EGNOS BULLETIN

Issue 41, Autumn'23 Edition

Credits: KLM

EUSPA
European Union Agency for the Space Programme

#EUSpace

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

ESSP

https://www.essp-sas.eu/

Contents

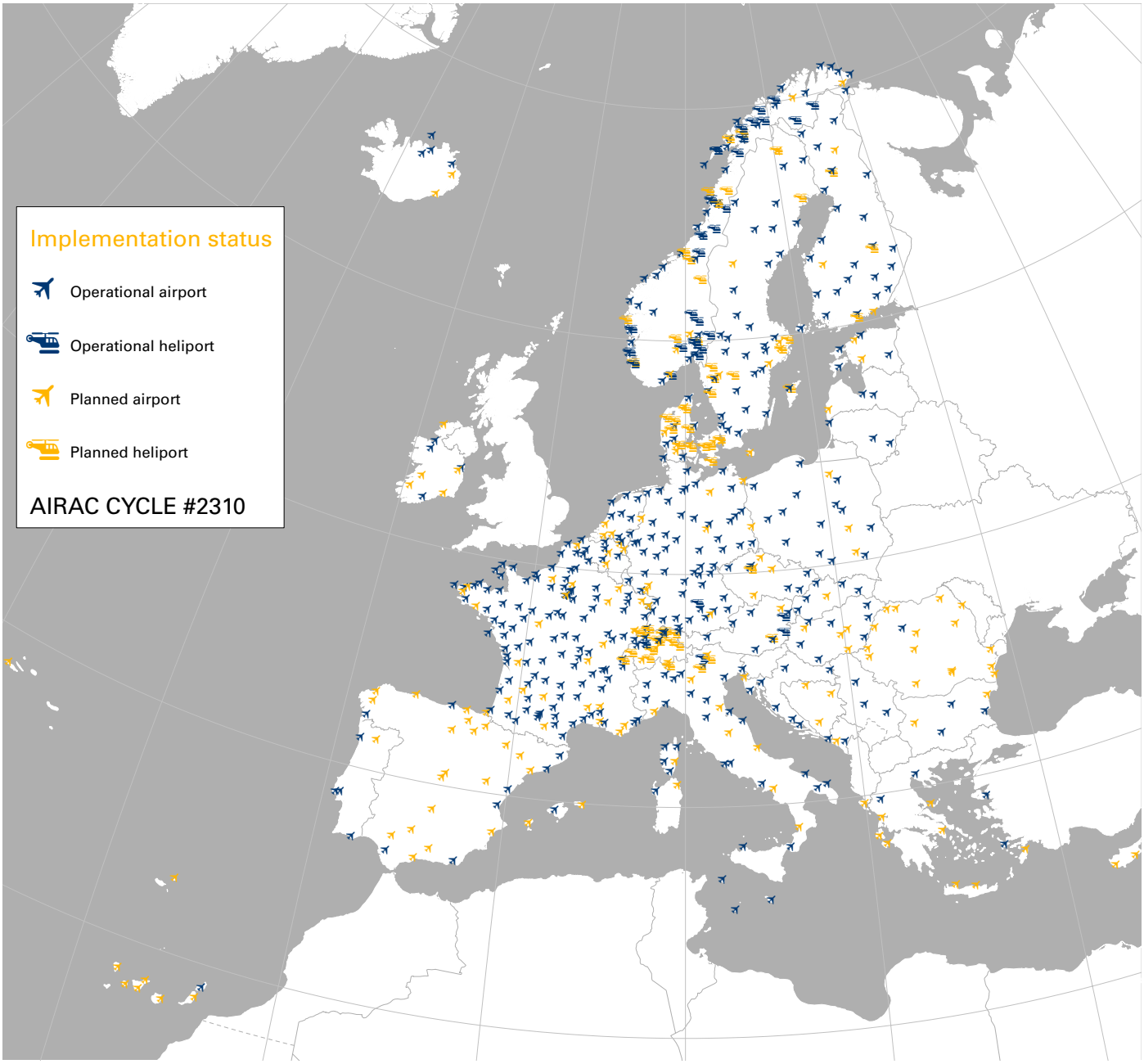
Cover Story

EGNOS Success Stories: KLM goes for LPV on their new A320neo fleet

The Netherlands flag carrier expands its fleet by incorporating a large set of new LPV-capable A320NEO and A321NEO, a more efficient aircraft model that will constitute a significant fleet renewal for the company, contributing to its sustainability objective for reducing CO2 emissions.

Page 4

EGNOS implementation



EGNOS Success Stories

KLM GOES FOR LPV ON THEIR NEW A320NEO FLEET

The Netherlands flag carrier expands its fleet by incorporating a large set of new LPV-capable A320NEO and A321NEO, a more efficient aircraft model that will constitute a significant fleet renewal for the company, contributing to its sustainability objective for reducing CO2 emissions.

Credits: KLM

About KLM…

Based in Amsterdam, KLM started operations in 1919, making it the world's oldest airline still operating under its original name. The airline has been evolving since then, reaching more than 92 European cities and 70 intercontinental destinations and carrying 34.1 million passengers and 621,000 tonnes of cargo today. The KLM Group (KLM Royal Dutch Airlines, KLM Cityhopper, Transavia and Martinair) is also part of the Air France-KLM group, being one of the world's largest air carriers. Following this lengthy path, the latest objectives for the company are sustainability and the reduction of the environmental footprint, which requires the acquisition of the latest and best available technologies.

A fleet renewal

The latest outcome of KLM's sustainability corporate objective is acquiring a large set of Airbus 320NEO and 321NEO aircraft. To this purpose, by the end of 2021, the Air France-KLM Group signed an order for 100 aircraft of the NEO family, with the option to extend it up to 160. The new fleet is intended to be operated by KLM, Transavia Netherlands and Transavia France and will replace the current Boeing 737NG, whose face-out is expected in 2030. The Airbus A320NEO family not only produces 50% less noise than the current, older generation of aircraft but also reduces fuel consumption and CO2 emissions to 15%. Alongside their LPV capability, these units will serve KLM to meet more stringent criteria and thus reduce Delays, Diversions and Cancellations (DDCs).

> "KLM has decided to equip all of those ordered aircraft with EGNOS and LPV capability, which will cover the European continental network"

KLM's decision on LPV

As part of this renewal, KLM has decided to equip all of those ordered aircraft with EGNOS and LPV capability, which will cover the European continental network. Currently, there are more than 800 LPV approaches published in Europe that KLM could benefit from with the new aircraft units, resulting in a safer and more sustainable fleet. As Vicent Hilligers -ATM Regional Manager of KLM- declares, the PBN Implementing Rule

Credits: KLM

and the safety benefits provided by EGNOS were fundamental in the decision-making. The PBN Implementing rule mandates that, for 2024, all European instrument runway ends must implement RNP approaches to the three lines of minima (LNAV, LNAV/VNAV and LPV), and air navigation should transition from conventional to a full PBN environment in 2030, with LPV as normal means for CAT-I approaches. KLM was aware of the expected scenario for 2030, and they saw LPV as a basic need for future operations. In addition, the vertical guidance provided by EGNOS is not affected by temperature or QNH mis-settings, increasing the safety levels compared to barometric vertical guidance.

Next steps

The process to be LPV-ready will not be complicated. Since the aircraft comes with LPV from the manufacturing line, they will only have to train the pilots from the beginning. The training will also include other PBN capabilities, such as RNP AR, which can fulfil the use of the parallel RNP AR approaches at their home base, Schiphol, which is foreseen in the Dutch PBN roadmap as part of their sustainability goal.

KLM sees the need to equip its fleet with LPV in the coming years, especially on new orders. Recently, the regional carrier of the KLM Group, KLM Cityhopper, received the first LPV-capable fleet with the acquisition of new Embraer E2 jets. On the other hand, KLM's French partner, Air France, implemented a new company policy to equip all new aircraft with SBAS and LPV. Clearly, EGNOS will play a key role in the future of the Air France-KLM Group.

Did you know...?

Air France will equip all future aircraft with LPV!

In a groundbreaking move for aviation, Air France has taken a monumental step to improve the safety and efficiency of its future fleet. The airline made the bold decision to equip all its future aircraft with LPV (Localizer Performance with Vertical Guidance) capability.

This visionary choice means a commitment to providing passengers with unprecedented precision during approaches and landings. LPV technology leverages the power of satellite-based navigation systems, ensuring aircraft can navigate safely even in the most challenging weather conditions.

Air France's decision to adopt LPV across its entire future fleet is a major step forward in modern aviation. It sets a new standard of excellence, demonstrating its unwavering commitment to passenger safety, operational efficiency and environmental responsibility.

EFLA AERODROME PUBLISHED THE FIRST-EVER LPV TO A NON-INSTRUMENT RUNWAY END (NIRE) IN CLASS G AIRSPACE

EFLA RWY 07/25
Credits: EFLA

Located in southern Finland, two hours north of Helsinki, Lahti-Vesivehmaa Aerodrome (ICAO code: EFLA) has served the region with a multi-purpose runway (RWY) for over 80 years from its beginning in the 1940s, when it was built for military purposes, until today, it has been intended for General Aviation in uncontrolled airspace, flying either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR).

This article summarizes Lahti-Vesivehmaa Aerodrome's success story in implementing the first-ever LPV procedure at an uncontrolled (non-ATS) aerodrome with a Non-Instrument Runway End (NIRE). This has been possible thanks to the involvement of Aki Suokas and Jukka Salokannel, representing the aerodrome operator, and Samu Tuparinne, Head of Flight Procedure Design, representing Fintraffic ANS, the main Finnish Air Navigation Services Provider (ANSP), both in close collaboration with ESSP.

The construction work of Lahti-Vesivehmaa Aerodrome started in 1939, and the first aircraft landed in 1940. At that time, implementing ILS or any other instrument approach procedure was not considered feasible. There was a VOR station near the aerodrome, but it only served ENR navigation and has not existed for many years now.

Currently, Lahti-Vesivehmaa Aerodrome is a base of operations for flight schools and several maintenance companies. In fact, it was the flight schools that started to draw attention to the publication of SBAS-based procedures to the airfield, as this would allow them to adjust their training, skills and catalogue while increasing the availability of the airfield and avoiding the impact of bad weather conditions, which are particularly frequent in Finland.

One of the key points that make the use of instrument approach procedures in such scenarios feasible is that the national regulatory framework for instrument flight operations in uncontrolled airspace (Class G) has been evolving since 2020 and being supplemented in 2022 to include criteria for uncontrolled aerodromes to apply for an instrument flight operations approval.

The project to implement the instrument flight procedure at Lahti-Vesivehmaa Aerodrome was launched in 2021 when the idea was first presented. Subsequently, in 2022, the national regulatory framework for such operations entered into force. This was made possible thanks to government funding, which included the RNP APCH down to LPV minima procedure design and adaptation of the runway to support IFR traffic (e.g. pavement, lights…), fast and reliable internet connection, refurbishment of parking, etc.

The first part of the Finnish regulatory scheme allowed operators to fly IFR in uncontrolled

airspace. In light of National Regulation OPS M1-6, air operators were required to develop a risk assessment to ensure safe operations. Later, in 2022 and based on the recently updated National Regulation AGA M1-1, the aerodrome operator received the applicable permit to be authorised to serve IFR traffic to a NIRE within this uncontrolled airspace.

The first step towards the implementation of IFR operations in such scenarios in Finland was taken at Kauhava Aerodrome -EFKA- in early 2022, where LNAV procedures were implemented and published, and other nearby sites followed suit, so it was time to start the next step: develop the SBAS-based procedures.

In the end, the design of the flight procedure for the RNP approach down to LPV minima at Lahti-Vesivehmaa was not particularly challenging. Fortunately, this airspace does not adjoin controlled airspace at any boundary, so it was easy to avoid them and thus facilitate the process.

"The most important advantage for flight schools at the aerodrome was the vertical guidance provided by EGNOS." By Aki Suokas.

It was necessary to analyse the design criteria to be supported by the most appropriate EGNOS service capability. SBAS allows the implementation of instrument flight procedures down to LPV minima with a Decision Height (DH) as low as 250 ft for the APV-I Service Level or 200 ft for the LPV-200 Service Level. Nevertheless, national regulations require any IFR approach procedure to NIREs to descend to a DH of no less than 500 ft, so either of the above would provide the same capabilities to the operator. In fact, the 500 ft DH could be achieved by a standard LNAV procedure, which was the primary intention. However, the rationale that drove the decision to implement LPV procedures was the vertical guidance provided by EGNOS, as flight schools had requested. As a result, the APV-I service level was identified, and its corresponding procedure was published in AIRAC Cycle 2301 on 26 January 2023. Thus, the EGNOS-based procedure on RWY 25 at EFLA aerodrome was the first LPV procedure published for an uncontrolled aerodrome with a non-instrument runway end in Europe.

During the first two weeks, the procedure was subject to validation tests, which confirmed that the added value provided by EGNOS would offer higher availability and reliability to the airfield operators. Additionally, another advantage provided by this LPV approach procedure is the avoidance of QNH miss-setting. During winter's high-pressure conditions, it is possible to see QNH values up to 1045hPa and above, which are outside the range available to many altimeters. With the LPV procedure, the vertical guidance is calculated geometrically and provided by the system, thus mitigating the likelihood of causing an incident or accident due to an erroneous barometer setting or calibration when performing the final EGNOS-based approach.

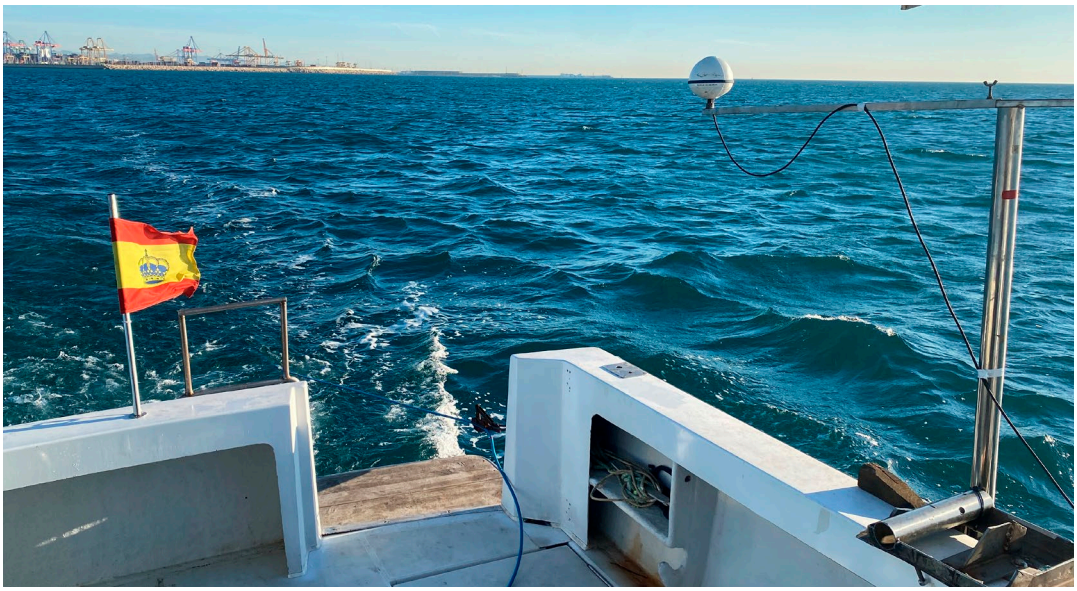
Currently, maintenance, repair and overhaul (MRO) companies based at Lahti-Vesivehmaa Aerodrome already benefit from the EGNOS-based LPV approach, as they can send and receive more aircraft units and models for maintenance. In fact, an increase in maintenance traffic by EFLA-based MRO companies is expected, thanks to LPV, as the new procedure ensures better accessibility to aircraft that previously had difficulties in reaching the airfield.

In addition, flight schools will use the EGNOS procedure to provide IFR, PPL and ATPL training, expanding their portfolio and positively impacting their business strategy.

Looking ahead, according to Fintraffic ANS, there are plans to implement LPV approach procedures to other non-instrumental runways in Finland. Nevertheless, LNAV procedures will likely be published as a first step before the final publication of RNP approach procedures to LPV minima.

Aiming to maximise the benefits available through the European GNSS programme and EGNOS in particular, Fintraffic ANS and the operator of the Lahti-Vesivehmaa aerodrome are pioneers in the use of EGNOS in these scenarios, thus paving the way for many others to come in the near future and ensuring a greater level of safety.

EGNOS SUPPORTING MARINE ENGINEERING AND MARINE ENVIRONMENT PROTECTION



Credits: GEOMYTSA

Marine surveying belongs to the field of marine engineering. It is a supporting activity for several Blue Economy Markets and a key instrument in protecting the marine environment.

In particular, marine geophysical surveying provides value in many different phases of a project developed in the marine environment.

Using acoustic and geophysical techniques and technologies, combined with the positioning and navigation provided by EGNOS and GNSS services, it is possible to characterise the marine seabed and subsoil in terms of geomorphology, seismic structure, depth and even natural resources.

Within this interesting technical context, today's success story focuses on a geomorphological survey (determining the shape and composition of the seabed) carried out by the Spanish Survey company GEOMYTSA off the Spanish coast of Valencia.

The survey campaign took place in March 2023 in the nearshore area off the coastlines of L'Arbre de Gos, Saler and Garrofera, a 7 Km long area parallel to the coast.

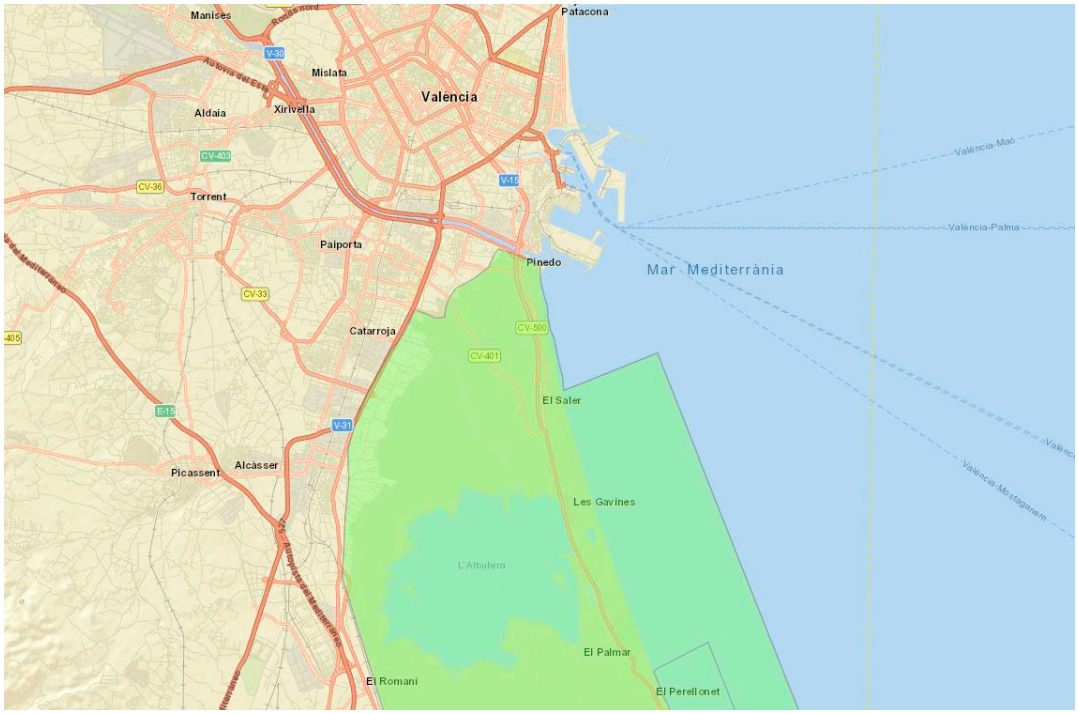
The ultimate objective of the data and information to be collected and produced is to identify suitable sand deposits for the recovery (replenishment) of "El Saler", a 2.7 km long and 35 m wide beach on the east coast of Spain.

The operational solution implemented to localise, measure and identify soil type or marine seabed communities using remote sensing technology is the Side Scan Sonar. Navigation and positioning are provided by a GNSS receiver, and the vessel movements are measured by a Motion Reference Unit.

This configuration requires a high level of accuracy and precision of about 0.2 m resolution for the Side Scan Sonar image and 0.05 degrees for the motion measures, as well as small variations in the vertical (depth), in a survey area of 30 to 50 m in depth.

To achieve these requirements, the average accuracies of the standalone GPS SPS solution providing 7 m in the horizontal and 10 m in the vertical are not sufficient, and the augmentation of SBAS (EGNOS) is key to the success of this survey project while maintaining the high accuracy of the relevant

> "The augmentation of SBAS (EGNOS) is key to the success of this survey project while maintaining the high accuracy of the relevant acoustic and inertial data"



Source: Ministerio para la Transición Ecológica y Reto demográfico
Credits: ESSP

acoustic and inertial data. The European SBAS, EGNOS, provides to accomplish this across the European Union's Sea Basins, free of charge and with very high service availability (higher than 99.9% in most monitoring stations). As reported by the survey team leader, oceanographer Rui Roma, the onboard GNSS receiver responsible for navigation and positioning, achieved accuracies of about 0.5 m (0.4 horizontally and 0.6 vertically) during operations thanks to corrections provided by the European SBAS, EGNOS Open Service.

The importance of this project, the work of companies such as GEOMYTSA and the support of EGNOS could be even better understood by explaining that "El Saler" is located in the area of the "Parque Natural de La Albufera" of Spain and a Site of Community Importance (SCI) of the European Union, within the Natura 200 Network. Therefore, we are talking about preserving a protected marine area of great environmental and touristic importance within the EU.

Did you know...?

European Maritime Day

The "European Maritime Day" is the annual event organised by the European Commission and stakeholders, where the maritime community gathers to network, discuss and outline joint actions on maritime affairs and sustainable blue economy.

This year, the event took place in Brest (France). It was co-organised by the city of Brest, the Brittany region, the Department of Finistère and the General Secretariat for the Sea.

As a highlight, during the event, Virginijus Sinkevičius, Commissioner for the Environment, Oceans and Fisheries, announced the publication of the Blue Economy report 2023 and the preparation of the Blue Economy observatory - two highly relevant tools for the monitoring of Blue Economy at an EU level.

NEW PBN PROCEDURES FOR HEMS IN THE APULIA REGION (PHAR)

November 2023 will mark one year since the successful completion of the PHAR project, co-funded under the EUSPA Aviation grants and managed by Alidaunia. The PHAR project has led to the implementation of a Point in Space (PinS) approach and departure procedures to LPV minima supported by EGNOS for five heliports used for HEMS (helicopter emergency medical services) in Italy - Apulia region (Bari, Celenza Valfortore, Peschici, San Giovanni Rotondo, and Vieste) together with a low-level flight network using RNP 0.3. All procedures were approved by the Italian Civil Aviation Authority and will be active in AIP one year after project completion.

Credits: Alidaunia

Alidaunia srl, an Italian-based air operator providing CAT, HEMS, and HOFO services from multiple bases in Italy, has announced the successful completion of the 'PBN for HEMS in the Apulia Region' (PHAR) project, which has been co-financed by EUSPA in the framework of the EUSPA Programme for the acceleration of EGNOS adoption in civil aviation. By November 2023, the PBN procedures that have been designed, validated, and approved will be published in AIP and visible on the LPV map of the EGNOS User Support website. The PHAR project has led to the implementation of a Point in Space (PinS) approach and departure procedures at LPV minima for five heliports used for HEMS in the Apulia region (Bari, Celenza Valfortore, Peschici, San Giovanni Rotondo, and Vieste) together with a low-level flight network using RNP 0.3.

The Apulia Region will be the first in Italy to be equipped with a network of flight connections and procedures that will be characterised by very high precision linked to the use of particular navigation specifications that will allow safe flight even at low altitudes, reducing environmental and acoustic impact and integrating, simultaneously and with less use of airspace, helicopters and aeroplane operations.

Alidaunia, always at the forefront in developing and implementing new technologies, will gain important operational benefits in the development of PBN routes, ensuring significant advantages in terms of 24/7 operation and marginal meteorological conditions, increasing safety and operational efficiency.

Publication of Guidelines on the use of EFVS in SBAS-based operations

EFVS implementations
Credits: Dassault Aviation

The European Union Aviation Safety Agency (EASA) updated the aviation regulatory framework for all-weather operations (AWO) under EASA Rulemaking Task (RMT).0379 to improve safety and efficiency using the latest technological developments. The proposed regulatory framework became applicable in October 2022.

Among the innovations incorporated in the new regulatory framework are provisions allowing the use of Enhanced Flight Vision Systems (EFVS) to obtain operational credits during straight-in 3D approach operations.

An EFVS is an onboard system that enables pilots to descend beyond the decision altitude/height (DA/H) of the instrument approach procedure, even to touchdown, by maintaining visual references. EFVS operations exploit the visual advantage provided by the EFVS to extend the visual segment of an instrument approach.

On the other hand, the operational concept of SBAS instrument approaches harmonises seamlessly with the objectives of the EFVS operational concept, as SBAS operations allow IAP minima to be as low as 200 ft and, simultaneously, EFVS systems can overcome their limitations. This alignment is based on the principle of providing advanced capabilities while minimising the need for costly investments in ground-based navigation infrastructure.

This combined approach promises to significantly enhance the availability of viable destination and alternate aerodromes, particularly in low visibility scenarios, potentially expanding operating conditions and maintaining more operational runways.

In this context, to promote and facilitate the implementation of SBAS-based EFVS operations, comprehensive 'Guidelines on the use of EFVS in SBAS-based operations' have been developed and published in August 2023. These guidelines have

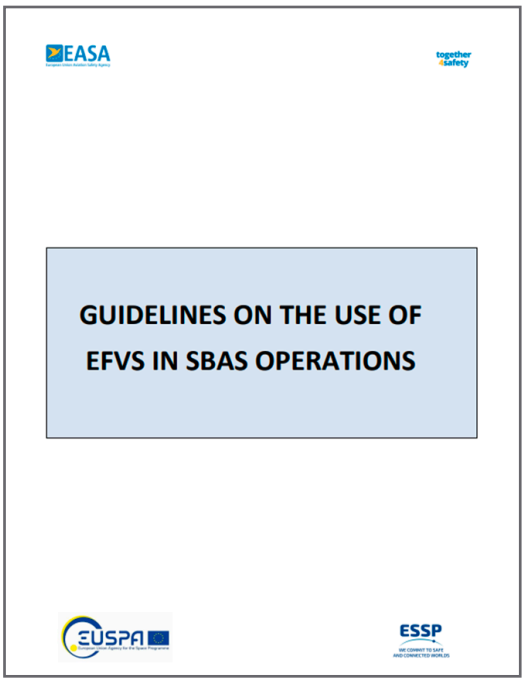
been developed by ESSP SAS and EUSPA with the support of several aviation stakeholders (such as EASA, Dassault Aviation, Collins Aerospace, Airbus, NetJets and Universal Avionics) to promote and provide high-level material to facilitate the implementation of SBAS-based EFVS operations. Guidelines on the use of EFVS in SBAS-based operations' can be downloaded at this link.

While these guidelines primarily target aircraft operators, they also encompass valuable insights for other aviation stakeholders, including aerodrome operators, Air Navigation Service Providers (ANSPs) and Aircraft Manufacturers/ Design Organizations.

Beyond the benefits of SBAS-based EFVS operations, EFVS significantly improves flight crew situational awareness during various flight phases. Furthermore, specialised emergency services, such as aerial firefighting operations, can leverage EFVS advantages to operate more effectively under challenging conditions.

Environmental benefits are further enhanced when SBAS is combined with EFVS, such as reduced missed approaches, more direct routings, and minimised circling procedures.

In conclusion, the merger of SBAS and EFVS technologies offers a substantial boost to the availability of viable aerodromes during periods of poor visibility. This collaboration improves safety and operational efficiency and minimises the need for costly ground infrastructure investments. The aviation industry can confidently embrace this harmonised approach, poised to usher in a new era of all-weather operations.



Guidelines on the use of EFVS in SBAS-based operations
Credits: ESSP

Did you know...?

General Assembly Copernicus

Mercator Ocean, the entity responsible for implementing the Copernicus Marine Service (CMEMS), organises the annual "Copernicus Marine General Assembly".

The event is of great importance within the Copernicus ecosystem, as it is the annual opportunity to bring together Copernicus Marine contractors and representatives of the user communities to review achievements and upcoming plans for the Copernicus Marine Service.

The agenda and videos of the presentations can be found here.

Talking about EGNOS with… Helicus: Enabling medical services through drone transport with EGNOS

In this edition of the EGNOS Bulletin, we had the chance to talk with Geert Vanhandenhove, Manager of Flight Operations at Helicus, a cutting-edge medical drone operator based in Antwerp, Belgium, which serves hospitals, laboratories and pharmacies by using drones to deliver sensitive goods.

Credits: Helicus

First, please tell us about Helicus and how this project started.

Helicus began in 2016 to address a challenge faced by centralised medical facilities, such as hospital labs and pharmacies. Centralising those services requires efficient and reliable medical transportation. For instance, a patient's samples must be moved from the hospital to a lab for analysis during cancer treatment. A specific treatment is then prepared in the pharmacy and returned to the hospital. The issue is that these facilities are often not in the same location, and many treatments have a limited shelf life, requiring swift transport unaffected by traffic. Helicus emerged to provide fast, compact, and trackable transport, covering everything from the initial request through to final delivery.

What drone models do you use for operations?

Credits: Helicus

We use an array of different drones, each designed to suit various types of missions: heavy or light payloads and short, medium, or long distances. Broadly speaking, these drones can be categorised into three groups: multi-rotors, VTOL tilt-wings and helicopters.

What kind of operations do you perform? In which EASA category?

Helicus strives to minimise human intervention in its operations. Our first beyond visual line of sight (BVLOS) operation in an urban setting took place in 2019 with a team of around 30. However, last year, under EASA guidelines, we managed to execute the same operation with just seven individuals. We aim to turn this around and have multiple simultaneous missions monitored from the central Command and Control Centre, ensuring maximum autonomy. Our operations mostly fall under the EASA's specific category. Presently, our operations are at SAIL level II, but we want to ramp that up to SAIL III and higher.

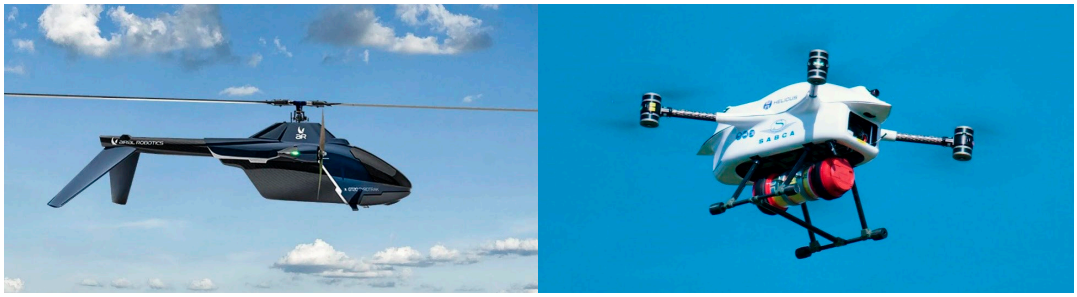
What are the particularities of medical drone transport compared to other drone operations?

Transporting medical supplies requires precise tracking, automation, and accuracy. These operations, done beyond the visual line of sight in urban areas, must closely follow their planned trajectory due to their critical nature. Consequently, we are defining strict standards that the drones that are manufactured by our partners need to comply with. The Helicus Command and Control Centre directly controls numerous drones, each with its own autopilot, in addition to linking directly with U-space service providers, hospitals, labs, pharmacies, and ANSPs.

What about GNSS configuration? Do you use SBAS/EGNOS?

All of our drone autopilots employ EGNOS since GNSS accuracy is vital for our missions. Most, if not all, GNSS receivers and autopilots on the market these days are EGNOS compatible, and many operators might be using it without realising it. Detailed information on SBAS often requires scrutiny of datasheets. You must be familiar with SBAS concepts to be able to find evidence of EGNOS compatibility.

> "All of our drone autopilots employ EGNOS since GNSS accuracy is vital for our missions"



Credits: Helicus

Credits: Helicus

What kind of benefits have you noticed? Do you see EGNOS as key for drone operations?

We have defined over 300 criteria for drone manufacturers, with positioning accuracy being one of them. EGNOS is indispensable for us, especially since our operations are beyond the visual line of sight in challenging urban areas and controlled airspace. Our drones must land with pinpoint accuracy, and EGNOS is essential for this. It's also crucial in SORA assessments. While many factors determine flight path accuracy, EGNOS enhances it. Without EGNOS, GNSS would be inadequate for our needs.

What about the future? Next steps? How do you envisage the future of medical drone operations?

The future offers numerous opportunities. Since we started building our solutions for urgent medical missions, we are actively extending our services to other demanding missions. We have actively engaged in drone standardisation efforts to reduce costs for those demanding missions and to open up the market. We are a founding member of a consortium called DORAI (Drone Operator Requirements Aero Initiative), which collaborates with other major drone operators to establish standards, such as drone container boxes. Additionally, we're building Drone Cargo Ports capable of automatically receiving and handling a wide range of drones.

Please feel free to share any additional thoughts in the article.

In conclusion, EGNOS is fundamental to our operations. We rely on it for all our missions, making it an essential requirement for our drone manufacturers. It's hard to envision our operations without EGNOS.

Geert Vanhandenhove, Manager of Flight Operations at Helicus

Currently steering the helm as Manager of Flight Operations at Helicus in the Antwerp Metropolitan Area, Geert seamlessly blends his passion for aviation and his knack for IT. From obtaining his Private Pilot Licence with the Royal Antwerp Aviation Club to crafting impactful IT solutions at Johnson & Johnson, his journey is marked by diverse experiences. Whether navigating through the clouds or diving deep into data analytics, Geert has a talent for fostering team growth and implementing innovative processes and solutions. With roots in Communications from Hogeschool Antwerpen and a stint in Applied Economics at the University of Antwerp, he's well-versed in creating meaningful connections, both in the digital landscape and the real world. Geert's multifaceted career, which combines a genuine interest in people and a focus on business impact, takes flight in the realms of aviation and technology.

EGNOS Services highlights

NEW SOL SDD V3.5 PUBLICATION

The upcoming release of the EGNOS Safety of Life (SoL) Service Definition Document (SDD) is scheduled for November 2023!

The EGNOS Safety of Life (SoL) Service is provided openly and is freely available at no direct charge. It is tailored to safety-critical transport applications in several domains. In particular, the service is compliant with the aviation requirements for Approaches with Vertical Guidance (APV-I) and Category I precision approaches, as defined by ICAO in Annex 10.

In this latest SDD release, the document has undergone comprehensive updates to reflect recent changes. These revisions encompass the integration of new SoL commitment maps, which align with the latest system updates. Furthermore, the release includes an update on EGNOS performance during the current solar cycle. Additionally, the SDD now reflects the transition from the GSA to the European Union Agency for the Space Programme (EUSPA), following the adoption of the Regulation that established the new EU Space Programme in 2021.

The next iteration of the SoL SDD is expected to be released in the second quarter of 2024, incorporating updates from the changes that will be implemented in V2.4.2B by the end of 2023.

You can access this information in its online version or download the content in PDF format at SoL SDD. Do not hesitate to contact our Helpdesk if you have any questions.

EGNOS GEO SWAPS SUCCESSFULLY COMPLETED

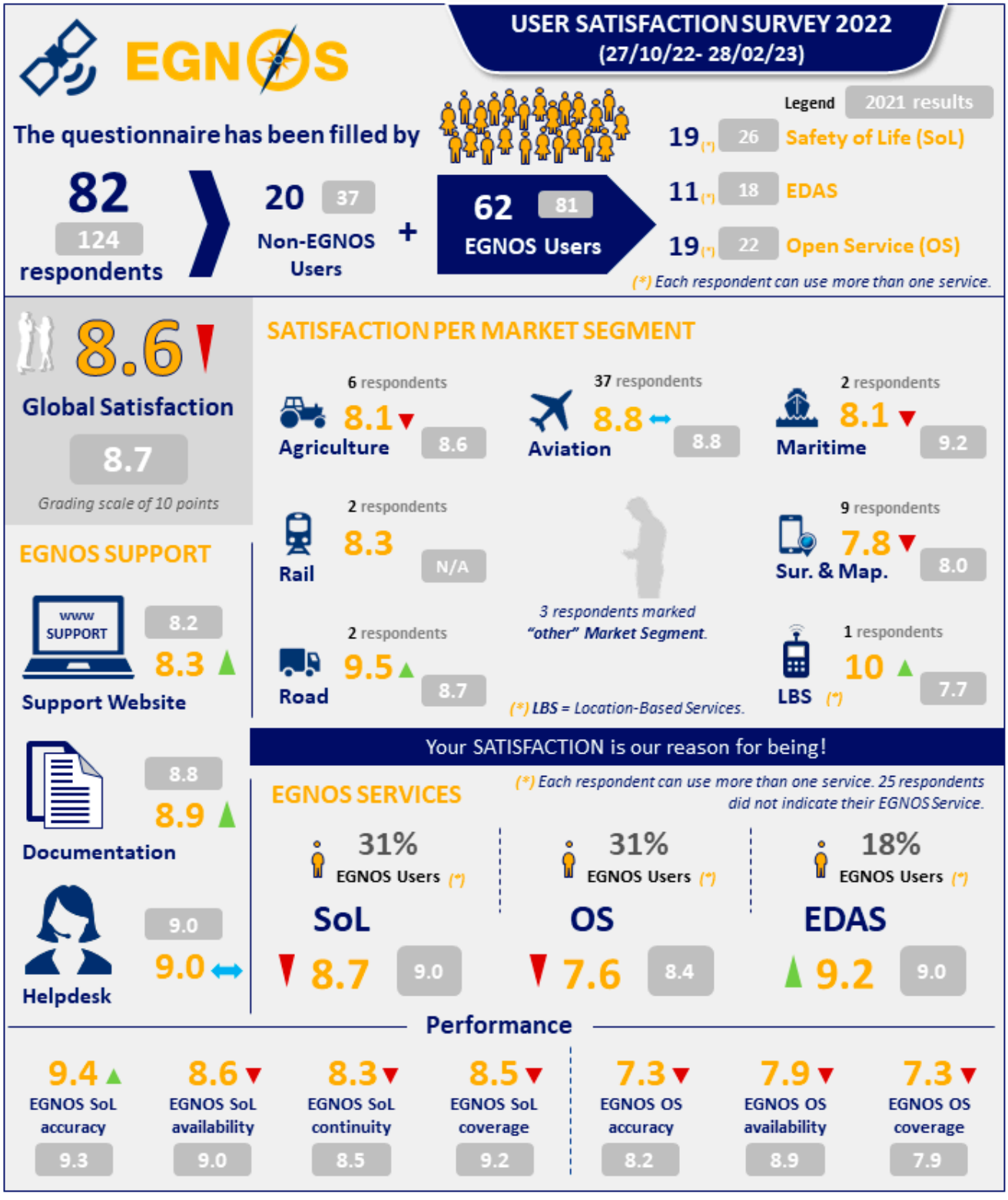
The EGNOS Space segment experienced some changes between 21 June 2023 and 24 August 2023. The two GEO swaps implemented were successfully executed, as notified through Service Notice #26.

During the initial GEO swap, the EGNOS operational platform welcomed the INMARSAT 4F2 (PRN 126) satellite, which replaced the outgoing ASTRA 5-B (GEO2/PRN 123) satellite.

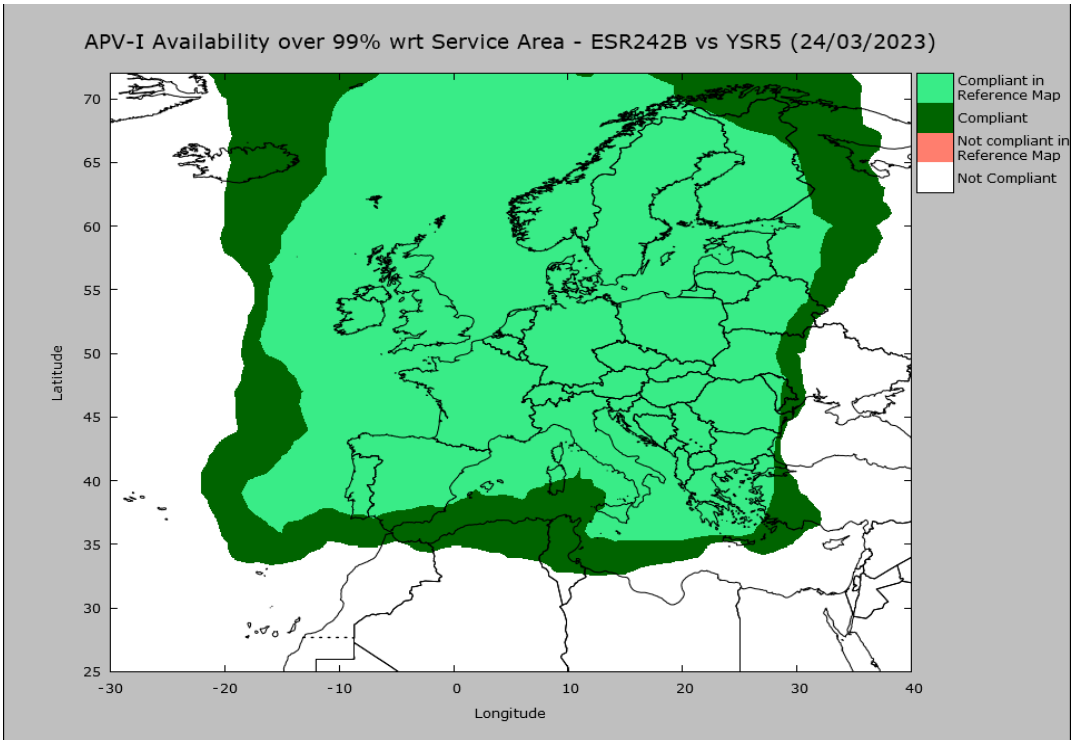
Following the completion of the second GEO swap, the EGNOS Space Segment reverted to its standard configuration, accommodating both ASTRA GEOs within the EGNOS operational platform. The current configuration of the EGNOS Operational Space Segment consists of two satellites: ASTRA SES-5 (GEO1/PRN 136) and ASTRA 5-B (GEO2/PRN 123).

During these activities, the integrity of the EGNOS SoL service has not been affected at any time or place within the EGNOS coverage area.

You can access this information in its online version or download the content in PDF format at SN#26. Do not hesitate to contact our Helpdesk if you have any questions.


EGNOS
USER SATISFACTION SURVEY 2022
(27/10/22- 28/02/23)
The questionnaire has been filled by
82
124
respondents
20
37
Non-EGNOS Users
+
62
81
EGNOS Users
Legend
2021 results
19 (*) 26 Safety of Life (SoL)
11 (*) 18 EDAS
19 (*) 22 Open Service (OS)
(*) Each respondent can use more than one service.
8.6
Global Satisfaction
8.7
Grading scale of 10 points
SATISFACTION PER MARKET SEGMENT
6 respondents
8.1
Agriculture
8.6
37 respondents
8.8
Aviation
8.8
2 respondents
8.1
Maritime
9.2
2 respondents
8.3
Rail
N/A
3 respondents marked "other" Market Segment.
9 respondents
7.8
Sur. & Map.
8.0
2 respondents
9.5
Road
8.7
1 respondents
10
LBS (*)
7.7
(*) LBS = Location-Based Services.
EGNOS SUPPORT
www SUPPORT
8.2
8.3
Support Website
8.8
8.9
Documentation
9.0
9.0
Helpdesk
Your SATISFACTION is our reason for being!
EGNOS SERVICES
(*) Each respondent can use more than one service. 25 respondents did not indicate their EGNOS Service.
31% EGNOS Users (*)
SoL
8.7
9.0
31% EGNOS Users (*)
OS
7.6
8.4
18% EGNOS Users (*)
EDAS
9.2
9.0
Performance
9.4
EGNOS SoL accuracy
9.3
8.6
EGNOS SoL availability
9.0
8.3
EGNOS SoL continuity
8.5
8.5
EGNOS SoL coverage
9.2
7.3
EGNOS OS accuracy
8.2
7.9
EGNOS OS availability
8.9
7.3
EGNOS OS coverage
7.9

EGNOS NEW RELEASE



By the end of 2023, a new release will have been deployed in the EGNOS system. At the time of writing, the operational release is YSR5, but the activities to commence broadcasting with ESR2.4.2.B are already underway. This new version is packed with upgrades, for instance, the addition of RIMS KUU (Kuusamo, Finland) and RIMS AGA-C (Agadir, Morocco) to the monitoring network. Nonetheless, from a performance point of view, the most eagerly awaited development is the new behaviour of the system in the face of ionospheric disturbances, especially near the equinoxes.

During the last two years, EGNOS has suffered from underperformance caused by ionospheric disturbances that are not only more recurrently but also have a deeper impact. The reason is the cyclical behaviour of the Sun's geomagnetic activity, which repeats in 11-year periods. Currently, the Sun is in the ramp-up stage of the cycle, showing an increase in the frequency of solar events.

Thanks to the temporary deployment of the ESR242B release on the EGNOS test platform until April 2023, a preliminary evaluation of the expected system performance can be made. Compared to the operational system performance, the ESR242B shows a notable improvement in the northern part of the Service Area (e.g., Iceland and Norway) and a minor upgrade in the coverage of the southern part (south of the Iberian Peninsula and Italy). This is illustrated in the image below, which shows a sample of the APV-I Availability (99% level) coverage extension in dark green by ESR242B when compared to YSR5. The selected day is representative of intense ionospheric conditions, with a severe geomagnetic storm taking place.

What's new?
Since the last bulletin...

EGNOS WORKING AGREEMENTS SIGNED (EWA)

The following EWAs have been signed in the last quarter:

SMAHU (Swedish Maritime Administration Helicopter Unit) (SE): authority responsible for Maritime and Aeronautical Search and Rescue (SAR) Services in Sweden, implements EGNOS-based procedures for their rotorcraft operations.

Sweden

Lahti-Vesivehmaa Aerodrome (FI): first aerodrome operator implementing EGNOS-based procedures in class G airspace in Europe.

Finland

JLČB (Jihočeské letiště České Budějovice a.s.) (CZ).

Czech Republic

SDATS (Saab Digital Air Traffic Solutions AB) (SE).

Sweden

SPAF (Spanish Air and Space Force) (ES): implementation of EGNOS-based procedures in military environments under general aviation rules.

Spain

Redstone Aero (FI): second aerodrome operator implementing EGNOS-based procedures in class G airspace in Europe.

Finland

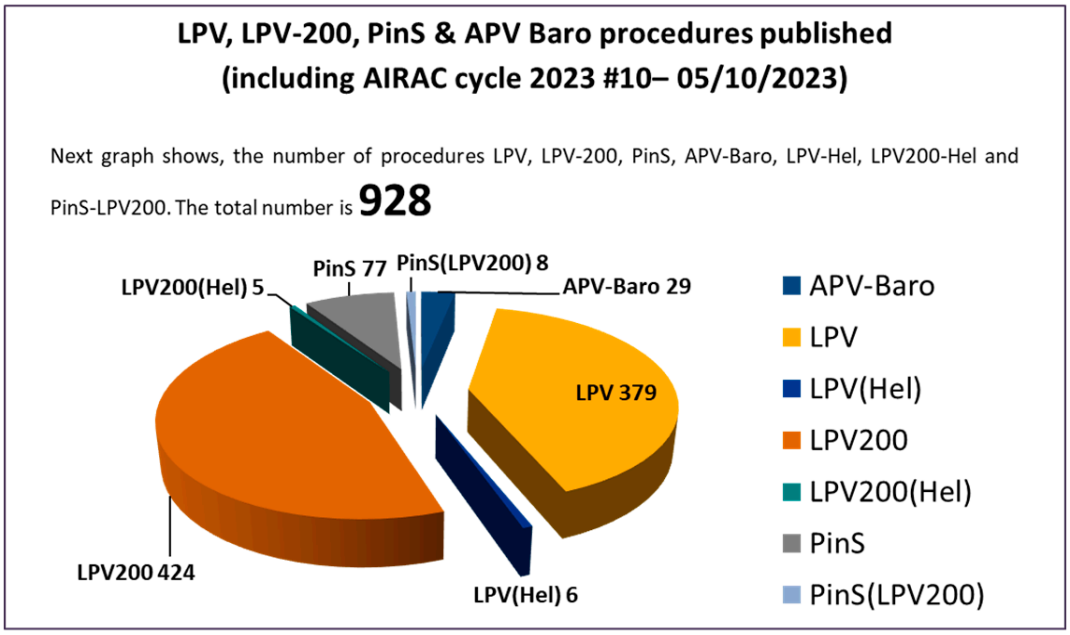
SLA (Svensk Luftambulans) (SE): provides advanced pre-hospital emergency medical and intensive care and implements EGNOS-based procedures for its rotorcraft operations.

Sweden

Belgian Defence (BE): implements EGNOS-based procedures in military environments under general aviation rules.

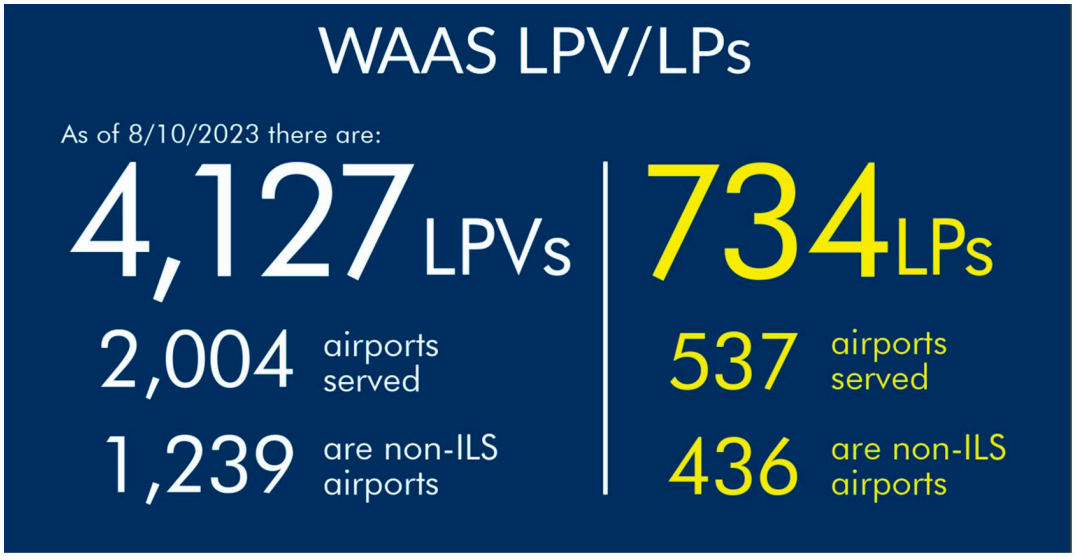
Belgium

LPV, LPV-200, PINS & APV BARO PROCEDURES PUBLISHED (INCLUDING AIRAC CYCLE 2023 #10 - 05/10/2023)



FAA PROCEDURES

Courtesy of the FAA WAAS Team.



What's going on...

in aviation.

AEROSPACE TECH WEEK

The Aerospace Tech Week, held in Munich (Germany) on 29-30 March 2023, consists of multiple events all under one roof, especially for avionics, with respected conference tracks dedicated to its core technologies and a large central exhibition. It offered a unique opportunity to promote EGNOS to the main aviation stakeholders, especially those in commercial aviation, one of the market segments where EGNOS and LPV adoption have room for improvement.
The annual international event provided a great occasion to establish face-to-face contact with the aviation industry. It was very useful to support air operators, manufacturers and avionics developers in adopting EGNOS and develop collaborative relationships with them.

AERO FRIEDRICHSHAFEN

As every year, Aero Friedrichshafen event took place in Germany in April 2023. It was the perfect occasion to follow up on the implementation of EGNOS by the aviation community in different segments, including Business Aviation (BA) and General Aviation (GA), and to discuss specific LPV implementation cases for operators who could potentially benefit from it.
Several operators were briefed on the benefits LPV brings to their specific use case. ESSP expertise in EGNOS was offered to those interested in analysing to what extent it would provide real value. In particular, the use of LPV together with EFVS was discussed with several BA operators, as it can be seen to remarkably help users in all-weather operations where the environment poses a more significant threat if the aircraft is not equipped with such mitigating technologies. Besides, it was also discussed the implementation and use of EGNOS for drone operators, as it has proven to offer higher accuracy than GPS and is useful on applications that require position accuracies in the range of 1m and below.

in aviation.

DRONE EVENTS 2023: DRONEXPO AND EXPODRÓNICA

Dronexpo and Expodrónica are two technological events focused on the unmanned aviation sector in Spain and internationally. The event offers a unique opportunity to support operators, public services, manufacturers and other entities in using and adopting EGNOS.

During Expodrónica, ESSP provided a hands-on demonstration on configuring EGNOS on drones in a combined session with the GSC (The European GNSS Service Centre). The presentation provided a general overview of the EGNOS system, an introduction to its advantages for drone operators, a live hands-on session on configuring it on a real drone, and how EGNOS will evolve in drone operations. It was greatly appreciated by the attendees and considered helpful for the day-to-day operation of drones.

EGNOS TAKES FLIGHT AT AIRSPACE INTEGRATION WEEK IN MADRID

EGNOS was present at the Airspace Integration Week held in Madrid from 25-28 September. One of the highlights was the presence of the LPV flight simulator, located at EUSPA stand #639, where attendees had the opportunity to put themselves in the shoes of a pilot and perform an LPV approach to RWY 32R at Madrid airport.

The event brought the opportunity to explore the diverse offerings of other exhibitors and took advantage of the various presentations in the event programme. In this way, this is the perfect place to engage with a multitude of industry players, making meaningful connections and gaining valuable insights into the latest trends and technologies in airspace integration.

As the event drew to a close, all the attendees that drop by the EUSPA stand left Madrid with new knowledge and connections that will undoubtedly propel EGNOS to even greater heights in aviation.

in aviation.

EUROCONTROL'S SAFETY OF VERTICAL NAVIGATION ON FINAL APPROACH WORKSHOP

The EUROCONTROL navigation and operational safety teams, in collaboration with relevant aviation industry entities, organised a workshop on the "Safety of Vertical Navigation on Final Approach" on 20 October 2023. The workshop, held at Eurocontrol's premises in Brussels, brought together experts from the aviation industry to delve into critical aspects of final approach safety, especially when using barometric information.
The objective of the workshop was to discuss operational experiences and best practices in ensuring safety of vertical navigation during final approach (using barometric altitude and alternatives), including case studies of use of incorrect barometric altitude in approach. One of the presentations showcased EGNOS and LPV as a cutting-edge technology representing a powerful mitigation method, as both lateral and vertical guidances are generated from GPS/EGNOS signal, and the pitot-static system has no effect on its vertical guidance.

in maritime.

IALA CONFERENCE

The 20th IALA Conference 2023, under the Theme "Marine Aids to Navigation – Innovation for a Sustainable Future", took place in Rio de Janeiro from 29 May to 3 June, where relevant and current issues on navigation aids were discussed. The conference addressed the applicability of the latest technologies developed in various fields of human activity to benefit the primary purpose, the comprehensive concept of Safety of Navigation. This demand is growing daily, posing new challenges to the IALA Technical Committees and the IALA World Academy.
EUSPA and ESSP presented the EGNOS L1 maritime service plans and the IEC 61108-7 standard status for SBAS L1 receivers. The EGNOS L1 maritime service is expected to be ready shortly. Once the IEC 61108-7 is published, vessels will start equipping type-approval receivers using SBAS and RAIM to ensure safe navigation in harbour entrances/approaches and coastal waters. The SBAS L1 shipborne receiver standard IEC 61108-7 publication is key for the harmonised adoption of SBAS in the maritime domain. During the conference, the community showed interest in using SBAS for maritime navigation.

in maritime.

INLAND WATERWAY EGNOS FOR TRACKING AND TRACING (IWETT)

IWETT is an ambitious project co-financed by EUSPA in the field of GNSS systems applied to the Inland Navigation and Inland Waterway River Information Services (RIS).

The 24-month project aims to achieve significant adoption of EGNOS in the inland waterway transport sector, namely on the Danube in Hungary, the Spree-Oder Waterway in Germany and the Guadalquivir River in Spain. The project will implement and improve GNSS-Based (EGNOS-based) infrastructure for inland navigation in these three representative areas of Europe.

Now that the analysis and design phases have been completed, progress focuses on implementing these infrastructures and testing in the three European Pilot Areas (Hungary, Germany and Spain).

IEC STANDARD STATUS

The maritime community is interested in using SBAS (Satellite Based Augmentation System), especially where there is no supporting infrastructure or in poorly covered environments. GNSS systems (i.e. GPS, Galileo, GLONASS and BeiDou) are currently recognised by the International Maritime Organization (IMO) as components of the World Wide Radio Navigation System. Nevertheless, they are not suitable for non-augmented approaches and entries to harbours and coastal waters. For such operations, differential services, such as DGPS/DGLONASS, are used, which provide augmentation data to meet the performance level required by IMO Res A.1046(27). Similarly, SBAS can be used as a suitable augmentation system for harbour entrances/approaches and coastal waters. To support its adoption, ESSP has led the generation of a new IEC standard for SBAS L1 in shipborne receivers over the last few years.

The Committee Draft for Vote (CDV) submitted for the IEC 61108-7 standard was finally approved within the IEC TC80 on 29 September 2023. In addition to the approval, some minor comments were received that will not block the publication of the standard but will need to be implemented before publication.

AQUACULTURE EUROPE

Aquaculture Europe is a leading international event for the aquaculture industry, featuring an international trade exhibition, industry forums, student sessions and activities, satellite workshops and updates on EU research.
The event took place from 18-21 September at the Messe Wien Exhibition and Congress Center. EGNOS was present for the first time at the event, visiting the trade exhibition, promoting the service and identifying potential technologies and operations that can benefit from the European SBAS. The International Trade Exhibition covered the full scope and diversity of European aquaculture. It provided an excellent opportunity to meet the most relevant international companies in the sector and learn about their latest products and services.

In addition to the trade exhibition, the thematic plenary sessions, the parallel technical sessions and the industry forum were an excellent way to update knowledge on trends and developments in this interesting market where positioning is becoming increasingly important.

CIRM

The annual CIRM (The International Association for Marine Electronics Companies) conference took place from 3-5 October 2023 in Izmir, Türkiye. CIRM is the leading international association of companies involved in maritime electronics and currently has more than 100 member companies from 30 nations worldwide.

The ESSP reported that the standard for SBAS L1 shipborne receivers IEC 61108-7 is planned to be published in late 2023-early 2024. Receiver manufacturers were invited to upgrade their receivers according to the forthcoming IEC 61108-7 SBAS receiver equipment standard.

EMRF

After some years of absence, the European Maritime and Rivers Navigation Forum (EMRF), a key forum for the Navigation in Europe, took place in Madrid on the 9th and 10th of October.
The main objective of the forum this year was to present and validate among the attendees the value of the upcoming EGNOS Maritime Service, officially called EGNOS SoL Assisted Service for Maritime Users (ESMAS), planned to be declared by early 2024. Thus, EGNOS will be the first SBAS worldwide to provide a service tailored to Maritime users.
Positive feedback and constructive comments were received from the relevant attendees from the Maritime and Inland Waterways domain (from International Authorities to Equipment Manufacturers), such as IALA, EC, EMSA, WVS, RSOE, Vayla, Kongsberg, GMV, Indra… It is worth mentioning the support to the event from the NAVAREA Coordinators from Spain, France and Norway.

However, not only the ESMAS service had the spotlight, also other topics among EU-financed projects, new technologies, products, and services, were presented and reviewed, to overview the status and trends of the Maritime and Inland Navigation markets in Europe. In particular, the synergies among EGNSS and Copernicus Space programmes were widely tackled with the presence of EFCA, Mercator Ocean and Puertos del Estado.

in maritime.

TRANSNAV CONFERENCE

TransNav is one of the most innovative global conferences on maritime transport research, which aims to find solutions to the challenges posed by waterborne transport, navigation and shipping, and the mobility of people and goods.

The 15th International Conference was organised by the Faculty of Navigation of the Gdynia Maritime University and the Nautical Institute and was held from 21 to 23 June 2023 in Gdynia, Poland.

This conference was divided into several technical sessions throughout that week. EGNOS was present in the GNSS Session at the Maximum Auditorium of the Faculty of Navigation on 22 June with the technical paper titled EGNOS Performance in Several Maritime Campaigns.

This article presents the performance of EGNOS observed over several maritime campaigns carried out in European waters to demonstrate the availability of corrections and the suitability of the accuracy to support maritime navigation. The selected regions correspond to those located in the EGNOS coverage boundary area and include the following campaigns: the Norwegian coast in 2018, Southwest Europe in 2018 and 2019, the Finnish coast in 2019, the Baltic Sea in 2021 and the Irish coast in 2022. These results in real maritime environments aim to demonstrate that the EGNOS L1 service is suitable to support maritime navigation in oceanic waters, coastal waters and harbour entrances/approaches under the operational requirements defined in the IMO Res. A.1046 (27), being beneficial to the maritime community.

This technical presentation was well received by the GNSS community, and several questions were raised regarding the data campaign environment and the equipment used. In addition, ESSP had the opportunity to discuss with key stakeholders in the maritime community the planned EGNOS L1 maritime service and the draft of the IEC 61108-7 standard for SBAS L1 shipborne receivers.

in rail.

SPACE FOR INNOVATION IN RAIL

The 2nd edition of the Space for Innovation in Rail event, organised by EUSPA, ERA, EU-RAIL and DG MOVE on 13 and 14 September in Madrid, brought together key stakeholders from the satellite and rail communities.

Interesting discussions were held on how to introduce European Union Space Programme assets in the railway domain. The event focused on the use of E-GNSS for fail-safe train localisation in the European Rail Traffic Management System (ERTMS) evolution framework.

As a result of the event, steps towards adopting EU-Space solutions in rail signalling were drafted, outlining concrete actions with the ultimate goal of having a "satellite on board".

Take a moment to watch the sessions again and find more information here.

Upcoming Events

EUROPEAN SPACE WEEK

7 - 9 Nov

The EU Space Week 2023, the hallmark event for the European space sector, is a unique opportunity to learn first-hand how European businesses – and society in general – benefit from the EU Space Programme. This year's EU Space Week, themed "Sustainable Innovation for a Resilient Europe", promises to be an unmissable experience, with an exciting agenda of networking events, business meetings and application demonstrations. Do not miss it in Seville, Spain, 7-9 November.

METSTRADE

15 - 17 Nov

The METSTRADE Show, held annually in Amsterdam, is the leading trade exhibition of equipment, materials and systems for the international recreational boating industry. It offers everything there is to know about recreational boat building and equipment. This global business-to-business platform and community focuses on innovation, market developments and on-site networking. This year it will take place from 15-17 November.

EGNOS WORKSHOP

13 - 14 March

The EGNOS Workshop 2024 will take place in Dublin, on March 13th and 14th.
Hosted by ESSP - the EGNOS Service Provider - this two-day event will put the focus on the maritime sector, featuring presentations from experts in the field. Furthermore, attendants to the EGNOS Workshop will have the chance to discover the status and roadmap of the EGNOS Programme and its evolution in different markets, with new success stories and real examples from European users.

EGNOS

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

EGNOS applications. Developers platform. Business support.
Information on historical and real-time EGNOS performance. EGNOS Signal in Space (SIS) status. Forecast on SIS availability and EGNOS performance. EDAS information and registration. EGNOS adoption material and tools.

For questions & information

EGNOS HELPDESK

+34 911 236 555

egnos-helpdesk@essp-sas.eu

EUSPA European Union Agency for the Space Programme

ESSP

#EUSpace