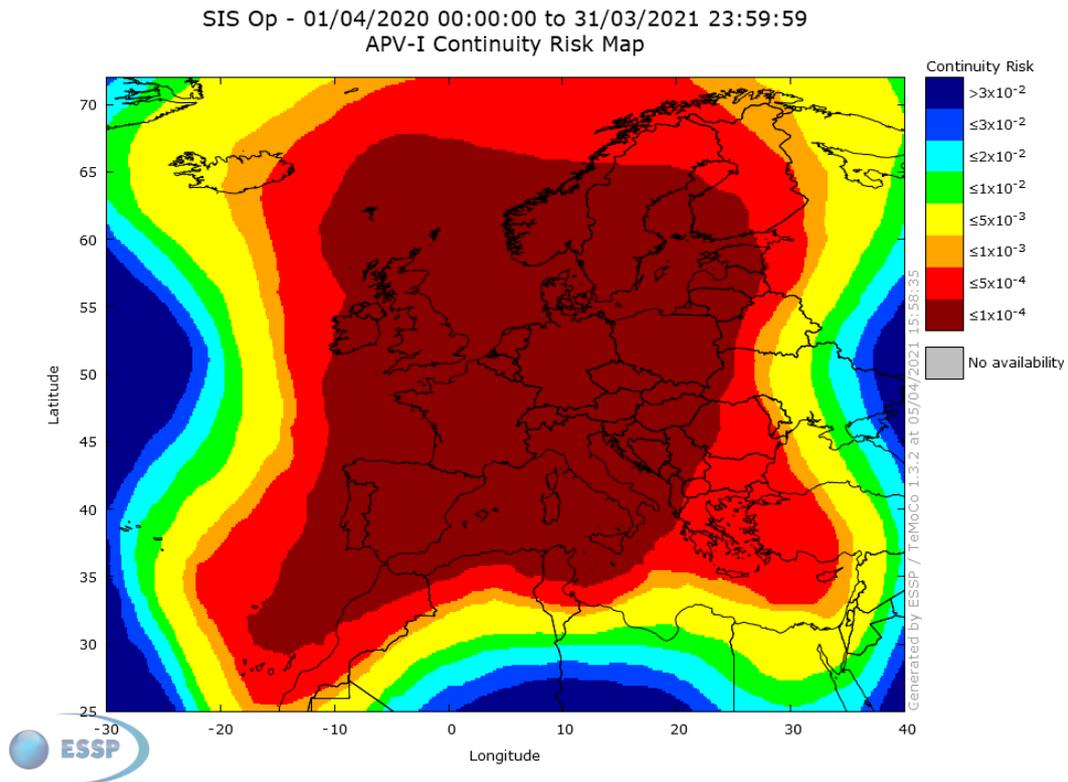


Figure 15: APV-I Continuity Risk from 01/04/20 to 31/03/21

The APV-I continuity performance has been very good during the reporting period: lower than $5 \cdot 10^{-4}$ over almost the entire $5 \cdot 10^{-4}$ APV-I Service Area⁷ with some deviations observed mainly in the northwest, northeast, and southeast.

⁷ $5 \cdot 10^{-4}$ APV-I Service Area is the $5 \cdot 10^{-4}$ APV-I continuity risk area depicted in Figure 9 obtained from the EGNOS Safety of Life SDD v3.3.

3.3.5 APV-I Continuity - Achievement against target

The combination of the $5 \cdot 10^{-4}$ APV-I Continuity Risk map and the $5 \cdot 10^{-4}$ APV-I Service Area⁸ gives the following:

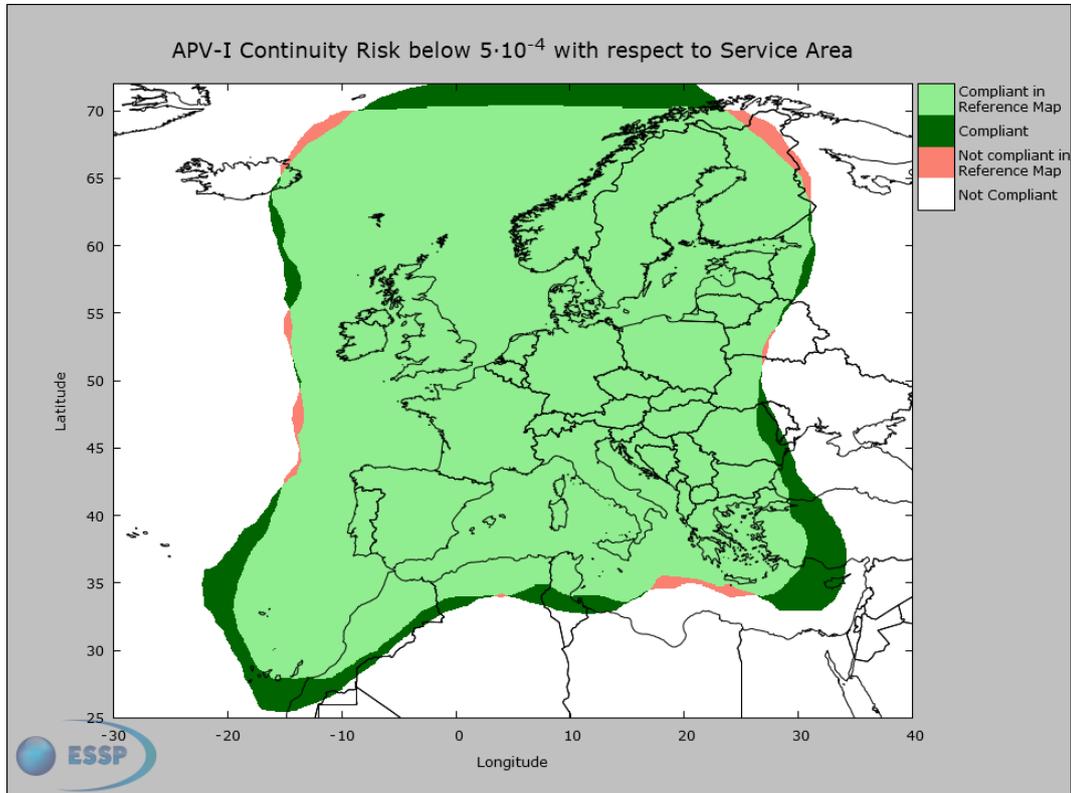


Figure 16: APV-I Continuity Risk ($5 \cdot 10^{-4}$) map with respect to the $5 \cdot 10^{-4}$ APV-I Service Area⁸ - 01/04/20 to 31/03/21
In the picture, the legend should be read as follows:

- **Compliant in Reference Map:** This is the part of the Service Area⁸ where APV-I continuity was above $5 \cdot 10^{-4}$.
- **Compliant:** This is the zone out of the Service Area⁸ where APV-I continuity was also above $5 \cdot 10^{-4}$ (coverage extension with respect to the commitment).
- **Not compliant in Reference Map:** This is the part of the Service Area⁸ where APV-I continuity was lower than $5 \cdot 10^{-4}$.
- **Not compliant (white):** This is any other zone out of the Service Area⁸ where APV-I continuity is lower than $5 \cdot 10^{-4}$.

Considering the SDD v3.3 map used as the reference, the percentage of points compliant with the $5 \cdot 10^{-4}$ APV-I Service Area ($5 \cdot 10^{-4}/15\text{sec}$) is **98.21%**. Note that the comparison with respect to the SDD SoL commitment map is included for information. The commitment map is a monthly reference while the reported period is one year, and, therefore, this comparison must be interpreted with care.

⁸ $5 \cdot 10^{-4}$ APV-I Service Area is the $5 \cdot 10^{-4}$ APV-I continuity risk area depicted in Figure 9 obtained from the EGNOS Safety of Life SDD v3.3.

3.4 SoL Service - EGNOS Localizer Performance with Vertical guidance to a decision altitude of 200 FT (LPV-200)

The following figures depict the minimum performance expected from EGNOS for LPV-200 availability and continuity, as defined in the [EGNOS SoL Service Definition Document](#), Version v3.3 of the SoL SDD was published on 26/03/2019 and remained applicable for the whole reported period.

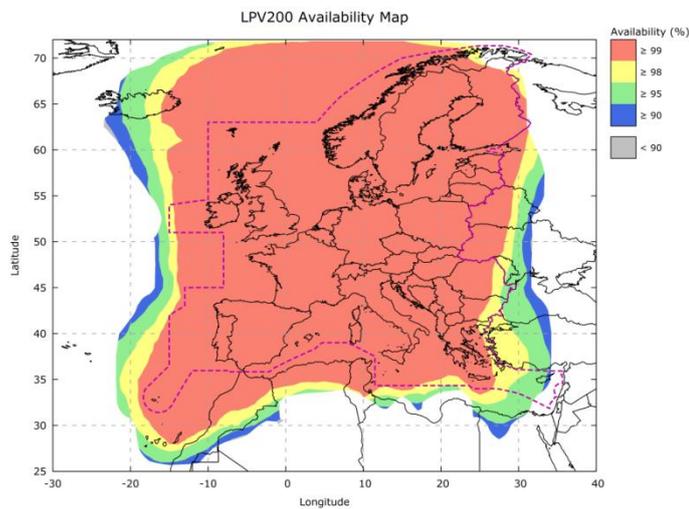


Figure 17: LPV200 Availability map- Expected minimum performance (SoL SDD v3.3)

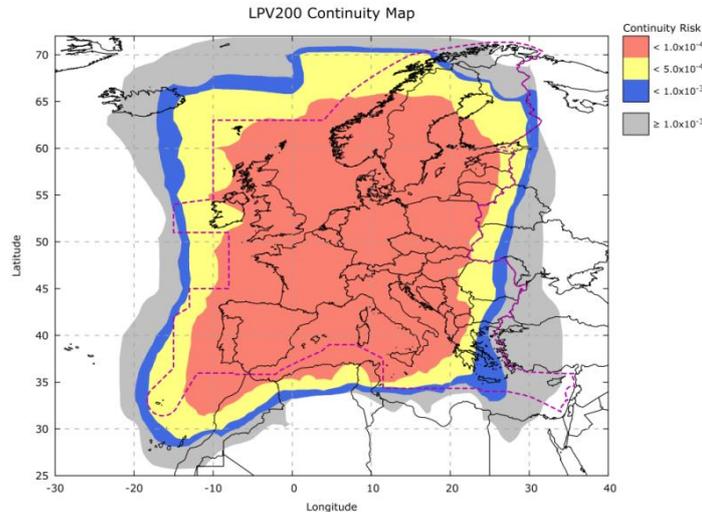


Figure 18: LPV200 Continuity map - Expected minimum performance (SoL SDD v3.3)

These values correspond to the expected performance measured by a fault-free receiver using all GPS satellites in view over one month and all the operational EGNOS GEOs.

The LPV-200 performance achieved during the reporting period is conveyed below. Additionally, LPV-200 performance is reported through the EGNOS Monthly Performance reports, available on the [EGNOS User Support website](#).

3.4.1 LPV-200 availability

EGNOS LPV-200 Availability is defined as the percentage of epochs in the period in which the Protection Level (both HPL and VPL) is below Alert Limits for this LPV-200 service (HAL: 40m; VAL: 35m) over the total period.

The following figure provides the LPV-200 availability for the combination of the operational GEOs during the period between April 2020 and March 2021:

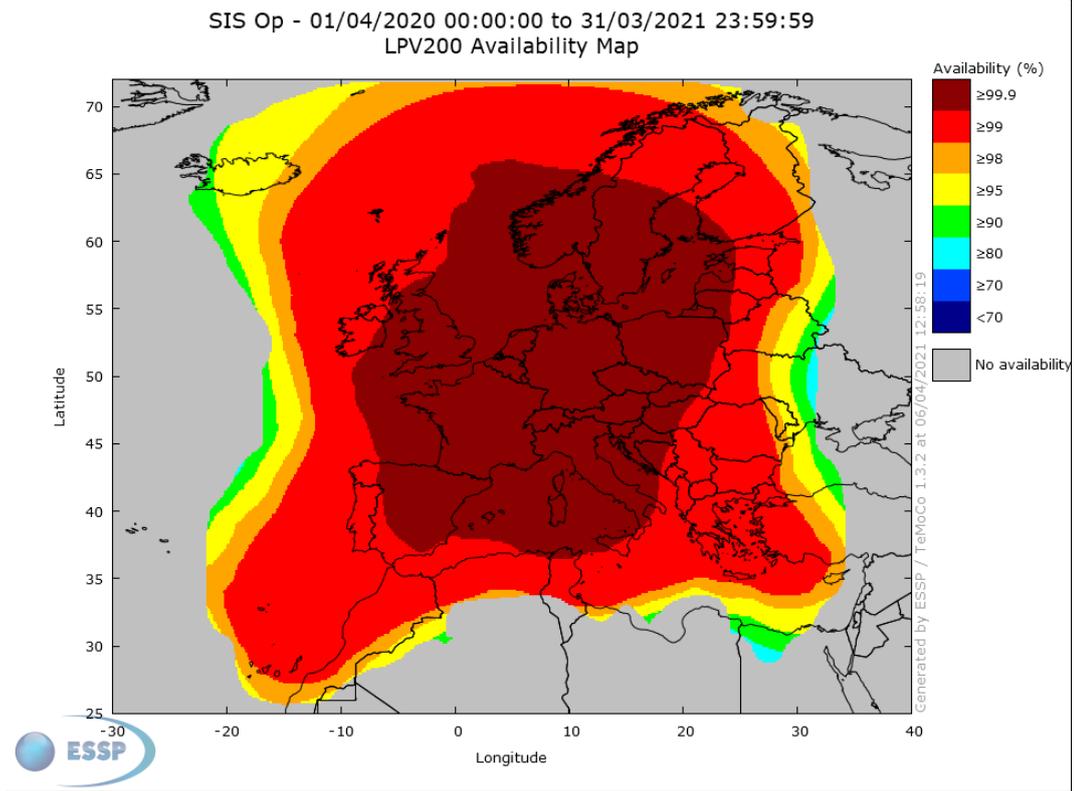


Figure 19: LPV-200 Availability from 01/04/20 to 31/03/21

The LPV-200 availability performance over the Service Area has been good during the reporting period: greater than 99% over the entire LPV-200 99% Service Area⁹ except for some areas in the border.

⁹ 99% LPV-200 Service Area is the 99% LPV-200 availability area depicted in Figure 17 obtained from the EGNOS Safety of Life SDD v3.3.

The following figure shows the annual LPV-200 availability compliance concerning the target at airports with published EGNOS-based operations:

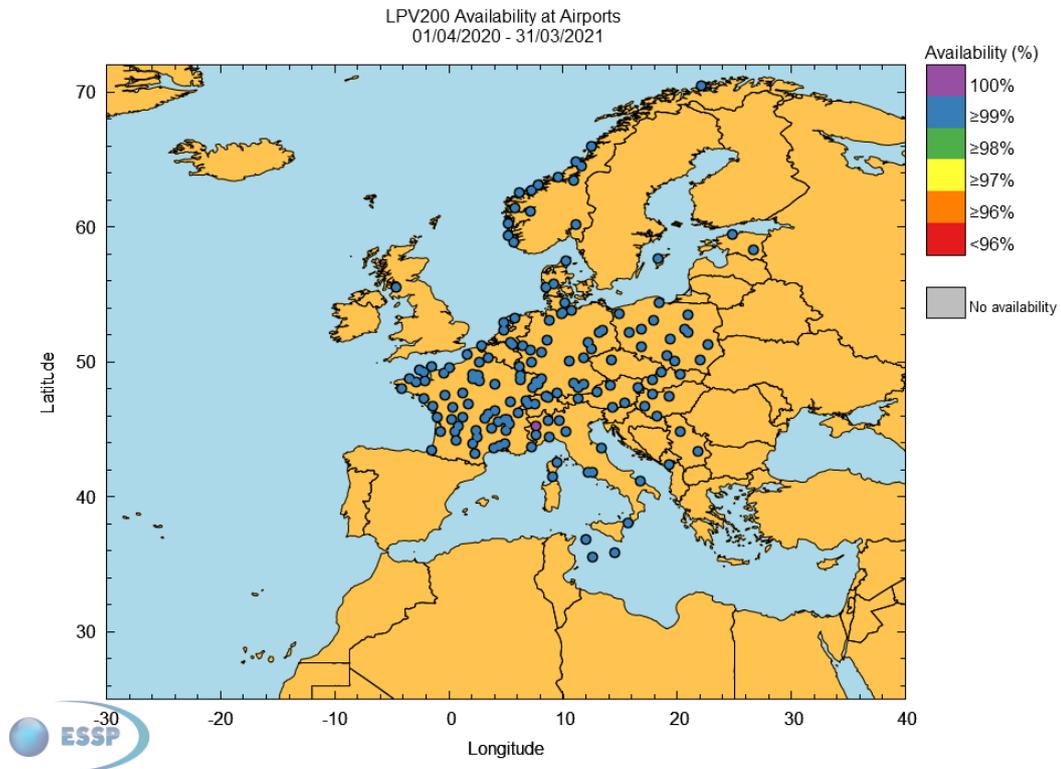


Figure 20: Annual LPV-200 Availability compliance at airports with published EGNOS-based operations

Moreover, the monthly LPV-200 service availability was higher than 99% during the entire reporting period at all airports with EGNOS-based operations.



Falcon 900LX EGNOS-equipped aircraft at Pau Pyrenees airport

3.4.2 LPV-200 availability - Achievement against target

The combination of the 99% LPV-200 Availability map and the 99% LPV-200 Service Area¹⁰ gives the following:

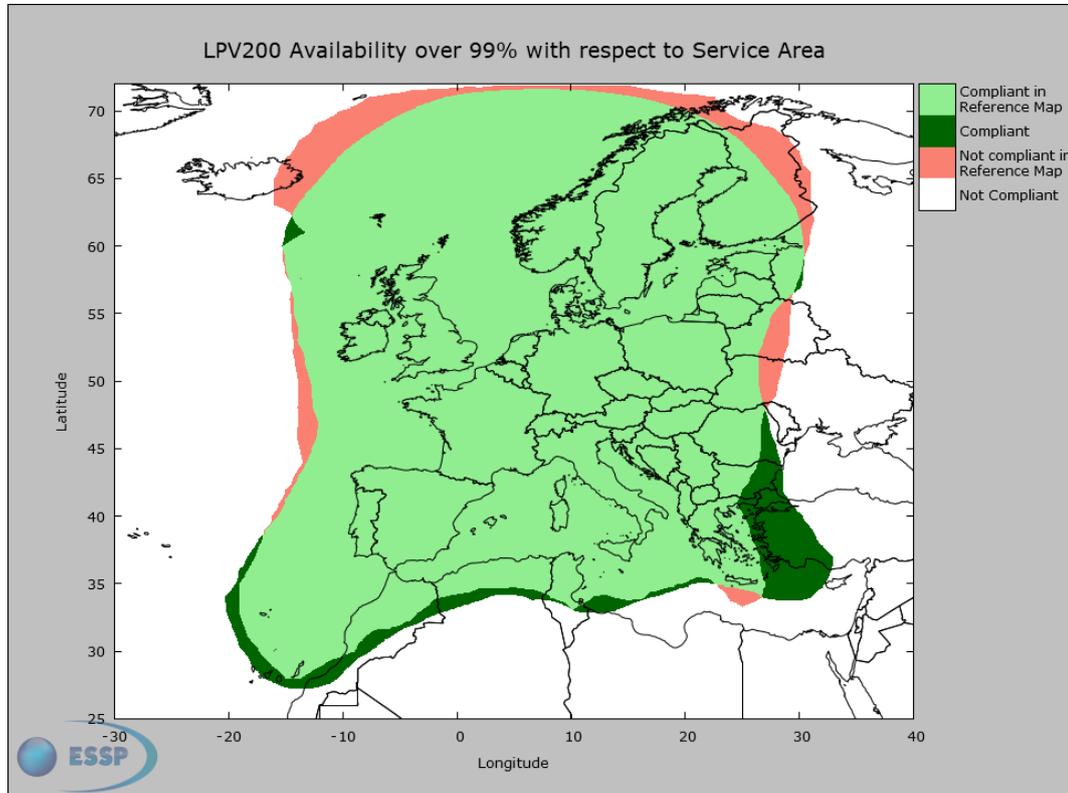


Figure 21: LPV-200 Availability map with respect to the Service Area¹⁰ - 01/04/20 to 31/03/21

In the picture, the legend should be read as follows:

- **Compliant in Reference Map**: This is the part of the Service Area¹⁰ where LPV-200 availability was above 99%.
- **Compliant**: This is the zone out of the Service Area¹⁰ where LPV-200 availability was also above 99% (coverage extension with respect to the commitment).
- **Not compliant in Reference Map**: This is the part of the Service Area¹⁰ where LPV-200 availability was lower than 99%.
- **Not compliant (white)**: This is any other zone out of the Service Area¹⁰ where LPV-200 availability is lower than 99%.

Considering the EGNOS Safety of Life SDD v3.3 map as the reference, the percentage of compliant points with the 99% LPV-200 Service Area¹⁰ is **93.16%**. Some areas in the southeast, east, west, north and, mainly, northeast and northwest deviated from the SDD commitment for similar reasons to the ones explained in section 3.3.2.

¹⁰ 99% LPV-200 Service Area is the 99% LPV-200 availability area depicted in Figure 17 obtained from the EGNOS Safety of Life SDD v3.3.

Note that the comparison with respect to the SDD SoL commitment map is included for information. The commitment map is a monthly reference while the reported period is one year, and, therefore, this comparison must be interpreted with care.

3.4.3 LPV-200 Integrity events

EGNOS LPV-200 Integrity Event is defined as an event in which the Navigation System Error is greater than or equal to the corresponding Protection Level for LPV-200.

No integrity events were detected.

The **Safety Index** is defined as the Navigation System Error versus the Protection Level ratio (assuming PA algorithms to compute $xNSE$ and xPL) for each second. If the xPE/xPL ratio is over 1, it indicates that a Misleading Information situation has occurred.

Table 5 shows the maximum HSI and VSI at each RIMS inside the LPV-200 Service Area (see Figure 17 and Figure 18). Moreover, Stanford plots are available on the operations website (http://egnos-user-support.essp-sas.eu/egnos_ops/index.php).

Station	HSI	VSI	Station	HSI	VSI
Agadir	0.26	0.30	La Palma	0.27	0.25
Aalborg	0.20	0.23	Lisbon	0.27	0.30
Alexandria	0.22	0.25	Madeira	0.28	0.22
Athens	0.18	0.22	Malaga	0.20	0.22
Berlin	0.22	0.25	Palma de Mallorca	0.21	0.20
Canary Island	0.26	0.25	Reykjavik	0.18	0.22
Cork	0.23	0.23	Roma	0.21	0.28
Catania	0.18	0.24	S. de Compostela	0.26	0.36
Djerba	0.19	0.21	Sofia	0.27	0.34
Egilsstadir	0.19	0.25	Swanwick	0.27	0.35
Glasgow	0.24	0.24	Toulouse	0.22	0.24
Golbasi	0.18	0.18	Trondheim	0.21	0.25
Gävle	0.21	0.24	Tromsoe	0.27	0.29
Jan Mayen	0.30	0.34	Warsaw	0.24	0.27
Lappeenranta	0.21	0.24	Zürich	0.20	0.25

Table 5: EGNOS LPV-200 Safety Index (maximum) at reference stations

The following figures provide the HSI (Horizontal Safety Index) and the VSI (Vertical Safety Index) histograms for each second when collecting measurements from the different EGNOS stations and for both operational GEOs over the reported period.

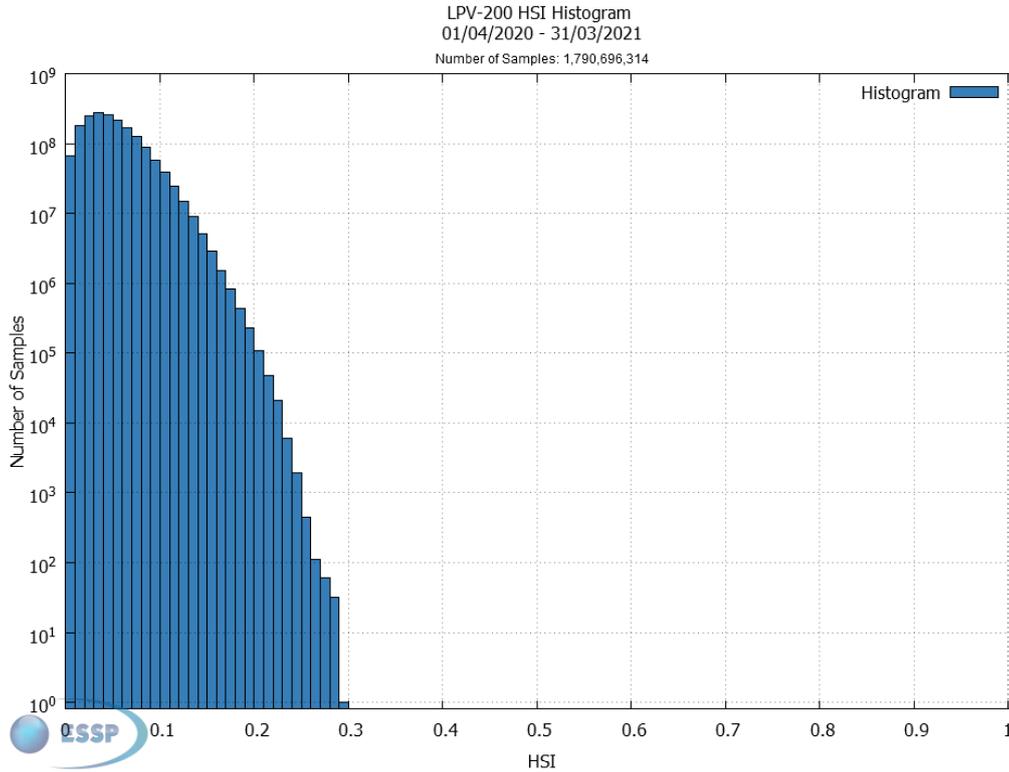


Figure 22: EGNOS LPV-200 Horizontal Safety Index

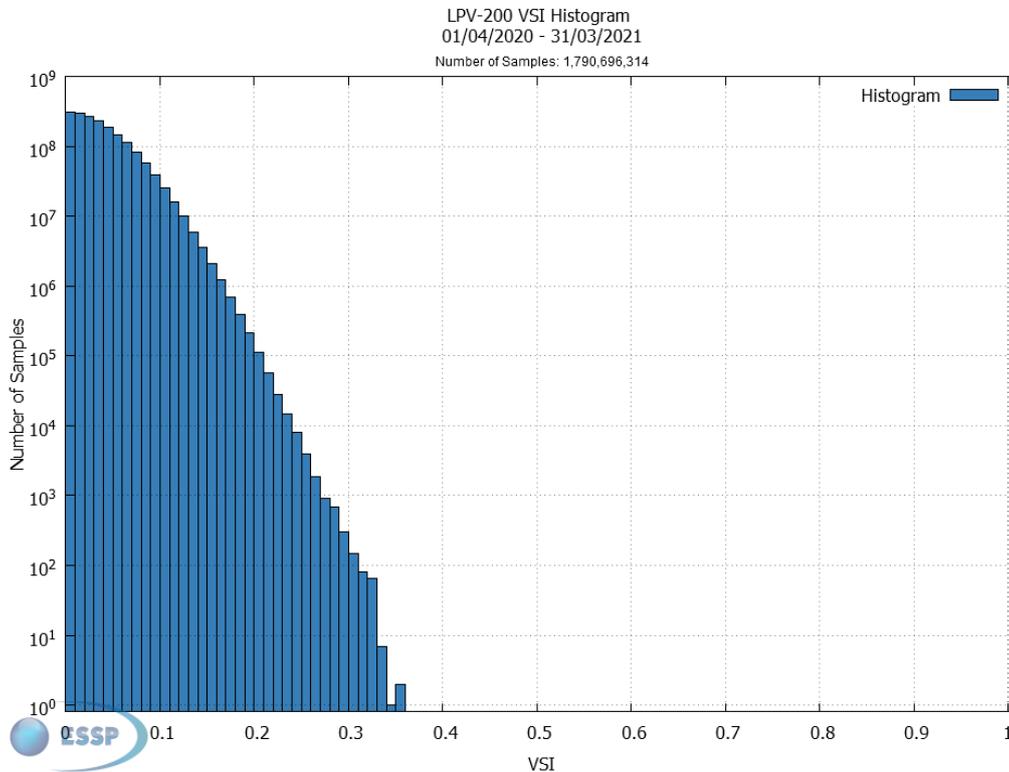


Figure 23: EGNOS LPV-200 Vertical Safety Index

The above figures show that the horizontal and vertical safety index for LPV-200 remained below 0.30 and 0.36, respectively, for all stations, representing a particularly good safety margin.

3.4.4 LPV-200 Continuity risk

EGNOS LPV-200 Continuity Risk is defined as the result of dividing the total number of single continuity events, using a time-sliding window of 15 seconds, by the number of samples with a valid and available LPV-200 navigation solution. A single continuity event occurs if the system is available at the start of the operation and becomes unavailable in at least one of the following 15 seconds.

The following figure provides the GEO combined LPV-200 continuity risk for the reported period:

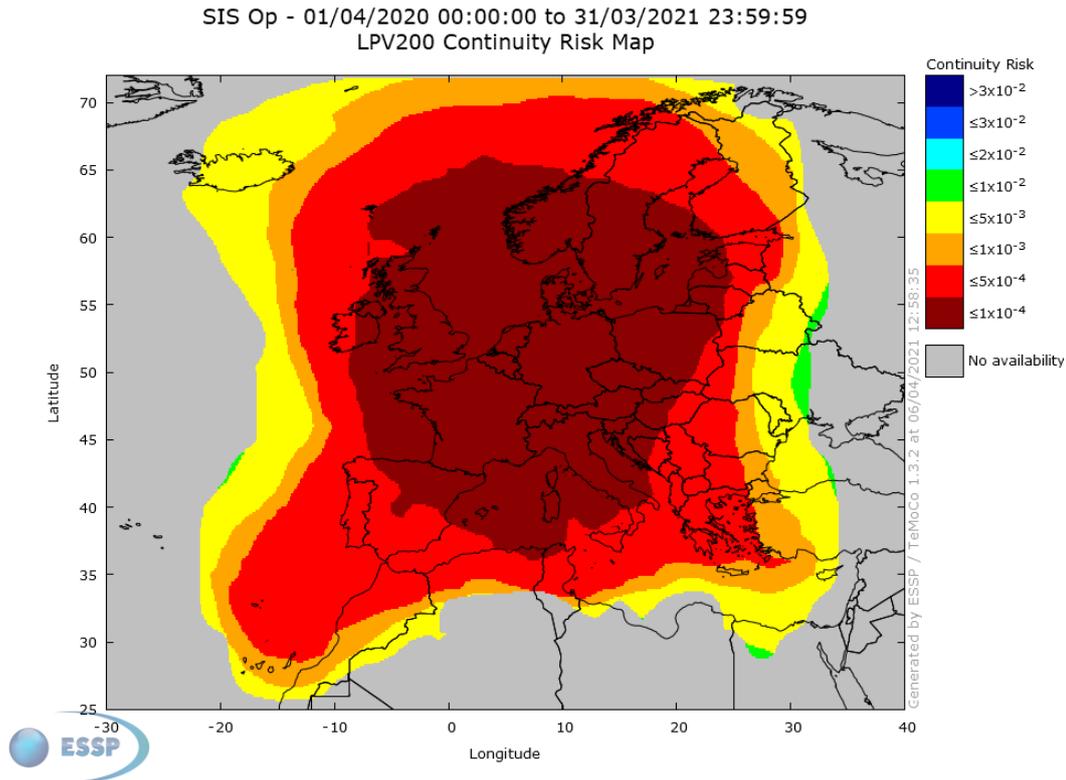


Figure 24: LPV-200 Continuity Risk from 01/04/20 to 31/03/21¹¹

The LPV200 continuity performance has been good during the reporting period: the entire LPV200 5·10⁻⁴ Service Area¹² is covered except for some border areas, mainly east/northeast and west/northwest.

¹¹ The grey colour identifies regions outside the LPV-200 Service area as defined in the EGNOS Safety of Life SDD v3.3.

¹² 5·10⁻⁴ LPV200 Service Area is the 5·10⁻⁴ LPV200 continuity risk area depicted in Figure 18 obtained from the EGNOS Safety of Life SDD v3.3.

3.4.5 LPV-200 Continuity - Achievement against target

The combination of the $5 \cdot 10^{-4}$ LPV-200 Continuity Risk map and the Service Area¹³ gives the following:

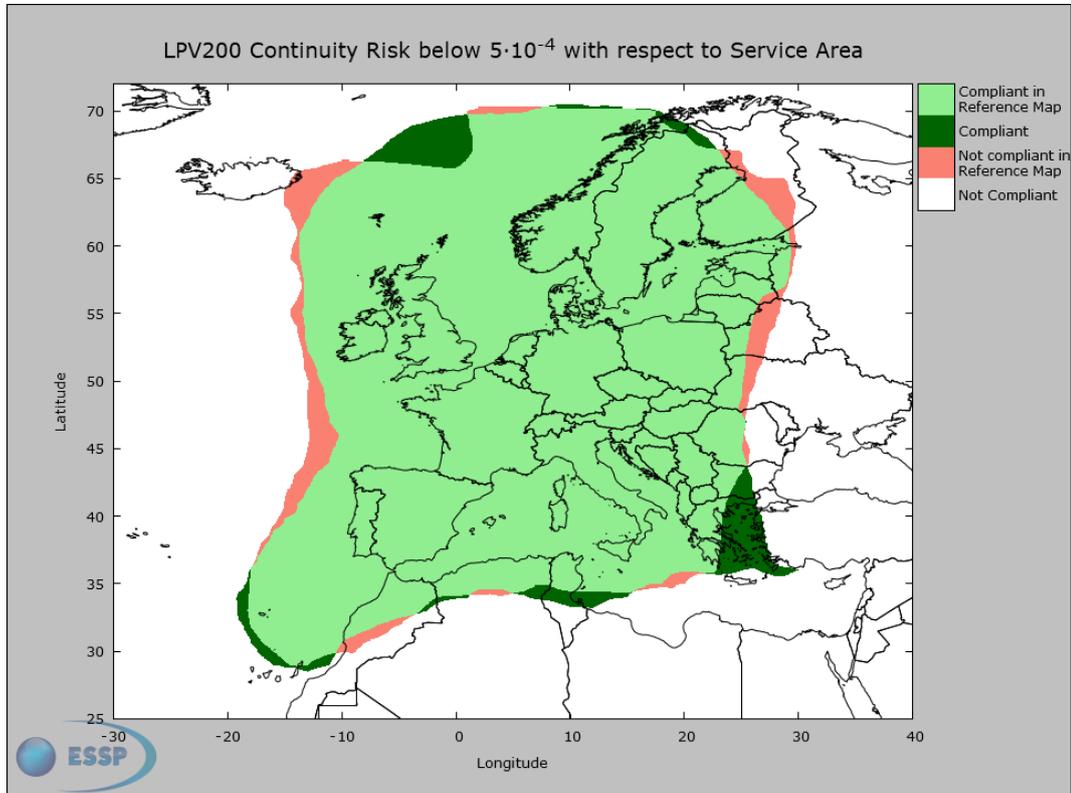


Figure 25: LPV-200 Continuity Risk ($5 \cdot 10^{-4}$) map with respect to the reference map - 01/04/20 to 31/03/21

In the picture, the legend should be read as follows:

- **Compliant in Reference Map**: This is the part of the Service Area¹³ where LPV-200 continuity was above $5 \cdot 10^{-4}$.
- **Compliant**: This is the zone out of the Service Area¹³ where LPV-200 continuity was also above $5 \cdot 10^{-4}$ (coverage extension with respect to the commitment).
- **Not compliant in Reference Map**: This is the part of the Service Area¹³ where LPV-200 continuity was lower than $5 \cdot 10^{-4}$.
- **Not compliant (white)**: This is any other zone out of the Service Area¹³ where LPV-200 continuity is lower than $5 \cdot 10^{-4}$.

Considering the SDD v3.3 map used as the reference, the percentage of compliant points with the $5 \cdot 10^{-4}$ LPV-200 Service Area ($5 \cdot 10^{-4}/15\text{sec}$) is **94.33%**. Note that the comparison with respect to the SDD SoL commitment map is included for information. The commitment map is a monthly reference while the reported period is one year, and, therefore, this comparison must be interpreted with care.

¹³ $5 \cdot 10^{-4}$ LPV200 Service Area is the $5 \cdot 10^{-4}$ LPV200 continuity risk area depicted in Figure 18 obtained from the EGNOS Safety of Life SDD v3.3.

3.4.6 EGNOS LPV-200 vertical accuracy

When compared to APV-I, LPV-200 is based on more stringent performance requirements, such as a Vertical Navigation System Error (VNSE) of 4 m (95%) and a Vertical Alert Limit (VAL) of 35 m. In addition, specific requirements are defined in terms of the probability the VNSE exceeds 10 m in nominal system operation conditions, set to 10^{-7} /per approach, or 15 m in degraded system operation conditions, defined as a 10^{-5} /per approach.

An Accuracy Major Event (AME) occurs whenever the instantaneous VNSE exceeds 10 m in nominal conditions or 15 m under degraded scenarios.

The following figures show the histogram and cumulative distribution function of VNSE, computed at the RIMS stations inside the LPV-200 Service Area for each second over the entire period.

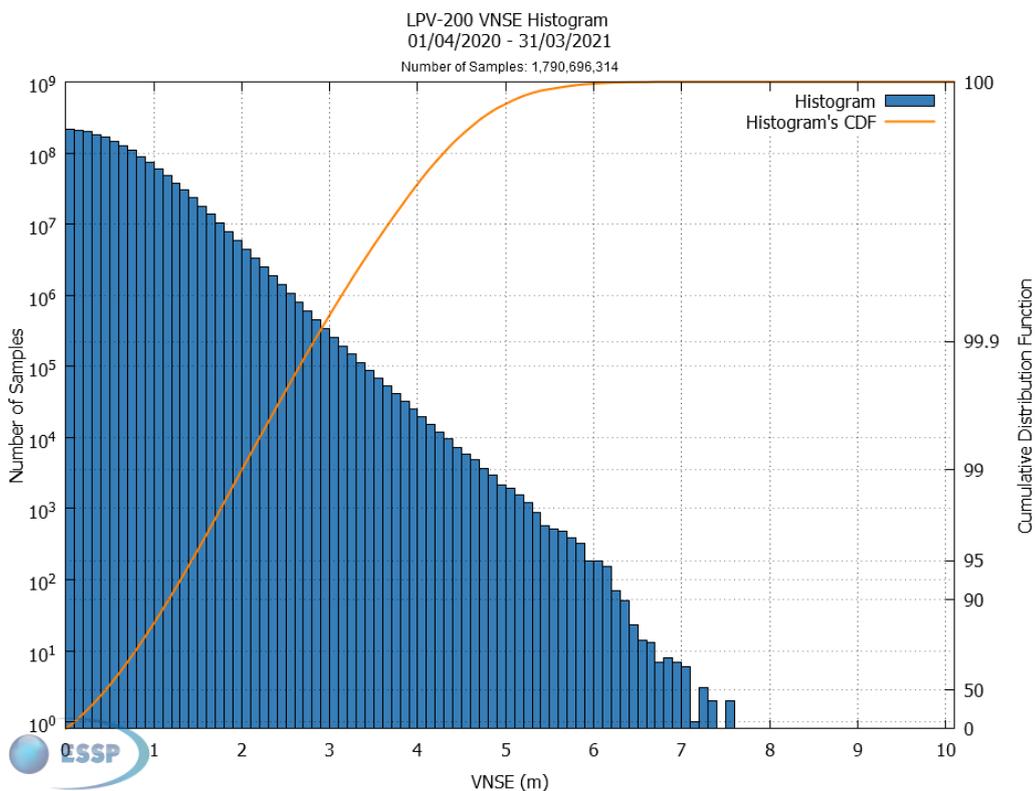


Figure 26: EGNOS LPV-200 Vertical Accuracy Histogram and Cumulative Probability

As observed, the cumulative results confirm that the vertical accuracy remained below 10 metres during the period analysed. In other words, no AME took place during this period. The 95th percentile is below 1.6 metres. The worst accuracy measured in any of the stations was lower than 7.6 metres.

3.4.7 EGNOS LPV-200 accuracy extrapolated at $10^{-7}/150$ s

This section presents the results of extrapolating the accuracy results for every station to $10^{-7}/150$ s. This extrapolation enables characterising the accuracy distribution tails through a Gaussian extrapolation applied to the vertical navigation error¹⁴.

The following results present the values obtained from 1 January 2020 to 31 December 2020, using values obtained from both operational GEOs. For this period, all the RIMS within the [LPV-200 Service Area](#) exhibit extrapolated accuracy values within the requirement: $Pr(VNSE > 10\text{ m}) < 10^{-7}/150$ s.

For the period of analysis, the accuracy tail extrapolated at $10^{-7}/150$ s values for the RIMS within the LPV-200 commitment are:

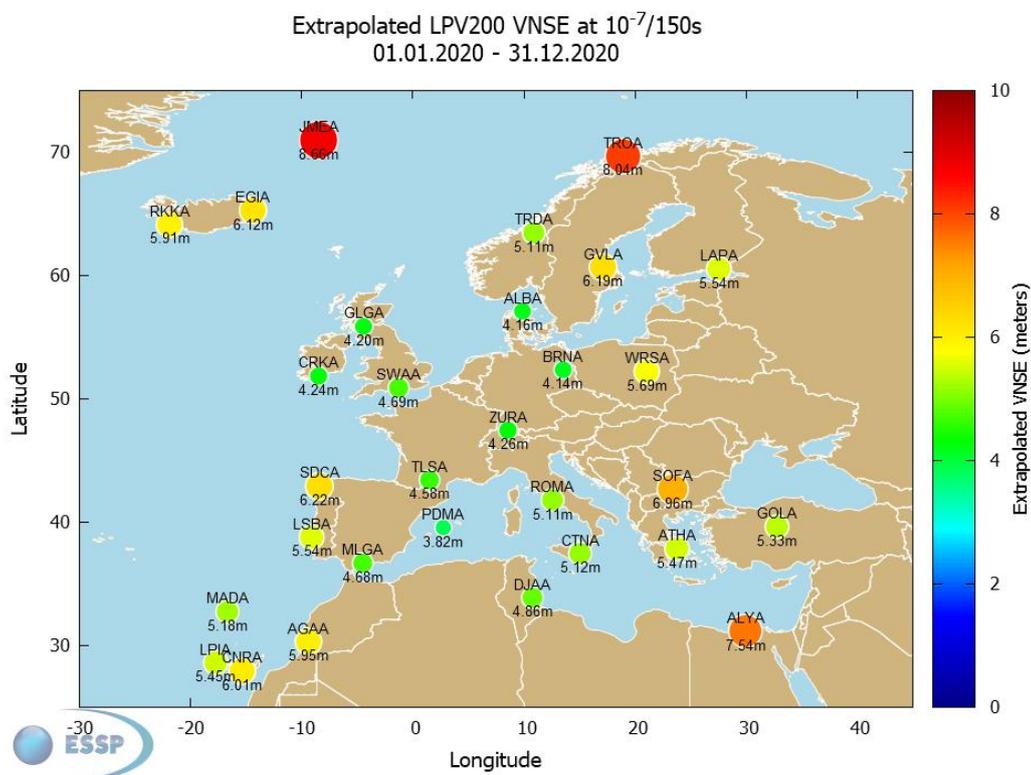


Figure 27: Extrapolated VNSE at $10^{-7}/150$ s in the RIMS within the LPV-200 commitment

The highest value is 8.66 m, obtained for RIMS Jan Mayen, which still complies with the requirement.

¹⁴ An over-bounding Gaussian distribution is computed (σ_{bound}) using the cumulative VNSE distribution, which enables obtaining the VNSE bound extrapolated to the required probability of $10^{-7}/150$ s. For additional details on the method used, please refer to “SBAS CAT-I available in Europe: LPV-200 commitment area and performance results” [ESSP SAS, ENC GNSS 2016].

3.5 Open Service (OS)

The EGNOS OS is qualified by defining the minimum compliance area where 99% of the time users can calculate their position, and the accuracy performance is better than three metres horizontally and four metres vertically. The minimum compliance area can be seen in the following figure:

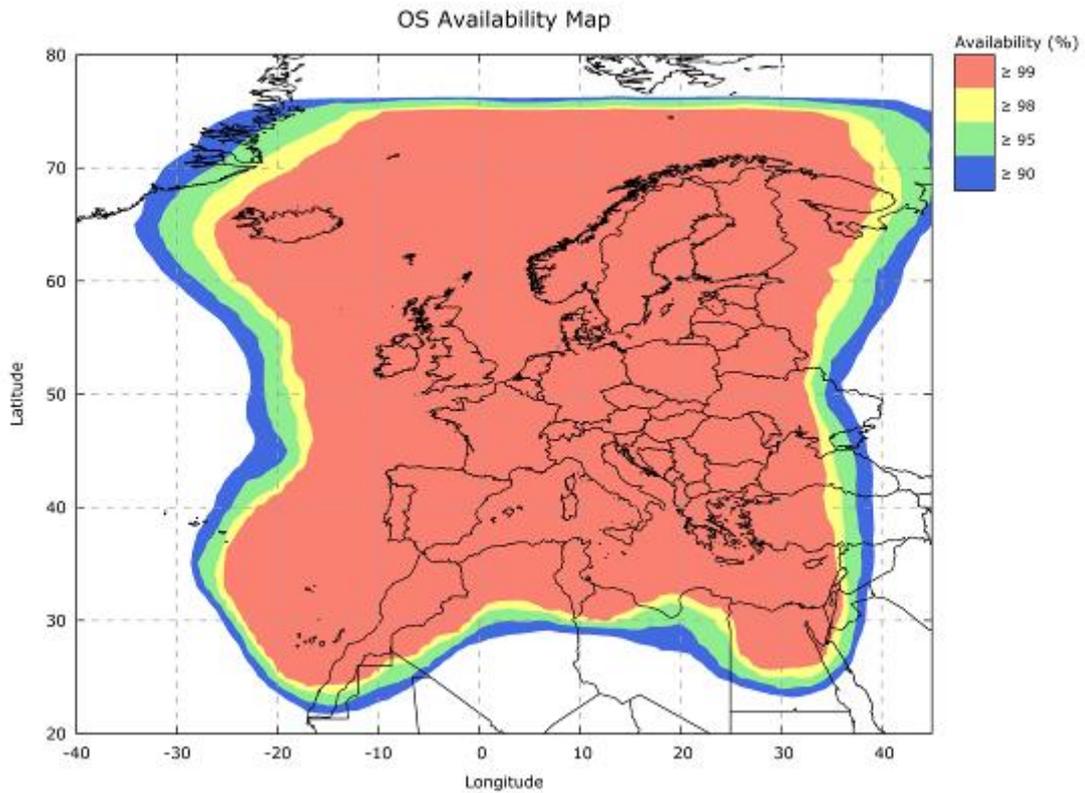


Figure 28: EGNOS OS compliance area

Further details can be found in the [EGNOS OS Service Definition Document](#) version v2.3. Additionally, OS performance is reported through the EGNOS Monthly Performance reports, available on the [EGNOS User Support website](#).

3.5.1 RIMS monitoring network

The following map shows the location of the deployed RIMS:



Figure 29: RIMS locations

The receiver network used to report the Open Service corresponds to the subset of RIMS inside the [EGNOS OS SDD](#) commitment map.

ID	Location name	Country	ID	Location name	Country
ALB	Alborg	Denmark	LAP	Lappeenranta	Finland
AGA	Agadir	Morocco	LPI	La Palma	Spain
ALY	Alexandria	Egypt	LSB	Lisbon	Portugal
ATH	Athens	Greece	MAD	Madeira	Portugal
BRN	Berlin	Germany	MLG	Malaga	Spain
CNR	Canary Islands	Spain	PDM	Palma de Mallorca	Spain
CRK	Cork	Ireland	RKK	Reykjavik	Iceland
CTN	Catania	Italy	ROM	Rome	Italy
DJA	Djerba	Tunisia	SDC	S. de Compostela	Spain
EGI	Egilsstadir	Iceland	SOF	Sofia	Bulgaria
GLG	Glasgow	United Kingdom	SWA	Swanwick	United Kingdom
GOL	Golbasi	Turkey	TLS	Toulouse	France
GVL	Gävle	Sweden	TRD	Trondheim	Norway
HFA	Haifa	Israel	TRO	Tromsoe	Norway
JME	Jan Mayen	Norway	WRS	Warsaw	Poland
KIR	Kirkenes	Norway	ZUR	Zürich	Switzerland

Table 6: List of RIMS sites where performance is reported



RIMS Station in Hartebeesthoek (South Africa)

3.5.2 Horizontal and Vertical Accuracy

EGNOS OS Horizontal (resp Vertical) Accuracy is reported as the 95th percentile of the Horizontal (resp Vertical) Navigation System Error (HNSE/VNSE) over the period, at the monitored sites, when applying EGNOS messages.

The following table provides the accuracy values (95%) in metres measured for the reported period.

Station	HNSE 95% (metres)	VNSE 95% (metres)	Station	HNSE 95% (metres)	VNSE 95% (metres)
Aalborg	1.0	1.6	Lappeenranta	0.8	1.5
Agadir	0.9	1.4	La Palma	1.0	1.7
Alexandria	1.1	1.8	Lisbon	1.0	1.4
Athens	0.8	1.3	Madeira	0.9	1.3
Berlin	0.9	1.3	Malaga	0.9	1.1
Canary Islands	1.2	1.6	Palma de Mallorca	0.7	1.0
Cork	1.1	1.2	Reykjavik	1.0	1.9
Catania	0.8	1.1	Roma	0.8	1.2
Djerba	0.9	1.2	S. de Compostela	0.9	1.1
Egilsstadir	0.7	1.6	Sofia	1.3	1.8
Glasgow	1.1	1.3	Swanwick	1.2	1.6
Golbasi	0.9	1.4	Toulouse	0.9	1.2
Gävle	0.8	1.5	Trondheim	0.8	1.5
Haifa	1.1	1.9	Tromsoe	1.0	2.3
Jan Mayen	1.2	2.2	Warsaw	0.9	1.4
Kirkenes	0.9	1.9	Zürich	0.8	1.2

Table 7: EGNOS Open Service accuracy (95%)

The horizontal accuracy results for all the stations remained below 1.4 metres (95%), and the vertical accuracy below 2.4 metres (95%), which represents a particularly good accuracy level.

The following figures show the histogram and cumulative distribution function of the HNSE (Horizontal Navigation System Error) and the VNSE (Vertical Navigation System Error), which are computed at the above stations for each second over the entire period, across the value range.

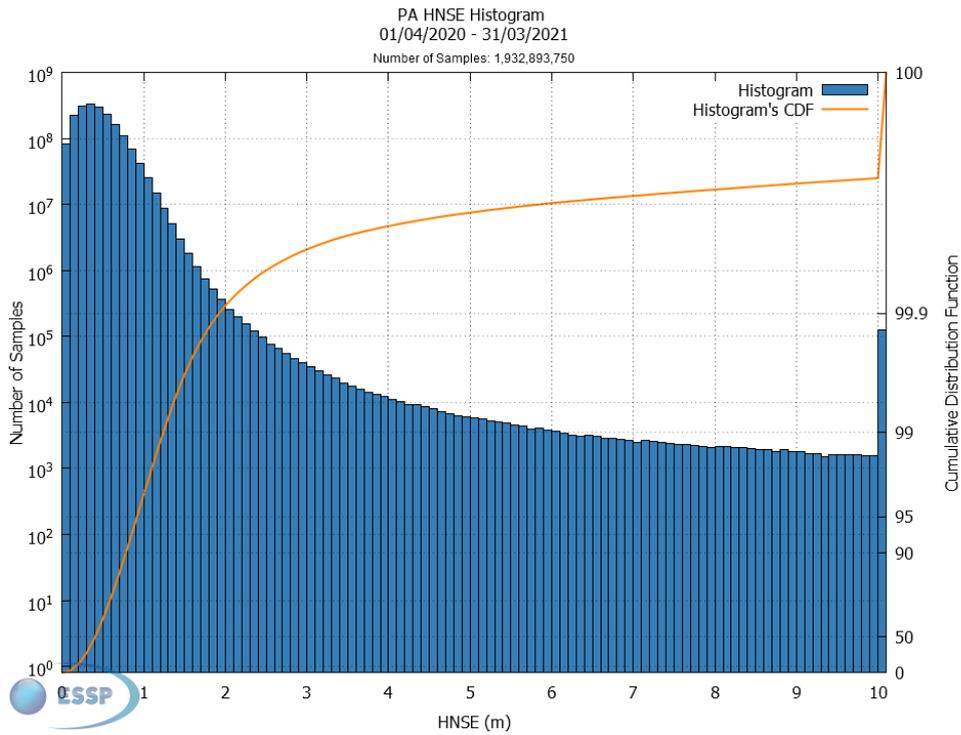


Figure 30: EGNOS Open Service HNSE Histogram and Cumulative Probability¹⁵

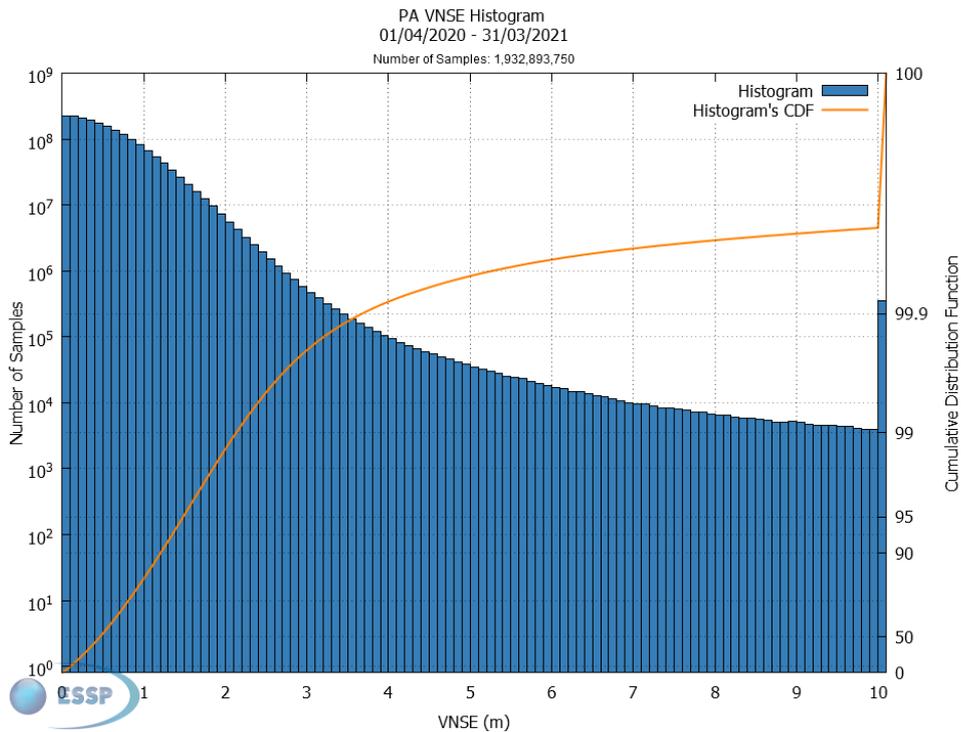


Figure 31: EGNOS Open Service VNSE Histogram and Cumulative Probability¹⁵

¹⁵ Note that some periods may have been removed for the computation of the different histograms presented in this document, corresponding to stations showing poor quality of data linked to the local environment. Data removed from histograms correspond to data from RIMS in which any OR affecting data quality has been observed, or the presence of cycle slips affecting performance is detected, or other data quality issues have been traced as a cause for daily degradations.

As shown, the cumulative results confirm the positive values observed at all stations. The 95th percentile of the observed accuracy performance is below one metre in the horizontal domain and below 1.5 metres in the vertical one.

Table 8 and Table 9 provide the daily values monthly maximum for Horizontal and Vertical Accuracy (95%) while using EGNOS message broadcast by GEO123 and GEO136.



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PRN 123		04/20	05/20	06/20	07/20	08/20	09/20	10/20	11/20	12/20	01/21	02/21	03/21	Average
AGA	HPE	1.45	1.10	1.06	1.30	1.34	1.50	1.41	1.67	1.51	1.76	1.62	1.57	1.44
	VPE	1.96	1.86	1.99	1.79	2.00	2.14	2.02	2.60	2.15	1.71	1.59	1.50	1.94
ALB	HPE	0.74	0.71	0.62	0.69	0.78	0.88	1.17	1.24	1.17	1.06	1.08	0.81	0.91
	VPE	1.71	1.65	1.65	1.56	1.59	1.66	1.55	2.06	1.58	1.46	1.67	1.79	1.66
ALY	HPE	1.21	1.28	1.27	1.19	1.27	1.31	1.20					1.58	1.29
	VPE	1.84	1.99	2.18	2.33	2.49	2.25	1.65					1.63	2.05
ATH	HPE	0.88	0.99	0.86	0.91	0.98	0.88	0.81	0.85	1.01	0.91	0.74	0.91	0.89
	VPE	1.36	1.52	1.44	1.78	1.69	1.64	1.66	1.48	1.74	1.62	1.58	1.36	1.57
BRN	HPE	0.91	0.93	0.86	0.85	0.94	0.96	1.09	1.28	1.25	1.06	1.20	0.93	1.02
	VPE	1.62	1.55	1.50	1.52	1.35	1.24	1.40	1.48	1.56	1.30	1.46	1.42	1.45
CNR	HPE	1.69	1.31	1.14	1.33	1.78	1.71	1.80	1.93	1.73	1.63	1.86	1.81	1.64
	VPE	1.79	1.88	1.87	1.93	2.12	2.60	1.99	2.07	1.84	1.75	1.70	1.80	1.95
CRK	HPE	1.01	1.01	0.97	1.17	1.23	1.05	1.48	1.38	1.36	1.49	1.26	1.13	1.21
	VPE	1.45	1.57	1.29	1.50	1.56	1.41	1.40	1.79	1.75	1.45	1.52	1.44	1.51
CTN	HPE	0.80	0.95	0.77	0.89	0.83	0.83	0.93	0.99	0.94	0.95	0.82	0.86	0.88
	VPE	1.27	1.48	1.36	1.44	1.57	1.35	1.51	1.40	1.43	1.45	1.34	1.13	1.39
DJA	HPE	0.93	1.14	0.97	1.02	0.96	0.98	0.97	1.11	1.24	1.00	1.05	0.99	1.03
	VPE	1.19	1.46	1.36	1.77	1.70	1.32	1.52	1.39	1.46	1.53	1.34	1.18	1.44
EGI	HPE	0.84	0.82	0.80	0.87	0.86	0.91	0.92	0.96	0.74	0.75	0.88	0.88	0.85
	VPE	1.95	1.89	1.77	1.79	2.02	2.28	1.74	2.38	1.96	2.11	2.03	2.39	2.03
GLG	HPE	0.93	0.92	0.84	0.87	1.01	1.09	0.80	1.45	1.28	1.36	1.34	1.11	1.08
	VPE	1.61	1.80	1.56	1.50	1.31	1.54	1.02	1.84	1.50	1.50	1.63	1.58	1.53
GOL	HPE	1.01	1.09	0.93	1.11		1.07	1.19	1.20	1.05	1.17	0.91	1.08	1.07
	VPE	1.80	1.74	1.60	1.92		1.70	1.79	1.72	2.06	1.97	1.56	1.55	1.76
GVL	HPE	0.62	0.65	0.66	0.72	0.68	0.82	1.13	1.22	1.02	1.01	0.99	0.76	0.86
	VPE	1.88	1.76	1.79	1.89	1.81	1.81	1.75	1.88	1.86	1.70	1.91	1.89	1.83
HFA	HPE	1.32	1.30	1.29	1.27	1.30	1.22	1.07	1.21	1.43	1.29	1.39	1.35	1.29
	VPE	2.05	2.19	2.20	2.56	3.23	2.37	1.82	1.99	2.41	2.21	2.04	1.94	2.25
JME	HPE	1.32	1.35	1.43	1.46	1.24	1.43	1.60	1.33	1.17	1.45	1.41	1.29	1.37
	VPE	2.52	2.40	2.37	2.88	2.60	2.65	2.53	2.74	2.90	2.54	2.97	2.55	2.64
KIR	HPE	1.26	0.98	0.99	1.83	1.01	1.05	1.08	1.11	0.95	1.18	1.10	1.08	1.14
	VPE	2.24	2.22	2.05	2.79	2.09	2.33	2.06	2.40	2.42	2.60	2.85	2.07	2.34
LAP	HPE	0.72	0.70	0.70	1.27	0.74	0.86	1.07	1.23	1.05	1.05	1.00	0.84	0.94
	VPE	2.04	1.68	1.87	2.28	1.78	1.84	1.78	1.77	1.71	1.85	2.03	1.88	1.88
LPI	HPE	1.44	1.14	1.06	1.33	2.13	1.78	1.24	1.33	1.44	1.42	1.75	1.47	1.46
	VPE	1.85	1.92	1.77	2.11	2.29	2.21	2.19	2.40	2.00	1.79	2.24	1.98	2.06
LSB	HPE	1.01	1.00	1.11	1.03	1.02	1.06	1.04	1.38	1.33	1.13	1.13	1.19	1.12
	VPE	1.66	1.58	1.72	1.58	1.71	1.73	1.61	1.65	1.86	1.83	1.75	1.96	1.72
MAD	HPE	1.05	0.95	0.94	1.14	1.06	0.88	0.91	1.04	0.94	1.04	0.99	0.93	0.99
	VPE	1.47	1.42	1.53	1.81	1.74	1.61	1.70	1.90	1.57	1.66	1.47	1.31	1.60
MLG	HPE	0.90	1.05	0.95	0.90	0.89	0.90	0.92	1.30	1.21	0.91	0.90	0.93	0.98
	VPE	1.24	1.23	1.28	1.32	1.74	1.45	1.62	1.37	1.56	1.31	1.23	1.06	1.37
PDM	HPE	0.73	0.80	0.71	0.70	0.72	0.72	0.80	1.04	0.87	0.76	0.78	0.79	0.79
	VPE	1.17	1.26	1.23	1.18	1.38	1.15	1.36	1.25	1.38	1.15	1.03	0.95	1.21
RKK	HPE	0.98	1.01	1.30	1.17	1.09	1.34	1.17	1.32	1.26	1.52	1.18	1.26	1.22
	VPE	2.14	2.26	2.59	2.29	2.33	3.61	2.74	2.73	2.28	2.95	2.12	2.46	2.54
ROM	HPE	0.81	0.85	0.75	0.75	0.72	0.80	0.84	1.02	0.98	1.02	0.91	0.81	0.86
	VPE	1.31	1.42	1.29	1.30	1.28	1.16	1.24	1.29	1.28	1.39	1.28	1.23	1.29
SDC	HPE	1.00	1.01	1.05	0.97	0.95	0.97	0.96	1.42	1.09	0.99	1.37	4.55	1.36
	VPE	1.30	2.02	1.29	1.44	1.36	1.40	1.25	1.47	1.17	1.21	2.21	4.51	1.72
SOF	HPE	1.29	1.33	1.18	1.26	1.26	1.53	1.32	1.51	1.51	1.74	1.41	1.38	1.39
	VPE	2.04	2.34	2.24	2.15	1.91	2.33	2.01	2.02	2.31	2.14	2.03	1.75	2.11
SWA	HPE	1.15	1.24	1.10	1.28	1.21	1.25	1.43	1.40	1.33	1.41	1.39	1.33	1.29
	VPE	1.69	1.95	1.75	1.89	1.64	1.74	1.58	2.04	1.69	1.89	2.00	1.92	1.82
TLS	HPE	0.88	0.86	0.85	0.85	0.86	0.82	0.92	1.10	0.98	1.05	0.97	0.89	0.92
	VPE	1.41	1.48	1.42	1.49	1.28	1.18	1.28	1.21	1.21	1.29	1.32	1.31	1.32
TRD	HPE	0.65	0.72	0.66	0.82	0.66	0.83	0.94	1.13	0.97	0.93	0.90	0.84	0.84
	VPE	2.12	2.09	1.69	1.67	1.65	1.80	1.54	1.99	1.69	1.86	2.01	1.85	1.83
TRO	HPE	1.49	1.21	1.08	1.72	1.08	1.11	1.23	1.46	1.05	1.25	1.15	1.46	1.27
	VPE	5.29	2.72	2.50	3.11	2.52	2.84	2.58	6.42	2.80	2.92	2.88	4.53	3.43
WRS	HPE	0.98	1.01	0.98	0.99	1.06	1.15	1.12	1.30	1.34	1.11	1.27	1.03	1.11
	VPE	2.03	1.80	1.91	1.75	1.72	1.78	1.58	1.56	1.55	1.32	1.73	1.70	1.70
ZUR	HPE	0.86	0.94	0.87	0.82	0.90	0.91	0.99	1.20	0.98	1.13	1.00	0.80	0.95
	VPE	1.44	1.56	1.54	1.51	1.38	1.34	1.33	1.59	1.43	1.37	1.51	1.30	1.44

Table 8: Monthly Horizontal/Vertical Accuracy at RIMS-A sites for GEO123 (in metres)

PRN 136		04/20	05/20	06/20	07/20	08/20	09/20	10/20	11/20	12/20	01/21	02/21	03/21	Average
AGA	HPE	1.44	1.10	1.06	1.30	1.36	1.50	1.45	1.67	1.51	1.76	1.61	1.55	1.44
	VPE	1.94	1.84	1.98	1.80	2.00	2.15	2.05	2.54	2.16	1.71	1.59	1.50	1.94
ALB	HPE	0.74	0.71	0.62	0.69	0.78	0.88	1.15	1.25	1.16	1.05	1.08	0.79	0.91
	VPE	1.71	1.65	1.64	1.58	1.58	1.67	1.52	2.07	1.58	1.44	1.68	1.79	1.66
ALY	HPE	1.21	1.27	1.30	1.19	1.27	1.31	1.20					1.54	1.29
	VPE	1.83	2.00	2.17	2.34	2.47	2.24	1.71					1.57	2.04
ATH	HPE	0.89	0.99	0.86	0.90	0.98	0.88	0.83	0.85	1.01	0.92	0.74	0.92	0.90
	VPE	1.34	1.50	1.44	1.78	1.70	1.62	1.63	1.47	1.74	1.61	1.58	1.35	1.56
BRN	HPE	0.92	0.95	0.85	0.85	0.93	0.95	1.08	1.28	1.25	1.06	1.21	0.93	1.02
	VPE	1.59	1.56	1.51	1.53	1.35	1.23	1.41	1.49	1.55	1.30	1.46	1.42	1.45
CNR	HPE	1.68	1.29	1.14	1.32	1.79	1.69	1.76	1.93	1.72	1.65	1.85	1.84	1.64
	VPE	1.73	1.87	1.86	1.94	2.05	2.59	2.01	2.03	1.81	1.77	1.71	1.81	1.93
CRK	HPE	1.00	1.01	0.96	1.17	1.23	1.05	1.47	1.38	1.36	1.49	1.26	1.13	1.21
	VPE	1.45	1.57	1.29	1.51	1.36	1.42	1.42	1.79	1.75	1.45	1.52	1.43	1.50
CTN	HPE	0.79	0.94	0.76	0.89	0.83	0.84	0.95	0.97	0.95	0.94	0.82	0.86	0.88
	VPE	1.26	1.47	1.33	1.42	1.55	1.32	1.51	1.41	1.42	1.42	1.34	1.12	1.38
DJA	HPE	0.93	1.14	0.96	1.04	0.96	0.99	0.96	1.13	1.24	0.99	1.05	1.00	1.03
	VPE	1.19	1.47	1.36	1.75	1.69	1.31	1.49	1.39	1.47	1.53	1.35	1.17	1.43
EGI	HPE	0.85	0.82	0.79	0.87	0.85	0.92	0.91	0.96	0.73	0.76	0.88	0.87	0.85
	VPE	1.94	1.90	1.77	1.76	1.97	2.28	1.73	2.39	1.97	2.09	2.03	2.30	2.01
GLG	HPE	0.94	0.94	0.83	0.86	1.01	1.10	0.80	1.45	1.28	1.36	1.34	1.08	1.08
	VPE	1.61	1.78	1.55	1.51	1.31	1.53	1.00	1.84	1.50	1.50	1.63	1.55	1.53
GOL	HPE	1.00	1.08	0.93	1.11		1.07	1.17	1.20	1.06	1.16	0.90	1.10	1.07
	VPE	1.87	1.74	1.60	1.93		1.70	1.76	1.72	2.06	1.92	1.56	1.55	1.76
GVL	HPE	0.61	0.65	0.67	0.72	0.69	0.82	1.12	1.23	1.02	1.00	0.99	0.77	0.86
	VPE	1.90	1.78	1.80	1.87	1.81	1.82	1.74	1.87	1.85	1.69	1.91	1.92	1.83
HFA	HPE	1.36	1.32	1.28	1.28	1.31	1.25	1.07	1.21	1.41	1.32	1.41	1.37	1.30
	VPE	2.01	2.21	2.20	2.54	3.22	2.37	1.82	2.00	2.44	2.21	2.04	2.10	2.26
JME	HPE	1.31	1.34	1.44	1.42	1.23	1.44	1.58	1.32	1.15	1.38	1.39	1.31	1.36
	VPE	2.52	2.40	2.42	2.89	2.59	2.67	2.48	2.75	2.83	2.55	2.98	2.56	2.64
KIR	HPE	1.25	0.96	0.99	1.75	1.03	1.04	1.07	1.11	0.94	1.22	1.12	1.08	1.13
	VPE	2.22	2.25	2.06	2.71	2.10	2.34	2.10	2.40	2.49	2.61	2.91	2.21	2.37
LAP	HPE	0.72	0.70	0.68	1.25	0.74	0.86	1.08	1.23	1.05	1.05	0.99	0.78	0.93
	VPE	2.02	1.67	1.85	2.23	1.78	1.87	1.76	1.76	1.71	1.89	2.02	1.89	1.87
LPI	HPE	1.43	1.12	1.06	1.32	2.15	1.79	1.20	1.33	1.46	1.42	1.74	1.53	1.46
	VPE	1.86	1.94	1.74	2.13	2.18	2.23	2.19	2.44	2.01	1.79	2.27	1.97	2.06
LSB	HPE	1.00	0.99	1.14	1.02	1.02	1.04	1.05	1.36	1.33	1.12	1.13	1.19	1.12
	VPE	1.66	1.57	1.71	1.57	1.69	1.74	1.58	1.64	1.95	1.84	1.75	1.97	1.72
MAD	HPE	1.05	0.94	0.93	1.15	1.06	0.88	0.91	1.00	0.94	1.04	0.99	0.93	0.99
	VPE	1.46	1.44	1.51	1.80	1.72	1.59	1.65	1.88	1.56	1.65	1.47	1.41	1.60
MLG	HPE	0.90	1.06	0.95	0.89	0.89	0.90	0.93	1.29	1.20	0.91	0.89	0.95	0.98
	VPE	1.25	1.23	1.29	1.32	1.73	1.43	1.61	1.36	1.57	1.31	1.24	1.04	1.37
PDM	HPE	0.73	0.82	0.70	0.70	0.72	0.73	0.81	1.03	0.87	0.76	0.78	0.79	0.79
	VPE	1.18	1.26	1.23	1.18	1.38	1.16	1.35	1.25	1.38	1.15	1.03	0.95	1.21
RKK	HPE	0.96	0.98	1.25	1.20	1.10	1.34	1.20	1.33	1.25	1.50	1.18	1.26	1.21
	VPE	2.15	2.33	2.52	2.29	2.47	3.71	2.79	2.73	2.28	2.93	2.12	2.44	2.56
ROM	HPE	0.81	0.85	0.75	0.75	0.72	0.81	0.84	1.03	0.97	1.02	0.91	0.83	0.86
	VPE	1.29	1.44	1.28	1.30	1.26	1.15	1.25	1.29	1.29	1.39	1.29	1.20	1.29
SDC	HPE	1.00	1.01	1.03	0.97	0.95	0.97	0.97	1.42	1.09	0.99	1.36	4.55	1.36
	VPE	1.31	2.12	1.30	1.40	1.35	1.40	1.26	1.46	1.17	1.21	2.21	4.48	1.72
SOF	HPE	1.29	1.34	1.19	1.27	1.26	1.52	1.31	1.51	1.51	1.76	1.41	1.39	1.40
	VPE	2.06	2.33	2.18	2.14	1.90	2.34	2.03	2.02	2.31	2.14	2.05	1.79	2.11
SWA	HPE	1.17	1.22	1.10	1.27	1.21	1.24	1.42	1.40	1.33	1.40	1.39	1.33	1.29
	VPE	1.67	1.96	1.73	1.88	1.62	1.74	1.62	2.03	1.68	1.87	2.00	1.93	1.81
TLS	HPE	0.86	0.86	0.83	0.85	0.86	0.82	0.92	1.10	0.98	1.06	0.97	0.87	0.92
	VPE	1.41	1.46	1.43	1.50	1.27	1.18	1.27	1.19	1.22	1.29	1.32	1.31	1.32
TRD	HPE	0.64	0.73	0.66	0.82	0.66	0.83	0.95	1.14	0.97	0.93	0.90	0.84	0.84
	VPE	2.10	2.12	1.66	1.67	1.62	1.79	1.49	1.98	1.72	1.87	2.01	1.90	1.83
TRO	HPE	1.48	1.20	1.08	1.72	1.08	1.13	1.25	1.47	1.04	1.23	1.15	1.50	1.28
	VPE	5.27	2.73	2.57	3.17	2.52	2.80	2.54	6.46	2.82	2.89	2.87	4.79	3.45
WRS	HPE	1.00	1.03	0.97	1.00	1.06	1.16	1.10	1.30	1.34	1.10	1.27	1.04	1.11
	VPE	2.05	1.84	1.83	1.74	1.72	1.76	1.56	1.55	1.54	1.32	1.73	1.71	1.70
ZUR	HPE	0.86	0.94	0.88	0.82	0.90	0.91	0.99	1.20	0.98	1.13	1.00	0.81	0.95
	VPE	1.45	1.58	1.54	1.52	1.37	1.34	1.31	1.57	1.42	1.37	1.51	1.29	1.44

Table 9: Monthly Horizontal/Vertical Accuracy at RIMS-A sites for GEO136 (in metres)

3.5.3 Open Service Availability

EGNOS OS Availability performance is defined in this document as the percentage of time in the month when the instantaneous HNSE is lower than three metres, and the instantaneous VNSE is lower than four metres over the total number of samples with valid PA navigation solution.

The following tables provide the values measured using GEO123 and GEO136, respectively.

PRN123	04/20	05/20	06/20	07/20	08/20	09/20	10/20	11/20	12/20	01/21	02/21	03/21	Average
AGAA	99.99%	99.98%	99.97%	99.92%	100.00%	99.98%	100.00%	99.89%	99.99%	99.99%	99.93%	99.97%	99.97%
ALBA	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	99.99%	100.00%	100.00%	100.00%	100.00%
ALYA	99.99%	99.99%	100.00%	99.98%	99.99%	100.00%	99.99%					99.89%	99.98%
ATHA	100.00%	100.00%	99.99%	99.99%	100.00%	100.00%	100.00%	100.00%	99.98%	99.96%	99.99%	100.00%	99.99%
BRNA	100.00%	99.96%	99.94%	99.93%	99.93%	99.95%	100.00%	100.00%	99.99%	100.00%	99.99%	100.00%	99.97%
CNRA	99.98%	99.98%	99.97%	99.93%	100.00%	99.92%	99.97%	99.99%	99.99%	100.00%	99.83%	99.94%	99.96%
CRKA	99.99%	100.00%	100.00%	100.00%	99.95%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	99.99%
CTNA	100.00%	99.99%	100.00%	99.97%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
DJAA	99.98%	99.97%	100.00%	99.98%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	99.93%	99.91%	99.98%
EGIA	99.99%	99.98%	100.00%	99.99%	100.00%	99.95%	99.99%	99.99%	99.95%	99.98%	99.96%	99.98%	99.98%
GLGA	99.96%	100.00%	99.99%	100.00%	100.00%	99.99%	100.00%	99.97%	99.99%	100.00%	99.99%	100.00%	99.99%
GOLA	99.96%	99.92%	99.98%	99.94%		99.99%	99.92%	99.98%	100.00%	99.97%	100.00%	100.00%	99.97%
GVLA	100.00%	100.00%	100.00%	99.99%	100.00%	99.99%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
HFAA	99.72%	99.92%	99.92%	99.53%	99.65%	99.75%	99.94%	99.94%	99.94%	99.91%	99.76%	99.91%	99.82%
JMEA	99.67%	99.71%	99.69%	99.61%	99.87%	99.80%	99.71%	99.79%	99.71%	99.83%	99.60%	99.77%	99.73%
KIRA	99.27%	99.36%	99.59%	98.99%	99.61%	99.48%	99.30%	99.70%	99.57%	99.53%	99.41%	99.59%	99.45%
LAPA	99.96%	99.87%	99.92%	99.72%	99.97%	100.00%	100.00%	99.99%	99.97%	99.97%	99.97%	99.98%	99.94%
LPIA	99.97%	99.97%	99.95%	99.91%	99.90%	99.95%	99.94%	99.94%	99.92%	99.99%	99.85%	99.89%	99.93%
LSBA	100.00%	100.00%	99.98%	99.99%	100.00%	99.99%	100.00%	100.00%	100.00%	99.97%	99.98%	99.96%	99.99%
MADA	100.00%	99.99%	99.97%	99.93%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	99.95%	99.99%	99.98%
MLGA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%
PDMA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
RKKA	99.35%	99.46%	99.21%	99.38%	99.09%	98.79%	98.94%	99.02%	99.11%	98.82%	99.34%	99.42%	99.16%
ROMA	99.98%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%
SDCA	100.00%	99.93%	99.99%	100.00%	100.00%	99.99%	99.99%	99.95%	100.00%	100.00%	99.52%	99.33%	99.89%
SOFA	99.99%	99.95%	99.96%	99.97%	99.98%	99.99%	99.99%	99.97%	99.98%	99.96%	99.97%	99.99%	99.97%
SWAA	99.99%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.95%	99.97%	99.99%
TLSA	99.91%	99.99%	99.95%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	99.96%	99.98%
TRDA	100.00%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	99.99%	100.00%	99.98%	99.99%	100.00%	99.99%
TROA	99.20%	99.43%	99.47%	99.07%	99.81%	99.71%	99.67%	99.57%	99.86%	99.76%	99.73%	99.43%	99.56%
WRSA	100.00%	99.96%	99.94%	100.00%	100.00%	99.99%	100.00%	99.99%	99.97%	100.00%	99.99%	100.00%	99.99%
ZURA	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%

Table 10: OS Availability at RIMS-A sites for GEO123



PRN136	04/20	05/20	06/20	07/20	08/20	09/20	10/20	11/20	12/20	01/21	02/21	03/21	Average
AGAA	99.99%	99.97%	99.97%	99.91%	100.00%	99.99%	99.99%	99.90%	100.00%	99.99%	99.94%	99.97%	99.97%
ALBA	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
ALYA	99.99%	99.99%	100.00%	99.99%	99.99%	100.00%	99.99%					99.97%	99.99%
ATHA	100.00%	99.99%	99.99%	99.98%	100.00%	100.00%	100.00%	100.00%	99.98%	99.97%	99.98%	100.00%	99.99%
BRNA	100.00%	99.96%	99.94%	99.92%	99.94%	99.95%	100.00%	100.00%	99.99%	100.00%	99.99%	100.00%	99.97%
CNRA	99.98%	99.99%	99.98%	99.92%	100.00%	99.92%	99.97%	100.00%	99.99%	100.00%	99.83%	99.95%	99.96%
CRKA	99.99%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%
CTNA	100.00%	100.00%	100.00%	99.97%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
DJAA	99.98%	99.97%	100.00%	99.97%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	99.93%	99.90%	99.98%
EGIA	99.99%	99.98%	100.00%	99.99%	100.00%	99.94%	99.99%	100.00%	99.95%	99.97%	99.96%	99.97%	99.98%
GLGA	99.96%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	99.99%	100.00%	100.00%	99.99%
GOLA	99.98%	99.91%	99.97%	99.93%		100.00%	99.91%	99.99%	99.99%	99.97%	100.00%	99.98%	99.97%
GVLA	100.00%	100.00%	100.00%	99.99%	100.00%		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
HFAA	99.71%	99.91%	99.92%	99.55%	99.65%	99.75%	99.94%	99.94%	99.93%	99.90%	99.77%	99.89%	99.82%
JMEA	99.69%	99.72%	99.70%	99.58%	99.87%	99.79%	99.72%	99.79%	99.71%	99.83%	99.57%	99.80%	99.73%
KIRA	99.26%	99.31%	99.63%	98.98%	99.62%	99.49%	99.34%	99.67%	99.56%	99.53%	99.39%	99.54%	99.44%
LAPA	99.96%	99.88%	99.91%	99.74%	99.98%	100.00%	100.00%	100.00%	99.97%	99.96%	99.97%	99.98%	99.95%
LPIA	99.97%	99.97%	99.95%	99.90%	99.91%	99.95%	99.94%	99.95%	99.93%	99.99%	99.86%	99.90%	99.94%
LSBA	100.00%	100.00%	99.98%	99.98%	100.00%	99.99%	100.00%	100.00%	100.00%	99.97%	99.98%	99.95%	99.99%
MADA	99.99%	99.99%	99.97%	99.93%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	99.95%	100.00%	99.98%
MLGA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%
PDMA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
RKKA	99.32%	99.46%	99.23%	99.46%	99.10%	98.77%	98.88%	99.00%	99.12%	98.84%	99.33%	99.44%	99.16%
ROMA	99.98%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%
SDCA	100.00%	99.93%	99.99%	99.99%	100.00%	99.98%	99.99%	99.95%	100.00%	100.00%	99.53%	99.39%	99.90%
SOFA	99.99%	99.94%	99.95%	99.97%	99.99%	99.99%	99.98%	99.96%	99.98%	99.96%	99.97%	99.98%	99.97%
SWAA	99.99%	100.00%	100.00%	99.97%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.95%	99.97%	99.99%
TLSA	99.91%	99.99%	99.95%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	99.97%	99.98%
TRDA	100.00%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	99.99%	100.00%	99.99%	99.99%	100.00%	99.99%
TROA	99.21%	99.40%	99.48%	98.98%	99.81%	99.72%	99.67%	99.57%	99.87%	99.76%	99.73%	99.38%	99.55%
WRSA	100.00%	99.97%	99.94%	99.99%	100.00%	99.99%	100.00%	99.99%	99.97%	100.00%	99.99%	100.00%	99.99%
ZURA	99.99%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	99.99%	100.00%	99.99%	100.00%	100.00%	100.00%

Table 11: OS Availability at RIMS-A sites for GEO136

The monthly Open Service availability performance in all the RIMS stations was over 99%, except RIMS KIRA and TROA in July 2020, and RIMS RKKA in September, October, and November 2020, and January 2021.

The following map shows the OS availability value during the year for each location. The worst value between GEO123 and GEO136 is displayed.

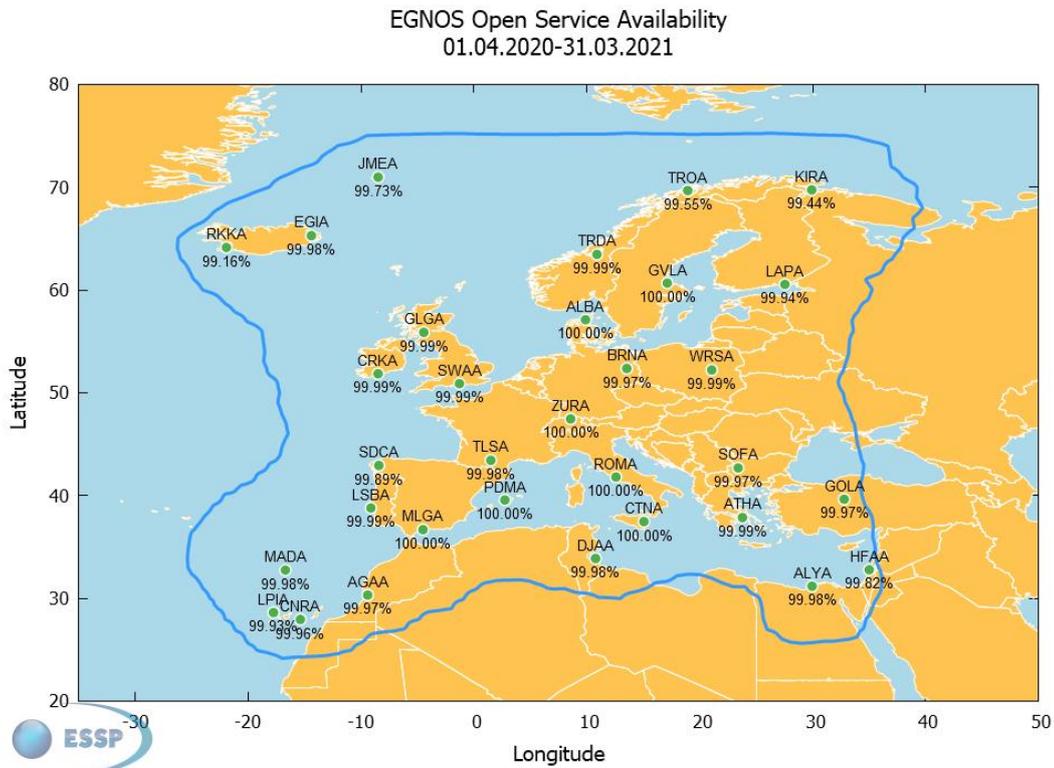


Figure 32: OS availability for the RIMS stations

As shown in the previous figure, the global Open Service Availability performance has been greater than 99% at all stations.

3.6 EGNOS Data Access Service (EDAS)

EDAS (EGNOS Data Access Service) provides free-of-charge internet-based access to EGNOS and GNSS (GPS&GLONASS) data in real-time and through an archive, including all the data generated by the EGNOS ground stations, mainly distributed over Europe and North Africa.

EDAS, like all other EGNOS Services, has its own [EDAS SDD \(Service Definition Document\)](#). Among other content, the EDAS SDD defines the committed performance for EDAS (which should always be met in a nominal situation) in terms of availability and latency:

- **Availability:** percentage of time in which EDAS is providing its services according to specifications. The availability of EDAS services is measured at the EDAS system output (excluding external network performance).
- **Latency:** time elapsed from the transmission of the last bit of the navigation message from the space segment (the EGNOS and the GPS/GLONASS satellites) until the data leave the EDAS system (formatted according to the corresponding service level specification). The EDAS latency is a one-way parameter defined for real-time services.

Based on the above definitions, the tables below provide minimum availability and maximum latency for the EDAS services:

SL0	SL2	SISNeT	FTP	Data Filtering	Ntrip
98.5%	98.5%	98%	98%	98%	98%

Table 12: EDAS services minimum availability

SL0	SL2	SISNeT	FTP	Ntrip	Data Filtering	
					SL0	SL2
1.3 seconds	1.450 seconds	1.150 seconds	N/A	1.75 seconds	1.6 seconds	1.75 seconds

Table 13: Maximum latency for EDAS Services

The EDAS performance is reported through the EGNOS Monthly Performance reports, available on the [EGNOS User Support website](#).

The availability achieved during the last annual period is shown in Figure 33.

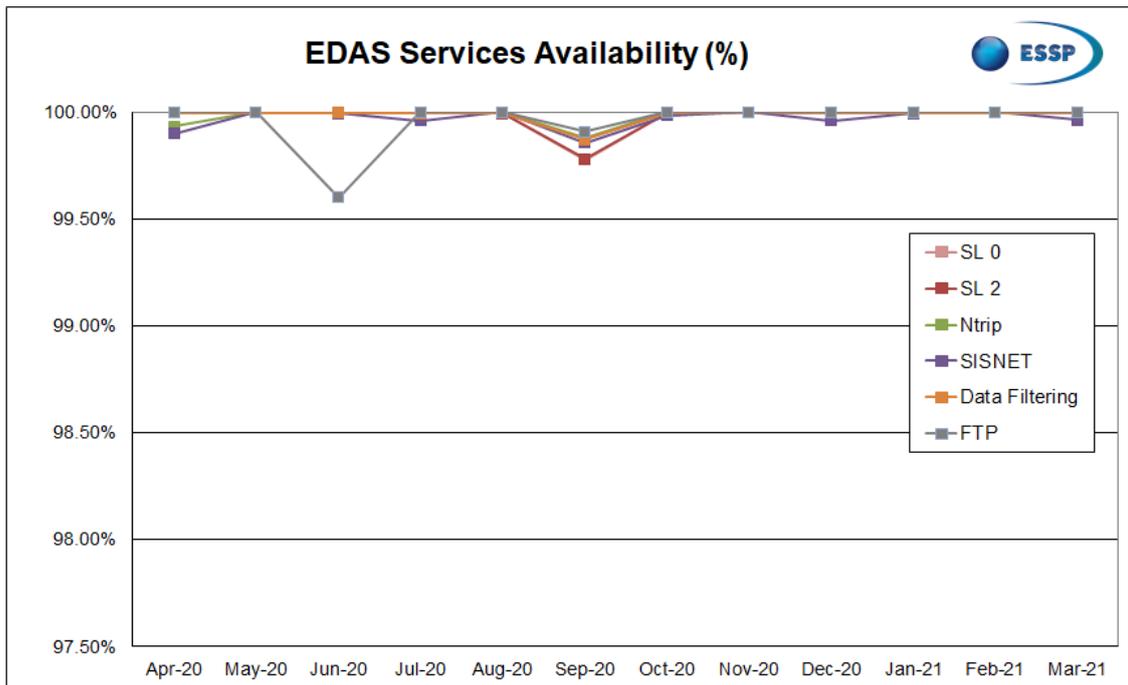


Figure 33: EDAS Services Availability (April 2020 - March 2021)

As shown above, the EDAS availability has been consistently above 99.9% for all services over the entire reporting period, except in June and September 2020, when there was a slight degradation (due to unplanned outages that were recovered within the day). Nevertheless, the monthly availability figures remained clearly above the commitments defined in the EDAS SDD v2.2.



Estonian DGNSS station powered by EDAS

The latency for real-time services (not applicable for the FTP service) during the last year period is shown below, computed as the average of the 95th percentile latencies monitored for every five minutes during the year.

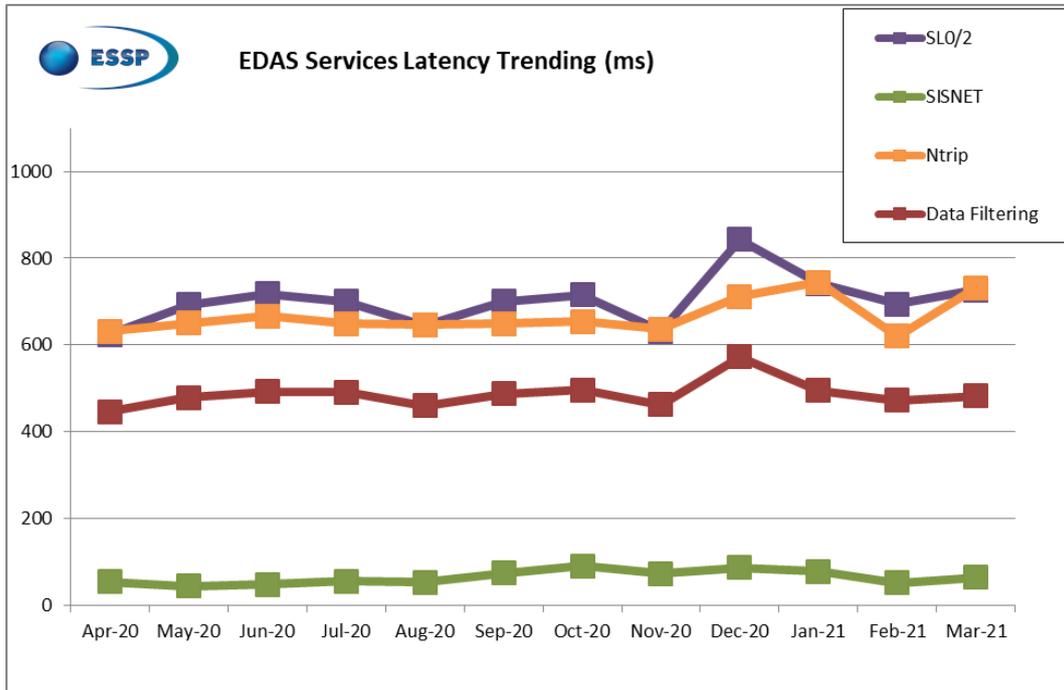


Figure 34: EDAS Services Latency (April 2020 - March 2021)

As shown in Figure 34, the EDAS services latency has been consistently below the one-second threshold and well below the EDAS SDD commitment for all services over the entire reporting period.

4 EGNOS SERVICES PROVISION

4.1 SoL Aviation Service Status

Based on the current EGNOS System Release (ESR), version 2.4.1I, all available Service Levels enable aircraft approaches from NPA to those operationally equivalent to ILS CAT I. APV-I and LPV-200 Service Levels provide lateral and angular vertical guidance without the need for visual contact with the ground until a Decision Height (DH) of 250 ft. and 200 ft., respectively, above the runway threshold. In particular, the EGNOS LPV-200 Service Level-based approaches guarantee the advantages provided by an ILS CAT I approach with the airspace design flexibility of a PBN approach.

The EGNOS SoL Service remained stable and robust during the reported period, only suffering degradations affecting specific airports in Norway, Finland, Iceland, and Greece. Such degradations were duly communicated to the concerned ANSPs, in line with the applicable mechanisms per the established and in-force EGNOS Working Agreements (EWAs). EWAs lay the operational and legal foundations in formalising working procedures, technical baselines, and required interfaces between ESSP and SES Certified Air Navigation Service Provider (ANSP) or other organisations entitled by the corresponding competent authority willing to use the EGNOS Safety-of-Life Service as a navigation aid. This Agreement is the necessary step before the publication of SBAS-based operations, mandatory for ANSPs.

The SoL Service Definition Document (SDD v3.3) has been in force for the entire reporting period.



EGNOS-equipped cockpit

4.2 Service Definition Documents and Service Notices over the period

EGNOS Service Definition Documents (SDD) describe the characteristics and conditions for access to each EGNOS service (OS, SoL and EDAS).

As anticipated in the SoL Service Implementation Roadmap, a new version of the SDD intends to include the updated performances with the extension of the commitment areas for APV-I and LPV200 in the SoL SDD to the southeast of Europe, expecting to cover Cyprus at the APV-I level fully. After introducing the two first GPS-III satellites in July 2020, ESSP continued to perform the analysis while maintaining ongoing discussions with EUSPA and EASA to evaluate the publication.

Meanwhile, at the request of EC, a new intermediate SDD was decided to be published based on the SoL service region actively pursued by the EGNOS Programme (magenta line), to be updated following the withdrawal of the United Kingdom from the European Union. This SoL SDD v3.4 was published on 4 May 2021, and includes a new magenta line layout and other topics, such as the non-use of L5 signal and clarification on the introduction of new GPS satellites.

As amendments to the EGNOS SDDs, ESSP generates Service Notices whenever there is any complementary information to users that could affect SDD content. Hence, an EGNOS Service Notice is a temporary amendment to the applicable version of the EGNOS Service Definition Documents.

During this reported period, ESSP has not published/updated any Service Notices. However, several drafts and templates were generated, mostly related to anticipating the potential impact that could require communication to the users. For instance, due to the COVID-19 foreseen effect, introducing the first two GPS-III satellites (finally, the EUSW published a piece of news on this subject) and other matters related to potential Brexit conditions with regards to UK RIMS, which were ultimately not needed.

The last SN was published in March 2020, addressing EGNOS Space segment configuration.

Number	Subject	Version	Date of Publication	Date of Status Change	Status	Target Users
22	EGNOS Space Segment Configuration	4.0	27/03/2020	-	In Force	All Users

Figure 35: Service Notices published/updated during this period

The current status of the [Service Notices](#) is available at the EGNOS User Support website.

4.3 User Consultations and Improvement Actions

Each year, an overall EGNOS User Satisfaction Process is jointly performed by the EUSPA and ESSP on the three EGNOS Services (SoL, OS, and EDAS). The purpose of this process is to obtain valuable feedback on the EGNOS use and ESSP's performance, identify improvement areas, and define recommendations on the EGNOS services.

This process considers feedback received via different means and interfaces, like the EGNOS Service Provision Workshop, the EGNOS User Support activities, ESSP's participation in multimodal forums, the GNSS implementation projects, working groups, or relevant events. However, the main input is the user satisfaction survey, widely distributed to key users and stakeholders of each EGNOS Services.

The EGNOS User Satisfaction Survey was launched in December 2020 and closed on 06/04/2021, using a specific online platform. A total of 124 responses were received.

The output from this survey will be included in the [EGNOS Bulletin Summer 2021](#) and published on the EGNOS User Support Website.

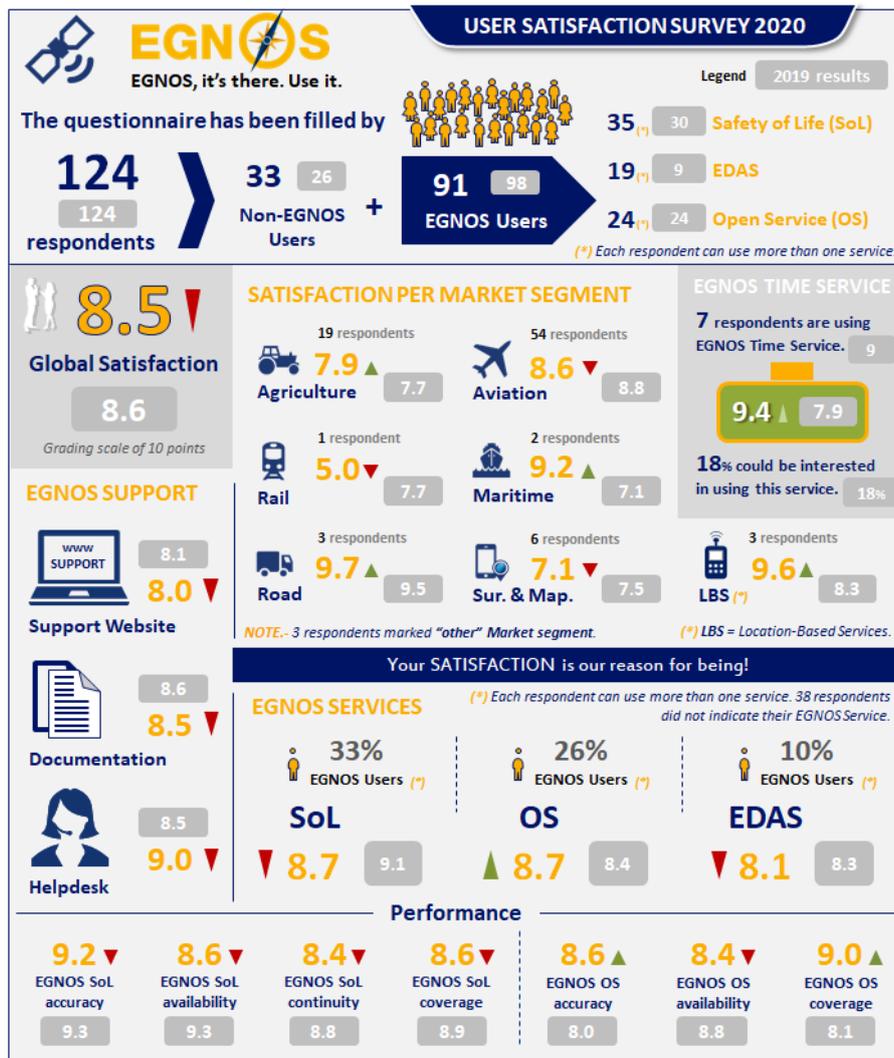


Figure 82: Summary of results from User Satisfaction Survey

Key conclusions on EGNOS User Satisfaction (Evolution from 2019 to 2020):

EGNOS users showed a satisfaction level of 8.5 over 10 in 2020 (8.6 in 2019). In general terms, this represents an outstanding level of satisfaction regarding EGNOS. In particular, note the increase achieved in Agriculture (from 7.7 in 2019 to 7.9 in 2020).

- **EGNOS SERVICES:** the score has improved for OS (from 8.4 in 2019 to 8.7 in 2020). All of EGNOS Services are rated over 8.0.
- **EGNOS USER SUPPORT:** User satisfaction levels have been slightly lower in 2020 compared to 2019 in terms of the website (8.0 versus 8.1), the documentation (8.5 versus 8.6), and the helpdesk (8.5 versus 9.0). Among the EGNOS Documentation elements, the EGNOS monthly performance reports have increased in satisfaction levels (9.0 versus 8.7).

4.4 Service Implementation Roadmaps

The EGNOS Services Implementation Roadmaps (SIR) provide a high-level overview of the current status of the EGNOS Services and their expected evolution in a three-year timeframe, linked to the subsequent deployments and information/interfaces improvements/changes of the EGNOS System Releases. These roadmaps mainly focus on four different areas: Service Evolution, Service Area / Service Level (or Data availability in EDAS), Service Robustness, and User Interfaces.

The three roadmaps for the EGNOS Services were updated twice since the previous report, in April 2020 (v4.3) and recently July 2021 (v5.0). The currently applicable version is available at:

- [EGNOS Open Service Roadmap](#)
- [EGNOS Safety of Life Service Roadmap](#)
- [EGNOS Data Access Service \(EDAS\) Roadmap](#)

Several improvements were made to the content and presentation of the SIR in these three documents, mainly to provide the EGNOS users with a more user-friendly, dynamic, and interactive way of obtaining information on the evolution of the EGNOS services. These improvements are included in last version of the SIRs.

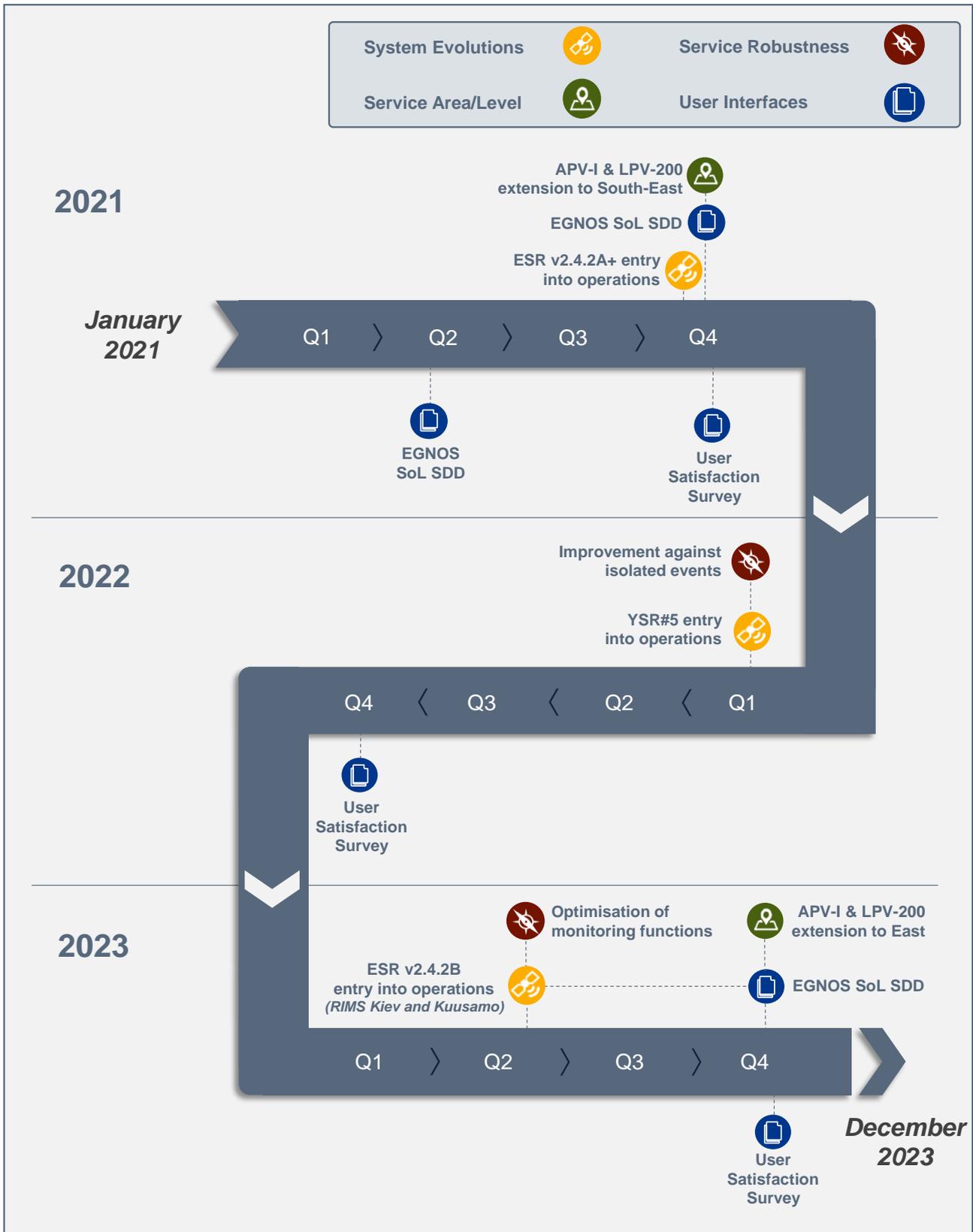


Figure 36: EGNOS Services Roadmaps –extract of the latest published SoL service roadmap

4.5 2020 EGNOS Multimodal Adoption Plan

The EGNOS adoption activities have proven to be a valuable means of enhancing the EGNOS use in the aviation, maritime, agriculture, geomatics, and rail market segments. In aviation, ESSP and the EUSPA have continued engaging aerodromes into publishing the EGNOS-based procedures and operators to get equipped and certified. Additionally, ESSP performed traffic assessments and Cost Benefit Analyses to support airlines, OEM, and airport decision-making processes regarding the adoption of EGNOS.

During the period reported in this document, 68 LPV, 45 LPV200, 4 LPV200(Hel), and 2 PinS were published, for a total of 119 EGNOS-based procedures within the period.

86 more aircraft/rotorcraft units have been engaged. Therefore, they will retrofit, start with the certification process, or request SBAS options in avionics for new unit orders in the near future. ESSP has proven to be a key facilitator in promoting, explaining, and connecting potential partners within ANSPs, Avionics Manufacturers, Operators, and Aircraft Manufacturers.

Regarding the maritime domain, the work done during previous years was continued in 2020:

- a) Supporting Slovakian maritime authorities by providing technical feasibility analysis and CBAs to recapitalise their AIS stations.
- b) Further market analysis on SBAS-enabled equipment, portable pilot units, and awareness.

In agriculture and geomatics, the contacts network has increased significantly, particularly in farming. New sub-segments are being explored: irrigation, fruit-yard machinery, water, and gas commodities. A new upgrade of the [GEAR tool \(EGNOS demonstrator for agriculture\)](#) has been released and uploaded to the EGNOS user support website.

ESSP has also continued preparing customized information for those market sub-segments during this period, including specific workshops and webinars (Geomatics webinar provided via the Geospatial Media platform). All this information is made available to users through the [EGNOS User Support Website](#).

Concerning rail activities, ESSP has continued supporting the EUSPA in the market size assessment of European freight wagons envisaged to be equipped with GNSS devices: the market size for freight cargo cars, estimated at ~170,000 units, and the timeframe foreseen to provide them with EGNSS sensors by 2022. By Q3 2019, ~23,000 smart wagons in Europe were confirmed to have already been equipped with the EGNSS telematics devices. Approximately 7000 of those are already using EGNOS.

4.6 Communication and EGNOS Promotion Activities

The EGNOS Annual Workshop took place online during the European Space Week on 9 December 2020. The online venue significantly increased the number of registered users, reaching 1,300.

During the hour and a half-long session, the EUSPA and the ESSP provided information on the EGNOS Programme’s status and roadmap, as well as on the market strategy, together with the latest position on the [EGNOS service](#) and its adoption in aviation ([Operators view on EGNOS](#), [ANSP view](#), [Implementation evolution](#) and a [simulation flying Rost LPV procedure](#)), [maritime](#), [Helicopter Emergency Medical Services \(HEMS\)](#), and [agriculture](#).



Figure 37: 2020 EU Space Week: EGNOS session – Online edition

Speaker presentations and videos are available online on the [EGNOS User Support Website](#) (*News & Events → Workshops → Workshop 2020*).

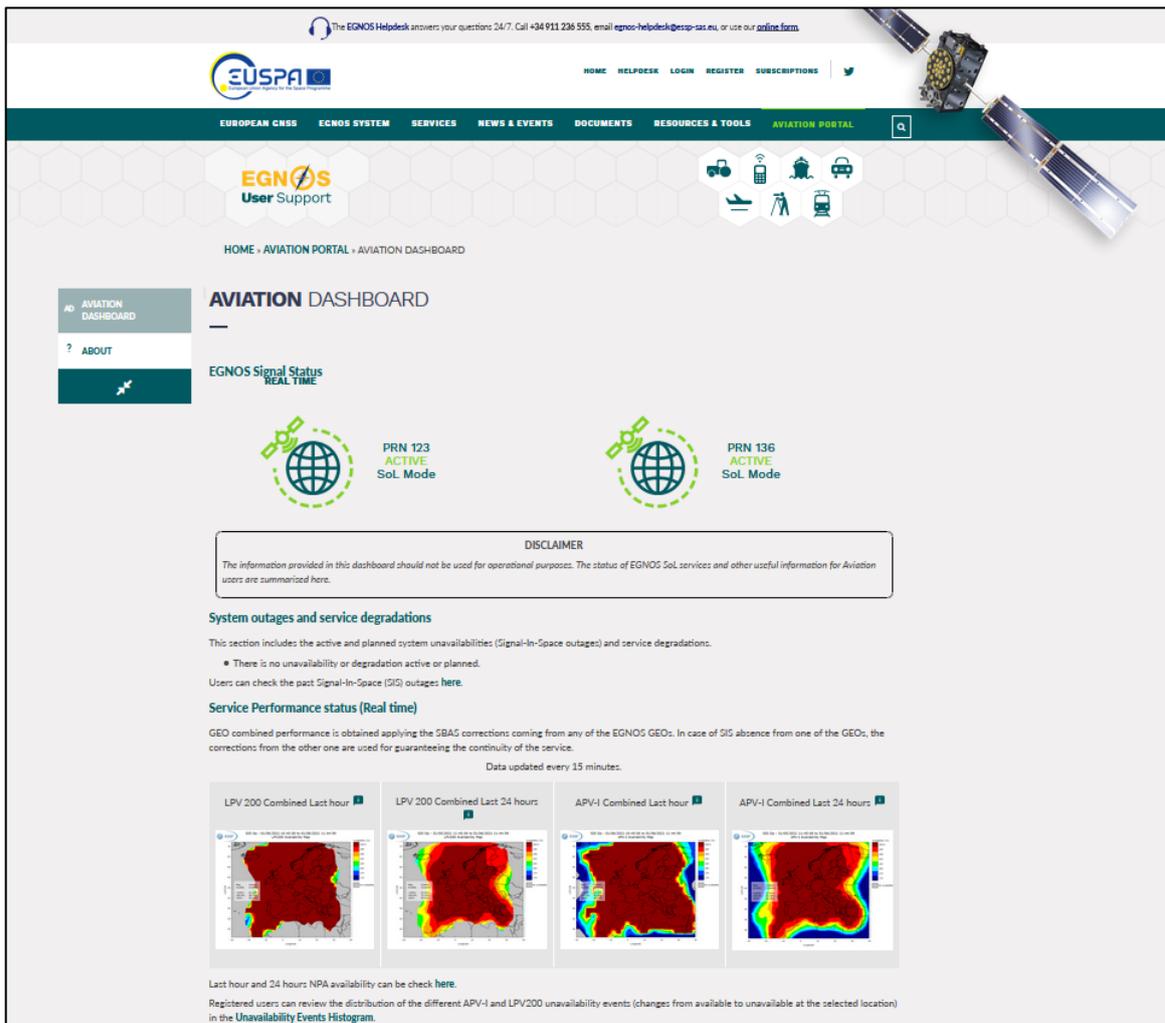
5 KEY ACTIVITIES PLANNED FOR THE YEAR AHEAD

5.1 Service Provision and Development

5.1.1 EGNOS Working Agreement Implementation in Aviation

The EWA contents are expected to evolve and improve to cover users' eventual needs and the applicable EU regulation. The main activities planned regarding the EWA are:

- EWA improvement activities: addressing mainly the improvement in using the Collaborative Decision-Making service arrangement and reinforcing communication with all types of users under the EGNOS Working Agreement framework.
- Confirming the EWA scheme for rotorcraft operators and aerodrome operators, facilitating the implementation of EGNOS-based procedures in scenarios where non-SES certified ANSPs operate, supporting the application of the National Regulation.



EGNOS aviation dashboard ([EGNOS User Support Website](#))

5.1.2 EGNOS Services' related documents evolutions

EGNOS Service Definition Documents (SDD)

One Service Definition Document is planned to be published over the next period:

- A new version of the SoL SDD, linked to the magenta line update following the withdrawal of the United Kingdom from the European Union, the non-use of the L5 signal, and the introduction of new GPS satellites. Its publication is scheduled for May 2021.
- A new version of the SoL SDD, linked to ESR 2.4.1N (YSR#4_PSS1), includes operations at the new RIMS station in the Eastern Mediterranean Region (RIMS Haifa). This new SoL SDD is expected to be published in Q4 2021.

Service Implementation Roadmaps

The three EGNOS Services Roadmaps will be updated at least twice over the next period.

The following publication is expected in Q2 2021 and will include the new Look & Feel. The main items addressed in the subsequent versions of the Service Roadmaps are:

- The publication of the next possible SDDs.
- Information regarding the upcoming EGNOS releases and their benefits to EGNOS users.

5.1.3 User Services Evolution

The EGNOS User Support is continuously evolving to better support the adoption of EGNOS and the needs of the different user communities.

The main priorities for the next period are:

- Improvements in the content organization and accessibility.
- Continue publishing news and articles in coordination with the EUSPA/communication.

5.1.4 2021 EGNOS Multimodal Adoption Action Plan

Every year, the EGNOS Multimodal Adoption (EMA) plan establishes the different activities that should be put in place to leverage the use of EGNOS by all different market segments. These are agreed upon between the EUSPA and the ESSP at the beginning of the year, and their progress is reviewed regularly. The activities to be developed during 2021 are distributed into four different market segments: aviation (where the major effort is placed), maritime, agriculture, geomatics, and rail.

Concerning aviation, the activities focus on active promotion and engagement of aviation stakeholders (aerodromes, ANSPs, and operators) through Traffic Assessments, the CBAs, and the continuous follow-up of the EGNOS implementation status (that allows updating the LPV procedures map every month in the EGNOS User Support Website). Particular focus is placed on the activities linked to quantify how EGNOS supports greener aviation through CO2 reduction by developing a tool to be placed in the EGNOS User Support Webpage, allowing CO2 reduction quantification and identification of real showcases.

In the maritime segment, support will be provided to those maritime and inland waterway authorities interested in the transmission of EGNOS corrections via AIS stations or IALA beacons by offering a trade-off architecture analysis (supported with a CBA). Additionally, continuous analysis of the

available SBAS compatible devices (navigation equipment, Portable Pilot Units -PPUs-, AIS, etc.) will be performed, together with promotion activities. This promotion is also linked to a better understanding of SBAS use and user requirements. Additionally, support in the development of SBAS guidelines for maritime receivers' manufacturers and strengthening relations with main stakeholders will continue.

In the scope of agriculture and geomatics, contacts activated in previous years will be maintained to support users and demonstrate the EGNOS benefits.

Finally, in the rail sector, a market assessment of EGNSS-enabled tracking devices supporting non-safety applications in freight and passenger trains is ongoing, with the subsequent promotion of the results. Support to relevant projects in the frame of signalling applications is foreseen, and also the follow up of the Change Request presented to ERA for the inclusion of EGNOS in the next update of the ERTMS regulatory framework.



The EGNOS Multimodal Adoption plan aims at fostering EGNOS use in all market segments

5.1.5 2021 EGNOS Workshop

The 2021 EGNOS Annual Workshop will take place online on 02 December 2021.

The event, organised by the ESSP and the EUSPA, will include information about the EGNOS services status, applications, and success stories from partners currently using EGNOS in real applications.



EGNOS Workshop 2021 – Details [here!](#)

APPENDIX A FULL LIST OF EGNOS-BASED APPROACH PROCEDURES

The information shown in this annex corresponds to the situation at AIRAC Cycle#2103 (25/03/2021). For an up to date list of the published EGNOS based procedures, please refer to the [EGNOS User Support Website](#).

Operational Aerodromes / Heliports /Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Akureyri	Iceland	BIAR	2	21/05/2020							2
Aerodrome	Husavik	Iceland	BIHU	1	29/03/2019							1
Aerodrome	Cles Helipad	Italy	DT71	2	30/01/2020							2
Aerodrome	Antwerpen / Deurne	Belgium	EBAW	1	10/12/2015							1
Aerodrome	Brussels-National	Belgium	EBBR	4	06/12/2018							4
Aerodrome	Charleroi / Brussels South	Belgium	EBCI	2	31/03/2016							2
Aerodrome	Liège	Belgium	EBLG	2	13/10/2016							2
Aerodrome	Kortrijk/Wevelgem	Belgium	EBKT	1	09/11/2017							1
Aerodrome	Oostende-Brugge	Belgium	EBOS					2	03/01/2019			2
Aerodrome	Bautzen	Germany	EDAB	2	27/04/2017		15/12/2011					2
Aerodrome	Leipzig/Altenburg	Germany	EDAC					2	28/03/2019			2
Aerodrome	Schoenhagen	Germany	EDAZ					1	11/10/2018			1
Aerodrome	Barth	Germany	EDBH			1	03/06/2010					1
Aerodrome	Magdeburg/City	Germany	EDBM	1	13/12/2012							1
Aerodrome	Neubrandenburg	Germany	EDBN	2	02/04/2015							2
Aerodrome	Berlin Brandenburg	Germany	EDDB				04/06/2009	4	08/10/2020			4
Aerodrome	Dresden	Germany	EDDC			2	15/12/2011					2
Aerodrome	Erfurt-Weimar	Germany	EDDE			2	15/12/2011					2



Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Frankfurt Main	Germany	EDDF			4	15/12/2011					4
Aerodrome	Münster/Osnabrück	Germany	EDDG			2	15/12/2011					2
Aerodrome	Hamburg	Germany	EDDH				15/12/2011	4	18/06/2020			4
Aerodrome	Köln/Bonn	Germany	EDDK				15/12/2011	6	12/09/2019			6
Aerodrome	Düsseldorf	Germany	EDDL			4	15/12/2011					4
Aerodrome	München	Germany	EDDM				15/12/2011	4	23/05/2019			4
Aerodrome	Nürnberg	Germany	EDDN			1	15/12/2011					1
Aerodrome	Leipzig/Halle	Germany	EDDP				15/12/2011	4	30/01/2020			4
Aerodrome	Saarbrücken	Germany	EDDR		01/03/2018	2	28/03/2019					2
Aerodrome	Stuttgart	Germany	EDDS				15/12/2011		23/04/2020			0
Aerodrome	Berlin-Tegel	Germany	EDDT			4	15/12/2011					4
Aerodrome	Hannover	Germany	EDDV			4	15/12/2011					4
Aerodrome	Bremen	Germany	EDDW				15/12/2011	2	30/03/2017			2
Aerodrome	Frankfurt Hahn	Germany	EDFH		23/07/2015			2	14/09/2017			2
Aerodrome	Allendorf/Eder	Germany	EDFQ	1	21/08/2014							1
Aerodrome	Siegerland	Germany	EDGS	1	12/10/2017			1	12/10/2017			2
Aerodrome	Hamburg/Finkenwerder	Germany	EDHI		13/12/2012			2	18/06/2020			2
Aerodrome	Kiel-Holtenau	Germany	EDHK					2	18/06/2020			2
Aerodrome	Luebeck-Blankensee	Germany	EDHL					2	18/06/2020			2
Aerodrome	Memmingen	Germany	EDJA			2	15/12/2011					2
Aerodrome	Moenchengladbach	Germany	EDLN					2	06/12/2018			2
Aerodrome	Paderborn/Lippstadt	Germany	EDLP		13/12/2012			2	10/10/2019			2
Aerodrome	Niederrhein	Germany	EDLV	1	23/06/2016							1

Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Dortmund	Germany	EDLW	2	12/12/2013							2
Aerodrome	Augsburg	Germany	EDMA			1	15/12/2011	1	11/10/2018			2
Aerodrome	Eggenfelden	Germany	EDME	1	11/12/2014							1
Aerodrome	Oberpfaffenhofen	Germany	EDMO		13/12/2012			1	23/05/2019			1
Aerodrome	Straubing	Germany	EDMS	1	11/12/2014							1
Aerodrome	Friedrichshafen	Germany	EDNY				15/12/2011	2	19/07/2018			2
Aerodrome	Donauwörth	Germany	EDPR	2	08/12/2016							2
Aerodrome	Coburg-Brandenstinebene	Germany	EDQC	1	11/12/2014							1
Aerodrome	Bayreuth	Germany	EDQD			1	15/12/2011					1
Aerodrome	Giebelstadt	Germany	EDQG			2	14/02/2012					2
Aerodrome	Hof-Plauen	Germany	EDQM					2	21/06/2018			2
Aerodrome	Hassfurt-Schweinfurt	Germany	EDQT					1	23/04/2020			1
Aerodrome	Karlsruhe/Baden-Baden	Germany	EDSB		17/09/2015			2	27/04/2017			2
Aerodrome	Donaueschingen-Villingen	Germany	EDTD	1	11/12/2014							1
Aerodrome	Lahr	Germany	EDTL	1	23/06/2016			1	27/04/2017			2
Aerodrome	Mengen-Hohentengen	Germany	EDTM	1	11/12/2014							1
Aerodrome	Schwäbisch-Hall	Germany	EDTY	2	13/12/2012							2
Aerodrome	Braunschweig-Wolfsburg	Germany	EDVE	2	18/10/2012							2
Aerodrome	Kassel-Calden	Germany	EDVK	2	04/04/2013							2
Aerodrome	Emden	Germany	EDWE	4	30/05/2013							4
Aerodrome	Wilhelmshaven JadeWeserAirport	Germany	EDWI			2	15/12/2011					2
Aerodrome	Sylt	Germany	EDXW	2	10/12/2015							2

Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Kärdla	Estonia	EEKA	2	31/01/2019							2
Aerodrome	Kuressaare	Estonia	EEKE	2	02/03/2017							2
Aerodrome	Lennart Meri Tallinn	Estonia	EETN					4	06/12/2018			4
Aerodrome	Tartu	Estonia	EETU	1	18/07/2019			1	18/07/2019			2
Aerodrome	Enontekiö	Finland	EFET	2	03/12/2020		07/12/2017					2
Aerodrome	Halli	Finland	EFHA	2	03/12/2020							2
Aerodrome	Helsinki-Vantaa	Finland	EFHK	6	27/02/2020							6
Aerodrome	Ivalo	Finland	EFIV	2	03/12/2020		07/12/2017					2
Aerodrome	Joensuu	Finland	EFJO	2	12/12/2013							2
Aerodrome	Jyväskylä	Finland	EFJY	2	28/01/2021		07/12/2017					2
Aerodrome	Kemi-Tornio	Finland	EFKE	2	28/01/2021		07/12/2017					2
Aerodrome	Kajaani	Finland	EFKI	2	03/12/2020		07/12/2017					2
Aerodrome	Kokkola-Pietarsaari	Finland	EFKK	2	18/06/2020		07/12/2017					2
Aerodrome	Kuusamo	Finland	EFKS	2	10/09/2020		07/12/2017					2
Aerodrome	Kittilä	Finland	EFKT			1	07/12/2017					1
Aerodrome	Kuopio	Finland	EFKU	2	16/07/2020		07/12/2017					2
Aerodrome	Lappeenranta	Finland	EFLP	2	10/09/2020		07/12/2017					2
Aerodrome	Mariehamn	Finland	EFMA	2	18/06/2020		08/12/2017					2
Aerodrome	Oulu	Finland	EFOU	2	23/04/2020		07/12/2017					2
Aerodrome	Pori	Finland	EFPO	2	03/12/2020		07/12/2017					2
Aerodrome	Rovaniemi	Finland	EFRO	2	23/04/2020		07/12/2017					2
Aerodrome	Savonlinna	Finland	EFSA	2	03/12/2020		07/12/2017					2
Aerodrome	Tampere-Pirkkala	Finland	EFTP	2	27/02/2020		07/12/2017					2



Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Turku	Finland	EFTU	2	27/02/2020		07/12/2017					2
Aerodrome	Utti	Finland	EFUT	2	28/01/2021							2
Aerodrome	Vaasa	Finland	EFVA	2	18/06/2020		07/12/2017					2
Aerodrome	Campbeltown	United Kingdom	EGEC	2	23/06/2016							2
Aerodrome	Cardiff	United Kingdom	EGFF	2	13/10/2016							2
Aerodrome	Bristol	United Kingdom	EGGD	2	21/08/2014							2
Aerodrome	Lands End	United Kingdom	EGHC	4	27/04/2017							4
Aerodrome	Yeovil	United Kingdom	EGHG	2	09/06/2017							2
Aerodrome	Southampton	United Kingdom	EGHI	1	11/10/2018							1
Aerodrome	Alderney	Guernsey	EGJA	2	07/12/2011							2
Aerodrome	Guernsey	Guernsey	EGJB					2	10/10/2019			2
Aerodrome	Jersey	United Kingdom	EGJJ					2	23/05/2019			2
Aerodrome	Barrow/Walney Island	United Kingdom	EGNL	2	23/06/2016							2
Aerodrome	Kirkwall	United Kingdom	EGPA	2	21/07/2016							2
Aerodrome	Sumburgh	United Kingdom	EGPB	3	11/10/2018							3
Aerodrome	Wick	United Kingdom	EGPC	2	23/06/2016							2
Aerodrome	Islay	United Kingdom	EGPI	2	18/08/2016							2
Aerodrome	Prestwick	United Kingdom	EGPK	2	30/01/2020			1	16/07/2020			3
Aerodrome	Dundee	United Kingdom	EGPN	2	30/03/2017							2
Aerodrome	Barra	United Kingdom	EGPR	2	18/08/2016							2
Aerodrome	Tiree	United Kingdom	EGPU	2	04/02/2016							2
Aerodrome	Exeter	United Kingdom	EGTE	2	21/08/2014							2
Aerodrome	Amsterdam	Netherlands	EHAM	1	21/06/2018			4	05/12/2019			5



Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Weert/Budel	Netherlands	EHBD					1	31/12/2020			1
Aerodrome	Eindhoven	Netherlands	EHEH					2	28/01/2021			2
Aerodrome	Eelde	Netherlands	EHGG	2	13/11/2014							2
Aerodrome	Den Helder - De Kooy	Netherlands	EHKD					2	28/01/2021			2
Aerodrome	Lelystad	Netherlands	EHLE	2	05/12/2019							2
Aerodrome	Leeuwarden	Netherlands	EHLW					2	28/01/2021			2
Aerodrome	Teuge	Netherlands	EHTE	1	13/11/2014							1
Aerodrome	Cork	Ireland	EICK	3	16/08/2018							3
Aerodrome	Dublin	Ireland	EIDW	4	25/05/2017							4
Aerodrome	Ireland West Airport	Ireland	EIKN	2	25/03/2021							2
Aerodrome	Sligo	Ireland	EISG	2	25/03/2021							2
Aerodrome	Aarhus	Denmark	EKAH	2	05/03/2015							2
Aerodrome	Billund	Denmark	EKBI					2	20/07/2017			2
Aerodrome	Esbjerg	Denmark	EKEB		15/10/2015			2	26/03/2020			2
Aerodrome	Karup	Denmark	EKKA	2	02/04/2015							2
Aerodrome	Sønderborg	Denmark	EKSB	2	18/08/2016							2
Aerodrome	Sindal	Denmark	EKSN	1	18/06/2020			1	18/06/2020			2
Aerodrome	Luxembourg	Luxembourg	ELLX					2	26/03/2020			2
Aerodrome	Ålesund/Vigra	Norway	ENAL		03/03/2016			2	07/11/2019			2
Aerodrome	Andøya/Andenes	Norway	ENAN	2	02/04/2015							2
Aerodrome	Førde/Bringeland	Norway	ENBL	1	28/05/2015			1	27/04/2017			2
Aerodrome	Brønnøysund/Brønnøy	Norway	ENBN	1	08/12/2016							1
Aerodrome	Bodo	Norway	ENBO	1	06/12/2018							1

Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Bergen/Flesland	Norway	ENBR				03/03/2016	2	28/02/2019			2
Aerodrome	Kristiansand/Kjevik	Norway	ENCN			2	03/03/2016					2
Aerodrome	Bardufoss	Norway	ENDU	2	26/04/2018							2
Aerodrome	Harstad/Narvik/Evenes	Norway	ENEV	1	30/03/2017							1
Aerodrome	Florø	Norway	ENFL	1	02/04/2015							1
Aerodrome	Gardermoen	Norway	ENGM					4	10/11/2016			4
Aerodrome	Haugesund/Karmøy	Norway	ENHD				03/03/2016	2	13/08/2020			2
Aerodrome	Hasvik	Norway	ENHK					2	03/12/2020			2
Aerodrome	Kristiansund/Kvernberget	Norway	ENKB	1	26/05/2016			1	31/12/2020			2
Aerodrome	Kirkenes/Hoybuktkmoen	Norway	ENKR	2	27/04/2017							2
Aerodrome	Leknes	Norway	ENLK	1	02/02/2017	1	10/10/2019					2
Aerodrome	Mehamn	Norway	ENMH	2	05/12/2019		28/03/2019					2
Aerodrome	Molde/Årø	Norway	ENML					2	30/03/2017			2
Aerodrome	Mosjøen/Kjærstad	Norway	ENMS	1	30/03/2017							1
Aerodrome	Namsos	Norway	ENNM		02/04/2015			2	27/04/2017			2
Aerodrome	Ørland	Norway	ENOL				03/03/2016	2	12/10/2017			2
Aerodrome	Rørvik/Ryum	Norway	ENRM					2	02/02/2017			2
Aerodrome	Røst	Norway	ENRS	2	06/03/2014							2
Aerodrome	Moss/Rygge	Norway	ENRY	2	10/12/2015							2
Aerodrome	Sogndal/Haukasen	Norway	ENSG		17/08/2017			1	14/09/2017			1
Aerodrome	Svolvær/Helle	Norway	ENSH	1	08/12/2016							1
Aerodrome	Stokmarknes/Skagen	Norway	ENSK	1	08/12/2016							1
Aerodrome	Stord/Sørstøkken	Norway	ENSO			2	03/03/2016					2



Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Vardø/Svartnes	Norway	ENSS	2	03/12/2020							2
Aerodrome	Sandnessjøen/Stokka	Norway	ENST		23/07/2015			2	30/01/2020			2
Aerodrome	Sandefjord/Torp	Norway	ENTO	2	20/08/2015							2
Aerodrome	Oslo Helikopterplass Taraldrud	Norway	ENTX	2	25/03/2021							2
Aerodrome	Trondheim/Vårnes	Norway	ENVA				03/03/2016	2	27/02/2020			2
Aerodrome	Stavanger/Sola	Norway	ENZV				03/03/2016	4	09/11/2017			4
Aerodrome	Bydgoszcz - Szwedkowo	Poland	EPBY					2	26/04/2018			2
Aerodrome	Gdańsk Lech Wałęsa	Poland	EPGD		28/05/2015			2	26/04/2018			2
Aerodrome	Kraków - Balice	Poland	EPKK		18/08/2016			2	26/04/2018			2
Aerodrome	Katowice	Poland	EPKT		03/04/2014			2	26/04/2018			2
Aerodrome	Lublin	Poland	EPLB					2	26/04/2018			2
Aerodrome	Łódź - Lublinek	Poland	EPLL					2	21/06/2018			2
Aerodrome	Warszawa/Modlin	Poland	EPMO					2	26/04/2018			2
Aerodrome	Poznan Lawica	Poland	EPPO					2	18/07/2019			2
Aerodrome	Rzeszów - Jasionka	Poland	EPRZ		15/09/2016			2	26/04/2018			2
Aerodrome	Szczecin - Goleniów	Poland	EPSC					2	26/04/2018			2
Aerodrome	Olsztyn - Mazury	Poland	EPSY					2	26/04/2018			2
Aerodrome	Warszawa - F. Chopin	Poland	EPWA					4	26/04/2018			4
Aerodrome	Wroclaw/Strachowice	Poland	EPWR		13/10/2016			2	26/04/2018			2
Aerodrome	Zielona Góra - Babimost	Poland	EPZG					2	18/07/2019			2
Aerodrome	Uppsala	Sweden	ESCM	4	21/05/2020							4
Aerodrome	Jönköping	Sweden	ESGJ	2	09/11/2017							2

Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Säve	Sweden	ESGP	1	05/11/2020							1
Aerodrome	Skövde	Sweden	ESGR	2	31/05/2018							2
Aerodrome	Trollhättan-Vänersborgs flygplats	Sweden	ESGT	2	29/03/2018							2
Aerodrome	Mora/Siljan	Sweden	ESKM	2	30/01/2020							2
Aerodrome	Kristianstad	Sweden	ESMK	2	06/12/2018							2
Aerodrome	Kalmar Öland	Sweden	ESMQ	1	28/03/2019	1	28/03/2019					2
Aerodrome	Halmstad	Sweden	ESMT	2	08/11/2018							2
Aerodrome	Växjö Kronoberg	Sweden	ESMX	2	25/04/2019							2
Aerodrome	Sveg	Sweden	ESND	2	31/01/2019							2
Aerodrome	Lapland	Sweden	ESNG	2	20/06/2019							2
Aerodrome	Kramfors-Sollefteå	Sweden	ESNK	2	13/08/2020							2
Aerodrome	Lycksele	Sweden	ESNL	2	15/08/2019							2
Aerodrome	Örnsköldsvik	Sweden	ESNO	2	07/12/2017							2
Aerodrome	Skellefteå	Sweden	ESNS	2	21/05/2020		28/03/2019					2
Aerodrome	Vilhelmina	Sweden	ESNV	2	27/02/2020							2
Aerodrome	Arvidsjaur	Sweden	ESNX	2	05/12/2019							2
Aerodrome	Örebro	Sweden	ESOE	2	16/08/2018							2
Aerodrome	Hagfors	Sweden	ESOH	1	30/01/2020							1
Aerodrome	Karlstad Airport	Sweden	ESOK	2	05/11/2020							2
Aerodrome	Stockholm/Västerås	Sweden	ESOW	2	30/01/2020							2
Aerodrome	Borlänge Dala	Sweden	ESSD	2	05/11/2020							2
Aerodrome	Linköping/Saab	Sweden	ESSL	2	31/01/2019							2



Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Norrköping Kungsängen	Sweden	ESSP	2	29/03/2018							2
Aerodrome	Torsby	Sweden	ESST	2	23/05/2019							2
Aerodrome	Eskilstuna	Sweden	ESSU	2	10/09/2020							2
Aerodrome	Visby	Sweden	ESSV					1	25/03/2021			1
Aerodrome	Ängelholm	Sweden	ESTA			2	19/07/2018					2
Aerodrome	Storuman	Sweden	ESUD		11/12/2014							0
Aerodrome	Pajala	Sweden	ESUP	2	31/12/2020							2
Aerodrome	Hemavan Tärnaby Airport AB	Sweden	ESUT	1	11/10/2018							1
Aerodrome	Palanga	Lithuania	EYPA	1	25/03/2021							1
Aerodrome	Vilnius	Lithuania	EYVI	2	16/07/2020							2
Aerodrome	Lanzarote AD	Spain	GCCR	1	23/05/2019							1
Aerodrome	Dubrovnik	Croatia	LDDU	1	10/12/2015							1
Aerodrome	Pula	Croatia	LDPL	2	26/04/2018							2
Aerodrome	Osijek/Klisa	Croatia	LDOS	1	29/03/2018							1
Aerodrome	Rijeka	Croatia	LDRI	2	12/09/2019							2
Aerodrome	Brač	Croatia	LDSB	2	05/12/2019							2
Aerodrome	Split/Kastela	Croatia	LDSP	1	29/03/2018							1
Aerodrome	Zagreb/Pleso	Croatia	LDZA	2	29/03/2018							2
Aerodrome	Zadar	Croatia	LDZD	4	11/10/2018							4
Aerodrome	Almería	Spain	LEAM	2	02/02/2017							2
Aerodrome	Palma de Mallorca	Spain	LEPA	3	01/03/2018							3
Aerodrome	Valencia Airport	Spain	LEVC	2	01/02/2018							2
Aerodrome	Vigo	Spain	LEVX	2	05/12/2019							2



Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Santander	Spain	LEXJ	2	17/10/2013							2
Aerodrome	Dieppe Saint Aubin	France	LFAB	1	02/03/2017							1
Aerodrome	Calais	France	LFAC	1	20/09/2012							1
Aerodrome	Albert Bray	France	LFAQ	1	15/11/2012			1	21/11/2017			2
Aerodrome	Le Touquet Paris Plage	France	LFAT	1	04/02/2016			1	21/11/2017			2
Aerodrome	Valenciennes Denain	France	LFAV	1	19/09/2013			1	21/11/2017			2
Aerodrome	Amiens Glisy	France	LFAY	1	27/06/2013							1
Aerodrome	Agen La Garenne	France	LFBA		06/03/2014			1	21/11/2017			1
Aerodrome	Bordeaux Merignac	France	LFBD	1	08/03/2012			3	21/11/2017			4
Aerodrome	Bergerac	France	LFBE		09/01/2014			2	21/11/2017			2
Aerodrome	Toulouse Francazal	France	LFBF	2	23/06/2016							2
Aerodrome	La Rochelle	France	LFBH	1	20/09/2012							1
Aerodrome	Poitiers Biard	France	LFBI	1	12/11/2015			1	21/11/2017			2
Aerodrome	Montluçon Gueret	France	LFBK	1	17/12/2013							1
Aerodrome	Limoges	France	LFBL		28/06/2012			2	21/11/2017			2
Aerodrome	Niort Marais Poitevin	France	LFBN	1	02/03/2017							1
Aerodrome	Toulouse Blagnac	France	LFBO	4	03/05/2012							4
Aerodrome	Pau-Pyrénées	France	LFBP	1	17/03/2011							1
Aerodrome	Muret Lherm	France	LFBR	1	15/10/2015							1
Aerodrome	Tarbes Lourdes Pyrénées	France	LFBT	1	28/05/2015							1
Aerodrome	Angoulême Brie Champniers	France	LFBU		03/04/2014			2	21/11/2017			2
Aerodrome	Périgueux Bassillac	France	LFBX		28/05/2015			1	25/05/2017			1
Aerodrome	Biarritz Bayonne Anglet	France	LFBZ		09/02/2012		01/01/2013	2	26/04/2018			2



Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Albi Le Sequestre	France	LFCI	1	26/05/2016			1	21/11/2017			2
Aerodrome	Castres Mazamet	France	LFCK	1	22/08/2013							1
Aerodrome	Rodez Marcillac	France	LFCR	1	31/05/2012			1	21/11/2017			2
Aerodrome	Royan Médis	France	LFCY	1	30/04/2015							1
Aerodrome	Auch Lamothe	France	LFDH	2	28/05/2015							2
Aerodrome	Rochefort Charente Maritime	France	LFDN					1	23/05/2018			1
Aerodrome	Ouessant	France	LFEC	2	11/12/2014							2
Aerodrome	Colmar Houssen	France	LFGA		02/05/2013			2	21/06/2018			2
Aerodrome	Dole Tavaux	France	LFGJ		09/01/2014			1	21/11/2017			1
Aerodrome	Le Puy Loudes	France	LFHP		04/02/2016			2	28/02/2019			2
Aerodrome	Moulins Montbeugny	France	LFHY	1	01/05/2014							1
Aerodrome	Metz Nancy Lorraine	France	LFJL	1	04/04/2013			1	21/11/2017			2
Aerodrome	Angers Marcé	France	LFJR		07/01/2016			1	21/11/2017			1
Aerodrome	Bastia Poretta	France	LFKB					1	07/12/2017			1
Aerodrome	Calvi Sainte Catherine	France	LFKC	2	30/04/2015							2
Aerodrome	Ajaccio Napoléon Bonaparte	France	LFKJ	1	23/06/2016							1
Aerodrome	Figari Sud Corse	France	LFKF					1	21/11/2017			1
Aerodrome	Auxerre Branches	France	LFLA	2	21/08/2014							2
Aerodrome	Clermont-Ferrand Auvergne	France	LFLC		05/05/2011			1	21/11/2017			1
Aerodrome	Bourges	France	LFLD	1	18/08/2016							1
Aerodrome	Lyon St Exupery	France	LFLM		07/02/2013			4	15/08/2019			4
Aerodrome	Saint Yan	France	LFLN					2	02/03/2017			2



Operational Aerodromes / Heliports / Routes												
Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Anancy Meythet	France	LFLP	2	19/09/2013							2
Aerodrome	Grenoble Isere	France	LFLS		05/12/2019			2	13/10/2016			2
Aerodrome	Valence	France	LFLU		13/12/2012			1	21/11/2017			1
Aerodrome	Vichy Charmeil	France	LFLV		05/02/2015			1	26/04/2018			1
Aerodrome	Aurillac	France	LFLW		26/06/2014			1	15/08/2019			1
Aerodrome	Chateauroux Deols	France	LFLX		06/02/2014			2	15/08/2019			2
Aerodrome	Lyon Bron	France	LFLY					2	28/09/2016			2
Aerodrome	Cannes Mandelieu	France	LFMD	1	05/02/2015							1
Aerodrome	Saint Étienne Bouthéon	France	LFMH		24/07/2014			2	02/02/2017			2
Aerodrome	Carcassonne Salvaza	France	LFMK		03/05/2012			2	21/11/2017			2
Aerodrome	Marseille	France	LFML	4	08/01/2015	2	25/06/2015					6
Aerodrome	Nice Côte d'Azur	France	LFMN		25/06/2015			2	25/04/2019			2
Aerodrome	Perpignan Rivesaltes	France	LFMP	1	15/10/2015							1
Aerodrome	Montpellier Mediterranee	France	LFMT					1	05/12/2019			1
Aerodrome	Béziers Vias	France	LFMU	2	18/10/2012							2
Aerodrome	Avignon Caumont	France	LFMV					3	21/06/2018			3
Aerodrome	Mende	France	LFNB	1	17/12/2013							1
Aerodrome	Beauvais	France	LFOB	1	20/09/2012							1
Aerodrome	Le Havre Octeville	France	LFOH		10/12/2015			2	21/11/2017			2
Aerodrome	Chalons Vatry	France	LFOK	2	02/02/2017							2
Aerodrome	Blois Le Breuil	France	LFOQ		15/09/2016			1	25/04/2019			1
Aerodrome	Cholet le Pontreau	France	LFOU	2	04/02/2016							2
Aerodrome	Laval Entrammes	France	LFOV	2	26/04/2018							2



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Aerodrome	Orléans St. Denis De L'Hotel	France	LFOZ	2	28/06/2012							2
Aerodrome	Paris-Le Bourget	France	LFPB	1	02/06/2011			1	21/11/2017			2
Aerodrome	Paris Charles de Gaulle	France	LFPG					8	28/04/2016			8
Aerodrome	Melun Villaroche	France	LFPM		10/12/2015			2	21/11/2017			2
Aerodrome	Toussus Le Noble	France	LFPM					2	27/04/2017			2
Aerodrome	Paris Orly	France	LFPO	3	30/05/2013	1	30/04/2015	2	21/11/2017			6
Aerodrome	Pontoise Cormeilles en Vexin	France	LFPT	1	01/05/2014			2	21/11/2017			3
Aerodrome	Reims Prunay	France	LFQA	1	03/04/2014							1
Aerodrome	Troyes Barberey	France	LFQB					2	18/08/2016			2
Aerodrome	Nevers Fouchambault	France	LFQG	1	13/12/2012							1
Aerodrome	Besançon La Vèze	France	LFQM	1	18/09/2014							1
Aerodrome	Lille Lesquin	France	LFQQ	3	26/06/2014							3
Aerodrome	Merville	France	LFQT	2	15/11/2012							2
Aerodrome	Brest Bretagne	France	LFRB	1	03/05/2012	1	01/01/2014					2
Aerodrome	Cherbourg Maupertus	France	LFRC					1	23/06/2016			1
Aerodrome	Dinard	France	LFRD	1	06/02/2014			1	21/11/2017			2
Aerodrome	Deauville Saint Gatien	France	LFRG	1	18/09/2014							1
Aerodrome	La Roche Sur Yon	France	LFRI		13/12/2012			1	10/11/2016			1
Aerodrome	Caen Carpiquet	France	LFRK		11/12/2014			1	21/11/2017			1
Aerodrome	Le Mans	France	LFRM	1	15/11/2012							1
Aerodrome	Rennes	France	LFRN	2	30/05/2013							2
Aerodrome	Lannion	France	LFRO		07/01/2016			1	21/11/2017			1
Aerodrome	Quimper	France	LFRQ		29/03/2019			2	21/11/2017			2

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Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Nantes	France	LFRS	1	28/06/2012							1
Aerodrome	Saint Brieuc Armor	France	LFRT		10/12/2015			1	21/11/2017			1
Aerodrome	Morlaix Ploujean	France	LFRU	1	13/10/2016							1
Aerodrome	Vannes Meucon	France	LFRV	1	31/05/2012							1
Aerodrome	Saint Nazaire Montoir	France	LFRZ		28/10/2014			1	21/11/2017			1
Aerodrome	Bâle-Mulhouse	France	LFSB	2	10/12/2015							2
Aerodrome	Dijon-Longvic	France	LFSD	1	28/04/2016							1
Aerodrome	Epinal Mirecourt	France	LFSG	1	30/05/2013							1
Aerodrome	Brive Souillac	France	LFSL	2	22/08/2013							2
Aerodrome	Nancy Essey	France	LFSN		02/05/2013			1	26/04/2018			1
Aerodrome	Strasbourg Entzheim	France	LFST		10/12/2015			2	21/11/2017			2
Aerodrome	Nîmes Garons	France	LFTW	1	18/10/2012			1	21/11/2017			2
Aerodrome	Ioannina	Greece	LGIO	2	27/02/2020							2
Aerodrome	Kos	Greece	LGKO	2	27/02/2020							2
Aerodrome	Mitilini	Greece	LGMT	1	27/02/2020							1
Aerodrome	Thessaloniki	Greece	LGTS	1	27/02/2020							1
Aerodrome	Békéscsaba Repülőtér	Hungary	LHBC	2	28/01/2021							2
Aerodrome	Budapest Liszt Ferenc	Hungary	LHBP					4	15/09/2016			4
Aerodrome	Debrecen International	Hungary	LHDC	1	30/01/2020							1
Aerodrome	Pecs-Pogany	Hungary	LHPP	1	03/12/2020			1	03/12/2020			2
Aerodrome	Győr-Pér	Hungary	LHPR	1	25/02/2021			1	25/02/2021			2
Aerodrome	Heviz-Balaton	Hungary	LHSM	1	25/03/2021			1	25/03/2021			2
Aerodrome	Bari/Palese	Italy	LIBD					2	25/03/2021			2

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Aerodrome/Ro ute	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Lamezia Terme	Italy	LICA	1	23/05/2018							1
Aerodrome	Lampedusa	Italy	LICD					1	30/01/2020			1
Aerodrome	Pantelleria	Italy	LICG					3	21/06/2018			3
Aerodrome	Palermo/Punta Raisi	Italy	LICJ	3	11/10/2018							3
Aerodrome	Reggio Calabria	Italy	LICR					1	19/07/2018			1
Aerodrome	Trento/Mattarello	Italy	LIDT	2	30/01/2020							2
Aerodrome	Alghero/Fertilia	Italy	LIEA	2	11/10/2018							2
Aerodrome	Olbia/Costa Smeralda	Italy	LIEO	1	12/11/2015							1
Aerodrome	Milano/Malpensa	Italy	LIMC	2	21/08/2014			2	23/04/2020			4
Aerodrome	Bergamo /Orio al Serio	Italy	LIME	1	20/07/2017			1	08/10/2020			2
Aerodrome	Torino/Caselle	Italy	LIMF					1	25/03/2021			1
Aerodrome	Genova/Sestri	Italy	LIMJ					1	10/09/2020			1
Aerodrome	Milano/Linate	Italy	LIML	2	13/12/2012							2
Aerodrome	Parma	Italy	LIMP					1	23/05/2018			1
Aerodrome	Cuneo/Levaldigi	Italy	LIMZ					1	23/05/2018			1
Aerodrome	Bologna/Borgo Panigale	Italy	LIPE	2	03/01/2019							2
Aerodrome	Ancona/Falconara	Italy	LIPY					1	03/01/2019			1
Aerodrome	Venezia/Tessera	Italy	LIPZ	4	27/06/2013							4
Aerodrome	Verona/Villafranca	Italy	LIPX		22/06/2017							0
Aerodrome	Roma/Ciampino	Italy	LIRA					2	21/05/2020			2
Aerodrome	Roma/Fiumicino	Italy	LIRF	4	10/01/2013			2	23/05/2019			6
Aerodrome	Firenze/Peretola	Italy	LIRQ	1	22/06/2017							1
Aerodrome	Kunovice	Czech Republic	LKKU	1	01/12/2017							1

Operational Aerodromes / Heliports / Routes												
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Aerodrome	Karlovy Vary	Czech Republic	LKKV	2	13/11/2014							2
Aerodrome	Ostrava	Czech Republic	LKMT	2	09/01/2014							2
Aerodrome	Prague	Czech Republic	LKPR				09/01/2014	4	05/12/2019			4
Aerodrome	Brno	Czech Republic	LKTB	2	09/01/2014							2
Aerodrome	Praha/Vodochody	Czech republic	LKVO	2	25/06/2015							2
Aerodrome	Luqa	Malta	LMML	2	11/10/2018			2	11/10/2018			4
Aerodrome	Vöslau	Austria	LOAV	1	28/02/2019							1
Aerodrome	Öamtc/Oberwart	Austria	LODO	1	28/02/2019							1
Aerodrome	Graz	Austria	LOWG		09/01/2014			2	01/03/2018			2
Aerodrome	Innsbruck	Austria	LOWI					1	01/02/2018			1
Aerodrome	Klagenfurt	Austria	LOWK					2	11/10/2018			2
Aerodrome	Linz	Austria	LOWL		09/01/2014			2	02/02/2017			2
Aerodrome	Salzburg	Austria	LOWS					1	23/04/2020			1
Aerodrome	Wien - Schwechat	Austria	LOWW					5	02/02/2017			5
Aerodrome	Faro	Portugal	LPFR	1	18/07/2019							1
Aerodrome	Porto	Portugal	LPPR	1	12/10/2017							1
Aerodrome	Lisboa	Portugal	LPPT	2	28/05/2015							2
Aerodrome	Cluj - Napoca / Avram Iancu	Romania	LRCL	2	10/11/2016							2
Aerodrome	Les Eplatures	Switzerland	LSGC					2	26/05/2016			2
Aerodrome	Genève	Switzerland	LSGG		12/11/2015			2	13/09/2018			2
Aerodrome	Dübendorf	Switzerland	LSMD	2	21/08/2014			1	30/01/2020			3
Aerodrome	Emmen	Switzerland	LSME	1	03/04/2014							1
Aerodrome	Payerne	Switzerland	LSMP		17/09/2015			1	05/12/2019			1

Operational Aerodromes / Heliports / Routes												
Aerodrome/Route	Name	Country	ICAO Code	APV-I Procedure (s)	Activation APV-I procedure	APV Baro Procedure (s)	Activation APV Baro Procedure	LPV-200 Procedure (s)	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Bern-Belp	Switzerland	LSZB		07/03/2013			1	03/12/2020			1
Aerodrome	Grenchen	Switzerland	LSZG	1	25/07/2013							1
Aerodrome	Zurich	Switzerland	LSZH	1	06/12/2018			1	25/05/2017			2
Aerodrome	St. Gallen-Altenrhein	Switzerland	LSZR	1	17/11/2011							1
Aerodrome	Beograd/Nikola Tesla	Serbia	LYBE					2	26/03/2020			2
Aerodrome	Niš/Konstantin Veliki	Serbia	LYNI					1	26/03/2020			1
Aerodrome	Podgorica	Montenegro	LYPG					1	26/03/2020			1
Aerodrome	Bratislava-Milan Rastislav Štefánik	Slovak Republic	LZIB	2	05/02/2015							2
Aerodrome	Košice	Slovak Republic	LZKZ	2	05/02/2015							2
Aerodrome	Piešťany	Slovak Republic	LZPP					1	02/02/2017			1
Aerodrome	Poprad-Tatry	Slovak Republic	LZTT					2	29/03/2018			2
Aerodrome	Žilina	Slovak Republic	LZZI					1	25/05/2017			1
Route	Hel Low-Flight Route KY251	Switzerland	KY251							1	22/06/2017	1
Route	Hel Low-Flight Route KY252	Switzerland	KY252							1	22/06/2017	1
Route	Hel Low-Flight Route KY253	Switzerland	KY253							1	22/06/2017	1
Route	Hel Low-Flight Route KY256	Switzerland	KY256							1	22/06/2017	1
Route	Hel Low-Flight Route KY257	Switzerland	KY257							1	22/06/2017	1

Table 14: Full list of EGNOS-based Approach Procedures as of March 2021 (AIRAC cycle#2103)

APPENDIX B LIST OF ACRONYMS

Acronym	Definition
AIRAC	Aeronautical Information Regulation And Control
AIS	Automatic Identification System
AME	Accuracy Major Event
ANSP	Air Navigation Service Provider
APV	Approach Procedures with Vertical guidance
ASECNA	Agency for Aerial Navigation Safety in Africa and Madagascar
ATM	Air Traffic Management
CBA	Cost Benefit Analysis
CEO	Chief Executive Officer
COVID	COronaVIRus Disease
CPF	Central Processing Facility
DGNSS	Differential Global Navigation Satellite System
DH	Decision Height
EASA	European Aviation Safety Agency
EC	European Commission
EDAS	EGNOS Data Access Service
EGNOS	European Geostationary Navigation Overlay Service
EGNSS	European Global Navigation Satellite System
EMA	EGNOS Multimodal Adoption
ERA	European Regions Airline Association
ERTMS	European Rail Traffic Management System
ESR	EGNOS System Release
ESSP	European Satellite Services Provider
EU	European Union
EUSPA	European Union Agency for the Space Programme
EUSW	EGNOS User Support Website
EWA	EGNOS Working Agreement
EWAN	EGNOS Wide Area Network
FTP	File Transfer Protocol
GEO	GEOstationary
GNSS	Global Navigation Satellite System
GPS	GPS Precision Positioning Service
HAL	Horizontal Alarm Limit
HEMS	Helicopter Emergency Medical Services
HNSE	Horizontal Navigation System Error
HPL	Horizontal Protection Level

HSI	Horizontal Safety Index
IALA	International Association of Lighthouse Authorities
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
KARI	Korea Aerospace Research Institute
LPV	Localizer performance with vertical guidance
MOPS	Minimum Operational Performance Standards
NPA	Non Precision Approach
OEM	Original Equipment Manufacturer
OP	Operational
OS	Open Service
PBN	Performance-Based Navigation
PRN	Pseudo Random Noise
RIMS	Ranging and Integrity Monitoring Station
RNP	Required Navigation Performance
RTCA	Radio Technical Commission for Aeronautics
SARPS	Standards and Recommended Practices
SBAS	Satellite Based Augmentation System
SDD	Service Definition Document
SES	Single European Sky
SIR	Services Implementation Roadmaps
SIS	Signal In Space
SN	Service Notice
VAL	Vertical Alert Limit
VNSE	Vertical Navigation System Error
VPL	Vertical Protection Level
VSI	Vertical Safety Index
YSR	Yearly System Release



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