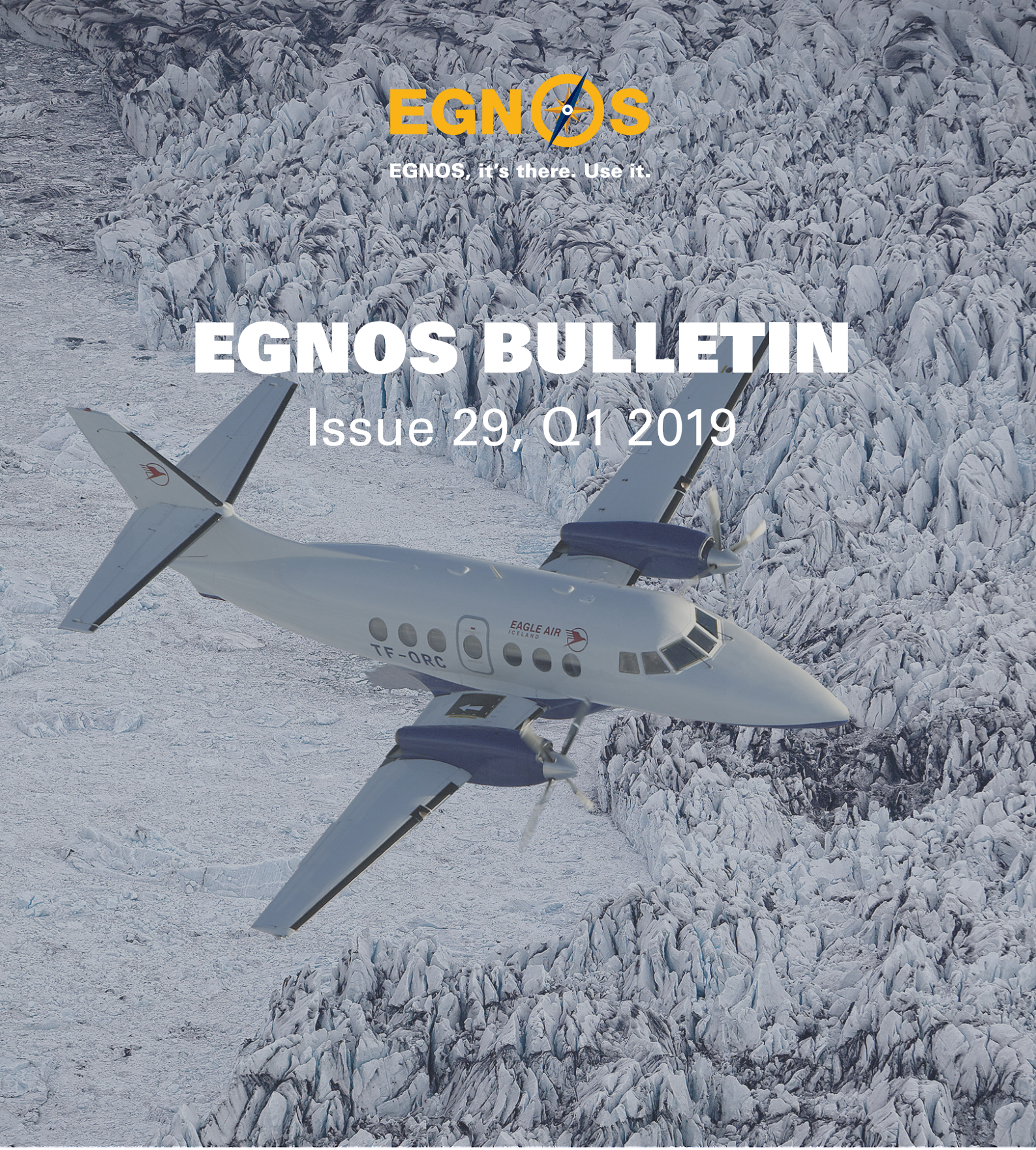
EGNOS

EGNOS, it's there. Use it.

EGNOS BULLETIN

Issue 29, Q1 2019



Credits: Eagle Air

European
Global Navigation
Satellite Systems
Agency

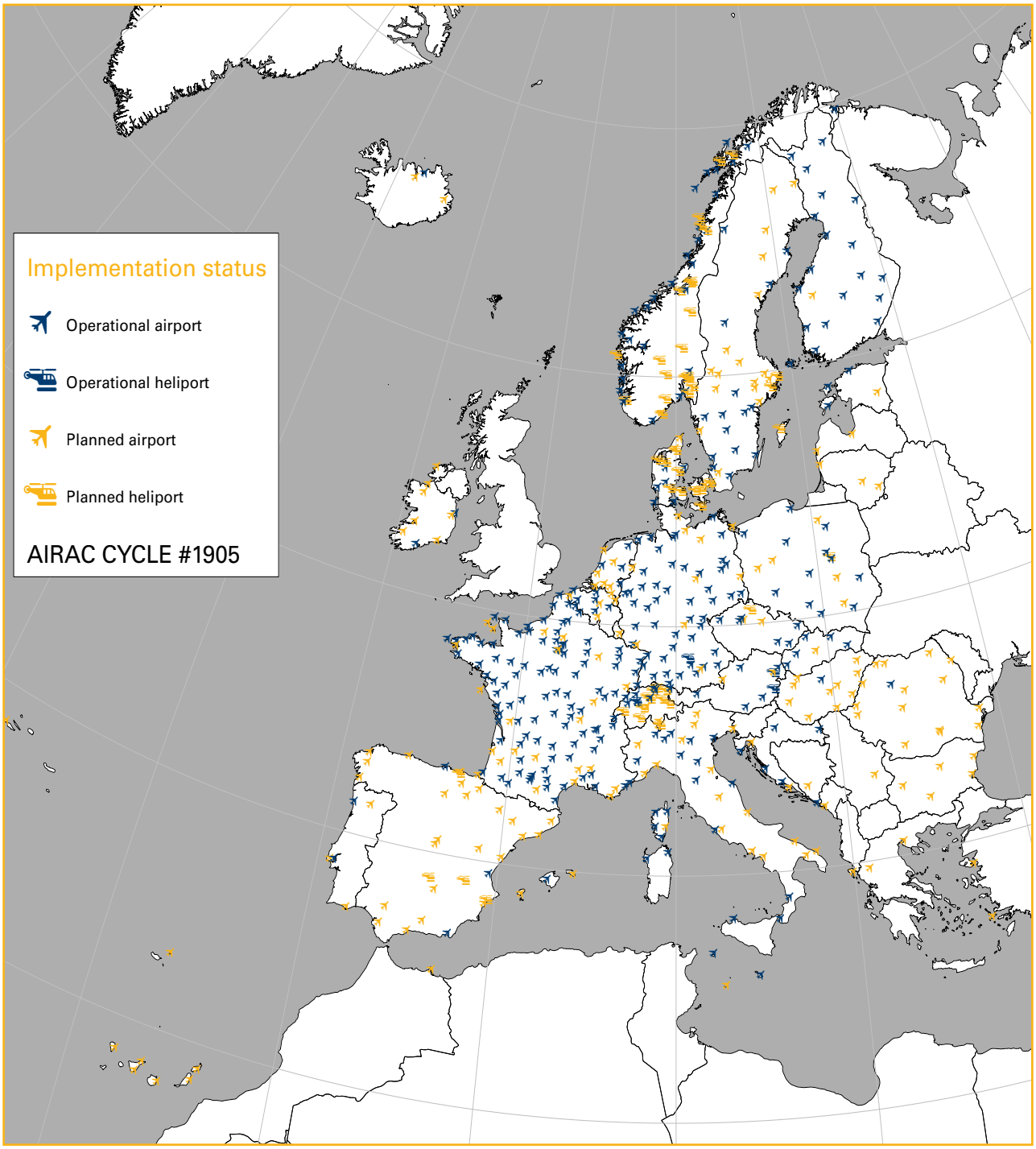
NAVIGATION
MADE IN
EUROPE

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

ESSP

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

EGNOS implementation



Talking about EGNOS benefits with… EAGLE AIR

Eagle Air is an Icelandic regional airline founded back in 1970. Besides conducting commercial passenger and freight air transport operations, Eagle Air offers other services such as ambulance flights or aerial photography, being able to reach the European continent with some of its aircraft. In this issue of the EGNOS Bulletin, we interview Eagle Air's Chief Pilot and Flight Operations Manager, Mr Ölver Jónsson

When did you first hear about EGNOS and LPVs?

We started to hear about it a few years ago during our meetings and discussions with our national ANSP ISAVIA. They were very eager to make use of EGNOS and implement LPVs all along the country in order to cut down costs related to ground navaids infrastructure maintenance. So we learned what it could offer to us and immediately became fully supportive to it.

As Chief Pilot and Flight Operations Manager, could you please let us know which are your roles within Eagle Air?

Besides being a pilot who has to deal with its own flight roster in domestic flying, I am also the main responsible individual in front of ICETRA, our CAA. In addition, I am also the training manager… so as you can see I am all over the company. I can deal with it because we are a relatively small company with 14 pilots and, what's more important, I have a lot of assistance and everyone is helping with all these tasks which come up.

How many LPV capable aircraft do you currently operate, and how many do you expect to operate during the next years?

From the x4 Jetstream 32s we operate, today two of them are approved for LPV. If everything goes as planned, we will have a third one by next year, but of course this depends also how the infrastructure will evolve in terms of implementing more EGNOS approaches here in Iceland.

If possible, give us some details of how the LPV functionality is implemented in your aircraft.

Both aircraft were fitted with dual Garmin GTN 650 boxes. They are coupled to the autopilot both for the horizontal and vertical navigation, dramatically reducing our workload during all phases of flight.

Credits: Eagle Air

In which airports do you expect LPV to be more beneficial? Why?

Let's take for example Húsavík airport (BIHU), the only Icelandic airport which today has a LPV line of minima. For RWY 02, the Decision Height (DH) of the LNAV line of minima is 670

> "From an operational perspective, it is necessary to extend the EGNOS Service Area so it covers all our country"

Credits: Eagle Air

ft, being the LPV one of 298ft. That means a difference of 372ft which makes a lot of difference. BIEG and BIAR are the next planned airports according to ISAVIA, and in these two locations the benefits of LPV should also be superb. In other locations, the lack of sufficient EGNOS coverage is an issue, but as an operator we expect this will be tackled by Iceland and EU institutions during the next years.

So, are you approved for LPV operations?

Yes, we have been for at least the last one and a half years, and we are still waiting to be able to use it in Húsavík (BIHU), as the LPV line of minima is not yet operational.

How much and what type of training did the crews receive?

We obtained all our approvals one and half years ago. Our pilots were trained on PBN and on the use of the GTN650 at the Icelandic Flight Academy. But the practical training was conducted in house, using our own aircraft in non-revenue flights..

Finally, as you certainly have SBAS sensors on-board…do your aircraft also include ADS-B Out capability?

No, not yet. We know we have to do it before June 2020 so we are still planning it. We are looking for the solution, from all available in the market, which best fits our needs. And we need to do it carefully considering the resources we have for it.

Any final message you want to share with our readers?

ICETRA and ISAVIA have got plans to start decommissioning several ground navigation aids (e.g. NDBs) and transition towards a PBN airspace environment. We insist that, to make it better and more effective from an operational perspective, it is necessary to extend the EGNOS Service Area so it covers all our country.

EGNOS Success Stories

HOW EGNOS MAKES A DIFFERENCE IN DUBROVNIK AIRPORT

Credits Dubrovnik Airport

Dubrovnik airport, located in the Dalmatian coast of Croatia, is one of the most important airports in Croatia in terms of number of passengers and operations.

Since 2017 and extending up to Q1 2019, an extensive reconstruction work took place in the airport so as to replace the entire pavement on its RWY 12/30.

Due to the construction work, several operational restrictions had to be set, being one of the most important the several threshold 12/30 displacements during the almost 2 years of work. Associated to this, and since December 2018 when THR12 was displaced by 1050 metres, the Instrument Approach Procedure (IAC) serving RWY12 had to be either temporarily redefined or suspended.

This was a good opportunity to demonstrate the flexibility and added value of EGNOS-based approaches. While the ILS 12 had to be suspended, a temporary RNAV GNSS Y 12 was published, allowing LPV equipped airlines such as Croatia Airlines to benefit from the accurate horizontal and vertical guidance provided by EGNOS.

SPANISH MOUNTAIN BIKE ROUTES POWERED BY EGNOS

IMBA Spain has recently published a new version of its Signalling Manual, which establishes the procedure and associated methods to plan, prepare, certify, inspect and promote MTB centres, spaces and routes.

The Signalling Manual is used by Spanish companies and institutions as the reference guide to deploy guidance signals and information panels along routes that are either newly developed or re-inspected from time to time.

One of the most important tools utilized during trail signalling campaigns are GPS devices.

In the last version of the Signalling Manual, the use of EGNOS is highly recommended as a means to increase the accuracy of both surveyed signals and track logs, reducing potential errors and subsequent corrections when working with these data into Geographic Information Systems (GIS).

About IMBA Spain

IMBA Spain is a non-profit association whose mission is to secure and enhance sustainable trails access for mountain bikers and communities across Spain. IMBA Spain is also a member of IMBA Europe.

CGEOS CREATIVE GEOSENSING RELIES ON EGNOS FOR ENGINEERING GEODESY SOLUTIONS

Credits: CGEOS

CGEOS Creative Geosensing is a Belgian company specialized in engineering geodesy and high precision positioning applications. CGEOS was founded by Professor Joël van Cranenbroeck in January 2014, taking advantage of his long-term (more than 30 years) experience with GNSS technology acquired at the Belgian National Geographic Institute along with other professional experiences. CGEOS addresses three major market segments at an international level: engineering geodesy consultancy services, GNSS high accuracy positioning and GNSS monitoring of human-made structures and natural elements. CGEOS delivers these services to both the public and private sectors, not only in Belgium but worldwide.

Prof. Joël van Cranenbroeck, current Managing Director of CGEOS, recognizes the usefulness and applicability of EGNOS, commenting that "CGEOS has tested EGNOS corrections for several years and we are using it for multiple applications related to agriculture, transportation buses, and GIS (geospatial information systems) surveys". In addition, CGEOS not only takes advantage of the signal in space of the EGNOS open service, but they also employ EDAS, the EGNOS data access service through the Internet, "to apply DGNSS corrections to both GPS and GLONASS constellations signals by means of NTRIP".

For CGEOS, the wide integration of EGNOS, available in most professional surveying and mapping equipment, from manufacturers all over the world, is an important feature that facilitates its adoption. In this sense, CGEOS is using EGNOS "mainly with GNSS OEM boards from ComNav Technology (China) and u-blox (Switzerland) chipsets". Prof. Joël van Cranenbroeck also refers to the main benefits that EGNOS offers to CGEOS asserting that "EGNOS provides DGNSS performances for portable receivers without the need to subscribe or/and to access any GNSS network positioning infrastructure".

EGNOS not only supports the nominal GIS and surveying tasks of CGEOS, but it also allows them to achieve high-accuracy technical requirements for specific works, such as the case of a "proposal for using EGNOS in a public transportation management project". Prof. Joël van Cranenbroeck anyway believes that EGNOS has still some potential to be exploited, remarking that "EGNOS deserves well a sound promotion and overall much stability for delivering 30 cm of horizontal accuracy". From CGEOS experience, Prof. Joël van Cranenbroeck concludes that "EGNOS is an extraordinary service that will be continuously developed to achieve more performing results".

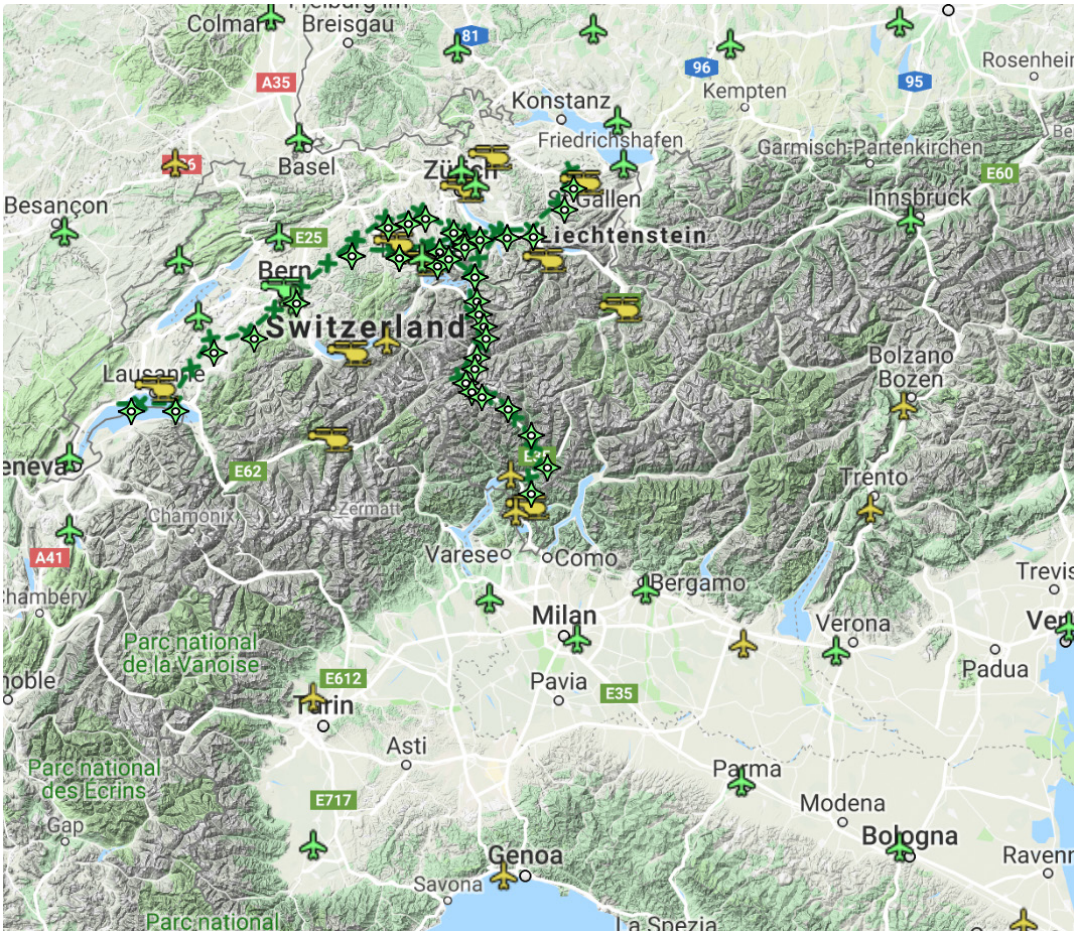
EGNOS services highlights

NEW EASE TOOL

The new EASE (Egnos sAvingS in agriculturE) tool is already available in the EGNOS User Support Website. The EASE tool intends to provide farmers with cost-benefit analyses on the use of EGNOS for machinery guidance in some of their typical agricultural labours: sowing, spreading, spraying and harvesting. The EASE tool presents a user-friendly interface that guides the user smoothly along the three configuration screens before obtaining the final EGNOS savings of the proposed scenario. To facilitate the configuration tasks, explanation pop-ups are also available for all the data fields (look for the exclamation mark bubbles). In addition, the text of the EASE tool can be automatically translated to any language (check the top right widget). Anyway, a detailed user manual is also at the disposal of the user for further consultation.

The EASE tool is based on a comprehensive (but pragmatic) model, in order to try to be simple but also in line with reality. The methodology takes into account the specific circumstances, considering both costs and labour practices, of each farmer. The tool can perform scalable studies, including as many operation tasks as the farmer considers relevant. In the end, the user can print or export the results obtained. The EASE tool is recommended for those types of crops that do not require very high precision solutions, i.e. extensive crops in dry areas, such as dryland cereals, legumes and sunflowers.

HELICOPTER RNP 0.3 ROUTES



Since last December, the Helicopter RNP 0.3 routes based on EGNOS are displayed in the LPV Procedures Map with their associated waypoints and the list of operators using them.

Required Navigation Performance (RNP) refers to the level of performance required for a specific procedure or a specific block of airspace. It is a type of performance-based navigation (PBN) which allows an aircraft to fly a specific path between two 3D-defined points in space.

Particularly, RNP 0.3 means that the lateral navigation accuracy of the helicopters must be within ± 0.3 NM for at least 95% of the flight time.

The aircraft must have both airworthiness and operational approval for RNP0.3. A typical RNP-compliant installation would at least consist of FMS equipment with GNSS sensor meeting ETSO-C146 (SBAS).

The first set of operational routes has been implemented in Switzerland, being the Swiss Air Force and REGA (HEMS Operator) the users of these procedures.

The new routes provide a huge advantage in terms of airports/heliports connectivity and accessibility, as the operators do not have to cancel their operations in case of adverse meteorological conditions.

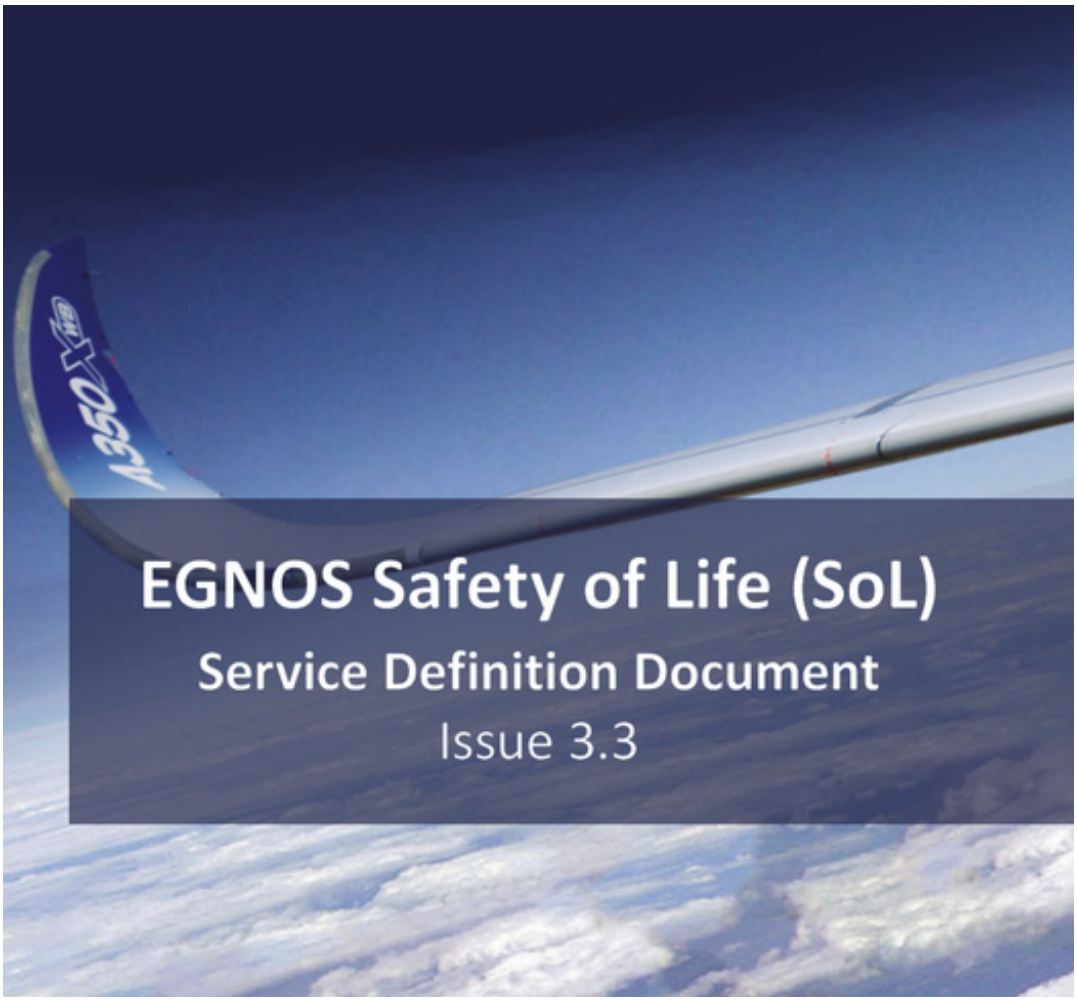
It is expected that in the future RNP 0.3 routes will become more common throughout Europe, as new approaches are planned to be implemented.

NEW SERVICE ROADMAP

The new version v4.1 of the EGNOS Service Implementation Roadmaps has been released and they are now available at the EGNOS Service Implementation Roadmap section

These new versions provide a high-level overview of the expected evolution in the next three years for each of the EGNOS Services; Safety of Life (SoL), Open Service (OS) and EGNOS Data Access Service (EDAS).
Moreover, additional information such as deployments of new RIMSs or future EGNOS v3 service is provided beyond this timeframe, focusing on planned improvements in a medium-term.
The Service Implementation Roadmaps documents are available in both PDF1 and interactive view. We invite you to explore the new roadmaps to have a look on the evolution of the different EGNOS Services, and do not hesitate to contact the EGNOS helpdesk in case you have any question!

NEW SAFETY OF LIFE SDD V3.3 RELEASE



The new version of the Service Definition Document (SDD) for the EGNOS Safety of Life service has been published!

The EGNOS Safety of Life service (SoL) supports safety-critical operations in the aviation domain such as Approaches with Vertical Guidance (APV-I) and Category I precision approaches. The SoL service area has been extended in the North of Europe and it is now providing the service up to 72° North. On top of this major feature, the SoL SDD contains up-to-date information on the EGNOS SoL achieved performances.

In addition the document encompasses information of interest for aviation users: conditions of use, information for ANPS on EGNOS Working Agreements and the relationship of Performance Based Navigation (PBN) specifications with all EGNOS SoL Service Levels.

Check out the new EGNOS SoL SDD, and do not hesitate to contact the EGNOS helpdesk in case you have any question!

What's new?
Since last bulletin...

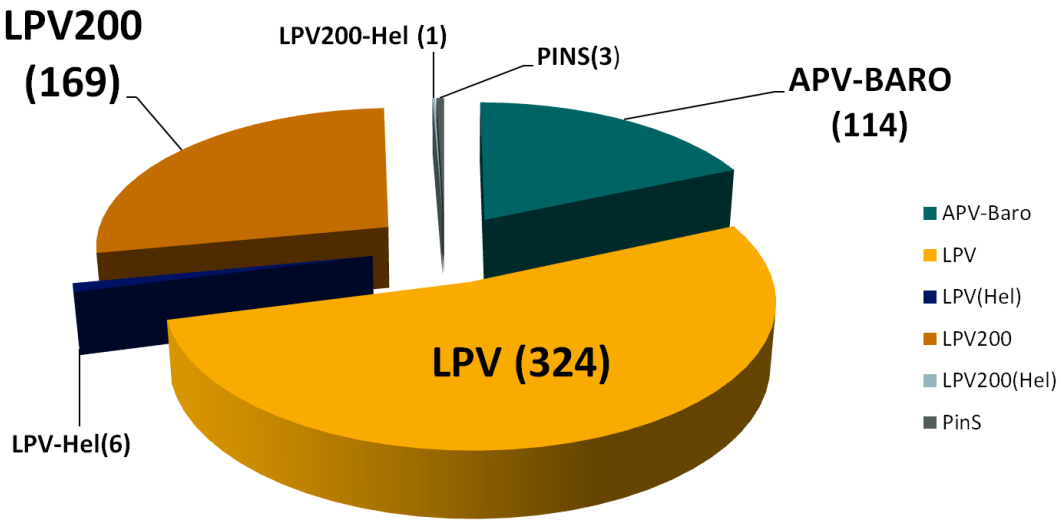
EGNOS WORKING AGREEMENTS SIGNED (EWA)

The following EWAs have been signed in the last quarter:

- ORO NAVIGACIJA **Lithuania**
- Arendal/Gullknapp Airport **Norway**
- High Coast Airport (Hoga) **Sweden**
- ATS Hagfors **Sweden**

LPV, LPV-200, PinS & APV Baro procedures published (including AIRAC cycle 2019 #04– 29/03/2019)

Next graph shows the number of procedures LPV, LPV-200, PinS, APV-Baro, LPV-Hel and LPV200-Hel. The total number was **617**



SBAS in the world

WAAS

The table below shows the WAAS list of satellite-based approach procedures. You can find further information on SatNav news.

Courtesy of the FAA WAAS Team.

Satellite-based Approach Procedures

RNAV (GPS) Approaches	ILS Runways	Non-ILS Runways	Total
LPV Line of Minima	1,178	2,791	**3,969**
<250' Decision Altitude			*1,088*
Exactly 200' Decision Altitude			*1,037*
LP Line of Minima	5	693	**698**
LNAV Line of Minima	1,222	4,848	**6,070**
LNAV/VNAV Line of Minima	1,154	2,703	**3,857**
GPS Stand-Alone Procedures	0	51	**51**
GLS Approach	11		**11**

(Data as of January 31, 2019)

What's going on...

in aviation.

EGNOS IN WORLD ATM CONGRESS

As in previous occasions, EGNOS was present at the World Air Traffic Management (ATM) Congress (Madrid, 12th - 14th March) through a stand and conferences.

The event is the world's largest ATM conference, gathering more than 200 exhibitors and 100 sessions every year. In this occasion the flight simulator and the drone platform attracted many visitors to the EGNOS stand curious to understand the benefits that this technology can bring to the aviation and drone sectors.

During the three days, attendees were able to fly LPV approaches on the simulator, find out the latest information on EGNOS implementation across Europe, test the EGNOS Application in their smartphones and learn about EGNOS benefits for drones from previous flight campaigns.

During the first day, a session on drones was arranged by GSA and ESSP at the stand with the participation of Ineco, Everis and GMV, who presented the main outcomes of the TERRA, GAUSS and EGNSS 4RPAS projects respectively. During the second day, a session on "EGNOS & Galileo services for aviation - status and opportunities" was organized in one of the conference theaters. The session offered presentations on R&D funding opportunities by GSA, Autonomous Distress Tracking mandate (ADT) by Orolia, benefits in using EGNOS&Galileo in drones by GeoNumerics and new EGNOS users in IFR and VFR environments by ESSP.

The workshop was followed by the EGNOS Awards which primarily recognized the signing of three new EGNOS working agreements by ISAVIA (Iceland), ORO NAVIGACIJA (Lithuania) and SMATSA (Serbia and Montenegro). In addition, the Spanish Civil Aviation Authority AESA was recognised with a special award, for pioneering effort making a reality the use of EGNOS and Galileo in drones.

in aviation.

EGNOS IN AERO FRIEDRICHSHAFEN

Last April, Aero 2019 took place at Friedrichshafen. This is one of the most interesting events for General Aviation (GA) awareness in Europe. It was a great opportunity to meet GA stakeholders (manufacturers, operators, pilots, associations), keep raising their interest on EGNOS and inform about the latest initiatives from GSA.
EGNOS was present as a Silver sponsor with a stand with a virtual reality station that attracted a lot of visitors. Additionally, the GSA participated in a keynote from EASA to talk about EGNOS.
The main outcome of the show in what regards to EGNOS is that it is a very well-known technology amongst GA users and there is a lot of people asking for it and using it due to its clear benefits for small aerodromes.

EGNOS PRESENT AT THE 73RD IATA/A4E CNS – ATM JURG

The 73rd Meeting of the IATA/A4E CNS – ATM Joint User Requirements Group (JURG), held in IATA's Brussels offices last 11-12 February, was an excellent opportunity to present, in front of a significant number of commercial airlines, both the status of the EGNOS SoL Service and what the implications of the PBN Implementing Rule are in regards to future EGNOS avionics equipage. It was particularly noted that, by 2024, LPV minima will be available in all European instrument runway ends, and that by 2030 LPV will become the 'normal' means to execute CAT I approaches, leaving other technologies such as ILS or GLS CAT-I as 'contingency' means.
With around 40 attendees, the audience was mainly composed of IATA and A4E-member airlines, representatives of regional and business aviation associations and also various industry members which took the opportunity to present the latest status on other CNS incoming technologies such as Space-based Datalink, ADS-B Out and Galileo

Did you know...?

…that Airbus has successfully completed their first LPV approach tests on a A330NEO? The test aircraft, equipped with dual Honeywell FMS (Flight Management System) and MMR (Multi-Mode Receiver), flew 5 successful approaches into Tarbes airport (ICAO LFBT), South-West of Toulouse, on the 29th of January.
The trials were part of the standard design and validation activities prior to certification. The objective for Airbus remains to have the full A319/320/321 and A330 (including the new Beluga XL) families certified for LPV approaches by 2020.

in maritime.

E-NAVIGATION UNDERWAY

Credits: IALA

The 9th e-Navigation Underway International conference was held from 6th to the 8th of February, 2019. The theme for the conference was "e-Navigation: Benefits and Barriers when Implementing New Technologies".

The e-navigation perspectives of the main maritime stakeholders were addressed: Harbour Masters, ship-owners, Pilots, Maritime Authorities. Special focus was put on the presented most recent progress in e-navigation concepts and developments

It was pointed how GNSS can provide realistic benefits to different e-navigation applications .

EGNOS representative was there presenting the status of the activities in progress for an EGNOS service introduction in maritime to support safety of navigation and search and rescue operations. Detailed information can be found here.

in rail.

SPACE FOR INNOVATION IN RAIL

Stakeholders from the space and rail sectors joined with regulators and government representatives to review the benefits and make a point on the way forward for European Global Navigation Satellite Systems (EGNSS), Galileo and EGNOS within railway applications in Europe. The two-day Space for Innovation in Rail event on 18 – 19 March 2019 in Vienna was jointly organised by the Austrian Ministry of Transport, Innovation and Technology, the European GNSS Agency (GSA), the European Union Agency for Railways (ERA), and the Shift2Rail Joint Undertaking (S2R JU) and highlighted the important role of satellite-based positioning technology for the future of the rail sector. More information on this event, available here.

in GNSS.

EUROPEAN NAVIGATION CONFERENCE

One more year, the European Navigation Conference has taken place from 9th to 12th April, in Warsaw, Poland. This year EGNOS has ben present in four different sessions, in the Marine/Under Water Navigation/Arctic Navigation panel on the 11th where the SBAS Guidelines for Shipborne Receiver: EGNOS performance based on IMO Res. A.1046 (27) were presented.

On the GNSS Hardware Technology session, AIOSAT presented an application using both EGNOS SiS and EDAS entitled " Autonomous Indoor & Outdoor Safety Tracking System". EGNOS performances were also shown in the panel Sensor Based Navigation and Precise Positioning (PPP, RTK) "Assessment of EGNOS Availability, Continuity, and Coverage for maritime applications" and finally on the panel devoted to the Education and Training for Navigation, Inland and Land Navigation on the 12th where EDAS (EGNOS Data Access Service) differential GPS corrections: a reliable free-of-charge alternative for precision farming in Europe was explained. AIOSAT - Autonomous Indoor & Outdoor Safety Tracking System.

Did you know...?

that the Department TESAF of the University of Padova uses EGNOS for precision agriculture and forestry activities. For instance, they employ EGNOS receivers, both portable and mounted on tractors, to collect field data related to sub-field variability (soil sampling points, vegetation indices, etc.) and to record accurately the fuel consumption of tractors during their tests. In the near future, TESAF plans to implement their telemetry systems on new machines.

Upcoming Events

EBACE

21 - 23 May

At EBACE, business aircraft manufacturers, avionics firms, handling organizations, fractional providers, charter/lease companies and aircraft resellers will display their latest products and services. EBACE exhibits will showcase more than 500 exhibitors and 60 business aircraft on static display. It is the right place to meet with new and existing customers within business aviation.

EGNOS will be present at Stand Z138

ECPA

8 - 11 July

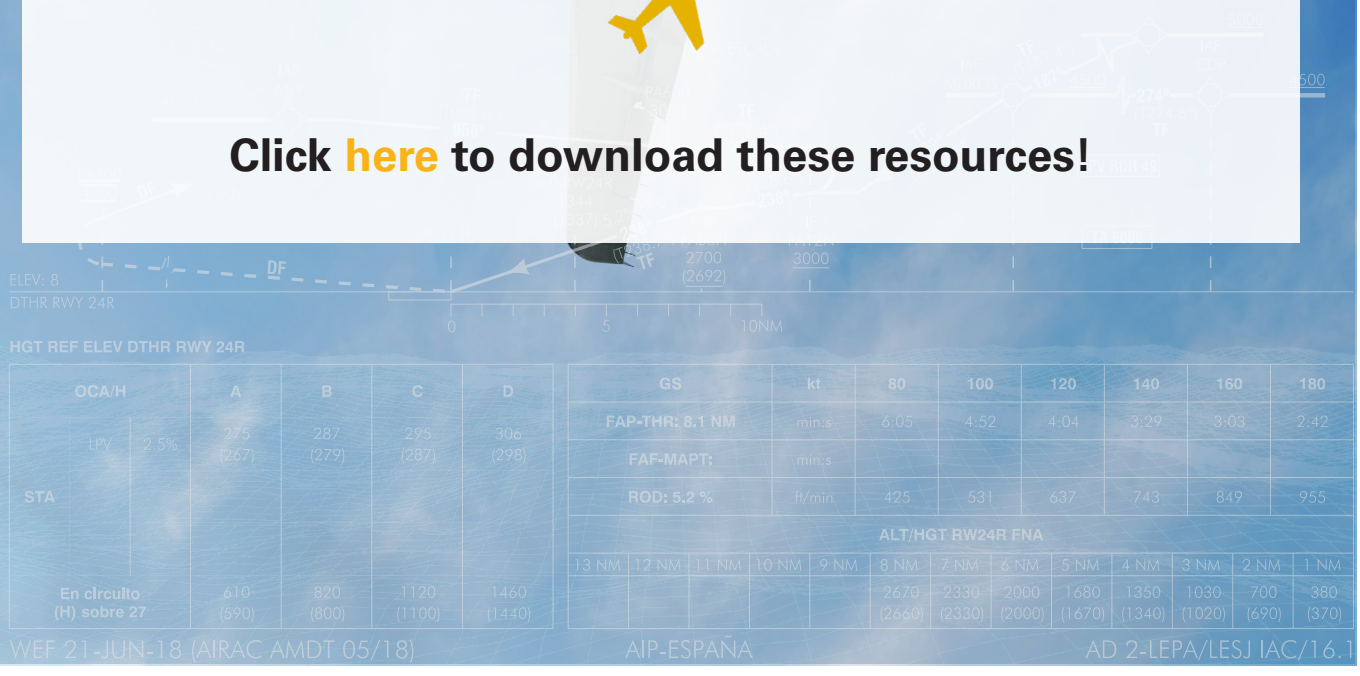
The 12th European Conference on Precision Agriculture (ECPA), will held in Montpellier, Occitanie, France in early July. The ECPA conference is an excellent forum in Europe and worldwide to focus on specific Precision Agriculture topics while discovering what our colleagues are working on, enabling synergies and co-operation.
EGNOS will be present in the conference agenda, key messages in relation with this free European service will be provided to the audience

GUIDANCE MATERIAL

The **Guidance Material** provides simple guidelines for aviation stakeholders within the European Civil Aviation Conference (ECAC) area to facilitate the operational implementation of Localizer Performance with Vertical guidance (LPV) operations.

Together with specific analysis on applicable regulations, ANSPs and Airport Operators shall find **LPV approach** implementation guidelines including LPV-200 aspects, while Aircraft Operators shall find practical hints to obtain operational approval by their national authorities to perform LPV operations.

Click here to download these resources!



EGNOS

EGNOS, it's there. Use it.

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

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In case of doubt the users and other parties should contact the ESSP SAS helpdesk at egnos-helpdesk@essp-sas.eu. Aviation Users may also contact their National Supervisory Authority.
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