

19<sup>th</sup> September 2016 – St. Petersburg, Russia

Report on VLBI Operations for Jodrell Bank Observatory

1. February/March 2016 Session

The February/March 2016 EVN session for JBO consisted of 24 experiments: 6 at 6cm, 6 at 5cm and 12 at 18/21cm and were scheduled to use both the Lovell and Mk2 telescopes. Six of the experiments were joint e-MERLIN projects although none were observed simultaneously. The C-band receiver was found to be faulty during the first NME experiment, N16C1, and was changed immediately. Unfortunately the replacement warmed up over a weekend so that all C-band observations were with reduced sensitivity. There were also problems at M-band which used another replacement broad-band C-band receiver that subsequently was discovered to have low sensitivity. This was fixed in time for the final M-band observation, EM117D. We also suffered from an odd error after changing between DBBC firmware for 'pseudo-2Gbps' recording (the firmware change allows 32MHz channels on the DBBC). This change resulted in a loss of sync between the FS and DBBC which took many cycles of restarting both machines to fix. At C-band, 60h of observations were scheduled (14h with the Lovell telescope and 46h with the Mk2 telescope) and there was a total of 42m of reported data loss due to a receiver checks. At M-band, 49h of observations were scheduled on the Mk2 telescope with 2.5h of reported data loss. At L-band, 99h of observations were scheduled (97h on the Lovell telescope and 3h on the Mk2 telescope) with a total reported data loss of 4.5h due to the problems syncing the FS and DBBC clocks during firmware changes. In conclusion, a total of 208h of telescope time was scheduled (111h on the Lovell telescope and 97h on the Mk2 telescope) with a total reported data loss of 7h42m (3.7%), i.e. a success rate of 96.3%.

2. May/June 2016 Session

The May/June 2016 EVN session for JBO consisted of 27 experiments: 3 at 18cm, 7 at 6cm, 6 at 5cm and 11 at 1.3cm. All were performed with the Mk2 telescope due to the Lovell telescope being in an early maintenance mode. Only one experiment was a joint (contemporaneous) e-MERLIN project. At 18cm, 25h of observations were scheduled and there was no reported data loss. At 6cm, 70.5h of observations were scheduled (57.5h of which were eVLBI observations) and no data loss was reported. At 5cm, 49h of observations were performed with no data loss reported. At 1.3cm, 117h of observations were scheduled at 2h10m (1.9%) were lost due to problems setting LO values. In conclusion, a total of 261.5h of observations were performed on the Mk2 telescope with a total reported data loss of 2h10m (0.8%), i.e. a success rate of 99.2%.

3. Technical Developments

Our Mark5C is now available at 2Gbps for recording. In the absence of a formal test we will record one or more experiments at 2Gbps with mark5-554 in the upcoming session (Session III 2016). eVLBI at 2Gbps is not yet possible as the 100G Ciena router has yet to be commissioned at Manchester/JBO. A backup plan in which we aggregate the 3x1G links is being set up using a spare PC and the hardware is currently being tested. The Mark5C is upgraded to 'wheezy' and SD9.4. Hence, incoming packs may need reformatting. Most of the upcoming recording will be on the Mark5B unit until the Mark5C is fully tested.

e-MERLIN recording of VDIF data appears to be functioning correctly and intend to record e-MERLIN data on a local Flexbuff for later e-shipping as there will be few of these experiment in the medium term. If it becomes necessary we can upgrade the other Mark5 unit so that e-MERLIN data can be recorded on diskpacks. A proposal is being considered for a new H-maser as our existing one is ~25 years old (although still functioning adequately).

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