ATNF Memorandum

To: **ATUC**
From: **ATNF Director**
Date: **01 June 2004**
Subject: **Director's Report** **Item 2.1**

Overview

Since the last ATUC meeting there have been a number of highlights. These include:

- The successful completion of the Mars tracking program. (Feb 04)
- The successful commissioning of the Arecibo multibeam (Apr 04)
- 256MHz/8-bit prototype DFB completed for CABB project (Jan 04)
- Successful commissioning of 256MHz DFB at Mopra (May 04)
- Completion of the Luneberg lens prototype for the NTD (Feb 04)
- Successful operation of atmospheric seeing monitor at ATCA (May 04)
- The highest ever over-subscription rate for the ATCA (2004MAYT)

On the other side of the coin, the decision not to proceed with negotiations with the Dutch community re: a NL-based LOFAR was a significant set-back. Nevertheless, the process (initiated by the ATNF) by which a community consensus was reached on the options of whether or not to proceed with the LOFAR project was highly valuable. All former members of the LOFAR consortium met in Hawaii at the end of March to discuss ways to move forward on WA-based facility. Again prior community consultation (led by Simon Johnston) provided crucial input to this meeting. The outcome from the meeting has resulted in a proposed change to the direction of the NTD project plan; now focussing on delivering a technology demonstrator at the Mileura site in WA in partnership with MIT (see agenda item 4).

There has also been a delay in the delivery of the 8GHz spectrometer to Mopra, A positive outcome is, however, that the Mopra system will now have coverage up to 115GHz. Nevertheless, the future productivity and impact of Mopra remains an issue and will be discussed as part of agenda item 3.1.

The 3mm system continues to make good progress. The system is due to be installed at the ATCA in the second half of June, although the some minor slippages (due to circumstances beyond ATNF's control) mean that final system is unlikely to be completed until the end of July, impacting on a couple of programs in 2004MAYT.

Negotiations with NASA on a 7mm system for the ATCA as part of their future Deep Space Tracking initiative are currently ongoing. NASA are mindful of the need to act as 'responsible requestors' of time on the ATCA; and the time

requested is likely to range from 4 – 8 hours per week (i.e. <5%) over and extended period from 2006-2012. The benefits of engaging is such a program are significant; not least the additional investment in the ATCA. (see agenda item 6).

With the availability of AARNET3, significant opportunities have opened up in the area of eVLBI. The ATSC strongly encouraged ATNF to explore the options for implementing real-time VLBI between the ATCA/Mopra and Parkes (see agenda item 3.4)

The introduction of uniform project management practices across the ATNF remains a high priority. Over the past six months, the ATNF has introduced a project database system, quarterly project progress reports, a formal project initialisation process. The ATNF plans to introduce a standardised project planning and resource management system (MS Project) over the next six months.

The goal is also to rationalise the number of projects at the ATNF to less than 20 active projects. Even within this overall development program, the projects likely to require the most significant amount of resources over the next 2 years are: CABB, NTD, eVLBI, Methanol Multibeam and 7mm system. Many of these projects have stakeholders beyond the immediate user community (e.g DEST, NASA, JBO) but nevertheless, ATUC input into the priorities of these projects, both with respect to one another and with respect to other smaller projects, is important if ATNF is to succeed in delivering to its users.

Advice Required

ATUC are asked to provide advice on:

- The priorities attached to the likely major ATNF projects attempted over the next 2 weeks; including potential new programs such as eVLBI, Methanol Multibeam and the 7mm upgrade.

Australia Telescope National Facility
Memorandum

To: ATUC
From: Director
Subject: ATSC recommendations
Date: 1 June 2004 Item 2.2

Background

For information, the ATSC recommendations are attached to this paper.

	Open Meeting	
1	**Executive Session**	
2	**Preliminary Business (0.5hr)**	
2.1	Minutes of Last Meeting (Anne Barends)	The minutes were approved (moved by Phil Diamond and seconded by Frank Briggs).
2.2	Director's Response (Brian Boyle)	ATSC recommends that the Director develop the Pulsar Archive Discussion Paper produced by the ATSC chair into a policy and implementation document. This document should be submitted to the ATSC for approval out-of-session by August 2004. ATSC recommends that the following principles be adhered to in framing the paper • All data taken with the ATNF telescopes in future should be archived on an appropriate medium (with backup). • All data to be publicly available within 18 months in as useful a form as practical. ATSC notes that significant IP has been invested in the hardware & software required to produce the reduced data by the ATNF, and that should be reflected in the access policy to archival data. ATSC notes the discussion over the relocation of the Marsfield facility. It encourages CSIRO to obtain the best outcome possible for the National Facility by considering a broad range of options. ATSC recognizes the importance of maintaining co-location with the AAO. ATSC recommends that the ATNF develop, with community input, a Science Requirements document for the CABB. ATSC requests that the Director submit this document to the next ATSC meeting. The Science Requirements document (and the corresponding Technical

		Specification document) should be maintained under version control. ATSC endorses the Director's response to the actions and recommendations from 2003 ATSC meeting. ATSC further endorses the use of 'traffic lights' in the Director's response to the ATSC recommendations as a performance measure. ATSC does not consider it appropriate to set goals on this performance measure.
2.3	Matters Arising	
3	**National/International Developments (2hr)**	
	BBQ Lunch/Tour of Facility	
4	**Operations (2hr)**	
4.1	Director's Report (inc. O.i.C reports + science highlights) (Brian Boyle)	ATSC endorses that the 3-mm upgrade is the highest priority ATNF development project at present. It recommends that resources be put into this program before the 21-cm multibeam refurbishment. The ATSC congratulates the Astrophysics group on the outstanding scientific results over the last 9 months. The ATSC recommends that, except in exceptional circumstances, ATNF scientific press releases should not made be made until the paper is published, or accepted for publication.
4.2	Engineering Report (Warwick Wilson)	Following commissioning of the 3mm-system, ATSC supports the broadband development at the ATNF as the highest priority development program over the next 2-3 years.
4.3	ATNF 2003 Annual Report (Jessica Chapman)	The ATSC notes with concern the apparent low publication rate of Australian astronomers with ATNF facilities. The ATSC asks the ATNF Director to commit resources to investigating these publication trends further, by including data from other National Facilities. This should form part of the input for the upcoming Decadal Review of Astronomy. The chair congratulates Jessica Chapman and her team on having such a well-advanced draft of the annual report available by the time of the ATSC meeting.
4.4	Astronomy Sub-committee Report (Brian Boyle)	The ATSC endorses the appointment of the nominated members as per the minutes of the subcommittee meeting held on the 29th of March 2004.
4.5	TAC Policy and Electronic Submission (Jessica Chapman)	The ATSC strongly endorses the plan to implement an electronic proposal submission system for the ATNF telescopes. The ATSC approved the recommended changes to TAC Policy 4.2, 4.8 and 10.6. Policy 10.6 the ATSC approved the revised policy but suggested to

		change the wording to …as allocated time, provided that the total of director time does not exceed 10% of overall time. Delete from "The priorities …"
5	**Staff (0.5hr)**	
5.1	Staff/PD Report (Lewis Ball)	
5.2	OHS Report (Dave McConnell)	ATSC recommends that the ATNF bring all lead OHS performance indicators to 100% by the end of the reporting year.
6	**Strategic Issues (2.5hr)**	
6.1	Project Management Initiative (Dave McConnell)	The ATSC endorses the development of the Project Management Initiative and the associated tools but urges the ATNF not to overburden project managers with unnecessary compliance obligations.
6.2	SKA ▪ NTD (Brian Boyle)	The ATSC notes and supports the Hawaii protocol. The ATSC endorses the general principles outlined in the NTD Vision paper. It asks the Director to develop the project plan further with full stakeholder engagement. In doing so, it notes the following principles: • The importance of establishing an operational facility at a remote Australian site. • The importance of linking the technical development with key science outcomes.
6.3	e-VLBI (Tasso Tzioumis)	The ATSC recognizes the strategic importance of e-VLBI and the opportunities provided by AARnet3 and the CSIRO One-IT initiative. The ATSC encourages the ATNF Director to explore ways of bringing e-VLBI online between Parkes, Mopra and the ATCA at 1 Gbps as soon as practical.
6.4	RQZ (Tasso Tzioumis)	The ATSC strongly supports the ongoing ATNF resource contribution to radio quiet zone protection.
6.5	Future of Mopra (Bob Sault)	The ATSC asks the Director to prepare, with full community consultation, a white paper on how best to improve the scientific productivity of Mopra, with the operational model required to support this outcome.
6.6	Business Development Activities (Carole Jackson)	The ATSC recognizes the benefit derived from the ATNF Business Development staff position and supports continued resources being devoted to this activity.
6.7	Future of AIPS++ (Neil Killeen)	The ATSC notes with concern the apparent slippage in milestones associated with the AIPS++ implementation of the single dish package at the ATNF. The ATSC asks the Director to conduct a review of the status of AIPS++ within the ATNF in mid-2004 following the outcome of the ALMA software decision. An important part of the review will be an assessment of the progress of the SPC project towards the initial June 2004 milestone for delivery.

	Staff/ATSC presentations (1hr) ▪ European Radio Astronomy: a Revolution in Progress – Phil Diamond ▪ ATNF EoR Experiment – Ravi Subrahmanyan	
	Lunch	
7	**Finance (0.5hr)**	
7.1	Finance Report (Phil Howson)	The ATSC notes that CSIRO policy is to lease motor vehicles. The ATSC considers that block grants are the most appropriate way to fund the National Facility.
8	**External Stakeholders (including CSIRO) (1hr)**	
8.1	ATUC Report ▪ ATUC Report (Steven Tingay) ▪ Director's Response (Brian Boyle)	The ATSC endorses the proposed terms of reference of the ATUC.
8.2	ATNF 04/05 Operational Plan (Brian Boyle)	
9	**AOB (0.5 hr)**	
	Coffee	
	Review of Action Items/Resolutions	
	Meeting close	

Australia Telescope National Facility
Memorandum

To: ATUC/ATSC
From: Director
Subject: ATUC response
Date: 10 March 2004 Item 2.3

Background

The Director's response to the ATUC report from the previous meeting is a standing item at each ATUC meeting. The meeting schedule for ATUC (December and June) and ATSC (March/April) is such that there is an opportunity for the ATNF Director to provide comprehensive feedback on the ATNF's progress towards achieving some of the recommendations/actions contained in the main (December) ATUC report to ATSC at their meeting.
In common with the approach adopted for the Director's response to the steering committee actions I propose a 'monochrome'[1] traffic light evaluation of ATNF's response to the ATUC recommendations. The symbols against each non-trivial action/recommendation are as follows:

○ Action done/recommendation adopted. (20)

◒ Action attempted or still ongoing, recommendation partially adopted (9)

● Action not attempted, recommendation not adopted (2)

Numbers in parentheses indicate numbers of actions/recommendations evaluated to fall in each category. ATUC are welcome to change any of these evaluations as the see appropriate.

Recommendations

It is recommended that the User Committee

- Endorse the Director's responses to their actions/recommendations from the 2003 report
- Agree, incorporating any revisions, with the 'traffic light' evaluation provided

[1] To save on the expense of colour printing

ATUC Comments	Director's response
3.5 Terms of Reference Prior to the meeting the ATNF Director provided draft ATUC Terms of Reference for consideration by ATUC. ATUC endorsed the draft Terms of Reference with a few minor alterations and an additional item outlining the membership structure of the committee. The revised suggested ATUC Terms of Reference follow: • To provide advice to the Director on operational and developmental issues relating to the facilities provided by the ATNF. These include the Australia Telescope Compact Array, the Parkes radio telescope, the Mopra radio telescope, the Long Baseline Array, the Tidbinbilla radio telescopes, and all aspects of National Facility support. • To make recommendations to the Director that seek to maximise the scientific productivity and maintain the international competitiveness of the ATNF, taking into account the likely resource availability. • To consult widely with the national and international community, liasing where necessary with the national time assignment groups, to make informed recommendations to the Director on priorities for both operations and future developments. • To meet twice a year in both open and closed sessions, with appropriate input on developments and responses to issues from the ATNF. • To provide an annual written report to the Director for communication to the AT Steering Committee in March/April of each year. • To maintain a membership of 10 to 13 voting members, two of which will be students, plus a non-voting Secretary. The membership will reflect the geographical distribution of users and include users of the full range of facilities.	The ATNF will submit these proposed terms of reference to the ATSC for approval.

5.1 Operational Plan ATUC endorses the 03-04 Operational plan. ATUC will compile advice on the 04-05 Operational Plan and make it available to the Director.	ATUC are asked to note that the 04/05 Operational Plan has expanded significantly with regard to information requested. ATNF plans to make a initial draft available for comment to ATUC by end-March.
5.4 Project Management ATUC strongly endorses the implementation of co-ordinated project management practices and believes that they will add to the efficiency and success of ATNF projects, with benefits for the ATNF and users.	ATNF thanks ATUC for their endorsement and will proceed with the implementation of its PM policies and procedures. ATNF will bring an updated report on the PM implementation to the June meeting
5.5 SKA/LOFAR ATUC are happy to see a high degree of coordination between the LOFAR and SKA projects within the ATNF, since this will allow an efficient use of limited resources. However, ATUC will reserve discussion or comment on the level of ATNF participation in LOFAR until the LOFAR Options Paper becomes available. ATUC do not feel that they have sufficient information available to discuss this issue in an informed fashion at this time.	The ATUC recommendation proved highly valuable in pushing forward the LOFAR Options process. The consultation process proved highly successful, with a broad cross-section of the community engaged in the process. A white paper was produced in December (supported by a public meeting), and its recommendations were subsequently endorsed by the NCA. The LOFAR Options WG recommendation proved crucial in subsequent negotiations with international partners. The clear community requirement that the telescope be located in the best site led to Australia withdrawing from negotiations with the Dutch on an NL-based telescope.
6.1 Six month semesters	
For ATUC position see report.	The ATNF hears what ATUC has had to say on this topic. It feels that the discussion with ATUC has moved the debate forward in a constructive sense and that the revised implementation below will address many of the concerns highlighted in their report.
What do ATUC think of a Triage system? ATUC sees little value in the triage process for the current level of over-subscription. ATUC request that users be fully informed of changes that are made to the proposal evaluation process.	The TAC considers approximately 120 proposals at each meeting and does not always have sufficient time to discuss the proposals fully. The triage system is strongly supported by the TAC, who ultimately must have ownership of the process by which they conduct their business. To amplify the point, at the forthcoming (March 2004) meeting the TAC will have over 180 proposals to review; with an oversubscription rate of 3:1 on the Compact Array. Triage is a system that requires more input before the TAC meeting so that the time during meetings is

	better used. Perhaps the greatest advantage provided by the triage system is in the level of preparation required before the meeting, resulting in greater and more equitable attention – not less – to all proposals. The TAC will therefore trial a triage system at the next meeting, scheduled for March 2004. Proposers will continue to receive TAC grades and comments. Users will be fully informed of the triage system at the next ATUC meeting.
Does ATUC have any view as to when deadlines for six-month terms should fall? ATUC recommend the following dates for the new six-month semesters: Proposals Due / TAC Meets / Sched out / Start Term / End Term 1 Dec / 15 Jan / 15 Feb / 15 Mar / 31 Aug 1 Jun / 1 July / 1 Aug / 1 Sept / 14 Mar Considering: 1. The September 1 start gives mm users opportunities in both semesters and provides flexibility in the important first mm season for the new system. This allows the Australian mm community to be responsive to new science opportunities and a rapidly evolving 3mm system at the ATCA. 2. These dates also meet the needs of new students and post-docs commencing early in the year who might otherwise have to wait another 12 months to propose for mm observations. 3. This takes into account Australian university semesters so that proposal deadlines occur during term breaks and don't coincide with ARC deadlines. 4. This takes into account transition issues such as allowing users time to adjust and plan for six month terms.	ATNF thanks ATUC for their careful consideration of this issue and for their proposed model for new semester dates. We note that the proposed deadlines of 1 June and 1 December provide a good solution to several of the issues raised by ATUC. There are however two concerns with this model: 1. It is not feasible to hold a TAC meeting between mid-December and end-January due to the holiday season. 2. The proposed term lengths are unequal – with a shorter 5.5 month term over the winter months when demand for ATCA facilities is likely to be greatest. This would create an imbalance in the oversubscription rate between the two semesters and would require additional effort to reconcile our key performance indicators. After consultation with both ATUC and TAC, and careful reconsideration of all the issues, the ATNF has decided to move to six month semesters with application deadlines on June 01 and Dec 01, for semesters that begin on Oct 01 and April 01. For the transition period, the dates for the next three terms will be as follows:

5. Four month terms should remain until the September 1 semester. The last proposal deadline for four month terms will be 15 Feb and the first proposal deadline for six month terms will be June 1.

6. This proposal is consistent with the ATNF meeting schedule and allows adequate time for the TAC to meet and OICs to produce schedules.

If ATNF require any further user input, ATUC would be happy to consult further on the details and we strongly encourage ATNF to keep ATUC
informed in the implementation of six month semesters.

Semester	Applications due	TAC meets (approx)	Scheds ou
MayT May 01 – Sep 30	Feb 15	Mar 3	Apr 01
Oct04S Oct 01- Mar 31	Jun 01	Jul 15	Sep 01
Apr05S Apr 01 – Sep 30	Dec 01	Feb 2	Mar 01

Notes:

- The two semesters are of equal length
- The TAC will review proposals over the Xmas period and will meet in early February
- The deadlines are well suited to new students and to the Australian universities
- Some limited millimeter observing will be available for 3-4 weeks in October.
- The deadline on Feb 15 will be for a five-month Term (May to Sep). The first six month term will begin on Oct 01

Director's time

ATUC would like to see a clarification on the purpose of discretionary time. Time is already available in the ATCA and Parkes schedules for observers who lose time, for commissioning instruments and for testing purposes. Processes are in place for scheduling unallocated time and ATUC don't see any reason for discretionary time given the amount of unallocated time currently available. ATUC are unclear as to whether the idea of discretionary time applies to all facilities or just the ATCA. What would be the rules for allocating discretionary time? If these rules are substantially different from existing rules for unallocated time, ATUC are concerned that this might act as a disincentive for Duty Astronomers, who currently have first priority to unallocated time after observatory requirements.

The ATSC has recommended that 5% of time on ATNF facilities should be scheduled at the Director's discretion. At present, around 10% of time at Parkes and the Compact Array is unallocated in the initial schedules. The use of this time is specified as (i) OIC discretion, (ii) maintenance (other than regular maintenance), (iii) DA, (iv) local staff, (v) other observers.

In the light of ATUC's comments the following resolution was put to the TAC at their March meeting:

With effect from May 1, all unallocated time at the Compact Array and Parkes will be designated as Director's time. The ATNF Director will have overall authority for the allocation of this time. In most cases this will scheduled according to previously established priorities:

	1. OIC discretion (targeted opportunities, lost time replacements), 2. Repairs (other than regular maintenance), 3. Duty astronomer, 4. Local staff, e.g. adjacent observers, 5. Other observers present on-site, 6. Remote observers *Applications to use this time should be directed in the first instance to the relevant OiC, via the existing application process.* In addition, one or two longer blocks of typically 12 hours may be scheduled each month as Director's time, provided that the total amount of Director's time does not exceed 10% in any one semester. Opportunities to use this time will be advertised to the user community as appropriate and applications submitted to the Director.
8.1 ATCA/Mopra report **Can ATUC suggest ways in which Mopra can be more heavily used by Australian users?** [question from ATNF] ATUC suggest that ATNF facilitate some Key Science Projects. For example a multi-line targeted survey with the new wide band spectrometer that could be run using the very successful HIPASS project as a model. There will be a Millimetre Workshop in December and a session will be devoted to new large projects with Mopra. Also, it seems likely that the implementation of reliable remote observing for Mopra would increase usage. ATUC suggest that implementation of remote Mopra observing could be brought forward to the 2004 winter, so that Mopra can be utilised in conjunction with the first observations of the full 3 mm system at the ATCA	The ATNF thanks ATUC for this helpful suggestion. The ATNF will develop a white paper on the future of Mopra that includes plans to fast track remote observing and the support of larger, potentially higher impact, science programs. It will present this paper to ATUC at their June 2004 meeting.
8.2. Users' Guide What is the status of the updated Users Guide that was recently being edited by Jess O'Brien**?**	Updated users' guide is now available and on the WWW.
9.2 Opera House ATUC would like to see the new areas converted to office space for observers and visitors, with computer facilities for data reduction, network connections for	Based on ATUC's recommendation, the work is now in progress and will be complete by the end of March.

laptops etc.	
9.3 Parkes Receivers ATUC noted queries from users on the timescales for planned upgrades to Parkes receivers.	Major receiver projects at Parkes undertaken in 2003/04 include; • refurbishment of the AT Multiband receiver (complete) • commissioning of the 8GHz (MARS) receiver (complete) • commissioning of the dual-frequency 10/50cm receiver (complete) • rectification and RFI mitigation of 10/50cm receiver (ongoing) • refurbishment of the 21cm Multibeam receiver (in progress) • refurbishment of H-OH receiver (complete) • construction of 7-beam 6GHz receiver (Marsfield project: in progress). The ATNF sees the next priority as upgrading the K-band (22GHz) capability. It has not been possible to initiate this project yet, largely due to uncertainties in, and priority of, the 21 cm refurbishment project. A detailed project plan for receiver upgrades will be distributed at or before the next ATUC meeting.
ATUC are encouraged by the potential 4dB improvement to the 12 mm system at Parkes and still consider this to be the first priority receiver for serious upgrade at Parkes. Will this upgrade be possible before the start of the 2004 winter season?	The endorsement of this upgrade as the highest priority is noted. It is unlikely that a serious commencement can be made before the middle of this year (see above).
ATUC would also like see the H-OH receiver upgraded with the Arecibo LNA's in the near term. Apparently this is not considered to be a large job. Could ATNF comment on the possibility of performing this upgrade before the start of the January term?	This upgrade was effected in December 2003, by replacing the LNA modules with new modules similar to those being made for the Arecibo multibeam. The upgraded receiver has 20% improved performance at 1.4GHz (33Jy SEFD v. 40Jy), much closer to the that of the 21cm Multibeam centre-beam (30Jy), but with considerably wider overall bandwidth. The upgraded receiver also has improved stability and gain properties.
10.1 Tidbinbilla	

Does ATUC see the need for a mapping mode at Tidbinbilla? If so, when would they like to see it implemented? **[question from ATNF]** ATUC sees great value in a mapping mode at such a powerful telescope and a significant potential demand. ATUC recommend that a spectral-line mapping mode be implemented as soon as possible, since on the advice of Jim Lovell this seems to be not such an onerous task. ATUC also request that Jim Lovell look into options for total power mapping and beam switching and report back to ATUC with a realistic timescale for implementation of this additional mapping mode.	ATNF has investigated the possibility of implementing a scanning mode on the 70-m. Test observations indicate that this is possible and will significantly reduce the observing overheads compared to a point-by-point observing mode. New antenna control software will need to be written and tested. The current milestone is the end of May at which point the system will be able to scan a region of sky while collecting data from the correlator. This will provide a basic spectral-line mapping capability. Total power mapping is a more difficult problem. There are a couple of issues. First, internal gain variations require a Noise-Adding Radiometer (NAR) at 12mm. For this we need a small (~1K) noise diode and a means of modulating it. Neither is available at the moment but a NAR is on JPL's development plan for DSN radio astronomy. Second, sky subtraction is an important issue. The 70-m is equipped with a 12mm off-axis feed and, when the second downconverter is installed (hopefully this winter) we will be able to take total power data from the on and off-axis feeds simultaneously. Questions still to be answered include: how well the shape of the off-axis beam matches the on-axis?; Is it possible to map extended continuum sources when the off-axis beam is also seeing the source? It is likely that the final system will be able to make good continuum flux density measurements of compact sources in the future but unlikely to be able to do a good job on extended objects.
11.1 LBA report ATUC feel that access to New Norcia would improve the operation of the LBA and request that Tasso Tzioumis provide a more detailed plan for access to this antenna at the next meeting. For example, is the aim with New Norcia to negotiate an agreement with ESA for access? What work is required to get the antenna ready for astronomical observations, apart from the provision of a data recording system as outlined in item 17.4 below?	In common with ATUC, the ATNF believes that the issue of New Norcia must be viewed in the broader strategic context of the future of VLBI in Australia. This not includes access to facilties, but the opportunity to fully upgrade to disk-based recording systems or even real-time recording systems eventually using the new broadband correlation at Narrabri. It will bring a "White Paper" on VLBI opportunities to the June 2004 ATUC meeting.

12.2 Time Usage Statistics ATUC request that the ATNF provide ATUC the same proposal statistics that the Steering Committee receive, as outlined under agenda item 3.4, action 8, of the Actions and Recommendations of the ATNF Steering Committee, July 2003. [request by ATUC] These statistics should ideally include a breakdown of proposals for overseas, ATNF, and other Australian proposers (by country for overseas proposals and by institute for other Australian), into the following categories, for each facility: • proposals submitted • proposals allocated • time allocated • breakdown of mm usage for the ATCA; • proposals involving students • breakdown on instrument (for Parkes)	The ATNF will endeavour to provide this information at future meetings.
13.1 Software Report ATUC encourage the ATNF to pursue the MOU for aips++, potentially with a view to long-term maintainance of the project. [statement by ATUC]	Unfortunately, ATNF were unable to get all parties to sign up to an MOU. A less formal agreement has been drafted between ATNF and NRAO. ASTRON have also expressed some interest in being part of this agreement. The main goal of the agreement is to ensure that all those working on aips++ remain informed of each others' activities, and do not compromise each others activities. Joint planning will be undertaken where appropriate (e.g. infrastructure changes) and work tradeoffs will be negotiated. ATNF is now highly focussed on developing applications with aips++ for its own needs. ATNF will continue to do some infrastructure work as needed (e.g. upgrade Coordinates to new WCS FITS standards).
13.2 SPC replacement ATUC would like to reinforce their previous statements that they consider the planned SPC replacement a very high priority. ATUC are encouraged by the outlined	The SPC replacement is now a high priority task in the Scientific Computing Group at Marsfield. The project scientist is Chris Phillips and the project

plan for the SPC replacement and look forward to a report on the expected progress toward this goal at the next ATUC meeting.	software engineer is Malte Marquarding. This project was commenced in mid January and is presently generating the requirements document (with community consultation). The goal is to have a useful prototype by mid 2004 but the detailed project plan depends upon the outcome of the requirements exercise.
13.3 Online archive ATUC notes comments from users that to be really useful, the ATCA data archive will need to record information from the observing system. **[Issue raised by users]** ATUC recognise that the ATNF is well aware of this issue. ATUC suggest that on-line logging of ancillary data be implemented at the ATNF telescopes as part of any data archives. A simple filtering of existing electronic logs might be a useful first step and should be incorporated into future observing software upgrades, especially as Linux becomes more pervasive throughout observing systems.	A small working group (Lister Staveley-Smith and Bob Sault) has been established to look into the issue of incorporating new RPFITS metadata with the purpose of facilitating automated ATCA data reduction, satisfying the requirements of ATCA millimetre observers, and allowing the implementation of on-the-fly mapping at the Mopra telescope. Some of the new metadata (meteorological data, pointing errors, calcode indexing) have already been incorporated by Narrabri staff. Much of the rest is expected to be in place by the time of the next ATUC meeting. A discussion of the issue of an electronic log (whether it is required if sufficient metadata is incorporated into RPFITS; how it should be implemented) is ongoing and further input from ATUC would be welcome. .
13.4 Miriad Support ATUC would like clarification on who is providing the 0.2 FTE support for MIRIAD. It appears that support for MIRIAD has decreased. Given that MIRIAD is a mission critical package for the ATNF, we encourage that it be continually supported at a reasonable level i.e. timely responses to bug reports, supported compatibility with new computers and new versions of Linux operating systems.	Since September 2003, Miriad support has been provided by Neil Killeen. All Miriad queries have been answered within one working day and all queries have been either resolved or are awaiting more information from the user in question (1 query). Bob Sault still provides some expert advice as needed and some application support, mainly for mm activities. There are no outstanding O/S support issues that ATNF is aware of.
13.5 ssh ATUC notes comments from users that the lack of the ssh2 software on ATNF computers is making difficult to connect to outside institutions. **[Issue raised by users]** ATUC requests that ssh2 be installed on the ATNF Unix computers.	ATNF acknowledges the frustration felt by many users. Most of our (Marsfield) IT support comes from the Computer Services Group (managed by CTIP), augmented by Vince McIntyre.

	A recent meeting between ATNF and senior CSG personnel has established firm milestones for a number of key IT issues that has languished for some time. These include: • Solaris upgrades • Linux support (mainly laptops) • Browser upgrades • ssh upgrade • User account name change over (to CSIRO ident) In particular, the ssh upgrade process will be much simplified by the Solaris upgrade. The present milestone is that the Solaris upgrade will be completed by June 2004. ATNF has also asked CSG to produce (by end March 2004) a plan to implement ssh2 immediately following the Solaris upgrade.
15.1 Technology Development Report ATUC propose to undertake a review of all projects before the next ATUC meeting. At this meeting ATUC will be willing to advise the ATNF on projects that have such a low priority, in the users view, that they can be dropped from this list. Would the ATNF consider this to be useful input from the ATUC?	ATUC's comments would be indeed be valued as part of the priority setting process for new projects.
16.1 Wide band correlator for Tidbinbilla ATUC suggest that ATNF explore the option of sharing the yet-to-be-constructed wide-band Mopra correlator between Mopra and Tidbinbilla, as an alternative to building two correlators, which will occupy a significant amount of precious time for key engineering personnel. It seems to ATUC that, if possible, sharing a wide-band correlator over the winter season between Mopra and Tidbinbilla may satisfy the demand for such an instrument on both antennas. ATUC would like to see an analysis of the shared correlator idea at its next meeting.	The ATNF Project Review Board has evaluated the initialisation documentation for the Tidbinbilla wide band correlator. It appears impractical to share the Mopra spectrometer (funded by UNSW), and there is significant doubt over whether NASA/JPL would pay for the IF conversion required. Moreover, the performance requirements for Tidbinbilla would appear to be not identical to the Mopra requirements and that, consequently, the resource needs have been underestimated. No further action on this program will be taken, along the ATNF will remain in touch with NASA regarding their requirements and receiver plans for Tidbinbilla.
16.2 EoR instrument ATUC can see the value in such an instrument but feel that the scale of the project is more suited to a collaboration between the ATNF and a university	Given the potential strategic importance of such a project (e.g. EoR science is increasingly influencing SKA design), the ATNF Project Review

department, funded possibly via the ARC. Regardless of the funding, this project could require a significant amount of ATNF engineering effort, which currently is the limiting factor in prioritising new projects. ATUC suggests that engineering support for this project could also be found outside the ATNF, through collaboration with a university department. This project should therefore be a low priority for the ATNF.	Board has approved limited resources ($10k, 0.5FTE) for a initial design study to develop a more complete concept, including more accurate costing, detailed project plan and risk assessment which can presented to ATUC. Any further resources required as this stage will be sought from external sources.
16.3 SUSI delay line ATUC also think that this is a very interesting and novel idea. However it appears that this project will be soon rivaled by the planned upgraded wide-band ATCA correlator and any resources would be better spent on this larger and higher priority project.	The ATNF Project Review Board considers the main driver for this project is the delivery of a 32GHz bandwidth An initial expenditure of $20k has been approved to develop the concept, but approval to proceed further will depend on: • Satisfactory negotiation with Sydeny University over resources & schedule • No impact on CABB or DSN • The delivery of a project plan with milestones by March 2004.
16.4 Portable VLBI terminal This project should be considered as part of a broader upgrade to LBA facilities. New hardware for New Norcia should only be considered after negotiation with ESA for access to the antenna**.**	Agreed. The portable VLBI project has been put on hold. Future consideration of the portable VLBI terminal project will only be considered as part of a larger strategic VLBI upgrade program, including opportunities for real-time VLBI and negotiations with ESA over the use of New Norcia.
16.5 Pulsar digital filter bank This project should have priority over the upgrade of the existing pulsar correlator to high time resolution. ATUC will review the overall priority of this project along with other existing projects, before the next ATUC meeting.	The pulsar digital filter bank has been given approval to proceed (including resources from RNM federation fellowship) once resources are available (June 2004). Approval also depends on the development of a coherent plan taking into account RFI mitigation and cooperation with the Swinburne plan. The ATNF would welcome feedback on this plan from ATUC at its next meeting.
16.6 Faraday/PHAROS ATNF should provide a project scientist to develop an initial science case, in the event that no especially interested person from the user community steps forward to provide a justification for these instruments. More information on the frequency range that these instruments might operate over would be useful. ATUC will review the overall priority of this project along with other existing projects, before the next ATUC meeting.	It has not yet proved possible to identify a project scientist from the ATNF or from the broader astronomical community for this project. A more complete description for the PHAROS program and its linkage with the European FP6 program will be presented to ATUC at their June meeting.

16.7 HIFAR This is a very large project. The scientific and technical case for HIFAR should be developed further, in particular how it aligns with LOFAR and the SKA. ATUC will review the overall priority of this project along with other existing projects, before the next ATUC meeting.	An updated and extended science case, incorporating pulsar, local HI and galaxy evolution science, is currently being developed under full version control, with broad community engagement. It is planned to present the latest version to ATUC for their feedback at the next meeting.

Australia Telescope National Facility
Memorandum

To: ATUC
From: Director
Subject: ATNF Divisional Plan
Date: 1 June 2004 Item 2.2

Background

All CSIRO divisions are now required to complete an annual Operational Plan. The performance of the division is subsequently monitored via four-monthly reports against stream goals listed in the operational plan. The 2003/04 operational planning exercise was carried out across CSIRO in September last year. This initial operational planning exercise – carried out late in the planning cycle – was largely intended as a 'dry run' for the 2004/05 planning exercise.

The current version of the ATNF 2004/05 operational plan is attached to this paper (excluding the risks/resourcing section) . The final version of the plan is due to be submitted by the end of June. It differs to the 2003/04 operational plan in requesting more information on capabilities and placing greater emphasis on alignment with the National Research Priorities.

Recommendations

It is recommended that the ATUC:

- note and endorse the draft 2004/05 ATNF Divisional plan

ATNF : Divisional Plan 2004-05

Contents of Plan

CSIRO Australia Telescope National Facility

Mission

To operate a world-class National Facility for radioastronomy for the Australian astronomical community supported by leading-edge technical innovation and high quality astrophysical research.

PART 1 - Our Aspirations

1.1 What do we aspire to become?

The ATNF aspires to enhance its status as a world-class radio astronomy observatory. In so doing, its primary aim is to continue to support and foster a vigorous astronomical community within Australia.

It will become the largest radio telescope with access to Southern skies that is sensitive to millimetre wavelengths over the period 2004-2009 providing its users with important scientific leverage in accessing the international ALMA facility when it is commissioned in 2009. By 2006/07 the ATNF will also have improved the current performance of the Compact Array for broadband observations by a factor of 10; enhancing the scientific output of the Compact Array.

The ATNF also aspires to be recognised as one of the key leaders in the international effort to design, build and operate the next generation of radio-astronomy facilities, such as the Square Kilometre Array (SKA). As a key part of this, it will seek to facilitate, wherever possible, scientific, technical and political engagement in the SKA by other all stakeholders (CSIRO, Universities, Industry and Government) within Australia.

By 2010, ATNF should seek to have jointly built and operating, a major prototype/science pathfinder for the SKA with international partners in Australia. In the next decade, the ATNF should seek to consolidate and build on this position in construction of the SKA. It will continue to play a key role in the frontier astrophysical research that will drive the design of SKA and demonstrators, in particular those relating to wide-field applications e.g. nature of dark energy, evolution of HI, pulsar surveys/general relativity.

The ATNF also aspires to consolidate its position as one of the world's major suppliers of radioastronomy services; including instrumentation, astronomical data products and spacecraft tracking. Through its ongoing technology program, ATNF will grow and develop its existing capabilities in strategic areas of antenna design, receiver technology and signal processing and invest in emerging areas including the Virtual Observatory. It will continue to build strategic links with key industry partners to maximise the returns from its technology development to Australia. It will work with international agencies such and NASA and ESA to play a key role in the development of the next-generation DSN. The ATNF will also explore a strategic partnership with Australian astronomy institutions (the Anglo-Australian Observatory and the Research School for Astronomy and Astrophysics) and CSIRO TIP to build critical mass in the area of astronomical instrumentation.

1.2 What will we look like?

The ATNF will maintain its main technology and astronomy research base in Sydney. The current laboratories may move from its current Marsfield location within the next 5 year time frame. The ATNF sees significant gains to be made from a move that enables greater synergies between CSIRO Divisions (particularly ICT Centre, CMIT and CTIP), the Anglo-Australian Observatory, University groups and local industry. The National Facility Operations will continue to be coordinated through the Sydney site, with the telescope sites (Narrabri, Parkes) remaining as point-of-delivery sites for astronomy.

In the near term (2005/06) we will seek to identify a new telescope site within Australia that, based on thorough site testing and characterisation, best meets the scientific needs and technical requirements of the next-generation radio telescopes. ATNF would plan to start developing this site as soon as the SKA siting decision is made (2006), possibly via with an international pathfinder facility for the SKA to be built during the period 2006 – 2009. In the short term (2004 – 2006), ATNF plans to build a demonstrator at the Mileura station in WA to establish the capability of a remote Australian site to support a major facility; enhancing the case for an Australian siting for SKA.

PART 2 – Our Capability

Title: Telescope Operations

Description: Maximising the scientific exploitation of the ATNF through the operation of astronomical telescopes and the provision of support services for user community.

Category: Core, established

Resources: 30 FTE

Contributes to

theme / other initiative[1]	level of contribution[2] and comments
National Facility Operation	High
Technologies for Radio Astronomy	Medium
Astrophysics	Medium
ESP	Low
SKA MXDP	Low

Underpinning scientific / technical skills, assets and relationships

skill, asset or relationship[3]	comments[4]
National Facility Management	Distinctive
Telescope Operation & Maintenance	Distinctive
Data Processing/Archival	Enabling

Strengths and weaknesses.

- *ATNF recognised ' world-best practice' in management of National Facility including Ministerially-appointed Steering Committee, Time Assignment Committee and User Committee.*
- *World-leading performance of telescopes: 80% of time used for science, less than 2% lost due to weather/technical failure, 2nd highest publication rate of world's radio telescopes.*
- *High level of influence on national/international strategic committees*
- *Unique databases of Southern sky at radio wavelengths*

Development of the capability

- *Develop streamlined project management tools to facilitate on-time delivery of instrumentation to ATNF telescopes.*
- *Increased use of remote/automatic observing (using Mopra radio telescope as a prototype) to achieve further efficiencies in operation of National Facility and develop key skills for future operation of SKA.*
- *Develop skills in data processing and data archival as part of International Virtual Observatory initiative – leveraging of existing unique databases. Emerging science initiative*

Title: Receiver Technology

Description: Development of leading-edge receiver technology in the 500MHz-100GHz domain.

Category: Core, established

Resources: 20 FTE

Contributes to

theme / other initiative[1]	level of contribution[2] and comments
National Facility Operation	Medium
Technologies for Radio Astronomy	High
ESP	Low
SKA MXDP	Medium

Underpinning scientific / technical skills, assets and relationships

skill, asset or relationship[3]	comments[4]
MMIC	Distinctive
Multi-fielding technologies	Distinctive
LNAs	Distinctive
Cryogenics	Distinctive

Strengths and weaknesses.

- Receiver technology (including MMIC)
  - Most efficient receivers in operation for radio astronomy
  - Successful development of mm-wave receivers for Compact Array
- Multi-fielding technologies
  - Development of world's first multi-beam receiver
  - Contracts to deliver similar systems to overseas clients
  - Luneberg lens development
- Low Noise Amplifiers/Cryogenics
  - World-class performance of cryogenic systems
  - Contracted by AAO to install He reticulation system

Development of the capability

- *Focal plane arrays are likely to play a significant role in the technologies for next-generation radio telescopes. It is Important to build on ATNF's world-leading position in multi-fielding technologies (e.g. multi-beam) via development of distinctive skills in this area. Emerging Science Initiative*

Title: Signal Processing

Description: High-speed digital/analogue processing of signals

Category: Core, established

Resources: 20 FTE

Contributes to

theme / other initiative[1]	level of contribution[2] and comments
National Facility Operation	Medium
Technologies for Radio Astronomy	Strong
SKA MXDP	Medium

Underpinning scientific / technical skills, assets and relationships

skill, asset or relationship[3]	comments[4]
Digital Signal Processing	Distinctive
Analogue Signal Processing	Distinctive
RFI mitigation	Enabling

Strengths and weaknesses.

- *Development of poly-phase filters and digital filter banks a key and distinctive strength*
- *Development of 8GHz analogue correlator for ATCA.*
- *Experience in RFI mitigation, in particular underpinning skills of RFI measurement/characterisation, distinctive in radio telescope siting.*

Development of the capability

- *Development of digital signal processing into broad-band (GHz) domain will provide ATCA with competitive advantage in cm/mm wave astronomy and develop IP in this area essential for next-generation radio telescopes and Deep Space Network tracking facilities*

Title: cm-wave astronomy

Description: Study of astrophysical processes and objects observed in the 500MHz-10GHz domain.

Category: Core, established

Resources: 20

Contributes to

theme / other initiative[1]	level of contribution[2] and comments
National Facility Operation	Medium
Astrophysics	High
Technologies for Radio Astronomy	Low
ESP	Low
SKA MXDP	Low

Underpinning scientific / technical skills, assets and relationships

skill, asset or relationship[3]	comments[4]
Neutral Hydrogen in the local Universe	Distinctive
Pulsars	Distinctive
Cosmology	Enabling

Strengths and weaknesses.

- *Distinctive strength in HI and pulsar surveys. Southern Hemisphere location provides competitive advantage.*

Development of the capability

- *Studies of high redshift galaxies in HI (evolution, equation of state) is a strong science-driver for SKA and for any low-frequency prototype system developed in Australia . Need to co-ordinate development of HI and cosmological activities. Lister Staveley-Smith to lead this activity. Science-driver for emerging science initiative*
- *The use of pulsars as GR laboratory/gravity wave telescope is key science goal for SKA. Dick Manchester (Federation Fellow) to lead this activity.*
- *Direct observation of the Epoch of Re-ionisation in HI at ~100MHz will be a major goal in observational cosmology over the next decade. It is also strong-aligned with science goals for SKA and any potential pathfinder facility built in Australia over the next few years. Ron Ekers (Federation Fellow)/Ravi Subrahmanyan to lead the scientific development of this research area.*

Title: mm-wave astronomy

Description: Study of astrophysical processes and objects observed in the 10 – 100 GHz domain.

Category: Developing

Resources: 5

Contributes to

theme / other initiative[1]	level of contribution[2] and comments
National Facility Operation	Medium
Astrophysics	Low
Technologies for Radio Astronomy	Medium

Underpinning scientific / technical skills, assets and relationships

skill, asset or relationship[3]	comments[4]
Star formation in the nearby Universe	Enabling
Star formation at high redshift	Enabling

Strengths and weaknesses.

- *ATCA/Mopra will provide unique capability in mm-wave region for Southern Hemisphere over the next 5-7 years, until ALMA becomes operational at the end of the decade.*

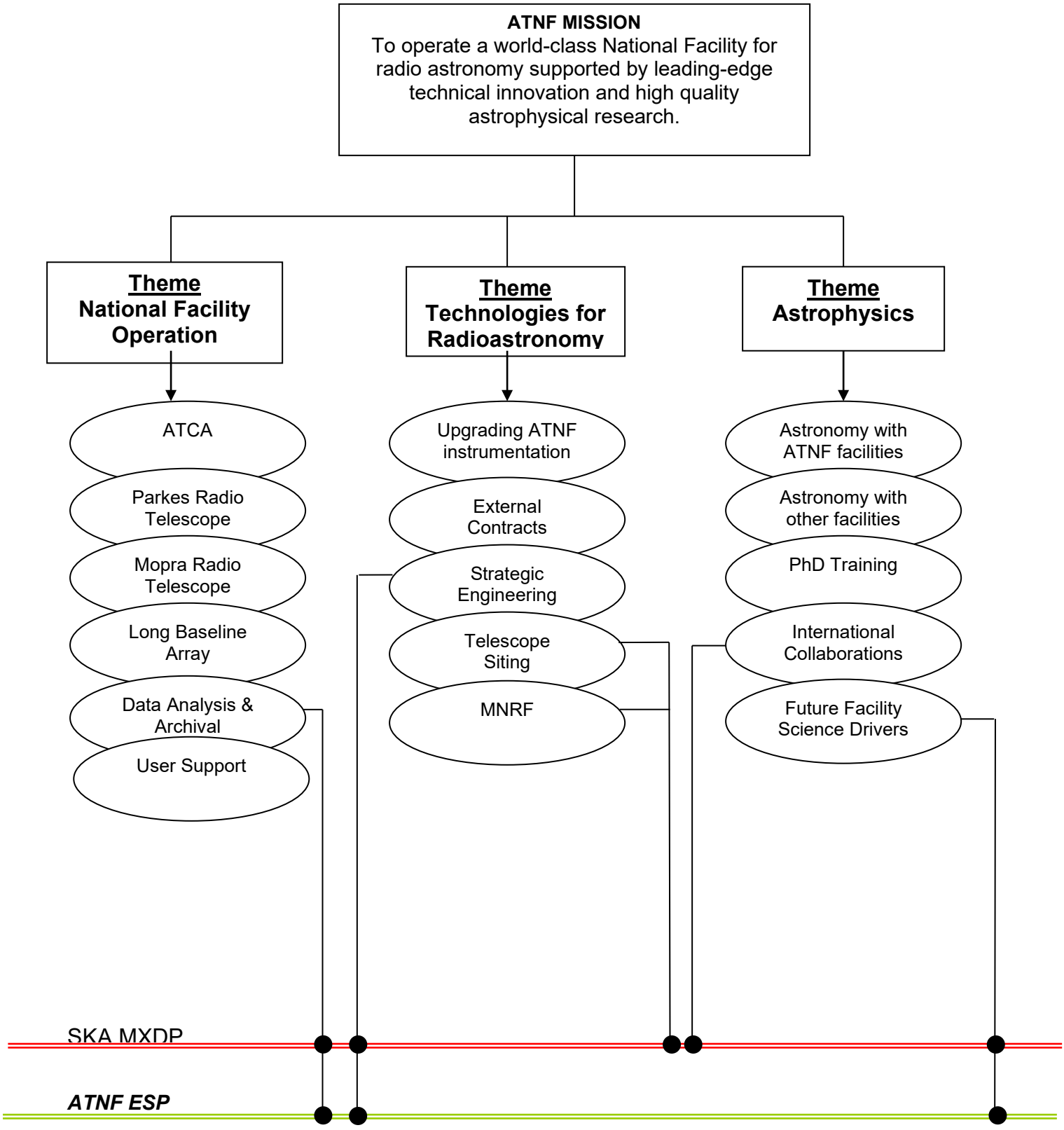
Development of the capability

- *Given distinctiveness of ATCA/Mopra in this domain, there is a need to rapidly develop scientific capability in key aspects of mm-wave astronomy (high-redshift Universe and star formation) to maximise scientific utilisation of the facility in this domain. Opportunity to use new senior astronomer position to develop this capability.*

PART 3 - Our Research Themes

3.1 Overview

Divisional Alignment Diagram



Capability	Telescope Operations	Receiver Technolog	Signal Processing	cm-wave Astro.	mm-wave Astro.	Total
Approx Number of EFTs *	17	18	15	15	4	69
% of Total	25%	26%	22%	22%	6%	100%
Astrophysics						
Technologies for radioast.						
National Facility Ops.						
ESP						
SKA MXDP **						

Key: Proportion of capability allocated to each Theme

'High'		50% plus
'Medium'		20% plus
'Low'		< 20%

* Includes staff in the three Functional Areas:
Research Scientist/Engineer, Research Projects and Research Management

** SKA MXDP currently unfunded. Box shows indicative capability mapping if funded.

Planned Application of Divisional Capabilities

3.2 Themes, Streams and Annual Performance Goals

Theme 1 : Technologies for Radio astronomy		
Theme Goal : To provide a platform for the development of front-line technology for the advancement of radio astronomy in Australia.		
Accountability: Head of Engineering		
Stream (investment 2004-05)	**Stream Objective**	**Projects**
1.1 Upgrading ATNF instrumentation ($1771K)	To ensure that ATNF telescopes retain their position at the forefront of international radio astronomy observatories through an on-going process of instrumentation upgrades.	1 MNRF1997 High frequency upgrade of the ATCA/Mopra. 2 Parkes 21cm multibeam receiver refurbishment. 3 Parkes 5cm multibeam receiver. 4 ATCA analogue correlator. 5 Mopra 8GHz spectrometer. 6 Parkes pulsar digital filter bank.
1.2 External Contracts ($1040K)	To earn external revenue by acting as a supplier of radio astronomy, or similar, instrumentation for outside organisations.	1. DSN Large array study for NASA. 2. ATCA Ka-band spacecraft tracking facility for NASA.
1.3 Strategic Engineering ($250K)	To maintain ATNF's position as a leader in radio astronomy technology by taking part in collaborative projects with outside partners, both national and international.	1. Faraday – FP5 EU Collaboration 2. Pharos – FP6 EU Collaboration 3. SKADS – FP6 EU Collaboration
1.4 Telescope Siting ($616K)	To identify an Australian site that, based on thorough site testing and characterization, best meets the scientific and technical requirements of next-generation radio telescopes.	1. Site infrastructure studies. 2. Site RFI and atmosphere characterization. 3. A radio-quiet reserve.
1.5 MNRF ($2741K)	To carry out ATNF's commitments to the Australian Astronomy MNRF, demonstrating enabling technologies for the SKA and facilitating Australia's engagement in next-generation telescopes.	1. New technology demonstrator. 2. ATCA broadband backend upgrade. 3. Monolithic microwave integrated circuits for demonstrators.
Theme Total ($6418K)		

Stream (Accountability)	Annual Performance Goal	ORA/ EDP	Due
1.1 Upgrading ATNF Instrumentation (Head of Engineering)	1. Complete installation of Mopra 12/3mm receiver.	EDP	Mar 2005
	2. Complete installation of refurbished Parkes 21cm multibeam receiver.	EDP	Sep 2004
	3. Complete construction of Parkes 5cm multibeam receiver.	EDP	Dec 2004
	4. Achieve full bandwidth operation of ATCA analogue correlator.	ORA	Sep 2004
	5. Complete installation of Mopra 8GHz spectrometer.	EDP	Apr 2005
1.2 External Contracts (Head of Engineering)	1. Complete DSN Large Array Study contract with NASA.	EDP	Sep 2004
	2. Negotiate contract for Ka-band use of ATCA with NASA.	EDP	Jun 2005
	3. Complete tests of 7mm local oscillator chain	ORA	Jun 2005
1.3 Strategic Engineering (Head of Engineering)	1. Supervise MMIC wafer testing for Faraday EU partners.	EDP	Jun 2005
	2. Implement and test signal processing model for focal plane array as part of PHAROS project.	ORA	Jun 2005
	3. Finalise ATNF involvement in SKADS if EU FP6 proposal successful.	EDP	Sep 2004
	4. Produce concept design for 12mm focal plane array (ESP)	ORA	Jun 2005
	5. Evaluate feasibility of line feed design for cylindrical reflectors (ESP)	EDP	Mar 2005
1.4 Telescope Siting (Head of Engineering)	1. Produce working definition for radio quiet reserve in W.A.	EDP	Dec 2004
	2. Define science requirements for a radio quiet reserve.	ORA	Dec 2004
	3. Complete preparations for site tests to be carried out by SKA International Site Selection Committee.	ORA	Nov 2004
	4. Produce final siting submission for SKA sites in Australia.	EDP	Jun 2005
1.5 MNRF (Head of Engineering)	1. Complete project plan for construction of new technology demonstrator.	EDP	Aug 2004
	2. Complete prototype 2GHz digital filter bank.	ORA	Nov 2004
	3. Complete prototyping of data transfer/sampling for ATCA.	ORA	Dec 2004
	4. Complete tests of packaged InP MMICs in time for next run.	ORA	Dec 2004
	5. Begin fabrication of integrated receiver MMICs.	EDP	Mar 2005

Alignment to National Research Priorities

NRP Goal	% Allocation
C1. Breakthrough Science	10%
C2. Frontier Technologies	50%
C4. Smart Information Use	25%
Total Alignment of Theme with NRP Goals	**85%**

Theme 2: Astrophysics

Theme Goal : Conduct cutting-edge research in astrophysics to solve fundamental problems of the Universe and stretch the performance of our telescopes

Accountability: Head of Astronomy

Stream (investment 2004-05)	Stream Objective	Projects
2.1 Astronomy with ATNF ($2008K)	To conduct world-class research in astrophysics using the telescopes operated by the ATNF in order to best exploit scientific opportunities and to best plan for future upgrades.	1. High-frequency (20 GHz) all-sky continuum survey (AT20G). 2. General relativity, gravitational radiation and precision pulsar timing. 3. Galactic All-Sky Survey (GASS) in neutral hydrogen. 4. Ultra-deep wide-area continuum surveys of ELAIS/SWIRE fields. 5. Imaging of the Galactic Centre region in ammonia. 6. High surface brightness sensitivity imaging survey for relic radio galaxies. 7. The detection of highly redshifted carbon monoxide emission from galaxies.
2.2 Astronomy with other facilities ($154K)	To conduct, where appropriate, complementary world-class research in astrophysics using external facilities.	1. Conduct observations to test the feasibility of detection of the epoch of reionisation all-sky signal. 2. Conclude MASIV survey for compact sources of high brightness temperature with the VLA.
2.3 PhD Training ($154K)	To train future generations of Australian radio astronomers and to establish firm linkages with Australian (and overseas where appropriate) Universities.	1. Maintain a student population of 25. 2. Encourage a minimum of six students a year to join the cosupervision program. 3. To offer Ph.D. scholarships to two students per year.
2.4 International Collab. ($309K)	To combine our strengths with those of international collaborators to obtain the best possible astrophysics research outcomes and to maintain the international profile of Australian astronomy.	1. Maintain a close international collaboration on pulsar studies (surveys and timing). 2. Collaborative studies in HI surveys (HIPASS, ZOA, SGPS, GASS, interacting and isolated galaxies and groups). 3. Radio continuum studies (AT20G, deep fields).
2.5 Future Facility Science Drivers ($463K)	To carry out research in fields which are likely to become important for future facilities in order to define how best to build these facilities, and to work out how best to use these facilities.	Epoch of reionisation. Low frequency astronomy. Dark energy.
Theme Total ($3088K)		

Stream (Accountability)	Annual Performance Goal	ORA/ EDP	Due
2.1 Astronomy with AT facilities (Head of Astrophysics)	1. Complete 6200 sq.deg of high-frequency (20 GHz) all-sky continuum survey over declination range –30 to –10 deg.	ORA	Nov 04
	2. Establish instrumentation and procedures to give sub-microsecond precision on at least 10 pulsars.	EDP	June 05
	3. Test survey techniques and spillover-correction strategy in preparation for full survey.	EDP	Oct 04
	4. Contingent on full support from TAC, make initial public release of deep wide-area 20cm survey of ELAIS-S1 field.	EDP	Jun 05
	5. Complete 935 pointings in (1,1) and (2,2) transitions of ammonia near the Galactic center.	ORA	Oct 04
	6. Complete pilot survey of 7.5 sq.deg to test performance of telescope at the required brightness levels.	ORA	Mar 05
	7. Obtain useful limit on brightness of CO (2-1) and (1-0) transitions for normal galaxies and radio galaxies at redshifts between 3 and 10.	ORA	Nov 04
	8. Publish at least 70 papers in refereed journals	ORA	Jun 05
2.2 Astronomy with other facilities (Head of Astrophysics)	1. Conduct observations to test the feasibility of detection of the epoch of reionisation all-sky signal.	EDP	Jun 05
	2. Complete MASIV survey for compact sources of high brightness temperature with the VLA.	ORA	Jan 05
2.3 Ph.D./student training (Grad. Student Conv.)	1. Co-supervise a minimum of 25 PhD students.	EDP	Jun 05
	2. Provide supervised research programs for at least 6 summer vacation students (with positive feedback)	ORA	Jun 05
2.4 International collaboration	*1.* Obtain access to spillover-corrected IAR HI data and algorithms through the University of Bonn, for the purposes of the Parkes Galactic All-Sky Survey in HI.	EDP	Jun 05
	2. Complete analysis, publication and full data release of the Parkes Zone-of-Avoidance survey for galaxies behind the Milky Way.*).*	ORA	Jun 05
	3. Obtain access to SWIRE/APEX data through deep fields collaboration.	ORA	Jun 05
	4. Maintain high level of visibility at international conferences (At least 10 ATNF staff as invited speakers to international conferences).	ORA	Jun 05
2.5 Future Facility Science	1. Co-ordinate science input for WA prototype facility	EDP	Oct 04
	2. Complete HYFAR “white book” with community input (ESP)	EDP	Dec 04
	3. Develop science case for EoR to aid in the interpretation of the all-sky EoR experiment	ORA	Jun 05

Alignment to National Research Priorities	
NRP Goal	**% Allocation**
C1. Breakthrough Science	50%
C2. Frontier Technologies	10%
C4. Smart Information Use	25%
Total Alignment of Theme with NRP Goals	**85%**

Theme 3: National Facility Operations

Theme Goal : To serve the Australian and international scientific community by providing radio astronomy facilities to conduct world-class research programs in astronomy

Accountability: Director

Stream (investment 2004-05)	Stream Objective	Projects
3.1 ATCA/Mopra ($5045K)	To facilitate astrophysical research by providing a world-class radio astronomy facility at wavelengths from 20cm to 3mm for both interferometry and millimetre-wave spectroscopy. • Maintain the telescope at the leading edge through installation and development of millimetre-wave and correlator upgrades.	1. Research support 2. Visitor services 3. Computing 4. Electronics 5. Engineering and site services 6. NFS Administration 7. Mopra
3.2 Parkes ($4171K)	To facilitate world-class astrophysical research with the 64m single-dish telescope. • Maintain the telescope and its instrumentation at the leading edge through receiver, correlator and baseband sampling techniques, and through radio interference mitigation strategies.	1. Research support 2. Computing 3. Electronics 4. Antennas 5. Buildings 6. Site services 7. Visitors Centre
3.3 LBA ($136K)	1. To facilitate world-class astrophysical research with the Long Baseline Array. • Maintain and upgrade VLBI instrumentation at all LBA telescopes and the LBA correlator.	1. Research support 2. NFS Administration
3.4. User Support ($990K)	Provide facilities for astronomers from Australia and overseas that will enable the best use of ATNF facilities.	1. National Facility Support
3.5 Data Analysis ($1132K)	1. Provide and support astronomers with a first-class facility to analyse their scientific data, and 2. To develop new software as needed by the community for new telescopes and data paradigms (e.g. the Virtual Observatory).	1. Virtual Observatory Display 2. ATCA on-line data archive 3. Single dish analysis software 4. Astronomical services for the VO
Theme Total ($11474K)		

Stream (Accountability)	Annual Performance Goal	ORA/ EDP	Due
3.1 ATCA/Mopra (OiC, Narrabri)	1. Greater than 75% of all time used for astronomy observations at the ATCA, with selection based on scientific merit, and less than 5% unscheduled downtime as a result of equipment failures.	ORA	Jun 2005
	2. Commission and bring into operation the 3mm system at the ATCA.	ORA	July 2004
	3. Greater than 40% of all time allocated for astronomical observations at Mopra, with selection based on scientific merit and research skill development and less than 15% of unscheduled downtime as a result of equipment failures.	ORA	Jun 2005
	4. Commission and bring into operation a new millimetre receiver package and wideband correlator on the Mopra radio telescope.	EDP	Jun 2005
3.2 Parkes (OiC, Parkes)	1. Greater than 75% of all time used for astronomy with the Parkes 64m telescope, with projects selected on scientific merit. Less than 5% total downtime due to equipment failures.	ORA	Jun 2005
	2. Reinstall refurbished 21cm Multibeam receiver.	ORA	Sep 2004
	3. Maintain leading-edge position in pulsar timing technology with new and upgraded data acquisition systems.	EDP	Jun 2005
	4. Install and commission new 7-beam 6GHz receiver for Galactic survey of Methanol.	EDP	Jun 2005
3.3 LBA (OiC, LBA)	1. Operate the VLBI system for astronomical programs for 20-25 days per year, with time allocated on scientific merit. Less than 15% of scheduled time lost to equipment failures.	EDP	Jun 2005
	2. Maintain and operate the LBA correlator for reduction of LBA data. Minimise the correlator backlog as practicable.	ORA	Jun 2005
	3. Deliver project plan for eVLBI & obtain approval to proceed.	EDP	Sep 2004
3.4 User Support (Head, National Facility Office)	1. Provide a time assignment process and hold Time Assignment Committee (TAC) meetings to rank proposals twice a year. Release schedules within 2 weeks of each TAC meeting	ORA	July 04 Feb 05
	2. Implement prototype electronic submission process for TAC	ORA	Jun 05
	3. Provide duty astronomer support for every scheduled observation on the Compact Array and obtain a mean rank of at least 8/10 for this 'Astronomy Support' in the User Feedback.	ORA	June 05
	4. Provide up-to-date technical and general information and user facilities on the ATNF website. Obtain a mean rank of at least 7/10 for 'Documentation' in user feedback.	ORA	June 05
	5. Provide report to NCA decadal review process on National Facility operation and productivity.	EDP	Dec 04
	6. Produce 2004 ATNF Annual Report	ODP	June 05
3.5 Data Analysis (Head, Software)	1. RVS deployed to ATNF archives and publicly available	ORA	End 04
	2. RVS fully featured & finalised	ORA	June 05
	3. ATCA online archive publicly available	ORA	Aug 04
	4. Processing pipeline connected to online ATCA archive & available at Narrabri during observing (ESP)	ORA	June 05
	5. Release "Quanta" and "Measure" astronomical web services to astronomical community (ESP)	EDP	End 04
	6. Release "Conesearch" and "Image Access" tools	EDP	End 04
	7. Initial version of new single-beam processing software available	ORA	Oct 04

Alignment to National Research Priorities

NRP Goal	% Allocation
C1. Breakthrough Science	50%
C4. Smart Information Use	25%
Total Alignment of Theme with NRP Goals	**75%**

3.3 Other Output Activities and Annual Performance Goals

Other initiative: MNRF Office		
Goal : To administer MNRF2001 monies.		
Accountability: MNRF Director		
Stream (investment 2004-05)	**Stream Objective**	**Projects**
4.1 Gemini ($2980k)	Contribution to Australian Gemini subscription	
4.2 MNRF participants ($300k)	University component of MNRF2001 funds	
Total ($3280k)		

Other initiative: Asset depreciation		
Goal : To register Asset Depreciation funds.		
Accountability: Director		
Stream (investment 2004-05)	**Stream Objective**	**Projects**
5.1 ATNF Asset depreciation ($4629k)	Annual depreciation on radio telescope facilities at Parkes, Narrabri, Mopra and certain other equipment.	
Total ($4629k)		

3.4 Alignment with National Research Priorities (Financial Summary)

Alignment of Total Planned Expenditure with National Research Priorities, $'000 (inc ESP)

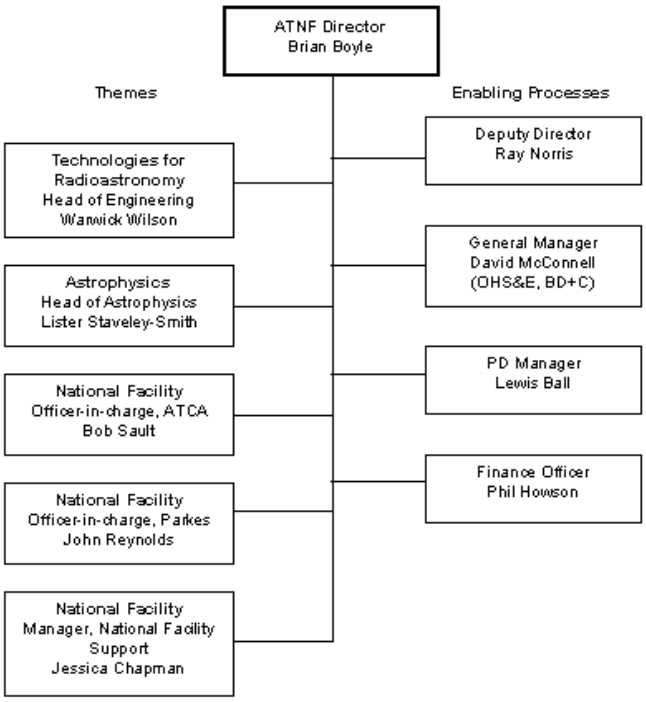
		$'000	Attributable to National Research Priority Goals					Total on NRP Goals	Percent on NRP Goals
			Goal C1	Goal C2	Goal C4				
Divisional Themes									
	National Facility Opera	**11474**	5737		2868.5			8605.5	75%
	Technologies for radio	**6418**	641.8	3209	1604.5			5455.3	85%
	Astrophysics	**3088**	1544	308.8	772			2624.8	85%
Other Divisional Activities									
	MNRF Office	**3280**							
	Asset Depreciation	**4629**							
Divisional Total									
	Total	**28889**	7922.8	3517.8	5245			16685.6	80%

PART 4. Our Enabling Processes

4.1 Overview - Divisional Governance

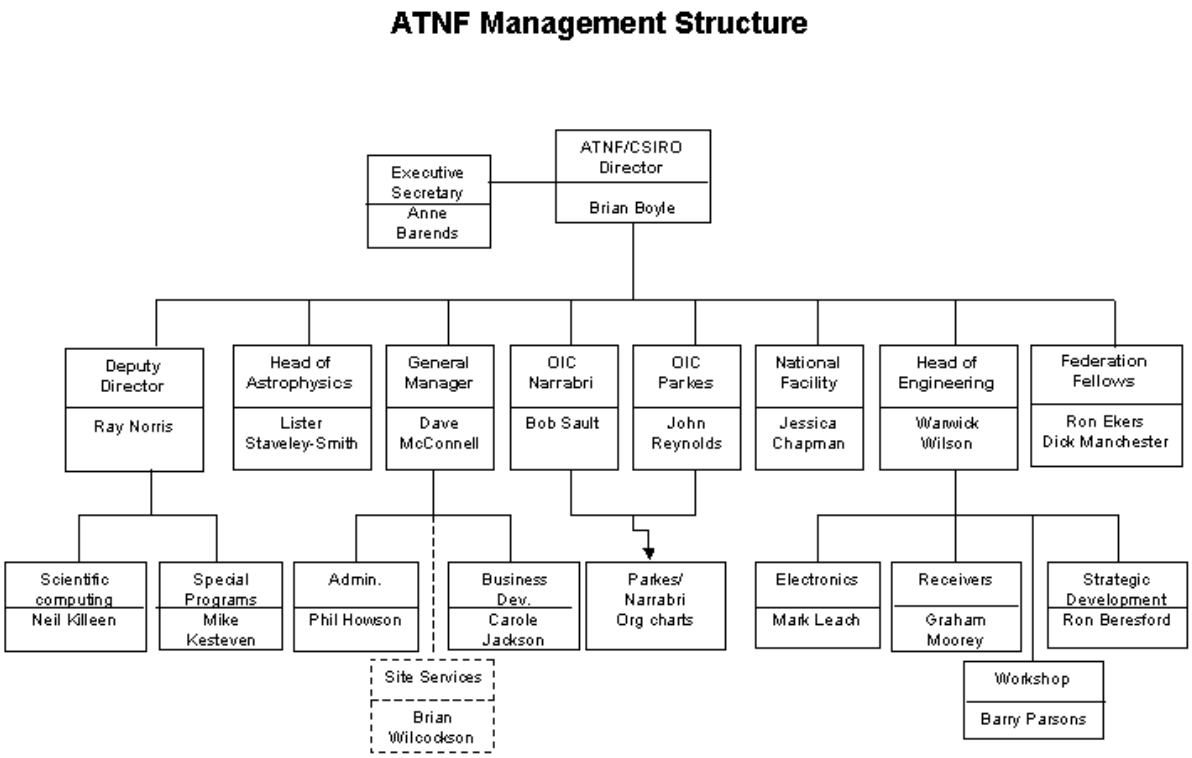
Senior Management Committee

The ANTF Senior Management Committee (SMC) comprises the leaders of ATNF themes and enabling processes as shown below. The SMC meets quarterly to discuss operational and strategic items and to develop policy issues.



Organisational chart

The ATNF divisional organisational chart follows.

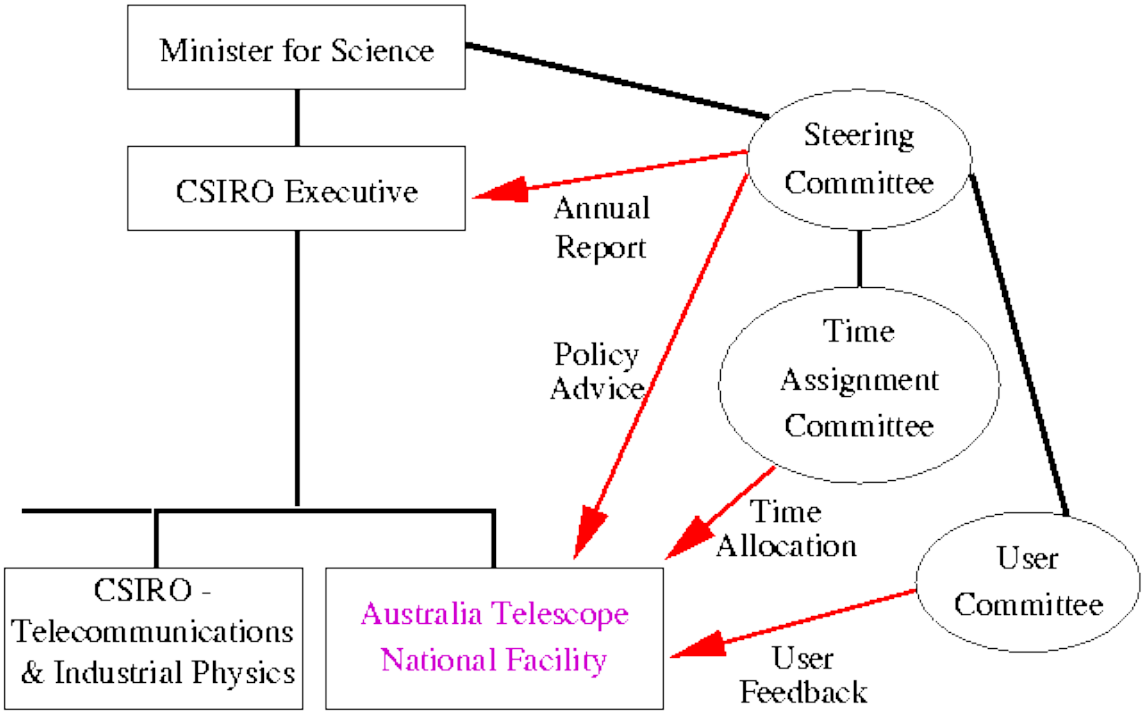


The Australia Telescope Steering Committee assists CSIRO in developing the long-term strategy of the ATNF. Meeting at least once a year, it defines the broad directions of ATNF scientific activities and the development of the Australia Telescope. It is also responsible for promoting use of the Facility and for the allocation of observing time. ATSC members are appointed by the Minister of Science and comprise representatives from all key stakeholders in the ATNF; national and international astronomical community, industry and CSIRO.

The ATSC appoints members to the Australia Telescope User Committee (ATUC), who provide detailed feedback and advice on the operation and future development of the facility to the Director from a user perspective. ATUC is dominated by Australian-based users external to the ATNF. ATUC meets on a 6-monthly basis, and provides a report to the ATSC on an annual basis. ATUC are primarily focussed on outcomes and performance in the National Facility and Technologies for Radio Astronomy Theme. The ATUC Terms of Reference, approved by the ATSC, may be found at http://www.atnf.csiro.au/management/atuc/ToR.

The ATSC also appoints members to the Time Assignment Committee (TAC). The TAC assesses proposals to use the ATNF telescopes on the basis of scientific merit on a 6-month semester. The majority of the science carried out in the Astrophysics Theme depends on access to the ATNF telescopes and thus the TAC provides an effective review mechanism in this theme. TAC policy is approved by the ATSC. Details of relevant policies may be found at http://www.atnf.csiro.au/observers/data.html .

The relationship between ATNF, ATSC, ATUC, TAC and CSIRO is illustrated in the diagram below.



In addition to the external review mechanism provided by ATSC and ATUC, internal project oversight at the Divisional level is provided by the Project Review Board (PRB). The PRB meets quarterly to review progress against milestones for all ATNF development projects and to assess 'initialisation' proposals for new projects. The terms of reference for the PRB, approved by the SMC, may be found at http://www.atnf.csiro.au/management/prb/ToR The PRB is chaired by the Director and comprises Head of Engineering Head of Astronomy and General Manager; leaders or representatives of allthree research themes within the ATNF.

Key Divisional Objectives for 2004-05

CSIRO Strategic Objective	Key Divisional Objectives, 2004-05	Accountability
1. Focusing our Science Investment		
1.1 Play a significant role in delivering on Australia's National Research Priorities	80% of divisional effort is directed towards delivering on National Research Priorities (see above).	
1.2 Build critical mass and ensure quality in our core research programs	To facilitate astrophysical research by providing world class radio astronomy facilities (ACA, Mopra, Parkes and LBA) at wavelengths from 20cm to 3mm To combine our strengths with those of international collaborators to obtain the best possible astrophysics research outcomes and to maintain the international profile of Australian astronomy.	Officers-in-charge (ATCA, Parkes, LBA) Head of Astrophysics
1.3 Champion Flagships to improve the lives of Australians and advance Australia's key industries		
1.4 Increase the impact of major cross-Divisional activities through a focused strategic investment process	To develop project plan for SKA MXDP associated with delivery of demonstrator at Mileura site in WA by 2006	Director, Head of Engineering
2. Delivering World-Class Science		
2.1 Concentrate people processes on developing, attracting, exciting and retaining talent	Identify, train and develop individuals with potential to fill key roles and provide appropriate training to all staff based on requirements.	Director, PD manager
2.2 Optimise delivery of all research activities by improving project management	**Need suitable objective here**	
2.3 Be globally recognised for science leadership in a growing number of science domains	To ensure that ATNF telescopes retain their position at the forefront of international radio astronomy observatories through an on-going process of instrumentation upgrades. To conduct world-class research in astrophysics using the telescopes operated by the ATNF in order to best exploit scientific opportunities and to best plan for future upgrades. To carry out research in fields which are likely to become important for future facilities in order to define how best to build these facilities, and to work out how best to use these facilities.	Head of Engineering Director, Head of Astrophysics Director, Head of Astrophysics
2.4 Maximise Australia's chances of hosting major international science facilities such as the SKA	To identify an Australian site that, based on thorough site testing and characterization, best meets the scientific and technical requirements of next-generation radio telescopes. To carry out ATNF's commitments to the Australian Astronomy MNRF, demonstrating enabling technologies for the SKA and facilitating Australia's engagement in next-generation telescopes.	Head of Engineering Director, Deputy Director, Head of Engineering
3. Partnering for Community Impact		
3.1 Focus and intensify collaboration with universities, CRCs and other agencies	To maintain ATNF's position as a leader in radio astronomy technology by taking part in collaborative projects with outside partners, both national and international. To train future generations of Australian radio astronomers and to establish firm linkages with Australian (and overseas where appropriate) Universities.	Head of Engineering Head of Astrophysics
3.2 Service the needs of government for informed policy setting	To play a major role in the PMSEIC WG on astronomy, and to engage whole-of-government support for SKA.	Director
3.3 Enhance communication to raise public and stakeholder excitement and trust in science	To raise the profile of astronomy in Australia. Maintain and foster good relation with local communities in current and future radio telescope sites. To attract young people into science.	Education Officer Publicity Officer
3.4 Partner with other agencies to advance Australia's global development contributions		
4. Serving as a Catalyst for Industry Innovation		
4.1 Intensify engagement with RDCs to grow regional and new industries		

4.2 Structure deeper and more meaningful relationships with large corporations		
4.3 Accelerate the growth of promising technology-based SMEs		
4.4 Reinvent our ICT capabilities to strengthen Australia's knowledge-based industries	To develop new software as needed by the community for new telescopes and data paradigms (e.g. the Virtual Observatory).	Head of Computing

5. Building One-CSIRO Capabilities and Commitment

5.1 Stimulate breakthroughs by promoting cross-pollination, especially in frontier research	To carry out (cross-divisional) research in fields which are likely to become important for future facilities in order to define how best to build these facilities, and to work out how best to use these facilities.	Director, Head of Engineering
5.2 Be among the best in governance, OHS&E and performance management processes	Provide a safe Workplace for all staff though improved understanding and adoption of OHS&E principles	Director, OHS Manager
5.3 Adopt a unified approach to dramatically improve service and grow top accounts	To facilitate the conception of new projects, with particular emphasis on strategic technology research and commercialisation activities	BD Manager
5.4 Implement standard processes and IT systems to enhance collaboration and efficiency	To interact effectively with other Divisions and sections of CSIRO to ensure the integrity of ATNF computing and information.	Head of Computing

6. Securing a Financial Foundation for Growth

6.1 Secure greater Federally funded support for CSIRO science investment		
6.2 Proactively manage patent portfolio to multiply IP-based revenue streams		
6.3 Deliver customer value for money and eliminate subsidisation in consulting services	To earn external revenue by acting as a supplier of radio astronomy, or similar, instrumentation for outside characterization.	Head of Engineering
6.4 Reduce overhead and purchasing costs and manage balance sheet for reinvestment	To reconcile the 5-year plan with the likely trajectory of revenue-generating projects.	Finance Officer

4.2 Research Management

Objectives
To ensure that ATNF resources are used optimally to support the world-class research in radio astronomy and related aspects of astrophysics. For astrophysics research ATNF seeks to ensure the optimal use of time on the National Facility to advance the science. For strategic engineering and technology research, we aim to explore new technologies for improving instrumentation of the National Facility, and for developing the next generation of radio telescopes.

Annual Performance Goals
- Maintain the standard of research on the National Facility through the continuing operation of the Time Allocation Committee and associated processes.
- Ensure the scientific potential of the ATCA Broadband Upgrade and, in particular, the new spectrometer is thoroughly assessed.
- To plan and implement the remainder of the NTD project (within MNRF) to ensure the best progress towards realising the SKA.
- To complete the establishment of ATNF Procedures Guidelines for Project Management (consistent with CSIRO PM Policy), and the “Projects Database” as support systems for the project selection process governed by the PRB (Projects Review Board).

Accountabilities: Director, OiC Parkes, OiC ATCA, Head of Astrophysics

4.3 Business Development, Commercialisation and Legal

Objectives
- To facilitate the conception of new projects, with particular emphasis on strategic technology research and commercialisation activities
- To acts as a key resource for project leaders and senior management, having oversight of all grant capture, incoming external fellowship applications, awards, agreements, legal advice and acts as advisor to preparation and application.

Annual Performance Goals
- Develop ATNF's full partnership within the EU sixth framework (FP6) “RadioNet” programme including obtaining DEST IAP funds for PHAROS and SKADS activities.
- Coordinate an application for ARC funds for Australian subscription for the SKA International Project office.
- Co-ordinate production of report the NASA DSN Array study and prepare a proposal for the next stage of work (DSN prototyping)

Accountabilities BD manager, General Manager

4.4 People Development

OHSE & EEO

Objectives

- Provide staff with a workplace free from harassment and discrimination
- Ensure fair and open process in job recruitment

Annual Performance Goals:
- Quarterly meetings of OH&S committees at each site
- 100% compliance with all OHS&E lead indicators
- Better support and more streamlined, coordinated reporting processes for OICs, Group Leaders and supervisors provided by new Divisional OHS&E Manager
- Ensure appropriate trained EEO officers at each site
- Prompt response to all complaints issues
- ll substantive (non-casual) positions to be advertised by an open process, consistent with CSIRO guidelines

- Uniform appointment process adopted, consistent with CSIRO guidelines

***Accountability**: OICs, General Manager, PD Manager, EEO Coordinator*

Personnel Development

***Objective**:*

- Identify, train and develop individuals with potential to fill key roles
- Provide appropriate training to all staff based on requirements
- Timely feedback on staff performance and reward of success
- Maintain effective communications between staff at all ATNF sites

Annual Performance Goals:

- Update key talent list
- Discuss development opportunities for key talent with Group Leaders and supervisors
- Identify and initiate development plans
- One member of key talent list in LRE course
- All project managers trained in the use of project management tools
- Opportunity for each astronomer to attend at least one international conference per year
- Leadership training provided for all senior managers
- 100% of APAs concluded by April 30
- Maintain system for continuous review of ERA and cash rewards
- Continued high ranking in Insight Survey

Accountability: Director, PD Manager, General Manager, Head of Astrophysics

4.5 Operations

Finance and funding management

Objectives

- To maintain a 5-year plan of income and expenditure.
- To reconcile the 5-year plan with the likely trajectory of revenue-generating projects.
- To compose and monitor the annual budget.
- To monitor the Whole-of-Life budget of all development projects.

Annual Performance Goals

- Monthly monitoring and quarterly discussion of expenditure and income against the annual budget.
- Compose the 2005-2006 budget.
- Quarterly update of the 5-year plan.
- Annual presentation of ATNF financial statement and 5-year plan to the AT Steering Committee.
- Quarterly financial information update for all projects incorporated in project reporting system.

Accountabilities: General Manager, Finance Manager

Information Management and Technology

Objectives

- To ensure an appropriate level of specialist computer support is delivered to ATNF staff and facility users.
- To ensure the security of scientific, engineering, financial and administrative data.
- To interact effectively with other Divisions and sections of CSIRO to ensure the integrity of ATNF computing and information.

Annual Performance goals

- To complete the ATNF crisis Management and Disaster Recovery Plan.
- To submit divisional requirements to CSIRO ITS for its “One IT” plan.

Accountabilities: General Manager, Head of Computing

Facilities Management

Objectives

- To ensure continuing reliability of the Parkes radio telescope; the Compact Array; the Mopra radio telescope; the LBA correlator and divisional infrastructure, including the Radiophysics Laboratory.

Annual Performance Goals

- To plan and execute the repairs and maintenance of the major telescope facilities for financial year 2004-2005.
- To plan and execute the "Asset Replacement" program for financial year 2004-2005.
- 6GHz Multibeam Receiver – December 2004.
- H-Maser refurbish.

Accountabilities: Head Engineering, OiC Parkes, OiC Compact Array, General Manager

4.6 Communications and Outreach

Outreach

Objectives

- The broad objectives for ATNF outreach and education are to (i) raise the profile of astronomy in Australia and (ii) maintain and foster good relation with local communities (iii) attract young people into science

Annual Performance Goals

- Continue to operate the Parkes Visitors Centre and maintain numbers greater than 130,000 visitors per year.
- Provide a summer vacation program for at least six ATNF-affiliated students
- Provide a new ATNF website for astronomy outreach and education
- Provide at least one workshop of two-three days for high school teachers
- Develop educational resources for the ATNF outreach website for the NSW HSC year-12 astrophysics curriculum – by March 2005

Accountabilities: Head, National Facility Support, Education Officer

Communication

Objectives

- To provide effective means of communications as appropriate for the different stakeholder groups: ATNF staff, National Facility Users, CSIRO, partners and external contracts, and the general public.

Annual Performance Goals

- Provide at least 10 media releases per year
- Provide the ATNF News, three times per year
- Provide and distribute the 2003 ATNF Annual Report by July 2004

Accountabilities: Head, National Facility Support, ATNF Publicity Officer