August 18, 2025

Effelsberg Station Report

General Status

Effelsberg stopped observations for several month after the eVLBI run in June 2024. The reason was the replacement of the main axis control system of the 100m Effelsberg antenna. The old electronics and VME computers were removed and a new modern antenna control unit (ACU) has been installed during July and August 2024. Originally, it was planned to start commissioning of the new system in September 2024 and after verification regular observations were supposed to start again in October 2024.
Unfortunately, the final installation steps and also commissioning and software adaptions to the new system took much longer than expected and regular operation started only in February 2025. By now, the project is still not finished and final adaptions to the encoder mounting is needed to recover the previous high pointing accuracy of 2-3 arcsec. We hope we can finally close the contract within autumn this year.

Past Sessions

Since the last report Effelsberg has missed EVN Session 3 2024 and all eVLBI Sessions until February 2025. EVN Session 1 and Session 2, 2025 have been observed again and we have also participated in all e-EVN Sessions and out-of-session observations after February 2025.
Specially during Session 1 2025 Effelsberg was still limited by some remaining software issues and a reduced pointing accuracy. Many observations were successful but a few had some issues as well. The first 5 observations (N25L1, EB104A, EB104B, EB104C, and EH046A) had problems with tracking, were some source changes have been missed. N25K1 was difficult because of the small beam at K-band and pointing issues. Has probably affected GC040B as well, but not much pointing checks were done during observations. Cable wrap commands were not preformed as commanded. Some long slews were the consequence. EY049, EY045A, EG131H, ES116A, EF033C, and EN016C were not observed at all, because of a failure in the new ACU.

Session 2 2025, however, was better and most observations went fine. There was particular bad weather and rain during K-band observations (bad luck) and N25C2 could not be observed because of thunderstorms. The rest of the session was successful.

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. Also the data taken for VLBA+Eb and HSA observations that are being correlated in Socorro are now being e-transferred.
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 tested in the antenna in June 2024. The digital backend is almost finished and new tests will follow within this year.