OAN - Yebes station report – April 2013

VLBI Equipment

No changes in the Mark 5B and the VLBA terminal. Some months ago the Mark5B motherboard stopped working and we bought 3 spares. The original board had two micros. Currently the new board only works with one micro since running with two of them caused problems.

Two ADB boards were sent to MPIfR to be checked and repaired. In the mean time the DBBC worked with 2 COREs. Since January 2013 the DBBC already has 4 COREs mounted and working.

A Fila10G standalone module was ordered to HAT-Lab in December 2012. The equipment has not been received at Yebes yet.

Since June 2012, and as part of the 4 Gb/s experiment, JIVE sent a Harrobox and Mark5C. The latter is used regularly (see below).

We are currently investigating how radiometry in the DBBC compares with the VLBA terminal one.

Field System

The current Field System version is 9.11.2 on a Debian Lenny host. We have also installed a second Field System (9.11.2) on a Debian Squeeze host. The latter allows to manage the Mark5C and DBBC when the VLBA/Mark5B+ is is in usage.

VLBI observations

We 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.

Since last year no significative changes have been performed in the current receivers: S band, C band, X band, 22 GHz and 86 GHz. Small operations were done in the C band and 22 GHz receivers.

Gigabit connection

Yebes is connected to RedIris, the spanish NREN using a 10 Gb/s dark fiber since May 2012. The fiber has been working successfully since then.

VLBI data transfer

We regularly send geodetic experiments via the Gb line to MPIfR correlator and Washington correlator using fuseMk5 and tsunami. We also transfer VLBI data to Moscow using scp and a server where we store our Radioastron data.

In order to avoid “blocking” our Mark5B we often use the Mark5C for data transfer. We have learnt that non real eVLBI requires a second terminal or an equivalent device that acts as buffer and does not prevent the usage of the main recorder for observations.

40m radiotelescope

The 40m antenna suffers a seasonal and an elevation dependent astigmatism which affects observations at 87 GHz. This effect is small at lower frequencies. The problem is described in report IT-OAN 2012-20 . Currently we are finishing another report with the latest measurements performed. In the future new works will be carried on after a set of temperature sensors are installed in the reflector structure.

A campaign of observations at all available bands (and selected frequencies) was performed to optimize the lateral position of the feeds in the nasmyth cabin. This required a new set of focus positions (X, Y, Z and tilts) and new pointing models.

A switch matrix which allows to remotely select between four receivers (c band, 22 GHz, 45 GHz and 87 GHz) was installed 1 year ago and it is regularly operated since then. Observations at S and X band still require manual cable switching. (Report IT-OAN 2012-8)

The Nasmyth mirror system which allows to direct radiation to the receiver in use is managed remotely from the control system (Report IT OAN 2012-7). This means that switching between the four receivers mentioned above is done in an automatic way and takes about 1 minute.

Pseudocontinuum observations using an FFTS spectrometer are been regularly used since September 2012 for methanol masers (6 GHz), water masers (22 GHz) and SiO masers (86 GHz). These observations are specially useful for pointing, focus and determination of gain under bad weather conditions. Furthermore they provide a high dynamic range. See reports IT-OAN 2012-3 and IT-OAN-2013-01

Since Yebes lacks a water vapour radiometer we rely on local weather parameters to determine the opacity of the atmosphere. Recently we have used data from balloons released daily from Madrid airport (50 km away) to determine the scale of water vapour in the atmosphere (report IT-OAN 2012-18). As a result some corrections were applied to optimize the computation of the atmoshperic opacity.

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