The ALMA Observing Tool: Proposal Preparation & Submission

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(UK ATC &
ALMA Computing IPT)

Overview

- Summary of ALMA Concepts
- Summary of ALMA OT Concepts
- Downloading & Installation Options
- The OT GUI overview
- Phase I - Preparing your proposal
- Science Goal details
- Validation and other tools
- Proposal Summary
- Proposal Submission
- Phase II SB Generation
- SB overview
- How the SB interfaces to observing

The Team

Collaboration between UK ATC, ESO and NAOJ

Developers:

UKATC: Alan Bridger, Stewart Williams, Stewart McLay, *David Clarke, Nuria Lorente, Martin Folger*

ESO: Marcus Schilling, *Joseph Schwarz, Maurizio Chavan, Heiko Sommer*

NAOJ: Hiroshi Yatagai

(Approx 2.9 FTE)

Science:

- Andy Biggs, *Liz Humphries, Leonardo Testi* +
- *Toshihiro Handa, Harvey Liszt, Suzanna Randall, and many others*

Documentation:

Rein Warmels +

ALMA Observing Concepts

ALMA Will be *dynamically scheduled* in a service mode operation. Observing is specified by *sensitivity* goals.

- Observing will be divided into *Scheduling Blocks* (SchedBlocks or SBs)
- Each SB will be ~ 30 minutes in length (weather considerations)
- “Best” SB at any moment will be observed (weather, science priority, project completion, …)
- SBs considered “complete” when have met individual goals
- SBs grouped into “sets” (Observing Unit Sets, ObsUnitSets) which:
  - provide the data processing trigger
  - allow for dependencies between SBs
  - provide the ability to create hierarchies
- In Early Science expect manual SB selection, manual pipeline processing, simple SB sets

Observing Preparation: The ALMA OT

- *Key Aim: Make it easy to use ALMA!*

- A Single Tool for Phase I (Proposals), and Phase II (Observing Preparation)
  - Supporting ”Novice” users,
  - But also “Experts” & Staff
  - Support for program review
  - Portable, easy to use, graphical user interface, user feedback of automatic choices, data rates, resources.
  - New release for each Proposal Cycle

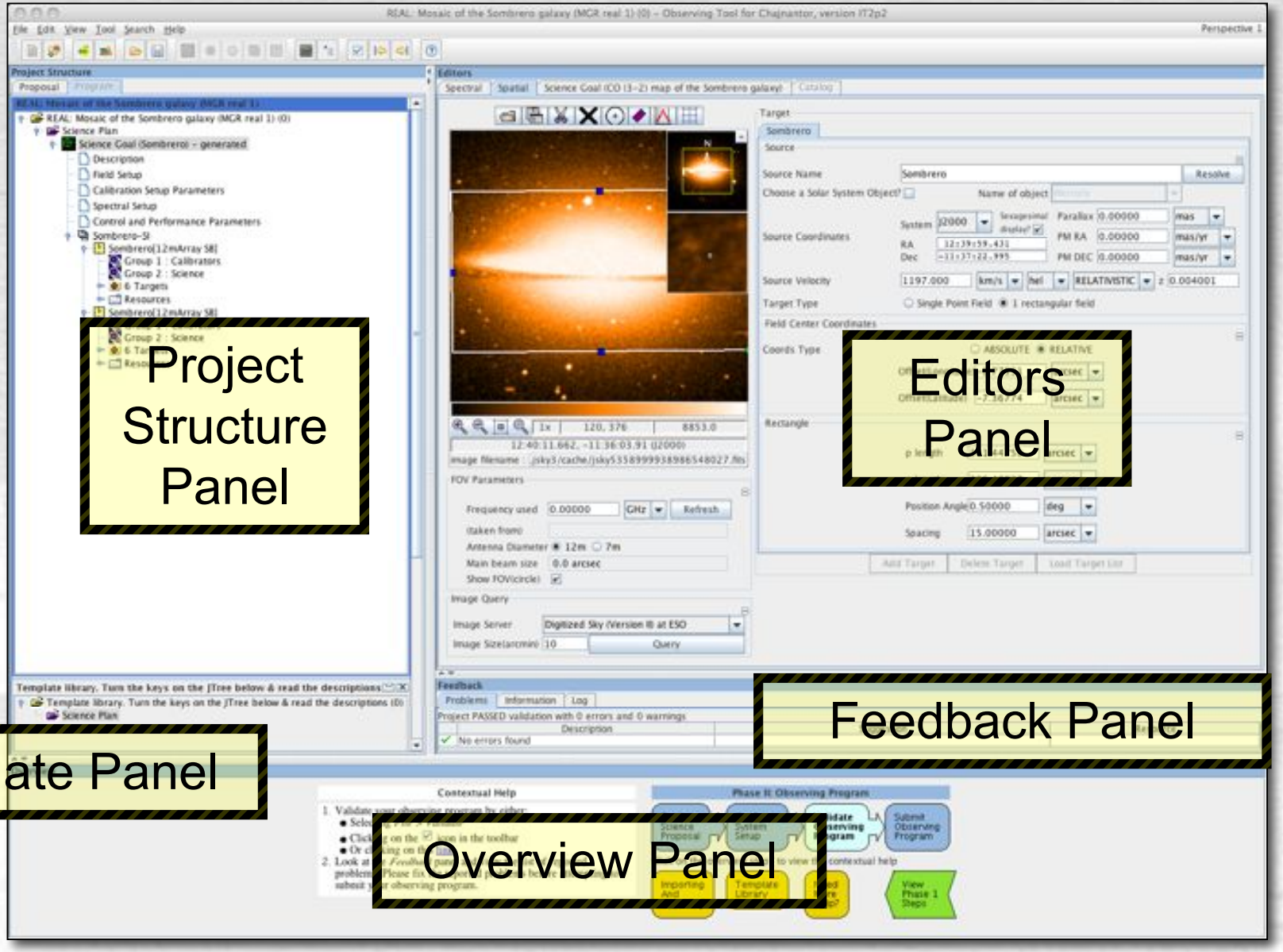
ALMA OT: Download & Installation

- Java-based desktop client program: runs on a number of platforms:
  - Tested on Windows (XP or later), Mac OS X (10.5 & 10.6), GNU/Linux (several distributions)
  - Standard Oracle (Sun) JavaVM required. Current version uses Java 1.6
- Two primary methods of installation
  - **Java Web Start:** Using standard web browser, just click on hyperlink or image in a web page, & tool is downloaded & locally installed. Subsequent version updates are automatically searched for & can be installed whenever OT is launched *Preferred installation option*
  - **Tarball:** Download and install from standard tarball file. Full instructions provided. Option of including recommended Java.

ALMA OT: Primary Concepts

- OT captures observing information in the form of *Science Goals*
- Science Goals are common to both Phase I proposals and Phase II observing preparation
- Science cases, technical cases, figures, etc. included as PDF files
- Output of the OT after Phase II is sets of SBs
  - The OT performs automatic generation of SBs from Science Goals
  - SB may also be created from scratch (*not in Early Science)*

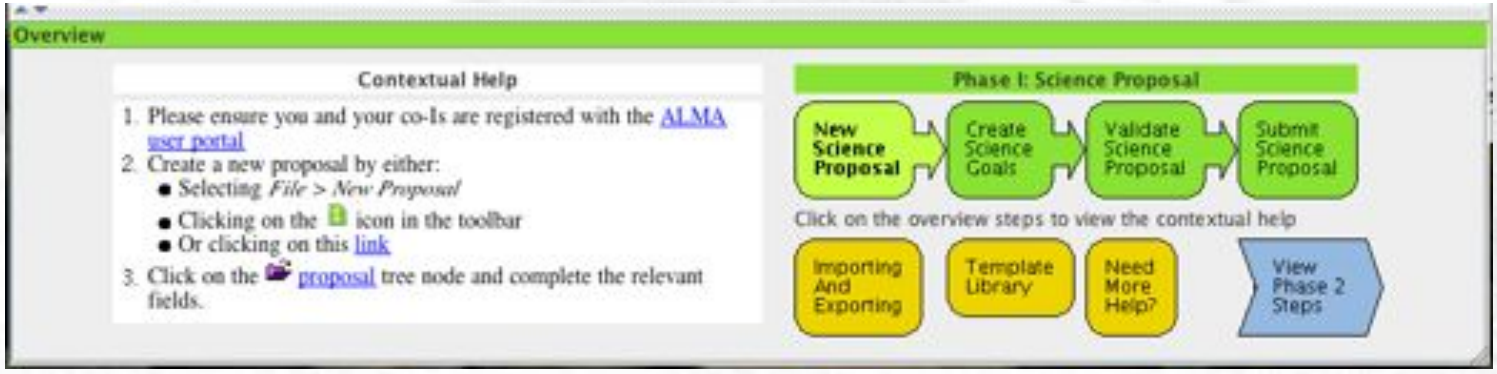
ALMA OT: Basic Layout



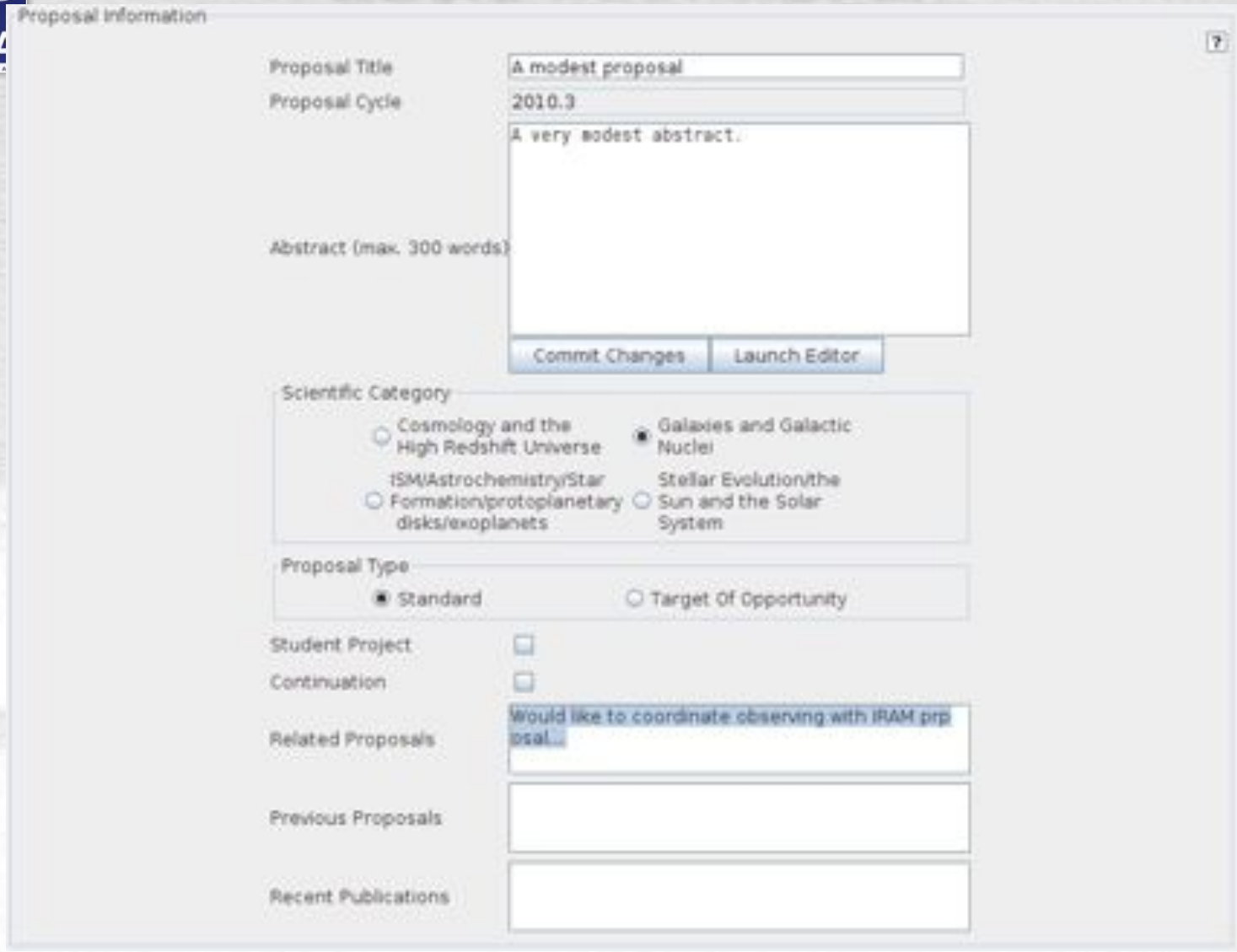
Phase I

Phase I: Getting Started

- All investigators must register at the ALMA User Portal
- Create new proposal, & enter initial info into appropriate Editor Panel form
  - Proposal title, abstract, identify PI & co-Is (checked against user database), indicate scientific category, etc.
  - Attach PDF files containing the science case, technical case, tables, figures, etc. Checked for length during validation.
- Create as many Phase 1 Science Goals as needed



Basic Information



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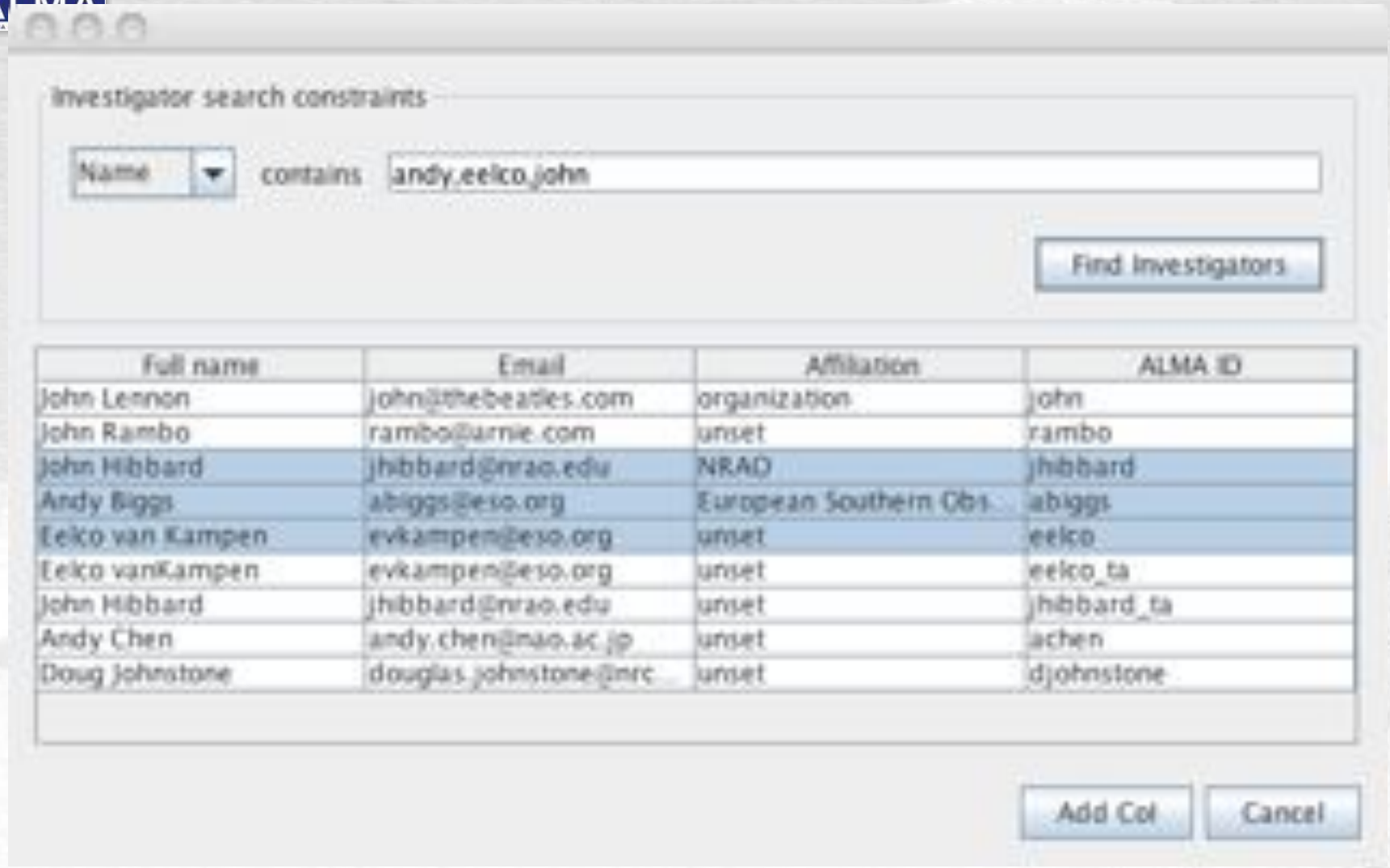

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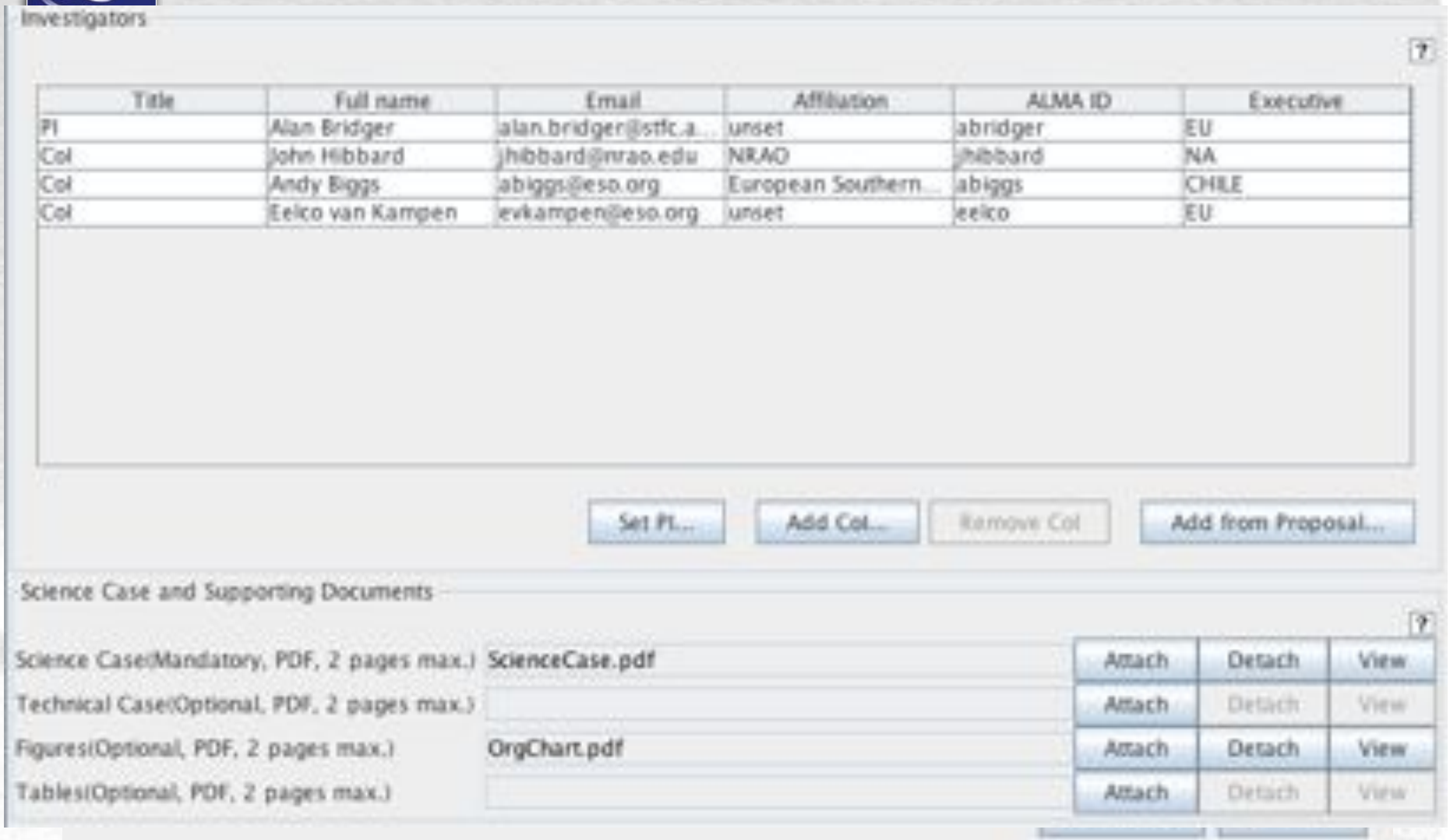
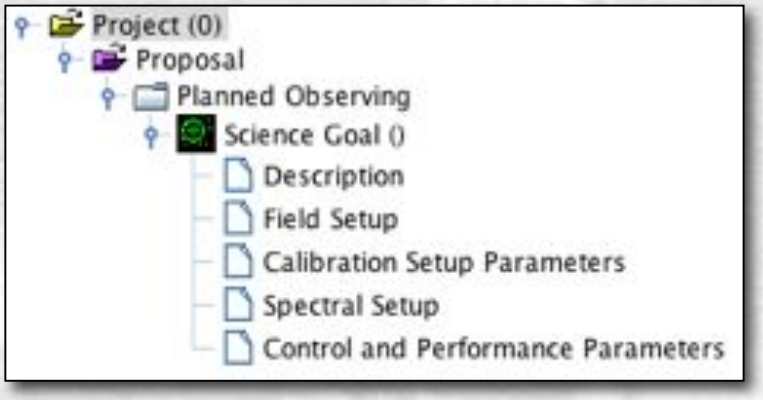


Science Goals

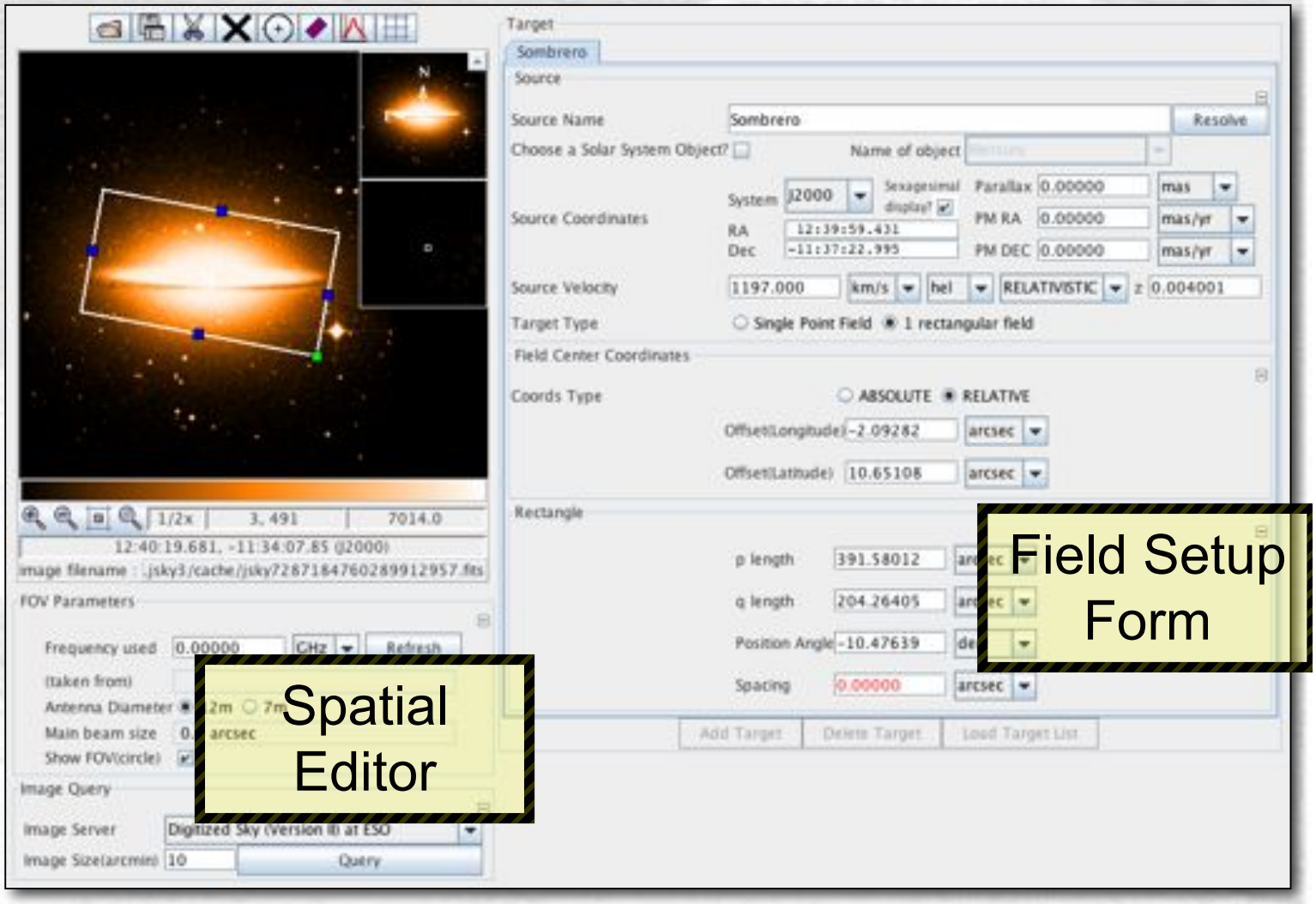
- **Science Goals**
  - **Philosophically:** Aim to abstract intended science from complexities of telescope
  - **Practically:** Container (with some header information) containing 5 types of entry:
    - **Description** - Optional description of science goal
    - **Field Setup** - Used to denote which sky field(s) are to be observed
    - **Calibration Setup Parameters** - Used to specify calibration strategy (types and details of calibrators, whether they are user-specified or system-selected
    - **Spectral Setup** - Used to specify frequency ranges, resolutions, etc. to be used
    - **Control and Performance Parameters** - Used to specify performance goals: angular resolution, largest scale, sensitivity, dynamic range, etc
  - Currently one spectral setup and one sensitivity target per goal.



Field Setup & the Spatial Editor

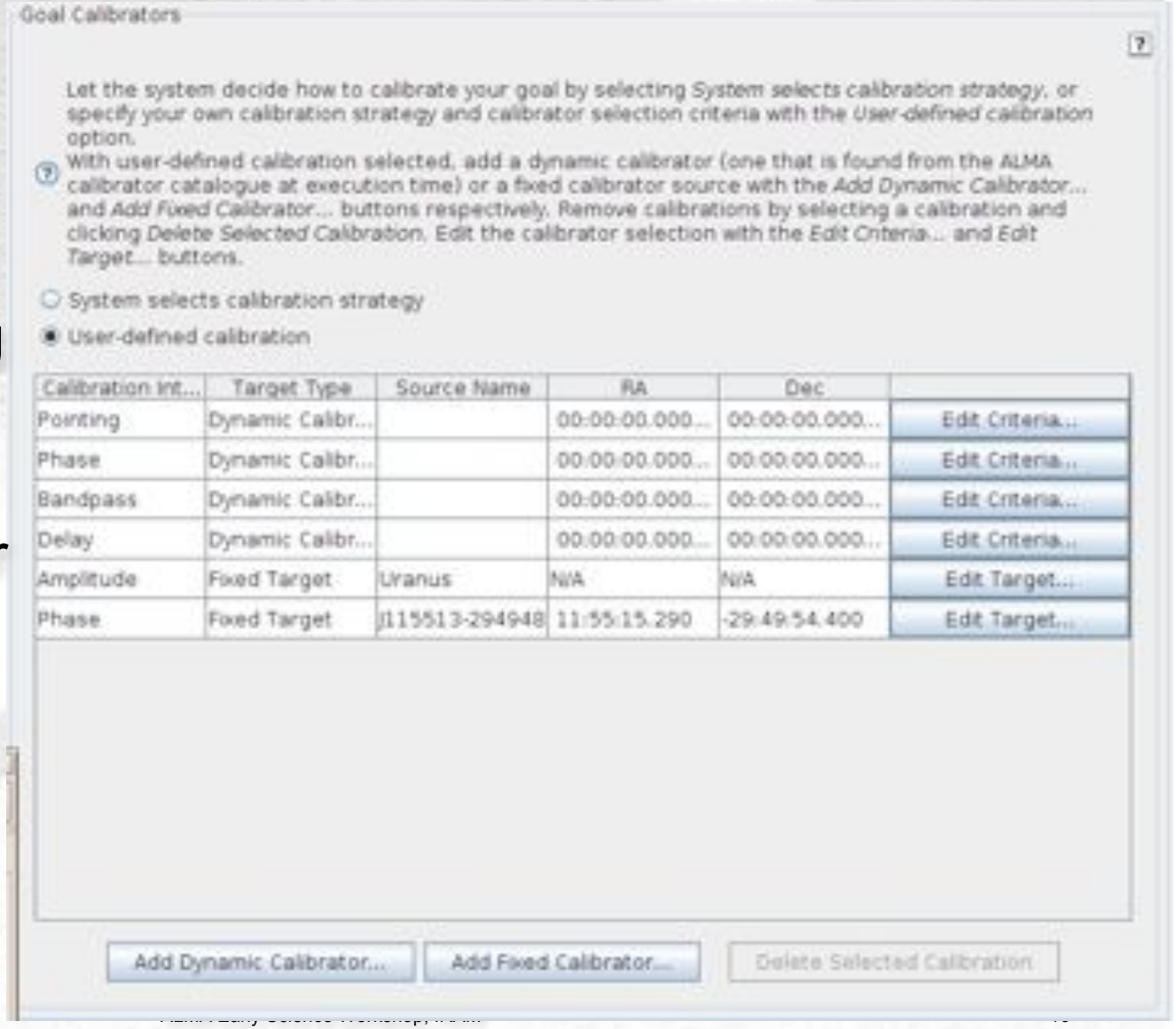
Online name resolvers & connections

to remote archive servers available

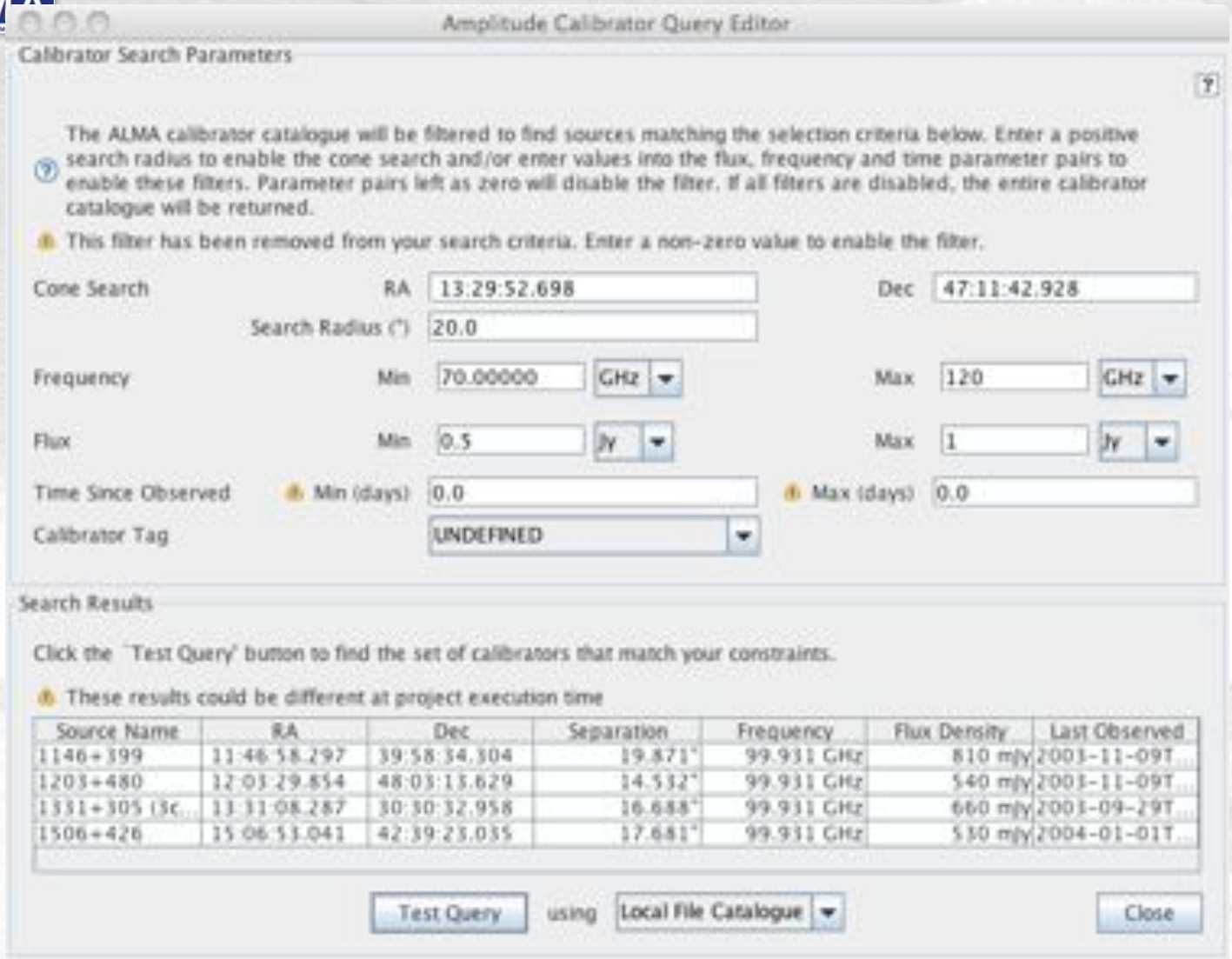


Calibration Setup Parameters

- Fully Automatic setup, or
- User setup using
  - queries and/or
  - fixed calibrators
- Search calibrator catalogues, using…

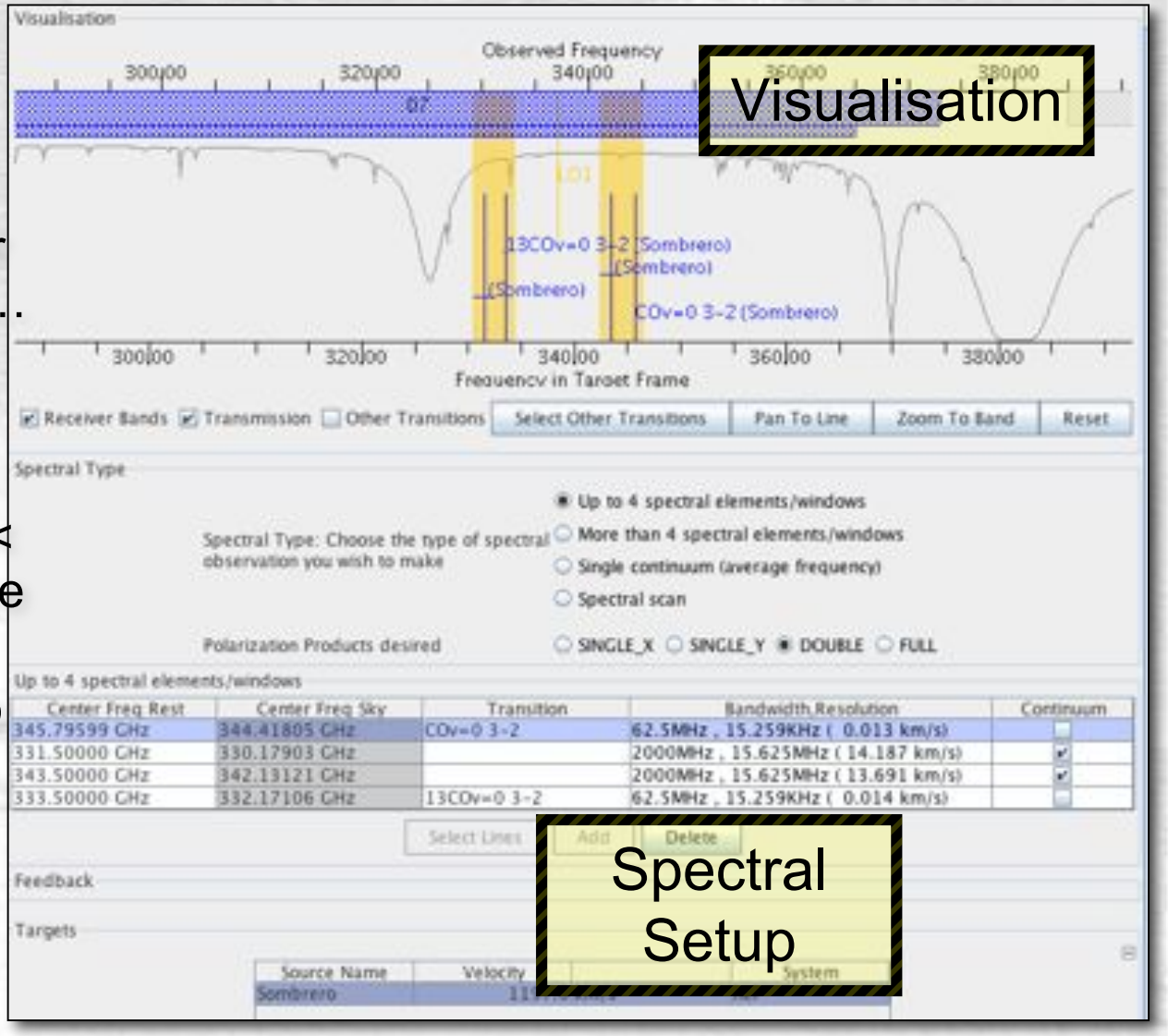


The Calibrator Query Tool



Spectral Setup & Visualisation

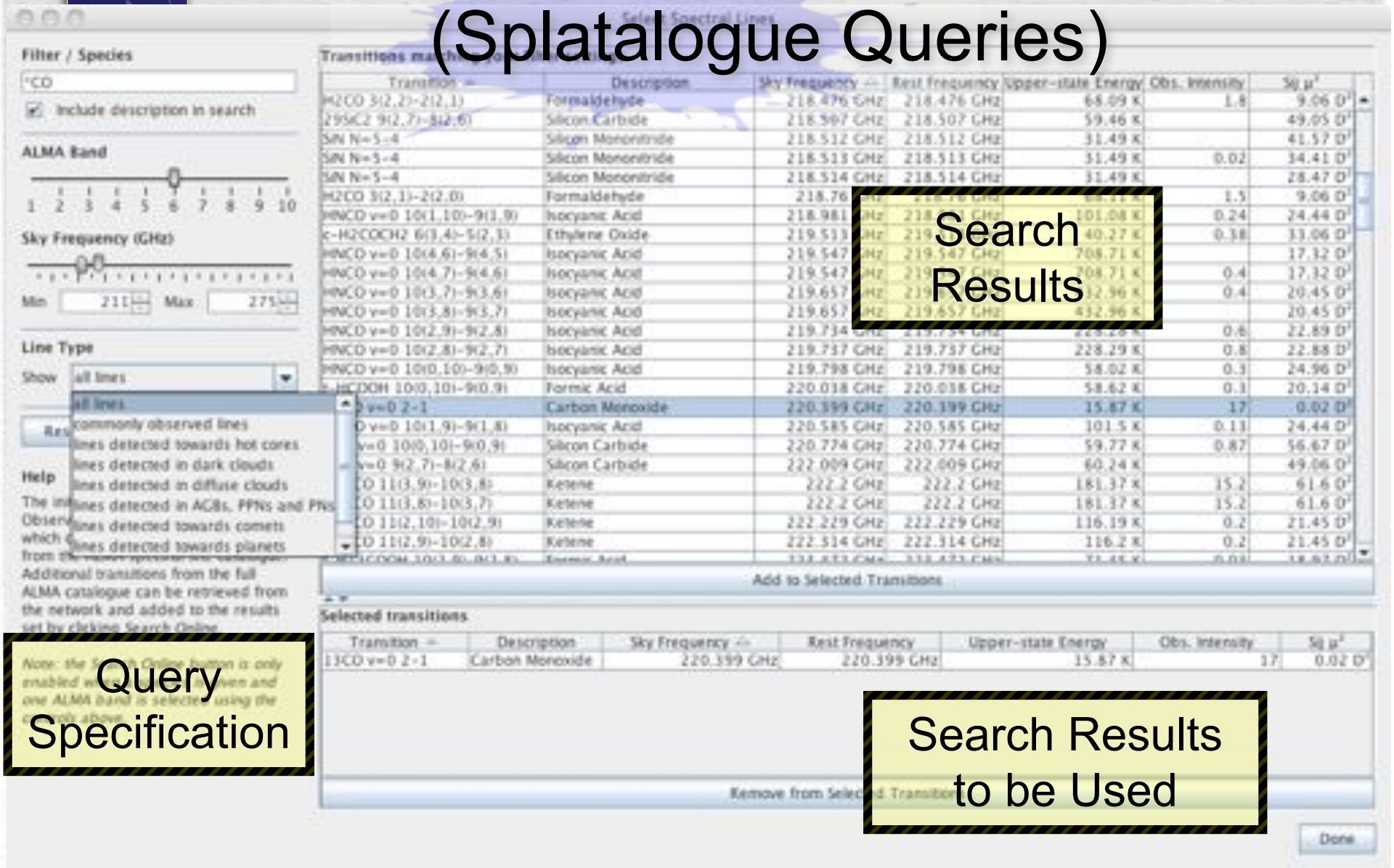
- Simple interface to spectral setup
- Hides LO & correlator as much as possible…
- Single average frequency for continuum
- Simple setups with =< 4 windows just choose your windows
- For more you need to manage correlator resources (*not available in first call*)



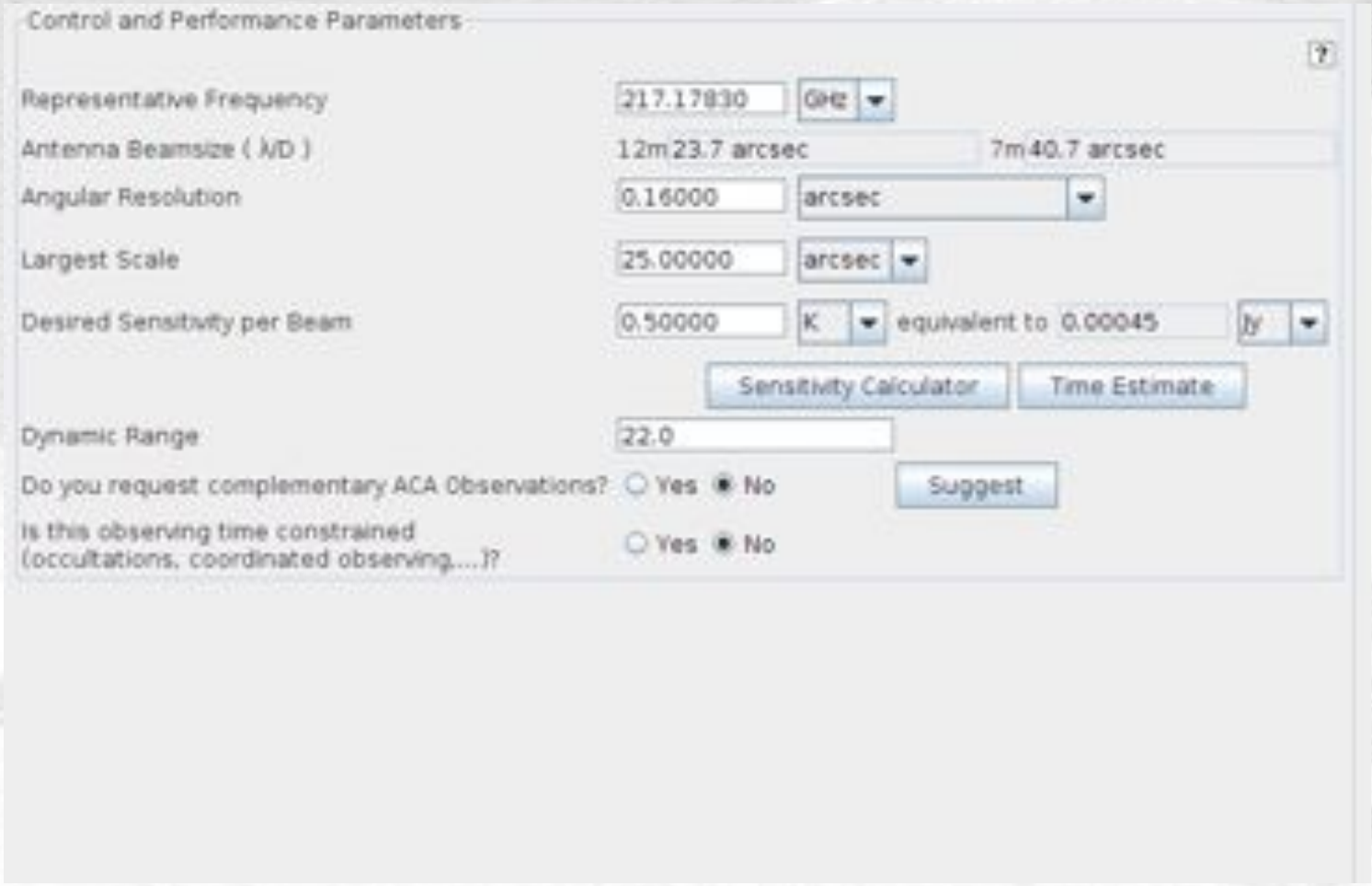
Line Selection Tool (Splatalogue Queries)

- Select lines from a subset of the Spatalogue (when offline)
- Or query full splatalog (when online)
- Query by species, description, frequency/band, where detected
- Or you can simply type in your frequencies

Line Selection Tool (Splatalogue Queries)

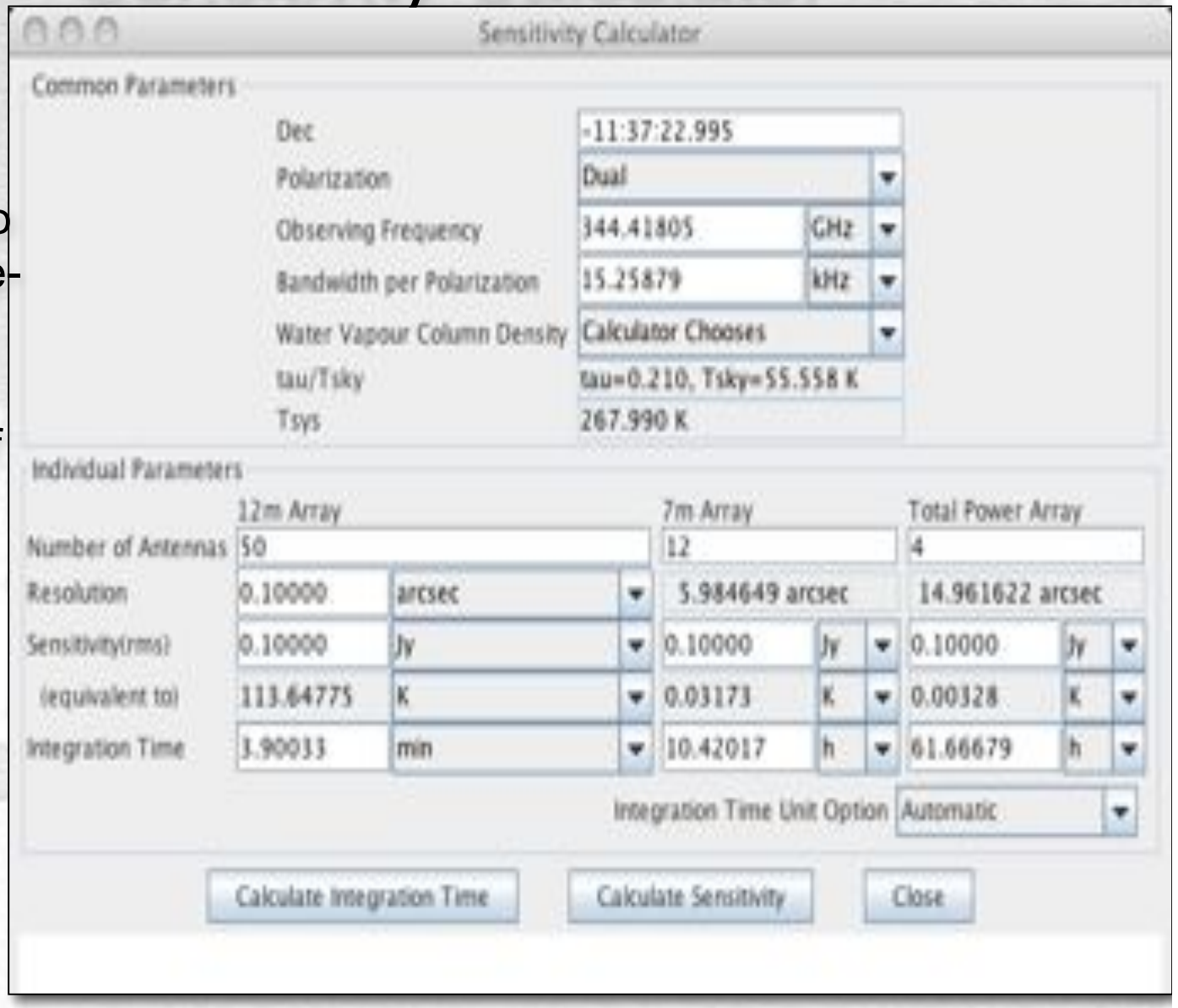


Control & Performance Parameters



Sensitivity Calculator

- Calculate integration time to sensitivity, or vice-versa (time per beam)
- Modify number of antennas (defaults to expected availability for cycle)
- Web version available



Template Library

- Selection of example Science Goals and common setups
- Drag and drop (or copy/paste) from the Library into proposal
- May copy whole Science Goal or components (e.g. spectral setup only)

Validation

- Provides a series of automated checks on the validity of the proposal at Phase I & Phase II
- Handles both errors & warnings
- Can be performed at any stage during the project creation process
- Detected errors/warnings trigger:
  - Indicator icons in the hierarchical structure
  - Clickable links within the error message that jump the user's view directly to the appropriate part of the proposal/program
- Also performed on the server side during submission to ensure that only valid projects can be submitted

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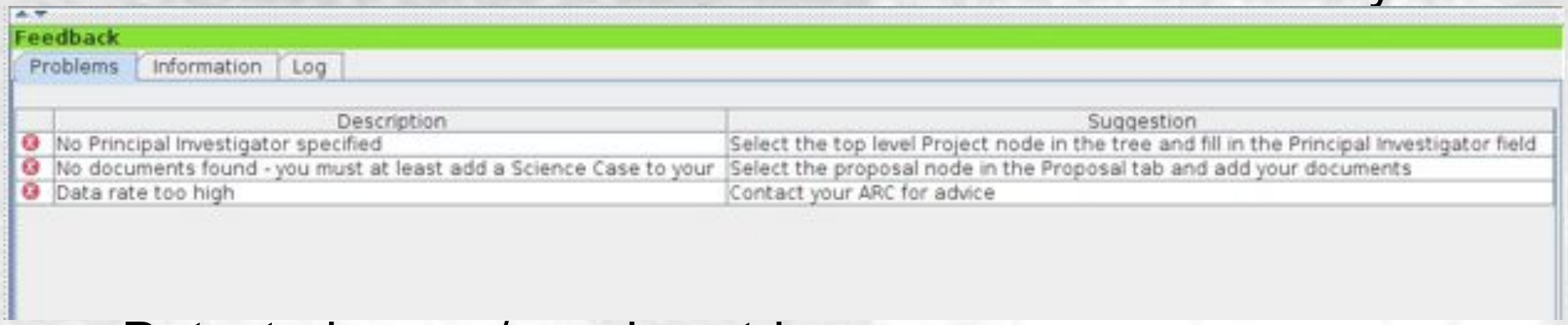

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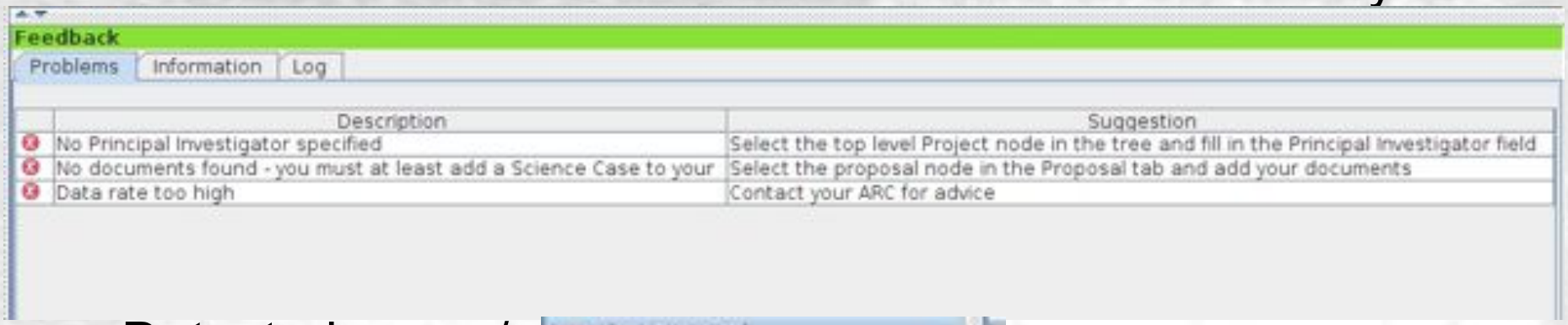

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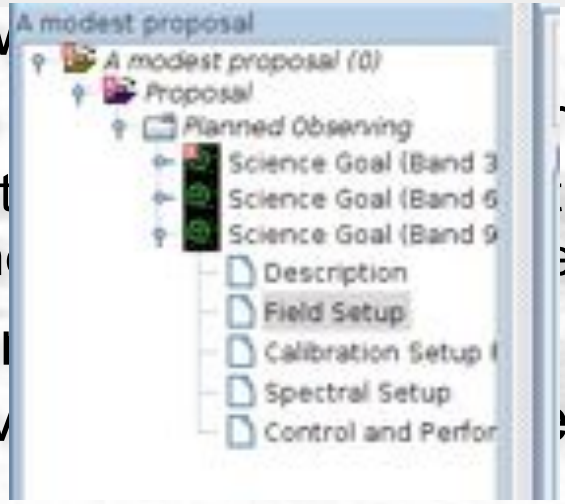

- Also performed o
  ensure that only v

Some other things

- Saving and Sharing
  - Export to local disk, import from local disk
  - You may use your own projects as “libraries” to copy from
- Some changeable user preferences
- Calibrator search can be used stand alone
- LO Setup tool for experimenting (*warning: expertise required)*

Help

- Contextual Help provided in the Overview panel
  - Step-by-step clickable walkthrough instructions, including links
  - Guides the PI through Phases I & II, as appropriate
- Additional help also provided via other means within the OT
  - Hover-over ToolTips
  - Searchable electronic copies of the complete user & reference manuals
  - Cookbook currently in development
  - In-form contextual help links into the reference manual
  - PDF versions of manuals

Help

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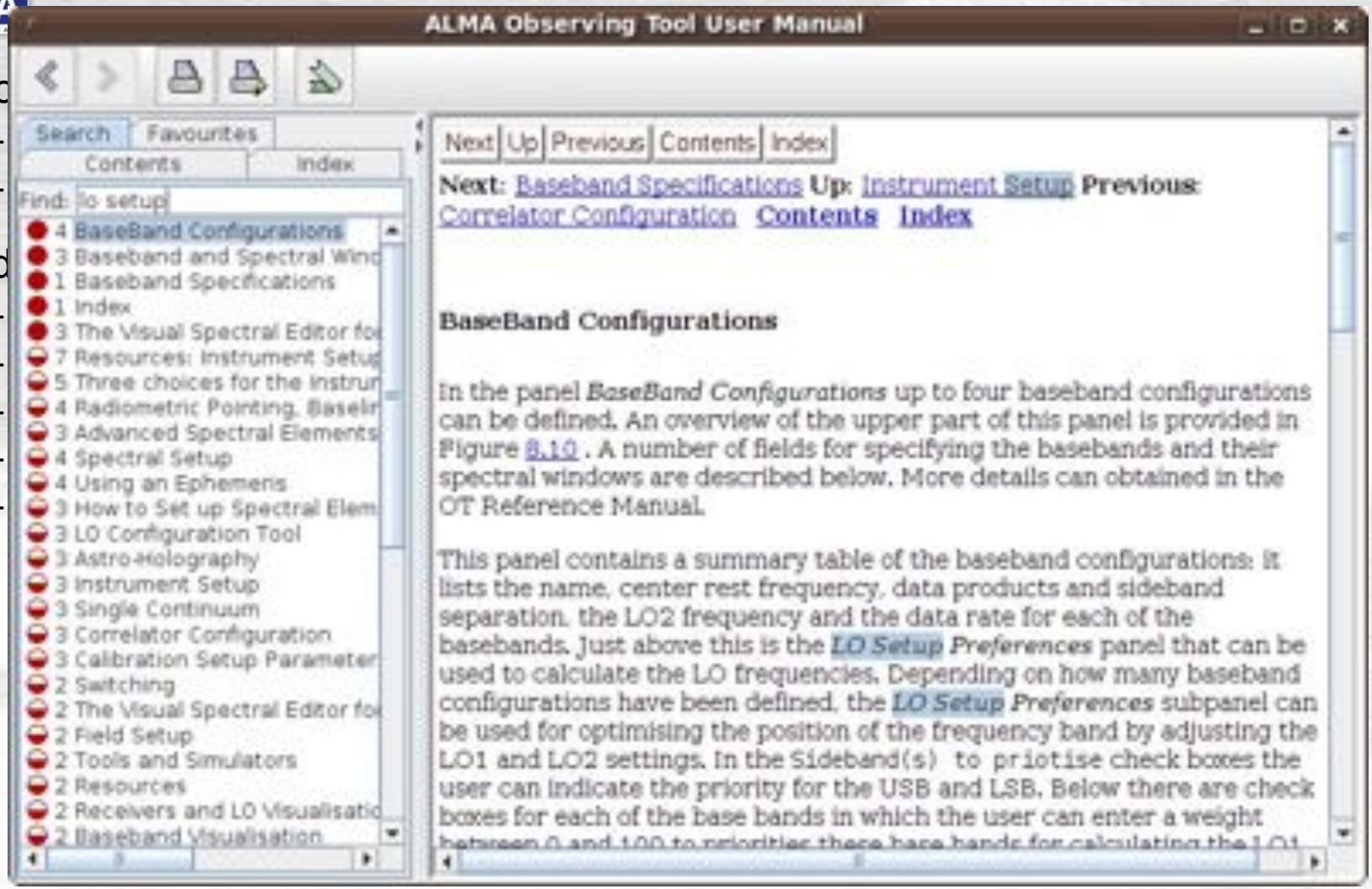
ALMA Observing Tool User Manual
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3 Advanced Spectral Elements
4 Spectral Setup
4 Using an Ephemeris
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3 Single Continuum
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2 Baseband Visualisation
Next Up Previous Contents Index
Next: Baseband Specifications Up: Instrument Setup Previous: Correlator Configuration Contents Index
BaseBand Configurations
In the panel BaseBand Configurations up to four baseband configurations can be defined. An overview of the upper part of this panel is provided in Figure 8.10 . A number of fields for specifying the basebands and their spectral windows are described below. More details can obtained in the OT Reference Manual.
This panel contains a summary table of the baseband configurations: it lists the name, center rest frequency, data products and sideband separation, the LO2 frequency and the data rate for each of the basebands. Just above this is the LO Setup Preferences panel that can be used to calculate the LO frequencies. Depending on how many baseband configurations have been defined, the LO Setup Preferences subpanel can be used for optimising the position of the frequency band by adjusting the LO1 and LO2 settings. In the Sideband(s) to priotise check boxes the user can indicate the priority for the USB and LSB. Below there are check boxes for each of the base bands in which the user can enter a weight

Time Estimates and Summaries

- OT generates a PDF version of the proposal, containing a distillation of all the key details:
  - Headed by the basic proposal information, such as PI, proposal title, etc.
  - Incorporates the provided PDFs for science & technical cases, figures, tables, etc.
  - Includes a full technical summary, containing all of the proposed observations, and associated setups, target lists, etc.
  - Includes a total execution time estimate
  - Available to the PI as a routine part of the proposal generation/submission process

Proposal Submission

Proposal Submission: Overview

- Client/Server system: OT client + Submission Server
- Connection via https - secure
- Authorization required, PI username must be used
- Proposal must be valid - only warnings are acceptable.
- PDF receipt returned on successful submission, including tracking code
- May re-submit up to the deadline
- All submissions to Santiago
- Project finder interface to Archive

Proposal Submission: Overview

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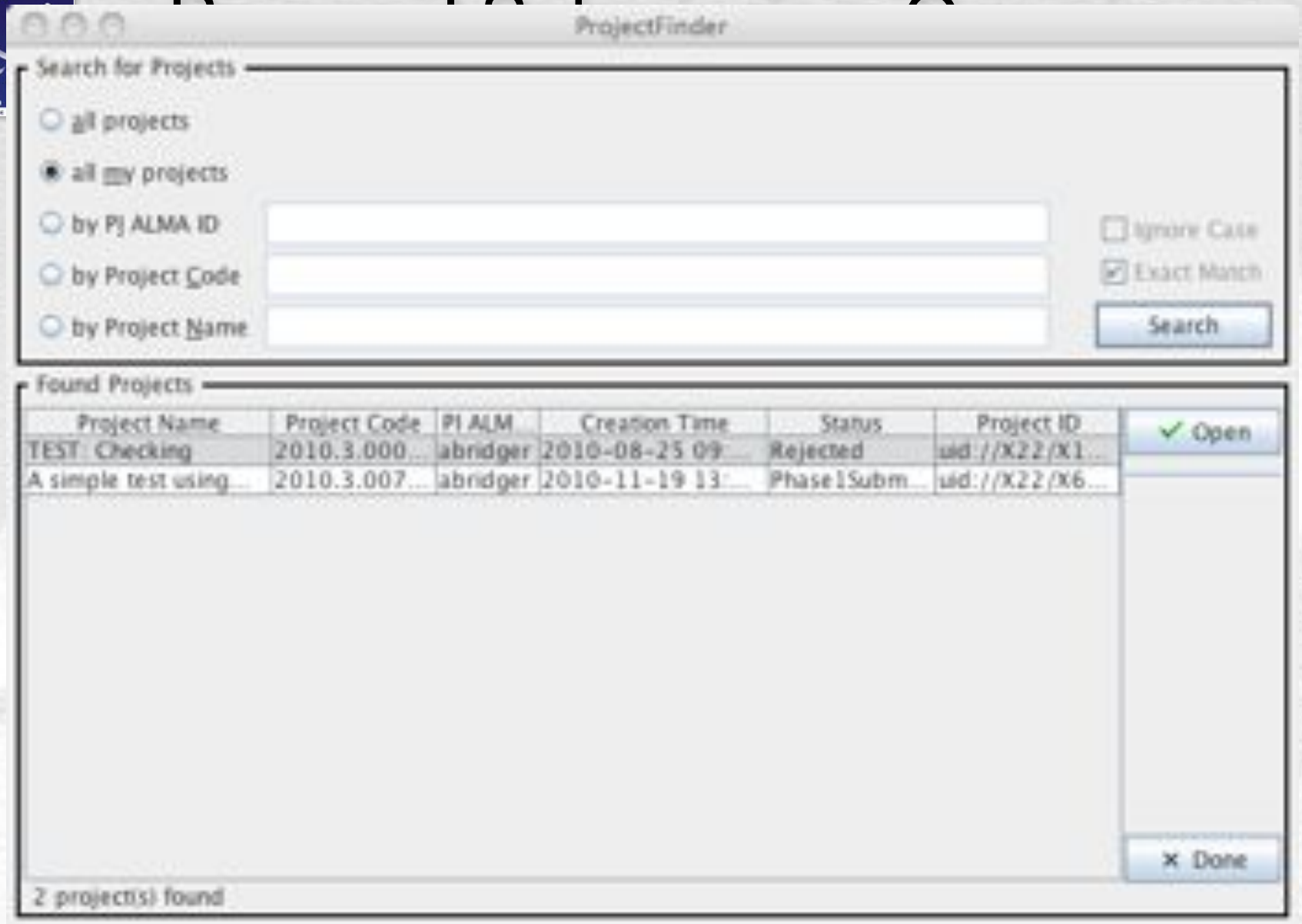
Congratulations!

Your project has been successfully submitted.

PI Name	Alan Bridger
Project Name	A simple test using 8_0_0
Project Code	2010.3.00797.S
Date Submitted	2010-11-19 01:51:46
Internal Project ID	uid://X22/X60/X1

Proposal Submission Overview



The Proposal Review Process takes place

(time passes…)


Success!
(The proposal gets ALMA time)

Phase II

Phase II

- Approved proposals flagged in ASA as ready for Phase II; PI notified
- PI uses OT to retrieve successful proposal from ASA
  - Proposal Phase I content now read-only
  - Program tab in Project Structure tab now foregrounded; includes Phase II Science Goals
- Ideal Phase II case:
  - PI is happy with the Science Goals as initially presented at Phase II
  - PI hits “Generate SBs”, & SBs are automatically generated
  - PI is happy with resultant SBs
  - PI re-submits project to ASA, including Phase II SBs

Phase II

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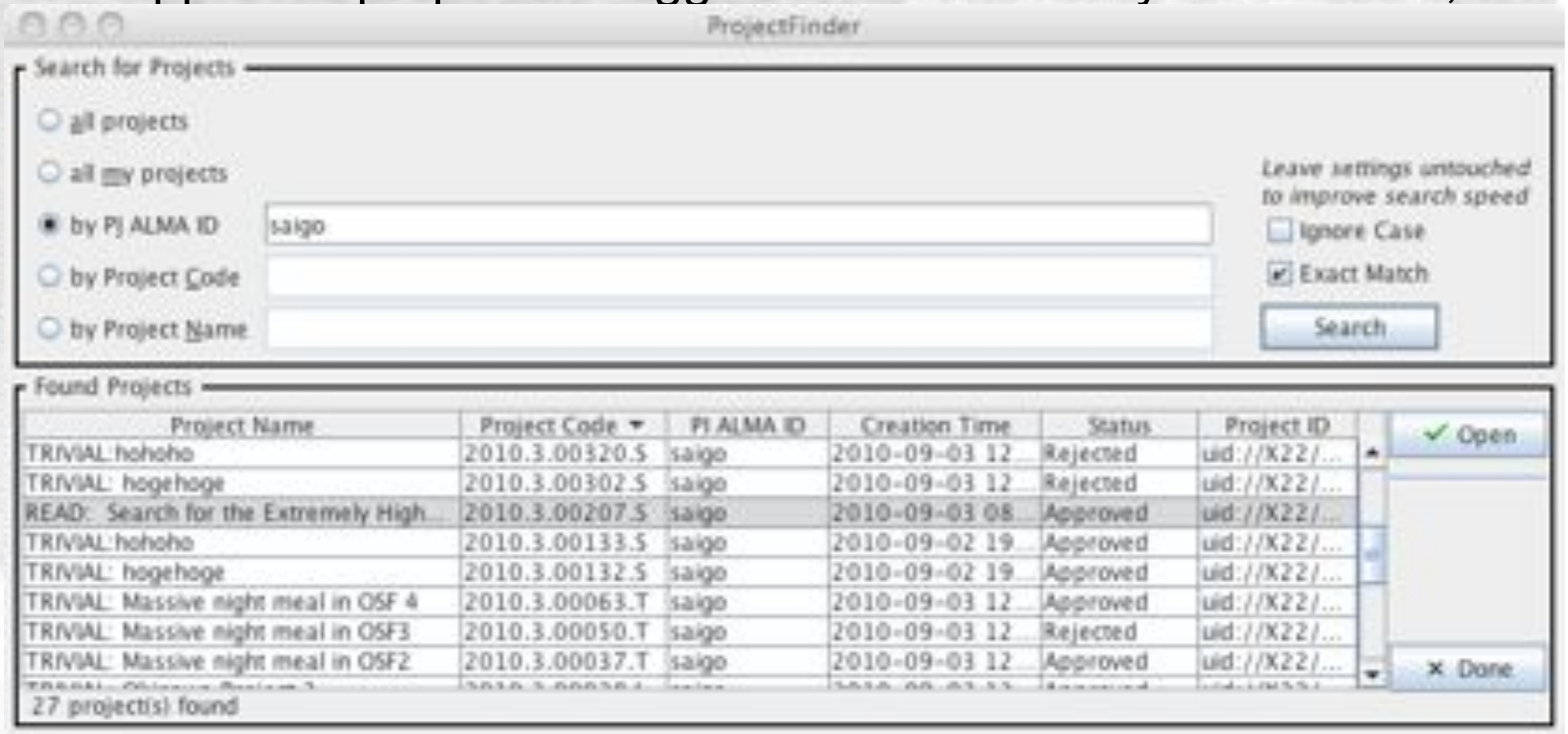
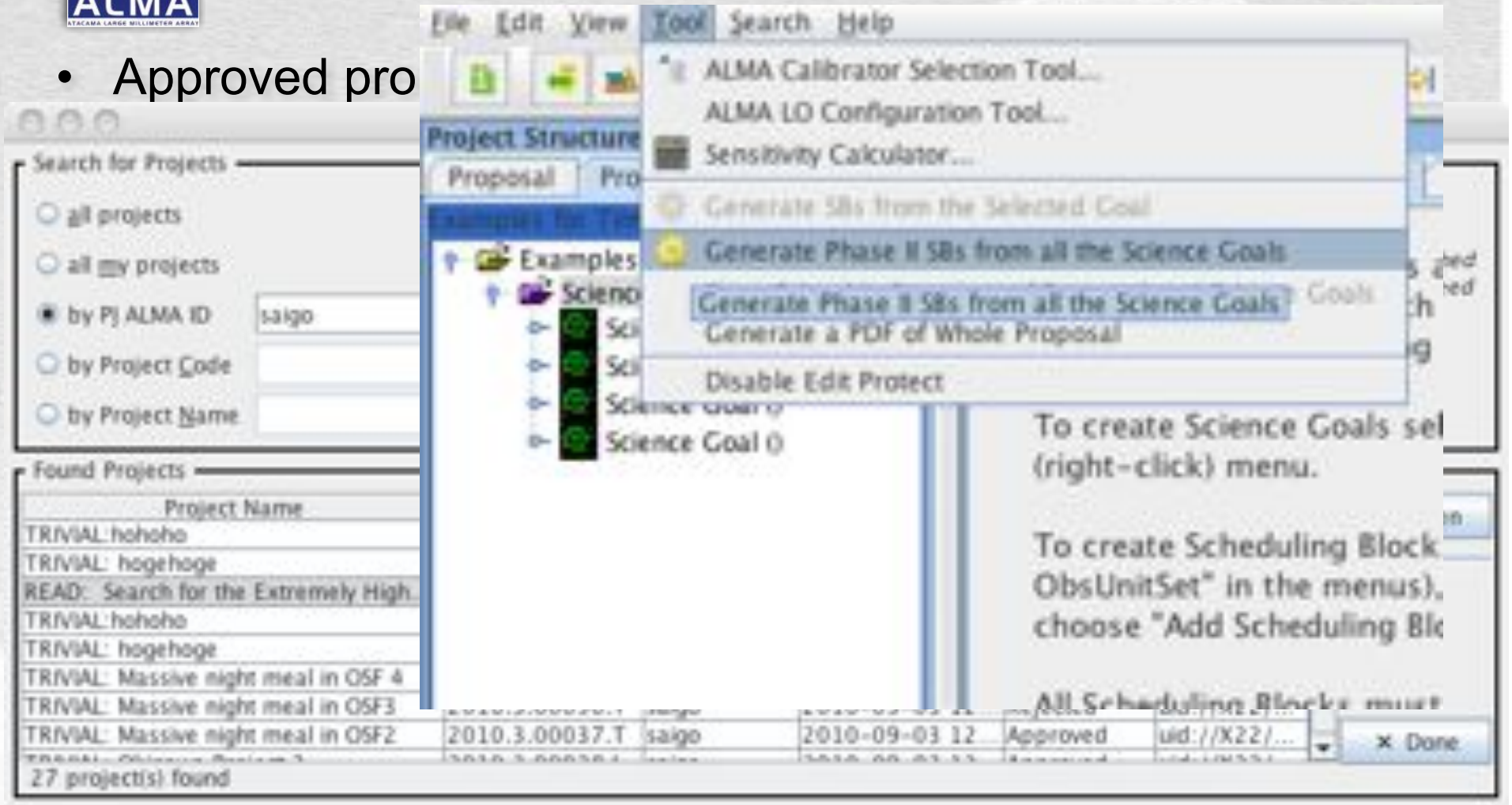


Phase II

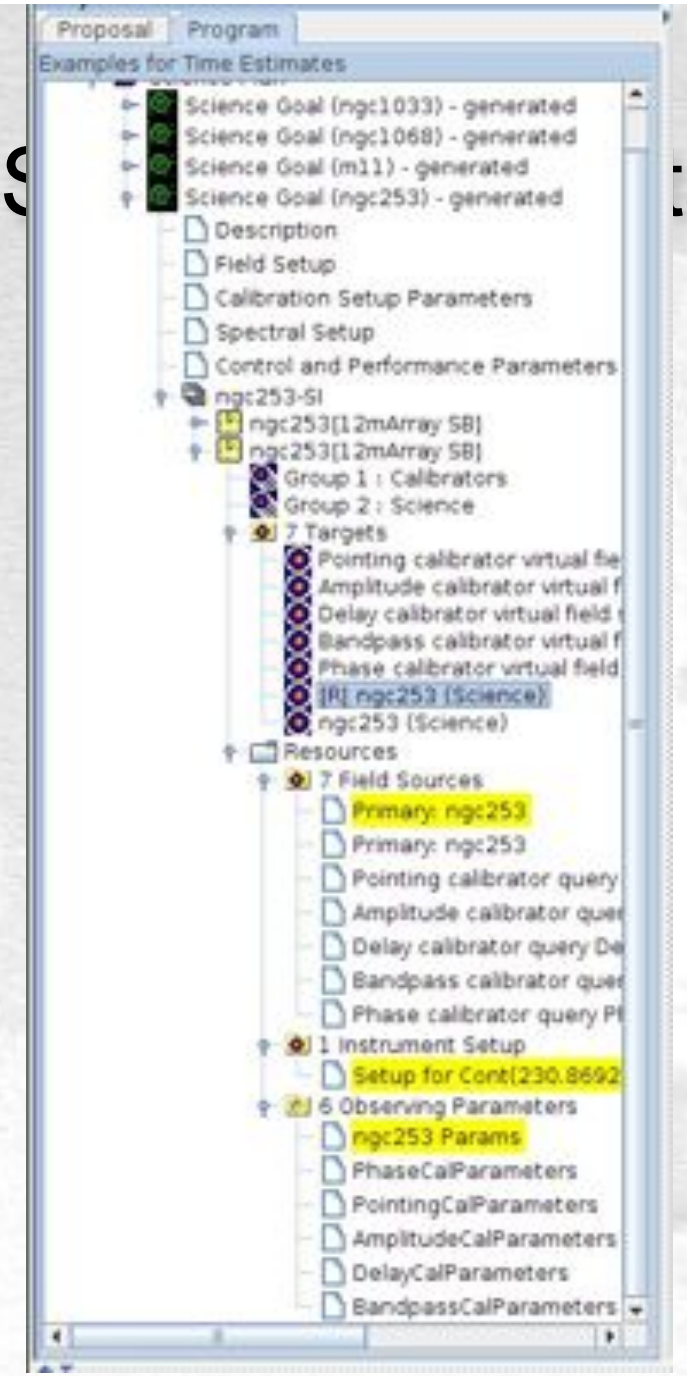
- Approved pro



Phase II: SchedBlock Details

- SB contains series of Observing Setups (“targets” - name may change)
- Targets are organised into Observing Groups
  - Only targets in a group are observed
  - Helps control order of observing
  - Group 1 is starting calibrators
  - Group 2 is science and frequent calibrators
- Target consists of field setup, spectral setup and observing parameters (“intents”)
- SB contains name of the observing script
- And scheduling information (required conditions etc)
- Obsunit set - connection to data processing

Phase II: S tails



Phase II: Validation and Submission

As for Phase I:

- Authorization required, PI username must be used
- Phase II program must be valid - only warnings are acceptable.
- May re-submit up to the deadline
- All submissions to Santiago

After Submission

Afterwards…

- JAO & ARCs verify SBs
- May iterate with PI
- SBs Made Ready for execution
- Track progress using the ALMA Science Archive

How does an SB “execute”?

- Actual run-time sequence is determined by the Control script
- This is an Observatory Standard Script
- Some control available in the SB via the populations of the Observing Groups…
- …and cycle times for the calibrators

www.almaobservatory.org

The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA is funded in Europe by the European Organization for Astronomical Research in the Southern Hemisphere (ESO), in North America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC) and in East Asia by the National Institutes of Natural Sciences (NINS) of Japan in cooperation with the Academia Sinica (AS) in Taiwan. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI) and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction, commissioning and operation of ALMA.