

Effelsberg Station Report

General Information

Since the last report, Effelsberg has participated in EVN session III 2019 and session I 2020 and all of the e-EVN sessions. Most of the observations were successful. Some observations were not observed or had to be stopped in between because of weather (snow, high winds, or thunderstorms).

In session III 2019 Ef had some trouble with the new V107 firmware and changes between geo mode and astro mode (affected only the SX NME experiment). The calibration of the DBBC changes when changing the mode. EK046B suffered from a wrong attenuation setting on the frontend which was not noticed by the operator, which will likely cause a lower SNR. In session I 2020 the weather was bad for a lot of the time. High wind and snow fall caused stops of a few hours in several observations. EC070I could not be observed at all. The problem with the changing calibration between geo and astro mode persists.

Current 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. Mark6 modules to Socorro are still being shipped.

The two Mark6 recorders currently provide about 340 TB of disk space in a raid configuration and are mounted as flexbuff mount points. Two slots are currently kept for modules that can be shipped. At least one slot is required because VLBA+Eb and HSA observations that are being correlated in Socorro are now recorded on Mark6 as well. The Mark5C recorder is no longer used.

Technical Developments

Plans for a direct digitalization of the RF signals from the receivers in Effelsberg are becoming more concrete. The same digitizers that are used for Meerkat digitize up to 3 GHz at the receiver and the full band at 12 or 14 bit is streamed over 40 Gbps Ethernet using the Speed protocol to the software backend.

The digital lab is developing a software backend on a GPU cluster. It currently supports single dish continuum, spectroscopy, and pulsar observations. A basic support for VLBI VDIF is implemented and first zero baseline test to the DBBC yielded fringes. However the GPU backend only samples the whole RF band and writes out a single channel of 1536 MHz or decimations of that by factors of two, 768 MHz or 384 MHz... Those bands do not match the traditional VLBI band with 2^x and will cause some overhead and require zoom correlation. Not a practical solution.

An alternative solution would be to convert the Speed protocol stream to a full band VDIF 8 bit stream as it is used for the BRAND receiver and feed that into a DBBC3. Discussion about the further strategy continue as well as the development of the digitalization. There are currently two receiver that provide the digitized signals, the 21cm (1.29 to 1.51 GHz) and the prime focus wide band receiver 1-3.5 GHz. Once the system is established it is planned to digitize more and more of the Effelsberg receivers, but this is not likely to happen within a short time. There is currently no need to change anything for the traditional Effelsberg VLBI operation, but it will affect us at some point.