

EGNOS: great for

Aviation is increasingly using GNSS as the primary means for navigation. In particular, regional aerodromes are benefiting from the increased accessibility offered by EGNOS. The European Satellite Services Provider (ESSP) and the European GNSS Agency (GSA) explain how

The European Geostationary Navigation Overlay Service (EGNOS) is Europe's first venture into satellite navigation systems. EGNOS augments the Global Positioning System (GPS) by providing correction data and integrity information for improving positioning, navigation and timing services across Europe.

Funded by the European Union and managed by the European GNSS Agency (GSA), EGNOS services are provided by ESSP SAS, a pan-European Air Navigation Service Provider (ANSP) certified in accordance with Single European Sky Regulation 2096/2005. Developed in compliance with applicable ICAO standards, the EGNOS Safety of Life (SoL) service has been available since March 2011.

“ Regional aviation is a key market segment for EGNOS ”

The increased accuracy and integrity provided by EGNOS enables instrument approach procedures down to the Localiser Performance with Vertical Guidance (LPV) minima, with a decision height as low as 200 feet (depending on geography). This means pilots can land aircraft more efficiently and safely, especially in bad weather conditions, thus reducing delays, diversions and cancellations.

With EGNOS, small and less well-equipped airports, such as the ones typically used by regional airlines, can implement CAT I precision approach operations free of charge. In other words, EGNOS provides safe access to airports where other means of navigation are not available or suitable.

EGNOS-enabled approaches in Europe

“Regional aviation is a key market segment for EGNOS”, underlines Gian Gherardo Calini, GSA Head of Market Development. Today, more than 440 EGNOS-based approaches are available at nearly 220 airports across Europe. These figures are expected to dramatically increase in the coming years, as EASA Opinion 10/2016 proposes that air ANSPs and aerodrome operators implement Performance Based Navigation (PBN) approach procedures with vertical guidance (APV), such as EGNOS LPVs, at all non-precision instrument runway ends by 2020. Additional measures are also being considered, including the implementation of 3D approaches to IREs with existing precision approaches by 2024.

Avionics requirements

OEMs are well aware of the many benefits that EGNOS provides and, as a result, most new aircraft come equipped with LPV capabilities.



These include:

- Bombardier's latest generation Dash 8-Q400, CRJ and C-series;
- Embraer E-Jets; and
- ATR -600 series.

“The accuracy and stability of the LPV guidance is impressive.

The approach procedure is straight and simple, and there is no necessary changeover regarding the Flight Guidance System (FGS) with respect to conventional approach aids”, says Peter Koch, Chief of Bombardier C Series at SWISS. As for retrofits, EASA-approved modifications are either currently available or are under development for the following types of avionics:

- Saab 340 and 2000;
- BAE ATP, Jetstream 41 and Avro RJ/146;
- Fokker 50;
- ATR 42/72; and
- Bombardier Dash-8 older series.

In addition, numerous airlines and operators are already using EGNOS, including ERA member airlines Aurigny Air Services and BAE Systems Corporate Air Travel, to name just a few.

regional aviation

Your EGNOS partner

The GSA is committed to fostering the development of EGNOS procedures and the upgrading of airline avionics. For example, via its aviation grant programme, GSA working on upgrade solutions with Air Baltic, Eastern Airways and HOP! airlines. The GSA also provides technical assistance to airlines and aviation stakeholders in implementing EGNOS, offering guidance for the approval and implementation process, as well as information on the status of upcoming applicable regulations.



More benefits coming soon

Accurate and reliable satellite technologies are a key enabler for aviation, and GNSS programmes such as EGNOS will continue to be essential in the future as they further optimise flight routes by reducing track lengths. Looking ahead, EGNOS will be of particular interest to the regional aviation sector due to its ability to complement such surveillance and communication technologies as ADS-B and Datalink, feeding them with precise position and time stamps. And, with the addition of Galileo to the GNSS scene, all of the operational, safety and economic benefits that EGNOS brings will continue to grow.

Galileo benefits for aviation

Galileo is Europe's global navigation satellite system with full operational capability planned for 2020. Galileo will bring multiple additional benefits to aviation since its OS provides two navigation signals, in the E1/E5a frequencies, interoperable with GPS (L1/L5), the most extensively currently used GNSS constellation in

aviation. Thus, more frequencies, signals and satellites are available for aircraft receivers to compute its position, enabling improved navigation performances and higher robustness compared to those attainable when using only one constellation or just one frequency.

The future standards required for operational approvals and upgraded augmentation systems (ABAS, SBAS and GBAS) are being developed to ensure interoperability and to take full advantage of the dual frequency multi-constellation (DFMC) scenario, in particular: RAIM; EGNOS V3; and CAT II-III operations.

Finally, additional benefits will come from the use in aviation of the Galileo Search and Rescue Service (SAR), the EU contribution to the COSPAS-SARSAT international system, which enables near real-time reception of distress messages transmitted from anywhere on Earth and feedback to the distress emitting beacon, in some cases.

In conclusion, Galileo will not only reduce Europe's aviation dependence on non-European services, but it will provide many improvements for the daily European Air Traffic Management Network. ■



Croatia Airlines is in the process of updating their Dash-8 fleet to become EGNOS LPV and ADS-B Out compliant