

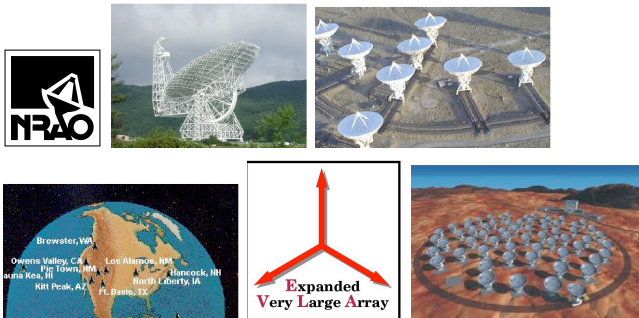
Interactive Services (my.nrao.edu)

Proposal Submission Tool, CASA Helpdesk & User Profile Management

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Last updated September 26, 2008

[PDF Version](#)



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1. Introduction

Interactive Services (my.nrao.edu) is a portal to the NRAO. Currently, the main services include the Proposal Submission Tool (PST), a CASA helpdesk, and user profile management. The PST is a package for creating and submitting proposals for NRAO telescopes that currently include the VLA, GBT, and VLBA. Common Astronomy Software Applications (CASA) is a suite of C++ application libraries for the reduction and analysis of radioastronomical data, packaged through a Python scripting interface. Interactive Services provides the user with a CASA helpdesk. The user may also manage their profile within Interactive Services which includes viewing and editing names, addresses, phone numbers, etc.

When you first log into Interactive Services you will see your Dashboard. The Dashboard is a management tool to help you keep track of news from the NRAO telescopes, latest developments, your data, your collaborators, and the status of dynamic scheduling. You will also be able to keep track of the various requests for feedback that NRAO has open at any given time. This utility will be continually evolved over the next one to two years, and new items will be added based on feedback from the user community. You will see tabs across the top of the page that say, ``Dashboard'', ``Proposals'', ``CASA'', and ``Profile''.

1.1 Registering at my.nrao.edu

If you do not have a username and password, you will need to request one. Click on the ``Create Account'' button on the Login page. This will take you to a page where you enter your user information into the NRAO Database. The information is entered via sections:

General Info:

Your name, professional status, and other miscellaneous information.

Affiliations:

The university, institution, or organization with which you are affiliated.

Addresses:

Mailing addresses for home, office, etc.

User Preferences:

Here, you enter your username and password. You may also enter a few other personal data.

Email Addresses:

Personal or work email addresses.

Phone Numbers:

How to contact you by phone or fax.

The fields marked with a red asterisk (``*") are required.

Once you have entered all the required information on each section, click on the ``Register" button. You will be taken back to the Login page where you may now login using the username and password you just specified. Once logged in, you may change any of this information by going to the Profile Tab and selecting ``My Profile".

To search for your university, institution, or organization, enter its name in the entry field and hit the ``Search" button. You will then be given several options to select via radio buttons. Select the appropriate radio button for your affiliation. If your affiliation was not found there is a button to have us contact you about adding your institution.

1.2 Lost or Forgotten Password

If you have lost or forgotten your PST password, simply go to the Login page and click on ``Forgot Password?". Enter your name and registered email address. You will be emailed your username and your password.

2. PST: Overview

The NRAO Proposal Submission Tool (PST) is a package for creating and submitting proposals for NRAO telescopes. The PST has been used for GBT observing proposals since June 2005, VLA observing proposals since January 2006, and VLBA/HSA observing proposals since 2 June 2008. The PST will eventually handle EVLA observing proposals and possibly ALMA proposals.

The PST is a combination of HTML and Java that is intended to be run from any web browser **with both Javascript and Cookies enabled**. If either is *not* enabled, the PST will fail without warning. The PST is known to be compatible with any combination of:

- Operating System: Linux, Mac OS X (10.3 or greater), SunOS (5.10 only), Windows (XP only)
- Browser: Firefox (1.0 or greater), Safari (312 or greater for the 300 series [1.3.x OS] and 419 or greater for the 400 series [1.4.x OS]), Internet Explorer (6 or 7), Netscape (7 only)

The purpose of the PST is to create an XML document which contains an NRAO observing proposal. The XML document contains cover page information (investigator names, contact information, and so on) as well as scientific and technical justifications, and observation and scheduling requests.

The PST is designed to make the proposal submission process simple both for proposal authors, and for the NRAO staff processing the proposals. For NRAO support staff, the PST ensures that proposal information is supplied in a uniform and complete manner. Electronic submission means that the proposal information can easily be inserted into the scheduling database, without the tedious manual

re-typing that was previously required.

This document can be found at:

To go to the PST, enable **Javascript and Cookies** in your web browser, then just [click here](#). A printable version of this document is available in [pdf format](#).

2.1 Proposal Types

2.1.1 Regular Proposals

Regular proposals are received on a trimester basis with deadlines of February 1, June 1, and October 1. If the deadline falls on Saturday or Sunday, it is extended to the following Monday. A regular proposal must request less than 200 hours of observing time on one or more of the NRAO telescopes. Some regular proposals will request coordination with non-NRAO telescopes.

Some regular proposals will request time to observe phenomena that are predictable in general, but not in specific detail. For example, a proposal to observe the next flaring X-ray binary that meets certain criteria would be included in this category. These regular proposals must (a) request an observing type of "Triggered Transient", (b) include specific triggering criteria, and (c) state the trimesters over which the proposal is to remain active.

2.1.2 Large Proposals

A large proposal is one that requires at least 200 hours of observing time on one or more of the NRAO telescopes. As of the 2 June 2008 deadline, large proposals can be submitted at any deadline; the page limits for these proposals are different than for regular proposals. For details see the large proposal policy at:

[Large Proposal Policy](#)

2.1.3 Rapid Response Proposals

All Rapid Response Science (RRS) proposals for the GBT, VLA, and VLBA must be prepared with the PST. The procedures are slightly different depending on the type of Rapid Response Science request. See the following links for the GBT and for the VLA/VLBA:

<http://www.gb.nrao.edu/gbtprops/generalproposalinfo.shtml>

<http://www.vla.nrao.edu/astro/prop/rapid/> Rapid Response Science requests of type 1 (Known Transient Phenomena) must be submitted during one of the regular trimester call periods (see §[2.1.1](#)). *Proposals to observe Known Transient Phenomena are classed as "Regular Proposals" in the PST, because they are submitted and refereed in the same way as "ordinary" (non-Rapid Response) proposals.*

Rapid Response Science requests of type 2 (Exploratory Time) or type 3 (Target of Opportunity) will be handled slightly differently from RRS type 1 and regular proposals. These can be submitted at any time.

2.2 Proposal Section

The Proposals Tab allows you to manage your proposals. Your proposals will be kept in a database so that you may save them and return to editing them at a later time. In order to protect your proposal information, a username and password are required to gain entry to the PST.

Each proposal is edited by entering information into a series of sections, listed in a tree structure on the left side of the page. Each section is devoted to a single aspect of the proposal.

Partially completed proposals may be saved within the PST, even with errors and/or length over-runs, allowing authors to complete their proposals at their leisure. Once the proposal is complete, it may be submitted to NRAO from within the tool. Proposals may also be withdrawn up until the proposal deadline.

If your PST web session is quiet (i.e., no server activity) for 60 minutes or more the system will automatically log you out. To resume working on the proposal, simply log back in and start editing the proposal again.

You will also be able to copy proposals previously submitted with the PST, either to revise them for resubmission during another proposal cycle, or to serve as templates for new proposals. If desired you may specify which sections to copy from a previously submitted proposal.

Once you have logged in and clicked on the Proposal tab, you will be presented with a list of your proposals with search and filtering options on the left-hand side. To the right will be a table consisting of the proposal name, legacy ID, title, P.I. name, submitted date, and status. **Within the proposal column there exists icons to delete, validate, copy, print, submit or withdraw the proposal.**

To edit a proposal, click on its highlighted title. To start a new proposal, click on the "New Proposal" button, then select the type of proposal you are creating (VLA, GBT, or VLBA/HSA). You will be returned to the proposal list where you will find a new link representing a new, blank proposal. To edit it, click on its highlighted title.

At this point, you will be in proposal editing mode. On the left will be a tree structure with your proposals and under each proposal are links to different sections of the proposal. Each link represents a major category of proposal information. The sections are:

General:

Title, abstract, proposal type, etc.

Authors:

List of authors and contact information.

Scientific Justification:

Scientific and technical justification.

Sources:

Source positions and velocities.

Resources:

Resource information, which can be GBT-specific: back ends, receivers, modes, etc.; VLA-specific: receivers, special back ends, correlator modes, etc.; or VLBA/HSA-specific: antennas, receivers, bit rates, processing, etc. This will depend upon the type of proposal being created.

Sessions:

Describes the amount of time requested, and how it should be divided amongst the various sources and resources. For most simple observations, each session represents a contiguous block of observing time, and the sum of the times for all sessions is the total requested observing time.

Student Support:

Information for financial support requests for students at U.S. universities or colleges.

Print Preview:

An HTML preview of the proposal. There are also options to print the entire proposal.

To move between the sections, simply click on the desired link, or use the page-forward and back buttons on the right-hand side of the page.

2.3 Text Length Within Entry Fields

NRAO policy limits the length of various entries in the proposal, as well as the number of pages for the scientific and technical justification. These limits are indicated in the appropriate entry fields of the PST. In most cases these limits are not enforced until the proposal is actually submitted, to allow authors flexibility as they are preparing their draft proposals.

2.4 Text Formatting within Entry Fields

It is not necessary to format the typed text within the PST by, for example, including line feeds. The PST will automatically wrap each line as needed. Indeed, if previously formatted text is imported or included from an external file, the only way to deformat it is to delete the control characters manually. Sophisticated formatting, such as italics, mathematical symbols, and font changes, are not allowed in text entry fields.

2.4.1 L^AT_EX Commands

L^ATEX control sequences may be used in text boxes; however, no L^ATEX processing is performed by the program, and all such commands will appear in their raw format in the saved/submitted XML file.

2.5 Levels of Help

On each PST page, you will find a "Help" button in the toolbar that will open this document to the appropriate section.

2.6 Reporting Errors, Problems, and Suggestions

At the bottom of each PST page, you will find a link to the Proposal Help Desk to send questions or comments about the PST to NRAO. Also, there is a small bug icon. This lets you submit a report of any errors or problems that you encounter while running the PST. The PST is under development and we would greatly appreciate your suggestions for improving it. Alternatively, if you wish to report errors, problems, or suggestions from outside the PST, please contact proposal@nrao.edu.

2.7 Sources, Resources, and Sessions

For the VLA, the primary substantive change between the earlier text submission process and proposal submission through the PST is the way in which observing requests are structured. The PST employs the concept of *sessions*, long in use for GBT observing requests. Generally a session represents a contiguous block of observing time. A session describes the amount of time requested for that block, and how it should be divided amongst various sources and resources. Many observing runs involve a single observing session per day. A proposal may request multiple observing sessions, either as repeats of the same session (for example, in monitoring observations), or as truly independent sessions (for example, in multi-configuration VLA observations). For the VLBA/HSA, the sessions are structured in the same way as for the VLA.

Within the PST, each session is specified as one source group/resource group pair for the GBT, and as one or more source group/resource pairs for the VLA and VLBA/HSA. The concept of a source group or a resource group is intended to make it easier to handle observations of a large number of sources or resources within a single observing session. The resource specifies the telescope setup to be used in observing the sources within a specified source group: the front end receiver, the back end, and the technical details of how they are to be used together. For the VLA and VLBA/HSA, resources are not grouped.

Each session has additional information, including a session name, a minimum start LST, a maximum end LST, a minimum elevation, a total session time, a counter for the number of times the session is

executed plus a separation interval, text describing scheduling constraints, and text giving comments. Some of this information is not applicable for the VLBA/HSA and is replaced by other parameters (e.g. minimum start GST, maximum end GST). For the VLA and VLBA/HSA, each source group/resource pair has an associated observing time and rms noise level, and the total time for the session is normally the sum of the observing times requested for the constituent source/resource pairs. For the GBT, the total observing time for the session is manually entered.

Most simple proposals fit fairly naturally into this scheme; some will not. At the moment those "edge cases" are handled primarily through the session's comments box. One can also manually over-ride the simple "sum of pairs" calculation of the total observing time for a VLA or VLBA/HSA session. If you are not sure that your session accurately represents what you wish to do, you are *strongly* encouraged to enter a text description in the appropriate comments field. If many proposals require similar tweaking, we will consider extending the concept of sessions to handle those cases.

The practical details of constructing sessions are described in §4.6. Examples of how one might use sessions to handle various GBT or VLA observations are given in Appendix A.1 and Appendix A.2, respectively.

3. PST: Getting Started

3.1 How Do You Run the PST?

To get the NRAO Proposal Submission Tool running, **enable Javascript and Cookies** in your web browser, then [click here](#).

3.2 Proposals Section

Once you have successfully logged into the PST and clicked on Proposals, you will see a table of all previous proposals that you have worked on inside the PST. There are a series of icons next to the title of each proposal that will perform operations on that proposal. These icons allow you to Delete, Validate, Copy, Print, or Submit/Validate the proposal. Clicking on the proposal title will allow you to edit the proposal.

3.2.1 Creating a New Proposal from Scratch

>From the Proposals section, select the "New Proposal" link. Select a telescope for your proposal and then press the "Create" button. This will send you back to the list of your proposals, where a new, blank proposal will be at the top of the list. To begin editing the proposal, click on its title.

The current version of the PST does not allow a single proposal for multiple telescopes. Instead you

must submit separate proposals for each telescope.

3.2.2 Working on a New or Existing Proposal

The My Proposals section shows a table of proposals that you have stored within the PST. The table lists the proposal ID, proposal legacy ID, title, PI Name, date, and status. To edit the proposal, click on the proposal ID link. You are also given a list of icons to delete, validate, copy, print, and submit/withdraw the proposal. These icons act as follows:

Delete:

Deletes a proposal (after asking for confirmation).

Validate:

Validates a proposal without submission.

Copy:

Makes a copy of the existing proposal and automatically adds that copy to the table of your proposals on the View Proposals section.

Print:

Generates a pdf file which can be sent to the printer.

Submit:

Validates a proposal and, if it is valid, asks whether you wish to submit the current version for refereeing.

Withdraw:

Withdraws a previously submitted proposal (after asking for confirmation).

3.2.2.1 Multiple Authors

You may edit any proposal on which you are a co-investigator. Similarly, any Co-I may edit, submit or withdraw a proposal.

4. PST: Entering Proposal Information

To create a valid proposal, you must complete every section. You may save partially completed proposals and exit the tool at any time.

4.1 General Section

This section is where you enter the title and abstract. You also must select the category that your proposal falls into. Additionally you are asked for any related proposals, what level of staff support you will require, and whether or not you will be present at the telescope for the observations.

Various length constraints are noted, or warned about, on this page. If these constraints are not met then a popup warning message will inform the user of the problem.

4.1.1 Title

The title of your proposal. For a submitted proposal, the title can be at most 80 characters long.

4.1.2 Abstract

A concise description and justification of the science goals of the proposed program. The abstract must be written in standard ASCII and should be no longer than 200 words.

4.1.3 Proposal Categories

Proposals are categorized in various ways, primarily to simplify referee assignment and the reporting of telescope usage statistics. Select at least one from each of the categories below.

4.1.3.1 Proposal Type

NRAO currently recognizes three different types of proposals. These are:

1. **Regular Proposal:** A proposal which requires small allocations of telescope time, less than 200 hours. Proposal deadlines are once per trimester. See §[2.1.1](#) for a complete description.
2. **Large Proposal:** A project which requires large allocations of telescope time, at least 200 hours. See §[2.1.2](#) for a complete description.
3. **Rapid Response Science:** Exploratory Time or Target of Opportunity proposals. See §[2.1.3](#) for a complete description.

Note that proposals for observations of Known Transient Phenomena are considered Regular or Large Proposals, as appropriate.

4.1.3.2 Scientific Category

This category indicates the types of objects and the science that you wish to do. The selections are:

1. **Solar System:** Sun, planets, satellites and comets. (Not included for VLBA/HSA proposals.)
2. **Stellar:** Neutron stars, stellar-mass black holes, pulsars, X-ray binaries, planetary nebulae, circumstellar shells, supernova remnants, masers, novae, supernovae, and stars.
3. **Galactic:** Galactic structure, galactic center, molecular clouds, HII regions, star formation, and the interstellar medium.
4. **Extragalactic:** Normal and active galaxies, radio galaxies, clusters, quasars, extragalactic molecules, and cosmology.
5. **Astrometry/Geodesy:** Only for VLBA/HSA.

4.1.3.3 Observing Type

The observing types are general descriptors of your proposed observations. They give the NRAO support staff a better idea of how you will be doing your observations. You should select all the observing types that apply for your observations. Below is a list of observing types for the GBT:

1. Continuum
2. On-the-Fly Mapping
3. Single Pointing(s)
4. Grid Mapping/Mosaicing
5. Planetary Radar
6. Solar
7. High Time Resolution
8. Polarimetry
9. Spectroscopy
10. Monitoring
11. Pulsar
12. Triggered Transient (Proposal types Regular or Large only)

For the VLA or the VLBA/HSA, similar observing types are selectable, crafted to reflect the kind of observing done on those telescopes.

4.1.4 Related Proposals

Here you should enter the proposal codes for any previous NRAO proposal that are related to the current proposal. These proposals can be any prior proposals submitted by the same group, whether approved or rejected. They may also include related proposals for another NRAO telescope that were part of a multi-telescope project.

4.1.5 Plan of Dissertation Research

Students planning to use an NRAO telescope for their PhD dissertation (particularly if more than one proposal will be required) should submit a "Plan of Dissertation Research" of no more than 1000 words with their first proposal. This plan can be referred to in later proposals. At a minimum it should contain a thesis time line and an estimate of the level of NRAO telescope resources needed. The plan provides some assurance against a dissertation being impaired by adverse referee comments on one proposal, when the referees do not see the full scope of the project. This requirement applies to all three of the NRAO major instruments: VLA, VLBA and GBT.

The Plan of Dissertation Research can be uploaded either from the Author's page or from the student's user profile at: Profile My Profile user preferences. The Plan of Dissertation Research is associated with an Author which can then be used in one or more proposals. The Plan of Dissertation Research field here is only used to display the current status. For example, if there are no students listed on the proposal who are observing for their thesis the text box will display: "Dissertation Research Plan(s) not required".

4.1.6 Joint Proposals

Proposals requesting multiple NRAO telescopes are considered joint proposals. You must choose the appropriate box from the list presented here. You must submit a separate proposal to each telescope; those proposals must each include the same scientific and technical justification. The cover information for each telescope may differ. The PST must be used if either the GBT, VLA, or VLBA are used in the joint proposal.

4.1.7 Observer Requirements

4.1.7.1 Present or Remote Observing?

Here the proposer indicates whether an observer will be present at the telescope for the proposed observations.

Each of the NRAO telescopes has different rules governing who must be at the telescope for observations and who may observe remotely. GBT observers may observe remotely if they have been deemed "qualified" by the support staff. Most VLA observations do not require that the observer be physically present, and the proposer should indicate here whether they will be. For VLBA/HSA observations, this question does not make much sense (where would the observer go?) and so this question does not appear for a VLBA/HSA proposal.

For information about GBT remote observing see:

[GBT Observing Policy](#)

4.1.7.2 Required Staff Support

Here you should indicate how much staff assistance you will need in preparing and carrying out your proposals. The levels of support are:

None:

You are requesting no help because you are an extremely experienced observer.

Consultation:

You have much experience observing but will still need advice on, for example, observe file preparation, calibration strategies, or observing techniques.

Friend:

You do not have much observing experience and will need extensive help from the NRAO staff.

4.2 Authors section

The Authors section is where you enter the contact information for the principal investigator (PI) and any co-investigators (co-I). A table of authors is shown (initially this will simply be the user for a new proposal, and will be filled in as authors are added to the proposal).

4.2.1 Adding Authors to a Proposal

Click the "Add" button to search and add an author to the proposal.

4.2.1.1 Searching for an Author in the NRAO User Database

First you must search for the author in the NRAO User Database to see if they have registered. To do this just enter their name (first name, last name, or full name) in the search area and press the "Search" button. If you find the right person, select the circular toggle button for that person. Even if the author's information is incorrect please continue to add the author to your proposal. Later you will be able to e-mail this author to ask them to update their user profile.

4.2.1.2 Adding a New Author to a Proposal

If the search for an author in the NRAO User Database is not successful please fill out the form and we will contact this author and ask them to register. You must include their name, email address, affiliation, and whether or not they are a student. Add the author's affiliation by first selecting their "Country" and then their "Institution". If the author's institution is not listed select "Please contact me to add my institution" and then enter the institution and department in the textbox directly.

4.2.2 Edit Author Information

To edit author information click on the author's name. Click on "Email" to email the author to ask them to edit their user profile if it is incorrect. If an author has updated their user profile click on "Update" to update this information in the proposal. Click on "Delete" to delete an author from the proposal.

4.2.3 Plan of Dissertation Research

If author is observing for a thesis use the "Thesis" checkbox. If the Plan of Dissertation Research had already been uploaded it should appear in the Dissertation Plan column. To upload the Plan of Dissertation click on the author's name and follow the instruction to upload a file. You may also replace the Plan of Dissertation Research. The Plan of Dissertation Research is tied to the student and therefore may be uploaded or replaced from the Profile tab (Profile My Profile Users Preferences).

4.2.4 Selecting the Principal Investigator

The principal investigator (PI) is defined to be the lead author on the proposal. Use the "Principal Investigator" menu to select that author from the available authors.

4.2.5 Selecting the Contact Author

The contact author (CA) is the individual on the proposal with whom NRAO staff will correspond when discussing the scheduling of the proposal. Use the "Contact Author" menu to select that author from the available authors.

4.2.6 Rearranging the Order of Authors

You can rearrange the order of the authors by using the up/down links in the first column of the table of authors.

4.3 Scientific and Technical Justification

This is where you upload a file containing the scientific and technical justification of the proposal, including figures and references. *Only PDF or ASCII formats are allowed.* Color figures are allowed. A possible template file is available at:

[sample justification template](#) This is provided as an example, but you are welcome to use your own formatting if you prefer. Some tips for turning a file into a PDF file which prints and views clearly are available at:

<http://ssc.spitzer.caltech.edu/documents/makepdf.html>. The justification must obey strict page limits, as follows:

- Regular or rapid-response proposals will be allowed a maximum of four (4) one-sided pages (US letter sized) with 11 point font (minimum) to present the scientific justification and the technical feasibility of the project, including all figures, tables and references.
- Large proposals will be allowed a maximum of ten (10) one-sided pages (US letter sized) with 11 point font (minimum) to present the scientific justification and the technical feasibility of the project, including all figures, tables and references.

The cover information form is not counted as part of these page limits.

Click on the "Add" button to upload a file from disk. Once the file is uploaded a preview of the scientific justification should be displayed on this page. (N.B., you *cannot* click on the preview pages to magnify or download. The display is to confirm that the scientific justification has been successfully uploaded.) Once a file has been uploaded there will be three buttons to "Download", "Replace", or "Delete" the scientific justification.

4.4 Sources Section

The Sources section is used to enter the positions and velocities/redshifts (where relevant) of your target sources. There are three different ways to do this. You can (1) enter the information by hand, one source at a time; (2) search for source information from NED/SIMBAD; or (3) load source information from a local data file.

Merely adding a source in the Sources section does not ensure that time is requested to observe that source. The source must also be paired with a telescope resource, and that source-resource pair must be added to a session (see §2.7 and §4.6).

4.4.1 Source Groups

Source groups are intended to make it easier to handle observations of a large number of sources within a single observing session. The source/resource pairs which form the basic units of observing sessions (see §2.7 and §4.6) refer to source groups. Click on the "New Source Group" button to add a new source group. A single source may belong to multiple source groups. See Appendices A.1 and A.2 for some examples of how to use groups.

4.4.2 Adding Sources by Hand

Once a group is created you can add new sources by hand by clicking on the "Add" button, then entering the appropriate information in the entry fields.

For the VLA and the VLBA/HSA, if more than 30 sources are involved do not add them all to the proposal. Rather, please just (1) characterize the source selection criteria (e.g., Right ascension and its range; Declination and its range) and (2) enter a minimum start LST (GST for the VLBA/HSA) and a maximum end LST (GST for the VLBA/HSA) for any sessions containing this characterizing source.

For the GBT, it is required that you add all of your sources to the proposal.

The entry fields for adding a new source include:

Source name:

A unique name for the source. This should be less than 60 characters long.

Epoch:

The epoch for the coordinate system used to define source positions. Only J2000 or B1950 are currently allowed.

Right ascension center:

The Right Ascension of the source or the reference position for a multi-point map.

Declination center:

The Declination of the source or the reference position for a multi-point map.

Right ascension range:

The Right Ascension range (\pm) used for multiple-pointing mapping, specified as hh:mm:ss or decimal hours (hh.h). Should be $\overline{00:00:00}$ for single-pointing observations.

Declination range:

The Declination range (\pm) used for multiple-pointing mapping, specified as dd:mm:ss or decimal degrees (dd.d). Should be 00:00:00 for single-pointing observations.

Velocity:

The velocity of the source in km/s. The reference frame is currently undefined for the VLA and VLBA/HSA and assumed to be LSR for the GBT. If this is important for the evaluation of your proposal, please note the reference frame in the comments section of the session containing the source. Explicit specification of reference frames will be added in a future PST release.

Alternatively, you may specify the redshift (see below).

Redshift:

The value of the redshift (z) for the source. Defaults to 0. The precise redshift definition used is currently not specified; again, if this is important for your proposal, please note your preferred definition in the comments section of the session containing the source.

Once the source information is entered, click the "Save" link. A message will report either that the source was successfully added, or that some error was found. In the latter case the offending entry or entries will be pointed out; simply correct those entries and press the "Save" link again. The source will now appear in the source table on the Sources section. Note that a source which is a member of multiple groups will appear multiple times in the source table.

4.4.3 Find Source in NED/SIMBAD: Searching For Sources

You can search NED and SIMBAD for source information if you know the object's name. Click on the "Search NED/SIMBAD" button; then enter the object's name (e.g., B0329+54) in the "Target Name" field and press the "Search" button. You will then be presented with the result of the search. The search currently goes through NED and SIMBAD, and names should adhere to their conventions (e.g., GRS 1915+105, NGC 4500, M31, HD19688). Only the most direct match is returned; that is, no extended name search is done. For example, M31 returns M31, not Mayall II, etc.

4.4.4 Load Sources From File: Reading in a Source List from a File

You can read in some or all of your sources from a local ASCII file that you have edited offline from the PST. Click on the "Import" button to view the browse/load options. To load the contents of the file into the PST, first enter the path and name of the file into the "Source Data File" field, either by hand or using the "Browse" button, and then click the "Load" button.

For the VLA or VLBA/HSA, if more than 30 sources are involved do not add them all to the proposal. Rather, please just (1) characterize the source selection criteria (e.g., Right ascension and its range; Declination and its range) via the Add Source Link and (2) enter a minimum start LST (GST) and a maximum end LST (GST) for any sessions containing this characterizing source.

For the GBT, it is required that you add all of your sources to the proposal.

This ASCII file must be formatted as follows:

- Each line of the ASCII file should contain the information for a single source, as a comma-separated list in the following order: source name; right ascension; declination; epoch; velocity; redshift; and group name(s), with each group name separated by a comma. At least one group name must be specified.
- Either, but not both of, **the velocity or the redshift must be specified** for every source.
- A valid source line must have a minimum of six commas.
- Comment lines begin with the character `#`.
- You can use tab as the delimiter in place of comma. However, commas and tabs cannot be mixed in the same source data line.
- Embedded blank lines are fine.

Here is a simple example:

```
# first source has a redshift, second has a velocity [LSR for theGBT]
Goober 03, 02:13:07.100, 01:14:01,J2000, ,2.1, Peanuts
Goober 04, 02:13:17.100, 01:14:11, J2000, 77.6, , Peanuts
```

Here is a more complicated example:

```
#this line is a comment, the beginning of the file
#sourceName, ra, dec, epoch, velocity, redshift, groupName1, groupName2
ngc123,11:22:33.44,-02:03:04,J2000,123.4, , group A
ngc567,11,-3,J2000,3.4, , cat B
ngc234,22:33:44.55,20:30:40,b1950, ,2.345, group A, cat B
# Blank lines are OK

SDSS J1148+5251 , 11 48 3, 52 50 6 ,j2000,, 6.419 , quasar group
```

And here are examples of source lines that fail:

```
# Trying to specify both velocity and redshift:
vel_red, 1 2 3 , -4 5 6 ,j2000,1800, 1.419 ,
# Neither redshift nor velocity given:
no redshift no velocity, 5 6 7, 7 8 9,j2000,,,xx
# No source name:
, 1 2 3 , -4 5 6 ,j2000,, 6.419 , quasar group,
# No epoch:
no epoch, 12 34 56, 21 32 43,,5.4 , ,
# Wrong epoch:
wrong epoch , 3 4 5 , -4 5 6 ,j4567,3,,
# No RA:
no ra , , -4 5 6 , j2000,3,,,,,,,,, ignore rest
# Wrong RA:
wrong ra, rara, 2 3 4,b1950, 4, ,yy
# No dec:
no dec , 3 4 5 , ,j2000,3,,
# Wrong dec:
wrong dec, 5 6 7, decdec,b1950, 4,5,yy
# Bad velocity:
wrong vel, 1, 3,j2000, velvel, ,
# Bad redshift:
wrong redshift, 1, 3,j2000, , redred ,
# Missing comma:
missing comma , 3 4 5 , ,b1950,3,
# No commas:
```

this line is obviously invalid

4.4.5 Modifying Source Groups

To modify a source group click on the group name. Rename a source group by editing the text field and clicking the "Save" button; click the "Delete" button to delete the group; or click the "Cancel" button to cancel. To modify sources within a source group a similar procedure is used, except now click on the source name located with a source group table. The different attributes of a source (RA, Dec, etc.) may be edited and then saved. Both sources and source groups may be reordered using the up/down links.

NOTE: When deleting source groups that are included in a session the PST will warn you that by deleting the source group the session will also be deleted. At this point you can either proceed with this operation or cancel.

4.5 Resources sections

The Resources section is used to specify the telescope setups to be used for the proposed observations. There is one such section per telescope. Each observing setup is called a resource; each resource is defined by the receiver, back end, spectral mode, etc. to be employed.

4.5.1 What is a Resource?

A resource consists of an array configuration (for the VLA) or a combination of stations (for the VLBA/HSA), a front end receiver, a back end processor, and the technical details of how they are to be used together. A resource is given a name which can be any unique character string. It is used to identify a specific experimental setup, e.g., 'setup1', 'Cont_43GHz', 'mapping_with_SP', 'Bconf-Xband', 'B14a', 'SiO_30kms'.

When defining an observing session you will combine a source group with one or more resources to specify what and how to observe. A single observing session may employ multiple resources, with some restrictions (e.g., only a single VLA array configuration may be used in a given session).

The Resource Page is different for the three telescopes (VLA, GBT VLBA/HSA). For the GBT there are resource groups that work the same way as source groups. One or more resources are selected within a given resource group that are later associated with a source group within a Session. For the VLA and the VLBA/HSA there are *no* resource groups but a list of resources that can be combined later within a given Session.

4.5.2 GBT Resources section

The GBT Resource section is where you select the back ends that you wish to use during the proposed

observations. You are also asked to provide information such as rest frequencies, desired bandwidths, desired spectral resolution, desired time resolution, etc. Click on "New Resource Group" to add a resource group. Once a resource group exists click on the "Add" button to add a resource.

You are then asked to fill in the following information:

Resource Name:

A unique name for the resource.

Receiver:

The GBT receiver that you wish to use for this resource. A pull-down list of the receivers is available.

Receiver Name:

If you have specified the Receiver to be "other" you must enter the requested receiver's name in this area.

Back End:

The back end/observing mode combination that you wish to use for your observing.

Rest Frequencies:

A comma separated list of rest frequencies or frequency ranges that you wish to observe. A list of spectral transitions is also allowed.

Depending on which back end was selected you may have to provide more details for the resource. For additional details consult the GBT Proposer's Guide:

[GBT Proposer's Guide](#)

This information includes:

1. GBT Spectrometer - spectral line mode

Bandwidth:

800, 200, 50 or 12.5 MHz modes

Number of spectral windows:

The number of different spectral lines (tuning frequencies) to be observed simultaneously.

Sampling level:

3 level sampling or 9 level sampling. 3 level sampling is only available for bandwidth/modes of 200 or 800 MHz.

Desired Frequency Resolution:

The frequency resolution needed to perform the requested science. This does not have to be the resolution of the GBT spectrometer.

Desired time resolution:

The minimum dump time requested.

2. GBT Spectrometer Spigot System

Bandwidth:

800, 200, 50 or 12.5 MHz modes.

Bits:

2, 4, 8 or 16 bit sampling.

Polarization:

Single hand of polarization or summed.

Desired Frequency Resolution:

The frequency resolution needed to perform the requested science. This does not have to be the resolution of the GBT spectrometer.

Desired time resolution:

The minimum dump time requested.

3. Spectral Processor - spectral line mode

Bandwidth:

40, 20, 10, 5, 2.5, 1.25, 0.625, 0.3125, 0.15625 or 0.078125 MHz.

Number of spectral windows:

The number of different spectral lines (tuning frequencies) to be observed simultaneously.

Desired Frequency Resolution:

The frequency resolution needed to perform the requested science. This does not have to be the resolution of the spectral processor.

Polarization Mode:

square, cross. or square + cross

Desired time resolution:

The minimum dump time requested.

4. Spectral Processor - pulsar mode

Bandwidth:

40, 20, 10, 5, 2.5, 1.25, 0.625, 0.3125, 0.15625 or 0.078125 MHz.

Number of spectral windows:

The number of different spectral lines (tuning frequencies) to be observed simultaneously.

Desired Frequency Resolution:

The frequency resolution needed to perform the requested science. This does not have to be the resolution of the spectral processor.

Phase bins:

128, 256, 512, or other.

Polarization Mode:

square, cross. or square + cross

Desired time resolution:

The minimum dump time requested.

5. Digital Continuum Receiver (DCR)

Instantaneous bandwidth:

The desired bandwidth.

Desired time Resolution:

The minimum dump time requested.

6. Caltech Continuum Back End (CCB)

Instantaneous bandwidth:

The desired bandwidth.

Desired time Resolution:

The minimum dump time requested.

7. Green Bank Astronomical Signal Processor (GASP)

GASP proposals must be pre-approved with instrument PI:

Check this box if you have receiver approval to use this instrument.

8. Caltech-GreenBank-Swinburne Recorder II (CGSR2)

CGSR2 proposals must be pre-approved with instrument PI:

Check this box if you have receiver approval to use this instrument.

9. Berkeley-Caltech Pulsar Machine

Channel Bandwidth:

1.4, 1.0, 0.7 or 0.5 MHz

Sample Time:

100, 72, 50, 36 microseconds

10. Radar Back End

Desired Frequency Resolution:

The frequency resolution needed to perform the requested science.

Desired time Resolution:

The minimum dump time requested.

No GBT staff support provided:

Check this box to acknowledge that you understand how to use this back end, and that the GBT staff will not provide any support for such use.

11. Green Bank Ultimate Pulsar Processing Instrument (GUPPI)

GUPPI is currently under development:

The use of GUPPI is shared risk. Please see the following link for additional information:
<https://wikio.nrao.edu/bin/view/CICADA/GUPPiUsersGuide>

12. Other

Name of special back end:

Short descriptive name.

Number of spectral windows:

The number of different spectral lines (tuning frequencies) to be observed simultaneously.

The GBT Resource section is where you select the back ends that you wish to use during the proposed observations. You are also asked to provide information such as rest frequencies, desired bandwidths, desired spectral resolution, desired time resolution, etc. Click on "New Resource Group" to add a resource group. Once a resource group exists click on the "Add" button to add a resource.

4.5.2.1 Additional GBT Information

Please consult the GBT Proposer's Guide for more information.

[GBT Proposer's Guide](#)

4.5.3 VLA Resources section

The VLA Resources section allows you to create, edit, and remove resources appropriate to the VLA, specifying such information as the array configuration, observing frequency, frequency resolution, and number of channels. You must create a separate resource for every different combination of these attributes. Click on the "Add" button to add a resource. Details about how to make these choices may be found in the VLA Observational Status Summary:

[VLA Observational Status Summary](#) A VLA resource is defined by the following information:

Resource Name:

A unique name for the resource.

Configuration:

The array configuration. Subarrays must currently be entered in the comments field of the session that will contain the resource (see §[4.5.4](#)).

Receiver:

The VLA receiver that you wish to use. This specifies the range of frequencies within which you will be observing. The pull-down menu shows the available receivers.

Back End:

The back end you wish to use. The most common one is the VLA correlator, in either single channel continuum or spectral line mode. Single channel continuum is used for standard

continuum observations; spectral line is required for line observations or certain special continuum observations. The High Time Resolution Processor (HTRP) is used primarily for pulsar observation; it is not available after 2006. These options are explained more fully in the VLA Observational Status Summary:

[VLA Observational Status Summary](#)

The choice of back end determines which additional entries are needed; the relevant entries are displayed automatically, once you click on your desired back end.

These entries are as follows:

VLA Correlator - Single Channel Continuum:

Bandwidth:

This is the bandwidth (per IF) to use for these observations, in MHz. Most single channel continuum observations with most receivers use 50 MHz (the maximum value) for sensitivity. Note that the bandwidth observable at the lowest frequencies is substantially less than 50 MHz. For details see the VLA Observational Status Summary:

[VLA Observational Status Summary](#)

Continuum center frequencies:

A comma separated list of frequencies or frequency ranges that you wish to observe.

"null" (or blank) is an acceptable option, meaning that the standard observing frequencies will do. **Only two frequencies may be specified in a single VLA resource**, as there are only two independently tunable IF pairs.

VLA Correlator - Spectral Line:

Hanning Smoothing:

Indicate whether or not you want Hanning smoothing enabled. For details see the VLA Observational Status Summary:

[VLA Observational Status Summary](#)

Frequencies:

A comma separated list of rest frequencies, frequency ranges, or spectral transitions that you wish to observe. "null" (or blank) is an acceptable option, meaning "I don't care", presumably implying multi-channel continuum (rather than spectral line) observations.

Only two frequencies may be specified in a single VLA resource, as there are only two independently tunable IF pairs. The PST does not currently check whether the correlator mode actually allows two simultaneous tunings. Although the PST will warn about rest frequencies outside the frequency range allowed by the receiver, it will still allow the resource to be saved, to allow for highly redshifted lines. If it is more convenient to specify sky frequencies, please note that you have done so in the comments field of the session that will contain the resource.

Correlator setup:

Here you select the total bandwidth correlated, and the number of channels produced (or

equivalently, the resolution of each channel). Simply click to select the desired entry in the table. The selected entry will be highlighted in blue. For a description of the various options, and some hints as to which to choose, see the VLA Observational Status Summary:

[VLA Observational Status Summary](#)

High Time Resolution Processor (HTRP):

Spectral resolution:

Spectral resolution of output data stream, in MHz. For details see the VLA Observational Status Summary:

[VLA Observational Status Summary](#) The HTRP is not available after 2006.

Time resolution:

Time resolution of output data stream, in milliseconds. For details see the VLA Observational Status Summary:

[VLA Observational Status Summary](#) The HTRP is not available after 2006.

The VLA Resources section allows you to create, edit, and remove resources appropriate to the VLA, specifying such information as the array configuration, observing frequency, frequency resolution, and number of channels. You must create a separate resource for every different combination of these attributes. Click on the "Add" button to add a resource. Details about how to make these choices may be found in the VLA Observational Status Summary:

[VLA Observational Status Summary](#)

4.5.4 Miscellaneous VLA Resources Issues

Simultaneous Receivers:

While normally one may use only a single receiver at a time on the VLA, one may observe simultaneously in both 4 and P bands (4P mode) or in both L and P bands (LP mode). Such receiver modes cannot be specified as a single VLA resource. Instead, two resources must be created (e.g., these could be called LP-Lband and LP-Pband). When creating sessions that use these resources only select **one** resource (e.g., LP-Lband) for the relevant source/resource pair. This is necessary to get the correct total integration time. Then note in the comments field that you are using multiple resources and specify the relevant resource name (e.g., "The source/resource pair Abell 1914/LP-Lband is using the LP mode. See resource LP-Pband band.").

NOTE: Given the EVLA-VLA transition, users who are requesting LP mode should consult the staff for technical advice.

Subarrays:

You must create separate resources for each subarray. When creating sessions that use these resources use the "Add Subarray" link to specify the different subarrays. Additional information should be included in the comments field. For example, "Resource Sub-1 will use

a 9-antenna subarray with the rest deployed simultaneously to Resource Sub-2".

4.5.5 VLBA/HSA Resources section

The VLBA/HSA Resources section allows you to create, edit, and remove resources appropriate to the VLBA and HSA, specifying such information as the stations (antennas) requested, observing frequency, number of baseband channels, polarization, sample rate, and other observing-time setup information. In addition, this section allows you to select a processor (correlator) and correlator set-up information, such as the requested polarization products, number of spectral channels, number of correlation passes, and the averaging time.

You must create a separate resource for every different combination of these attributes. Click on the "Add" button to add a resource. Details about how to make these choices may be found in the VLBA Observational Status Summary:

A VLBA/HSA resource is defined by the following information:

Resource Name:

A unique name for the resource.

Stations:

The requested stations. Checking "VLBA" selects all VLBA stations. Checking "HSA" selects all of Ar, Ef, GBT, and Y27 (the phased VLA). In both cases individual stations may be unchecked, once selected. VLA-Y1 selects a single antenna of the VLA to be in the VLB array. Y1 and Y27 may not both be selected. Codes for geodetic stations may be entered in the box marked "Geodetic".

Wavelength:

The wavelength at which you wish to observe. The pull-down menu shows the available VLBA receivers. There is no checking whether other antennas (besides the VLBA) are actually equipped with a selected receiver. The Tool will happily allow you to select an array including Ar at 1.3 cm, even though Ar does not have such a receiver.

Processor:

The processor (or correlator) you wish to have the data sent to and correlated. Possible selections are Socorro (the VLBA hardware correlator), Bonn (in Effelsberg), JIVE, and Washington (USNO). For most VLBA/HSA experiments, the correlator will be Socorro.

Observing Parameters:

The parameters that you wish to set at observe time; these include the Bandwidth per baseband channel, the number of Baseband Channels, the Sample Rate per baseband channel, the number of Bits/Sample recorded, and the polarization. The Aggregate Bit Rate is calculated, based on the other selections.

Bandwidth:

A pull-down menu lets you select the bandwidth per BBC, in factor of 2 steps from 62.5 kHz to 16 MHz. This is the standard set of bandwidths in a VLBA data acquisition rack.

Baseband Channels:

A pull-down menu lets you select the number of BBCs, in factor of 2 steps from 1 to 16; 16 is allowed by using both upper and lower sideband from the hardware BBCs in the VLBA DAR.

Sample Rate:

A pull-down menu lets you select the Sample Rate in Msamples/s per BBC. For the VLBA samplers, the lowest sample rate is 2 Msamples/s. Thus bandwidths below 1 MHz are oversampled. The sample rate is automatically set to Nyquist when the Bandwidth is selected, except for bandwidths lower than 1 MHz.

Bits / Sample:

One or two bits per sample can be selected.

Polarization:

One can observe with right circular polarization, left circular polarization, or both (dual) using the VLBA. In the hardware, each BBC selects either RCP or LCP.

Aggregate Bit Rate:

This is calculated by the tool, by the product of number of Baseband Channels, Sample Rate, and Bits / Sample.

Correlation Parameters:

The parameters that you wish to set at correlation time; these include Full Polarization, Pulsar Gate, number of Correlator Passes, Averaging Time, and number of Spectral Points per BBC. Correlator resources are as valuable as Observing resources, so proposers are asked to justify the correlator resources as well as the observing resources. There are some interactions among correlation parameters as well as among correlator and observing parameters. Most of these interactions are not currently checked in the Tool, so the Tool will quite happily allow you, for example, to select 8 baseband channels and 1024 spectral points per BBC, which the Socorro (hardware) correlator, for example, cannot do. Restrictions on correlator processing can be found in the VLBA Correlator Capabilities:

Full Polarization:

If checked, the correlation of all polarization cross-products are requested, for each baseline: RR, RL, LR, and LL. If unchecked, only the correlation of parallel-hand products are requested: RR, LL, or RR and LL, depending on what was observed. Obviously, Full Polarization cannot be requested if only one polarization is observed; the Tool does check this.

Pulsar Gate:

The correlator can gate based on a pulsar ephemeris; i.e., do the correlation only at times when the pulse is on (or off for that matter). If this item is checked, further input to the correlator will be required -- see the Pulsar Gate Observer's Guide:

Number of Correlator Passes:

The number of correlator passes required (default one). More than one may be necessary for correlating at different positions, or to get the required spectral resolution, or to limit the correlator output rate, etc. If more than one is required, a brief justification should be written in a Technical Justification Section in the Science Justification.

Averaging Time:

The averaging time, in seconds, in the correlator (default 2 seconds). The shorter the averaging time, the larger the (rate) field of view. One must balance the output rate of the correlator with the required field of view. For the Socorro correlator, the averaging time is

an integer multiple of 131.072 milliseconds (multiplied by the speedup factor). The output data rate of the Socorro (hardware) correlator is about 1 MBy/sec. This depends on a variety of factors; for some particular kinds of correlation an output data rate of 1.5 MBy/sec have been managed; it is best to consult with the data analysts (analysts@nrao.edu) if high data output rates are expected from the correlator.

Spectral Points / BBC:

For continuum observations, the default number of spectral points is 16. For spectroscopy, the number of spectral points depends upon the required velocity resolution. Although the PST does not check this, the maximum number of spectral points per baseline is 2048 over all baseband channels; except for full polarization, when 128 spectral points per baseband channel is the maximum. See the VLBA Correlator Capabilities Guide:

4.6 Sessions Section

The Sessions section is used to construct observing sessions. As defined in §2.7, a session is generally a contiguous block of observing time on the telescope. Many proposals involve one observing session in a day. Proposals may request multiple sessions, either as repeats of a single session, or as truly independent sessions. Examples of how one might use sessions to handle various GBT or VLA observations are given in Appendix A.1 and Appendix A.2, respectively.

On the GBT, a session can contain only one source group/resource group pair.

On the VLA, a session can contain one or more source group/resource pairs. All the source group/resource pairs in a VLA session must use the same array configuration. For example, you must assemble two separate observing sessions if your proposal requests VLA observations in both the A and the B configurations, even if those observing sessions use otherwise identical source group/resource pairs.

Sessions on the VLBA/HSA are similar to that of the VLA.

A session has additional attributes, including a session name, a minimum start LST, a maximum end LST, a minimum elevation, a total session time, the number of session to execute plus a separation interval, text describing scheduling constraints, and text for comments. For the GBT, the total observing time for the session is manually entered. For the VLA, each source group/resource pair has an associated observing time and rms noise level, and the total time for the session is calculated as the sum of the observing times requested for the constituent source group/resource pairs. The VLBA/HSA uses a minimum start GST and a maximum end GST (Greenwich Sidereal Time) since the antennas/stations can be spread over a large geographical range. The total time for a VLBA/HSA session, as for the VLA, is calculated given the source group/resource pair's associated observing time.

4.6.1 How to Add a Session?

To add a new session, click on the "New Session" button, then enter the appropriate information in the entry fields.

The fields include:

Session:

The session name uniquely identifies the session.

Number of Sessions:

The number of times this session will be executed.

Separation:

The separation time in days desired between different executions of this session. If you don't care, leave this as zero. This field is often used for monitoring projects. Unusual monitoring requests and comments as to the strictness of the observing interval should be described as scheduling constraints (see below).

Minimum Start LST (HH:MM:SS):

The minimum start LST for the session. Optional; 00:00:00 usually means "anything sensible" (i.e., the source is observable). (For the VLBA/HSA, this field is minimum start GST.)

Maximum End LST (HH:MM:SS):

The maximum end LST for the session. Optional; 24:00:00 means "anything sensible" (i.e., observe anytime the source is high enough in the sky). (Again, for the VLBA/HSA, this field is maximum end GST.)

Minimum Elevation (degrees):

The minimum elevation for the session. Optional; 0 means "anything sensible" (i.e., observe anytime the source is high enough in the sky). For the VLBA/HSA, this field does not exist.

Available Sources:

A menu of available source groups.

Available Resources:

For the GBT, a menu of available resource groups. For the VLA and VLBA/HSA, a menu of available resources.

Time (including calibration and slew overheads):

For the GBT this is the total session time in hours. For the VLA and the VLBA/HSA, this is the time for the specified source group/resource pair in hours. The total session time is the sum of the observing times for the constituent source group/resource pairs.

RMS Noise (VLA and VLBA/HSA):

The RMS noise per source group/resource pair in mJy/beam using the exposure time (time on-source) only, and thus excluding calibration and slew overheads. For spectral line observations, this is the RMS noise in each spectral channel. This may be calculated using the VLA Exposure Calculator for the VLA, or the EVN Exposure Calculator for the VLBA/HSA.

Sub-arrays (VLA only):

The VLA can currently be divided into up to five sub-arrays to observe different fields or frequencies simultaneously. A separate resource must be created for each sub-array. Add the first sub-array as you would any source/resource pair when a new session is created or by using the "Add" button if the session already exists. To add the remaining sub-arrays click on the "Add Subarray" link. Notice that the time is now fixed and cannot be changed.

Scheduling Constraints:

Specify any additional scheduling constraints in this ASCII field. For example:

- Please do not schedule this session through sunrise.
- I am using repeats to accumulate more time for all the sources in the session.
- Observations should be simultaneous with Spitzer. We expect to know the rough Spitzer schedule a month in advance; exact times will not be available until perhaps a week in advance.
- Nighttime observations are required for these HI observations near solar maximum.
- Nighttime observations are required for reduction of RFI.
- Nighttime observations are required for high frequency GBT observations.
- I would like logarithmic sampling of the light curve, with observations 1, 3, 10, 30, and 100 days after the beginning of the outburst.
- Observations every week or two would be ideal but the exact sampling interval is not very important. But observations within a few days of one another are not useful.

Comments:

Enter any comments relevant to the entire session in this ASCII field. For example:

- Given the declination of this source, the DnC configuration would be an acceptable alternative to the D configuration.
- We will observe only one source in this group: whichever first matches our triggering criterion.
- The time requested for each observing session will be divided amongst the requested frequency bands depending on current source strengths.
- We will not be able to observe with the GBT on November 5, December 24 and April 1.

4.6.1.1 Exposure Calculators and Other Helpers

Several tools are available for helping you calculate the time on-source needed to achieve a given rms noise level, and to make various decisions regarding GBT mapping and back end setups.

Recall that to run the PST, you need to **enable Javascript and Cookies** in your web browser. If, in addition, you wish to use any of the tools noted below, then your web browser also needs to **have a plug-in for Java** -- otherwise those tools will fail without any warning. Each tool will start up in a separate window or tab. When you are finished with that tool, simply close its window or tab.

EVN Exposure Calculator:

The link given goes directly to the EVN Calculator. One must select stations, observing band and data rate, time on-source, number of spectral channels, integration time, maximum baseline length, number of polarizations, subbands per polarization (BBC in VLBA parlance) and the

bandwidth of a subband.

VLA Exposure Calculator:

To start the VLA Exposure Calculator, click on "Calculator." Given the effective bandwidth (172 MHz for continuum: 2 IF pairs, each with a noise equivalent bandwidth of 43 MHz), the number of antennas (27 for the full VLA, if no antennas are out for maintenance etc.), the time on-source, the observing band, and the array configuration, the tool calculates the expected rms noise and rms brightness temperature in a naturally-weighted image. For 1.5 GHz observations, given the width of the HI profile, the tool also gives the rms HI column density.

GBT Sensitivity Calculator:

To start the GBT Sensitivity Calculator, click on "Calculator." Given various observing parameters (time on- and off-source, observing frequency, back end, etc.), the tool calculates the expected rms noise, brightness temperature, and confusion limit, as well as reporting the assumed gain, aperture efficiency, and channel width.

GBT Mapping Planner:

To start the GBT Mapping Planner, click on "Mapping Planner." The Mapping Planner is used to calculate various parameters for GBT on-the-fly mapping, given basic map parameters (receiver, integration time per pixel, pixels per beam, and map size). In the current context the most important calculation is the total time required for the map. Unlike the other tools, you must invoke the Planner separately for every calculation.

GBT Spectral Advisor:

To start the GBT Spectral Advisor, click on "Spectral Advisor." The Spectral Advisor calculates the integration time required to reach a given rms noise level for a given velocity resolution, and also suggests spectral processor and ACS spectrometer setups to achieve a given spectral setup (velocity resolution, velocity range, and number of bands).

4.6.2 Modifying Sessions

Once a session is created click on the session name for an expanded view of the session parameters. Click the "Edit" button to edit the text fields (e.g., session name, minimum start LST, etc.). Click "Save" to save, "Delete" to remove this session, or "Cancel" to cancel the edit operation. To change the sources or resources connected to this session click on either the source or resource listed and use the pull-down menus.

4.7 Student Support section

The NRAO has a program to support research by students at U.S. universities and colleges. Regular GBT, VLBA and HSA proposals are eligible for funding, while regular VLA proposals are not. Large proposals for the VLBA, GBT, HSA, VLA and any combination of these telescopes are also eligible. The program covers student stipends, computer hardware purchases, and student travel to meetings to present observing results. Awards of up to 35,000 USD are available. For more information see:

[NRAO Student Observing Support Program](#)

4.7.1 Apply for Student Support

In order to apply for student support a U.S. Student must be listed as an author on the proposal and have been fully registered in the NRAO user database. Click the "Apply" button to apply for student support.

The following information must be provided:

Requesting Investigator:

The Requesting Investigator must be the student's advisor. They must also be based at a U.S. university or college. Advisors from federally funded research centers are not allowed to request student support. Use the "Requesting Investigator" menu to select the advisor.

Other Related Awards:

Any awards that the student or the advisor are currently receiving that support the work in this observing proposal should be listed here.

Student Stipends:

Indicate for which student(s) the support is being requested by clicking the appropriate check box(es). Maximum of 32,000 USD per observing proposal.

Estimated Budget:

For each student selected to receive a stipend you must indicate the requested budget.

Work Assignment:

For each student selected to receive a stipend you must describe the work to be done by the student. There is a 150 word limit.

Miscellaneous Expenses:

Up to 3000 USD are available for funding the student's domestic travel to meetings to present observing results and the student's computer hardware expenses.

Student Travel:

List of the student's domestic travels.

Computer Hardware:

List of computing hardware that the student will need.

Estimated Budget:

The estimated budget for the miscellaneous expenses (travel plus computing hardware). Maximum of 3,000 USD per observing proposal.

4.8 Print Preview

The Print Preview link displays an HTML view of your current proposal. N.B., the scientific justification is not displayed in this preview but it can be downloaded as a pdf file using the "Download Justification" button or the link at the bottom of the HTML display. Also, the entire proposal, including the scientific justification, can be downloaded into a pdf file by clicking on the "Print All" button.

5. PST: Submitting a Proposal

A proposal can be submitted using the icons located on the main proposal page where all of your proposals are listed in a table. Several icons can be located for each proposal to the right of the proposal ID in the first column of the table. The submit/withdraw icon is the last icon in the list. Clicking the submit icon starts a two step process: (1) your proposal will be validated; and (2) your proposal will be submitted for refereeing. Any errors detected during validation will be displayed.

There also exists several other icons to the left of the submit/withdraw icons. Here you may delete, validate (without submitting), copy, or print a proposal. Printing a proposal will pop-up a pdf copy of the proposal that can either be saved or sent to the printer for a hardcopy.

6. CASA

Common Astronomy Software Applications (CASA) is a suite of C++ application libraries for the reduction and analysis of radioastronomical data, packaged through a Python scripting interface. Information about obtaining CASA, user documentation, demos, and tutorials are available. Also included is a CASA helpdesk.

7. User Profile Management

The Profile tab is available to manage user profiles. Click on "My Profile" to view your profile. There are several sections: General Information, Organizations and Affiliations, Addresses, User Preferences, Email Addresses, and Phone Numbers. To change any information click on the blue highlights or the "Edit" button where available. To add additional information (e.g., another phone number) click on the "Add" button.

Acknowledgments

This work was in part copied from the original GBT PST documentation written by Richard Prestage.

The NRAO PST would not have become a reality if not for the hard work of Bryan Butler, Dale Frail, Susan Loveland, Gustaaf van Moorsel, Boyd Waters, Stephan Witz, and Honglin Ye. Thanks also to the many scientists, both within and outside NRAO, who have tested or used the PST and provided feedback on their experiences.

A. Examples of Using Sessions

A.1 GBT Session Examples

For the GBT a session can be thought of as the longest period of contiguous time that the proposed observations can be scheduled. There are several scientific and technical reasons why one should separate the proposed observations into different or repeating sessions. Some of these reasons include:

1. The time needed on source is greater than the time the source is above the horizon.
2. The sources in a proposal are grouped in widely separated declinations.
3. The sources in a proposal are grouped in widely separated right ascensions.
4. A prime focus receiver change is required for all of the observations to be completed. The prime focus receiver changes require the receiver to be physically changed on a maintenance day. Changing the Gregorian receivers just requires a rotation of the Gregorian feed mount (which is performed by the telescope operator).
5. The proposals are for monitoring observations.

The following examples provide guidance on how you should break up your proposed observations into sessions.

Example 1:

A proposer would like to observe galaxies that are members of two different galaxy clusters. The galaxy clusters are well separated in right ascension, and each is up for 8 hours each day. There are approximately 30 galaxies per cluster.

This means that a session will be 8 hours long. Since there is a large break/gap in the LST ranges in this survey, there should be two different sessions, one for each galaxy cluster. Now we will let each session contain all the sources within that galaxy cluster. This project then has two sessions of 30 sources with a length of eight hours each. Each session will likely need to be repeated. The time between the scheduling of sessions can be arbitrary.

Example 2:

A proposer would like to observe approximately 100 extragalactic sources. They will need to look at each source for 1 hour, giving a total proposed observing time of 100 hours. The sources are randomly distributed across the sky.

Since it is possible to observe this project for 100 contiguous hours this proposal should contain one session with 100 sources.

Example 3:

Now let's consider a survey where the sources are in a narrow range of right ascensions but are clumped into different declination ranges. To illustrate the point let's say half the sources are circumpolar and the other half are low elevation sources in the South.

In this case there should be two sessions, breaking the sources up via their declination ranges. This is because they put different pressures on the scheduling of the telescope. The circumpolar sources can be done at any LST while the southern sources have a narrow range of LSTs for which they can be observed. The session containing the circumpolar sources will not need to be

repeated since the observations of all the sources could be done continuously. The session with the low declination sources will likely need to be repeated.

Example 4:

An observer would like to determine the properties of a single source over many different frequencies (i.e., receivers). Let's assume that the observer only needs one hour per receiver to make their measurement.

If we assume that all the required receivers are available on the telescope (i.e., no receiver of feed change is needed) then there is no technical reason to have this observing be in multiple sessions at the proposal stage. This is an example of a session with a single source and multiple resources.

If the requested observations are known to require a receiver change, such as using multiple prime focus receivers, then there should be multiple sessions. There should be a session for each set of observations that could be scheduled at the same time.

Should the time required to make all the observations be more than the time that the source is visible in one day, then the project should be broken up into multiple sessions or repeats of the same session.

Example 5:

It is common for pulsar timing observations to use up to three different pulsar back ends at the same time with the GBT. The observers may also be timing pulsars in globular clusters, which means that they are timing multiples sources at the same time also.

This is an example where you would want to have a single (or multiple) source(s) with multiple resources (i.e. back ends) in a single session.

Example 6:

A source has a high proper motion across the sky. Currently it is behind a large cloud and molecular absorption lines are seen against the source. The source will soon emerge from behind the cloud. The proposer would like to monitor the change in the molecular absorption lines as the source emerges from behind the cloud by observing the source once a month for a whole year.

This is an example of where a single source is observed within a session with the session being repeated twelve times.

Example 7:

A proposer wishes to obtain a timing solution on a newly discovered pulsar by using two different frequencies which are widely separated, requiring different receivers. For the lower frequency the timing measurements need to be done once a month. For the higher frequency they need to be done once every two months. The timing solution can be determined after monitoring the pulsar for one year.

In this example we have two different sessions because the time between repeats for each resource (receiver) is different. The first session is repeated twelve times, once a month for a

year, and uses the lower frequency receiver. The second session is repeated six times, running once every other month, and used the higher frequency receiver.

Example 8:

The Arecibo radar is being used to illuminate an object beyond Saturn. The round trip time is longer than the time the object is viewable at Arecibo so the GBT is being used to receive the return radar signal. This observing run must be coordinated with other telescopes and must occur on a specific date due to the property of the source being measured. The observations must occur on two separate days.

This is an example of a coordinated observation. The observation must be carried out on given UTC dates at specified times. Because the coordinated observations must occur on separate but specific dates these should be in different sessions.

Example 9:

A new supernova has gone off. A proposal is received to measure its flux versus frequency between 300 MHz and 2 GHz in order to look for synchrotron self-absorption.

This proposal has one source and six receivers: three Prime Focus 1 receiver bands, the Prime Focus 2 receiver, the L-band receiver, and the S-band receiver. However, only one of the three Prime Focus 1 receiver bands and the Prime Focus 2 receiver can be on the telescope at one given time. This then is a scenario where multiple sessions are needed due to technical reasons - receivers or feeds will have to be physically removed/placed on the telescope.

Example 10:

The proposers want to observe a source at a very low declination for four different epochs separated by about three months each to look for variations. Since the source reaches an elevation of only 6 degrees above the horizon and is visible for only 80 minutes per day, the source must be observed for five consecutive days to reach the desired sensitivity for a single epoch of observation.

This requires 20 repeats of the same session. However, there are two time scales involved. The observer should request the minimum timescale. In the constraints to the session they should give a full written explanation of how the observations should be scheduled.

A.2 VLA Session Examples

For the VLA, a session can be thought of as the longest period of contiguous time over which the proposed observations can be scheduled. There are several scientific and technical reasons why one should separate the proposed observations into different or repeating sessions. Some of these reasons include:

1. More than one array configuration is required for all of the proposed observations to be

completed. Changing between array configurations requires that some antennas be transported from one antenna pad to another. Such changes occur during pre-set reconfiguration periods that span one to three weeks, depending on the starting and ending configurations of the array. Note that even if a proposal requests only a main configuration (e.g., D) plus its associated hybrid configuration (e.g., DnC), separate sessions are still required.

2. The time needed on a source is greater than the time the source is above the elevation limit of 8 degrees, requiring repeated sessions.
3. The sources in a proposal are grouped in widely-separated declinations.
4. The sources in a proposal are grouped in widely-separated right ascensions.
5. The proposal is for monitoring observations.

The following examples provide guidance on how you should break up your proposed observations into sessions.

Example 1:

The proposers would like to observe galaxies that are members of two different galaxy clusters. The galaxy clusters are well separated in right ascension and have positive declinations. For each cluster, its approximately 20 galaxies are to be observed for 8 hours including calibration and slew overheads. The same VLA configuration is required for both clusters.

Since there is a large break/gap in the LST ranges in this survey, there should be two different sessions, one for each galaxy cluster. Each session will contain all the sources within that galaxy cluster, so the proposers might want to place that cluster's sources into a source group. This proposal then has two sessions, each involving about 20 sources and a total session time of 8 hours. The resource(s) for each session will involve the same VLA configuration.

Example 2:

The proposers would like to observe approximately 20 extragalactic sources in the same VLA configuration. They will need an average of about 5 hours per source, giving a total proposed observing time of 100 hours including calibration and slew overheads. The sources are randomly distributed across the northern sky.

Since it is possible to observe this project for 100 contiguous hours in one VLA configuration, this proposal could contain one session with 20 sources and a total time of 100 hours. The proposers might want to use a source data file to read in the source information and place the sources into one source group. In the scheduling constraints field, the proposers might want to note that it would be acceptable to split the session into four, each lasting about one day and involving about a quarter of the sources, with no preference regarding the separation between the four repeats.

Example 3:

Now let's consider a survey where the sources are in a narrow LST range but are clumped near different declinations. To illustrate the point let's say half the sources are near a declination of

70 degrees (thus circumpolar) and the other half are near a declination of -15 degrees. The same VLA configuration suffices for all sources.

In this case there should be two sessions, breaking the sources up according to their declinations. This is because they put different pressures on the scheduling of the telescope. The circumpolar sources can be done at any LST, while the southern sources have a narrower range of LSTs during which they can be observed. The session containing the circumpolar sources might not need to be repeated, since the observations of all the sources could be done continuously. The session with the southern sources might need to be repeated, because those sources are above the elevation limit only for about 9 hours per day. In the comments field, the proposers might want to note that the associated hybrid configuration would also be acceptable for their southern sources.

Example 4:

The proposers would like to determine the properties of a single source using one VLA configuration and the seven receivers that are always (sequentially) accessible.

This is an example of a single VLA configuration, with a single source, and with multiple resources due to multiple receivers. Since multiple source/resource pairs can be added to one session, there is generally no reason to request multiple sessions. But if the total session time is more than the time per day that the source is above the elevation limit, then the request should be broken up, either as repeats involving the same set of receivers or as multiple sessions involving different sets of receivers.

Example 5:

The proposers would like to determine the properties of a single source using a single receiver and two VLA configurations.

This is an example of a single source and a single receiver, and with multiple sessions needed because of multiple configurations. In this case, two sessions are generally needed, one for each VLA configuration. If the total time per session is more than the time per day that the source is above the elevation limit, then each request should be broken up as repeats.

Example 6:

The proposers would like to determine the spectral index of a single source at a matched angular resolution, thus using two receivers and two appropriately-scaled VLA configurations.

This is an example of a single source, with a single receiver per configuration, and with multiple sessions needed because of multiple configurations. In this case, two sessions are generally needed, one for each VLA configuration with its single receiver. If the total time per session is more than the time per day that the source is above the elevation limit, then each request should be broken up as repeats.

Example 7:

A source has a high proper motion across the sky. Currently it is behind a large cloud and molecular absorption lines are seen against the source. The source will soon emerge from behind the cloud. The proposers would like to monitor the change in the molecular absorption

lines as the source emerges from behind the cloud by observing the source monthly throughout a year that does not involve the D configuration.

The simplest approach would be to have this single source be observed within a single session, with the session repeated 12 times separated by 30 days. The resource(s) would specify any configuration and the scheduling constraints field would note that the D configuration is not acceptable.

Alternatively, three sessions could be requested, involving resource(s) specifying the A configuration, the subsequent B configuration, and the subsequent C configuration. The session for each configuration would involve 4 repeats separated by 30 days.

Example 8:

The proposers would like the VLA to observe during Suzaku time already awarded. This joint observation must be coordinated with another telescope and must occur on separate days, with the specific dates and times established by that telescope. Any VLA configuration is acceptable.

This is an example of coordinated observations. The observations must be carried out on given UTC dates at specified times. Because the coordinated observations must occur on separate but specific dates, these should be in different sessions. For each session, the resource(s) should specify any configuration and the scheduling constraint should note the date and times for the coordinated observing.

Example 9:

The proposers want to observe a source at a declination of -45 degrees to look for variations between observations during two BnA configurations separated by the nominal 16 months for the configuration cycle. Since the source is above the elevation limit for only 90 minutes per day, it must be observed daily for five days to reach the desired sensitivity during each BnA configuration.

The proposers should request two sessions, one for the first BnA configuration (in 2007, say) and one for the second BnA configuration (in 2008, say). Each session will involve 5 repeats, separated by 3 days; the proposer would note in the constraints field that any separation between repeats is fine, so long as the first and last observations occur within two weeks of one another (if the source is expected to have interesting variations only on longer timescales).

Example 10:

The proposers wish to monitor the evolution of the next bright nova, using logarithmic time sampling and selecting the receivers used in each epoch according to the current source spectrum and flux density. Each observation should be about an hour, with a maximum of 20 observations. The proposers are also requesting similar RXTE observations, and would like the VLA and RXTE data to be taken quasi-simultaneously. In addition, the proposers wish to obtain a three-hour HI absorption spectrum if the source rises above 100mJy at 1.4GHz, as well as a 20-hour observation at 5 or 8GHz to obtain a deep limit on both polarization and extended low surface-brightness emission after 100 days.

The proposers should request three sessions: one for the flux density monitoring, one for the HI

absorption observation, and one for the deep polarization limit.

The flux density monitoring session should have a single source (Bright Nova 1) and multiple resources (one for each VLA receiver that might be used). This session will involve 20 repeats, with a "placeholder" separation of 1 day. The time per session should be entered manually, since the actual time per receiver will vary as the source evolves. The scheduling constraints field should note that the actual separation should be 1, 3, 10, 30, 100, etc. days, with the first observation occurring as soon as possible after an appropriate nova is discovered. The constraints field should also note the desire to coordinate with Swift, insofar as possible.

The HI absorption session should have a single source and receiver, and request a single 10-hour observation. The constraints field should be used to specify that this observation should occur as soon as possible after the nova is observed with a flux density of at least 100mJy at 1.4GHz. Note that a single 10-hour observation is requested, even though the nova may appear at such a low declination that it is observable for only a couple hours a day.

Finally, the deep continuum observation should have a single source and multiple receivers, and request a single 20-hour observation. The constraints field should request observations between 90 and 120 days after the triggering nova explosion. The proposers should also note here that multiple observing runs are fine if that makes scheduling easier, but that each individual observation must be at least 5hours long, to ensure adequate uv-coverage and to cover a wide range of parallactic angles. The comments field should note that only one of the requested receivers will actually be used, depending on the nova characteristics and the VLA array configuration (e.g., one might prefer 5GHz observations in B configuration, but 1GHz observations in A configuration, for sensitivity to similarly extended emission).

All of this should of course be discussed and justified in the scientific justification.

About this document ...

Interactive Services (my.nrao.edu)

**Proposal Submission Tool,
CASA Helpdesk & User Profile Management**

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The translation was initiated by Ashish Arte on 2008-09-26

Ashish Arte 2008-09-26