ATUC Report (November 2018)

1. ATUC members in attendance:

James Miller-Jones (chair), Stefan Osłowski, Shari Breen, Cormac Reynolds (secretary), Maria Rioja, Jo Dawson, Bi-Qing For, Miroslav Filipovic, Dougal Dobie, Ramesh Bhat

2. Commendations for CASS:

ATUC commends CASS on:

- Richard Manchester being awarded the 2019 Matthew Flinders Medal and Lecture
- Lisa Harvey-Smith being appointed as Australia's first Women in STEM Ambassador
- The success of the 2018 ICRAR/CASS Radio School in Geraldton
- The success of the MRO open days
- The recent Nature/Nature Astronomy papers based on ASKAP observations
- Successful delivery of the multibeam receiver for FAST and the PAFs for Effelsberg and Jodrell Bank

3. ATUC

The current ATUC Terms of Reference date back to 2004, and parts have now become somewhat out of date. To rectify this situation, ATUC has proposed some minor changes (indicated in the attached document), for consideration by the AT Steering Committee.

To try to provide the AT Steering Committee with more up-to-date input from ATUC prior to their mid-year meeting, ATUC would be happy to try to schedule their next meeting to take place at least two weeks prior to the ATSC meeting in May. The ATUC members are aware that this will require a rapid turnaround of the final ATUC report.

Recommendation: *ATUC respectfully requests that CASS pass on to the ATSC for their consideration the attached document, which contains a few suggestions on how the ATUC Terms of Reference might be brought up to date for the ASKAP era.*
Recommendation: *Next ATUC meeting to be scheduled prior to ATSC meeting.*

3. Prioritisation of technology development

ATUC commends ATNF on the formal EoI process that they have implemented for the upcoming round of LIEF proposals, which facilitates communication with the Universities, ensures that proposals are sufficiently well-prepared, and aids in averting unintentional misunderstandings. The Committee recommends that the results of this process be

communicated to the Universities as soon as a decision has been made, to enable the CIs and PIs to prepare the most compelling science case possible, and the Universities to assign the requested co-funding. In many cases, Universities have strategic meetings to allocate their LIEF support well ahead of the closing date.

ATUC supports the three projects identified as high-priority (the Cryo-PAF for Parkes, the BIGCAT correlator upgrade for ATCA, and the coherent FRB detector on ASKAP), but note that the timescale for LIEF would be too long for the development and installation of the FRB hardware. While this technology has a very high-impact science case, and would facilitate the development of a tied-array mode on ASKAP, it would serve a smaller community than either the Cryo-PAF or the BIGCAT upgrade.

ATUC notes that the Cryo-PAF for Parkes would have a broad application beyond ATNF facilities, and would have the potential for generating external revenue. Given the recent LIEF results, the Committee leaves it to CASS to determine whether or not this should be the subject of a third LIEF bid, but given the strategic potential would support the decision to proceed with this development regardless.

The BIGCAT upgrade would expand the ATCA's capabilities, extend its lifetime, help guard against a catastrophic failure and the loss of at least six months' worth of observing time, and has broad support from the community. ATUC would support this being the subject of a LIEF proposal in the coming round, especially if NASA funds became available from Voyager tracking to support this project.

Recommendation: *CASS should provide clear and timely communication to the lead CIs of the various LIEF EoIs regarding CASS's final prioritisation and the level of support that CASS would provide to whichever proposal(s) were selected to go forward.*

4. Time Assignment Committee

ATUC has been made aware of some concerns from the community regarding the TAC feedback on telescope time proposals. In some cases TAC comments appear to reflect a lack of appropriate science expertise, raising the concern that the grades of proposals in these science areas could have been negatively impacted. ATUC suggests that CASS re-evaluate whether all key science areas have sufficient expert representation on the committee, and if necessary be proactive in recruiting members. ATUC also reiterated the importance of ensuring that TAC feedback reflects the assigned scores, and that (as far as possible) concrete suggestions are given for improvements. ATUC is aware of the dedication and thoroughness with which the individual TAC members approach their roles, and commend them for their continued service.

TAC readers have traditionally filled some of the science gaps in the main committee. However, the feeling is that the pool of readers may be smaller than ideal, as reflected in the fact that readers are currently assigned large numbers of proposals including some outside their main

fields of expertise. ATUC recommends that a concerted effort be made to grow the pool of readers (including approaching past and present users of the telescopes), and that each reader be assigned fewer proposals, targeted specifically to their expertise. This would also lessen the workload associated with the reader role, potentially helping the recruitment effort. Feedback to readers would also assist them in performing their roles effectively (e.g. for those whose scores are very narrowly distributed, or who provide insufficient comments for the TAC to understand their scores).

A related issue is that in some highly-collaborative fields (notably pulsars), conflicts of interest can make it impossible for a proposal to be formally assessed by subject matter experts among either the readers or the TAC itself. In such cases, the only viable option would appear to be to increase the number of overseas readers. However, the problem of lack of expert (non-conflicted) representation amongst the TAC membership itself would still remain an issue.

Finally, ATUC notes that the TAC website is more than a year out of date, and was therefore unable to easily determine the current distribution of expertise.

Recommendation: *CASS should consider revisiting the makeup of the TAC to ensure that all key science areas have a genuine expert on the committee. The pool of readers should also be expanded and used effectively.*

5. Broken web pages

ATUC was asked for feedback regarding the status of the ATNF website. ATUC notes that (as of the 2018 November meeting) several pages (including the members list on the TAC webpage, and the research interests of ATNF staff) are outdated, and various links are missing or broken (e.g. the new visit/accomodation page). Some pages have a “created on” date, a “modified on” date, and the author of the update, but this is not implemented consistently across the site.

Recommendation: *Pages noted by users to be outdated should be updated. The owner and date of last modification should be included at the bottom of each page on the website.*

6. Gravitational Wave Follow Up

ATUC was asked to consider the best way to handle a number of large, highly-ranked NAPA proposals in the area of gravitational waves. The likely rate of events, their high visibility and scientific impact, and the fact that these are ongoing NAPAs that will displace a large number of scheduled projects means that these proposals require special consideration, although ATUC notes that this need not be specific to gravitational wave follow up. It could equally apply to other large NAPA time requests from multiple teams on any area of transient science.

Regardless, extra green time should be built into future schedules to provide sufficient slots for the expected numbers of NAPA overrides, or to accommodate displaced observers.

ATUC's position is that is it not feasible to observe the full requested time allocations of all three proposals without significantly (and negatively) impacting the broad range of science being done on ATNF facilities. ATUC believes that CASS staff do not have the capacity to perform all the observations as a community service, so the observing would need to be planned and carried out by the science teams themselves. Given the significant observing time requested, the science teams should demonstrate their capability to perform the observations. With a view to maximising the overall science being performed by ATNF telescopes, ATUC maintains that it would not be efficient to observe the same event three times in three different ways. ATUC therefore agreed that any approach would need to be cooperative, although the exact form of that co-operation would need to be agreed in consultation with the science teams, mediated by CASS. ATUC notes the success of the data-sharing agreement in place for the late-time monitoring observations of GW170817 and supports a similar agreement for future events.

ATUC is very keen for ATNF facilities to be involved in high-impact science. However, duplicating observations being carried out by other facilities in areas that do not take full advantage of ATNF's capabilities should be avoided without strong scientific justification. For instance, a compelling justification (e.g. in terms of early-time temporal coverage, or higher-frequency coverage) would be needed for sources above a certain declination (e.g. -10 degrees).

While a Science Day would be very useful to help the community assess the pros and cons of different approaches, ATUC felt that it would be sensible to broaden the topic of such a Science Day beyond the field of gravitational waves, to include all classes of NAPA observations that might displace other observers. However, the timescale needed for a decision on how to handle the gravitational wave proposals requires more immediate action.

Since it is not yet clear what the GW event rate is, nor what the best strategy for continued observations would be, ATUC feels that new proposals should be submitted each semester, to justify the time used to date and the proposed follow-up strategy for each continuing (or expected) candidate.

The Committee would therefore put forward the following suggestion to CASS for consideration:

- CASS should put the teams in contact to discuss a common approach, to share data (although not necessarily publications), and to ensure a single strategy per event. For the current semester, where the three proposals are all nominally active, an agreed strategy with a maximum number of hours should be submitted to CASS for approval prior to the beginning of the potential trigger period. Given the short time window before the start of the LIGO O3 Engineering run, this action should be taken as soon as possible. For the 2019APR semester, a new, joint proposal should be submitted.

Teams willing to share data in this way would be given priority. If no teams were willing to share data, the proposal ranked highest by the TAC would take precedence.

Recommendation: *That CASS consider requiring the three gravitational wave follow up teams to collaborate, co-ordinating a strategy and sharing data to maximise the efficiency of follow up and minimise the impact on the rest of the ATNF science program.*

7. ASKAP

The current ASKAP data product labelling scheme with 7 levels has created confusion during the SST conversations. Most of these levels are not even data products. Levels 1-3 are all processing stages internal to the telescope and are not accessible externally; levels 5 and 6 are **the same** data product, just before and after validation.

Recommendation: *CASS should revisit the product labelling scheme. Simplification to 3 levels would be very useful (e.g. Raw, Calibrated, SST-Generated).*

Various ASKAP SSP members have expressed interest in the possibility of splitting the bandwidth into two non-contiguous frequency chunks. With the current specification, the entire 300 MHz (or 288 MHz) has to be contiguous. The motivation for a split would be to avoid the large chunk of RFI from 1150-1280 MHz in band 2 due to satellite navigation systems, and enable the entire RFI-free part of the band to be observed in a single observation, rather than the current mode in which two separate frequency settings are required. This would, for example, streamline the DINGO SSP survey strategy and increase the HI science utility of their observations, and enable the GASKAP SSP to observe both the HI line and all four OH lines with a single frequency setting. However, any implementation would need to factor in the available resources, and should not take precedence over commissioning basic functionality of the telescope. As far as we are aware, the firmware is capable of providing a split band, and only software would need to be updated.

Recommendation: *The option of splitting the bandwidth into non-contiguous frequency chunks should be explored given that this capability would benefit many of the SSPs.*

Users have made a request to trade narrower bandwidth (288 MHz for example) for more simultaneous beams. The current configuration makes use of 36 beams for two dithered footprints. The benefit of using 72 beams simultaneously would be to increase the spectral line survey speed. A feasibility study to determine how much effort and resources would be needed to enable this mode would be required before any prioritisation can be made.

Recommendation: *The feasibility of trading bandwidth for beams be explored, with the scientific returns being balanced against the resources required to implement the mode before any prioritisation is made.*

8. ATCA

Remote requalification: ATUC was pleased to see that remote requalification is being considered and further explored. The experience that Jamie Stevens has had training DAs remotely will be useful in informing the best ways to make sure that observers and trainers can communicate effectively.

Recommendation: *CASS should continue to develop remote requalification practices and plan to make this option available to observers once it has reached a sufficient level of maturity.*

Legacy observer training: ATUC was also pleased to see that a scheme whereby Legacy survey teams would be able to train their own observers was being considered. This would take some pressure off teams that are geographically distributed, and also relieve pressure on CASS staff.

Recommendation: *CASS should consider developing a set of guidelines and processes that would allow designated members of Legacy survey teams to train (and qualify) new observers.*

Automatic overrides: Currently the policy for automatic overrides precludes them from occurring while CABB is in 64 MHz mode. The community has asked for clarification about whether or not there is scope for them (or someone else, perhaps the DA) to change the correlator mode to continuum mode to allow the automatic trigger to occur. This would pose some difficulties for scheduling, as it has the potential to increase the number of required correlator changes. One suggestion was that Jamie Stevens could provide a list of times when it wouldn't be too inconvenient to change the correlator mode and if a trigger occurred during that time, allow the correlator mode to be changed into continuum mode. Outside of these times we note that it is possible to observe these triggered continuum observations in 64 MHz mode, if the zooms are used rather than the continuum bands. There would be some reduction in sensitivity (32 x 64 = 2048 MHz, rather than the 2 x 2048 MHz bands provided in continuum mode) and increase in overall data volume (by a factor of 32) but it has the potential to simplify the process of automatic overrides and potential schedule disruptions.

Recommendation: *Automatic overrides be allowed to occur while the current observer is using 64 MHz mode. This should either use the current 64 MHz mode or be changed to continuum mode (by the PI of the triggered proposal) based on the CABB requirements of the subsequent scheduled observations (in conjunction with the expected length of the trigger). We suggest that if the scheduled observations following the expected end of the triggered observation would be in 64 MHz mode that the triggered observations use 64 MHz mode. In the case that CABB would have been changed to continuum mode by the end of the triggered observations then we*

suggest that the correlator configuration could be changed prior to the triggered observations commencing.

Legacy surveys: It was pleasing to see that CASS now has a plan for hosting data products resulting from Legacy surveys, but note that this information is yet to be communicated to the Legacy survey PIs. We further note that issues raised at previous ATUC meetings about the lack of clarity around the support offered by CASS (such as disk space) are still yet to be reconciled.

Recommendation: *CASS should communicate the process for data release to the Legacy survey PIs, and clarify the support offered to Legacy surveys, particularly around promised resources such as disk space.*

9. Parkes

The community is generally happy with the status of Parkes, particularly noting the successful deployment of the UWB Low. We note that thanks to outstanding performance of the new backend, very high data rates can be produced which can cause problems for data archiving, processing, as well as potentially impacting observers whose observations follow recording modes with high data rates. While the message on PORTAL helps to raise the awareness of the issue, more could perhaps be done in the UWL guide.

As these are the early days of using the UWL, the community would appreciate if the observer's guide for UWL (including the current interim google document) could include an example of the expected bandpass. Given the large parts of the bandpass being zeroed out by the backend, it can be hard to decide if the bandpass is acceptable.

The community recognizes the importance of supporting the Voyager 2 tracking. While there is some inconvenience caused by the lack of Galactic time, ATUC was satisfied with the way CASS handled the rescheduling, including extension of the schedule into the first month of the next semester. A minor worry is what happens if the goals of the tracking are not achieved by mid-February when the currently scheduled tracking ends.

Recommendation: *CASS should continue commissioning of the UWB Low and TOS.*

10. LBA

ATUC would like to see an update on the LBA included in the ATUC Open Session, and continued support of all telescopes in the network.

On-going and planned technological developments, such as UWL and BIGCAT capabilities, enable increased flexibility and new capabilities for wideband and astrometric LBA observations. The ASKAP tied-array output which would straightforwardly be enabled by the coherent FRB detector is very timely to carry out science cases proposed for the SKA-era, with joint global VLBI observations with MeerKAT and FAST. Note that FAST plans to be VLBI-ready by 2020, and has a unique potential for ultra-high precision astrometry using the 19-beam receiver.

At mm-wavelengths, joint observations between ATCA and the Korean VLBI Network (KVN, KASI) at 43 and 86 GHz are becoming more common with an increasing number of proposals for new science. Equipping Mopra with a mm-wave simultaneous multi-frequency receiver system compatible with the KVN (currently under exploration led by KASI, South Korea) would further strengthen this field, although ATUC is aware that CASS does not currently have the budgetary resources to continue either operating or upgrading the capabilities of Mopra, and this would rely on external funding becoming available.

ATUC strongly supports the ongoing efforts to streamline the process of joint proposals with the European VLBI Network (EVN).

Now that the Mars receiver is in the Parkes focus cabin for the Voyager tracking, it might be worth considering scheduling additional ~8 GHz VLBI observations (if any were in the queue). This would maximise the benefits of the current receiver setup, and enable some science which normally would require additional receiver changes.

Recommendation: *CASS should include an LBA update in the Open Session of future ATUC meetings, and endeavour to provide continued support to all ATNF telescopes participating in LBA operations.*

11. Other issues

ATUC noted that significant events at the MRO - such as the power failure and resultant RFI as well as the burnt PAF(s) - were not mentioned in any of the updates at the Open Session. In future meetings, ATUC would prefer to have developments like these included so the Committee can better gauge the ongoing status of the facility, and more effectively communicate with the broader community.

ATUC is in principle supportive of the construction of a second dish at New Norcia, provided that it did not impact on the support and continued operations of existing ATNF facilities (including ASKAP, ATCA, Parkes and the LBA). If such a facility were to be constructed, ATUC would encourage CASS to negotiate a host country agreement and guaranteed time for this facility, noting its potential to participate in the LBA.

At future meetings, ATUC would like to see the inclusion of mid and long term visions, along with the currently provided short term plans for the various ATNF instruments.

Recommendation: *ATUC requests updates on major facility issues and developments, as well as mid- and long-term visions for the different instruments, at each ATUC Open Session.*

Recommendation: *Should significant resources be invested into the construction of a second dish at New Norcia, ATUC recommends that CASS pursue a host country agreement with guaranteed host country time attached.*

12. Other community feedback:

ATUC received a request to discuss whether the scheduling of observations in AEST should be deprecated, on the basis that it is confusing for observers. ATUC discussed this issue, but recommend that no changes be made to current policy of providing schedules in both UT and AEST. The committee noted that AEST is a clearly-defined timezone, and gives users an indication (within 1 hour) of East Coast office hours, which is relevant when deciding how to escalate technical issues. ATUC noted that this issue may need to be revisited in future when deciding how to display ASKAP schedules (e.g. consider using AWST).

Recommendation: *Schedules to remain primarily in UT, with AEST remaining as an indication of East Coast office hours.*