Future ATNF Operations

Community Feedback

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1 Introduction

1.1 Background

The CSIRO Australia Telescope National Facility (ATNF) is planning major changes to its operations. By 2012 the ATNF will be operating four observatories; the current facilities – the Australia Telescope Compact Array, the Parkes and Mopra radio telescopes – and the Australian SKA Pathfinder telescope (ASKAP), now under construction. This array will be located in the Mid-West region of Western Australia within a radio-quiet region designated as the Murchison Radio-astronomy Observatory, and is expected to comprise thirty-six 12-m diameter antennas. These four Observatories will also be used as elements of the Long Baseline Array (LBA) for Very Long Baseline Interferometry (VLBI).

In December 2007, the ATNF Leadership Team (ALT) provided a report on the plans for future operations, *Future ATNF Operations (version 1)*[1], to the ATNF Steering Committee. The report was then made available to the wider community, through the ATNF website, in February 2008.

Briefly stated the future operations plans are to:

1. Restructure ATNF Operations from a site-based structure into two streams for Science Operations and Engineering Operations;

2. Establish a Science Operations Centre in Sydney (SOC); and

3. Streamline supported observing modes according to scientific priorities.

Following the release of *Future ATNF Operations (v1)*, it was clear that many ATNF users had significant concerns with the proposed plans. In response to this, the ATNF and the ATNF Users Committee consulted widely with the user community to seek input on the future operations plans. The ATNF will consider this feedback and provide further versions of the *Future ATNF Operations* document as the plans progress.

This report has been prepared by Jessica Chapman (Operations Research Program Leader, ATNF) and Elaine Sadler (Chair of the ATNF Users Committee) as a joint summary of the feedback received from the ATNF user community between February and early June 2008 on the future operations plans. Without restating all of the feedback received we have attempted to capture the areas of concern raised by individuals and cross-sections of the community. The timeline for input to this document was as follows:

12 December 2007	*Future ATNF Operations (v1)* was considered at a meeting of the Australia Telescope Steering Committee.
15 February 2008	*Future ATNF Operations (v1)* was made available to the ATNF User Committee (ATUC) and to ATNF users.
March – early April 2008	David McConnell, Jessica Chapman and/or Lewis Ball visited user groups in Sydney, Hobart, Melbourne, Perth and Canberra to present the plans and discuss these with individuals and groups.
19 March 2008	A well-attended open forum discussion, mediated by Prof Steven

[1] For web links to the *Future ATNF Operations* report and other related web pages, see section 4.

	Tingay (Curtin University of Technology), was held in Marsfield.
February – early May 2008	Contributions from around 35 individuals were received through a Future Operations Discussion Forum available on the web. Some contributions were also made directly to ATUC members.
7 – 8 May 2008	ATUC meeting held at Marsfield
2 – 5 June 2008	ATNF staff attended a meeting of the American Astronomical Society meeting, held in St Louis, US, to present and discuss plans for ATNF facilities and future operations.

2 Community Feedback

2.1 General comments

Following the release of *Future ATNF Operations (v1)* it was apparent that ATNF users were taken aback by the range of measures and the degree of changes being considered by the ATNF. Users felt that there had been an insufficient level of consultation in the preparation of the document, and were unclear regarding which decisions had already been made and which were open for further discussion.

However, since February 2007, there has been strong engagement from the user community which has welcomed the opportunity to provide input into the plans. Many users are strongly interested in discussing how the telescopes of the future might operate, and how to run facilities productively and efficiently. Australian users have appreciated the visits of ATNF staff to the university groups, and the ensuing discussions. There have been fewer opportunities for direct dialogue with overseas users. As one commented on the web forum -

> *.. I think that the international community and its interests would and should deserve much more attention. Of course, Parkes is an ATNF facility, but it should not be neglected that the overall success in the past was often achieved with international partners and astronomers. [M. Kramer, Jodrell Bank Observatory]*

Most users accept that the ATNF does need to streamline its future operations, and that (as foreshadowed in the recent Decadal Plan) there are strong budget considerations to take into account if the ATNF is to to operate ASKAP as well as the current facilities. The user community would, however, like to have more information on the costs, detailed plans and timescales for the future operations plans, and to have a clear understanding of what the cost and science benefits will be. Many individuals stated that decisions should be science driven and lead to the best possible science outcomes.

Many of the concerns raised by users relate to the Parkes telescope. Whilst some see advantages in upgrading the telescope and providing some level of remote operations, many users were sceptical that Parkes could be operated in a fully remotely and safe mode which was also cost-effective. Users would also like to know how the remote operations of Parkes will impact on research programs.

> *… It is also important that the risks and costs are understood to apply, not only to the telescope automation process, but also to the future science productivity of the telescope... [R. Manchester, ATNF]*

2.2 ATNF Operations restructure

2.2.1 Parkes and Narrabri Officers-in-Charge

A significant concern amongst some users is that the new structure for Operations does not include Officers-in-Charge at the Observatories and that this change would be taking place on a short time scale (from 1 July 2008). Comments included that the Officers-in-Charge have provided a strong focus at each site on the operations and requirements of that site and that there is a risk of losing this in the new model. Conversely, during the open forum discussion, other users commented that there are risks associated with having a 'single point of failure', and that there can be advantages in a model where there is a wider distribution of expertise.

> *From the observers' perspective, we need to know who has the final responsibility for the telescope and its operations. This has safety as well as scientific consequences, and we view the decision to remove the Parkes and Narrabri OiCs, especially at such short notice, with grave concern. [University of Sydney group submission]*

The change from having an Officer-in-Charge in the new structure is of most concern to Parkes observers who felt strongly that the extensive knowledge of the Officer-in-Charge and his interactions with visiting astronomers have contributed hugely to the successful operations at the Observatories and to staff morale on the site. Some individuals expressed concern that this change will lead to a loss in staff morale at the Observatories (especially Parkes) and this in turn may make it harder to appoint staff. We note that there was less feedback on these issues for the Narrabri Observatory.

It is generally felt that the outstanding success of Parkes for single dish radio astronomy, and in particular for pulsar research, in recent years has been due to a combination of the Officer-in-Charge and a team of skilled and dedicated staff at the site who are strongly committed to supporting observations.

> *In my opinion, as a pulsar astronomer, Parkes is THE world's premier pulsar instrument. This is no mean feat given its smaller size versus more mightier competitors such as Arecibo and the GBT. [D. Lorimer, West Virginia University]*

It was noted that once the Officers-in-Charge roles cease, it will be important to continue to have staff available on site with high-level systems knowledge. On a practical level, users would like to have clear information on the people to contact with enquiries when the new structure is in place.

2.3 Science Operations Centre and remote operations

Many observers who use the Compact Array are comfortable with remote operations of the array and would like to be able to continue to take some observations remotely, provided that they can also visit the Observatory when they need to. Mopra observers commented that the recent change in the observing mode, where Mopra observations are now taken remotely from the Narrabri site, has been beneficial. The Mopra observers have found that this has provided better access to expert staff and improved accommodation and site facilities.

The feedback indicates that some degree of automation is seen as beneficial for Parkes. However, as discussed above, in general users were unconvinced that it will be possible to achieve fully remote operations for Parkes in a cost-effective way.

Observers clearly enjoy going to the Observatories and often find these visits to be inspirational. The benefits mentioned include the opportunities for interacting closely with the telescope systems, the support provided by expert on-site staff, opportunities for trying out innovative techniques and to push the boundaries of what can be done, and not least – the quiet, remote locations where observers can work in a highly focused way on their observations and data reduction.

Reactions to the proposed SOC in Sydney have been mixed. Some see that a Sydney-based Science Operations Centre would provide new opportunities. A long-term perspective was that

> *The enjoyment and experience one gets out of going to Parkes or Narrabri in 2008 might be replaced by an equally stimulating experience exploring the archive at the Operations Centre in 2028. This might sound unappealing to some, but I personally am quite excited by the new discovery space that will be opened up.*
>
> *There will always be a place for observing, especially on older and smaller telescopes. But the front line of astronomy is shifting, and we need to be prepared to move with it.* [B. Gaensler, University of Sydney]

In the shorter term some see that the SOC will lead to an increase in the level of support, especially for novice observers. Australian users noted the cheaper costs of travelling to Sydney compared to the Parkes and Narrabri sites. However, overseas observers responded that having made the effort to travel to Australia, they would like to be able to go the final few hundred kilometers to the sites.

A number of people commented that the SOC should aim to reproduce the benefits of on site observing as closely as possible. Observers will need a quiet and focused control-room environment and appropriate on-site facilities, including quiet areas for resting and sleeping during the day or night, and the provision of all meals. In response to the question raised on ‘why come to Sydney’, an ATNF staff member commented that there is a human factors element in encouraging responsible use and monitoring of the telescope facilities by observing from a focused environment.

Observers asked for clarification on when they will be expected to observe in Sydney, when they can observe remotely from other locations and when they will be able to go to the Observatories. Some of the reasons given by observers for continuing to go to the Observatories are to try out new or innovative techniques, to set up and test observations at the start of large projects, and for students and younger staff to gain experience and training (section 2.3.1). It was suggested that observing from the SOC may be best suited to straightforward and/or long term projects. A concern was raised that the amount of observations that continue at the Observatories may become too small to be sustainable.

Users requested more clarification on the level of support that will be provided in Sydney, particularly during night-time hours. Some noted that the recovery time for observing problems may be longer for remote observations than for on-site observing. A drop in night time support from on-call staff is of particular concern to observers taking observations at millimetre wavelengths, as conditions for their observing are generally best at night time.

It was also noted that the SOC will require a change of culture in Sydney. While staff at the Observatories are strongly focused on supporting visitors and observers, Sydney staff may find visitors a disturbance to their other work, and/or may find they are asked to provide a higher level of support for operations.

Several discussions included comments that the proposal to build an SOC is part of a wider international trend that will see an increasing number of such centres around the world. Some university groups expressed an interest in seeing a wider network of science centres established in Australia.

2.3.1 Students and duty astronomers

Many individuals, including postgraduate students and their supervisors, provided feedback on the importance of the observing and other visits made by postgraduate students to the Observatory sites. These are seen as extremely beneficial to students who gain hands-on experience of observing, improve their knowledge of radio astronomy techniques, and benefit from the close interactions with ATNF staff and visitors.

> *As a PhD student, I personally have found observing experiences very important in shaping me as a real radio astronomer. I have made one trip to the Compact Array and one trip to Parkes and I couldn't tell you how much I loved and treasured my time spent at the telescopes. [S. Mao, CfA / ATNF]*

Students and ATNF staff also indicated that they gain valuable experience by providing Duty Astronomer support for the Compact Array. This provides opportunities to identify and diagnose problems with telescope systems as they arise, and thus a richer experience at understanding the systems. There is a general agreement that users would like the Duty Astronomer program, or a similar scheme, to continue.

Some requests were made for clarification from the ATNF of how the Duty Astronomer scheme will work at the SOC, and whether Duty Astronomers will continue to have 'priority' access to Director's Time. University users requested confirmation that ATNF will continue to provide travel and accommodation funds for PhD-affiliated students who provide Duty Astronomer support in Sydney.

2.4 Proposed changes to observing modes

2.4.1 Upgrades to current facilities

Strong concern was expressed by some experienced astronomers over a statement in the *Future ATNF Operations* document that 'no major new instrumentation projects will be undertaken beyond those already commenced or approved', as they consider that this will lead to an overall decline in facilities and drop in scientific output. The need for the Compact Array upgrade to provide broadband centimetre facilities with CABB was highlighted as a priority for future upgrades.

2.4.2 Support for Tidbinbilla single dish observations

A possible measure for streamlining operations, included in *Future ATNF Operations (v1)*, is to cease operation of CDSCC facilities at Tidbinbilla for single dish astronomy. A new 12-mm receiver will be commissioned at Parkes in 2008 and will provide an alternative facility for single-dish 12-mm radio astronomy.

Users of Tidbinbilla facilities noted that the 70-m antenna is still the most sensitive single dish in the Southern Hemisphere for the 12-mm band, and is approximately nine times faster than expected for the new Parkes receiver for single telescope pointings.

> *…The 70-m provides the largest and most sensitive single dish in Australia. The 34m provides another valuable facility. They both operate up to the 20 GHz band, and provide an important resource for both VLBI as well as single-dish observations. We should not willingly be offering to give back our national time on these facilities…*
> *[M. Burton UNSW]*

Users commented that the service observing mode used for single dish observations has allowed very productive use of the short blocks of time that are available through the Host Country Agreement. Tidbinbilla observers said they would like to see support for this continued, as well as the use of the 70-m antenna for VLBI observations. They consider that the ATNF has had very good value from Tidbinbilla since almost all of the operational costs are provided by the CDSCC. The presence of an astronomer at Tidbinbilla, with part of a position funded by ATNF has been of great value in achieving excellent science outcomes, for example with the detection of water masers from distant galaxies.

2.4.3 Parkes receivers and receiver changes

Another possible measure for streamlining operations proposed in *Future ATNF Operations (v1)* is to reduce the number of receiver changes at Parkes. The plans include a proposed reduction from the current level of about 30 receiver changes per year to about five per year, with an advertised schedule of available receivers.

Users stressed that the frequency coverage and agility of the Parkes telescope are two of its competitive advantages. Parkes observers would like to retain some degree of flexibility with receiver changes and consider that a rigid schedule would be detrimental to some science programs such as monitoring or timing observations that require year-round data. It was suggested that it may work better to have a schedule based on a six-month cycle of receiver changes than a one-year cycle, to allow for night time observations across all right ascensions.

A provisional list of equipment at Parkes to be decommissioned included in *Future ATNF Operations (v1)* includes the methanol multibeam receiver that may be transferred to Jodrell Bank. Parkes observers stated that they would like to see the facilities for 6- and 12-GHz spectral line observations retained at Parkes.

> *Australia has lead the way in observations of methanol masers and has dominated the field due to superior instrumentation, particularly at Parkes … [S. Ellingsen, UTAS]*

A general request for ongoing Parkes support was received from several members of the GLAST (Gamma Ray Large Area Space Telescope) community. The GLAST satellite was launched on 11 June 2008. Several scientists involved with GLAST sent feedback through the web forum to say that Parkes observations associated with GLAST would be essential to the success of this NASA Mission. For example,

> *….the opportunities for exciting science collaborations in the near future between ATNF and GLAST scientists are numerous and compelling. As much as I appreciate the need for future planning such as the ASKAP development under always-limited financial resources, I want to emphasize my strong hope that the outstanding science program of the present ATNF facilities will remain for cooperative efforts with programs like GLAST, whose future is now. [D. J. Thompson, GLAST]*

2.4.4 Millimetre observing and length of observing season.

Two proposed measures to streamline operations outlined in *Future ATNF Operations (v1)* are to limit Mopra single-dish operations to six months per year (over winter), and to limit ATCA 3-mm observing to six months per year (over the winter months from May to October).

Considerable feedback was received from the users of the ATNF millimetre facilities. There was a strong view expressed that decisions should carefully consider science priorities and productivity. Australia has outstanding millimetre facilities at Mopra and the Compact Array and these are strongly oversubscribed in the winter months. The tremendous increase in Mopra productivity over the last few years was noted and it was argued that this should not be curtailed.

Observers discussed the future user of the millemetre facilities and considered it likely that the demand for observing time at millimetre wavelengths on ATNF facilities will increase further as ALMA comes online. The ATNF should encourage complementary millimetre programs to ALMA, and collaborations by Australian scientists in ALMA science. They also noted that the Compact Array millimetre facilities will be enhanced with the full CABB systems and this will also increase the demand for telescope time.

Mopra observers provided feedback from their observing experiences to say that 12-mm observations at Mopra can successfully be taken all year round, while some good science in the 3 and 7-mm bands can be obtained over more than the standard six months period. It was suggested that millimetre observing with Mopra, outside the standard season, could be restricted to experienced observers who would need less support from ATNF staff.

Clarification was requested as to whether remote observing is expected to be possible from other locations for both Mopra and the Compact Array.

2.4.5 Compact Array reconfigurations

Some Compact Array observers argued that a proposed reduction in the number of reconfigurations would be detrimental as it could then take longer to complete programs requiring multiple array configurations. This would impact in particular on PhD students. One observer

pointed out that compact configurations can be needed in summer, for example for night-time observations of the Magellanic Clouds.

2.4.6 Long Baseline Array

Members of the VLBI community, who use the LBA and other radio telescopes in Australia, commented that in general they favour remote operations, as this make it easier to operate multiple facilities. They noted that the trend towards remote operations will also make it easier to schedule more frequent but shorter VLBI observing sessions.

Several users discussed the importance of the Tidbinbilla 70-m antenna for VLBI observations, and noted that they would like, if possible, to have access to some longer blocks of time (of around 12 hours) on the 70-m. Users also emphasized that Parkes is a vital part of the LBA and concern was raised on the impact of some of the proposed measures to streamline Parkes operations, in particular the proposed reduction in the number of receiver changes.

> *Parkes is vital for VLBI observations where sensitivity is important, which includes many of the highest science impact projects, such as observations of LMXB, extragalactic SNe, water megamasers or AGN …. In recent years the ATNF has made significant investments in disk-based recorders and high-capacity fibre optic links to enable wider bandwidth VLBI. When Parkes is not able to participate in an observation due to reduced frequency coverage or frequency agility the effect is to largely nullify the improvements made by the new infrastructure. [S. Ellingsen, University of Tasmania].*

It was noted by others that the list of proposed measures to streamline operations in the *Future ATNF Operations (v1)* does not include any measures that relate directly to LBA operations, and that the costs, science productivity and efficiency of the LBA should also be under scrutiny. One astronomer queried whether the LBA should be operated at a National Facility level.

3 Concluding comments

The intensity of the debate and discussion which followed the release of *Future ATNF Operations (v1)* clearly demonstrates that the ATNF has a user community which is both closely engaged with the National Facility and passionate about ensuring its success in the future. The ATNF Users Committee (ATUC) noted in its May 2008 report that the ATNF 'Future Operations Roadshow', which visited university groups around the country in March and April, was seen as a valuable exercise which improved communication between the ATNF and users at a grassroots level. The ATNF user community looks forward to building on this work in the future, and to ensuring that the ATNF's existing telescopes remain scientifically productive at a high level as we move forward into the ASKAP era.

4 Web links

ATNF Future Operations Overview	www.atnf.csiro.au/observers/planning/
ATNF Future Operations (v1)	www.atnf.csiro.au/observers/planning/Future_ATNF_Operations.pdf
Community feedback and Future Operations Discussion Forum	www.atnf.csiro.au/observers/planning/discussion/index.php
ATNF Science Priorities and Science Priorities Discussion Forum	www.atnf.csiro.au/observers/planning/priorities/discussion/index.php