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Effelsberg, den 15.05.2017

An:
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Report on the first installation of the PAF frontend in the 100m Telescope.

Installation procedure:

On Friday May 5 2017 we installed and connected the PAF frontend (FE) in the focus of the Effelsberg 100m radio telescope. We started at 7:00h with the installation of the PAF adapter box which was finished at 8:00h without any problems. At 8:00h we started with the installation of the frontend itself. We were 8 persons in total; 4 of the systems group, 2 of the electrical group and 2 of the mechanical group. Four colleagues, two of the systems group and two of the mechanical group, handled the FE in the Apex of the mirror to shift it from the external to the internal focus crane. We did not need to place FE on the mirror surface to change crane hooks, this is easily done 'on air'. The elevation of 88° turned out to be too much as we had to deploy quite some force to balance the FE in an appropriate position.

The colleagues of the electrical group installed the Keysight DC-supply and a power distributor for 2 x 400V/16A connectors for the Keysight TEC DC-supply and the fan in the focus cabin. For 240V in total 3 connectors are needed; the FE-DC supply, the X310 controller and a small Ethernet switch for X310 and Keysight control. The colleagues also helped us with the optical and DC cable wiring in the focus cabin. Two of our colleagues were busy in the receiver tube with fixing the frontend, handling the optical and DC cables and installing the TEC cables. Although we prepared all cables well by wrapping them up on top of the FE we were not able to unwrap the cables completely and store the rest in the focus cabin. Instead we had to leave most of the optical cable length on the FE which is no problem as the cables are far too long for our installation geometry.

Mechanical installation including cable wiring and fixing was finished after 3.5h, cleaning the MTP connectors and connect TEC and DC for the whole system was done in 0.5h.

Demounting procedure:

On Friday, May 12 we removed the PAF Frontend from the telescope again. We started at 7:30h and finished at about 9:00h. After disconnecting all the cables and fibers we attached them to the chain of the cabin crane as we could not wrap them up on the frontend as we did during the installation. This went quite well although we had to fiddle the cable wraps hanging over another at the crane chain through the bottom of the adapter box. Having lowered the FE down to the Apex the cables had to be wrapped up on the frontend again for getting it down to earth via the outer crane.

On Monday morning we took the adapter box out off the telescope which took another half an hour. In total the effort to demount the PAF is 2.5h with 5 persons, 3 in the focus and 2 at the Apex.

Lessons learned:

The minimum manpower needed for future PAF installations is 6 persons; 3 in the focus and in the apex each. The time needed is 4h.

For changing cranes an appropriate elevation angle has to be found (we estimate ~84°) to avoid stabilization of the FE by ropes which have to be fixed and dismantled on the right time.

To reduce this effort we suggest to equip the PAF FE with a new patch board accessible through the adapter box from inside the focus cabin. By that the cables will stay connected in the focus cabin and the only interface is at this patch board. All disconnectable connectors are thus reachable from inside and can be cleaned and maintained if needed. The following material is needed for that:

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1. 18 MTP – MTP patch cables (or better patch cables from MTP to another appropriate optical multiple-fiber connector)
2. Patch board for 18 MTP (or other optical mulit-fiber connector)
3. Harting Connector for FE DC supply (same as on FE)
4. Harting Connector for TEC control(same as on FE)
5. Harting Connector to replace 8 TEC module connectors (tbd).

The mechanical interface needs no modification.

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