

10th April 2013 – MPIfR, Bonn, Germany

Report on VLBI Operations for Jodrell Bank Observatory

1. October/November 2012 Session

The October/November 2012 EVN session consisted of 40 experiments: 13 at 18cm, 13 at 6cm, 7 at 5cm and 7 at 1.3cm. Originally, observations at 18cm and 6cm were scheduled for the Lovell telescope but shortly before the session the Lovell suffered a critical wheel failure which took it out of operation for the duration of the EVN session. Hence, all experiments were performed using the Mk2 telescope. No experiments involved e-MERLIN or eVLBI. At 18cm, 99.5h of observations were scheduled with a reported data loss at the telescope of 1h35m (1.6%) due to either telescope control problems, problems with recording or in one instance the wrong LO scheme being initially set. At 6cm, 68h of observations were performed with a data loss of 6h31m (9.6%). This was mainly due to high winds (4h35m) during experiment gk045b, but also included 1h lost due to not running experiment gk045a (which required the Lovell telescope) and several data recording problems. At 5cm, 44h were scheduled and 3h (6.8%) were lost (due to a band switch error during the NME experiment). At 1.3cm, 42.5h of observations were scheduled with a reported data loss of 3h40m (8.6%), almost entirely due to various problems preventing ToO experiment ro009a being observed. In conclusion, a total of 254h of observing time was scheduled on the Mk2 telescope with a total reported data loss at the telescope of 14h46m (5.8%), i.e. a success rate of 94.2%.

2. February/March 2013 Session

The February/March 2013 EVN session comprised of 33 experiments: 12 at 6cm, 3 at 1.3cm, 6 at 5cm and 12 at 18cm and were scheduled to use Jodrell Bank's Lovell and Mk2 telescopes. Seven of the experiments (1 at 6cm and 6 at 18cm, all with the Lovell telescope) were designated joint e-MERLIN/EVN observations and two experiments (at 6cm) were performed using eVLBI. It was discovered after the session that the Lovell telescope DINT was in an incorrect mode so that only a portion of the e-MERLIN data was recoverable. This did not affect the EVN data. This was the first session where VLBI used the e-MERLIN IF chain and subsequently new LO schemes for all observations. This was also the first EVN session where simultaneous observations were made with home station VLBI and the e-MERLIN array, giving a common telescope but not a common baseline in the joint observations. This demonstrated that the e-MERLIN observing system is now able to successfully import and observe using standard VEX files. It was discovered shortly after the start of the 18cm sub-session that the Lovell's polarisations were swapped. Since all experiments were dual polarisation, and to avoid disruption to observations, this was not corrected until after the session. At 6cm (Lovell), 75h of observations were scheduled and 5h42m (7.6%) were lost due to either power glitches causing LOs to reset to incorrect values or problems with the Mk5 recorder hanging. At 1.3cm (Mk2), 17h of observations were performed with no reported data loss. At 5cm (Mk2), 50h of observations were scheduled with a reported data loss of 8h (16%) when a power glitch resulted in a band shift for experiment es071a. At 18cm (Lovell), 68.5h of observations were performed with a data loss of 5h29m (8%) due entirely to high winds. In conclusion, a total of 210.5h of telescope time was scheduled (67h on Mk2 and 148.5h on Lovell) with a total reported data loss at the telescope of 19h11m (9.1%), i.e. a success rate of 90.9%.

3. Technical Developments

The home station VLBI telescope (Lovell and Mk2) and eVLBI have continued as normal during the complex change-over to e-MERLIN at JBO. We have installed optical fibre-based IF transport from the Mk2 telescope to the VLBI observing room which has proven very effective. We have bought more units to replace the cable IFs on the Lovell at a later date this year but we are already using the e-MERLIN IF transmitted on the old cables. We have also developed new IF systems for e-MERLIN compatibility which are now in use and have produced EVN fringes at all standard observing bands. Some additional disk packs have been built and we are currently pricing a further 5 frame units and disks (8TB/pack). One of our Mark5 recorders was upgraded to 5B a while ago and we plan to test this during an upcoming eVLBI experiment when we are able.

Work on VLBI control of e-MERLIN stations is progressing again. We have not been able to make much further progress with eVLBI from e-MERLIN outstations, partly because it needs us to tie up JIVE during the tests. We

are working around this by setting up a local software correlator. We believe that the network arrangement and the VDIF data formats are correct and hope to have the system tested soon.

On or about 8th February this year our three 1GBps light-path connections stopped working during a period of alterations from Surfnet, JANET and Geant/Dante. The fibres are undamaged but the IP layer transport has problems which we are hoping will be resolved soon. We successfully used the Nexpres 'BoD' light-path to replace it during recent e-VLBI experiments, and will do so again as long as it is available, although it is due to expire in June this year.

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