

ATUC Report to the Director - Nov 2014

This meeting of the Australia Telescope Users' Committee was held at the ATNF Headquarters on 25-26 Nov 2014.

Attendance: Virginia Kilborn (Chair), Jo Dawson (Secretary), Minh Huynh, Tobias Westmeier, Stas Shabala, Evan Keane, James Miller-Jones, Paolo Serra and Claire-Elise Green & Vasaant Krishnan (student representatives).

Apologies: --

Commendations and Successes

ATUC wishes to commend ATNF on:

- Outstanding progress on ASKAP BETA commissioning by the ACES team;
- First scientific results from BETA that are leading to publications;
- Being a partner of a successful ARC LIEF grant for the Ultra-wide Band Receiver for Parkes;
- Contract with NAOC to build the 19-beam receiver for FAST;
- Scientific achievements of CASS staff, including the Pawsey Medal won by Dr Naomi McClure-Griffiths and the John Philip Award, won by Dr Ryan Shannon;
- Excellent transition to and implementation of remote observing at Parkes;
- Smooth transition of observing from ATCA to CASS headquarters.

Recommendations and Discussion

The ATUC recognises the significant budgetary pressure that CASS is under, and appreciates the effort the CASS staff have made to keep the current observing capabilities at the expense of other areas (e.g. onsite observing).

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

1. User training and Support

The topic of user training and support has been one of significant discussion between the user community and CASS staff over the past few months. Users have been required to visit ATNF yearly to maintain their remote qualification, with the rationale that they will interact with the local staff during their visit. Users have reported that such interactions often do not occur - either due to the observations being at night-time (so the observer is sleeping when staff are on site), or the observations are during the day, so the observer is in the observing room and can't attend ATNF scientific and social

meetings. Some of the Parkes training is carried out via videolink, which could be carried out at any institute.

Recommendation: *ATUC suggests that the issue of training and observer qualification be separated from the issue of attracting regular scientific visitors on site to Marsfield.*

1.1 Remote observer training and (re-)qualification

The ATUC notes that the technical requirements for observing using ATCA, Parkes, (Mopra) and the LBA are quite different, and suggests varying criteria for observing (re-)qualification for each of these instruments.

• **ATCA Remote Observer Training:** New observers will continue to require intensive training to successfully carry out their observations. The ATUC feels that face-to-face training at the SOC should remain mandatory for first-time users. The ATUC also strongly supports the proposed scheme to offer data reduction assistance to inexperienced users should they elect to stay on at the SOC for a few days following the completion of their observations. Provision of intense pre-observation training and post-observing data support would ensure continuity with the previous scheme on-site at Narrabri. In removing one of the major roadblocks to the timely publication of new results this would benefit both the observers and ATNF.

Recommendation: *Implementation of the proposed offer of post-observation data reduction assistance for new and inexperienced observers.*

Although a single visit to the SOC is nominally sufficient to qualify an observer for remote observing, inexperienced observers will likely still need significant interaction with a DA or a “friend”, and should be encouraged to come to the SOC to observe. The update to the User Guide is extremely helpful, but there is no substitute for direct interaction with ATNF staff. The ATUC recommends that all observers coming to the SOC should be guaranteed some face-to-face interaction with local experts, to ensure that the trip offers significant added value to users making the effort to visit. The potential to offer a slot for such interactions could be reserved at the same time as accommodation is booked.

Recommendation: *Guarantee of face-to-face interaction for all observers travelling to the SOC for observing.*

For experienced observers, the requirement to re-qualify at the SOC on a yearly basis has proven a source of frustration for the user community. ATUC suggests that in the absence of significant changes to the telescope systems, there could be a rolling extension of the 1-year qualification period following each new instance of successful remote observing. Users who have not observed (remotely or on-site) over the past year would still be required to travel to the SOC to re-qualify, but those who observe on a

sufficiently regular basis would be exempt from the travel requirement. Direct interaction with these experienced users would be better served by supporting separate scientific visits (as recommended in Section 1.2).

Recommendation: *Extension of the re-qualification period for a year following each successful new observing session (in the absence of major changes to the system).*

• **Parkes Remote Observer Training:** There is a broad consensus in the Parkes user community that the current remote “face-to-face” orientation model could be conducted from the trainee’s home institution. The requirement of having this conducted from the SOC is a source of discontent for both domestic and international users. The training consists of two parts: (i) “face-to-face” orientation by a video link between the SOC and Parkes for first time observers, and (ii) observer training provided to the observer by the project expert. We see no obstacle to having the face-to-face orientation component, which up to this point has been required to be undertaken via video-link at the SOC, instead performed over video-link from the observer’s home institute. As the observing training is actually given by the project experts (who may not be based at the SOC), the requirement to travel to the SOC is seen as prohibitive, and unnecessarily increases travel costs and time costs of observers. One concerning effect of the requirement of training at the SOC is that there has been an increased observing burden placed upon Australian-based observers by international collaborators, as it is seen to be more efficient to have the former group satisfy re-qualification requirements.

Recommendation: *Face-to-face orientation for first-time observers should be possible by video link from the observer’s home institution. A review of the efficiency of the face-to-face training via SOC to Parkes video link would be welcome, perhaps via the use of online documentation.*

• **Role of the Parkes SOC support astronomer:** Limited documentation exists concerning the nature of this role. Currently some observers expect technical support from the Parkes SOC support astronomer, which, according to existing documentation, is beyond the remit of this position.

Recommendation: *It is felt that both observers and staff would benefit from further clarification and documentation on the role of and training requirements to be the Parkes SOC support astronomer. It should also be ensured that this role adds value to visiting the SOC and provides some benefit for the support astronomer.*

• **Re-qualification:** Currently re-qualification requires a yearly visit to the SOC but does not require face-to-face training or any extra training from a project expert. We feel that this requirement can and should be removed and that regular observers should have their qualification extended in a rolling fashion.

Recommendation: *We recommend extension of the re-qualification period for a year following each new successful observing session (in the absence of major changes to the system)*

• **LBA observer training:** We welcome LBA observer training as a way of reducing the observing burden on ATNF staff. We understand that the role of the observers will be to monitor their experiment and contact an on-call ATNF staff member if any problems should arise. We look forward to a timely discussion of the specifics of this model and providing user feedback at the next ATUC meeting. As things stand, we are concerned that users without remote qualification for both ATCA and Parkes will be discouraged from applying for LBA time.

Recommendation: *As a matter of urgency, we request that a training model be designed and implemented to enable PIs to fulfil their support responsibilities as outlined in the call for proposals.*

1.2 Scientific Visits

The ATUC recognises the value to both CASS, and the user community, of a vibrant scientific visitor program. The ATUC is supportive of the idea of a shorter-term scientific visitor program to encourage interaction amongst the observers and local experts. ATUC believes this is likely to be an attractive option for scientists, as organising short trips is often easier than a long visit. It may also enable a larger number of scientists to be supported to visit ATNF and interact with local staff and students.

ATUC support the excellent idea of a twice-yearly data reduction school/busy week which would allow ATNF engage with users and likely increase the productivity of ATNF telescopes.

Recommendation: *Expand the current scientific visitor program to include shorter (~1-2 weeks) visits, and organise a twice-yearly data reduction school/busy week.*

1.3 Observer Support

Visitors coming to the SOC in Marsfield for observing are not currently provided with warm meals, as was the case for on-site observers at Narrabri and Parkes in the past. While day-time observers can at least get their lunch from the canteen, this option does not exist for night-time observers who will instead have to prepare their own meals in the lodge kitchen. ATUC therefore recommends that catering options for SOC observers be offered. This could, e.g., be the form of pre-cooked meals provided by the canteen that observers could heat up in a microwave oven at night similar to the procedure at Narrabri and Parkes in the past. Observers could be given the option to specify catering wishes and dietary requirements online when booking their visit to the SOC.

2. ASKAP

ATUC welcomes the decision by the ATNF to allow for 2-3 BETA antennas to be equipped with Mk II PAFs for ASKAP-18 to optimise the performance of the array for early science projects.

3. Parkes

• **MB-20 Removal:** There exists concern about loss in scientific capabilities associated with the potential replacement of the MB-20 receiver with the H-OH or the “Bonn PAF”. This would remove Parkes’ current world-leading position for searching for fast radio bursts (FRBs) well before it is overtaken by MeerKAT. If the PAF’s larger FOV compensates for the reduced sensitivity in this regard then the FRBs discovered will all be at low redshift, hindering their unambiguous identification and precluding the scientific exploitation of FRBs for cosmology. For PPTA work increased FOV is of no benefit and decreased sensitivity would mean an increase in the required time on sky to obtain the same data quality.

***Recommendation:** The committee recommends conducting community consultation regarding the scientific benefits and costs of replacing the MB-20 receiver. The effect of commissioning the “Bonn-PAF” on Parkes scheduling also requires further elucidation and the timeline for any such changes needs to be made clear well in advance of proposal deadlines.*

• **Receiver Change Policy:** The recent APR2015 call for Parkes proposals stated that only the MB-20 and 10/50cm receivers would likely be available, with the possibility of other receivers being available under certain conditions. However, it was unclear how a proposal would qualify for a receiver change for Parkes (including Parkes as part of the LBA), in terms of TAC grade, minimum hours requested, scheduling constraints etc. This lack of information is discouraging of quality proposals making use of different receivers.

***Recommendation:** Increased clarity is needed concerning the Parkes receiver change policy, with information disseminated effectively to observers (e.g. via OPAL and relevant mailing lists) well in advance of proposal deadlines. We suggest keeping strong proposals for alternate Parkes receivers active for more than one semester so that they can be scheduled in one block, minimising the number of receiver changes.*

4. Australia Telescope Compact Array

4.1 ATCA wavelength capabilities

The Users Committee is pleased to see that ATCA capabilities will remain unchanged for the next semester but we note the uncertainty of whether the full observing capabilities of ATCA will remain. In particular, we are concerned that mm support may be discontinued in the near future. ATUC would like to stress that ATCA is the only southern hemisphere interferometer that can access the 7 - 15 mm regime until the advent of ALMA Bands 1 (31 - 45 GHz) and 2 (65 - 90 GHz). However, these ALMA bands are only under development and not yet fully funded. The latest information is that Band 1 may be available by 2020 but there are no firm plans for construction of Band 2. ALMA Band 3 (3 mm) overlaps with ATCA but shutting down the 3mm receivers on ATCA does not save any money as the 7 and 15mm receivers sit in the same dewar as the 3 mm receiver. Furthermore, given the excellent site, ALMA will be more likely to do observations at higher frequencies (band 6/7, 215 - 375 GHz) so time in Bands 1 - 3 will be limited. ALMA is also over-subscribed by factors of ~10 compared to ~2 for ATCA. The ATCA mm receivers produce world class science and will be even more in demand as targets from MWA, ASKAP, and ALMA surveys are identified over the coming years.

ATUC notes that there were over twice as many proposals for 2014APRS (mm-season) as there were for 2014OCTS. To understand the pressure on mm capabilities, we request a full breakdown of the fraction of time requested by mm observing programs.

Recommendation: *Retain the full observing capabilities of ATCA and if that is not possible due to funding pressures then ensure that: a) options are fully discussed with the community (ATUC stands ready to consult the community); and b) as much notice as possible is given of any changes to observing capability (>6 months ideally).*

ATUC notes the importance of ATCA at cm wavelengths as a high-frequency follow-up to ASKAP / MWA.

4.2 Automatic observing capabilities

Should ATCA observing be automated?

ATUC is not philosophically opposed to increasing the degree of automation in ATCA observing. However, any implementation of automated procedures should not come at the cost of having to reduce the current capabilities of the ATCA, e.g. due to financial constraints or staffing levels.

Recommendation: *ATUC therefore proposes that maintaining the full capabilities of the ATCA should take precedence over any automation of ATCA observing procedures.*

Should queue mode or dynamic scheduling be implemented?

ATUC would welcome the implementation of dynamic scheduling at the ATCA. Dynamic scheduling was recommended in the December 2013 ATUC report to improve the efficiency of mm observations limited by the weather. If implemented, a call for additional

“backup” low-frequency projects to be carried out when the weather was unsuitable for mm observing would improve the telescope efficiency.

While ATUC is not opposed to the implementation of queue mode observing, this would presumably require operators and hence additional funding, and this should not come at the expense of array capabilities.

Should raw data or calibrated data be offered?

Raw data should be offered by default to allow experienced users to optimally calibrate their data. Calibrated data could be offered as an *additional* data product, but this would require the development of generic calibration pipelines which would require significant staff effort and are unlikely to produce optimal results in all situations. Again, such efforts should not come at the expense of observational capability, and users of any such generic calibration pipelines should be made aware of potential problems with automatically calibrated data.

How should astronomers be informed about the telescope capabilities?

All new procedures should be explained in detail in the relevant documentation such as the General Users Guide or the Remote Observing Guide. In addition, major changes should be listed on the “Current Issues” web page and communicated via e-mail to all ATCA observers.

5. Long Baseline Array

ATUC would like to re-iterate the importance of the LBA. It is currently the only high-resolution radio instrument in the southern hemisphere, and this situation is unlikely to change over the next several years. The LBA is highly complementary to ASKAP as a follow-up instrument, and needs to remain in operation.

Recommendation: *If external funding is sought for any of the ATNF antennas, we strongly encourage the ATNF to seek a commitment to operate these as part of the LBA.*

We commend the ATNF on helping to secure funding towards an ultra-wideband low frequency receiver for Parkes. We note that funding has also recently been secured towards broadband (3–12 GHz) receivers at AuScope VLBI antennas, which provide long baselines to the LBA. In light of this and the availability of the CABB system on ATCA, development of an ultra-wideband high frequency receiver at Parkes would enable broadband VLBI for the first time. Inclusion of Parkes in the LBA is important for zero- and short spacings, as well as sensitivity of long baselines to 12-m antennas.

Recommendation: *Update the community on the status of the previously-proposed ultra-wideband high frequency receiver upgrade for Parkes.*

We note that the effect of limited Parkes receiver changes on ongoing, partially-completed monitoring projects (particularly those at high frequencies) is unclear.

Recommendation: *ATUC requests clarification of the status of these projects.*

Elimination of Parkes receiver changes has limited Parkes' participation in the LBA to L and S-band. Tidbinbilla (DSS43 and DSS34) time is available through host country arrangements, although long tracks cannot be guaranteed, and LST range can be limited. We suggest Tidbinbilla be considered as the best available replacement for Parkes in the LBA until the ultra-wideband high frequency receiver is available. This is important for the sensitivity of the LBA.

Recommendation: *The ATNF considers the availability of Tidbinbilla when scheduling LBA observations during the year. Proposals should state explicitly whether the proposed science requires Parkes / Tidbinbilla observations.*

The current system in place to request observing time on Tidbinbilla as a single dish is unclear.

Recommendation: *We request that this process be made transparent for users.*

6. Governance

The ATNF, AAO, Australian SKA Office and AAL have begun discussions about the governance of those bodies in the future. We were pleased that the terms of reference were distributed to the community via the ASA email exploder, and request that the community is kept regularly informed about the process.

7. Other issues

• **Ongoing software support:** There is concern in the community surrounding the provision of ongoing support for the software livedata/gridzilla taking into consideration the recent retirement of the developers of this software. Livedata/gridzilla is used by Parkes but is also essential to Mopra. If this software is not maintained in the future then re-processing/processing Parkes and Mopra data may become difficult.

Recommendation: *Provide ongoing support for the livedata/gridzilla software packages.*

• **CASS radio astronomy school:** The CASS radio astronomy school has been highly successful, receiving extremely positive community feedback from students and supervisors. This school remains in high demand from Australian and New Zealand students. Given that observing has now shifted to remote-only mode it is crucial that this

school continues as a forum for first-hand exposure of students to radio telescopes. Having the school on-site at a radio telescope is scientifically worthwhile for the training of future astronomers in radio astronomy techniques and the operational details of radio telescopes. The hands-on experience provided by hosting the school on-site at a telescope is essential in the remote observing era, guaranteeing students actually visit an operational radio telescope in their career. It also helps foster working relationships between the site staff and the observers.

Recommendations: *The committee strongly encourages CASS to hold this school yearly on-site at a radio telescope. The committee recognises that, in light of increased budgetary pressures and a decrease in available staff to organise the school, it may be difficult to run annually. However we suggest that CASS could seek out a partner institute with which to co-host the school in alternating years. At the very least we strongly believe that the school should be held every two years.*

• **On-site observing experience for CASS summer students:** The CASS student vacation scholarship program has traditionally included an observing trip to either ATCA or Parkes where students are trained to observe and then carry out their own observations with the telescope. The trip also involved the preparation of mock observing proposals, tutorials on schedule file preparation and intensive lessons on data reduction, along with telescope tours which reinforce the content of the lectures they attend at Marsfield. This observing trip has been very successful in the past, and in feedback from past vacation students it is always described as the highlight of the summer program. On-site observations are a key aspect of the summer vacation scholarship program, providing the first radio observing experience for these students. Furthermore, it often inspires students to enter the field of radio astronomy. With many past summer vacation students later coming to work at CASS it is therefore also a valuable recruitment tool.

Recommendation: *ATUC is highly supportive of continuing the on-site observing experience for CASS summer students*

9. Issues arising from the previous report

ATUC regrets the need to effectively cease all work on the CABB 16-MHz zoom mode due to budget constraints. The 16-MHz mode would be important to fill the gap that currently exists between the 1-MHz and 64-MHz zoom modes, in particular for spectral-line observations.

10. Date and Format of the next meeting:

We propose to have an ATUC science day in May/June (TBD) next year on the topic of “The Future of Australian radio telescopes in the ASKAP/SKA1 Era”.