EUROPEAN VLBI NETWORK – TECHNICAL & OPERATIONS GROUP

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Report on VLBI Operations for Jodrell Bank Observatory

1. May/June 2010 Session

The May/June 2010 EVN session comprised of 31 experiments: 11 at 6cm, 4 at 5cm and 16 at 18cm and utilised Jodrell Bank's Lovell, Mk2, Cambridge and Knockin antennas. Two experiments at 6cm and four at 18cm were joint MERLIN/VLBI observations. All experiments that included the Cambridge antenna and which had sufficient spare recording bandwidth included the Knockin antenna. This was done for seven 6cm experiments (55h10m) and ten 18cm experiments (71h), giving a total of 126h10m of observing time with the Knockin antenna. There was no reported data loss from the Knockin antenna. At 6cm there were 63h of observations scheduled on the Lovell telescope, 56h10m scheduled on the Mk2 telescope and 55h10m on the Cambridge telescope. 40m of time was lost on the Lovell (1.1%) due to problems with the Mk5 recorder whilst Cambridge suffered no apparent data loss. At 5cm, 34h were scheduled on both the Mk2 and Cambridge antennas. Lost time on Mk2 amounted to 25m (1.2%) due to a clock error on the Field System computer. Finally, at 18cm, 104.5h were scheduled with the Lovell telescope and 71h on Cambridge and a single experiment (gb071c) used the Mk2 telescope for 10h. 1h02m were lost on the Lovell (mainly due to an investigation of elevation bearing problems), whilst Mk2 and Cambridge had no data loss at 18cm. In conclusion, a total of 554h of telescope time was scheduled (167.5 on the Lovell, 100h10m on the Mk2, 160h10m on Cambridge and 126h10m on Knockin) with a total data loss at the telescope of 2h05m (0.4%), i.e. a success rate of 99.6%.

2. October/November 2010 Session

The October/November 2010 EVN session comprised of 23 experiments: 4 at 5cm, 2 at 6cm, 5 at 1.3cm and 12 at 18cm and were scheduled to use Jodrell Bank's Lovell, Mk2, Cambridge and Knockin antennas. None of the experiments were joint MERLIN/EVN observations. Some experiments (4) at 18cm that included the Cambridge antenna and which had sufficient spare recording bandwidth included the Knockin antenna. This session was affected by various critical failures. Firstly, at 5cm the Mk2 receiver was discovered to have severe polarisation cross-talk during the NME experiment and was rapidly replaced. This receiver then immediately warmed. The sensitivity was so low that the observed data is probably unusable. Also during the 5cm NME experiment the Cambridge antenna suffered a serious power failure. At 5cm there were 36h of scheduled observations with the Mk2 and Cambridge telescopes. Essentially all Mk2 observations were lost and 2h4m lost on the Cambridge antenna. At 6cm, JBO was scheduled to observe with the Lovell and Mk2 antennas only, each for 15h. However, just prior to the EVN session the Lovell telescope suffered a severe crack in the bowl backing structure and was taken out of service for repairs. There was no replacement 6cm receiver for the Mk2 so the 6cm observations were cancelled for both telescopes. At 1.3cm, the Mk2 telescope was scheduled for 47h or observations and Cambridge for 23h. Whilst Cambridge reported no data loss, 30m were lost on Mk2 due to high winds and upwards of 12h due to the failure of the 1.3cm receiver during (or possibly prior to) experiment ea044. With the Lovell telescope out of service, the Mk2 telescope was rapidly replaced as the home station for all 18cm observations. 95.5h were therefore scheduled on the Mk2, 43.5h on Cambridge and 36h on Knockin. Knockin reported no data loss but the Cambridge link system failed prior to experiment rl002 and was replaced for only that experiment by the Darnhall antenna. 30m of data were lost on the Mk2 at 18cm due to a Mk5 recorder failure. In conclusion, a total of 349h of telescope time was scheduled (15h on the Lovell, 195.5h on the Mk2, 102.5h on Cambridge/Darnhall and 36h on Knockin) with a total reported data loss at the telescope of 81h04m (23.2%), i.e. a success rate of 76.8%.

3. Technical Developments

A stabilised noise cal diode driver has been built and installed on the Mk2 telescope to provide better calibration reliability. Some scripts and software changes have been made to allow easier and more rapid switching between different telescopes and observing bands. Automation of e-VLBI schedule processing has also been improved. Some local improvements in receiver and down-converter hardware have been implemented to improve reliability. We are currently investigating a doubling of the throughput of our e-VLBI links, to 2.2Mbps on the current 2x1G links for Mark5C+ operations.

Alastair Gunn, Paul Burgess