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National Report of IGE Spain

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Spanish GNSS Permanent Network (ERGNSS)

- The Network of GNSS Permanent Stations of Spain (ERGNSS) consists of more than 120 sites distributed throughout the national territory. 27 stations are integrated into the EPN network, and 9 stations are part of the IGS network. 40 stations are installed in Canary Island for **volcanic monitoring**.
- The IGN also operates 9 permanent stations in **Antarctica**. This year a new GNSS station has been installed in Livingston Island: **BJC100ATA**.
- All data are available via **HTTPS server** in daily (30-second rate) and hourly (1-second and 30-second rates) RINEX.
- Additionally, GNSS data from 329 stations are provided through the national **EPOS data node**.



Fig. 1. ERGNSS Network

Real Time Positioning Service (SPTR)

Service	Real-time positioning service (SPTR)
Fee	Free of charge
Accuracy	Centimeter-level
Coverage	Spain
Availability	24-hours
Source	Network of 270 GNSS stations
Origin of the stations	IGN stations (ERGNSS) and regional networks
Constellations	GNSS, GLONASS, GALILEO and BEIDOU
Solutions provided	VRS, MAC, FKP or nearest network bases and single station
Users (year 2026)	More than 20000 and increasing
Main sector	Agriculture (more than 60%)
Other key applications	Topography, Civil Engineering, UAVs or Precision navigation

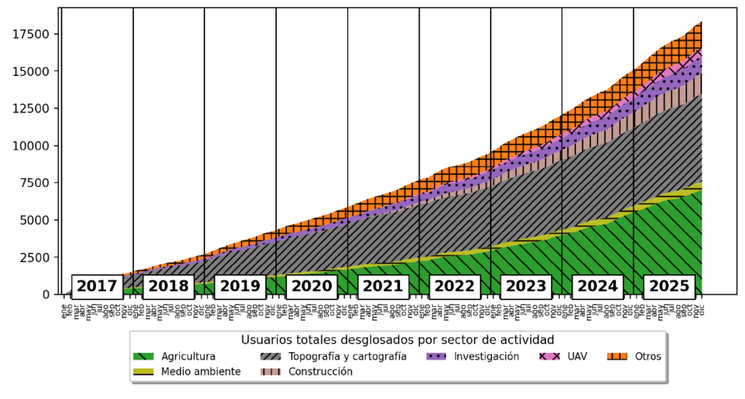


Fig. 2. Users by year

IGE GNSS Analysis Centre

- **National Projects**

➢ The **IBERRED Project** comprises the analysis of around 450 stations distributed across Spain and its surrounding regions. IBERRED main goals are geodetic and geodynamic, providing precise coordinates, time series, velocities and tropospheric data (ZTD).

➢ Last year, the **IBERRED-Repro Project** was completed: it reprocessed the entire IBERRED dataset from 2000 to now using unified models consistent with IGS repro3 and IGS20. The result is a fully harmonized solution, providing reliable regional reference frame products.

➢ **National coordinates update** of the GNSS stations in Spain by combining the solutions processed by IGE, ARA, ICGC, ITACYL. For details, see the presentation: "*Updating the Spanish national reference frame: A reprocessed ETRF2000 solution based on ITRF2020*" (Esther Azcue, IGN, Wednesday).

➢ **GNSS-IR technique** in coastal stations for sea level monitoring. It has been also applied to snow depth estimation in Antarctica.

- **International Projects**

➢ As a **Local EUREF Analysis Centre**, LAC IGE processes a subnetwork of 100 EPN stations. Since last meeting, two additional stations were added: PCAR00AND and BFST00GBR. IGE contributes to EPN by providing positions and tropospheric parameters in final (weekly and daily) and rapid (daily) solutions.

➢ The IGE has participated in EPN-Repro3.

➢ Since 2008, through the **E-GVAP Project [1]**, the AC is submitting near real-time ZTD data from approximately 400 stations across Spain and Portugal, in two different solutions.

➢ The solution of IBERRED is submitted to the **EPN-D Project**. From this year onward, the solution is being combined with two Spanish additional solutions (ARA and ICGC) with the aim of providing a unified **Iberian Solution for EPN-D** (project pilot).

IGE VLBI Analysis Centre

- Since its designation as an Official IVS Analysis Centre in 2020, IGN has routinely processed 24-hour R1, R4, and VGOS sessions using the WHERE [2] software.
- A major milestone is the historical VLBI reprocessing for the ITRF2020-u2025 solution (submitted February 2026).
- In collaboration with the University of Alicante within RAEGE project, research includes ML-based EOP prediction and data exploitation, supported by a dedicated web service (https://pred-uavac.streamlit.app/).

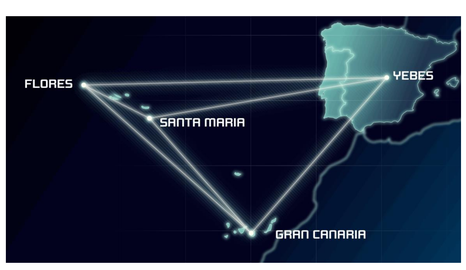




Fig. 3 (left) RAEGE (Atlantic Network of Geodynamic and Space Stations) is a Spanish–Portuguese geodetic infrastructure comprising four multi-technique observatories: Yebes (Guadalajara, Spain) and Santa Maria (Azores) currently operational, with Gran Canaria (Spain) under construction and Flores planned. The main goal is contributing to GGOS and global reference frames.

Fig. 4. (right) Foreground: RAEGYEB VGOS antenna at Yebes Observatory; background: legacy 40-m VLBI antenna.

SLR Analysis Centre

- IGN operates an ILRS Associated Analysis Centre, IGN-Yebes, which provides the centre of mass corrections for geodetic spherical satellites used by ILRS ACs and other analysts of SLR data. The centre performs QC solutions to monitor the performance of the SLR station in Yebes (Spain).
- IGN-Yebes is also involved in other projects and R&D activities. It actively participated in the **project GUEST** (Gravitational Universe Exploration with Satellite Tracking), submitted this year to the 2025 ESA's Call for F-class missions. The centre participates in discussions and plans for the Genesis mission, which will mount a retroreflector array for SLR needing range corrections to be independently computed by IGN-Yebes.



Fig. 5. SLR Station in Yebes and Green Laser Beam

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References:
[1] The EUMETNET EIG GNSS water vapour programme, egvap.dmi.dk
[2] Kirvirk A., et al. (2017): WHERE — A New Software for Geodetic Analysis, 23th EVGA Working Meeting & 18th IVS Analysis Workshop.