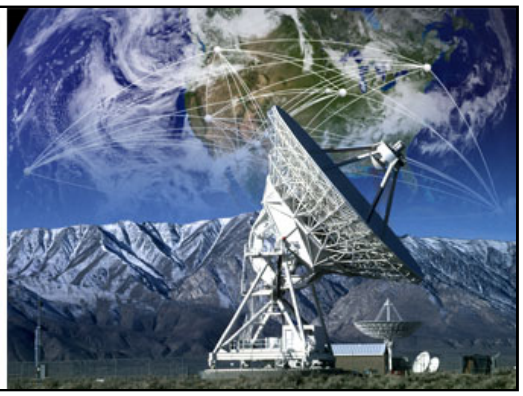
LBO Call for Proposals: Semester 2017A

30 June 2016



The Long Baseline Observatory (LBO) invites scientists to participate in the LBO's Semester 2017A Call for Proposals for the Very Long Baseline Array (VLBA), the High Sensitivity Array (HSA), and the Global 3mm VLBI Array (GMVA).

The submission deadline for Semester 2017A proposals is Monday, 1 August 2016, at 17:00 EDT (21:00 UTC).

The LBO especially wishes to highlight continuing opportunities for joint observations with the **Chandra X-ray Observatory**, the **Hubble Space Telescope** and the **Swift Gamma-Ray Burst Mission**.

The LBO strongly encourages proposers to read through the "News and Opportunities (https://science.nrao.edu/observing/call-for-proposals/lbo_2017a/news-opportunities) " page carefully as there have been a number of changes made to instrument availability and student support opportunities for 17A.

Proposal preparation and submission remain via the **NRAO** Proposal Submission Tool (PST) available at NRAO Interactive Services (http://my.nrao.edu/) . Note that PST use requires registration. Proposers who need assistance with proposal preparation or have questions regarding the Call or GBT capabilities should submit help requests via the NRAO Helpdesk (https://help.nrao.edu/) .

In semester 2017A, there will be fewer hours available for Open Skies observing than there has been in the past. This is a reflection of the change in funding sources for the VLBA - a larger fraction of the VLBA budget will be coming from the US Naval Observatory.

Along with the reduced number of hours available for science we may also face reduced scheduling flexibility. The LBO will work with individual observers to optimize the observing efficiency and scientific productivity of the VLBA as we move into this new operating model.

News & Opportunities

VLBA Time Allocation Under a New Organization

On 20 November 2015, the National Science Foundation (NSF) selected Associated Universities, Inc. (AUI) to manage the National Radio Astronomy Observatory (NRAO) through a new 10-year cooperative agreement. The new agreement includes the operation of the Karl G. Jansky Very Large Array (VLA), the North American share of the international Atacama Large Millimeter/submillimeter Array (ALMA), and NRAO's development

laboratories and administrative and management functions, effective 1 October 2016.

The Very Long Baseline Array (VLBA), and the Green Bank Telescope (GBT), which were recommended for divestment several years ago, will exit NRAO and become independent facilities known as the Long Baseline Observatory (LBO) and the Green Bank Observatory (GBO). Associated Universities, Inc. (AUI) will operate LBO under a 2-year cooperative agreement between the National Science Foundation (NSF).

Because of this reorganization, the 2017A Call for Proposals is now divided into three separate calls for the VLA, LBO, and GBO. This call is for the VLBA, HSA, and GMVA only; the call for GBO can be found here (https://science.nrao.edu/observing/call-for-proposals/gbo_2017a) and the call for VLA can be found here (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/introduction) .

Large Proposals

The VLBA will continue to support large proposals. The upcoming completion of the large BeSSeL project will free considerable observing time in the highly coveted Galactic plane parallax slots. All VLBA proposers that have been contemplating submission of a large proposal are encouraged to do so, or to submit relevant pilot projects that may be useful in shaping a future large proposal.

Continuing Opportunities

The joint observations described below provide opportunities to combine observations with the VLBA and several space observatories operating at very different wavelengths. Joint observations combining the VLBA with other ground-based VLBI instruments are embedded in the periodic VLBA Call for Proposals, and the VLBA Observational Status Summary. The following joint observation opportunities will continue in semester 2017A via existing arrangements made through NRAO.

Joint Observations with Chandra X-ray Observatory

In previous semesters, the community has had the opportunity to propose for observing time on NRAO facilities through a joint program with the Chandra X-ray Observatory. The NRAO would like to alert the community to the fact that, beginning in semester 2016A proposers to the NRAO will have the opportunity to request time on Chandra, to be awarded on the recommendation of the NRAO Telescope Allocation Committee (TAC) and approved by the NRAO Director. Up to 120 ksec will be made available to NRAO proposers annually. See the Joint Observations with Chandra (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/chandra) page for details.

Joint Observations with the Hubble Space Telescope (HST)

By agreement between the NRAO and the Space Telescope Science Institute, STScI will be able to award up to 3% of the available time on NRAO's North American facilities to highly ranked proposals that request time on both HST and NRAO telescopes. In return, STScI has offered 30 orbits of HST time for allocation by the NRAO TAC to proposals submitted for the NRAO deadlines for Semester 2016B and Semester 2017A. See the Joint Observations with HST (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/hubble-space-telescope) page for details.

Joint Observations with Swift Gamma-Ray Burst Mission

To foster correlative observations, a joint Swift/NRAO observing program has been established, detailed in a

Memorandum of Understanding (http://swift.gsfc.nasa.gov/proposals/nrao.html). By this agreement, the Swift Program permits NRAO to award up to 300 kiloseconds of Swift observing time per year. Similarly, NRAO permits the Swift Guest Investigator (GI) Program to award NRAO observing time. See the Joint Observations with Swift (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/swift) page for details (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/swift).

Joint Observations with Fermi Gamma-Ray Space Telescope

We remind the community that it is possible to propose for observing time on NRAO facilities through the Fermi Gamma-ray Space Telescope Joint Proposal Opportunity or the Cooperative Proposal Opportunity. See the Joint Observations with Fermi page for details (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/fermi).

Joint Proposals Among the LBO, GBO, NRAO and Other Radio Observatories

As part of the inter-observatory agreements establishing the High Sensitivity Array and Global 3mm VLBI Array, a single proposal to either of those extended arrays suffices to request all telescopes *for VLBI observations*. However, separate proposals must be submitted for any *non-VLBI use* of any requested telescopes.

Other Proposal Opportunities

Proposers should keep in mind that the following classes of observations are welcome:

- **High Risk Proposals:** As a means of maximizing its scientific impact through cutting-edge observations, the Observatory encourages the submission of high-risk/high-reward proposals.
- **Commensal Observing**: The VLBA has some innate ability to support commensal observing either through clever use of existing infrastructure or through operation of user-supplied capabilities. It is recommended that interested proposers discuss their ideas with VLBA staff prior to submission in order to develop a plausible program. Such observations will be subject to resource constraints.
- **Filler Programs:** Some programs are not time critical, do not require highly subscribed GST ranges, or can usefully observe in multiple brief, randomly-timed sessions. Such programs may be able to take advantage of "filler" time. Types of projects that might be suitable for VLBA filler time include: surveys of many sources, deep integrations spread over many sessions, and long term monitoring. It is rare for fewer than 6 antennas to be functional and have good observing conditions as well; high frequency projects that can use a reduced array are therefore viable. To be eligible for FILLER status the project should be flexible enough to be scheduled:

  with non-ideal weather conditions;
  with less than the full complement of antennas;
  with a target list of source positions around the sky; and
  with short duration or variable length scheduling blocks.

  Proposals for filler projects must include the word "filler" in the proposal title. Teams must provide tools that allow VLBA operations, with minimal effort, to create schedules for arbitrary blocks of time of one hour or longer when such time becomes available during dynamic scheduling. Large VLBA filler proposals, and multi-semester proposals, will be considered.

Further information about each of these programs can be found here

(https://science.nrao.edu/observing/proposal-types/proposal-opportunities) .

Proposal Guide

PLEASE READ IMPORTANT INFORMATION IN THE INTRODUCTION !! (https://science.nrao.edu/observing/call-for-proposals/lbo_2017a/introduction)

Call for Proposals

Proposals are due by 2016 August 1, 17:00 US EDT (21:00 UT).

This deadline applies to Very Long Baseline Array (VLBA (https://science.nrao.edu/facilities/vlba)) and High Sensitivity Array (HSA (https://science.nrao.edu/facilities/vlba/proposing/HSA)) proposals requesting time in semester 2017A (2017 February 1 – 2017 July 31) or multi-semester proposals, and to Global mm VLBI Array (GMVA) proposals for 2017 Session I (March 30 – April 4), or later sessions.

All proposals mentioned above must be prepared and submitted using the NRAO Proposal Submission Tool (PST), accessible via NRAO Interactive Services (http://my.nrao.edu/) . Use of the PST requires registration by all proposers, including co-investigators, in the NRAO User Database.

Requests for resources beyond the VLBA — i.e., the inclusion of HSA or Global 3mm VLBI (GMVA) stations — need to be quantitatively justified in the proposal.

For this 2017A observing semester, we expect no significant GST-related pressure on available VLBA observing time.

VLBA Observing Capabilities

The VLBA provides ultra-high angular resolution for observations of:

- Non-thermal continuum emission, including polarimetry, pulsars, and multiple phase centers.
- Maser lines of OH (1.7 and 6.0 GHz), CH3OH (6.7 and 12.2 GHz), H2O (22 GHz), SiO (43 and 86 GHz) and other molecules.
- Absorption-line studies of numerous thermal spectral lines.

The VLBA operates two data systems, a Polyphase Filterbank (PFB), and a Digital Downconverter (DDC). These are described in detail in Section 5.4 (https://science.nrao.edu/facilities/vlba/docs/manuals/oss/sig-proc/rdbe) of the VLBA Observational Status Summary (OSS), which also includes suggestions for selecting the optimal observing system for various scientific goals.

Proposals requiring significant additional correlator resources, such as multiple phase centers per field, should address mechanisms to support the correlation without adversely affecting the throughput of other projects.

VLBA Resident Shared Risk Observing Program

The VLBA Resident Shared Risk Observing (RSRO) program provides users with early access to new capabilities in exchange for a period of residency in Socorro to help commission those capabilities. For example, the phased-VLA system was developed through RSRO programs. **Users are encouraged to conceive and propose innovative ideas for new VLBA capabilities**. Some staff suggestions are

included at the VLBA RSRO program (https://science.nrao.edu/facilities/vlba/proposing/rsro) page, along with details for submitting RSRO proposals.

Proposers should be aware that RSRO capabilities are generally not approved at priority A, owing to the level of risk associated with these observations.

High Sensitivity Array (HSA)

The HSA (https://science.nrao.edu/facilities/vlba/docs/manuals/oss/vlba-plus/hsa) comprises the VLBA, phased VLA, GBT, Effelsberg, and Arecibo telescopes. All of these are equipped with instrumentation compatible with the VLBA observing capabilities described in the VLBA Observational Status Summary (OSS). VLBI observations combining the VLBA with any one or more of the other four HSA stations can be requested in a single HSA proposal. Ongoing special considerations for these additional telescopes are documented in Section 14.2 (https://science.nrao.edu/facilities/vlba/docs/manuals/oss/vlba-plus/hsa) of the OSS; new features and special cases are cited here.

• **The phased Very Large Array (Y27)** will be available for HSA observing in semester 2017A, in its D and C configuration (see the NRAO Call for Proposals (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/proposal-guide) for applicable dates).

Observing with a single VLA antenna (Y1) in conjunction with the VLBA will only be available through the VLBA Resident Shared Risk Observing (https://science.nrao.edu/facilities/vlba/proposing/rsro) program.

• **The Green Bank Telescope, like the VLBA, will be transitioning to a new partnership arrangement for semester 2017A.** Time available for VLBI on the GBT will be dramatically reduced compared to past observing semesters due to this change. Proposers should only include the GBT in the proposal if it is essential for the science and if it is clearly justified in the text.

Again for this call, proposals to use the GBT 6-cm receiver will be considered only for total-intensity observations.

• **The Effelsberg telescope** supports both of the VLBA observing systems.

• **The Arecibo 305-m telescope** is currently available only with the PFB observing system. An RSRO project is encouraged to help qualify the 4-channel DDC observing system at Arecibo.

Global 3mm VLBI Array (GMVA)

GMVA proposals submitted by the 2016 August 1 deadline will be considered for scheduling in 2017 Session I (March 30 – April 4), or later sessions.

Ongoing special considerations for the GMVA are documented in Section 14.3 (https://science.nrao.edu/facilities/vlba/docs/manuals/oss/vlba-plus/gmva) of the VLBA Observational Status Summary (OSS); new features and or special cases are cited here.

ALMA and LMT are not available for proposing in this call, and the former participating telescope at Plateau de Bure is not available in 2017. Also, as noted elsewhere, time available for VLBI on the GBT will be dramatically reduced compared to past observing semesters due to its new partnership arrangement.

All GMVA telescopes will record at 2 Gbps, except the KVN telecopes which will record in a compatible 1 Gbps mode. In proposals for semester 2017A, the telescopes of the KVN must be specified by entering "KVN" as an "other" entry the Proposal Submission Tool.

European VLBI Network (EVN) and Global cm VLBI

The EVN operates on a trimester cycle, with proposal deadlines on February 1, June 1, and October 1. No EVN deadline coincides with the impending VLBA deadline of 2016 August 1. The next coincident deadline will be on 2017 February 1.

Information on the EVN, and EVN-based global cm observations, is available on the EVN home page (http://www.evlbi.org/), and is updated in Section 14.4 (https://science.nrao.edu/facilities/vlba/docs/manuals/oss/vlba-plus/evn) of the VLBA Observational Status Summary (OSS) when coincident proposal deadlines occur.

Alerts & Tips for Proposers

Source Lists

LBO requires proposers to specify their source lists in full. This enables the LBO to identify potential conflicts between observing programs and to better understand scheduling pressure on the instruments it operates. It may be the case that the final target list has not been selected at the time a proposal is submitted. In such cases, all potential targets and fields should be listed. The only exceptions to this requirement are for Triggered proposals to observe targets that are unknown a priori. Proposal source lists are not made public by the LBO.

Dissertation Plans

Students planning to use the VLBA for their PhD dissertation must submit a "Plan of Dissertation Research" of no more than 1000 words with their first proposal. This plan must be referred to in later proposals for time allocations relevant to the thesis work described in the plan. It is the responsibility of the student to ensure that the information contained in the plan is up-to-date at the time a given proposal is submitted. By the same token, a proposal for work that is relevant to a student thesis should refer to the plan and clearly state the relevance of the proposal to the plan. At a minimum the plan should contain:

1. An overview of the research program
2. The thesis timeline, including the expected date of completion
3. An estimate of the VLBA resources needed to complete the program of research
4. Clear statements about the importance of each proposal to the thesis as a whole.

The plan provides some assurance against a dissertation being impaired by an adverse review of a proposal when the full scope of the thesis is not seen. The plan can be submitted via NRAO Interactive Services (http://my.nrao.edu/). Students are reminded to submit their plan comfortably in advance of the proposal deadline. Thesis plans must be in pdf format so science reviewers can easily access the plans. Students who have not yet graduated but have active plans on file should update those plans to a pdf format if they are not already in that form.

Tips for Proposers

LBO will use the panel-based NRAO proposal evaluation and time allocation infrastructure. That is, members of the scientific community are responsible for reviewing proposals based on their scientific merit through eight Science Review Panels (https://science.nrao.edu/observing/proposal-types/sciencereviewpanels). As a means of

broadening the scientific perspective of its reviewers, and of increasing the participation of the wider astronomy and astrophysics community in the science programs of LBO, GBO and NRAO facilities, SRP membership is deliberately selected to include some colleagues that are not necessarily experts in radio observational techniques. This being the case, we encourage proposers to consider the following when preparing their proposals:

1. Avoid the use of radio astronomy jargon
2. Do not assume the reader is familiar with a particular observing technique - explain it briefly
3. Do not assume the reader is familiar with an earlier rationale for a developing line of research - provide adequate historical context and connect the dots as necessary
4. Describe previous observations and publications relevant to the proposed observations
5. If a particular point source or brightness temperature sensitivity is required, justify it.

Useful Resources & Tools

Note: you must be a registered NRAO user to access many of these resources. Please go to NRAO Interactive Services (http://my.nrao.edu/) . If you are already a registered user, you are encouraged to update your profile.

Proposal Submission Tool

The Proposal Submission Tool and associated documentation is accessed through NRAO Interactive Services (http://my.nrao.edu/) .

Proposal Finder Tool

The Proposal Finder Tool (http://library.nrao.edu/proposals) (PFT) may be used to search cover sheets of proposals approved for time on NRAO telescopes. The PFT returns the proposal's authors, title, abstract, and, if available, approved hours.

Links to VLBA Documentation

General

- VLBA Observational Status Summary (https://science.nrao.edu/facilities/vlba/docs/manuals/oss)
- NRAO Helpdesk (https://help.nrao.edu/)

High Sensitivity Array

- VLBA+ Observing (https://science.nrao.edu/facilities/vlba/docs/manuals/oss/vlba-plus)
- Observing with the High Sensitivity Array (https://science.nrao.edu/facilities/vlba/proposing/HSA-Tips)

- VLBI at the VLA (https://science.nrao.edu/facilities/vla/docs/manuals/obsguide/modes/vlbi)
- VLBI on the GBT (http://www.gb.nrao.edu/~fghigo/gbtdoc/vlbinfo.html)

Proposing

- EVN Sensitivity Calculator (http://www.evlbi.org/cgi-bin/EVNcalc)

Observing

- SCHED User Manual (http://www.aoc.nrao.edu/software/sched)
- VLBA Calibrator Search Tool (http://www.vlba.nrao.edu/astro/calib/)

Analysis

- NRAO Data Archive (https://archive.nrao.edu/archive)

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