June 18, 2024

Effelsberg Station Report

General Status

After the eVLBI run in June 2024 the main axis control system of the 100m Effelsberg antenna will be replaced. The work will last at least 8 weeks and starts on June 24th. The antenna will be stowed and secured and there will be no observations in July and August 2024. The old electronics and VME computers will be removed and a new modern antenna control unit (ACU) will be installed. A test and commissioning period should start in early September and after verification regular observations are supposed to start again in October 2024.
If any delays due to unexpected problems occur during the installation and testing phase that might affect our participation in EVN observations in autumn 2024 we'll communicate this to the EVN scheduler.

Past Sessions

Since the last report Effelsberg has participated in all observations of EVN Session 1 and Session 2, 2024. Effelsberg has also participated in all of the e-EVN sessions and out-of-session observations. Most of the observations were successful, no observation failed completely, but several had minor failures. Due to network problems at Effelsberg during the eVLBI observations in December 2023 the data had to be recorded and correlated later after the connection was back. Ef recorded the data locally and all other stations were recorded at JIVE. During EVN Session 1 2024, the X-band NME, N24X1, suffered from high wind and some tracking problems occurred during EV026C and EM164H, where the antenna stayed on one source and did not follow the schedule any more. During several 18cm observations the phasecal was turned on, although it was supposed to be off. This was caused by a failure of the phasecal switch box. The classical 6cm C-band receiver broke shortly before the session start. All 5 GHz observations were observed with the C/X wide band receiver (4-9.3 GHz), which is usually no problem. However, the receiver provides only linear polarization and observations need to be converted using polConvert after correlation.
No observations was missed or failed in Session 2 2024.

Current Equipment Status

Effelsberg uses the DBBC2, Fila10G and a Mark6 recorder for all EVN, global, GMVA, and geodetic VLBI observations. Most of the recorded data is e-transferred to the correlators in JIVE and Bonn. In addition there are two NRAO RDBEs connected to one of the Mark6 recorders that are used for observations with the VLBA and HSA.
During the last month the Field System PC has been upgraded to a more modern operating system and installed with the newest Field System 10.1.0 that allows to program and control the DBBC3. The two Mark6 recorders currently provide about 390 TB of disk space and are mounted as Flexbuff mount points. One slot is currently kept for modules that can be shipped. This is required because data from VLBA+Eb and HSA observations that are being correlated in Socorro are still being shipped.
The Effelsberg Flexbuff storage at JIVE has about 509 TB.

Technical Developments

The full integration of the DBBC3 in the VLBI observing system is still to be done.
At the same time the project to digitize the direct RF signals of most receivers at the Effelsberg is continued. Until now the general GPU backend can perform polarimetric, spectroscopy, and pulsar measurements. A digital down conversion software for VLBI is in development. Successful zero-baseline test have been performed and also a real fringe-test between Medicina, Yebes, Effelsberg

and the MPI SKA prototype dish in South Africa has been performed with the new universal software backend. After the main axis control system upgrade in Summer a fringe-test with the new backend within the EVN might be useful. Currently available receivers that have direct digitalization implemented are the L-band receiver from 1.26-1.51 GHz, the wide-band receiver from 4-9 GHz, and an ultra wide band receiver from 1.4 to 6 GHz.
The BRAND receiver has been assembled and has been recently installed in the antenna. First on sky test have been performed on June 12 and 13, 2024. The results are still being analyzed, but the performance was good and the receiver had successful first light. A fringe-test with Mc, On, and Ys at C-band has been performed on June 13 as well. Correlation at the Bonn correlator is ongoing.