

## Observatorio Astronómico Nacional – Yebes

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### Abstract

This report updates the description of the OAN facilities as an IVS network station. The new 40-m radiotelescope has seen first light, and commissioning is in progress. First geodetic VLBI observations are expected in 2008.

### 1. General Information: the OAN Facilities

The Observatorio Astronómico Nacional (OAN) of Spain is a department of the Instituto Geográfico Nacional (IGN, Ministerio de Fomento) and operates a new 40 meter radiotelescope at Yebes (Guadalajara, Spain). The facility also includes an old 14-m radiotelescope, which has been a network station of the IVS, participating regularly in the geodetic VLBI campaigns until 2003, and will now be refurbished to become a tracking station for the next space radiotelescope VSOP-2.

Pictures of the radiotelescopes and of the Yebes site are available in the IVS Annual Reports for 2005 and 2006. A satellite view can be found at the URL <http://tinyurl.com/23ooly>.

Yebes is also the reference station for the Spanish GPS network. A building has been finished to hold the IGN gravimeters.

### 2. OAN Staff Working in VLBI Projects

Table 1 lists the OAN staff who are involved in VLBI studies, some of whom can be found at the telescope (CAY) address. The VLBI activities are also supported by other staff such as receiver engineers, computer managers, secretaries, and students. Moreover, we expect to contract telescope operators in 2008.

Table 1. Staff in the OAN VLBI group (Email: [vlbitech@oan.es](mailto:vlbitech@oan.es)).

Name	Background	Role	Address
Francisco Colomer	Astronomer	VLBI Project coordinator	OAN
Richard Dodson	Astronomer	Marie-Curie fellow	OAN
Susana García-Espada	Engineer	PhD student	OAN
Jesús Gómez–González	Astronomer	General Subdirector for Astronomy, Geodesy and Geophysics	IGN
José Antonio López–Fernández	Engineer	CAY site manager	CAY
Maria Rioja	Astronomer	Scientist (Astrometry)	OAN
Pablo de Vicente	Astronomer	VLBI Technical coordinator	CAY



Figure 1. Photograph of the new X-band receiver, to be installed at the new 40-m radiotelescope.



Figure 2. Photograph of the new S/C/CH-bands receiver, installed at the new 40-m radiotelescope cabin.

Table 2. Characteristics of the Yebes 40-m geodetic VLBI station.

Parameter	Value	DAR	VLBA4 (14) + VSI-C
Diameter	40 meter	Recorder	Mark 5B
Receivers	2 - 115 GHz	H-maser	KVARTZ CH-1
S/X $T_{\text{sys}}$	100 K	GPS	TrueTime XL-DC
S/X SEFD expected	420 Jy	Weather station	SEAC-EMC

### 3. Status of the Geodetic VLBI Activities at OAN

The most important developments have been the construction of the S/X band receivers for the 40-m radiotelescope (see Figures 1 and 2), as well as its commissioning and setup for VLBI. All relevant equipment is already available at the Yebes site (e.g., VLBA4/VSI DAR, Mark 5B recorder, H-maser, GPS receiver, weather station).

Thanks to a fruitful cooperation with the geodesy group at Onsala Space Observatory (Sweden), we have re-analyzed the geodetic VLBI data of all campaigns where the old 14-m radiotelescope at Yebes has participated using the best available a priori geophysical models. We compared in particular the time series of station coordinates with the results from an analysis of the Yebes GPS data. This work is part of the PhD thesis of Susana García-Espada and, together with planned local-tie measurements, is of major importance for the combination of the historic VLBI observations performed with the 14-m radio telescope and the future observations with the new 40-m radio telescope.

### 4. Future Plans

The construction of a new building for the installation of permanent equipment for constant gravity monitoring (FG5–number 211, and A-10–006 absolute gravimeters) is finished (see Figure 3). The construction of a network of concrete pillars around the 40-m radiotelescope to measure its reference point and its local-tie to the old 14-m radiotelescope is delayed and will be performed in 2008. Moreover, the Yebes site will get connected to GÉANT at a rate of 1 Gbps thanks to the EC project EXPreS.

### References

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Figure 3. Building at Yebes which will hold the gravimeters.

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