

ENAIRe in EGNSS

The view of the Spanish Air Navigation Service Provider

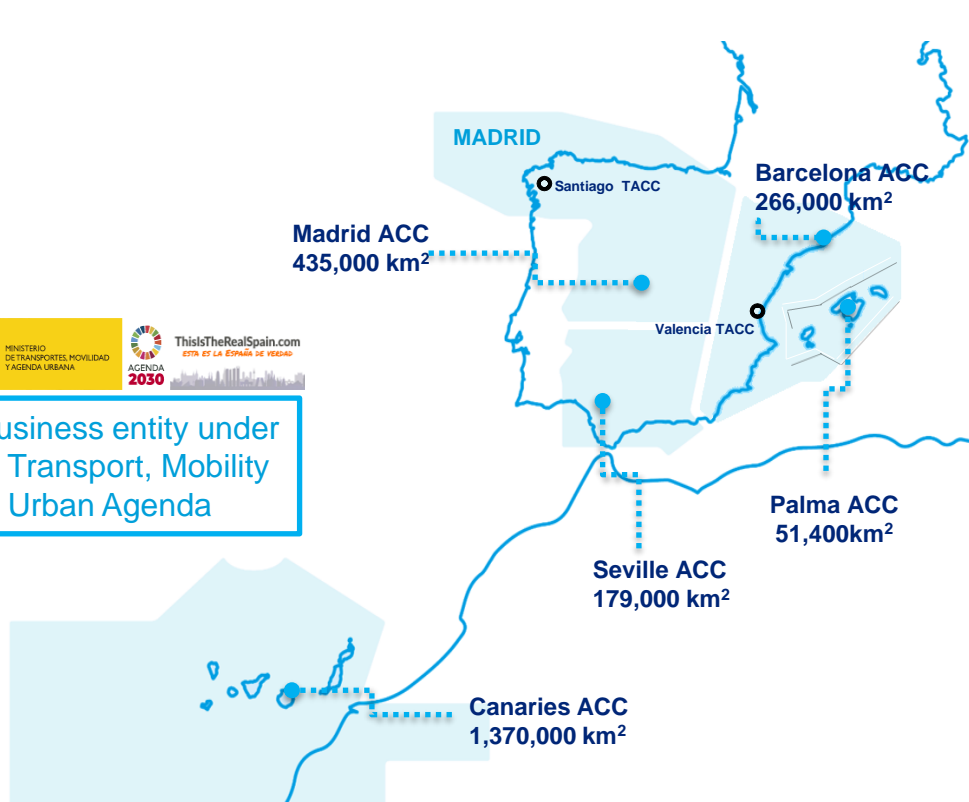
ICG - 16/10/2023 (Madrid)



WHO WE ARE



Public Business entity under
Ministry Transport, Mobility
and Urban Agenda



We manage
2,190,000 km²
controlled airspace

• Spanish airspace is divided into **3 Flight Information Regions (FIR):**

Madrid
Barcelona
Canaries

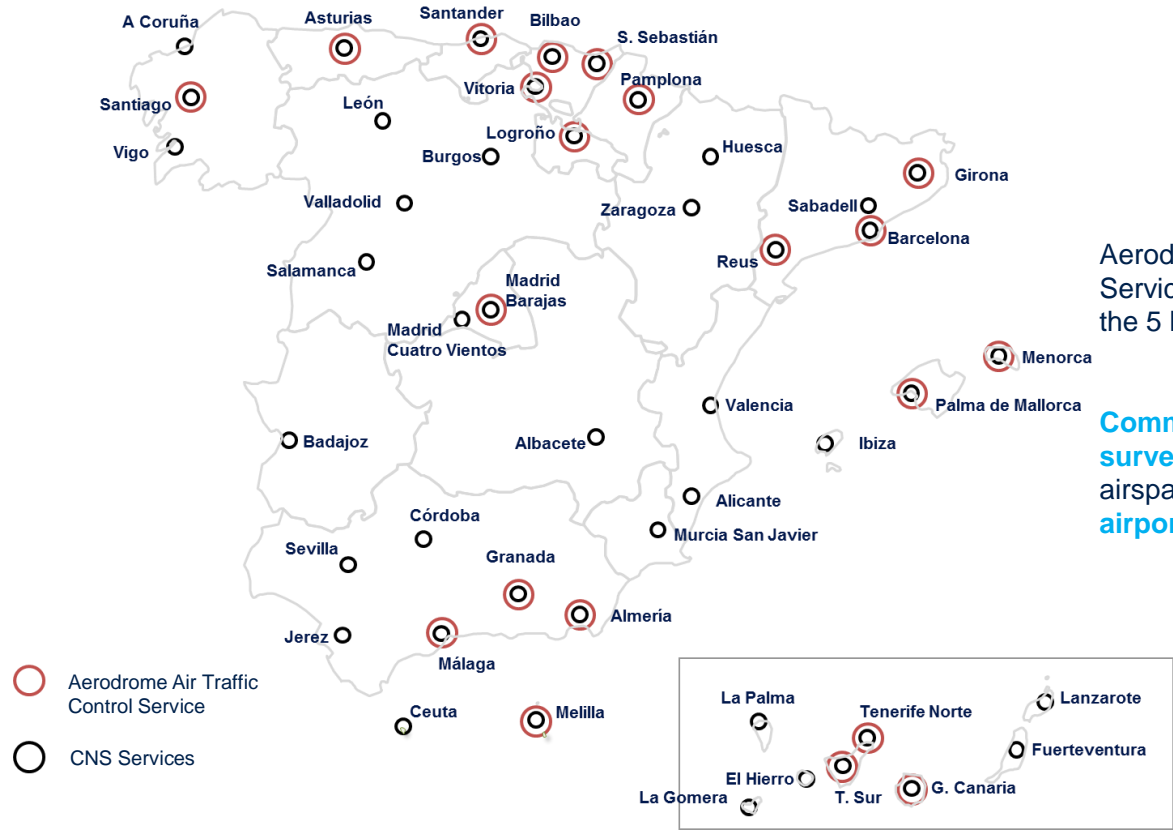
• **ENAIRE** divides its services through **5 Air Navigation Regional Directorates:**

- **Central-North** - Madrid ACC
- **East** – Barcelona ACC
- **South** - Seville ACC
- **Canaries** - Canaries ACC
- **Balearic Islands** - Palma ACC

• Also provides services through **2 terminal control centres:** Valencia and Santiago de Compostela

ACC: Area Control Center

WHO WE ARE



Aerodrome Air Traffic Control Services in **21 airports**, including the 5 busiest airports in **Spain**.

Communication, navigation and surveillance provider in Spanish airspace and Aena airports (**46 airports**).

ENAIRE's participation in EGNSS: EGNOS & GALILEO



- ❖ **ENAIRE** (formerly Aena) has been supporting since **1995** all the EU initiatives on satellite's navigation, at financial, technical and operational level, being the **first ANSP participating in the ARTES-9 Program of ESA (later EGNOS)** and being part of the EU representation in international fora to present and launch the EU GNSS initiatives.
- ❖ Strong political support from Spain to the Programme, the European Commission and the EUSPA (European Union for the Space Program Agency).
- ❖ ENAIRE was also **supporting GALILEO from the first time in 1998**, being member of the first group to define the system and, until today, participating in EU frequencies and user/system requirements working groups.
- ❖ ENAIRE was **founding member of the ESSP (European Satellite Services Provider)** which was set up in 2008.
- ❖ **More than 60 M€ have been invested by ENAIRE in EGNOS.**
- ❖ For ENAIRE, GNSS is a **Strategic Sector** to improve the quality of air navigation in Spain, for the benefit of our users, and to provide new value-added services that allow to increase investments in infrastructures, systems and engineering in Spain.

Spain and EGNOS



Spain is the country that hosts more EGNOS infrastructure in its territory:

- EGNOS Service Centre in Torrejón de Ardoz (Madrid).
- Mission Control Centre (MCC) in Torrejón de Ardoz (Madrid).
- 5 RIMS located at Santiago, La Palma, Gran Canaria, Málaga and Mallorca.

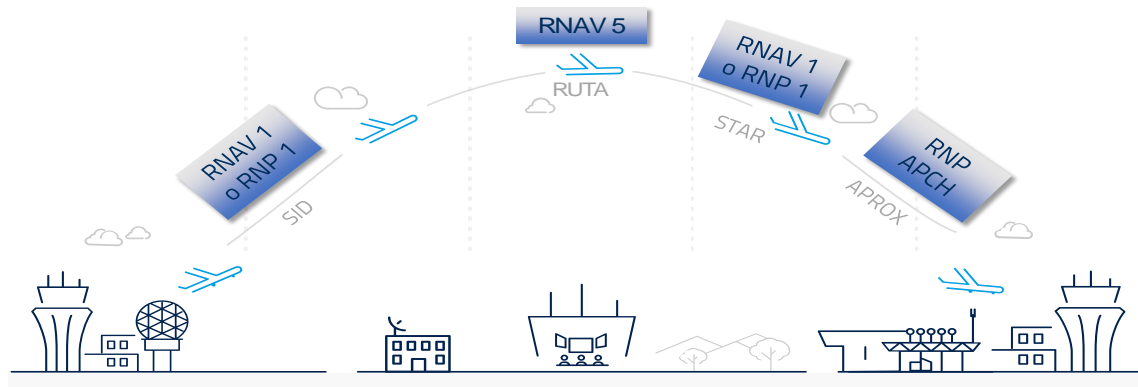
ENAIRES, as ESSP shareholder, performs operation and deployment tasks as subcontractors of the EGNOS service provider.



ENAIRE as EGNOS user



- ✎ The national PBN Implementation Plan and Strategy is focused on the compliance of PBN Regulation 1048/2018 (mandate).
- ✎ LPV or LPV 200 procedures, based on EGNOS, equivalent to CAT I, are foreseen in all European instrumental runways before 2024.
- ✎ Current limitations of performances in Canary Islands.
- ✎ Important benefits:
 - ✎ Precision approach in airports NPA.
 - ✎ Backup of ILS. Beyond 2030, ILS only for contingency.
 - ✎ Lower minima -> operational improvements for Airlines.
 - ✎ More direct, flexible and efficient routes -> Decarbonization, noise reduction and cost efficient.
- ✎ ENAIRE actively contributes to all the relevant International Groups regarding GNSS (EGNOS/Galileo/GBAS) and PBN implementation.



ENAIRES's participation in GBAS

- Málaga GBAS station second to support operational procedures in Europe (First Bremen's in 2012).
 - Operating since 2014.
 - Currently GLS CAT I to RWY 13/31. Soon to give service to RWY 12 too.
- Plans for GBAS deployment in other airports ongoing (supporting CAT II operations).
- Strong involvement in the inclusion of EGNSS in future GBAS systems together with EC and EUSPA.
- CAT II/III prototype in Barcelona's airport for data validation (GBAS GAST-F).
- Data gathering for ionospheric model development on-going in Tenerife airport.

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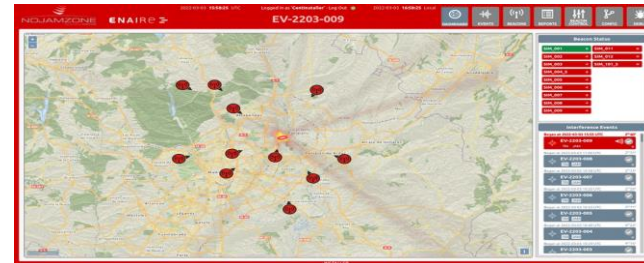


Performances and Interferences Assessment

📡 ENAIRE has its own network of receivers (RECNET) located at airports and Control Centres, as well as portable equipment for data collection and a laboratory with various tools for evaluating performances and interferences of the GNSS systems used by aviation in Spain (GPS, GBAS and EGNOS, plus Galileo).



- 📡 DYLEMA: ENAIRE solution for the detection and geo-localization of jammers and spoofers in Madrid area (20 km around Madrid Airport).
- 📡 Objectives: detect and localize asap GPS L1/L5 signal interference sources (jamming/spoofing) and proceed to notify to the telecommunication authority for shutdown.
- 📡 Next deployment in Palma de Mallorca and Barcelona with improved jamming and spoofing detection & localization capabilities.





Has worked intensively in EGNSS for more than 20 years, supporting the EC initiatives.



Is a shareholder of ESSP and contributes to operate the EGNOS infrastructure at European level.



Hosts the largest number of EGNOS facilities in the world.



Is an internationally recognized reference in the development of the GBAS program.



Has established a performance and interference network and develop monitoring tools to control GNSS data quality.



Has developed DYLEMA, an innovative system to geo-locate jammers and spoofers around the busiest airports.

Thank you!

