

Further information on proposed changes to Australia Telescope National Facility operations

CSIRO Astronomy and Space Science
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Financial background

CSIRO's radio astronomy observatories are collectively known as the Australia Telescope National Facility (ATNF). This consists of a set of radio telescopes, provided as a national research facility for use by Australian and international researchers.

The current cost of operating the ATNF is approximately \$10.5m per annum (financial year 2010-11), excluding depreciation. CSIRO also supports the facility with the development of new instrumentation through CASS's "Technologies for Radio Astronomy" Theme, commonly augmented by external capital injections (e.g. Major National Research Facilities Program, MNRF, and the National Collaborative Research Infrastructure Strategy, NCRIS). In addition, CASS Astrophysics staff contribute as Duty Astronomers and as project scientists for upgrades.

The cost of operating ASKAP in the first full financial year of operations (2013-14) is expected to be \$12.2 m, assuming phased array feeds have been installed on all antennas. This cost is dominated by labour and electricity.

At the time *New Horizons: A Decadal Plan for Australian Astronomy 2006-2015* was released in 2005 it was anticipated that cost savings in the then ATNF portfolio (including Astrophysics and Technologies for Radio Astronomy) would be sufficient to cover ASKAP operating costs. Substantial savings in existing activities *were* found, used to support ASKAP construction, and will in turn be redirected to ASKAP operations. However, the ATNF budget (and the Commonwealth appropriation of CSIRO as a whole) has not kept up with cost increases. Although significant new funds are also targeted towards ASKAP operations, it is now clear that substantial savings must be made beginning in financial year 2012-13.

Scenarios and implications

In order to meet this funding gap, several scenarios for modifying operations of the Parkes Telescope and the ATCA have been considered. Here we present the preferred scenario (with reasons for the choice) and two of the alternatives considered. Cessation of *National Facility* operation of Mopra is proposed under each of these scenarios. We invite comment.

Scenario 1 (preferred) – substantially revised Parkes operations

Under this scenario, the Parkes Telescope would be reconfigured within approximately one year as a facility devoted to the remote observation of large projects with a limited suite of instruments. The actual instrumentation and support model would be determined in consultation with the community. Observing projects would normally be conducted remotely. User support would be extremely limited; observing teams would be expected to be largely self-supporting. Although observing at the telescope would still be possible, support staff would not necessarily be available on site. Technical

support for reconfigurations or instrumental problems would typically be available only during working hours. Unused receivers and backend instrumentation would be decommissioned to reduce operating costs and system complexity. We anticipate that over time the Parkes operating budget would be reduced by approximately 40%, or \$2m per annum, under this scenario.

The ATCA would continue to be operated approximately as at present, although there could be some modest reductions in instrumentation. The “user-operator” model, where users perform their own observing, would continue to be the norm. Remote observing would continue to be available to expert users that are able and willing to cope with a lower level of support. Full observing capabilities and support would be available at the observatory and probably in Marsfield.

The following factors have led us to strongly prefer this scenario:

- The broader science scope and the larger, more diverse user base of the ATCA compared to Parkes.
- The opportunities for the ATCA to provide high frequency follow-up observations to surveys conducted with ASKAP.
- The viability of a strong science case for Parkes, through high impact, large-scale projects, even with the changed model.
- The remarkable re-generation of the ATCA through upgrades to the front-ends (16cm receivers, 3/6cm receivers, high frequency capability) and back-end (with the flexibility and bandwidth coverage of CABB).

Scenario 2 (non-preferred) – substantially revised ATCA operations

Under this scenario, the ATCA would operate on a substantially reduced budget. The availability of observing modes (e.g. configurations, receivers) would be extremely limited unless external support could be found. This scenario would offer substantially reduced user support and observatory facilities.

Parkes would continue to operate as a national facility. The upgrades currently underway would allow remote observing and fully supported observing from Marsfield, but it would remain normal to go to the telescope.

Under plausible conditions, external support would be required to make similar savings to scenario 1. It is not clear that there are suitable high-impact large projects for the ATCA. The relatively large user base of the ATCA would be severely impacted. CSIRO does not view this scenario as feasible.

Scenario 3 (non-preferred) – moderately revised Parkes and ATCA operations

Under this scenario, both telescopes would have substantial budget reductions, but continue to be operated approximately as at present. At the Parkes Telescope, there would be a reduction in the number of receivers, while at the ATCA, the 3mm system would be decommissioned. However, these measures would provide only modest savings and the ongoing maintenance burden would remain significant.

In addition, substantial reductions to scientific support would be required. The provision of computing services for visitors and the maintenance of data reduction software would be eliminated. Users would be largely self-supporting observers present at the site. Duty Astronomers drawn from CSIRO Astrophysics staff and the community would be primarily responsible for observing support and fault diagnosis. Accommodation would be provided, with meals self-catered. The availability of external

support could mitigate some of these measures. CSIRO does not view this scenario as likely to continue to produce the high-impact science that is the goal of the ATNF.

Mopra, Tidbinbilla 70m and the Long Baseline Array (LBA)

Under all the above scenarios, Mopra must be fully supported externally by October 2012, or no longer operated by CSIRO, in order to provide sufficient savings to operate Parkes, the ATCA and ASKAP. This timetable could allow the completion of large survey projects currently underway if new proposals were limited. Allocation of future observing time would be responsibility of the funding external partners. One final call for National Facility winter observing, for Winter 2012, will be released late this year.

A fraction of time on the Tidbinbilla 70m antenna is currently offered to the community via the ATNF, under the host country agreement between the USA and Australia. The cost to ATNF of this is minimal and no changes to the arrangement are planned.

We anticipate continuing to operate the LBA approximately as at present. However, the above scenarios, and the possible cessation of Mopra operations, will clearly affect the instrument. This will be offset (at some frequencies) by the participation of ASKAP and the AUT Warkworth 12-m antenna in New Zealand.

ASKAP

CSIRO is committed to providing the necessary operating support to allow ASKAP to deliver its full potential.

Astrophysics and Technology Development

These activities will continue to support the culture of radio astronomy instrumentation and world-class scientific output at CSIRO in the future. Reducing them substantially was not considered viable as an alternative to reducing support for facilities.

Opportunities for external support of Mopra

CSIRO is seeking external support for the Mopra Telescope beyond September, 2012. A call for expressions of interest from organisations interested in operating the telescope will be made shortly. The present cost of operating Mopra is approximately \$500,000 per annum, calculated as the increment over what would be required at Narrabri for the ATCA in any case. However, CSIRO will assist with the design of alternative operating models that trade cost against availability and functionality. CSIRO anticipates being able to provide support for the telescope from Narrabri and Marsfield on a reimbursement basis. Access to the telescope would be determined by the operating organisation. CSIRO is interested in retaining use of Mopra in the LBA.

To discuss opportunities to support Mopra, please contact Douglas Bock (douglas.bock@csiro.au; +61 2 9372 4276).

Consultation process

Australia Telescope Users Committee

The strategy and its implementation will be discussed with ATUC at their next regular meeting (October 25-26). The meeting will include an open community forum on future ATNF operations, moderated by ATUC chair, Sarah Maddison. CASS leadership will be in attendance to engage with ATUC and the community.

Over the coming months, community advice through ATUC will be sought as the operating model is developed in detail.

Australia Telescope Steering Committee

The AT Steering Committee (ATSC) met on May 10-11 and was briefed on the scenarios under consideration. The committee will be kept informed of community input and will meet again to provide advice to the Director before the decision is taken.

Community briefings

CASS leadership will visit universities around Australia during the coming weeks. A schedule will be available shortly on the ATNF webpage.

Written input

Written input on any aspect of the proposed changes is welcome. Input may be made by email to Director@atnf.csiro.au by 30 November, 2011.