EGNOS

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EGNOS BULLETIN

Issue 24, Q3 2017

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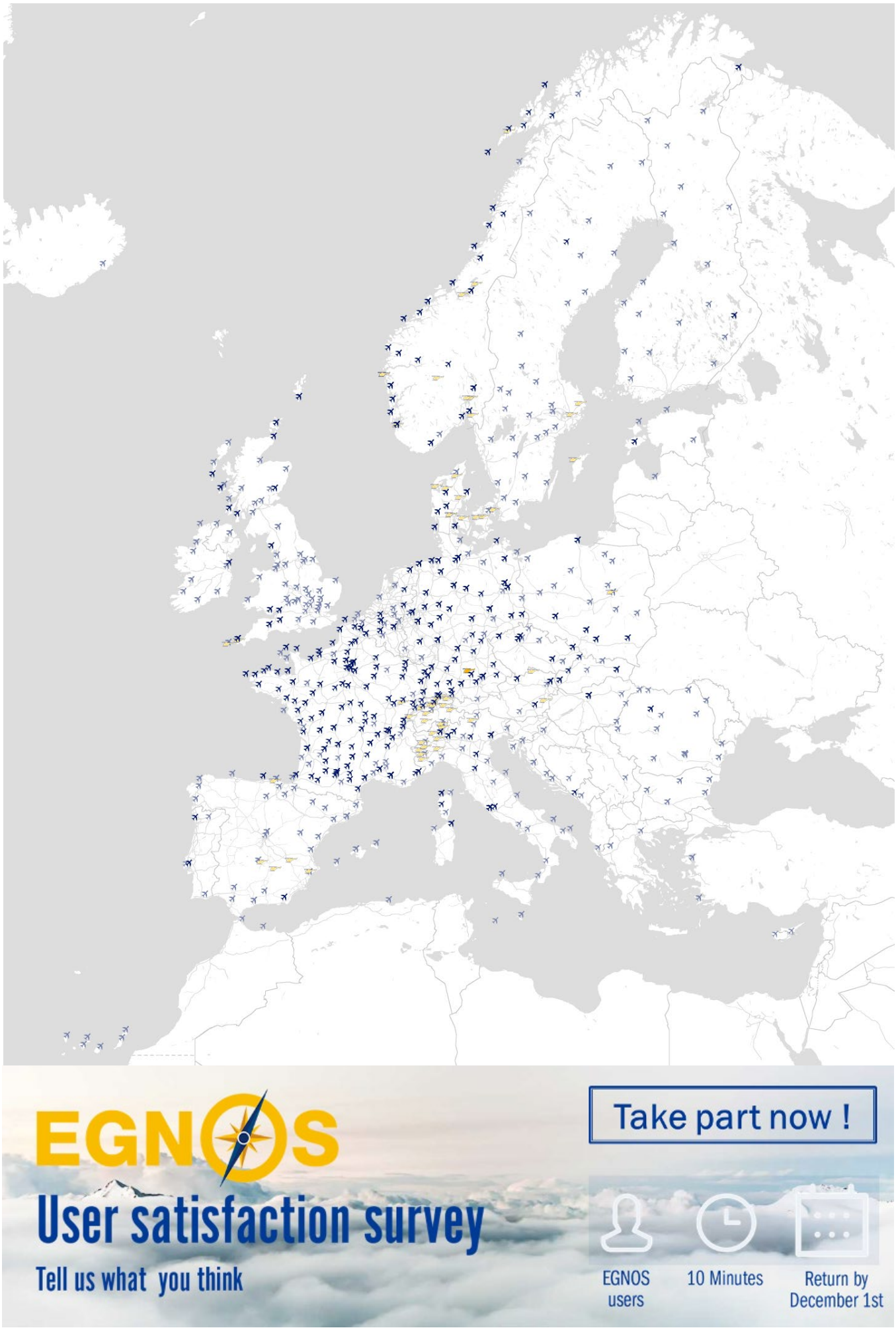
European
Global Navigation
Satellite Systems
Agency

Precise navigation,
powered by Europe

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

ESSP

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


EGNOS
User satisfaction survey
Tell us what you think
Take part now !
EGNOS users
10 Minutes
Return by December 1st

A review on EGNOS Annual Workshop Athens 2017

We are pleased to introduce this special issue of the EGNOS Bulletin which is dedicated almost in full to cover the main messages given by all stakeholders who participated to the EGNOS Annual Workshop in Athens during the 3rd and 4th October. Near 200 participants congregated during these two full days of presentations, side meetings and networking opportunities at the 2017 edition of this Annual Workshop which has demonstrated once again to be a clear success, reflecting that the EGNOS user community keeps on growing every year

Carlo des Dorides (GSA Executive Director) and Ekaterini Kavvada (EC)

Thierry Racaud, ESSP Chief Executive Officer, welcomed the attendees to the Workshop and shared the contents of the agenda. He then gave the floor to GSA and EC opening words.

Carlo des Dorides, European GNSS Agency (GSA) Executive Director, opened the workshop noting that bringing actors together is essential for guaranteeing the success of all EGNOS services and thanked the industry and the Service Provider for their role. He then reviewed the three major upcoming targets for the EGNOS Programme which are obsolescence, the delivery of the services to all EU users and the next ionospheric peak scheduled for 2023-2025. In this regard, he reminded that a contract for a new GEO satellite had been recently awarded to Eutelsat and that the ground segment was to be renewed too. Additionally, he reminded that new standards are under development to guarantee the full exploitation of EGNOS v3.

He also noted that there are other regions outside EU-28 like Ukraine, North Africa and Balkan countries which are looking with great interest to EGNOS and also that EU industry had been awarded a contract for the Korean SBAS confirming a successful technology export.

The PBN Implementing Rule, ADS-B, the UAV market, helicopter operations and commercial aviation were listed as top priorities in the short and medium term. The GSA was happy to note that SBAS procedures in Europe have currently reached one third of European IFR aerodromes and they have targeted a 50% penetration by 2020. In order to support this uptake, the GSA will make available a new Call for Grants before the end of the year.

Ekaterini Kavvada, from the European Commission, shared the EU Space Strategy with the audience in the areas of growth, global competition and major technological shift. The strategy pursues four different objectives: to allow EU to fully benefit of the different services provided by Space, to provide the right ecosystem for business opportunities, to allow startup companies to grow to promote EU leadership and, finally, to increase EU share in the Space global market which currently represents 21%. To do so, EC is planning, among other things, to secure the continuation of their Space programs (including EGNOS & Galileo) to provide the necessary confidence to the private

> “the three major upcoming targets for the EGNOS Programme: obsolescence, the delivery of the services to all EU users and the next ionospheric peak scheduled for 2023-2025”

Attendees at the EGNOS Annual Workshop 2017

sector and to maintain R&D programs such as H2020.

The first day was devoted to cover the latest updates on both the EGNOS Services & Program together with an overview of the current implementation status of EGNOS in aviation mainly from GSA and ESSP. OS SDD new release v 2.3 was made public on this day . From the institutional side, EUROCONTROL and EASA provided a glimpse on the regulatory and standardisation perspective while KOREA and ASECNA provided the progress status of their satellite navigation programs and CNES presented and independent assessment on SBAS systems. The rest of the presentations were examples of success stories in aviation from various stakeholders. These were Swiss Airlines as a pioneer commercial operator flying LPV-200 (EGNOS CAT I), AOPA UK providing the views of general aviation, CANSO debriefing their ATM strategy, Skyguide pioneering the first RNP0.3 route based in EGNOS, easyJet plans to SBAS upgrade some of their A320 fleet and ENAV&HCAA current status of LPV implementation in Greece. The first day session closed by awarding the Irish Aviation Authority and DFS for recently publishing LPV and LPV-200 procedures respectively. Similarly, the airports of Sligo, Donegal, Waterfold, Gloucestershire and Esbjerg Airport were awarded for having recently signed an EGNOS Working Agreement.

The second day was devoted to EGNOS in maritime and land applications as well as to the use of the EDAS service for added value applications. Both GSA and ESSP explained in detail the current status of all EGNOS markets, and the actions taken for further EGNOS adoption in multimodal domains. EGNOS use in aids to navigation and recreational boats was dealt with by presentations from Cerema, General Light house Authority, Alberding and Super Series 52 Regatta. The challenges for EGNOS in the ERTMS evolution under the Shift2rail initiative where presented by Ansaldo. The use of EGNOS in CAP subsidies verification in the agriculture domain as well as its use in drones was presented by the Generalitat de Catalunya and HEMAV respectively. TopCon Europe showed the very promising results of an EDAS infield test.*

**This article has been written by ESSP and does not engage the quoted persons*

EGNOS Annual workshop
Satisfaction Survey results

EGNOS Annual Workshop

ATHENS 3-4 October 2017

Satisfaction Survey Results

The Workshop was held in Athens last 3-4 October. **167** participants attended the Workshop, of which **66** (non-ESSP staff) responded the Satisfaction Survey.

8.5

OVERALL SATISFACTION

(Scale from 0 to 10)

9.5	Organization
8.8	Facilities
8.0	Contents & Timing
8.0	Working Material
8.2	Speakers
8.1	Knowledge Acquisition
7.7	Usefulness
9.0	Catering
8.6	Social Event

(Scale from 0 to 10)

Probability of Returning (*)

1	Very High	42.4%
2	High	36.4%
3	Acceptable	9.1%
4	Low	3.0%

(*) 6 respondents (9.1%) marked "Do not know".

8.0 RECOMMENDATION

The workshop to a colleague.

Net Promoter Score

NPS 22.6%

% Promoters - **% Detractors**

(30.7%) (8.1%)

Promoters: respondents who have assessed **9** or **10**.
Detractors: respondents who have assessed from **0** to **6**.

How did you know about the EGNOS Service Provision Workshop?

invitation *(30 mentions),* ***e-mail*** *(8 mentions),* ***contacts*** *(19 mentions),* ***website*** *(12 mentions),* ***newsletter*** *(5 mentions) and* ***events*** *(2 mentions).*

EGNOS Programme

Mr Jean-Marc Pieplu, EGNOS Exploitation Programme Manager at the GSA

EGNOS exploitation programme update

Mr Jean-Marc Pieplu, EGNOS Exploitation Programme Manager at the GSA, provided a high-level and quick overview of the status of the EGNOS Program: the system's operational configuration and the actual performances against the EGNOS committed Service. Several hints were also provided on the deployment of new System Releases and for EGNOS v3 status.
Presentation available here.

Mr Gian-Gherardo Calini, Head of Market Development Department at the GSA

EGNOS market strategy and achievements

The market strategy set up to accelerate the use of EGNOS in different market segments was provided by Mr Gian-Gherardo Calini, Head of Market Development Department at the GSA. With a clear identification of where EGNOS should be in 2020, the audience could learn about the current and foreseen uses and applications of EGNOS in aviation, maritime, rail, road, survey&mapping and agriculture segments.
Presentation available here.

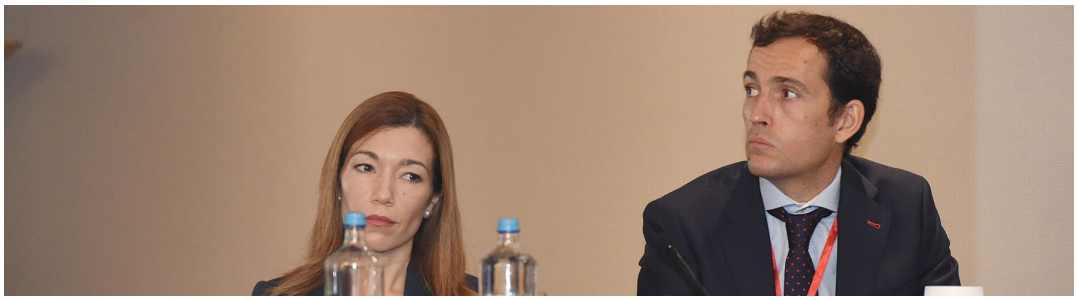
EGNOS Services

Javier Murcia (left) and Jose-Luis Fernández (right) both from ESSP

EGNOS SoL service: APV-1
EGNOS SoL service: LPV200

Performance & Roadmap

Jose-Luis Fernández and Javier Murcia (both from ESSP) presented the performance and status of the EGNOS system, as well as the expected evolution of the services in the next years. SoL performances observed every month were very good with the exception of July 2016 in which a slight degradation is observed in the South of the coverage area (around Sicily). No airports with published EGNOS LPV procedures were affected. OS and EDAS performances were beyond expectations and commitment. The complete presentation is available here.



Carmen Aguilera (GSA) and Miguel A. Sánchez (ESSP)

User Satisfaction Survey Results 2016

Carmen Aguilera (GSA) and Miguel A. Sánchez (ESSP) introduced the overall EGNOS User Support Improvement process, highlighting the complementary approach covering both Service Adoption and User Satisfaction activities to promote EGNOS and foster its adoption in different market segments as well as to improve users' perception on the EGNOS service provision, respectively.

The survey 2016 results were also presented, showing an overall satisfaction score of 8.1 (instead of 7.6 in 2015) from a sample of 134 EGNOS users answers (compared to 136 in 2015). In general, most of the evaluated areas improved with respect to the 2015 results.

At this point, the main recommendations derived from the process were described for the different areas of analysis. These recommendations were mapped into 10 actions under implementation in the course of 2017. One of the most relevant actions ongoing is the revamp of the EGNOS User Support website, covering different recommendations of the analysis. Miguel A. Sánchez also showed a live video of the main features of the coming website. Finally, the launch of the EGNOS Users' Satisfaction Survey 2017 was announced (open until 30 November 2017): https://www.gsa.europa.eu/european-gnss/egnos/what-egnos/egnos-user-satisfaction-survey

The complete presentation is available here.

EGNOS in aviation

Successful EGNOS implementation stories

easyJet, launch customer of first LPV ready A320neos.

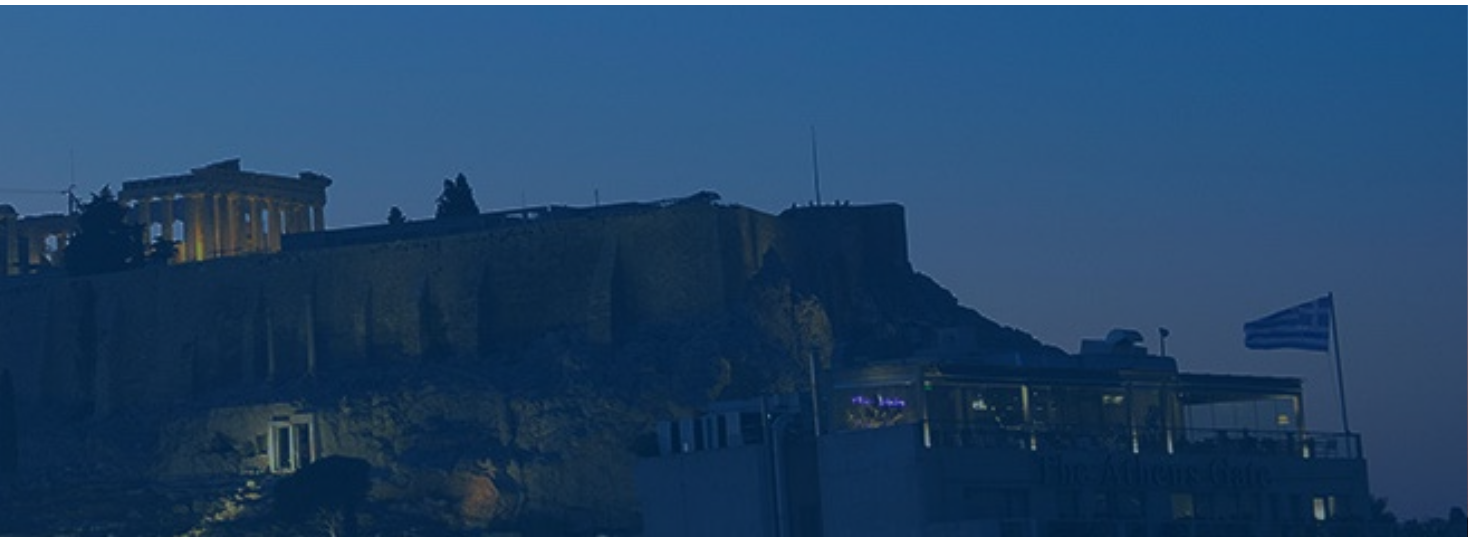
Dominic Haysom, from easyJet Flight Operations, presented the operator plans to acquire ten LPV ready A320neo models from the manufacturer by 2020 as part of the INEA funded project that will be kicked off in November 2017.
The A320 family aircraft represents 32% of current EU traffic and easyJet is convinced of EGNOS benefits in secondary runways during poor weather conditions and ILS unavailabilities. Currently 34% of easyJet landing destinations are on EGNOS enabled airport. By 2020, 79% of the landing destinations should be performed in EGNOS-enabled airports. The figure could rise up to 92% if an LPV was available at Gatwick, easyJet base of operations.
The complete presentation is available here.

GPS with RAIM or EGNOS? The difference for mountainous helicopter operations

Marc Troller, CNS expert from Skyguide, presented the results of the study to compare GPS + RAIM and EGNOS performance values achieved in Helicopter operations on high level demanding orographic environment, to determine the navigation solution to support RNP 0.3 specification.
Flying RNP 0.3 approach procedures with GNSS, the HPL (99%) and VPL (99%) values measured from EGNOS receivers in comparison with RAIM ones are significantly better.
The conclusions of the experimental results show that the availability of EGNOS signal is significantly higher and reaches better robustness than RAIM, specially important in high demanding operations coming closer to the ground. For Skyguide EGNOS is the favorite solution for rotorcraft operations.
The complete presentation is available here.

EGNOS implementation plans in Greece

Alexander Desylas (HCAA) and Patrizio Vanni (from ENAV) presented the results of the works performed within Blue-Med project in Greece, with new RNP APCH closing to finalize its implementation process by 2017 at 4 different airports (Ioannina, Kos, Mitilini and Thessaloniki).
HCAA also presented the status of the hosting activities of the EGNOS Ranging Integrity Monitoring Station successfully hosted in Athens (RIMS-ATH). All GNSS monitoring stations have been already deployed and integrated with EDAS data at the airports and first reports are produced. HCAA remarks in its intervention the increase on airport accesibility enabled by the possibility of precision approaches for both RWY ends on airports only equipped with conventional NPA infrastructure
The complete presentation is available here.



Operator experience with EGNOS

CaptainThomas Schnider, from Swiss Flight Operations Support, presented the operator experience with the recently acquired Bombardier CSeries aircraft, which are LPV ready from factory. With the recent recent EGNOS CAT I publication at their base of operations in Zurich in May 2017, 84% of the operator current flights are performed to LPV destinations. Swiss authorities expects that 25% of their CSeries flights are conducted with an LPV approach by the end of 2018, representing a 10% of their total fleet. The EGNOS benefits assesed the improved overall accessibility as well as the increased flight safety when compared to Baro VNAV due to QNH missetings/errors or the absence of secondary lobes when compared to ILS.
The complete presentation is available here.

EGNOS benefits for general aviation

Mr Martin Robinson, CEO of AOPA UK, briefed the attendees with an overview of the added value that EGNOS brings to the General Aviation community.
Thanks to the many benefits listed by Mr Robinson, GNSS approaches, and LPVs based on EGNOS in particular, shall serve to further boost the important economic footprint of this aviation segment in the UK and in Europe.

To demonstrate the potential, AOPA UK is currently involved in a pioneering project named GAGA, that tries to implement EGNOS LPV approaches in "airports which do not meet ICAO requirements for instrument runways" and without Air Traffic Control service.
The publication of the LPV procedures in AIP is expected at the end of 2018.
The complete presentation is available here.

EGNOS in CANSO's ATM strategy

Benoît Roturier, from DSNA, on behalf of Jean-Marc Loscos, presented ANSPs views on EGNOS. CANSO believes that GNSS augmented by EGNOS represents the most performant technology supporting 3D type A approaches in Europe (vertical guidance down to 250ft) and and fully agrees with the aim to implement "3D approaches everywhere, every time" in EU countries.
CANSO remarks once LPV supported by SBAS/EGNOS is proved as a fully feasible alternative to ILS Cat I, additional benefits of LPV capabilities shall be explored such as multiple glide path approaches or increasing signal robustness with EGNOS v3. CANSO also recalls that having a high percentage of aircraft operators capable of flying the published routes is needed and asks for adequate incentives and forward fit mandates to enable Dual Frequency Multiconstellation avionics (DFMC).
The complete presentation is available here.

EGNOS Safety-of-Life Service for Aviation

Enabling harmonised EGNOS-based operations

Aline Troadec, RAISG secretary and Navigation specialist from EUROCONTROL, made a presentation to give a high level view of EUROCONTROL activities and main topics debated relevant to RNP APCH, including EGNOS-based aspects. Following the methodology for RNP APCH implementation included in ICAO EUR Doc 025, EUROCONTROL provides technical support on different steps of the implementation process such as Airport Capabilities Assessment (Activity 5), Standard Inputs for Cost Benefit Assessment (Activity 8), Flight validation scenarios assessment (Activity 13. Procedure Validation), a FAS DB Tool (Activity 15. AIS Requirements) or a Generic Safety Assessment on APV (SBAS CAT I and APV Baro, Activity 12. Local Safety Case). The complete presentation is available here.

EGNOS-based Operation vis-à-vis Air Traffic Services

Ivan Ferencz, ATM/ANS Team Leader from EASA, presented EASA's view about the role of Air Traffic Services on EGNOS based operations, focusing on Flight Information Service (FIS) provision. Either an Air Traffic Control Unit (ATC), Aerodrome Flight Information Service (AFIS) unit or a Flight Information Centre (FIC) could be designated to provide airspace users the needed information to perform an EGNOS-based operation no matter the type of airspace in which the operation shall take place. Availability of FIS increases the safety of the operation, providing aircraft operators with approach meteorological conditions (visibility, wind shear or QHN), runway conditions or any potential hazard identified. The complete presentation is available here.

EGNOS in aviation: strategies and implementation status

Carmen Aguilera (GSA) explained how aviation capitalizes GNSS benefits to support Navigation and Surveillance applications. The increase on LPV capability on board, RNP APCH deployment and regulator support results on over 45 operators approved and certified to fly LPV, without the need for specific approvals. EGNOS also supports demanding ADS-B applications without the need to upgrade GNSS receivers. Rotorcraft operations are also rapidly expanding their use of SBAS (PinS and RNP 0.3) and even in RPAs market E-GNSS is considered as key enabler for high-demanding applications such as geo-fencing systems, building a satellite based scenario to support aviation environment. Jose Maria Lorenzo (ESSP) presented EGNOS Working Agreements (EWA, 56 in place) status introducing new actors (AD operators) and scenarios (non-EU countries). Following EASA strategic objective on enabling IFR operations for GA, the challenge is to find a harmonize scenario to enable its use for General Aviation and non-instrument RWYs. The complete presentation is available here.

Did you know...?

… that Aeroconseil (an Akka Technologies Group company) recently achieved EASA certification for a new STC that allows introducing LPV capability to the ATR legacy aircraft? The solution, which makes use of the Esterline CMC-5024 GPS Precision Approach Receiver and CMA-5025 Control Panel, has been first fitted and certified in ATR42-500s of a French ATR operator and it is valid for all ATR 42 and 72 legacy models (100 to 500 series). Air Saint-Pierre, another French airline who operates under WAAS coverage between Langlade in Saint Pierre & Miquelon and Canada has already provisioned for the retrofit of one aircraft.

EGNOS market status and adoption plan

Katerina Strelcova (GSA) and Sofía Cilla (ESSP) provided an overview of the EGNOS market status and the activities developed in the frame of the EGNOS Multimodal Adoption Plan for 2017.

GSA presented the strategy and goals to be reached in aviation, maritime, rail and agriculture & surveying market segments while ESSP debriefed on the actions and tools launched to accomplish such objectives. In aviation, it was presented new stakeholders that are starting to play a role in EGNOS use as cargo aircraft operators, military transport for civil purposes and aircraft lessors.

For maritime, it was mentioned both the capabilities to assess high level architectures of an EGNOS-based DGNSS service over IALA beacons and AIS using EGNOS SIS or EDAS together with the development of the corresponding CBAs.

In relation with agriculture and surveying, it was presented the specific receiver configuration awareness campaign to promote right receiver configuration when there is a PRN change and the material developed to let users know how they have to configure an EGNOS compatible devices as well as the activities launched to monitor user feedback both on agriculture and surveying.

Presentation available here.

Katerina Strelcova (left, GSA) and Sofía Cilla (right, ESSP)

EDAS for added value application

ESSP presented the EGNOS Data Access Service (EDAS), which provides free of charge access to the GNSS data broadcast by the GPS, GLONASS and EGNOS GEO satellites over the internet.

Once received by the EGNOS ground stations, EDAS processes the input and formats them according to the different EDAS services specifications. The variety of GNSS data, formats and protocols supported results in a huge versatility which is key to enable the implementation of added value applications by users and service providers.

This versatility is also reflected on the wide range of market segments where EDAS is already present.

The most relevant current use cases of EDAS were also introduced by ESSP (covering transportation, agriculture, maritime and aviation market segments), above 50% of them being linked to professional and commercial applications here.

Juan Vázquez, from ESSP

EGNOS...

in maritime

EGNOS in Maritime: Navigating with integrity

George Shaw (Principal Engineer at GLA) provided an initial overview of the challenging scenarios for Maritime navigation applications, where more than 95% of world goods go by sea is one of the facts arising the need to implement high integrity, smart maritime and multimodal systems for improving safety, reducing congestion, increasing efficiency, protecting environment and reducing emissions. In parallel new applications as the autonomous vessels are becoming a reality appearing as a new actor in the maritime navigation scenarios.

All these facts jointly with the e-navigation concepts currently on the implementation phase requires Resilient Positioning, Navigation and Timing (PNT) where the integrity is fundamental element.

Today GNSS is the principal means of navigation and EGNOS/SBAS plays a key role as the service providing integrity information for GNSS applications and safeguarding the mariner and world trade.

Presentation available here.

Cerema - EGNOS/EDAS based solution for the French DGPS network

Due to the obsolescence situation affecting the French DGPS network, French maritime authorities instructed Cerema (Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement) to propose a short-term and cost-effective solution to maintain the French DGPS maritime service. In this situation, Cerema's proposal was to set-up an EDAS based centralized architecture. The EGNOS messages from EDAS are accessed from a central facility in the Northwest of France. There, an specific software component is in charge of the generation of the RTCM differential GPS corrections for the 7 beacon sites located along the French coast (Virtual Reference Stations Concept). The required integrity checks are based on a pre-broadcast integrity mechanism which is implemented at the central facility using raw GNSS measurements from the receivers at each beacon site. Following the full scale tests implemented in 2017, Cerema has confirmed that the EDAS based differential GPS corrections fulfil the requirements for coastal navigation in real operation conditions. Cerema now plans to start broadcasting the EDAS based DGPS corrections operationally from at least two stations in 2018. In parallel, Cerema will develop a local back-up solution to be deployed at each beacon site which will use the EGNOS signal in space as input for the generation of this secondary source of DGPS corrections, in order to increase the availability and reliability of the new French DGPS maritime service. Presentation available here.

Alberding GmbH and German Federal Waterways and Shipping Administration (WSV) - The role of EGNOS in the recapitalised DGNSS service of WSV - concept and implementation

Alberding Gmbh presented the modernization of the WSV DGPS network, which has migrated from a classical network topology with local DGPS reference stations at the broadcast sites, to a network based approach capitalizing on the Virtual Reference Stations concept. The new WSV system is hence based on centralized architecture, which counts on redundant computing centres in charge of the generation of the DGNSS corrections for all WSV broadcast sites. This primary VRS DGNSS corrections stream is computed by Alberding's Beacon.net SW suite, using as input the GPS and GLONASS raw measurements from German reference stations networks (GREF, SAPOS and WSV stations).

The WSV DGPS system counts on an EGNOS based local back-up system at each transmission site which would ensure the delivery of DGPS corrections (VRS concept as the primary one) in case the primary streams are not available (e.g. communications issue). Alberding GmbH showed the excellent performance level provided by the EGNOS based VRS corrections

generated by the local back-up (approximately 0.5 m horizontal accuracy –percentile 95- for a 76 km baseline) and recalled the advantages of this EGNOS based solution at technical level (e.g. compliance with IALA/IMO recommendations, robustness in front of local effects) and also on the cost side thanks to the reduction of the required onsite infrastructure.

Presentation available here.

EGNOS in the start-line of a high performance regatta (Superseries 52)

The 52 superseries is the world leading monohull circuit and one of the most popular regatta competitions in Europe. Campbell Field, an experienced navigator, explained the importance of an accurate position at the right time, as this can make the difference in high performance regatta.

Video shown in event is available in this link

Presentation available here.

in land application domains

EGNOS enabled equipment for CAP implementation in Spain (Catalonia)

Gemma Fustegueres from the SIGPAC unit within the Departament d'Agricultura, Ramaderia, Pesca i Alimentació in Catalunya, explained the process followed (in accordance with EU regulation) to control the farmer requests in relation with CAP subsidies each year.

She explained how the controls on the field are done, and the importance of the equipment to be used for such purpose. EGNOS compatible devices are used as they provide the needed accuracy requested by EU regulation, are cheap and simple to use.

In Catalonia, on the PAC-2015 campaign more than 85000 parcels have been controlled using EGNOS. Presentation available here.

GNSS Initiatives in Shift2Rail: the challenges for EGNOS in the ERTMS evolution

Salvatore Sabina (Vice President Innovation & Satellite Projects in Ansaldo) presented the GNSS Initiatives in Shift2Rail focusing the presentation on the challenges for EGNOS in the ERTMS evolution Within Shif2Rail, the Innovation Program (IP) 2: Advanced Traffic management and Control Systems is the one addressing the GNSS/EGNOS applications. Salvatore highlighted the new ERTMS (which will include GNSS/SBAS applications), must fulfill SIL 4 Fail-Safe Train Positioning, must guarantee the backward compatibility and the interoperability requirements.

Recently has started a Technology Demonstrator(TD 2.4) project (24.29 M€.) with the aim to Provide a Business Model for GNSS application in Railway taking into account the outcomes and the results of others relevant projects (ERSAT-EAV, STARS, RHINOS, 3InSat, SBS,…) and specific requirements of different Railway Market Segments. TD 2.4 will be implemented throughout two consecutive projects: X2Rail-2 and X2Rail-5 with to be concluded by 2022. Rail scenarios are complex from the radio electric perspective and the GNSS applications in Virtual Balice will represent a challenge for EGNOS where it is initially proposed that each on-board user receiver would receive augmentation data from the railway trackside interoperable constituent (RBC) via the available ERTMS safe (radio) communication session. Presentation available here.

Topcon Precision Agriculture Europe - EDAS for precision agriculture: infield test results

Topcon's presentation started with an introduction of the company, one of the worldwide leaders in the precision agriculture market, focusing on the wide range of HW and SW solutions available for farming operations. J. Rioja recalled the importance of increasing efficiency and productivity of farming operations considering that, while the crop production will need to be increased to feed the continuously growing population, the size of the arable land is expected to decrease in the next years. Topcon Precision Agriculture Europe introduced the in-field tests that they have conducted, in collaboration with ESSP, in order to analyse the pass-to-pass accuracy performance that can be supported by EDAS DGPS corrections in a dynamic and real-life environment. Topcon receivers, vehicles and guidance systems were used in order to confirm the suitability of the EDAS DGPS corrections for precision agriculture. The tests have shown that EDAS DGPS corrections can support pass-to-pass accuracies in the order of 10-20 cm in a consistent manner and with a high degree of repeatability, when located within a reasonable distance to the target EGNOS reference station (at least up to 150 km distance based on the tests that have already been conducted; further tests are planned to confirm the maximum distance). Topcon judged such performance level as appropriate for most cereal farm operations, which represent around 80% of farms in Southern Europe. In particular, the observed performance is sufficient to support the following precision agriculture applications: spraying/spreading of any crop type and tilling and harvesting of cereal. Presentation available here.

EGNOS as an enabler for drone operations

Laura Samsó from HEMAV presented the use of EGNOS as an enabler for drone operations. HEMAV activities are driven to provide drone support to precision agriculture, drone-based inspection services and mapping of surveying industries. HEMAV started a test campaign to fly with drone different missions to cover the last segment of the final approach and initial part of missed approach on ILS RWY31 approach procedure from Lleida-Alguaire Airport (LEDA) with the aim to acquire GNSS data to be processed off-line. This promising project tests the navigation signal and measures GNSS signal protection levels (HPL, VPL) and errors (HPE, VPE) on-board using drones instead of using ground static stations. Presentation available here.

SBAS in the world

SBAS systems independent assessment

Jean Marechal, Head of Service GNSS Performance Monitoring at CNES

Presentation available here.

KAAS programme status

Eunsung Lee, Project Manager at KARI

Presentation available here.

SBAS-ASECNA programme status

Julien Lapie, Advisor to the Director of Operations at ASECNA

Presentation available here.

WAAS

Table below shows the WAAS list of satellite based approach procedures. You can find further information on SatNavNews.
Courtesy of the FAA WAAS Team.

Satellite-based Approach Procedures			
RNAV (GPS) Approaches	ILS Runways	Non-IL Runways	Total
LPV Line of Minima *<250' Decision Altitude* *Exactly 200' Decision Altitude*	1,169	2,681	**3,850** *1,020* *975*
LP Line of Minima	3	641	**644**
LNAV Line of Minima	2,437	3,715	**6,152**
LNAV/VNAV Line of Minima	1.956	1,771	**3,727**
GPS Stand-Alone Procedures	4	70	**74**
GLS Approach	11		**11**
(Data as of August 28, 2017)			

EGNOS Awards

1. *Mr Cathal McCriostal (IAA) receiving EWAs for Sligo North West Airport Co. Ltd, Donegal Airport and Waterford Airport /* **2.** *Jan Hjort receiving an EWA for Esbjerg Airport /* **3.** *Mr Martin Robinson (AOPA UK) receiving the EWA for Gloucestershire Airport Ltd /* **4.** *André Biestmann, from DFS, recieving the LPV-200 award (Bremen, Karlsruhe/Baden Baden and Lahr) /* **5.** *The winners with Thierry Racaud and Jean-Marc Pieplu*

What's new since last bulletin?

EGNOS WORKING AGREEMENTS SIGNED (EWA)

The following EWAs have been signed in the last quarter:

Gloucestershire Airport Ltd **United Kingdom**

Blackbushe Airport **United Kingdom**

LPV & APV Baro procedures published per country(including last AIRAC cycle 2017 #11 – 12/10/2017)

Next table shows, for each country:

- the number of airports with LPV procedures, as well as the total number of LPV procedures;
- the number of airports with APV Baro procedures authorised to be flown with EGNOS vertical guidance as well as the total number of APV Baro procedures.

Country	Airports – SBAS APV procedures	# SBAS APV Procedures	Airports – SBAS CAT-I procedures	# SBAS CAT-I procedures	SBAS RNP0.3 routes	Airports – APV baro Procedures	# APV baro Procedures
Austria	2	2	2	4	0	0	0
Belgium	4	10	0	0	0	0	0
Croatia	1	1	0	0	0	0	0
Czech Republic	4	8	0	0	0	1	4
Denmark	4	8	1	2	0	0	0
Estonia	1	2	0	0	0	0	0
Finland	1	2	0	0	0	0	0
France	89	141	10	18	0	4	5
Germany	22	35	5	8	0	22	60
Guernsey	1	2	0	0	0	0	0
Hungary	0	0	1	4	0	0	0
Ireland	1	1	0	0	0	0	0
Italy	10	20	0	0	0	0	0
Netherlands	2	3	0	0	0	0	0
Norway	16	24	8	15	0	6	14
Poland	5	9	0	0	0	0	0
Portugal	2	3	0	0	0	0	0
Romania	1	2	0	0	0	0	0
Slovak Republic	2	4	2	2	0	0	0
Spain	2	4	0	0	0	0	0
Sweden	1	1	0	0	0	0	0
Switzerland	7	9	2	2	5	0	0
United Kingdom	14	31	0	0	0	0	0
Total	**191**	**322**	**31**	**55**	**5**	**33**	**83**

Events

METSTRADE 2017

14 - 16 Nov.

METSTRADE Show is the world's largest trade exhibition of equipment, materials and systems for the international marine leisure industry. All sorts of technologies related to boat construction and equipment are presented. Over 22,000 professionals from 112 countries around the world gather in Amsterdam. Thus, METS provides the perfect platform to network, exchange ideas and do business.

EGNOS will be present at Hall 1, Stand 01.500

AGRITECHNICA 2017

12 - 18 Nov.

AGRITECHNICA 2017 – the leading trade fair for agricultural machinery – opens on 12. November in Hanover (Germany). For seven days, until 18. November, AGRITECHNICA will set the stage for 2,900 exhibitors and will lift the curtain on the future of crop production. High-calibre manufacturers and service providers will fascinate an international audience with brand new concepts and spearheading innovations in as many as 23 halls.

EGNOS will be present at Hall 15, Stand K03c

EGNOS

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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.

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For questions & information

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