Station report to the EVN TOG 2017.05.22-23.

Irbene station, Ventspils.

Irbene Ir – RT-32 radio telescope.

RT-32 successfully participated in the EVN October – November (2016) session in L, C, M, X bands.

In November 2016 RT-32 successfully participated in the eVLBI run at 2 Gbps.

Additionally, thanks to IVS team and especially Leonid Petrov and Alessandra Bertarini, RT-32 participated in IVS sessions and using only X band receiver, after third attempt Irbene team manages to setup antenna configuration correctly. This allows get fringes with other stations and improve RT-32 coordinates by 26 m.

Beginning with December 2016 radio telescope RT-32 refurbishment efforts were continued. Telescope is down until May 2017 and missed EVN February – March session in 2017.

Irbene Ib – RT-16 radio telescope.

Since December 2016 all observations was shifted to RT-16, including EVN observations.

RT-16 participated in several observations at L, C, M and X bands in EVN 2017 February – March session. From January 2017 RT-16 participated in the e-VLBI runs and target-of-opportunity observations at 2 Gbps. From December 2016 RT-16 is participating in C and L band RadioAstron observations.

During the beginning of 2017 the pointing model for all frequencies of both antennas was greatly improved and included in FS. Efforts related to automatic antenna log files delivery to EVN ftp server were finished. Also stability of control system and related software modules were improved. Meteo station and phase cal units are connected to FS now.

First DPFU curve was obtained for RT-16 C band using acquire and gnplt, but further measurements mus be carried for L, M and X bands. Custom made two channel total power meter was integrated in FS, to allow use of onoff and fiveptp with larger measurement bandwidth and reduced rms of measurements. It should be mentioned that Tcal vs Freq. still needs to be hot-cold calibrated, only Tcal ratio have been improved. RT-32 pointing model and gain curve still not updated, due to antenna unavailability during first quarter of 2017.

Three Flexbuff servers are available for both antennas; the 1st Flexbuff (8TB) is a local server at VIRAC, the 2nd and 3rd Flexbuffs (20 and 10 TB) are virtual machines on cloud of University of Latvia (LU), Riga, with 10 Gb/s link to VIRAC.

Currently main activities are focused on:
- Improving RT-32 pointing model and gain curve measurements in all subbands.
- RT-32 primary and secondary mirror adjusting and improvement of antenna efficiently (for this moment RT-32 efficiency still less than 40%)
- Improving stability and quality of observations.
- RFI monitoring station configuration;
- Preparation for 4 Gbps eVLBI observations.
- Implementation of continuous calibration in C band system.
- Antena beam maps (not clear what is required format)

VLBI equipment status:

RT-32:

Field System: 9.11.19
DBBC: 4xADB3L, Internal Fila10g, DDC v106/v106E, PFB v16_120517 (not stable yet)
Mark5c + Glapper, jive5ab : 2.7.1 64bit, AMAZON,10GbE

RT-16:
Field System: 9.11.8,
DBBC: 4xADB2, External Fila10g (only one VSI connection right now), DDC v105_1/v105E_1
Mark5c + Glapper (large packet loss (missing bytes), sent to Bonn for repair), jive5ab : 2.7.1
64bit, AMAZON,10GbE

Flexbuffs:
1. Capacity: 8 TB, jive5ab : 2.8.0 64bit
2. Capacity: 20 TB, jive5ab : 2.8.0 64bit
3. Capacity: 10 TB, jive5ab : 2.8.0 64bit

All backends are ready for VDIF format

DBBC issues.
During 2017, it was found that new DBBC (ADB3L) have instability issues, which causes
DBBC to crash if BBC AGC is turned on. After remote debugging together with Gino, it was
concluded to send whole DBBC to Bonn for further debug/repair. It was found that there is
bug/incompatibility of firmware DDC v105/v105E with ADB3L. New firmware DDC
v106/v106E was developed which solved the AGC issue. But PFB mode is still not stable (it was
not tested very much, only before May 10, 2017 4 Gbps test) with automatic threshold on (Bug
in communication on the PCI bus). Special PFB v16_120517 was provided recently, but after
first short tests it seems that it still does not solve the issue. Further work is needed. Old DBBC
works (showed fringes in all tests during 2017), but one CORE2 board shows increased
Tsys/non-linearity.

4 Gbps notes
Recently (May 10, 2017) RT-16 participated in 4 Gbps eVLBI fringe test FR041 for the first
time. For that, PFB mode configuration was tested. It was necessary to upgrade FS to 9.11.19
and use workaround (setting automatic threshold off) for DBBC PFB firmware to be stable.
However, test was successful and first 4 Gbps fringes were obtained. Data to Jive was
successfully transferred via lightpath.