

## **ATNF ATUC MEMORANDUM**

**To:** ATUC  
**From:** Bob Sault  
**Date:** 29 May 2004  
**Subject** Millimetre systems on the ATCA

### **Performance of the 12mm system**

The 12mm system is now well integrated into the ATCA system, with performance being very good. System temperatures on typical winter days are 50-60K, and phase stability to 6km baselines is often not an issue. Operation of the 12mm system is now routine.

The system temperature measures of the 12mm receivers are now calibrated, and will need to be recalibrated after the 3mm installation period. 1934-638 has been shown to be “constant” over more than a year. The spectrum of 1934-638 has been determined and installed into the offline calibration software, as has an opacity correction. Flux measurements have been completed on most 12mm calibrators, which are now reflected in the calibrator database.

The weather does impact the 12mm system more than at centimetre wavelengths. The 12mm observations bracketing summer were on 4 December and 15 February. Both of these observations were effectively abandoned because of poor weather. In general 12mm observations should be avoided from mid November to late March. In addition, observing at 12mm in poor weather is a challenge for the ATCA observing system. In poor weather, the potentially large atmospheric contribution to system temperature at 12mm makes achieving a good power level balance more difficult.

There are some lingering issues:

- Water can condense on the 12mm dewar window. To prevent this, the 12mm horns are now sealed and filled with dry nitrogen, but there have been instances where this has failed. A longer term solution awaits resources after the completion of the 3mm systems.
- There are some poorly understood issues in the 24.0-24.5 GHz region, where most (all?) antennas can sometimes show inexplicably high system temperatures. This is not always repeatable.
- An improvement in the attenuator system will be installed during the upcoming shutdown. This will resolve a compression problem in some systems.
- The frequency range from 25.1 to 26 GHz is not yet available. We hope to resolve this in the 3mm installation shutdown.

### **Installation of the 3mm systems**

The next major step in the MNRF high frequency upgrade started on 15 May, with two millimetre receivers warmed, removed from the antennas, and transported back to Marsfield to be retrofitted.

The main shutdown for the 3mm installation is 15 June-2 July. By the end of the shutdown, all 12mm systems should be available, and the 3mm cryogenic components should be

installed and cold. However the 3mm LO/downconversion system will be missing on some antennas. The current estimate is that all five 3mm systems will be available by the time the bulk of the 3mm observing starts on 23 July (although this slipped timetable is looking tight). Three observing slots are affected by the predicted late delivery: two of these will be rescheduled, and one will proceed with the available 3mm system.

More information on the progress of the installation will be available by the time of the ATUC meeting.

**Advice sought**

ATUC's advice is sought on the following issues/questions:

- Are there areas where ATUC has suggestions for further refinement of the 12mm systems.
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