

Hartebeesthoek (Hh) Station Report - TOG Meeting - April 2013

The Hartbeesthoek 26m telescope continues to perform well after it's repair, though an updated pointing model adequate for higher frequencies is pending on an upgrade of the secondary reflector positioning system which is now underway.

Session III - Oct/Nov 2012:

This session was reasonably quiet with 13 experiments scheduled, of which 7 were user experiments, comprising some 79% of the 69 hours (23 hours L-band, 33 hours C-band, 7 hours X-band and 6 hours K-band) of recording time and some 84% of the 15566.6 Gbytes of recorded data. The average filling factor of the disk-packs was over 95%. Some 329.4 Gbytes (ie. 2%) of the user data (from one experiment) was electronically shipped to the Bonn correlator.

Additionally some 1950 Gbytes of parallel test data from our DBBC was also shipped to JIVE.

Some 122 minutes of data (ie. ~3%) was lost due to various faults, most notably a sticky attenuator in the RCP channel of the IF distributor, which resulted in partial loss of this polarisation in several experiments. Additionally one user experiment was badly degraded due to condensation in a feedhorn which was missed during checkout. We continued to experience significant L-band RFI during the session.

Session I - Feb/Mar 2013:

This session was quite busy with 17 experiments scheduled, of which 10 were user experiments, comprising some 89% of the 107 hours (23 hours C-band, 17 hours K-band, 42 hours methanol and 25 hours L-band) of recording time and some 83% of the 15783.2 Gbytes of recorded data. The average filling factor of the disk-packs was around 86%. We shipped 2024.0 Gbytes (ie. 13%) of the user data (from two experiments) electronically to the Bonn correlator.

Additionally some 3477.2 Gbytes of parallel test data from our DBBC was also shipped to JIVE.

Some 18 minutes of data (ie. ~0.2%) was lost, due to local control software hangup and a bug introduced in the new FS version which caused automatic bank switching to fail. There was still significant RFI at L-band during the session.

e-VLBI / Connectivity

Over the period July 2012 to April 2013 Hartebeesthoek participated in a total of only 4 e-VLBI sessions, all at C-band comprising about 36 hours of user data. The dedicated layer-2 2Gbps 'light-path' connection direct to JIVE was used in all but one of the experiments, where it had failed due to a re-configuration of the NRENS interconnectivity.

Mark5(B/B+) Recorders:

Our two spare Mark5B+ recorders have now been permanently installed to record the primary VSI-H outputs of the new DBBC terminals assigned to the 26m and 15m antennas, enabling us to record all three VLBI backends in parallel. We also

have the parts necessary to upgrade these two recorders to Mark5C as and when required.

Mark "5" Terminal:

The Mark5 rack continues to perform reasonably well, though a failure of a switchable attenuator in the IF distributor module required us to source some second-hand components from Haystack in October 2012. Exchange of the control board failed to eliminate the intermittent communication fault in the distributor but changed it such that it now only impacts total power measurements, which is relatively harmless. We are still operating with out a working spare video converter, the unit we have lacks a functional synthesizer/divider module (and may have other faults), despite spares from Haystack following the failure of yet another such module.

DBBC Terminals:

The two DBBC units (HB1 and HB2) have now been permanently installed on the 15m and 26m respectively. The faulty input conditioning module in HB2 has been replaced and the DBBCs appear to be functioning normally and both continue to produce routine fringes in DDC mode after being calibrated. The PFB mode has successfully produced fringes in HB2, but needs further work to be fully operational.

Frequency Standards:

HartRAO continued to operate on our T4Science iMaser-3000 (iMaser-72) during both sessions. Our trusty EFOS-C (EFOS-28) maser failed again in testing due to another fault in the Datum OXCO unit (this time a failed IC) but has since been restored to normal operation. Our original EFOS-A maser (EFOS-6) is also operational and we now have a Vremya VCH-314 two-channel precision frequency comparator to allow intercomparison of the three masers.

26m Telescope Surface:

Just before the Feb/Mar session, some panels which had been deliberately displaced for holographic measurement were reset along with a few loose panel adjusters resulting in a not insignificant improvement in higher frequency efficiency.

At this stage further work is needed on the pointing model, together with development of a cryogenic K-band receiver, before we can declare this frequency available for general use, though experiments on strong maser targets are definitely feasible.

Receivers:

There have been no changes to our receiver complement since the last TOG meeting.

Other Hardware/Software:

Field System: FS 9.11.2 running on FS Linux 8 (Debian "lenny") kernel 2.6.26-2
DBBC versions: DDC v102 / PFB v14 running on Windows XP
Mark5B version: 2007y222d04h running on Debian "etch" kernel 2.6.18-6
Mark5B+ version: 2007y222d04h running on Debian "etch" kernel 2.6.18-6

Computer (and hence FS) control of the secondary reflector position to enable fast switching between all the available receivers is fully operational, but the proposed upgrade to a shaft encoder on the tilt mechanism is still only half implemented; the current actuator readouts do not allow pointing accuracy sufficient for operation at K-band and above.

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