EUROPEAN VLBI NETWORK – TECHNICAL & OPERATIONS GROUP

9th February 2016 – Madrid, Spain

Report on VLBI Operations for Jodrell Bank Observatory

1. October/November 2015 Session

The October/November 2015 EVN session for JBO consisted of 22 experiments: 10 at 18/21cm, 6 at 5cm and 6 at 6cm and were scheduled to use both the Lovell and Mk2 telescopes. This was smaller than usual for JBO due to a network sub-session at 3.6cm in which JBO does not participate and a smaller than usual disk availability within the EVN. Four of the experiments were joint e-MERLIN projects although none were observed simultaneously. At L-band, 66h of observations were scheduled (57h with the Lovell telescope and 9h with the Mk2 telescope) and there was no reported data loss. At M-band, 33h of observations were scheduled on the Mk2 telescope and there was no reported data loss. At C-band, 79h of observations were scheduled on the Mk2 telescope with no reported data loss. It should be noted that EVN users are now choosing the Mk2 telescope over the Lovell telescope at 6cm possibly due to the difficulty of gain calibration resulting from the pointing hysteresis. In conclusion, a total of 178h of telescope time was scheduled (57h on the Lovell telescope and 121h on the Mk2 telescope) with no reported data loss i.e. a success rate of 100%.

2. Technical Developments

Development of control software is continuing in the background. We are building a unit for continuous calibration control and to provide 10MHz referenced from the 5MHz signal. In 2016, we will build three more 32 TB disk packs. Subject to finding resources we also plan to upgrade our other Mark 5 unit to Mark 5B+ and the DBBC to be upgraded to two extra Core 2 boards, both for 2Gbps observations in 2016. This upgraded Mark 5 unit will then become the operational one. Our network connection through JANET will be expanded to 2.5 Gbps hopefully during 2016. We have progressed with our investigation of returning an e-MERLIN antenna to the EVN. After difficulties in finding fringes between data in the e-MERLIN post-correlator and VLBI data paths, an experiment was performed using pulsar timing pulsars. This identified an unexplained 120ms delay between the two data paths (about equal to half the size of the e-MERLIN correlator delay buffer). Using this information fringes between EVN and e-MERLIN antennas were found in data from a Network Monitoring Experiment in the October/November 2015 EVN session. This is a significant step which will allow e-MERLIN antennas to return to the EVN. Currently, we are investigating the cause of the delay with the hope of eliminating or at least correcting for it. Concurrently we are considering options for e-MERLIN data transport to Mk5 recording and possibly as an eVLBI stream to JIVE. We hope to make further progress towards returning an e-MERLIN antenna to the EVN in 2016. In 2016 a major refurbishment and building project will take place at JBO. The VLBI equipment will thus be temporarily relocated very shortly. Due to the major work to replace the original backing-structure (old surface) of the Lovell telescope the antenna will not be available for EVN Session II 2016. The Mk2 will be available instead.

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