

# **OAN - Yebes station report** **Bonn [virtual] TOG meeting 5 May 2020**

- 1 . VLBI Equipment
- 2 . Field System
- 3 . EVN observations
- 4 . Other VLBI observations
- 5 . Continuous calibration
- 6 . Disk purchases
- 7 . Spares
- 8 . Gigabit connection
- 9 . 40m radiotelescope
- 10 . 13.2 m radiotelescope
- 11 . Developments
- 12 . Future Plans

## **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 4 MHz.
      - v107 (beta 4)(June 7 2019). This firmware is used with 4 MHz channel bandwidth or wider.
    - PFB (hardly ever used):
      - v16\_2 (October 13 2017).
    - Fila10G:
      - fila10g\_v4\_1 (reported as 2.8.0, October 20 2017).
- Flexbuffs
  - flexastro:
    - 36 disks of 10 TB capacity. Total capacity of 360 TB
    - Software version: jive5ab : 2.9.0 : 64bit : dev : flexastro
  - flexbuff:
    - 36 disks of 6 TB capacity. Total capacity of 216 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. A third Flexbuff system with 144 TB of capacity (36 disks of 4 TB each) is available, as well as a Mark5B+ which is not presently used.

Last year the DBBC3 was repaired at Bonn and equipped with a bigger power source to handle the current requirements of new firmwares.

## 2 Field System

We presently run three FS computers:

- RT40m: FS version 9.13.2 on Debian 7.11 Wheezy, kernel 3.2.0-6-686-pae
- 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 since last TOG:

EVN session 2019-3:

<b>Band</b>	<b>Scheduled</b>	<b>Success</b>	<b>Failure</b>	<b>Minor failure</b>	<b>Notes</b>
S/X	4	4	0	0	
M	7	7	0	0	
C	9	8	1	0	Aborted*
K	4	3	1	0	Aborted*

\* observation was aborted because of rain. Broken vertex membrane.

EVN session 2020-1:

<b>Band</b>	<b>Scheduled</b>	<b>Success</b>	<b>Failure</b>	<b>Minor failure</b>	<b>Notes</b>
S/X	5	5	0	0	
M	4	4	0	0	
C	11	10	0	1	tracking
K	5	3	1	1	Noise diode
Q	2	2	0	0	

EVN Out-of-Session:

<b>Type</b>	<b>Scheduled</b>	<b>Success</b>	<b>Failure</b>	<b>Minor failure</b>	<b>Notes</b>
OoS	5	5	0	0	
ToO	4	4	0	0	
eVLBI	4	3	1	0	Aborted after 30% due to severe storm

#### **4 Other VLBI observations**

We regularly run several VLBI programs at Yebes: EVN, IVS (geodetic observations), GMVA (Global millimeter VLBI), and Radioastron observations. Since June 2011 the telescope is managed by operators during 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**

Last disk purchase on 2019, 60 TB to reach 360 TB of storage space at the station.

#### **7 Spares**

We have one Fila10G-SA, one DBBC and one Mark5-B+ spares.

#### **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 a new 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**

Minor upgrades in the Q band receiver to reduce the bandpass ripple.

#### **10 13.2 m radiotelescope**

The 13.2m radiotelescope has been taking part in VGOS test observations since April 2016. Current observations with 4 RDBEGs + 1 Mark6 are 24 hour long and are performed every 2 weeks. Working under nominal condition.

#### **11 Developments**

The conceptual design stage of a new C-M-X broadband receiver has started. The preliminary requirements are:

- Frequency range: [4.5 – 9 GHz]
- Feeds: 1
- Polarization: LHCP, RHCP
- Cross-polar rejection: better than 20 dB
- Noise temperature: better than 20 K
- Gain calibration: Noise diode

## **12 Future Plans**

Storage space: Purchase of new servers has been considered, to be done within the next two years. This includes a new 432 TB flexbuff type recorder and its counterpart to be provided to JIVE.

Backends: There is a plan to upgrade the DBBC3-2L-2H to a DBB3-6L-6H. Such a system could digest four different IF bands spanning from 0 to 4 GHz each. This is a milestone for the W/Q/K simultaneous observing project.

**Note**: Due to the COVID-19 situation there is a budget suspension for purchases. It is not known at this time which will be the final budget restrictions for this year.

Javier González García

23/04/2020