Metsähovi Radio Observatory

EVN station report II/2023

1) EVN sessions in 2023

Aalto University Metsähovi Radio Observatory (MRO) participated in the EVN Session III in the K band (although some K-band experiments were beyond our frequency capability), as well as two EVN Target-of-Opportunity-sessions:

- RG013E (04/02; X-band)
- RA006 (16/02; K-band)

We were not able to participate the EVN Session II due to personnel shortage.

MRO also participated in two GMVA sessions and two ad hoc global 3mm sessions in 2023.

2) Personnel changes

After VLBI-related personnel changes in spring 2023 the MRO technical crew is again full and we continue operations normally. The staff was joined by Dr. **Derek McKay**, who now works as the VLBI friend and EVN TOG representative and shares the session management by Dr. **Tuomas Savolainen**, and Mr. **Christian Malino**, whose main tasks as the main RF engineer is to participate in the receiver maintenance.

3) Receiver status

The following VLBI receivers are currently operational at MRO: 2/8, 22, 43 and 86 GHz. However, 2 GHz is not offered at the moment, since it requires change of the sub-reflector and that is not feasible currently. Remotely-adjustable sub-reflector steering system is under final phases of development, with installation and testing expected by mid-2024.

A new wide-band, triple-band receiver working at K-, Q- and W-bands was ordered from the MPIfR electronics division in March 2023; the new receiver is expected to be operational in 2026.

4) DBBC status

The dBBC2 has been working without major problems and it has been used successfully in all VLBI sessions. The dBBC3 commissioning has been delayed due to personnel resource challenges, and is currently expected to happen in the latter half of 2024. In the dBBC3 commissioning, we are collaborating with the Finnish Geospatial Research Institute (FGI), who will in the future carry out IVS VLBI sessions with their VGOS antenna very close to the MRO, with the aim of utilizing synergies in having two dBBC3 and other VLBI equipment in the same area.

5) Flexbuff and Mark5B+

MRO has three Flexbuffs (watt, luckyluke and rintintin) with a total capacity of 1368 TB. All astronomical VLBI sessions use Flexbuff as a recorder. Because MRO does not participate in IVS sessions anymore (the FGI will use their VGOS telescope for those in the future), the Mark5B+ unit is kept mainly as a back-up recorder.

6) Software versions

We are using FS 9.13.2, SDK 9.4 and jive5ab 2.8.1. We have also been using DBBC firmware versions DDC v107_281019 in the past sessions. In addition, FILA10G version v3.3.2_1 is in use. FS upgrade is scheduled for near future.

7) Other issues

Our broken hydrogen maser remains unfixed, and the two older ones cannot be maintained/refilled, due to the Russian component and service unavailability. Our attempts to find company or service provider able to refill the Russian-made hydrogen units have not been successful. We are in the process of purchasing a new maser, but expect the long delivery times to cause problems to future VLBI operations.