Recommendations for scheduling Effelsberg in VLBI observations

A general guide line for EVN or global VLBI observer is provided by the EVN User Guide. The information given here is meant as a summary of the capabilities and restrictions regarding the use of the Effelsberg antenna in any VLBI array.

- There are two new digital VLBI systems installed at Effelsberg
  - **A DBBC with a Mark5B+ disk recorder**. In digital down converter mode (DDC) it provides 8 tunable base band converters (BBCs) with upper (USB) and lower side band (LSB) at bandwidth of 1 to 16 MHz. The recording rate depends on the number of selected base band channels, the maximum data rate is 1024 Mbps using 16x16 MHz channels. The DBBC can be also operated in a poly-phase filter bank mode (PFB) that provides 16 or 32 BB channels at fixed frequencies (8/16 dual or 16/32 single pol. of 32 MHz bandwidth) and a recording rate of 2048 or 4096 Mbps. It is recommended to use the DBBC for any EVN, global VLBI, and geo observations that are correlated in Bonn or JIVE. Projects that are correlated in Socorro might want to use the RDBE instead, however also DBBC data can be correlated at Socorro. The SCHED station code is EFLSBERG.
  - **The NRAOs RDBE with a Mark5C disk recorder**. It can be used in a poly-phase filter bank mode (PFB) that provides 16 BB channels at fixed frequencies (8 dual or 16 single pol. of 32 MHz bandwidth) and a recording rate of 2048 Mbps. There is also a digital down converter mode (DDC) available that provides either 4 or 8 tunable base band channels at variable bandwidth between 1 and 128 MHz and corresponding recording rates. The maximum recording rate is 2 Gbps (4x128 MHz or 8x64MHz). The BB channels can be either LSB or USB. The SCHED station code is EB_RDBE. More details on the RDBE modes and scheduling of EB+VLBA and HSA observations can be found on the Wiki pages below and the NRAO proposal web page and the HSA web page.
- Since the resolution of the Effelsberg antenna is higher than that of the usual VLBI antennas it is recommended to introduce same gaps for pointing checks in the schedule at least for frequencies of 5 GHz and higher. Gaps of 6-8 minutes on a bright source should be sufficient for a pointing. If the VLBI source itself isn't bright enough 10 minutes are better to allow for a source change.
  At 6cm and 3.6cm a pointing every 4 hours is sufficient, at shorter wavelength a gap every 2 hours is recommended.
- Driving speeds of 25 deg/min in azimuth and 15 deg/min in elevation are the usual settings in the station catalogue from SCHED and produce realistic results.
- Effelsberg has a high frequency agility for its secondary focus receivers. This includes the 6cm, 3.6cm, S/X, 2cm, 1.3cm, and 7mm receivers. Switching between those takes less than 40 seconds. The 92/50cm, 18/21cm, 5cm and 3mm receivers are located in the prime focus and cannot be changed within a single VLBI project. For more details about receivers: Receivers for the Effelsberg 100-m Telescope
- All receivers can be used with both digital backends. Most receivers provide phase-calibration signals at 1 MHz separation, only the 92/50cm and 5cm don't have phase-cal units.
- VLBI Friend at Effelsberg is Uwe Bach (ubach at mpifr.de).