ATUC Report to the Director - October 2012

This meeting of the AT Users Committee was held at the ATNF Headquarters on 30-31 October 2012.

Attendance: John Dickey (Chair), Chris Phillips (Secretary), James Allison, Virginia Kilborn, Ryan Shannon, Steve Ord, Minh Huynh, Tobias Westmeier and Vikram Ravi (student representative). Apologies from Sarah Reeves (observing nights at ATCA)

Commendations and Successes

ATUC wishes to commend ATNF staff on their great progress on the ASKAP telescope. The closure phase between three PAFs is an excellent demonstration of phase coherence and the feasibility of the aperture synthesis with PAF systems. In addition the committee congratulates CSIRO on the opening ceremony at the MRO.

The new ATCA 4cm receivers show excellent performance across the very broad band of the CABB system. In addition, the new feed design looks promising as a way to extend this system to the critical 12.2 GHz spectral lines. The user community looks forward to having the full complement of six receivers operational on the CA antennas

The CABB backend system has now full capability for zoom bands with widths of 64 MHz as well as 1 MHz. This is an important step toward the full capability of the CABB system.

At Parkes there have been several improvements to the infrastructure, notably a new maser/timing distribution system, and a significant upgrade to the backup power system, including UPS for the antenna drive motors.

Recommendations and Discussion

The committee considered many issues relevant to ATNF operations and development, as detailed below.

1. ASKAP

We agree with the ATNF management that the number one priority for the Observatory is to complete ASKAP and make it a world-leading scientific instrument.

Given the huge contribution of the Survey Science Teams (SSTs) in planning surveys and the effort of CASS in designing and building ASKAP, it is vital that ASKAP is completed to a full 36 dish array with Mk.2 PAFs so that the survey science projects

carried out as planned.

Continued dialog with the SSTs on the progress of BETA and the initial 12-18 station ASKAP is needed.

Further clarity and timelines on the impact of SKA phase-I construction on ASKAP operation is needed.

2. Response to Mopra status report:

The committee feels ordinary TAC scheduling for Mopra is the best model for allocation of the remaining CASS share of telescope time. Some flexibility is needed on the allowed size of accepted projects. There is no demand for a special Expression of Interest process and we do not want the ATNF to discourage small projects on Mopra.

3. Response to ATCA status report:

The committee supports the deliberate pace of bringing up the zoom modes with different bandwidths. The success of the 64 MHz zoom modes has been good, and we agree the continued process of debugging and streamlining the changing between the existing 1 MHz and 64 MHz zooms takes priority over implementing the 16 MHz mode. We are also looking forward to the completion of 16 MHz modes.

The CA has developed many new and world-leading technical capabilities, and we expect a broad range of applications from the user community will be proposed in the next year or two. Therefore we do not see a need for the ATNF to specifically seek out large projects at this time.

4. Response to Parkes status report:

ATUC recommends CASS encourage more meetings and workshops to be held at Parkes to increase the interaction between Parkes operational staff and the astronomy community.

ATUC is concerned that the Parkes observing model based on a Project Expert collaborator may effectively reduce access to the telescope for novice observers. This model could work as a means of training new observers and to increase operations efficiency, but it will need careful adjustment. The responsibility of the Experts for guiding novice users through the proposal process, and through preparing for and conducting observations, will be critical.

5. ATNF Operational Plans, Remote Observing, the Marsfield Operations Centre, and Student Experience on Telescopes:

All members of the Users Committee had the experience of observing on site when we were doing our Ph.D. research. We see this experience as crucial in our training and development as observational astronomers. The ATNF tradition of hands-on observing has led to a generation of world-leading scientists.

While recognising the benefit of remote observation capability for large projects and experienced observers, the ATUC values and advocates for the continued opportunity to observe on site at each CASS telescope.

- In the ASKAP/MeerKAT era, the scale of radio astronomy will jump by orders of magnitude. As training and experience are essential in understanding the basis of the field, observatories like Parkes and Narrabri will remain important as training facilities. Hence, the UC strongly recommends that the option of operating the telescopes on site should be preserved.

- The UC anticipates that future observers at Parkes will use local hotels and restaurants, doing their observing from inside the tower. We will minimise the inconvenience to the local staff, but we still want to feel welcome at the observatory. We will work within whatever budget constraints are required.

- The UC feels that a good use of the SOC could be as a base for students who are users of ATNF telescopes for training and interaction with CASS staff. All students, both ATNF co-supervised and external, could be based in the SOC visitor area.

- To qualify for remote observing, the plan is to have a user come to Marsfield for training. The UC believes that the user should have the option of doing the training either in Marsfield or at the telescope. We recognise that there will be extra OH&S training required for visitors to the site. We prefer a two-stage training process, reflecting the different expertise of the staff at the observatories vs. the Marsfield scientific and technical staff. Neither is sufficient on its own to train new users.

6. Parkes Science Day Outcomes:

The Science Day discussion of the future priorities for the Parkes telescope was productive. The ATUC thanks the ATNF for support in organizing and hosting this workshop. Some points that came out of the discussions are:

- The Pulsar Timing Array (PTA) is a key science area for Parkes. The telescope must be equipped with a world-leading Pulsar receiver, like the present 10-50 cm receiver.
- The top spectral line use currently is studies of HI to trace galaxy evolution, from the MW and MCs to distant galaxies, using a range of techniques including intensity fluctuation mapping.
- Methanol and NH3 are important star formation tracers, and Parkes is the only large single-dish telescope readily available in the southern hemisphere to map these lines.
- Polarisation surveys with Parkes have become an important use of the telescope in recent years, and this is likely to continue.
- VLBI remains a crucial application, as Parkes is the only large aperture that is consistently available in the LBA, which is the only southern hemisphere VLBI facility.

In the ASKAP era, Parkes will play a different but critical role, both to follow-up detections from the SSPs and to supply zero (*uv*) spacing information, as well as continuing observations of high frequency spectral lines and pulsars.

7. Parkes Receivers:

We want new receivers to improve the performance of Parkes, not to come at a price of worse sensitivity, polarization quality, interference suppression, field of view, or baseline stability.

The objective is to have all receivers mounted on the translator all the time, so that receiver changes are not a problem for Parkes operations.

A goal that satisfies most or all the science drivers would be to have:
- A wideband 4.5-25 GHz package, but there is no strong science driver for capability in the range 12.5 to 19 GHz. This could be similar to the CABB CX system, plus a high frequency receiver in the same package. This will replace the many older single band receivers that are difficult to mount and dismount and troublesome to keep in service.
- A wideband 700 - 3600 MHz receiver, optimised for pulsar observing. The upper and lower frequency limits are not solid. The impact of the RFI environment must be addressed in the design of this receiver. The ongoing experience with the new receiver on the Effelsberg telescope will help guide the design of this new system.
- A wide-field L-band receiver optimised for spectral line surveys of Galactic and extragalactic HI and OH. It is not clear that an uncooled PAF with the performance of the Mk.2 ASKAP receiver will be better than the existing L-band multibeam. When a PAF system is available with better performance than the multibeam, it may allow better baselines and other scientific advantages.

The process for setting priorities among these options will involve the national community as well as the ATNF staff in a dialog with the technical experts. The possibility of collaborative proposals and joint development with university groups could enhance the funding and personnel available. Backend development is particularly strong in several Australian universities.

The ATUC will be happy to play a role in the ongoing decision-making process. We will facilitate the dialog between the national community and the ATNF technical staff. We can be a sounding-board for design questions, report user ideas and preferences, and assist the ATNF scientific staff in determining the schedule and priority of different options.

8. Response to Questions to the Committee:

The radio school is essential for new PhD students and others interested in learning radio astronomy techniques and is still very popular. Given the split between single dish and interferometric focused meetings, yearly meetings are considered important. To ease the burden on CASS staff, the ATUC recommends sharing the responsibility for organising the meetings and increasing the pool of speakers from the wider radio astronomy community.

9. Other questions from User community:

Miriad has successfully risen to the challenge of analysing the large data volumes from the zoom bands on CABB. However there is a continuing need for improvements and bug fixes. Some users have found reduced reliability in Miriad, particularly associated with the WCSlib and its compatibility with new versions of the Miriad package. On this subject, the ATCA forum has been very effective and widely used as a way to report and get help with Miriad issues.

The interference surveys at both Narrabri and Parkes are very important. The users would like to have the results kept on a well-maintained webpage.

10. Matters arising from the July 2012 report:

1a: “Service observing is not offered now, and there are no plans to introduce it”. The UC notes that some users have asked for a change in this policy.

1b: “Remote observing requirements are under review and will be discussed with ATUC at the next meeting.” The ATUC requests further explanation of remote observing training requirements.

11. Date and Format of the next meeting:

The next meeting is expected to be called sometime in the first two weeks of June, 2013.