

# OAN - Yebes station report

## Jodrell Bank TOG meeting 26 June 2019

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### **1 VLBI Equipment**

Details of the equipment used in EVN observations:

- DBBC2
  - 4 CoMo boards (Unica 4).
  - 4 ADB2.
  - 4 Core2.
  - Internal Fila10G.
  - Software available:
    - DDC:
      - v105\_1 (June 10 2015). This firmware is used with channel bandwidth narrower than 16 MHz.
      - v107 (January 29 2019). This firmware is used with 16 MHz channel bandwidth or wider. Narrower bandwidths produce bad filter shapes and low power detected.
    - PFB:
      - v16\_2 (October 13 2017).
    - Fila10G:
      - fila10g\_v4\_1 (reported as 2.8.0, October 20 2017).
- Flexbuffs
  - flexastro:
    - 36 disks of 6 TB capacity. Total capacity of 216 TB
    - Software version: jive5ab : 2.9.0 : 64bit : dev : flexastro : 17-oct-2018
  - flexbuff:
    - 36 disks of 10 TB capacity. Total capacity of 360 TB
    - Still not in production.
- We use a Harrobox running Debian Jessie (8.2) as a proxy between the FS and the DBBC to allow concurrent connections to DBBC2. JIVE correlator uses this feature to control the flow of data from the Fila10G when doing eVLBI. This host is in the public LAN but allows connections from the private LAN.

At present time RT40m's spare DBBC2 is on lend to Santa María station in Azores. The DBBC3 is being repaired at Bonn. A second Flexbuff system with 144 TB of capacity (36 disks of 4 TB each) mainly used for non-EVN experiments is available, as well as a Mark5B+ which is not presently used.

## **2 Field System**

We presently run three FS computers:

- RT40m: FS version 9.13.1-rc2 on Debian 7.11 Wheezy, kernel 3.2.0-6-686-pae.<sup>1</sup>
- RT13.2m: FS version 9.12.11 on Debian Jessie 8.10, kernel 3.16.0-4-686-pa.
- A test computer which can be connected to any of the non-used backends. Debian Jessie and FS 9.11.19

## **3 EVN observations**

These are the statistics of Yebes participation in the EVN during 2019 so far:

EVN session 2019-1:

- S/X band: 7/7 successfully observed.
- M band: 1/1 successfully observed. 3 scans lost from 1 observation.
- C band: 12/12 successful observations. One observation with minor failures due to DBBC error.
- K band: 5/5 successful

EVN session 2019-2:

- M band: 2/2 successful.
- C band: 6/6 successful.
- X: 4/4 successful.
- K: 3/3 successful.

## **4 Other VLBI observations**

We regularly run several VLBI programs at Yebes: EVN, IVS (geodetic observations) and GMVA (Global millimeter VLBI). The telescope is managed by operators during approximately 80% of the time. The rest of the time operations are done in an unattended and automatic way.

## **5 Continuous calibration**

Continuous calibration mode (80 Hz applied to a noise diode) works in C, X and K bands.

## **6 Disk purchases**

36 disks of 10 TB were purchased by the end of 2018, as well as a new flexbuff machine with six 10 GBASE-SR network interfaces, to potentially record higher bit rates.

## **7 Spares**

14 BBCs are available from the VLBA terminal decommissioned on 2014. 3 of them are faulty. We also have some IO Mark5B+ boards and some main boards for the Mark5B+.

We have lent temporarily one Fila10G unit to Torun.

<sup>1</sup> 2019 Session I and Session II were observed using FS-9.13.1-rc1.

## **8 Gigabit connection**

Yebes is connected to RedIris, the spanish NREN using a 10 Gb/s dark fiber since May 2012. In 2017 we introduced an Aruba-3810M 10G switch to interconnect all Gigabit systems in the backend room that eliminated the necessity of plug/unplug some of the fibers when switching between recorders.

## **9 40m radiotelescope**

Two new receivers were built to replace the old existing W-band and Q band receiver. They were commissioned during January 2019. Both use linear polarized feeds although a quarter-wavelength plate is available for both receivers to get circular excitation. They are installed in the Nasmyth cabin, in the high-frequency light path (K, Q and W band receivers, all of them can be used simultaneously). The frequency ranges available for VLBI operations are 85-87 GHz and 42-44 GHz with 2 GHz instantaneous bandwidth.

## **10 13.2 m radiotelescope**

The 13.2m radiotelescope is participating in the EurVGOS project, running observations a few hours in advance to the regular VGOS runs. The telescope is currently equipped with 4 RDBEGs and a Mark6 with expansion chassis, but will be upgraded with R2DBE backends this year.

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