ATUC Report to the Director - July 2012

The ATUC met on 11 and 12 July, 2012, at the CASS Marsfield site.

Attendance: John Dickey (Chair), Hayley Bignall, Chris Springob, James Allison, Ryan Shannon, Stephen Ord, Giovanna Zanardo, and Sarah Reeves. Apologies were received from Virginia Kilborn, Kathrin Wolfinger and Chris Phillips. Vincent McIntyre assisted the committee as secretary.

The committee received comments from various colleagues in advance of the meeting, and many important questions were raised during the open session on 11 July. The Director and several staff members of the ATNF gave talks describing work that is underway at all the CASS sites.

The ATUC congratulates the ATNF staff for their successful progress in many areas since the last meeting. Some highlights are:

- The ASKAP telescope is moving toward completion. The committee notes the highly improved performance of the prototype Mark II phased-array feed (PAF) system and we strongly support the ATNF in seeking funds to construct the full set of 36 receivers based on the ADE design.

- The Parkes telescope has had many improvements, with the goal of making it safe and reliable as a remotely operated facility (the Remote Access Parkes Telescope - RAPT).

- Scientific research by the ATNF staff and visitors has made notable discoveries, and productivity as measured by publications based on ATNF data is at an all-time high.

- The ATNF is in negotiations with external partners to arrange continued funding for observations using the Mopra telescope. If successful, this would prevent the closing of this important, world-class facility.

- The Compact Array Broad-band (CABB) system continues to make progress toward completion, including implementation of spectrometer zoom bands. The new wide-band C-X receivers have excellent performance over the range 4-10.8 GHz, and a new feed will be tested that may allow operation as high as 12.25 GHz.

- The ATNF has begun a process of planning for a new set of receivers for the Parkes telescope that will reduce operating costs. In the long term, the number of receiver changes can be greatly reduced by building wideband, high performance receivers based on the newest technology. The committee was excited to hear about many possibilities that are under consideration, with design studies underway. The committee was also impressed by the participation of the astrophysics staff in projecting future research needs.

There are several topics for discussion that the committee considered in closed session. We recommend that the ATNF Director consider these issues for future attention:

1. Remote Observing at Parkes and Narrabri

There are several questions associated with the issue of remote observing. At Narrabri, the policy of requiring users to come to the Observatory at least once a year, in order to be approved for future remote observing, continues with some changes suggested. At Parkes the model starting in 2013 is to have only remote observing, with some exceptions for development of new techniques. The committee approves of this policy in general. The role of the "observer's friend" is no longer clearly defined; when is a local collaborator required, and what is the Observatory policy on service observing? How will new users of the telescopes be trained?

The ATUC suggests that a two year refresher schedule for ATCA remote observers might be better than every year, at least after an observer has a few years of experience.

The ATNF should develop a training process based at Marsfield, for new observers using Parkes remotely. A similar remote training process for Narrabri observers should be considered. New documentation and complete instructions will be needed for the RAPT system before it can be opened up to the broad user community.

Remote observers using the ATCA need a Q&A checklist for fixing problems that come up during observing. A standard email with up-to-date links to important documentation should be sent to all observers a few weeks before their telescope time. Communication between successive observers is a critical part of observing. Remote observing must incorporate that process, perhaps using a designated staff member for continuity.

For the next meeting, the ATUC would like a more detailed summary and timeline of the operations model for the Marsfield remote control centre.

2. Reduction and Analysis of CABB Data

The MIRIAD package is successfully calibrating and mapping data from CABB, including the 1 MHz zoom modes. This is critical for science with CABB, and the committee congratulates the ATNF on the successful operations of CABB including software and hardware. There are some applications of CABB, particularly at the lower frequency end (16 cm band) dealing with large fractional bandwidths that will require a more sophisticated package like CASApy. The committee recommends that techniques for measuring continuum source flux and spectral index, polarization calibration, and other difficult topics should be explored and tested. Users need good advice about how to use CASApy for CA data analysis. There is a need for better documentation on using either Miriad or CASApy for CABB data. On less challenging topics, the online ATCA forum is very useful for users to get help with CABB data calibration and analysis problems.

3. New Receivers for Parkes

The opportunity to develop new receivers for Parkes is exciting for both technical innovation and increased scientific capability. The ATUC is happy to play a role in the selection of which projects should take priority by engaging the user community in the discussion. The ATNF staff have made an impressive list of potential future surveys, and the ATUC would like to expand this discussion to involve all interested users. In preparation for this science day, it would be helpful if a review of receiver developments

at other large single-dish telescopes could be compiled by the ATNF staff.

The basic choices for receiver development are

a. wideband receivers for
(i) 4 to 24 GHz and
(ii) 0.7 to 4 GHz.
A receiver similar to option (ii) is under development at the MPIfR.

b. a new multibeam receiver for 20-25 GHz.
This will require extensive technology development, particularly in MMIC fabrication techniques.

c. a PAF, with 21-cm line applications as the science driver.

At the "science day" we will need interim progress reports on these receiver options from the engineering staff. The committee recognizes that considerations of calibration, interference, and the financial and human resources required must be balanced with the various science applications in setting priorities for development.

4. Interim Parkes Receiver Change Policy

For approximately two years, it will still be necessary to change receivers on the Parkes Telescope to allow science over its full range of operating frequencies. A policy that reduces the number of receiver changes for this interim period before the new wide-band systems are ready has been discussed by the ATUC at its February meeting. As a follow-up to that discussion, a memo was prepared by leaders of a major, on-going pulsar timing project to explain the need for a particular cadence of observations, i.e. whether or not it is necessary to make observations with the 10-50 receiver every two weeks. The ATUC considered the memo, and discussed the conclusions with ATNF staff in closed session. As a factor in mitigating the impact of a reduced number of receiver changes per semester, the 10-50 receiver could be off the telescope for up to two months, without compromising most pulsar timing results, provided that the total observing time is not reduced, and that pulsar timing data can be taken using the multi-beam receiver during the period when the 10-50 is off the telescope. The ATUC recommends that the Observatory staff reconsider the possibilities of receiver changes, given this relaxation of the strict pulsar cadence requirement.

An advertised receiver rotation schedule with all receivers available on a 12 month time scale would be a viable operations model for 2013-2015, based on input from users. For the VLBI requirement an exception to the rotation schedule may be needed. The TAC should be open to proposals for particular receivers that are NOT scheduled for the coming semester, to preserve flexibility for the proposers and for the scheduler. The rotation schedule should be given first consideration, but not be binding on the TAC or scheduler. Exceptions can be made in any semester based on proposal quality and pressure.

The goal should be to allow observations at all Parkes frequencies for highly ranked proposals with at most a 1 year waiting time.

5. ASKAP Science

The ATUC encourages the ASKAP team to focus on a science application that can demonstrate the power of the PAF design. There should be a track to early publication of results as soon as possible.

6. Mopra time available to the mm-wave community

If and when an agreement is concluded to allow continuing operations with the Mopra telescope, the ATNF should issue a clarification to the users on how access and scheduling will be handled. The ATUC reaffirms its strong commitment to an open-skies policy on all telescopes operated by the ATNF, but we understand the need to accommodate partners who make substantial contributions to operations of a telescope.

7. The VLBA Contribution

The decision to contribute to the VLBA was not widely discussed in advance, and the telescope time that became available did not go through the ordinary proposal process. The committee understands the special need for executive action in this case, and we support the Director in his decision to join an ad-hoc international consortium to help the NRAO continue VLBA operations. The ATUC recommends that in future situations when new resources like the Australian VLBA time become available, an email should be sent to all users explaining the process.

8. Data Archive Annotations

A suggestion has been made that the ATOA should include a link to the relevant publication that describes the observations, where possible.

9. Next Zoom modes

Users have given convincing arguments in favour of giving priority to 16 MHz zoom modes over 4 MHz, when the 64 MHz zooms are finished.

10. Visualisation

The committee discussed the options for spectral line cube visualisation in the future if KARMA is no longer supported. A recommendation for future visualisation options would be helpful.

11. Science Day for next meeting

The ATUC wishes to organise a science day to be held as part of our October 2012 meeting to discuss astrophysical drivers for future receivers. The specific goal of the day would be to gather input for prioritisation of the new receiver development, particularly to hear plans and concepts for large projects. It would also be important to get feedback on the interim receiver change schedule concept, perhaps in response to a straw-man schedule prepared by ATNF staff.

The next meeting will be held in 29-31 October 2012. Feedback from users as raised at the Science Day can be incorporated into the call for proposals leading to the December 15, 2012, deadline. The committee is happy to have a quick telecon meeting early in 2013 if requested by the engineering staff to consider design studies for Parkes receivers. There will be a meeting of the ATUC in week of June 10, 2013.