

ATUC Report – April 2024

* = Action recommended by ATUC

non-* = Update requested by ATUC

1. ATUC members in attendance

Stas Shabala (Chair), Vanessa Moss (Executive Officer), Craig Anderson, Hayley Bignall, Adelle Goodwin, Marcus Lower, Yik Ki (Jackie) Ma, Rami Mandow (student member), Gavin Rowell, Manasvee Saraf (student member), Ivy Wong.

2. Commendations for S&A

- The Royal Astronomical Society Jackson-Gwilt Medal to Keith Bannister and Ryan Shannon for their work on FRB search using ASKAP.
- First BIGCAT data on Optus satellite and maser, including first demonstration of observations at 12.2 GHz
- Regular FRB detections and discoveries of new Galactic sources such as pulsars, RRATs, and ULPs with CRACO
- Contribution to successful deployment of SKA-Low antennas
- Data now taken for all ASKAP Science Surveys by end of 2023

3. Operations

3.1. ASKAP

ASKAP workflows

A large fraction of the community continues to be heavily invested in the success of ASKAP, ATNF's youngest flagship facility. Since the start of the full survey period in Q4 2022, continuum surveys have made good progress while some spectral line surveys have experienced significant delays. Issues experienced by WALLABY and other spectral line surveys arise largely from the processing workflow in combination with the challenges faced by the commissioning of Setonix at Pawsey. Community feedback indicates that several anticipated early science discoveries are now being made by ASKAP's contemporaries (such as MeerKAT), taking opportunities away from ASKAP users who have already invested their time and funding resources.

In the medium term, the current backlogs in observations and processing can be alleviated by an upgraded ASKAPsoft workflow which will reduce the number of rejected observations. In the short term, investigation of alternative interim processing avenues and/or decoupling observations from processing may be helpful to spectral line surveys such as WALLABY, which is important to the ASKAP user community.

**3.1 Recommendation:* ATNF to implement necessary improvements to the ASKAPsoft workflow, including those previously recommended by ASKAP spectral line survey teams such as peeling and the RACS sky model. ATUC would like to see progress in this area by the next meeting.

**3.2 Recommendation:* ATUC emphasises the importance of resolving current issues with the ASKAP data pipeline on the shortest possible timescales. Into the future, ATUC recommends prioritising flexible workflows and portable code bases, to enable alternative solutions to data processing when any future issues arise.

Engaging the user community

Initiatives such as AKVET, following in the footsteps of ACES, are key for involving the wider community and Survey Science Teams (SSTs) in helping solve ASKAP's technical challenges. Secondment arrangements may complement CSIRO's limited resources, and serve as a two-way conduit for information between CSIRO and the SSTs. Yet, AKVET is mostly inactive. ATUC is aware of plans to revive AKVET, and we encourage ATNF to engage people who are deeply involved in both ASKAP's daily work and the SSTs, including in the leadership of this initiative.

**3.3 Recommendation:* ATNF to engage the user community in a technically-focused way, for example through AKVET, to accelerate implementation of the upgraded workflows. ATUC requests greater visibility of progress of workflow upgrades.

3.4 Recommendation: Restart AKVET at the earliest opportunity, preferably prior to the next ATUC meeting, with a careful consideration given to leadership structure, goals, and close working relationship to SSTs.

3.2 High Performance Computing

ATUC appreciates the efforts of ATNF staff and external partners, including at the Pawsey Supercomputing Centre, in supporting the rollout and operations of new HPC infrastructure in support of ASKAP science. We acknowledge the numerous challenges involved in this rollout, including some unexpected ones beyond the control of both ATNF and Pawsey. In ATUC's view, the system stability issues have persisted well beyond a reasonable timeframe, with significant negative impact on the ATNF user community. ATUC is concerned about medium- and long-term impacts of these issues on the viability of affected research programs, including external funding streams which leverage ASKAP data.

ATUC notes that the ASKAP and broader radio astronomy community in Australia have built a 15-year partnership with (and hence expectation of) the Pawsey Centre as being central to our work. ATUC seeks a better understanding of why the current Pawsey strategy does not appear to align with the community's priorities, in the context of radio astronomy being a foundation partner for the centre.

**3.5 Recommendation:* ATNF continues seeking appropriate support for the user community's ongoing needs. ATUC strongly supports the ATNF in highlighting the key role of radio astronomy as a foundation partner in Pawsey.

**3.6 Recommendation:* Given Pawsey's proposal to change cluster management software on Setonix to reduce downtime, ATUC recommends that ATNF obtain evidence-based projections from Pawsey on the

expected impact of this change. ATUC recommends that ATNF communicate these findings to the SST leads to ensure transparency and align expectations.

3.3 Ticketing system

As raised in the last ATUC report, users have continued to express the need for a straightforward and formal way to report problems, track them, and get regular, open updates on what is being prioritised and worked on.

**3.7 Recommendation:* In view of strong and continued user-demand, ATNF implements a ticketing system as soon as is practical, preferably prior to the next ATUC meeting.

3.4 Murriyang dynamic scheduling

Murriyang users currently have the ability to commence an observing block and leave the telescope unattended, returning to it later. However, if a non-critical observing failure occurs (e.g. wind / storm stow, or sudden instrument failure) there is no way to automatically return to scheduled observing. This presents a problem for projects that don't have observers available (e.g. on overnight shifts) as leaving the telescope alone could result in the telescope stowing and losing an entire block of observing time. A potential solution would be to introduce an optional degree of intelligence and automation to observing algorithms that will allow the telescope to remain unattended and still not risk losing a full observing block. This intelligence would recognise when a non-critical failure occurred, and when the telescope can resume operation. When resuming, it will take into account the elapsed time and select the next appropriate target in the schedule block. This is not related to telescope safety issues or RFI mitigation, which is handled in post-processing. A solution of this nature may also be portable to ATCA or other future applications (e.g. with CryoPAF). The feasibility of autonomous observing has already been demonstrated by ASKAP.

3.8 Recommendation: ATNF continues to investigate dynamic scheduling options on Parkes, and reports to ATUC before the next meeting.

4. Data and archiving

4.1 Data retention and resilience

Currently science-ready data products are only available from ASKAP as the migration of ATOA to CASDA still involves ATNF delivering raw data. This impacts the potential transition and implementation of a cloud-based data platform solution(s). Data egress from commercial cloud services is expensive but if the data need to be processed, the users need additional software processing support for cloud-based systems. ATUC notes that there is some concern about users being required to pay (often large) fees to store and access data from commercial cloud based services.

ATUC strongly supports ATNF in prioritising long-term data storage, to ensure data resilience and security. As Australia's national science agency, CSIRO is the appropriate custodian of these data which provide significant long-term benefits to the nation. The counterfactual in which data and archiving activities are not supported poses a significant risk to large technology and science investment already made.

The impact of archival data can be profound. A search of the NASA ADS database reveals that the number of publications per year which use archival telescope data has more than doubled over the past decade. Many noteworthy discoveries, including those which generated entirely new fields of astronomy (e.g. Fast Radio Bursts), were made with archival data. The impact is even greater when the available data are science-ready and easily used by communities beyond their immediate area of research, as demonstrated by facilities such as the Sloan Digital Sky Survey. The transition to delivering science-ready data will reduce the data load on the local/cloud archives, as well make the data more accessible to a wider demographic of astronomers and multi-messenger scientists.

ATUC's view is that dedicated support of data archives is essential for maximising the impact of ATNF facilities.

**4.1 Recommendation:* ATUC encourages CSIRO to prioritise the investigation and implementation of long-term data storage solutions that will ensure the impact of the ATNF datasets, without compromising existing telescope operations. ATUC notes that, while delivering science-ready data is not a "business as usual" activity for all ATNF telescopes, it is crucial for the long-term impact of ATNF facilities.

4.2 Pulsar data

ATUC acknowledges that the pulsar search data rates from the CryoPAF present a challenge for data storage. One potential solution would be to perform pulsar searching as a service using a standard ATNF-designed pipeline on an ATNF machine. ATUC is interested in further details on the pipeline specifics, final data products and what resources are needed to develop and support this effort.

The Parkes Pulsar Data Archive is a vital public resource that the ATNF provides to users. However, users have reported that accessing some files is often difficult and unintuitive. Large (>10 GB) files cannot be requested via the search form, and instead requires users to locate and access individual collections. There have also been issues with incorrect files being retrieved by the supplied terminal commands. This has led to some user confusion surrounding the availability of certain data and frustrations around their accessibility.

4.2 Recommendation: ATNF to report on the feasibility of providing pulsar searching as a service for the community. ATUC requests an update before the next meeting.

4.3 Recommendation: ATNF to improve the accessibility of data collections hosted on the Parkes Pulsar Data Archive.

5. Policies

5.1 ASKAP Guest Science Program

The first call for ASKAP Guest Science Projects (GSP) was successfully opened last year, presenting an opportunity for users to access the instrument beyond the SSTs. ATUC received user feedback that the time allocation for the GSP is too small, with just 150 hours available to be allocated per semester. A concern was raised that this may discourage users from applying for ambitious projects and ATUC notes

that this is significantly less than the up to 25% of observing time originally suggested by the ATNF in 2009. The ASKAP GSP observations also do not have an embargo period, although ATUC notes a policy statement that an embargo period “will be considered only under exceptional and compelling circumstances, up to a maximum of 12 months from the observation.” This policy may limit the nature of proposed projects, with potential proposers without mature ASKAP processing pipelines less likely to engage with this process. ATUC also notes that the ASKAP user policy available on the website is outdated, and should be updated to be consistent with the more up-to-date documentation available on Confluence (linked within the ATNF Telescope Status page provided with the Call for Proposals).

In early operations, some GSP proposers were notified of the status of their project after the start of the relevant semester. Timely notification of observation times is crucial to enabling any required multi-frequency observations to be scheduled, as well as ensuring that the observers can prepare for data when it is taken.

5.1 Recommendation: ATNF review the ASKAP GSP time allocation process and data embargo policy, including assessing the possibility of increasing the time available. ATUC requests an update by the next meeting.

**5.2 Recommendation:* ATNF ensures that the communications mechanism for ASKAP GSPs is consistent with other ATNF facilities, including notification of proposers whether or not their project will be scheduled time before the observing semester begins.

**5.3 Recommendation:* ASKAP user policy from 2009 is updated and made consistent with that provided in the Call for Proposals.

5.2 DDT and NAPA policies

ATUC appreciates the clarifications and summary of DDT prioritisation, ToO and NAPA policies provided during the ATUC open session. ATUC notes that the recommendation from the 2023OCT semester report has not been addressed in full. We recommended:

“The data policies surrounding triggering and sharing of data for NAPA/ToOs are updated and clearly outlined on the “Data access and archives” website including specific example scenarios. This includes developing a policy for the new rapid response triggering mode for ATCA.”

These policies do not appear to have been reviewed or updated, and some scenarios remain unclear.

Required policy updates include:

- NAPA projects currently being required to re-justify multiple triggers on a source for a proposal that has already been approved by the TAC;
- A policy on competing rapid response mode triggers; and
- Clarification on the proprietary data periods for NAPA and ToO observations. While the official ATNF policy states that if results are not made available within a week of the observations, then the raw data may be released to other groups, in practice it is not clear how (or if) this policy is enforced. For example for Parkes, users report that all ToO data are made public on the archive immediately even if the observers release the results within the one week period indicated. ATUC notes that one week may not be a reasonable timescale to release all NAPA results, and many ToOs. For example, a NAPA with multiple triggers on the same source (e.g. a synchrotron transient such as a GRB or TDE) may have multiple triggers that are logarithmically spaced over years. The observers will likely (and usually do) release an ATel announcing the initial

detection/non-detection within one week of the first observation, but requiring that the observers release each subsequent observation within one week means that the authors have to release multiple ATels on the evolution of the source, essentially releasing the results prior to a peer-reviewed publication – a situation which ATUC considers to be unreasonable.

**5.4 Recommendation:* ATUC supports prioritisation of NAPAs over ToOs. ATUC recommends that the official ToO and NAPA data release policy is reviewed and clarified, specifically that:

- A policy for competing rapid response mode triggers is developed.
- The public release of NAPA and ToO data policy is updated, clarified, and enforced.
- The policy surrounding triggering of NAPA projects is updated, as NAPAs that have been approved by a TAC for a certain number of triggers should only need to refer to their scientific justification when triggering pre-approved observations.
- All of these updates are added to the NAPA and ToO policy website.

5.3 User-supplied equipment at Parkes

ATUC notes some interest in the community for users to bring their own equipment, to satisfy the needs of future large projects involving the CryoPAF. Such user-supplied equipment and resources have been installed on Murrinyang in the past (and in more recent years, MeerKAT) to support large surveys and enable new science operation modes. These initiatives have included saving data to storage on site, then transporting the physical drives to university-operated HPCs for processing and analysis.

**5.5 Recommendation:* ATUC requests that ATNF clarify the policies and frameworks for installing user-supplied equipment such as data recording machines at the Parkes observatory.

6. Training and user support

ATUC congratulates ATNF on progress with BIGCAT and CryoPAF, and notes an opportunity to develop a plan relating to training materials for both instruments by and for the community of users of these instruments.

6.1 Recommendation: A plan for development of training materials is created and tested.

Members of the ATNF community have raised that some ATNF telescopes have a steep initial learning curve, with not many learning materials easily accessible. Users noted that there is also no clear indication of where to start in accessing these materials, nor if they were accessing the most up-to-date versions. Having publicly available and up-to-date training documentation across telescopes would be very useful.

6.2 Recommendation: A review of existing training documentation across the national facility be undertaken, with gaps identified. Once identified, ATUC recommends that a publicly-available training development plan be developed before the next ATUC meeting, outlining ATNF's approach to mitigating these identified gaps and a plan for implementation with target timelines. The plan should also outline where these public documents are stored, as well as who is responsible for mitigating the training gaps.

Amid ongoing updates, involving students in crafting supplementary training materials may enhance clarity on frequently-raised user concerns without replacing official guidelines. Collaboration with communication teams to develop style guides and templates can ensure consistency, and pairing students with experienced individuals is likely to foster mentoring relationships across CSIRO nodes.

6.3 Recommendation: In time for the next ATUC meeting, ATNF to investigate the feasibility of student contributions to training materials, through pairing with expert observers to create content tailored to specific problems relevant to their research projects.

7. ATNF projects and future priorities

7.1 Long-term planning for Australian astronomy

ATUC notes current strategic planning initiatives within both ATNF (via the “ATNF of the Future” project) and the broader Australian astronomy community (via the “NCA Decadal Plan”). The long-term future of all ATNF facilities is closely tied to these initiatives. Specifically, the “ATNF of the Future” Working Group reports commissioned by the ATNF contain a plethora of viable future science cases and information on complementarity with other (non-radio) facilities, and ATUC recommends that these be shared with the community as soon as possible.

ATUC acknowledges potential challenges for ATCA in the SKA-Low/Mid era, but emphasises the need to support investments in BIGCAT to extract science return back to the partners investing in it, as well as to the wider community.

**7.1 Recommendation:* ATNF to share the “ATNF of the Future” Working Group reports with the user community as a matter of priority (no later than May), to enable input into the NCA Decadal Plan for Australian Astronomy 2026-2035 which is currently in development.

7.2 Recommendation: ATNF to share with the user community its desired future science roles for ATCA, noting the new opportunities BIGCAT will offer for the next 5-10 years.

7.3 Recommendation: ATUC supports ATNF’s efforts to advance ASKAP’s role in the future SKA-Low and Mid era. ATUC recommends that ATNF develop a science case in consultation with the community, and share in relevant public forums (such as a white paper and/or presentation at the ASA ASM) the key criteria and desired performance specifications for an upgraded ASKAP. ATUC requests an update in time for the next meeting.

7.2 ATNF projects

ATCA BIGCAT

ATUC congratulates ATNF on the commissioning progress of the ATCA BIGCAT, especially with the streamlined procedures regarding observations. ATUC further notes that maintaining ATCA’s status as a world-class instrument into the SKA era will require demonstration of its scientific value with the BIGCAT backend. This can be achieved by assisting potential users of the telescope in developing and carrying out ground-breaking projects.

**7.4 Recommendation:* ATNF develop necessary user software, in-depth training materials, and a dedicated community engagement plan for BIGCAT. ATUC requests a plan for these activities, including resourcing, presented at the next ATUC meeting.

VLBI

ATUC notes the potential of the proposed low-frequency LAMBDA VLBI demonstrator in the SKA era. Driven by linkages to developments in other wavebands and multi-messenger fields, ATUC recognises future opportunities for metre plus centimetre VLBI, including rapid-response science opportunities across a broad frequency range.

7.5 Recommendation: ATNF considers future resource requirements to enable a path for the demonstrator to turn into a national facility with a broad user base. ATNF should investigate the benefits of co-location of LAMBDA with existing ATNF facilities. ATUC requests an update in time for the next meeting.

Parkes CryoPAF and UWMH

ATUC commends ATNF staff on their persistence in commissioning the CryoPAF, and appreciates the benefits from the connections between ongoing projects such as the Jimble digitiser utilised by both CryoPAF and BIGCAT. ATUC recognises the expanded science opportunities a new ultra-wideband high receiver and back end will offer, and that its addition will also enable the continued participation of Parkes in VLBI.

**7.6 Recommendation:* ATNF continues to pursue the development of the UWMH receiver to ensure the future science role of Parkes. ATUC requests an update in time for the next meeting.

CRACO as a National Facility

ATUC recognises the success of CRACO and notes that there have already been ASKAP Guest Science Proposals interested in using this observing mode. In order for CRACO to become a National Facility, the observing mode needs to be stable, reliable, available long term, and the data products need to be able to be reliably supplied to the user community.

7.7 Recommendation: ATUC encourages the CRACO team to work with ATNF to further develop plans to become a National Facility for the benefit of the wider community.

8. Community Engagement

8.1 Observing Experts model

ATUC recognises the improvements offered by the unified OE model, over the old Duty Astronomer (ATCA) and Project Expert (Murriyang) support models. Some aspects, such as ensuring appropriate support for NAPA observations, and OE training, need finessing, and specific expectations of the OE role for each instrument need to be clearly documented and easily accessible on relevant web pages. We recognise that new instrumentation requires new, specific documentation and training.

**8.1 Recommendation:* ATUC recommends the OE model be further defined and outlined, then socialised with the wider user communities, to allow opportunity for user feedback on what the model of upskilling Observing Experts might look like. ATUC requests an update by August. Once this information is received in a timely manner, ATUC will request user feedback specifically on the OE model in advance of the next meeting.

8.2 Website

The ATNF website is in the early stages of being redeveloped. This website serves a wide variety of user personas including students, internal staff, external researchers, teachers, and the general public. Website redevelopment allows the opportunity for ATNF to re-organise the website based on user experience (UX) feedback from each of these user groups, and ensuring a high-quality final product.

8.2 Recommendation: ATNF conducts user experience (UX) research to inform critical decision-making for different ATNF stakeholders (user personas, journeys) in the ATNF website redevelopment project before the commencement of wireframing, design and development.

9. Student Experience

At present, the engagement within the student community is limited, resulting in a lack of awareness regarding student opportunities. This also hinders the ATUC student members' ability to assess the overall student experience and understand the broader or deeper impacts of issues affecting students.

**9.1 Recommendation:* The ATNF collaborates with current ATUC student members to promptly re-invigorate the student program. This includes enhancing connectivity within the student body and at the earliest opportunity. ATUC requests an update before the next meeting.

Incorporating a student perspective throughout the ATUC open session presentations, where appropriate, would help new ATUC members provide valuable student perspectives in the ATUC reports.

9.2 Recommendation: ATUC suggests that the presenters at the next ATUC open session specifically address any possible impact of operational changes on the student body.