1 Australia Telescope National Facility Guide to VLBI Observing

October 2007

1.1 Introduction

A number of radio telescopes in Australia (and overseas) operate together as an array capable of VLBI observations. Up to 1997, this network was supported by the individual institutions operating each telescope via a *cooperative* arrangement whereby the people operating the different telescopes collaborated in the VLBI scientific programs. Under the 1997 Major National Research Facilities program, the VLBI network was upgraded and agreement reached between the ATNF and the University of Tasmania to operate the network as a *National Facility.* From 2006, the Hobart and Ceduna antennas have been operated by the University of Tasmania under a service agreement with ATNF.

Operational arrangements for the VLBI National facility have been implemented and the conditions are outlined below.

Proposals are sought for the National Facility part of this VLBI network. Please read this guide carefully for details before completing the proposal form.

1.2 The Network

The telescopes that may be available for VLBI observations and some of their characteristics are shown in Tables 1 & 2. Detailed information about Parkes, Mopra and the Compact Array of the ATNF are included with the separate proposal forms for these instruments.

Note that inclusion in the table *does not* imply any guarantees of telescope availability.

Proposals are accepted **only** for the ATNF and U.Tas. operated telescopes, and for time on a Tidbinbilla antenna under NASA-CSIRO arrangements. Only one of 2 available telescopes at Tidbinbilla may be requested and time available on the 70m telescope is limited.

The ATNF **cannot** allocate time on non-AT telescopes but the VLBI scheduler will facilitate the necessary arrangements.

1.3 VLBI scheduling and coordination

ATNF provides a VLBI scheduler (currently Dr. Phil Edwards) and a network coordinator (currently Dr. Tasso Tzioumis) for the entire VLBI array. The scheduler and coordinator will cooperate to:

- act as the contact persons for the users and potential users regarding the capabilities and availability of time and antennas each proposal term and facilitate appropriate arrangements and collaborations where necessary.
- schedule the accepted proposals after the review by the Program Committee in consultation with non-ATNF telescope groups
- coordinate the provision of observing manpower for the network
- oversee the equipment and disk availability before each session
- arrange for correlator time as required.

1.4 Conditions for all potential users:

1. The VLBI network will operate under guideline similar to the ATCA and Parkes. There will be **no absentee** observing and proposers are expected to participate in the observing. Personnel requirements can be quite large i.e. at least 1 person per antenna for each observing shift. To simplify observing arrangements, proposers will be required to observe at one antenna only but for $n\times$ observing shifts, where n is the number of telescopes requested in the network. The VLBI coordinator will coordinate the arrangements for observing.

2. Use of antennas which are not part of the National Facility require the cooperation of the home institution and such permission is the responsibility of the proposer. Detailed information and contact persons may be obtained from the VLBI scheduler, who will assist with overall coordination.

3. Disks for VLBI recording (XRAID) are in limited supply and proposers may be required to provide additional disks for special observations with extreme recording capacity needs.

4. Mk4/5 recording systems are available at some antennas (Table 1). The Network can schedule these, but the provision of Mk5 disks and correlating is the proposer's responsibility and may need special arrangements. The VLBI scheduler can provide information and guidance.

5. The LBADR disk-based recording system has now been adopted on the LBA. The tape-based S2 system has been decommissioned from the beginning of 2007.

1.5 Correlation

The VLBI coordinator will assist with organisation of correlating for all LBA scheduled observations.

The 7-station S2 correlator at ATNF has been decommissioned since January 2007. All LBA recordings are correlated on the Swinburne supercomputer cluster under an agreement with ATNF, using the DiFX software correlator developed at Swinburne.

The correlator part of the supercomputer is normally available for production correlating at all times. However, tests and development may take priority during the normal day-shift.

All production correlation and data quality control will be performed by Swinburne personnel and the correlated data shipped to the PIs. Proposers do not need to visit the correlator but may make special arrangements if desired.

Details and advice should be sought from the VLBI coordinator.

1.6 AT Compact Array observations

Since the December 1995 AT term, a "phased-array" facility has been available for VLBI recording. This allows a phased combination of up to all 6 CA antennas, which greatly increases the telescope sensitivity. Contact the VLBI scheduler or coordinator for details.

Note that it is not always possible to operate the ATCA in standard imaging mode simultaneously with VLBI observations. Proposers interested in such combined observations should consult the VLBI scheduler or coordinator on feasibility and include appropriate additional scientific justification.

1.7 Asia Pacific Telescope – APT

The VLBI network in Australia is also a key component of the Asia Pacific Telescope (APT), which includes most radio telescopes in the Asia Pacific region, primarily in Japan and China. Information on the APT, including telesope and receiver details are available via WWW on *http://www.vsop.isas.jaxa.jp/apt/*.

There are no scheduled APT observing sessions at present but proposals for APT observations will be accepted by any of the regional networks comprising the APT (e.g. ATNF, JNET, China), as part of each network's normal proposing cycle. Additional scientific justification is essential.

Please discuss with the VLBI coordinator or scheduler when proposing APT observations.

1.8 Observing Proposals

From November 2005, all telescope applications to the ATNF must be submitted using the ATNF Online Proposal Applications and Links (OPAL).

For information on using OPAL and how to apply please see the ATNF Telescope Applications website at *http://www.atnf.csiro/observers/apply/applications.html* and the Opal home page at *http://opal.atnf.csiro.au.*

Proposals sent by email using the previous latex proposal forms will not be accepted unless there are exceptional circumstances.

The Australia Telescope keeps archives of all approved proposals and sources observed (with the Compact Array). A search of the database at *http://www.atnf.csiro.au/observers/data.html* is useful before planning your observing proposals.

Additionally, a list of all currently active VLBI proposals and their status is also available at *http://www.atnf.csiro.au/vlbi/observing/vlbi_active.html.*

Proposed observations, if approved, should normally be scheduled within 1 year of approval. If observations cannot be scheduled within 1 year, the proposal will *lapse* and the proposer will be notified. Lapsed proposals may be resubmitted.

The primary constraint in scheduling VLBI observations is the availability of requested non-AT network telescopes, especially Tidbinbilla.

1.9 Contact and further information

Information and assistance can be obtained from the VLBI scheduler and coordinator by

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