An Introduction to the ALMA Observing Tool

How to turn that great idea into ALMA data..

Sarah Wood

Mark Rawlings, Harvey Liszt, Tony Remijan

Atacama Large Millimeter/submillimeter Array

Expanded Very Large Array

Robert C. Byrd Green Bank Telescope

Very Long Baseline Array

Cycle 3 Capabilities

- At least **36 x 12-m** antennas, plus **10 x 7-m** antennas (for short baselines) and **2 x 12-m** antennas (for zero-spacing)
- Receiver bands 3, 4, 6, 7, 8, 9, & 10 (wavelengths of about 3.1 to 0.35 mm)
- Baselines up to **2 km** for **Bands 8, 9 and 10,** up to **5 km** for **Band 7,** and up to **10 km** for **Bands 3, 4, & 6**
- Both single field interferometry and **mosaics** of up to **150 pointings**
- Spectral-line observations with all arrays and continuum observations with the 12-m Array and the 7-m Array. Single dish use will be limited to spectral line observations in Bands 3 to 8.
- Polarization (on-axis, continuum in Band 3, 6 and 7, no ACA, no mosaics, no spectral line, no circular polarization)
- Mixed correlator modes and multiple spectral windows (both high and low frequency resolution in the same observation)
- The **maximum** observing **time** per proposal, as estimated by the OT, is **100 hours**.

Once you have done this…

Observing Tool

The ALMA Observing Tool (OT) is a Java application used for the preparation and submission of ALMA Phase I (observing proposal) and Phase II (telescope runfiles for accepted proposals) materials. It is also used for preparing and submitting Director's Discretionary Time (DDT) proposals. The current *Cycle 1* release of the OT is configured for the Early Science Capabilities of ALMA as described in the Cycle 1 Call For Proposals. Note that in order to submit proposals you will have to register with the ALMA Science Portal beforehand.

Download & Installation

The OT will run on most common operating systems, as long as you have Java 6 installed (see the troubleshooting page if you are experiencing Java problems). The ALMA OT is available in two flavours: Web Start and tarball.

The **Web Start** application is the recommended way of using the OT. It has the advantage that the OT is automatically downloaded and installed on your computer and it will also automatically detect and install updates. There are some issues with Web Start, particularly that it does not work with the Open JDK versions of Java such as the "Iced Tea" flavour common on many modern Linux installations. The Sun/Oracle variant of Java should therefore be installed instead. If this is not possible, then the tarball installation of the OT is available.

The **tarball** version must be installed manually and will not automatically update itself, however there should be no installation issues. For Linux users, we also provide a download complete with a recommended version of the Java run time environment. Please use this if you have any problems running the OT tarball install with your default Java.

WebStart Tarball

Documentation

Extensive documentation is available to help you work with the OT and optimally prepare your proposal:

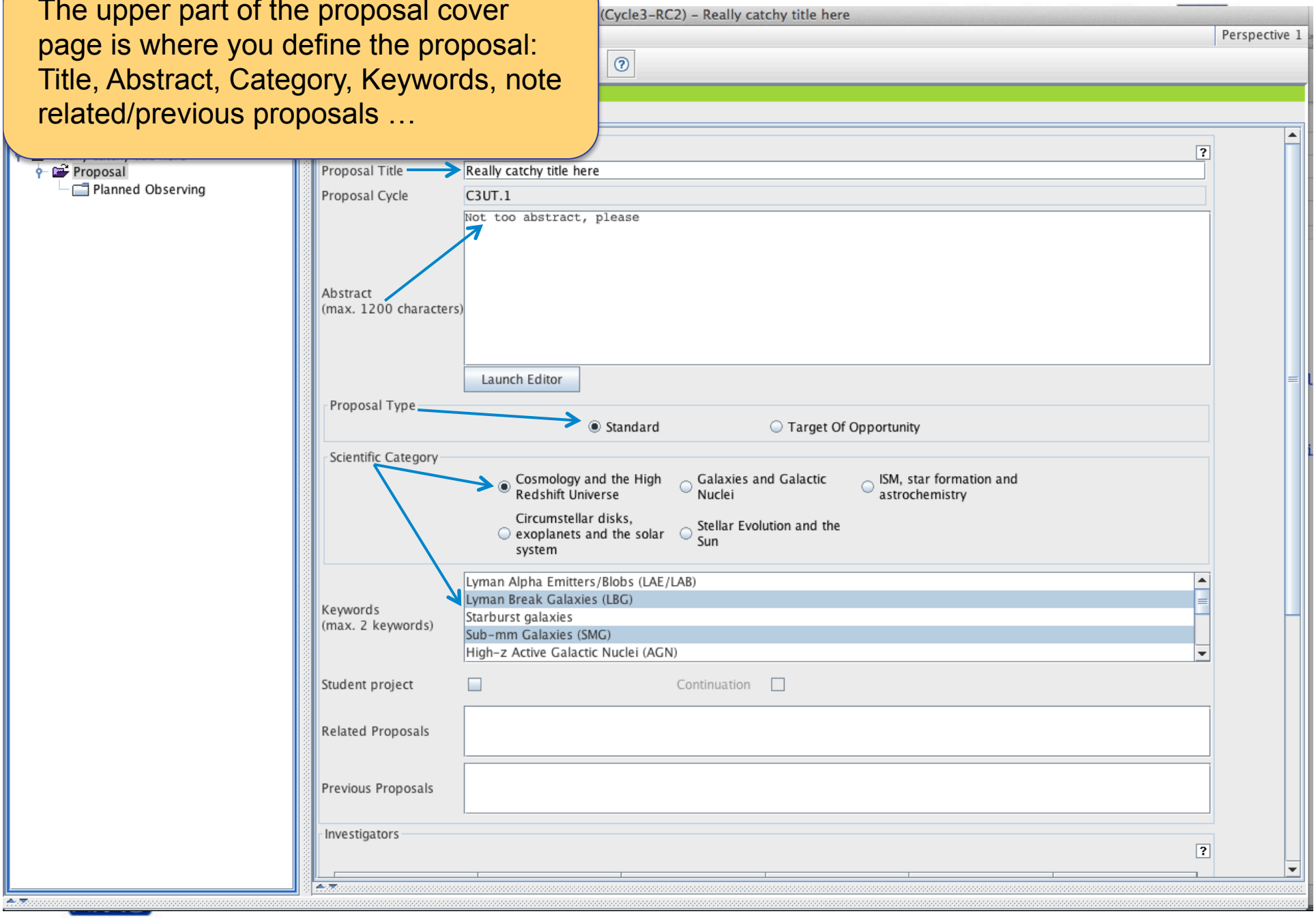
- If you are a novice OT user you should start with the OT Quickstart Guide, which takes you through the basic steps of ALMA proposal preparation.
- Audio-visual illustrations of different aspects of the OT can be found in the OT video tutorials. These are recommended for novices and advanced users alike.
- More in-depth information on the OT can be found in the User Manual, while concise explanations of all fields and menu items in the OT are given in the Reference Manual. These two documents are also available within the OT under the Help menu.

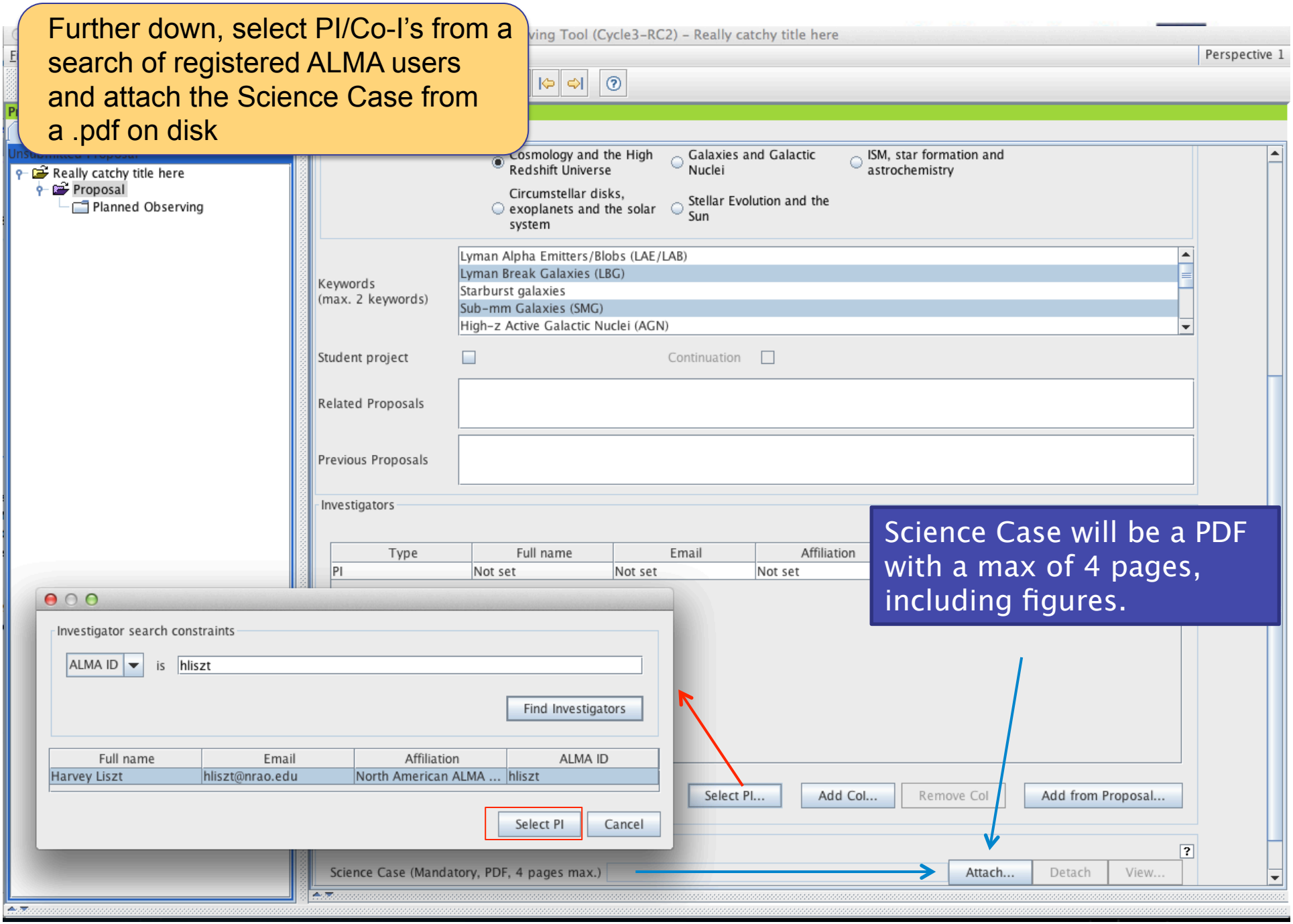
Associated Universities Inc.

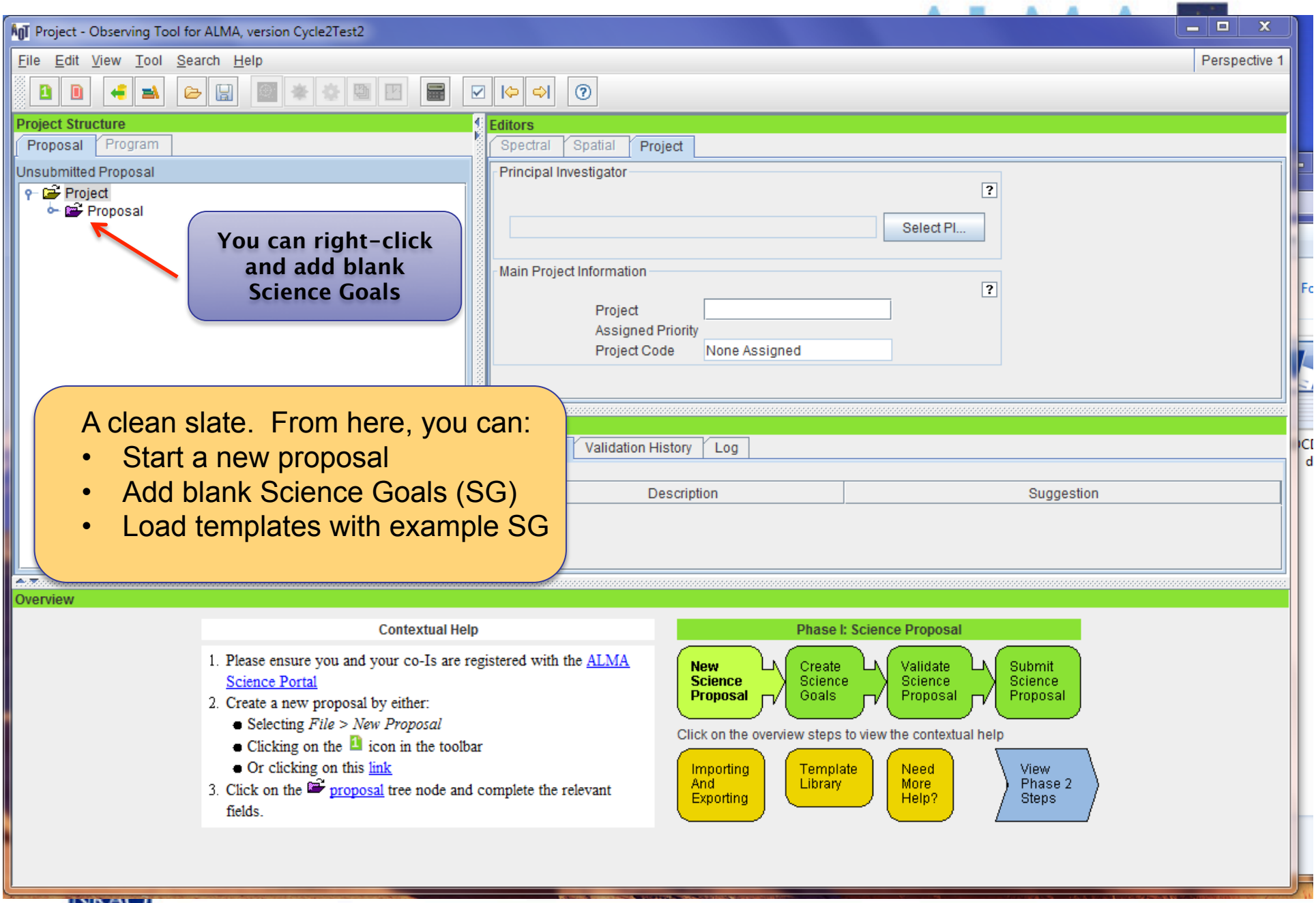
Expanded Very Large Array
Robert C. Byrd Green Bank Telescope
Very Long Baseline Array

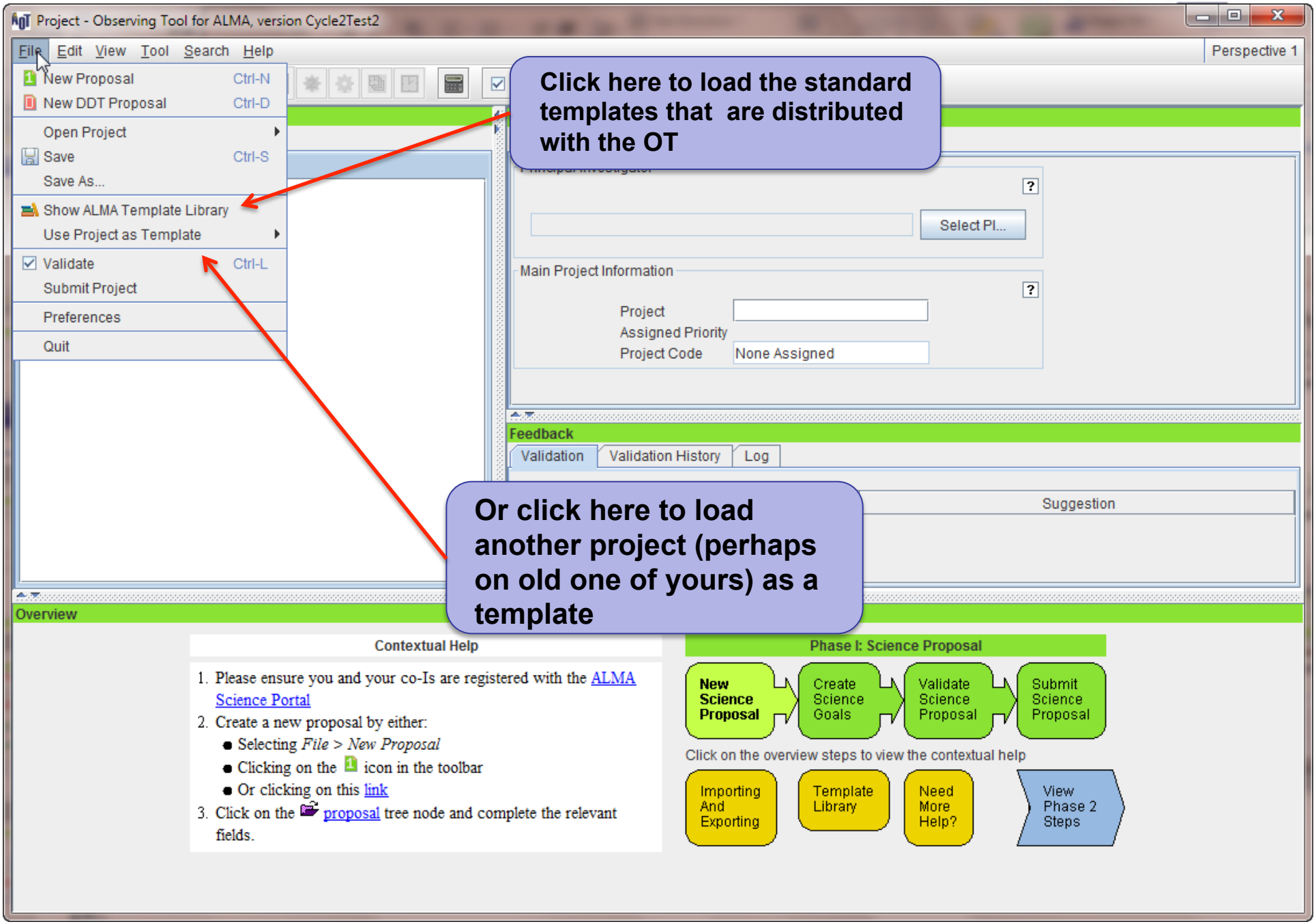
NRAO

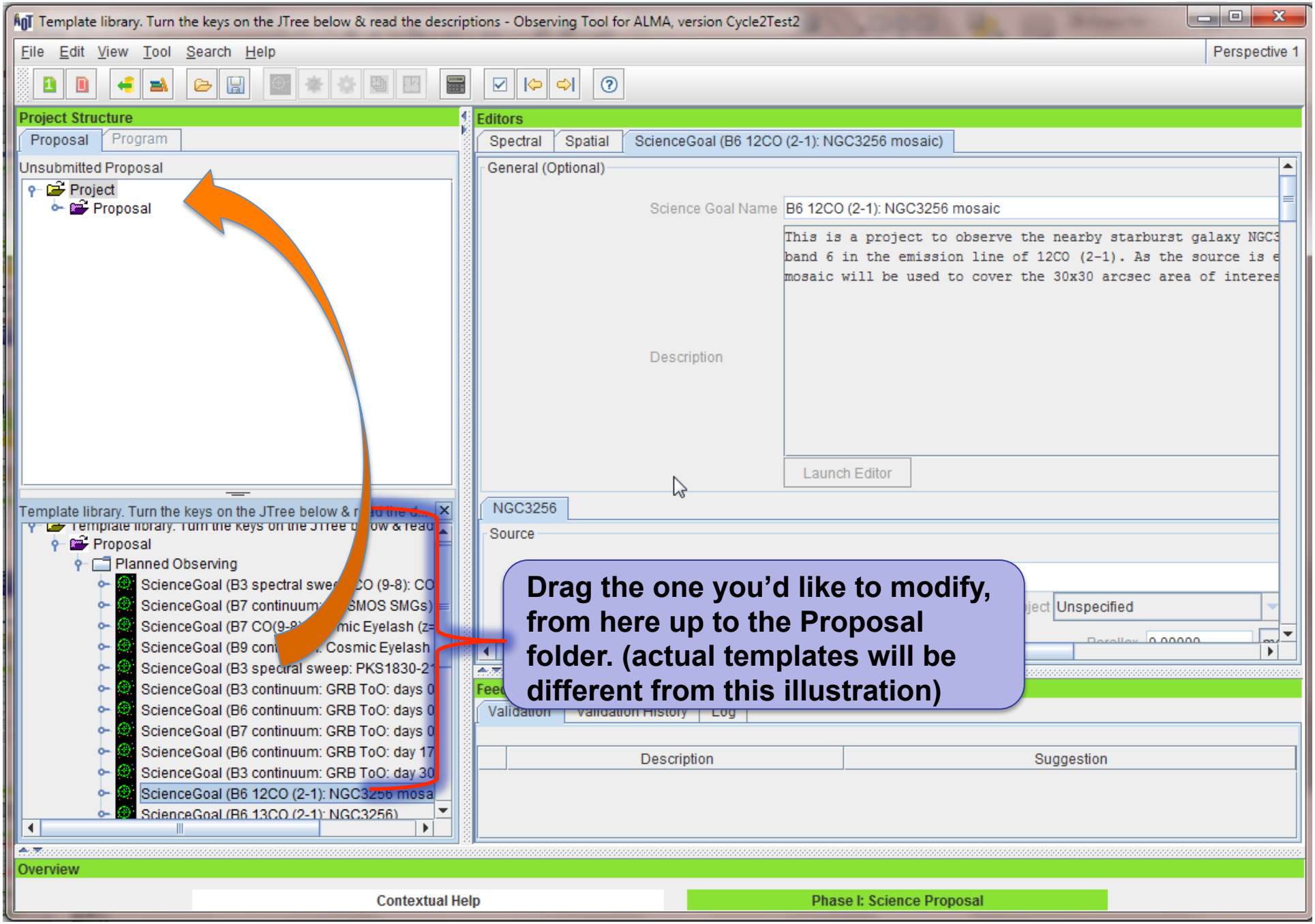
The upper part of the proposal cover page is where you define the proposal: Title, Abstract, Category, Keywords, note related/previous proposals …

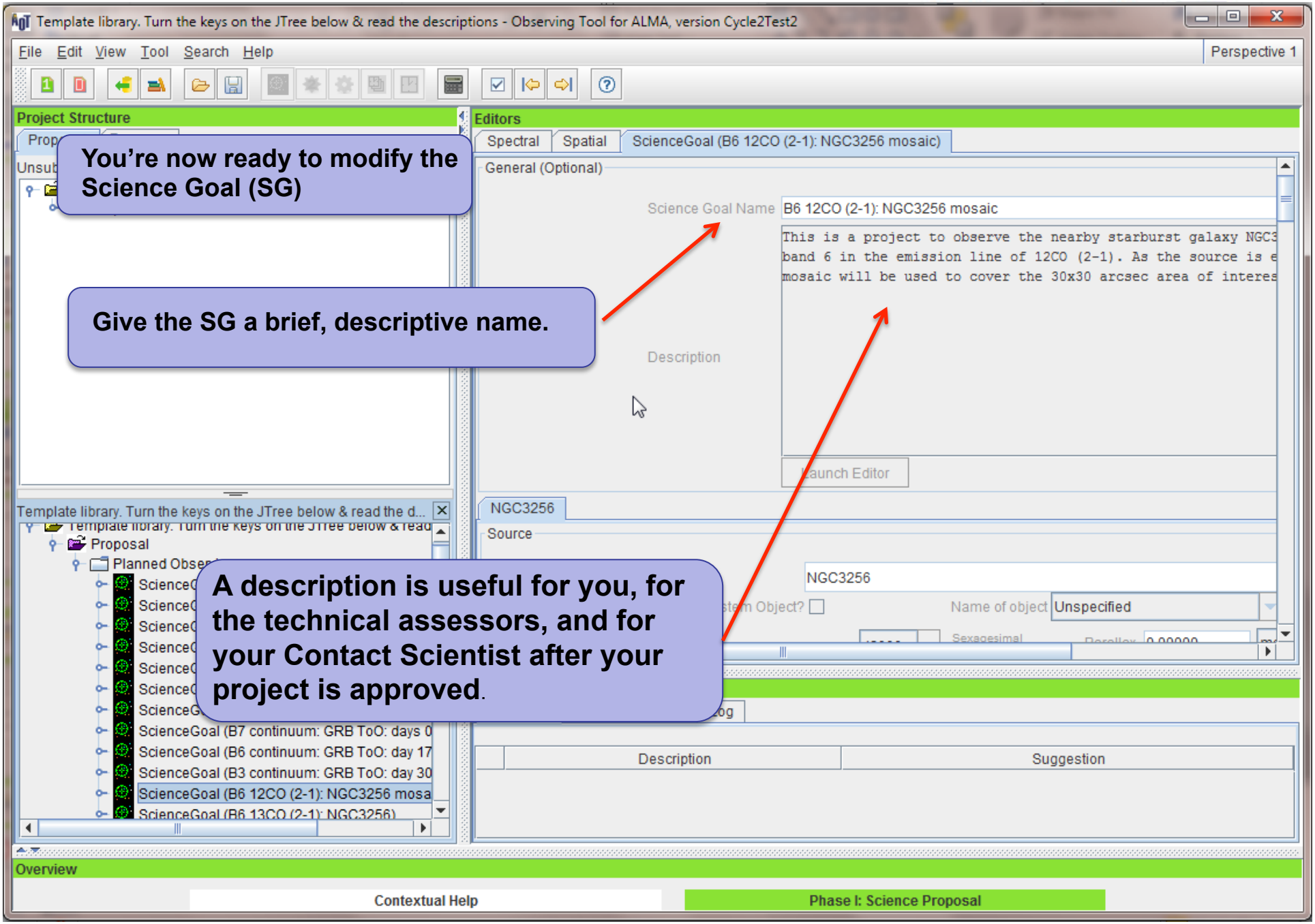


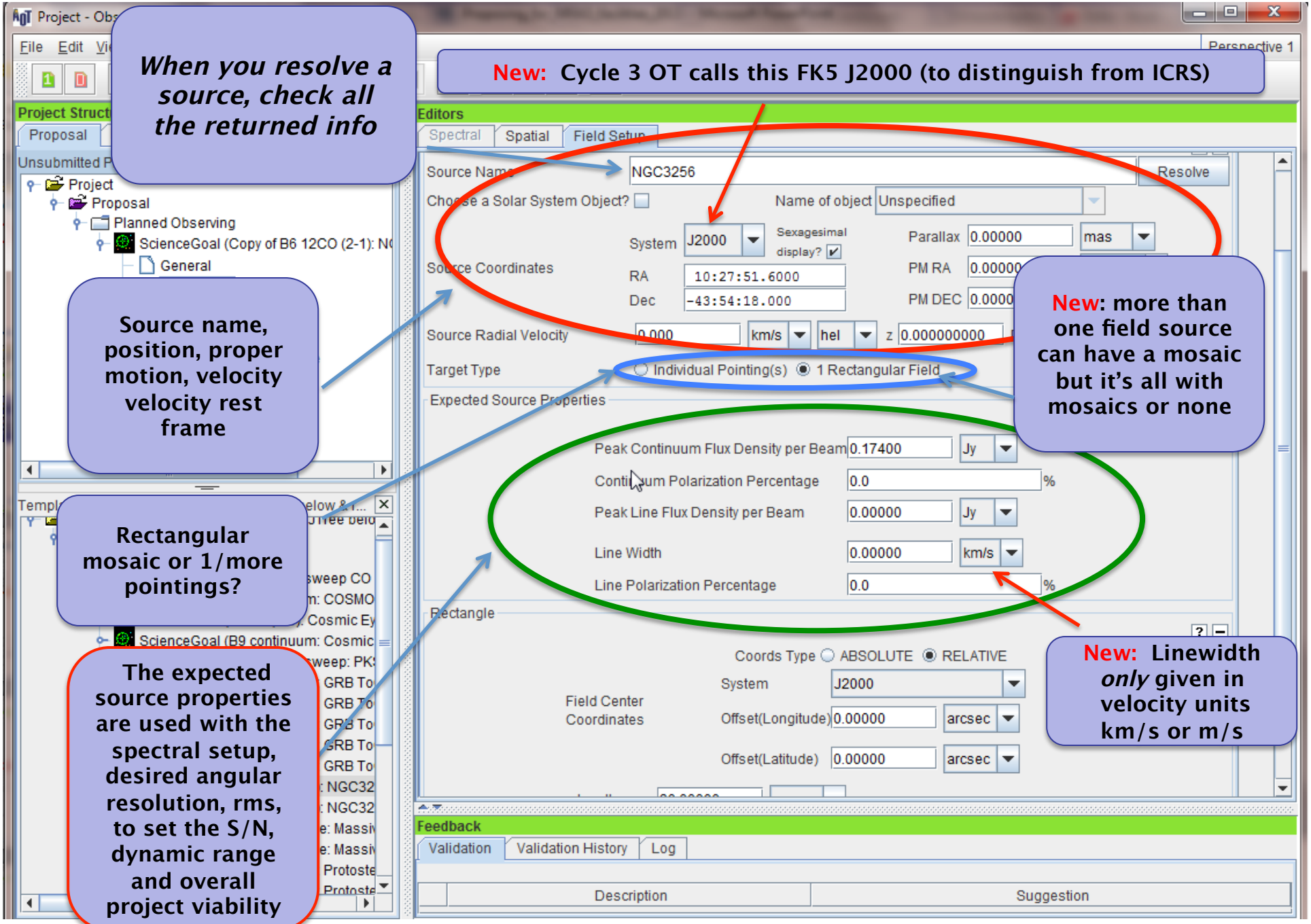

Further down, select PI/Co-I's from a search of registered ALMA users and attach the Science Case from a .pdf on disk
Really catchy title here
Proposal
Planned Observing
Cosmology and the High Redshift Universe
Galaxies and Galactic Nuclei
ISM, star formation and astrochemistry
Circumstellar disks, exoplanets and the solar system
Stellar Evolution and the Sun
Keywords (max. 2 keywords)
Lyman Alpha Emitters/Blobs (LAE/LAB)
Lyman Break Galaxies (LBG)
Starburst galaxies
Sub-mm Galaxies (SMG)
High-z Active Galactic Nuclei (AGN)
Student project
Continuation
Related Proposals
Previous Proposals
Investigators
Type
Full name
Email
Affiliation
PI
Not set
Not set
Not set
Science Case will be a PDF with a max of 4 pages, including figures.
Investigator search constraints
ALMA ID
is
hliszt
Find Investigators
Full name
Email
Affiliation
ALMA ID
Harvey Liszt
hliszt@nrao.edu
North American ALMA ...
hliszt
Select PI
Cancel
Select PI...
Add Col...
Remove Col
Add from Proposal...
Science Case (Mandatory, PDF, 4 pages max.)
Attach...
Detach
View...

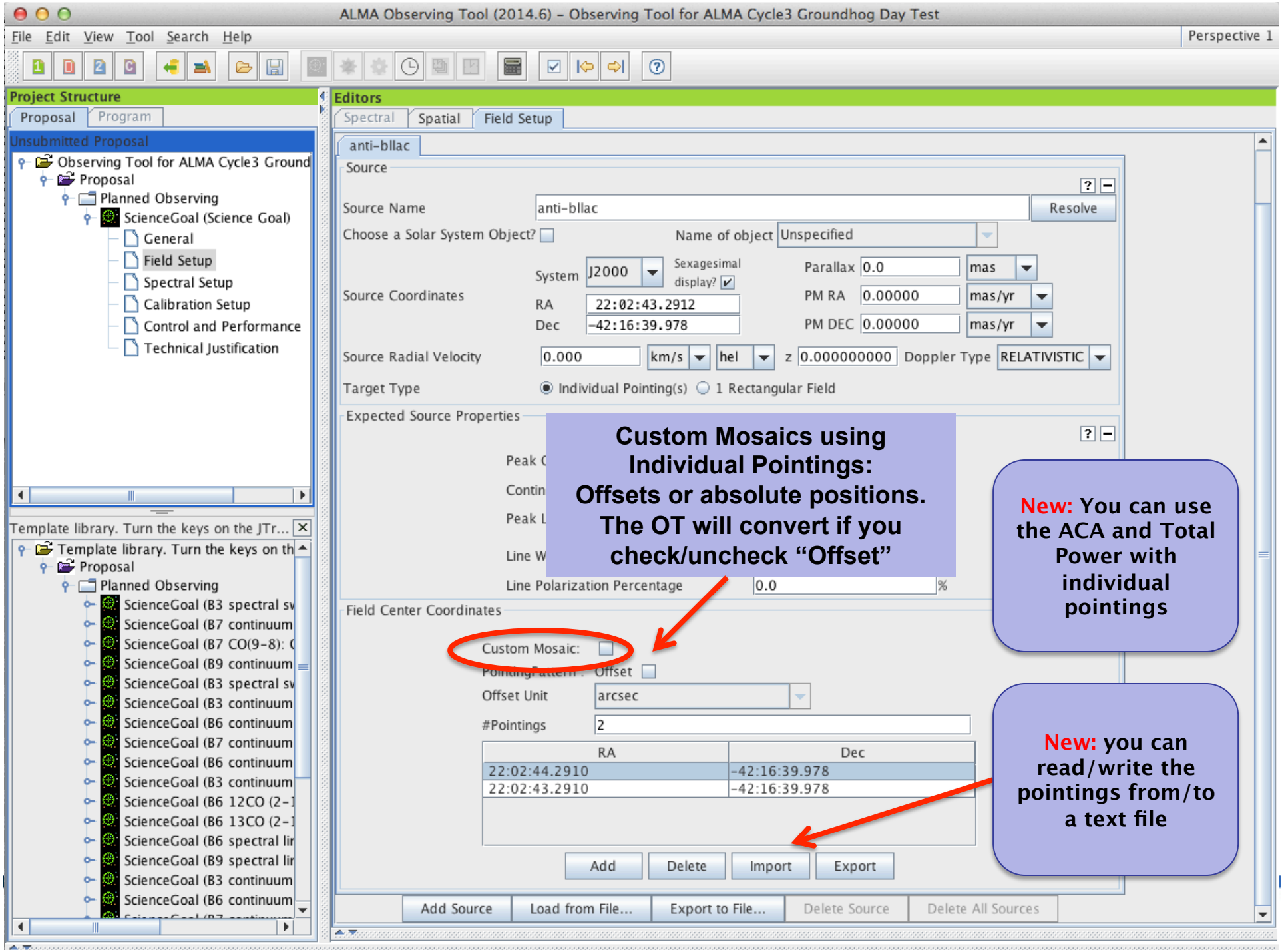

Project - Observing Tool for ALMA, version Cycle2Test2
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
You can right-click and add blank Science Goals
Editors
Spectral Spatial Project
Principal Investigator
Select PI...
Main Project Information
Project
Assigned Priority
Project Code
None Assigned
A clean slate. From here, you can:
• Start a new proposal
• Add blank Science Goals (SG)
• Load templates with example SG
Validation History Log
Description Suggestion
Overview
Contextual Help
1. Please ensure you and your co-Is are registered with the ALMA Science Portal
2. Create a new proposal by either:
● Selecting File > New Proposal
● Clicking on the icon in the toolbar
● Or clicking on this link
3. Click on the proposal tree node and complete the relevant fields.
Phase I: Science Proposal
New Science Proposal
Create Science Goals
Validate Science Proposal
Submit Science Proposal
Click on the overview steps to view the contextual help
Importing And Exporting
Template Library
Need More Help?
View Phase 2 Steps


Project - Observing Tool for ALMA, version Cycle2Test2
File Edit View Tool Search Help
Perspective 1
New Proposal Ctrl-N
New DDT Proposal Ctrl-D
Open Project
Save Ctrl-S
Save As...
Show ALMA Template Library
Use Project as Template
Validate Ctrl-L
Submit Project
Preferences
Quit
Click here to load the standard templates that are distributed with the OT
Select PI...
Main Project Information
Project
Assigned Priority
Project Code
None Assigned
Feedback
Validation
Validation History
Log
Suggestion
Or click here to load another project (perhaps on old one of yours) as a template
Overview
Contextual Help
1. Please ensure you and your co-Is are registered with the ALMA Science Portal
2. Create a new proposal by either:
● Selecting File > New Proposal
● Clicking on the icon in the toolbar
● Or clicking on this link
3. Click on the proposal tree node and complete the relevant fields.
Phase I: Science Proposal
New Science Proposal
Create Science Goals
Validate Science Proposal
Submit Science Proposal
Click on the overview steps to view the contextual help
Importing And Exporting
Template Library
Need More Help?
View Phase 2 Steps

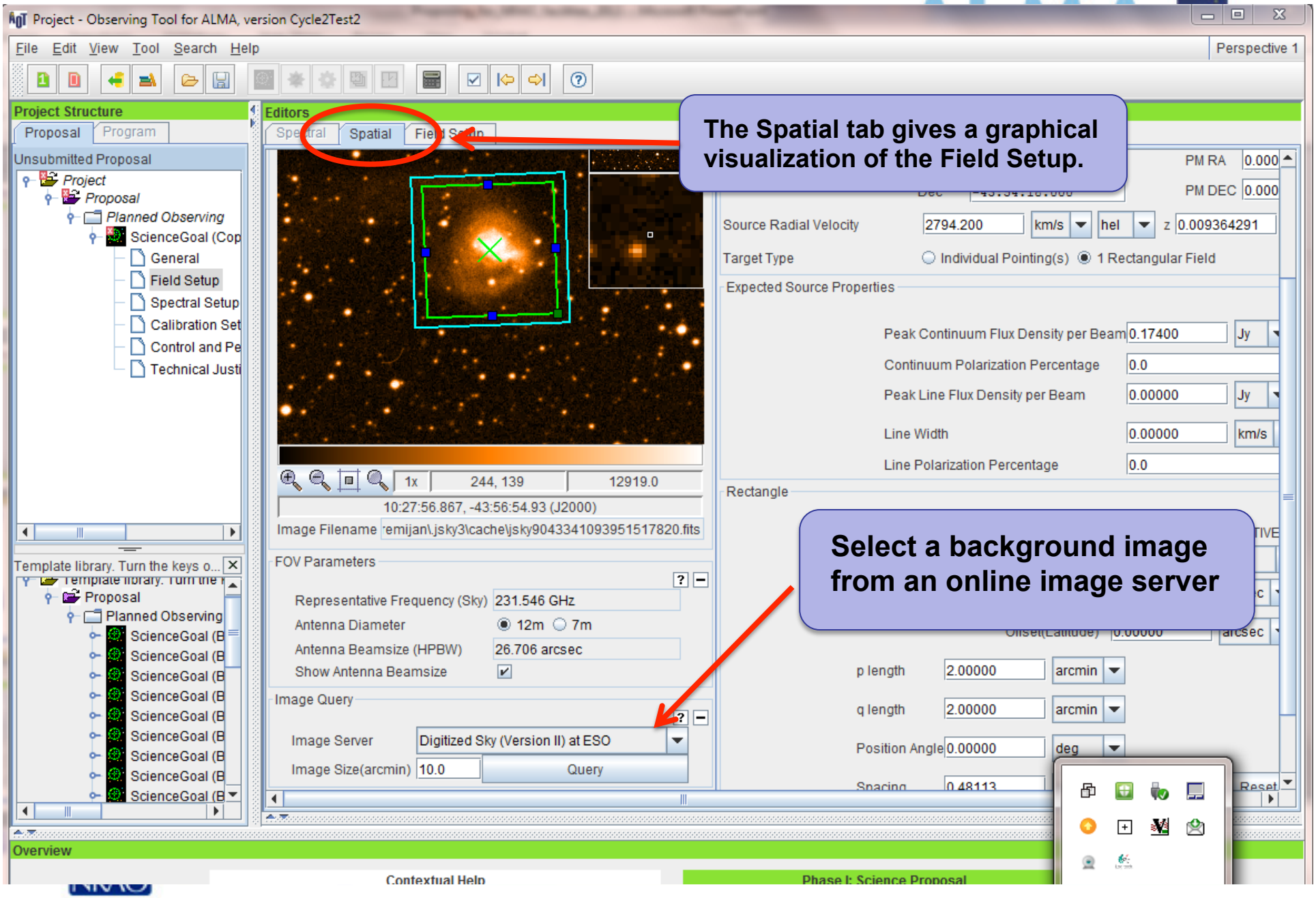

Template library. Turn the keys on the JTree below & read the descriptions - Observing Tool for ALMA, version Cycle2Test2
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Editors
Spectral Spatial ScienceGoal (B6 12CO (2-1): NGC3256 mosaic)
General (Optional)
Science Goal Name B6 12CO (2-1): NGC3256 mosaic
This is a project to observe the nearby starburst galaxy NGC3
band 6 in the emission line of 12CO (2-1). As the source is e
mosaic will be used to cover the 30x30 arcsec area of interes
Description
Launch Editor
NGC3256
Source
Unspecified
Template library. Turn the keys on the JTree below & read the d
Proposal
Planned Observing
ScienceGoal (B3 spectral swee CO (9-8): CO
ScienceGoal (B7 continuum: SMOS SMGs)
ScienceGoal (B7 CO(9-8): mic Eyelash (z=
ScienceGoal (B9 cont: Cosmic Eyelash
ScienceGoal (B3 spectral sweep: PKS1830-21
ScienceGoal (B3 continuum: GRB ToO: days 0
ScienceGoal (B6 continuum: GRB ToO: days 0
ScienceGoal (B7 continuum: GRB ToO: days 0
ScienceGoal (B6 continuum: GRB ToO: day 17
ScienceGoal (B3 continuum: GRB ToO: day 30
ScienceGoal (B6 12CO (2-1): NGC3256 mosa
ScienceGoal (B6 13CO (2-1): NGC3256)
Drag the one you'd like to modify, from here up to the Proposal folder. (actual templates will be different from this illustration)
Validation Validation History Log
Description
Suggestion
Overview
Contextual Help
Phase I: Science Proposal


You're now ready to modify the Science Goal (SG)
Give the SG a brief, descriptive name.
A description is useful for you, for the technical assessors, and for your Contact Scientist after your project is approved.
Template library. Turn the keys on the JTree below & read the descriptions - Observing Tool for ALMA, version Cycle2Test2
File Edit View Tool Search Help
Perspective 1
Project Structure
Editors
Spectral
Spatial
ScienceGoal (B6 12CO (2-1): NGC3256 mosaic)
General (Optional)
Science Goal Name
B6 12CO (2-1): NGC3256 mosaic
This is a project to observe the nearby starburst galaxy NGC3
band 6 in the emission line of 12CO (2-1). As the source is e
mosaic will be used to cover the 30x30 arcsec area of interes
Description
Launch Editor
NGC3256
Source
NGC3256
Name of object
Unspecified
Proposal
ScienceGoal (B7 continuum: GRB ToO: days 0
ScienceGoal (B6 continuum: GRB ToO: day 17
ScienceGoal (B3 continuum: GRB ToO: day 30
ScienceGoal (B6 12CO (2-1): NGC3256 mosa
Description
Suggestion
Overview
Contextual Help
Phase I: Science Proposal

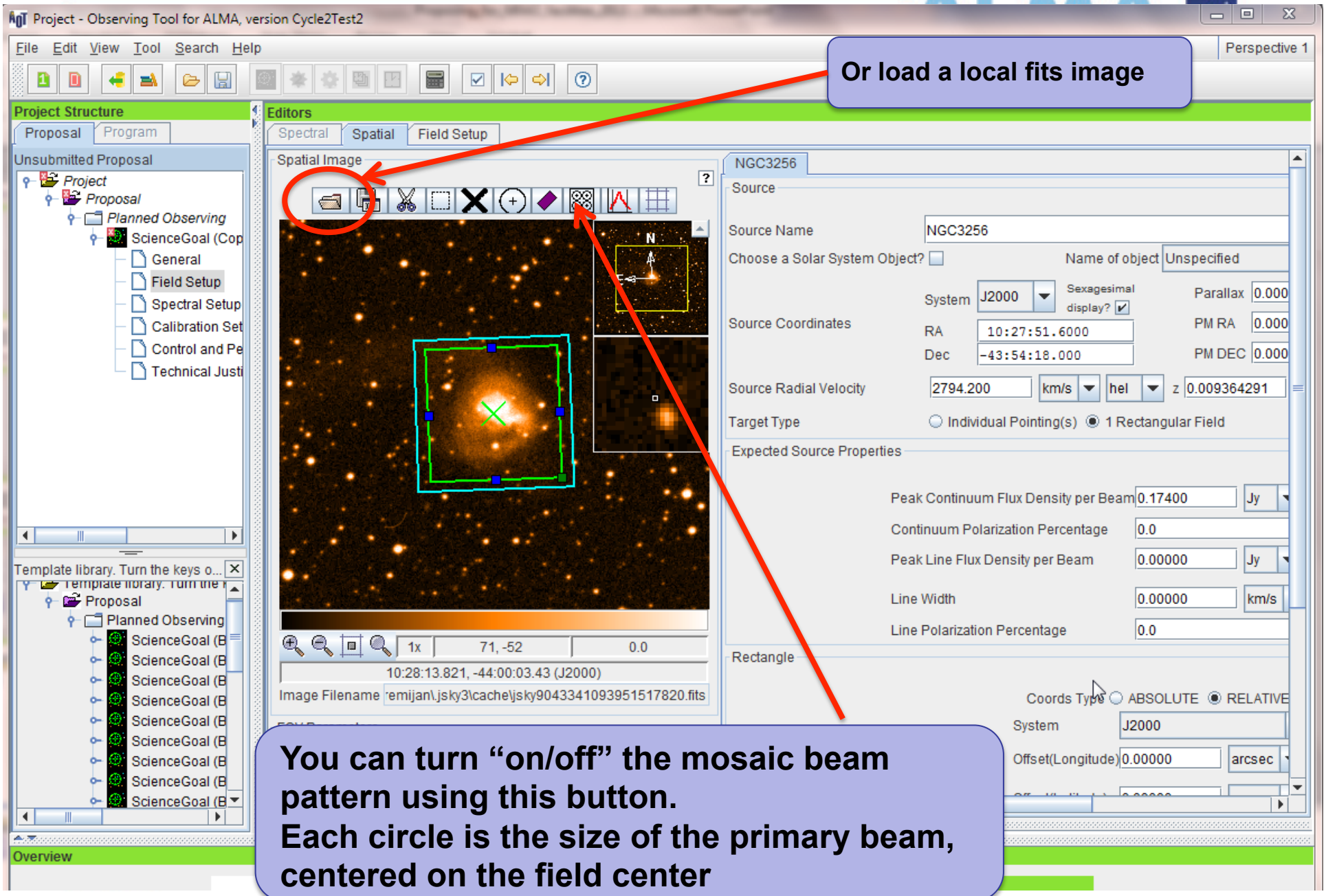

When you resolve a source, check all the returned info
New: Cycle 3 OT calls this FK5 J2000 (to distinguish from ICRS)
Source name, position, proper motion, velocity velocity rest frame
Rectangular mosaic or 1/more pointings?
The expected source properties are used with the spectral setup, desired angular resolution, rms, to set the S/N, dynamic range and overall project viability
New: more than one field source can have a mosaic but it's all with mosaics or none
New: Linewidth only given in velocity units km/s or m/s
File Edit
Perspective 1
Project Structure
Proposal
Unsubmitted P
Project
Proposal
Planned Observing
ScienceGoal (Copy of B6 12CO (2-1): N
General
Editors
Spectral
Spatial
Field Setup
Source Name
NGC3256
Resolve
Choose a Solar System Object?
Name of object
Unspecified
System
J2000
Sexagesimal display?
Parallax
0.00000
mas
Source Coordinates
RA
10:27:51.6000
PM RA
0.00000
Dec
-43:54:18.000
PM DEC
0.0000
Source Radial Velocity
0.000
km/s
hel
z
0.000000000
Target Type
Individual Pointing(s)
1 Rectangular Field
Expected Source Properties
Peak Continuum Flux Density per Beam
0.17400
Jy
Continuum Polarization Percentage
0.0
%
Peak Line Flux Density per Beam
0.00000
Jy
Line Width
0.00000
km/s
Line Polarization Percentage
0.0
%
Rectangle
Coords Type
ABSOLUTE
RELATIVE
System
J2000
Field Center Coordinates
Offset(Longitude)
0.00000
arcsec
Offset(Latitude)
0.00000
arcsec
Feedback
Validation
Validation History
Log
Description
Suggestion


ALMA Observing Tool (2014.6) – Observing Tool for ALMA Cycle3 Groundhog Day Test
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Observing Tool for ALMA Cycle3 Ground
Proposal
Planned Observing
ScienceGoal (Science Goal)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Template library. Turn the keys on the JTr...
Template library. Turn the keys on th
Proposal
Planned Observing
ScienceGoal (B3 spectral sv
ScienceGoal (B7 continuum
ScienceGoal (B7 CO(9-8): (
ScienceGoal (B9 continuum
ScienceGoal (B3 spectral sv
ScienceGoal (B3 continuum
ScienceGoal (B6 continuum
ScienceGoal (B7 continuum
ScienceGoal (B6 continuum
ScienceGoal (B3 continuum
ScienceGoal (B6 12CO (2-1
ScienceGoal (B6 13CO (2-1
ScienceGoal (B6 spectral lir
ScienceGoal (B9 spectral lir
ScienceGoal (B3 continuum
ScienceGoal (B6 continuum
Editors
Spectral Spatial Field Setup
anti-bllac
Source
Source Name anti-bllac Resolve
Choose a Solar System Object? Name of object Unspecified
Source Coordinates System J2000 Sexagesimal display?
RA 22:02:43.2912
Dec -42:16:39.978
Parallax 0.0 mas
PM RA 0.00000 mas/yr
PM DEC 0.00000 mas/yr
Source Radial Velocity 0.000 km/s hel z 0.000000000 Doppler Type RELATIVISTIC
Target Type Individual Pointing(s) 1 Rectangular Field
Expected Source Properties
Peak
Contin
Peak L
Line W
Line Polarization Percentage 0.0 %
Field Center Coordinates
Custom Mosaic:
Offset
Offset Unit arcsec
#Pointings 2
RA Dec
22:02:44.2910 -42:16:39.978
22:02:43.2910 -42:16:39.978
Add Delete Import Export
Add Source Load from File... Export to File... Delete Source Delete All Sources
Custom Mosaics using Individual Pointings: Offsets or absolute positions. The OT will convert if you check/uncheck “Offset”
New: You can use the ACA and Total Power with individual pointings
New: you can read/write the pointings from/to a text file

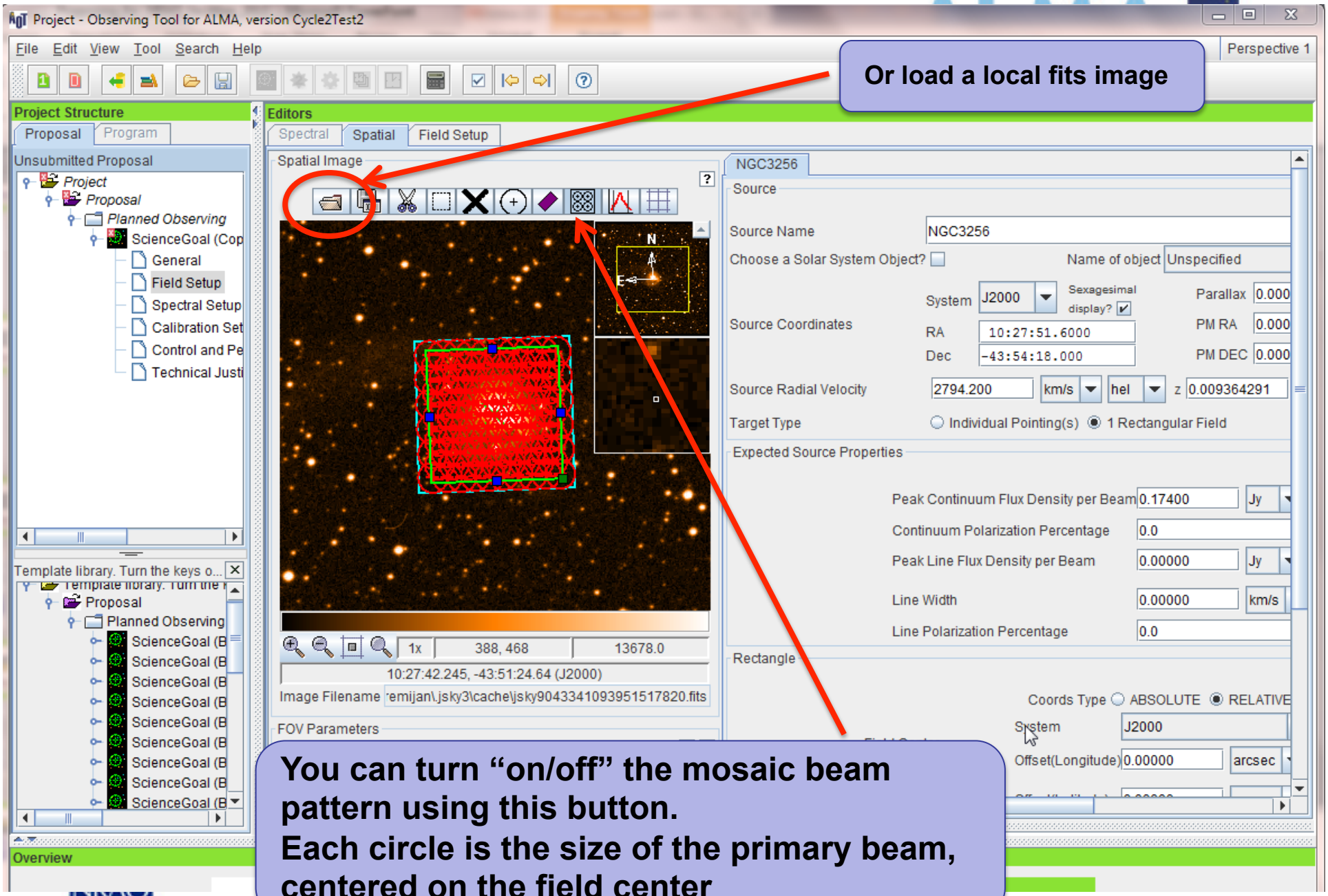
New: Put a mosaic around more than one field source



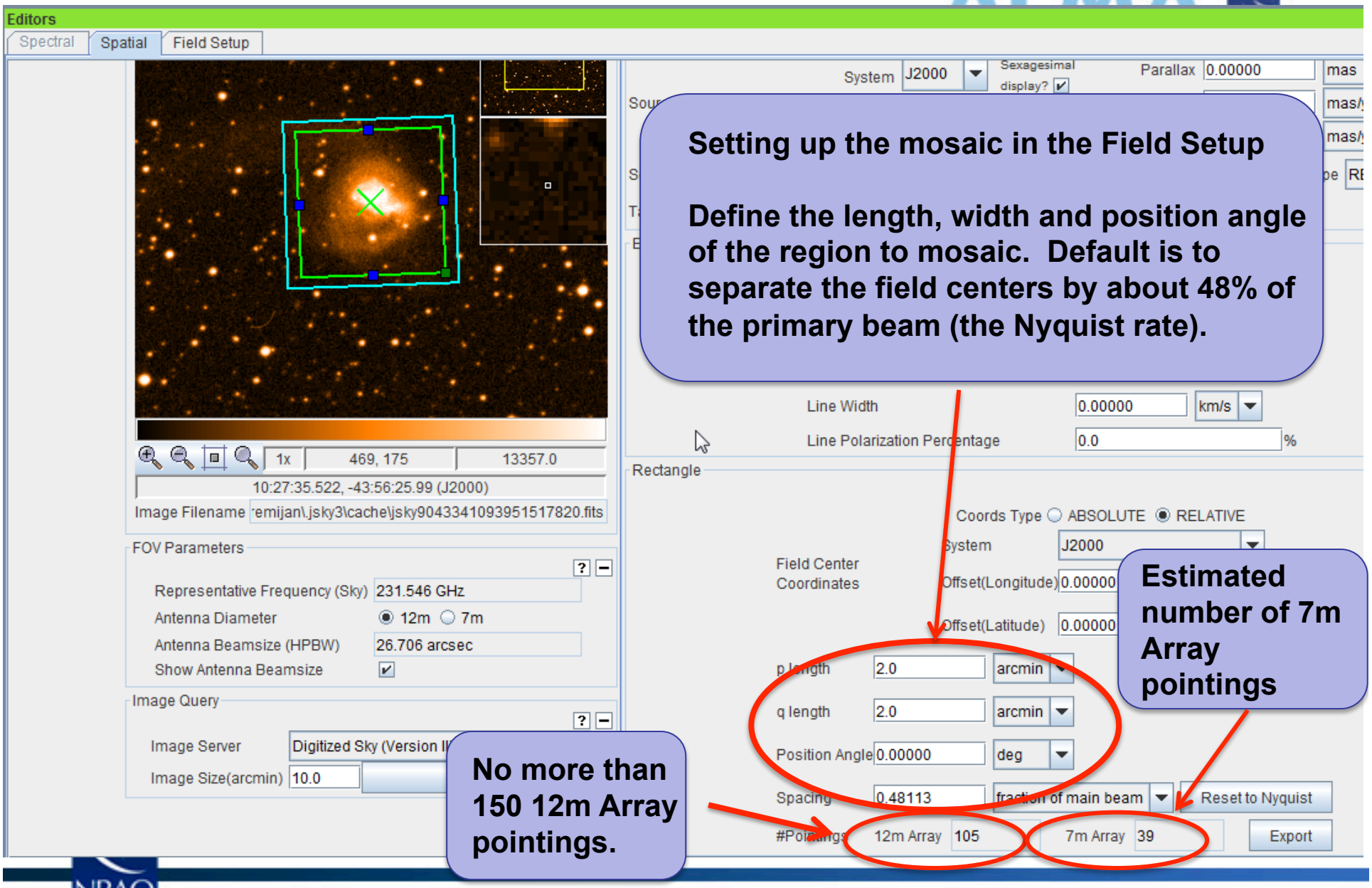
New: Put a mosaic around more than one field source

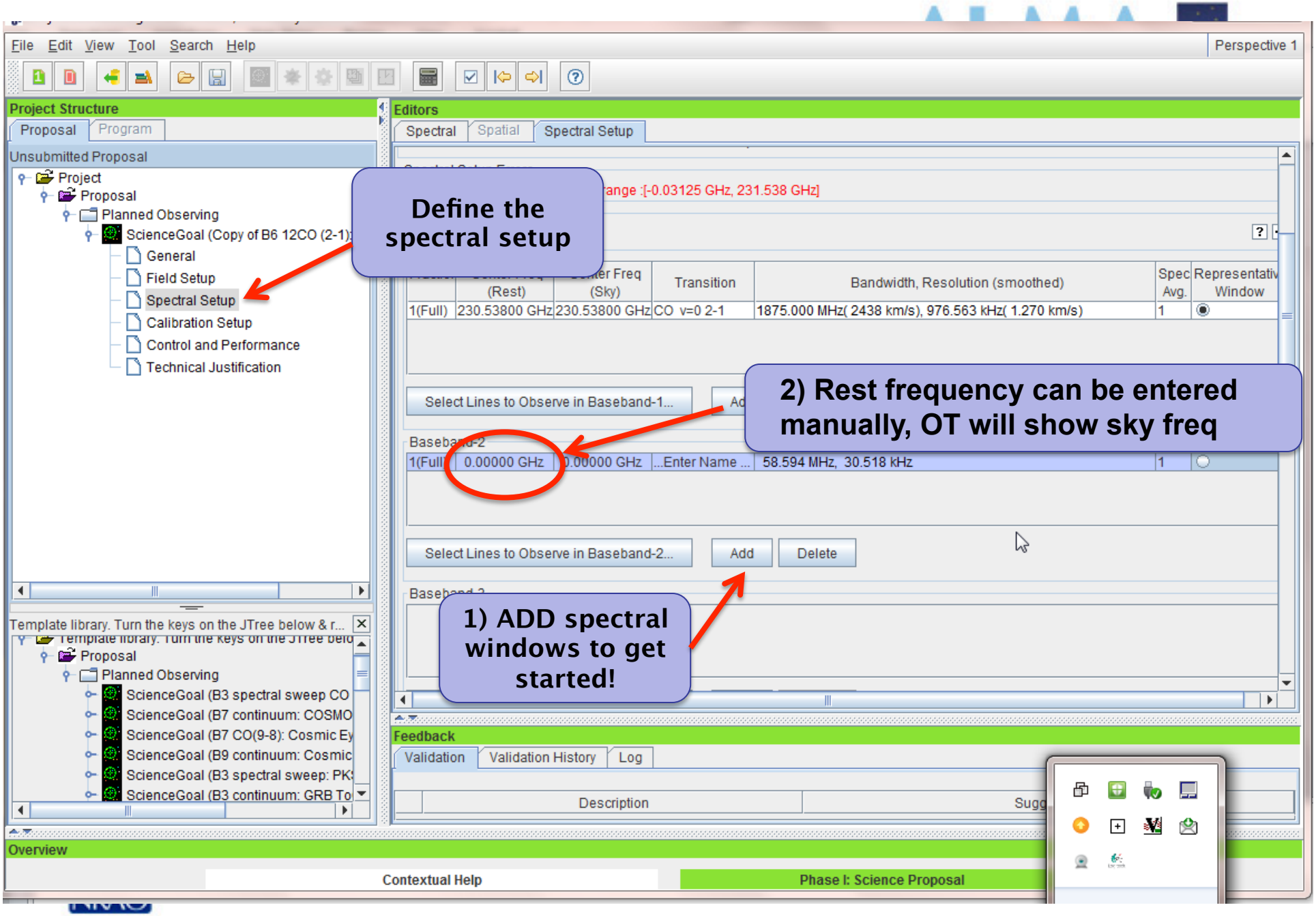


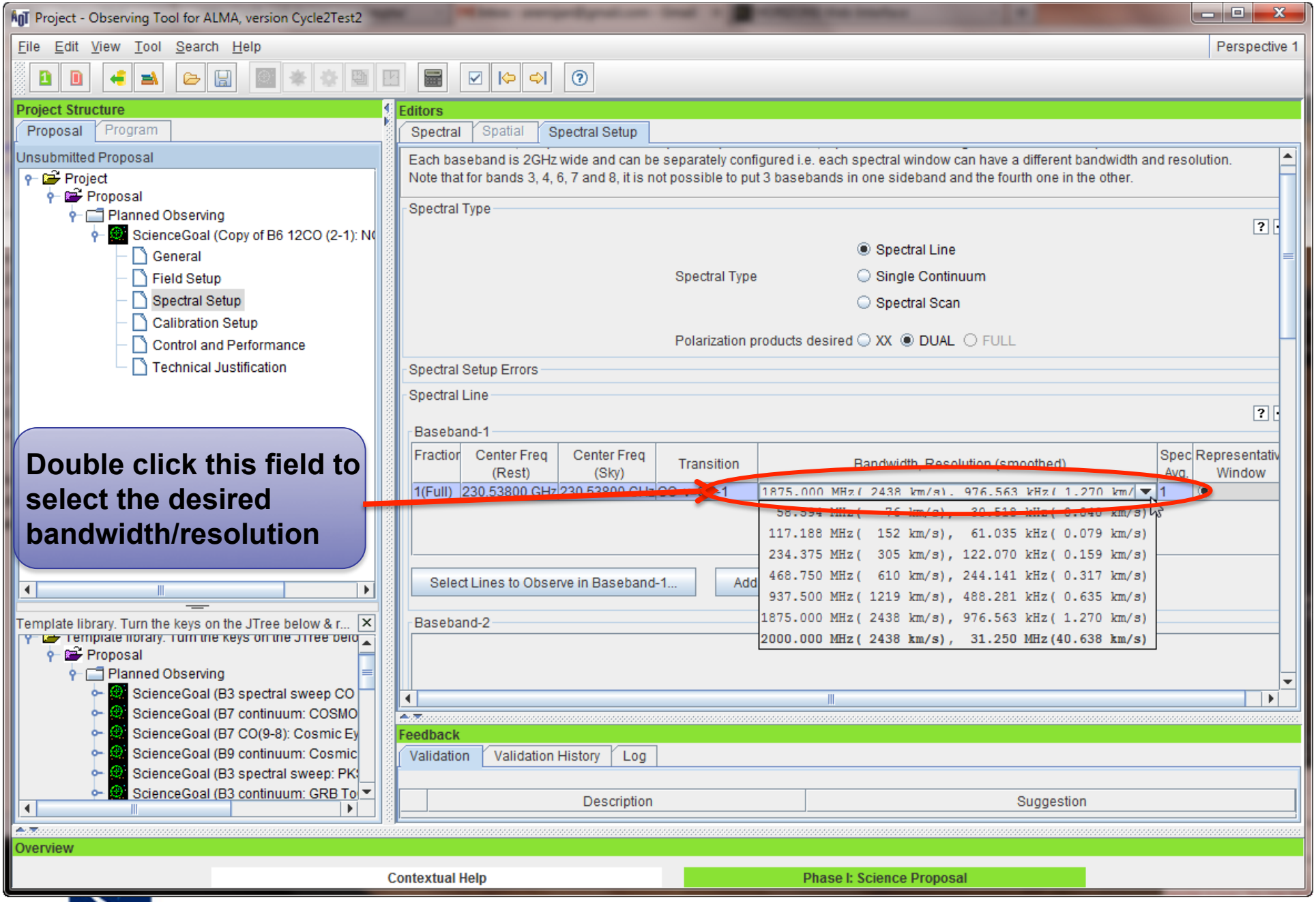
New: Put a mosaic around more than one field source



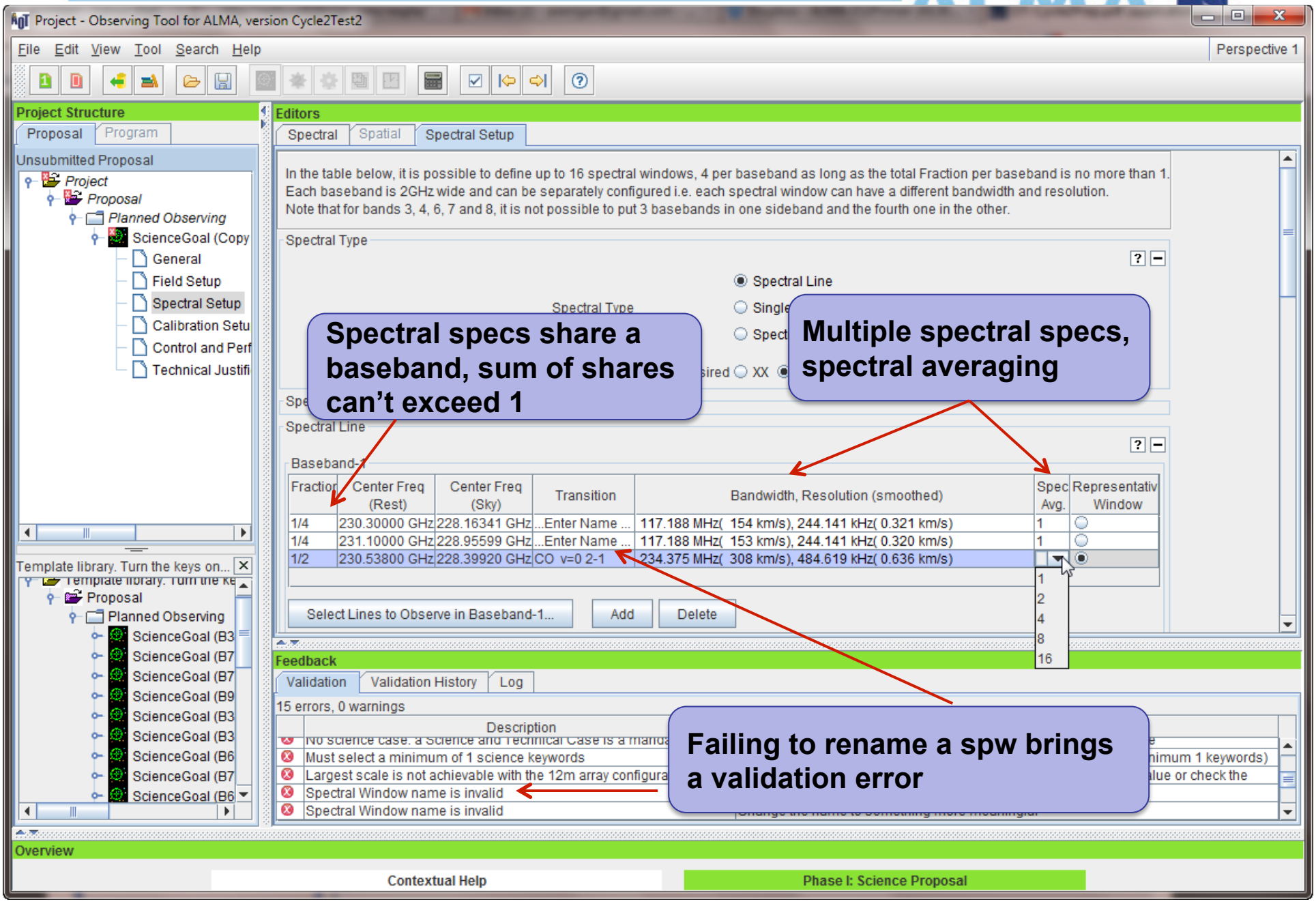
New: Put a mosaic around more than one field source

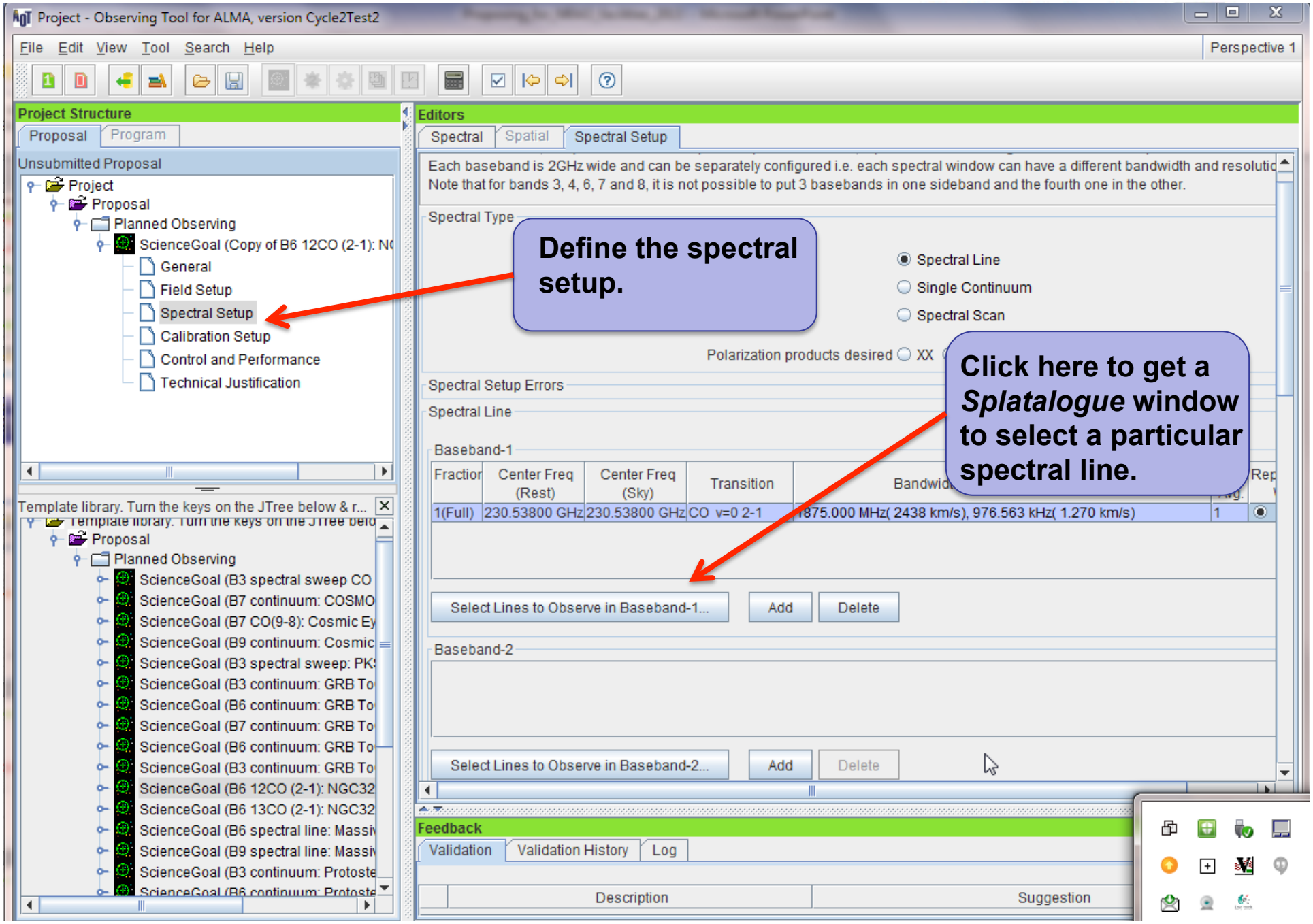


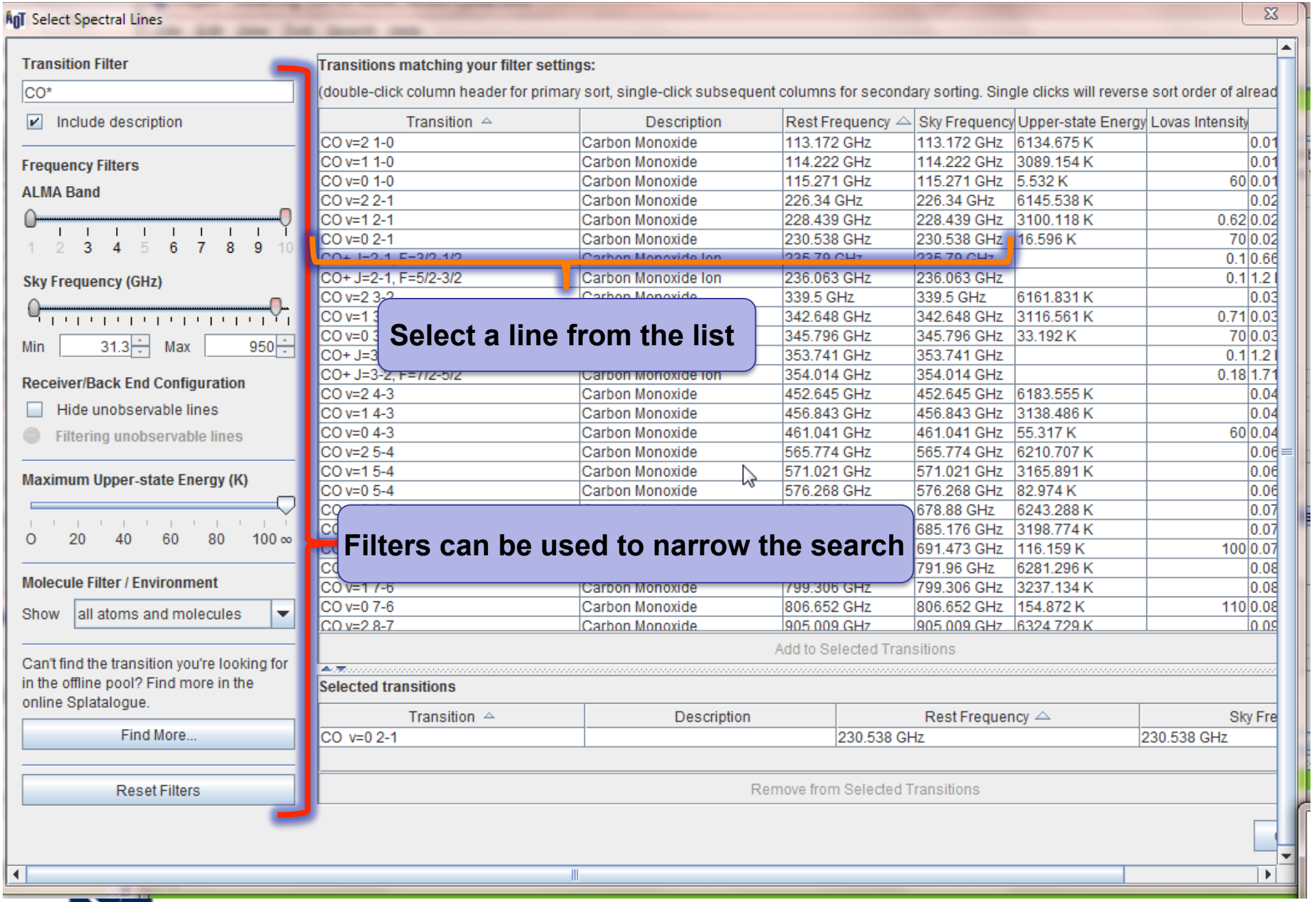

File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (Copy of B6 12CO (2-1)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Define the spectral setup
Editors
Spectral Spatial Spectral Setup
Transition
Bandwidth, Resolution (smoothed)
Spec Avg.
Representativ Window
1(Full) 230.53800 GHz 230.53800 GHz CO v=0 2-1 1875.000 MHz(2438 km/s), 976.563 kHz(1.270 km/s) 1
Select Lines to Observe in Baseband-1...
2) Rest frequency can be entered manually, OT will show sky freq
0.00000 GHz
...Enter Name ...
58.594 MHz, 30.518 kHz
Select Lines to Observe in Baseband-2...
Add
Delete
1) ADD spectral windows to get started!
Template library. Turn the keys on the JTree below & r...
Proposal
Planned Observing
ScienceGoal (B3 spectral sweep CO
ScienceGoal (B7 continuum: COSMO
ScienceGoal (B7 CO(9-8): Cosmic Ey
ScienceGoal (B9 continuum: Cosmic
ScienceGoal (B3 spectral sweep: PK
ScienceGoal (B3 continuum: GRB To
Feedback
Validation Validation History Log
Description
Overview
Contextual Help
Phase I: Science Proposal

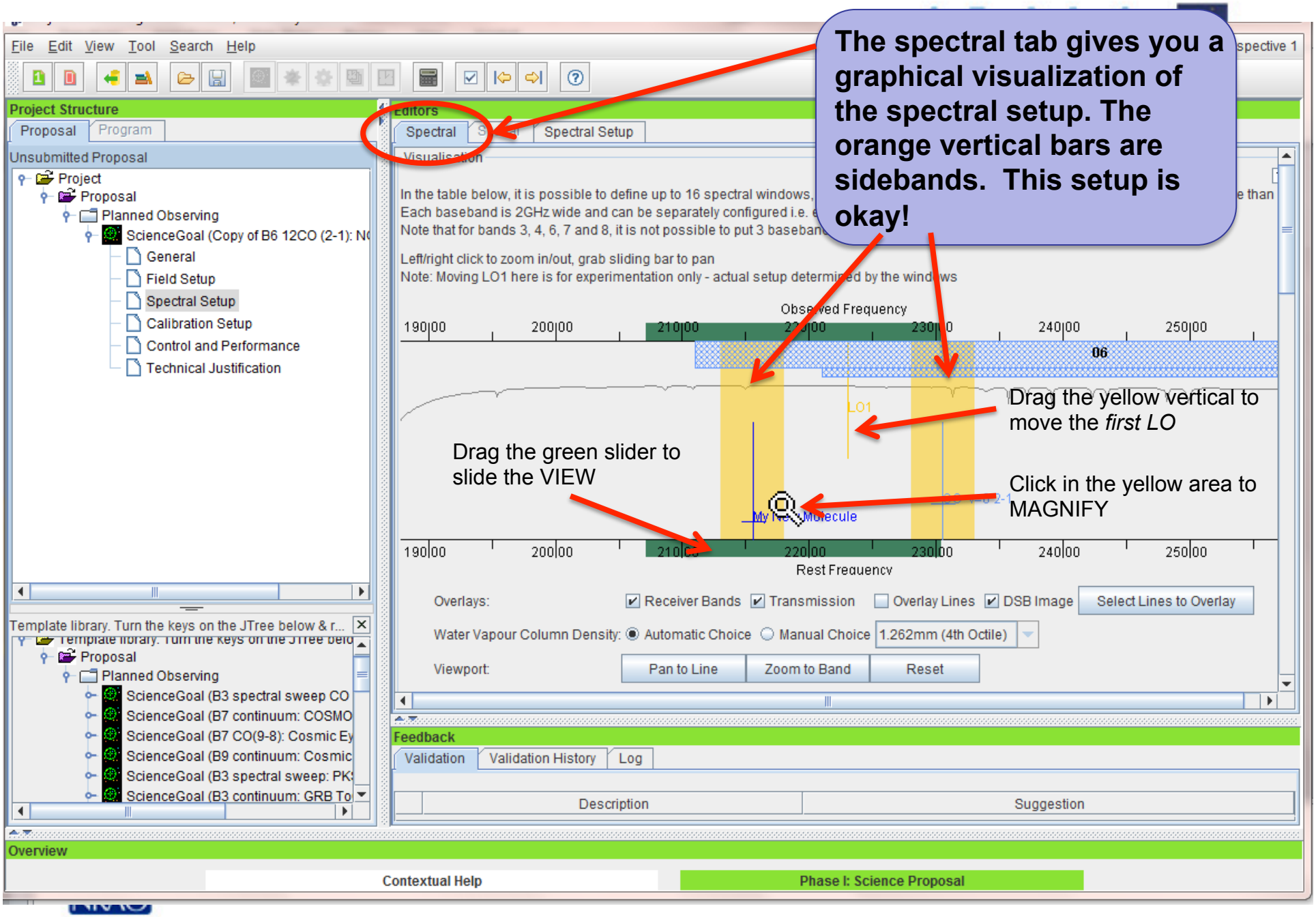

Project - Observing Tool for ALMA, version Cycle2Test2
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (Copy of B6 12CO (2-1): N
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Double click this field to select the desired bandwidth/resolution
Template library. Turn the keys on the JTree below & r...
Proposal
Planned Observing
ScienceGoal (B3 spectral sweep CO
ScienceGoal (B7 continuum: COSMO
ScienceGoal (B7 CO(9-8): Cosmic Ey
ScienceGoal (B9 continuum: Cosmic
ScienceGoal (B3 spectral sweep: PK
ScienceGoal (B3 continuum: GRB To
Editors
Spectral Spatial Spectral Setup
Each baseband is 2GHz wide and can be separately configured i.e. each spectral window can have a different bandwidth and resolution.
Note that for bands 3, 4, 6, 7 and 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.
Spectral Type
Spectral Type
Spectral Line
Single Continuum
Spectral Scan
Polarization products desired XX DUAL FULL
Spectral Setup Errors
Spectral Line
Baseband-1
Fraction
Center Freq (Rest)
Center Freq (Sky)
Transition
Bandwidth, Resolution (smoothed)
Spec Avg.
Representativ Window
1(Full)
230.53800 GHz
1
1875.000 MHz(2438 km/s), 976.563 kHz(1.270 km/
1
117.188 MHz(152 km/s), 61.035 kHz(0.079 km/s)
234.375 MHz(305 km/s), 122.070 kHz(0.159 km/s)
468.750 MHz(610 km/s), 244.141 kHz(0.317 km/s)
937.500 MHz(1219 km/s), 488.281 kHz(0.635 km/s)
1875.000 MHz(2438 km/s), 976.563 kHz(1.270 km/s)
2000.000 MHz(2438 km/s), 31.250 MHz(40.638 km/s)
Select Lines to Observe in Baseband-1...
Baseband-2
Feedback
Validation Validation History Log
Description
Suggestion
Overview
Contextual Help
Phase I: Science Proposal

NRAO

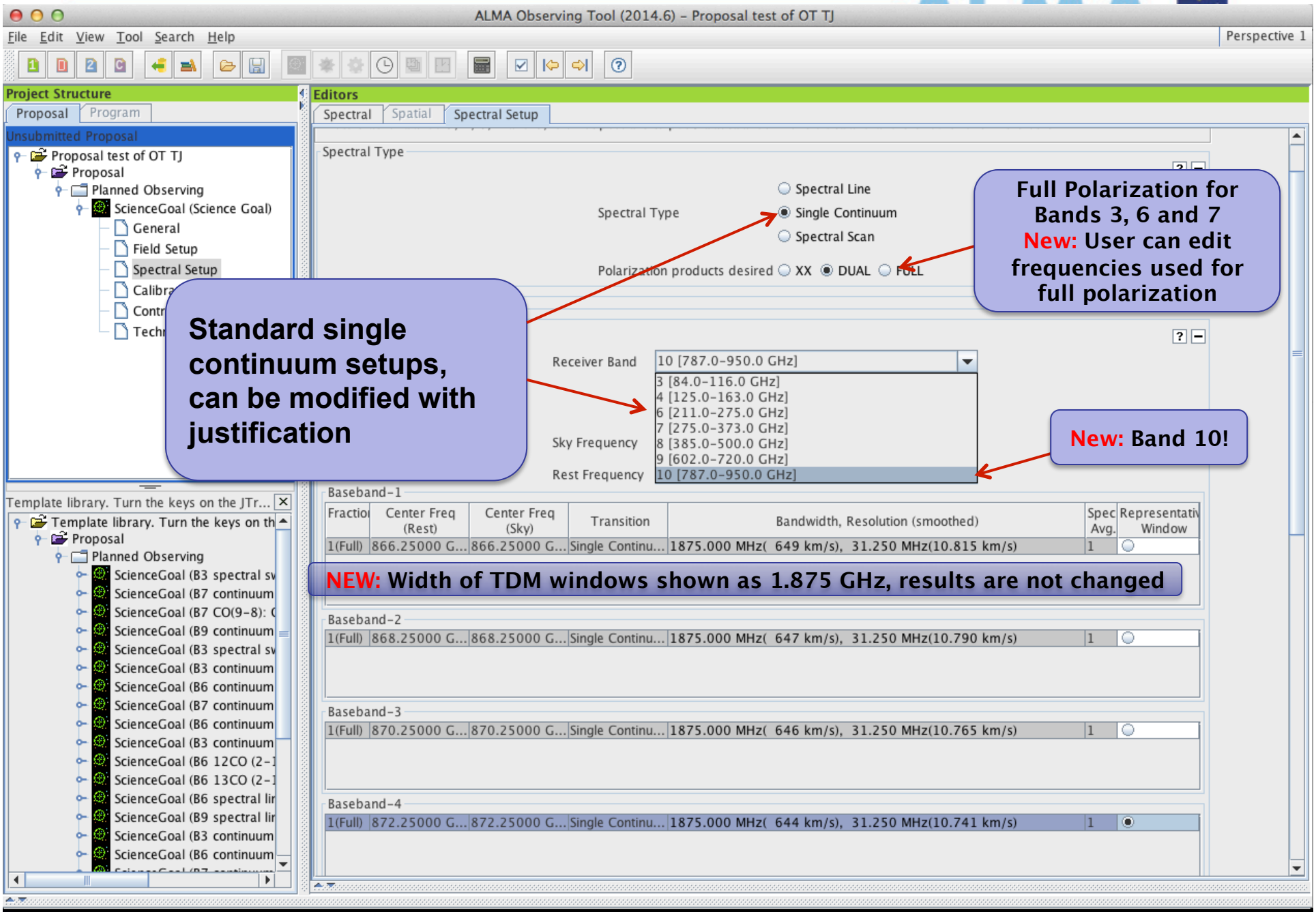

Project - Observing Tool for ALMA, version Cycle2Test2
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (Copy
General
Field Setup
Spectral Setup
Calibration Setu
Control and Perf
Technical Justifi
Editors
Spectral Spatial Spectral Setup
In the table below, it is possible to define up to 16 spectral windows, 4 per baseband as long as the total Fraction per baseband is no more than 1.
Each baseband is 2GHz wide and can be separately configured i.e. each spectral window can have a different bandwidth and resolution.
Note that for bands 3, 4, 6, 7 and 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.
Spectral Type
Spectral Line
Spectral Line
Baseband-1
Fraction
Center Freq (Rest)
Center Freq (Sky)
Transition
Bandwidth, Resolution (smoothed)
Spec Avg.
Representativ Window
1/4 230.30000 GHz 228.16341 GHz ...Enter Name ... 117.188 MHz(154 km/s), 244.141 kHz(0.321 km/s) 1
1/4 231.10000 GHz 228.95599 GHz ...Enter Name ... 117.188 MHz(153 km/s), 244.141 kHz(0.320 km/s) 1
1/2 230.53800 GHz 228.39920 GHz CO v=0 2-1 234.375 MHz(308 km/s), 484.619 kHz(0.636 km/s)
1
2
4
8
16
Select Lines to Observe in Baseband-1...
Add
Delete
Spectral specs share a baseband, sum of shares can't exceed 1
Multiple spectral specs, spectral averaging
Feedback
Validation Validation History Log
15 errors, 0 warnings
Description
Must select a minimum of 1 science keywords
Largest scale is not achievable with the 12m array configura
Spectral Window name is invalid
Spectral Window name is invalid
Failing to rename a spw brings a validation error
Template library. Turn the keys on...
Proposal
Planned Observing
ScienceGoal (B3
ScienceGoal (B7
ScienceGoal (B7
ScienceGoal (B9
ScienceGoal (B3
ScienceGoal (B3
ScienceGoal (B6
ScienceGoal (B7
ScienceGoal (B6
Overview
Contextual Help
Phase I: Science Proposal


Project - Observing Tool for ALMA, version Cycle2Test2
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (Copy of B6 12CO (2-1): N
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Define the spectral setup.
Template library. Turn the keys on the JTree below & r...
Proposal
Planned Observing
ScienceGoal (B3 spectral sweep CO
ScienceGoal (B7 continuum: COSMO
ScienceGoal (B7 CO(9-8): Cosmic Ey
ScienceGoal (B9 continuum: Cosmic
ScienceGoal (B3 spectral sweep: PK
ScienceGoal (B3 continuum: GRB To
ScienceGoal (B6 continuum: GRB To
ScienceGoal (B7 continuum: GRB To
ScienceGoal (B6 continuum: GRB To
ScienceGoal (B3 continuum: GRB To
ScienceGoal (B6 12CO (2-1): NGC32
ScienceGoal (B6 13CO (2-1): NGC32
ScienceGoal (B6 spectral line: Massi
ScienceGoal (B9 spectral line: Massi
ScienceGoal (B3 continuum: Protoste
Editors
Spectral Spatial Spectral Setup
Each baseband is 2GHz wide and can be separately configured i.e. each spectral window can have a different bandwidth and resolutio
Note that for bands 3, 4, 6, 7 and 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.
Spectral Type
Spectral Line
Single Continuum
Spectral Scan
Polarization products desired XX
Spectral Setup Errors
Spectral Line
Click here to get a Splatalogue window to select a particular spectral line.
Baseband-1
Fraction
Center Freq (Rest)
Center Freq (Sky)
Transition
Bandwid
1(Full)
230.53800 GHz
230.53800 GHz
CO v=0 2-1
875.000 MHz(2438 km/s), 976.563 kHz(1.270 km/s)
1
Select Lines to Observe in Baseband-1...
Add
Delete
Baseband-2
Select Lines to Observe in Baseband-2...
Add
Delete
Feedback
Validation Validation History Log
Description
Suggestion

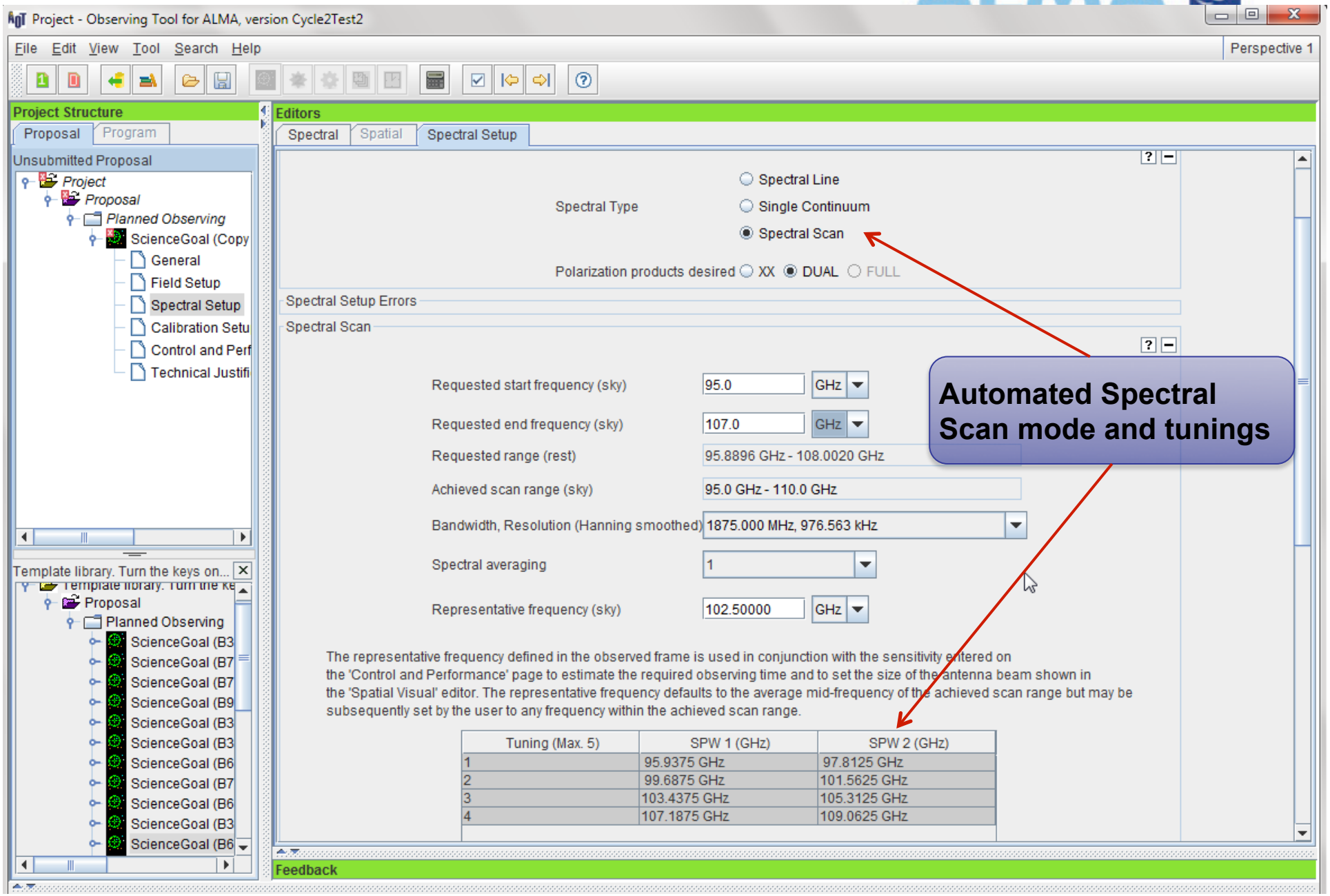

Select Spectral Lines
Transition Filter
CO*
Include description
Frequency Filters
ALMA Band
1 2 3 4 5 6 7 8 9 10
Sky Frequency (GHz)
Min 31.3 Max 950
Receiver/Back End Configuration
Hide unobservable lines
Filtering unobservable lines
Maximum Upper-state Energy (K)
0 20 40 60 80 100 ∞
Molecule Filter / Environment
Show all atoms and molecules
Can't find the transition you're looking for in the offline pool? Find more in the online Splatalogue.
Find More...
Reset Filters
Transitions matching your filter settings:
(double-click column header for primary sort, single-click subsequent columns for secondary sorting. Single clicks will reverse sort order of alread
Transition | Description | Rest Frequency | Sky Frequency | Upper-state Energy | Lovas Intensity
CO v=2 1-0 | Carbon Monoxide | 113.172 GHz | 113.172 GHz | 6134.675 K | 0.01
CO v=1 1-0 | Carbon Monoxide | 114.222 GHz | 114.222 GHz | 3089.154 K | 0.01
CO v=0 1-0 | Carbon Monoxide | 115.271 GHz | 115.271 GHz | 5.532 K | 60 | 0.01
CO v=2 2-1 | Carbon Monoxide | 226.34 GHz | 226.34 GHz | 6145.538 K | 0.02
CO v=1 2-1 | Carbon Monoxide | 228.439 GHz | 228.439 GHz | 3100.118 K | 0.62 | 0.02
CO v=0 2-1 | Carbon Monoxide | 230.538 GHz | 230.538 GHz | 16.596 K | 70 | 0.02
0.1 | 0.66
CO+ J=2-1, F=5/2-3/2 | Carbon Monoxide Ion | 236.063 GHz | 236.063 GHz | 0.1 | 1.2
CO v=2 3-2 | Carbon Monoxide | 339.5 GHz | 339.5 GHz | 6161.831 K | 0.03
CO v=1 3
342.648 GHz | 342.648 GHz | 3116.561 K | 0.71 | 0.03
CO v=0 3
345.796 GHz | 345.796 GHz | 33.192 K | 70 | 0.03
CO+ J=3
353.741 GHz | 353.741 GHz | 0.1 | 1.2
CO+ J=3-2, F=7/2-5/2 | Carbon Monoxide Ion | 354.014 GHz | 354.014 GHz | 0.18 | 1.71
CO v=2 4-3 | Carbon Monoxide | 452.645 GHz | 452.645 GHz | 6183.555 K | 0.04
CO v=1 4-3 | Carbon Monoxide | 456.843 GHz | 456.843 GHz | 3138.486 K | 0.04
CO v=0 4-3 | Carbon Monoxide | 461.041 GHz | 461.041 GHz | 55.317 K | 60 | 0.04
CO v=2 5-4 | Carbon Monoxide | 565.774 GHz | 565.774 GHz | 6210.707 K | 0.06
CO v=1 5-4 | Carbon Monoxide | 571.021 GHz | 571.021 GHz | 3165.891 K | 0.06
CO v=0 5-4 | Carbon Monoxide | 576.268 GHz | 576.268 GHz | 82.974 K | 0.06
678.88 GHz | 6243.288 K | 0.07
685.176 GHz | 3198.774 K | 0.07
691.473 GHz | 116.159 K | 100 | 0.07
791.96 GHz | 6281.296 K | 0.08
CO v=1 7-6 | Carbon Monoxide | 799.306 GHz | 799.306 GHz | 3237.134 K | 0.08
CO v=0 7-6 | Carbon Monoxide | 806.652 GHz | 806.652 GHz | 154.872 K | 110 | 0.08
CO v=2 8-7 | Carbon Monoxide | 905.009 GHz | 905.009 GHz | 6324.729 K | 0.09
Add to Selected Transitions
Selected transitions
Transition | Description | Rest Frequency | Sky Fre
CO v=0 2-1 | 230.538 GHz | 230.538 GHz
Remove from Selected Transitions
Select a line from the list
Filters can be used to narrow the search


The spectral tab gives you a graphical visualization of the spectral setup. The orange vertical bars are sidebands. This setup is okay!
Drag the yellow vertical to move the first LO
Drag the green slider to slide the VIEW
Click in the yellow area to MAGNIFY
File Edit View Tool Search Help
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Editors
Spectral
Spectral Setup
Visualisation
Left/right click to zoom in/out, grab sliding bar to pan
Observed Frequency
Rest Frequency
LO1
Overlays:
Receiver Bands
Transmission
Overlay Lines
DSB Image
Select Lines to Overlay
Water Vapour Column Density:
Automatic Choice
Manual Choice
1.262mm (4th Octile)
Viewport:
Pan to Line
Zoom to Band
Reset
Feedback
Validation
Validation History
Log
Description
Suggestion
Overview
Contextual Help
Phase I: Science Proposal

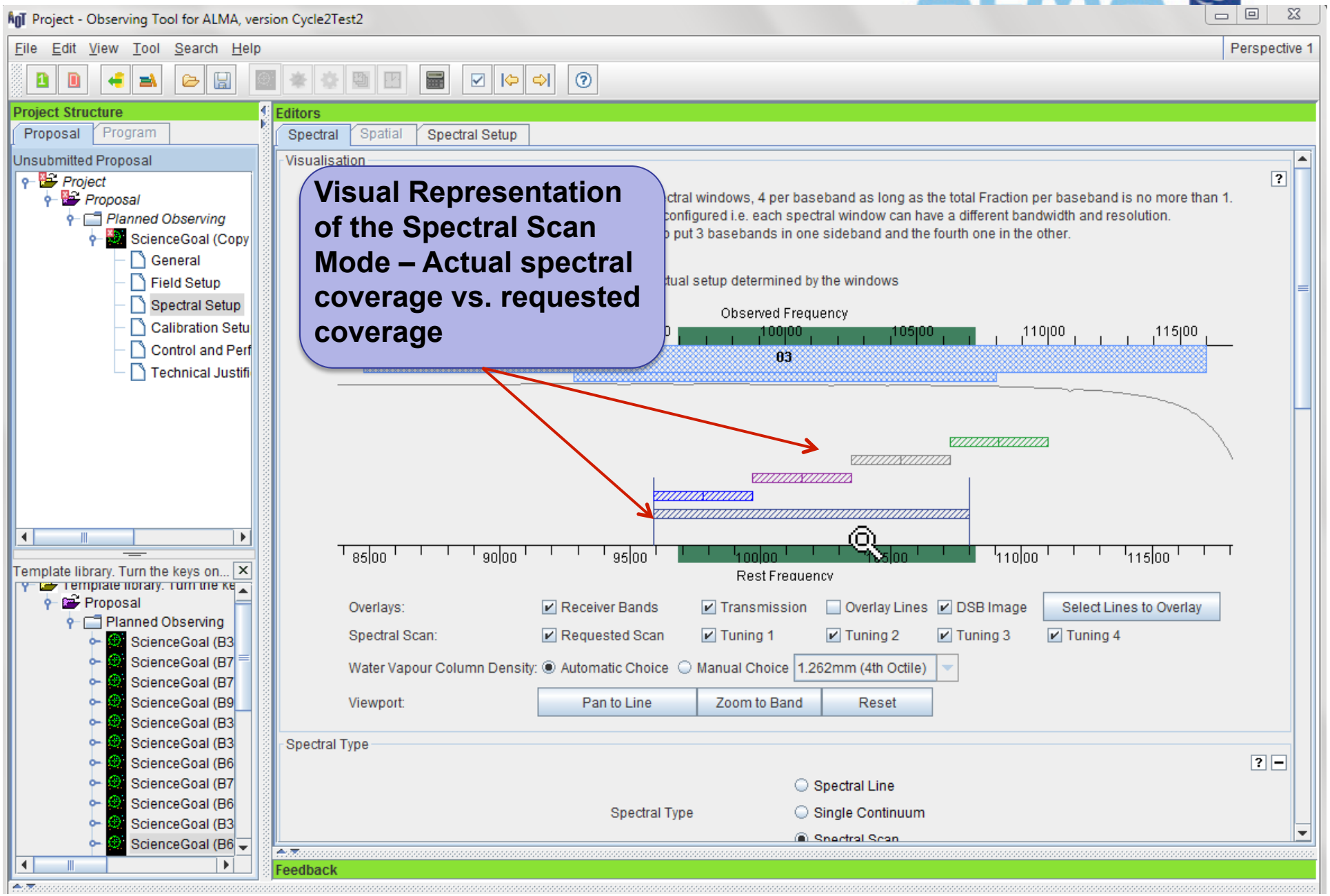
Full Continuum & Polarization

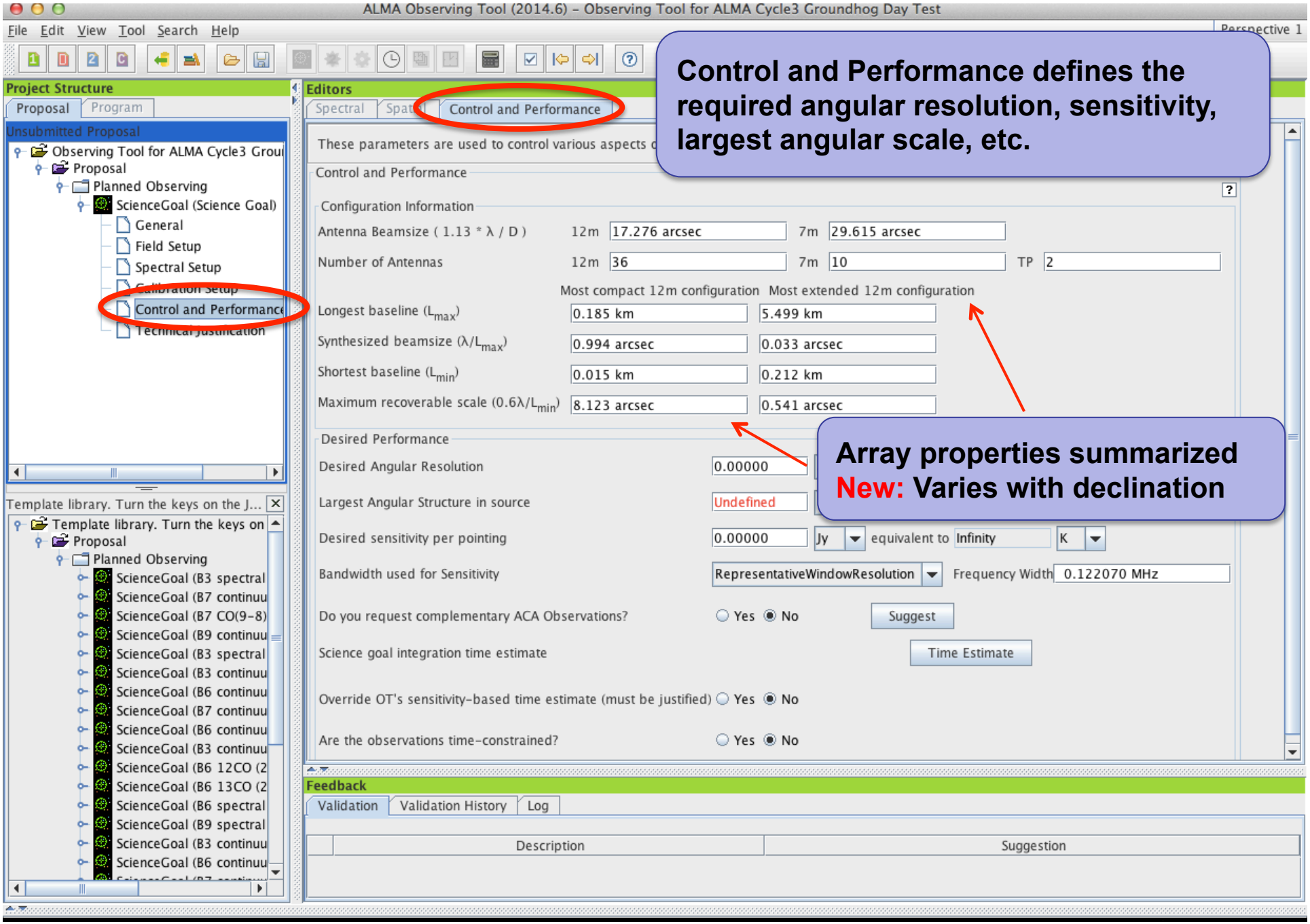


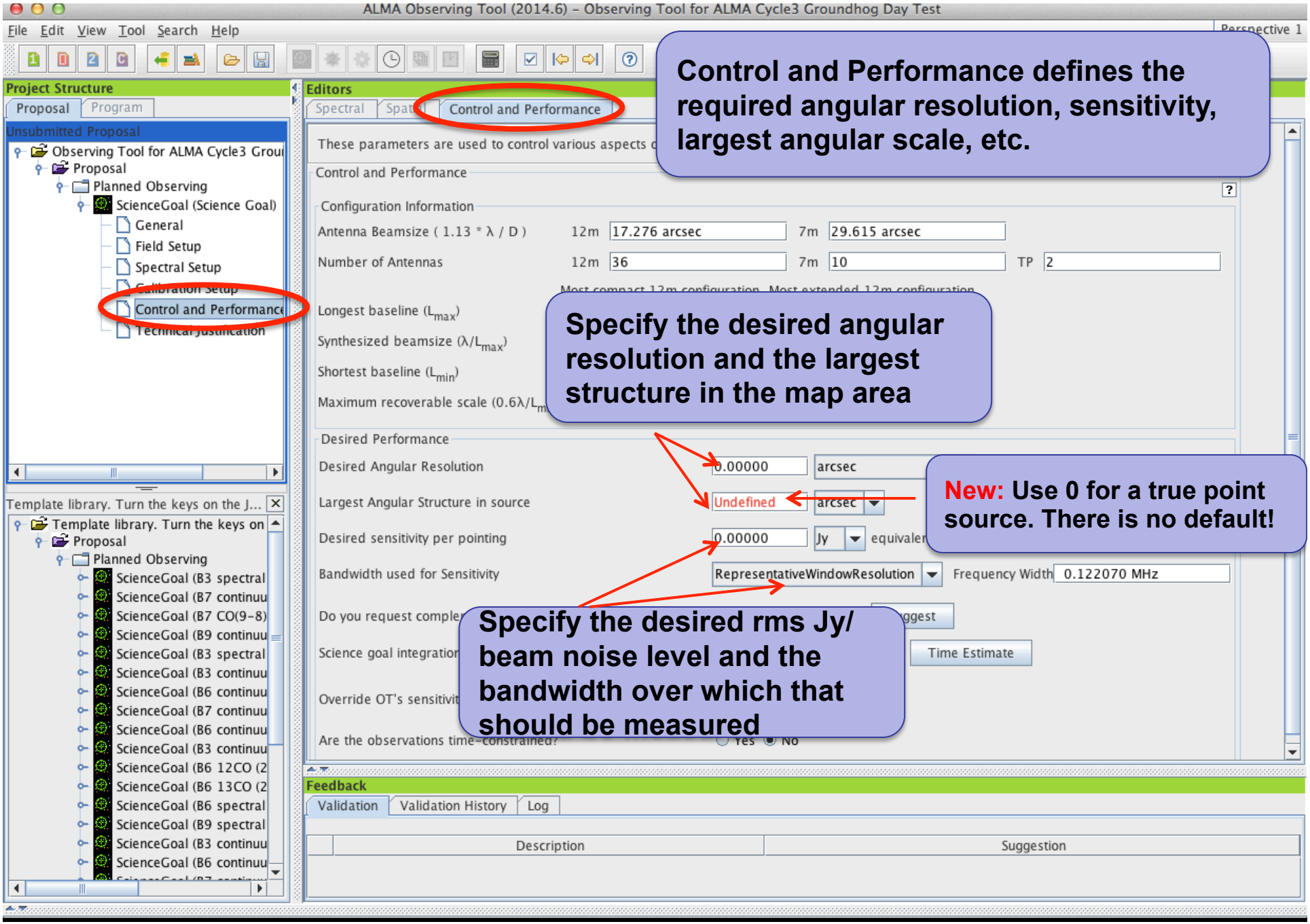
Automated spectral scan - I



Automated spectral scan - II




ALMA Observing Tool (2014.6) – Observing Tool for ALMA Cycle3 Groundhog Day Test
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Observing Tool for ALMA Cycle3 Grou
Proposal
Planned Observing
ScienceGoal (Science Goal)
General
Field Setup
Spectral Setup
Control and Performance
Technical Justification
Template library. Turn the keys on the J...
Template library. Turn the keys on
Proposal
Planned Observing
ScienceGoal (B3 spectral
ScienceGoal (B7 continuu
ScienceGoal (B7 CO(9-8)
ScienceGoal (B9 continuu
ScienceGoal (B3 spectral
ScienceGoal (B3 continuu
ScienceGoal (B6 continuu
ScienceGoal (B7 continuu
ScienceGoal (B6 continuu
ScienceGoal (B3 continuu
ScienceGoal (B6 12CO (2
ScienceGoal (B6 13CO (2
ScienceGoal (B6 spectral
ScienceGoal (B9 spectral
ScienceGoal (B3 continuu
ScienceGoal (B6 continuu
Editors
Spectral
Control and Performance
Control and Performance defines the required angular resolution, sensitivity, largest angular scale, etc.
These parameters are used to control various aspects
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D)
12m 17.276 arcsec
7m 29.615 arcsec
Number of Antennas
12m 36
7m 10
TP 2
Most compact 12m configuration
Most extended 12m configuration
Longest baseline (L_{max})
0.185 km
5.499 km
Synthesized beamsize (λ/L_{max})
0.994 arcsec
0.033 arcsec
Shortest baseline (L_{min})
0.015 km
0.212 km
Maximum recoverable scale ($0.6\lambda/L_{min}$)
8.123 arcsec
0.541 arcsec
Array properties summarized
New: Varies with declination
Desired Performance
Desired Angular Resolution
0.00000
Largest Angular Structure in source
Undefined
Desired sensitivity per pointing
0.00000
Jy
equivalent to
Infinity
K
Bandwidth used for Sensitivity
RepresentativeWindowResolution
Frequency Width
0.122070 MHz
Do you request complementary ACA Observations?
Yes No
Suggest
Science goal integration time estimate
Time Estimate
Override OT's sensitivity-based time estimate (must be justified)
Yes No
Are the observations time-constrained?
Yes No
Feedback
Validation
Validation History
Log
Description
Suggestion


ALMA Observing Tool (2014.6) – Observing Tool for ALMA Cycle3 Groundhog Day Test
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Observing Tool for ALMA Cycle3 Grou
Proposal
Planned Observing
ScienceGoal (Science Goal)
General
Field Setup
Spectral Setup
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Control and Performance defines the required angular resolution, sensitivity, largest angular scale, etc.
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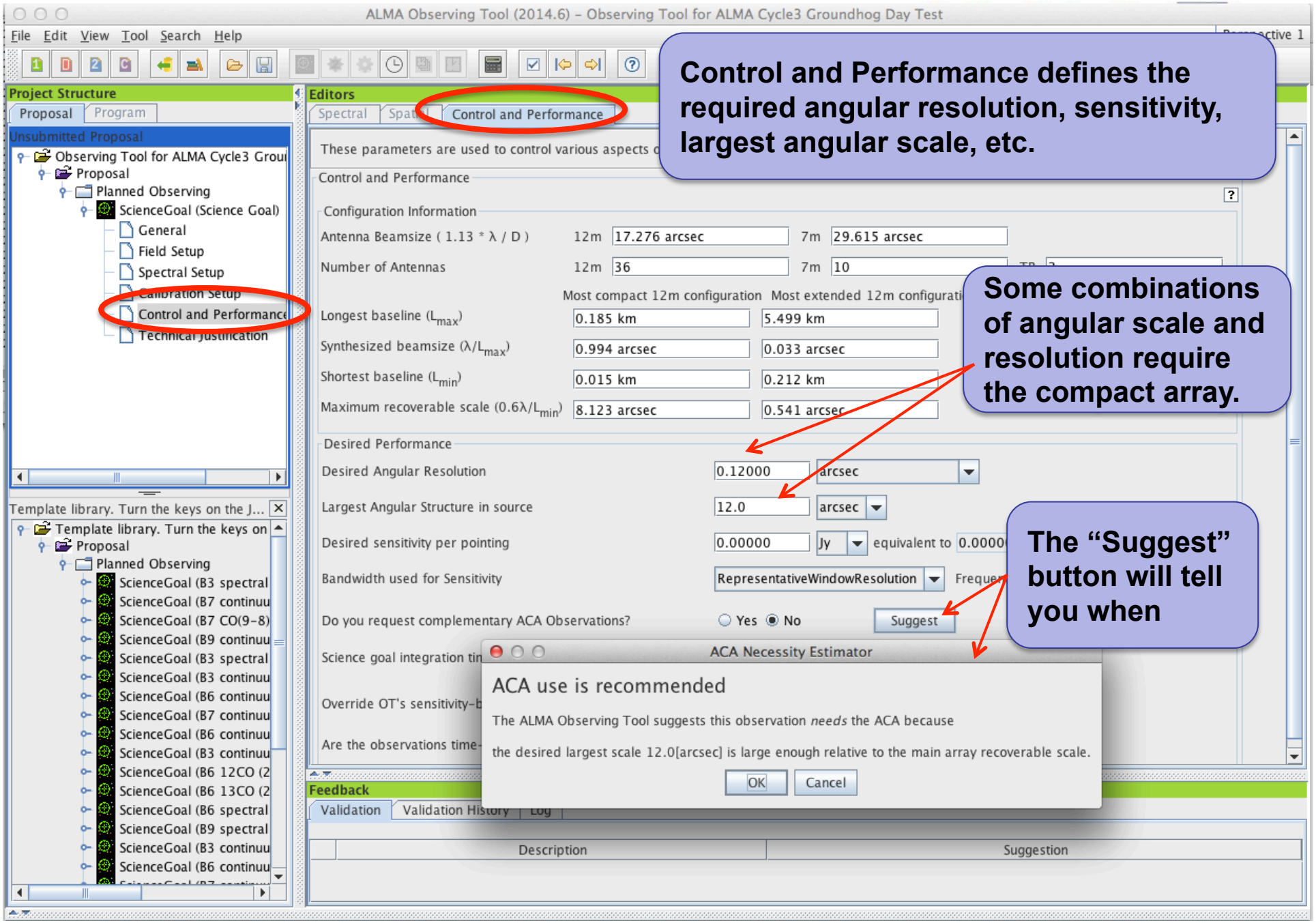
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D)
12m 17.276 arcsec
7m 29.615 arcsec
Number of Antennas
12m 36
7m 10
TP 2
Longest baseline (Lmax)
Synthesized beamsize (λ/Lmax)
Shortest baseline (Lmin)
Maximum recoverable scale (0.6λ/Lm
Specify the desired angular resolution and the largest structure in the map area
Desired Performance
Desired Angular Resolution
0.00000
arcsec
Largest Angular Structure in source
Undefined
arcsec
New: Use 0 for a true point source. There is no default!
Desired sensitivity per pointing
0.00000
Jy
Bandwidth used for Sensitivity
RepresentativeWindowResolution
Frequency Width 0.122070 MHz
Specify the desired rms Jy/beam noise level and the bandwidth over which that should be measured
Time Estimate
Are the observations time-constrained?
Yes No
Feedback
Validation Validation History Log
Description
Suggestion
Template library. Turn the keys on the J...
Template library. Turn the keys on
Proposal
Planned Observing
ScienceGoal (B3 spectral
ScienceGoal (B7 continuu
ScienceGoal (B7 CO(9-8)
ScienceGoal (B9 continuu
ScienceGoal (B3 spectral
ScienceGoal (B3 continuu
ScienceGoal (B6 continuu
ScienceGoal (B7 continuu
ScienceGoal (B6 continuu
ScienceGoal (B3 continuu
ScienceGoal (B6 12CO (2
ScienceGoal (B6 13CO (2
ScienceGoal (B6 spectral
ScienceGoal (B9 spectral
ScienceGoal (B3 continuu
ScienceGoal (B6 continuu


ALMA Observing Tool (2014.6) – Observing Tool for ALMA Cycle3 Groundhog Day Test
File Edit View Tool Search Help
Project Structure
Proposal Program
Unsubmitted Proposal
Observing Tool for ALMA Cycle3 Grou
Proposal
Planned Observing
ScienceGoal (Science Goal)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Editors
Spectral
Control and Performance
These parameters are used to control various aspects
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D)
12m 17.276 arcsec
7m 29.615 arcsec
Number of Antennas
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Most compact 12m configuration
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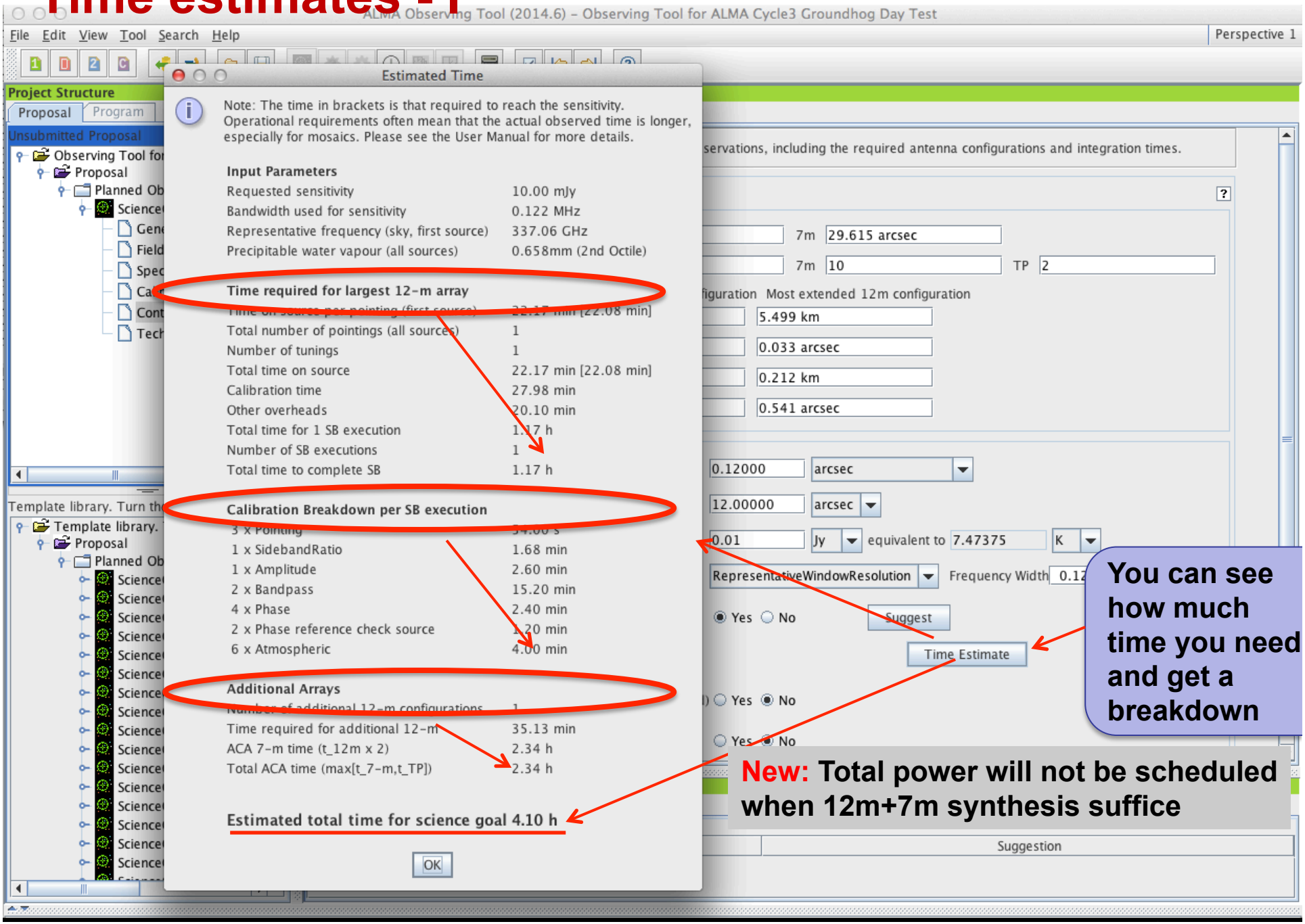
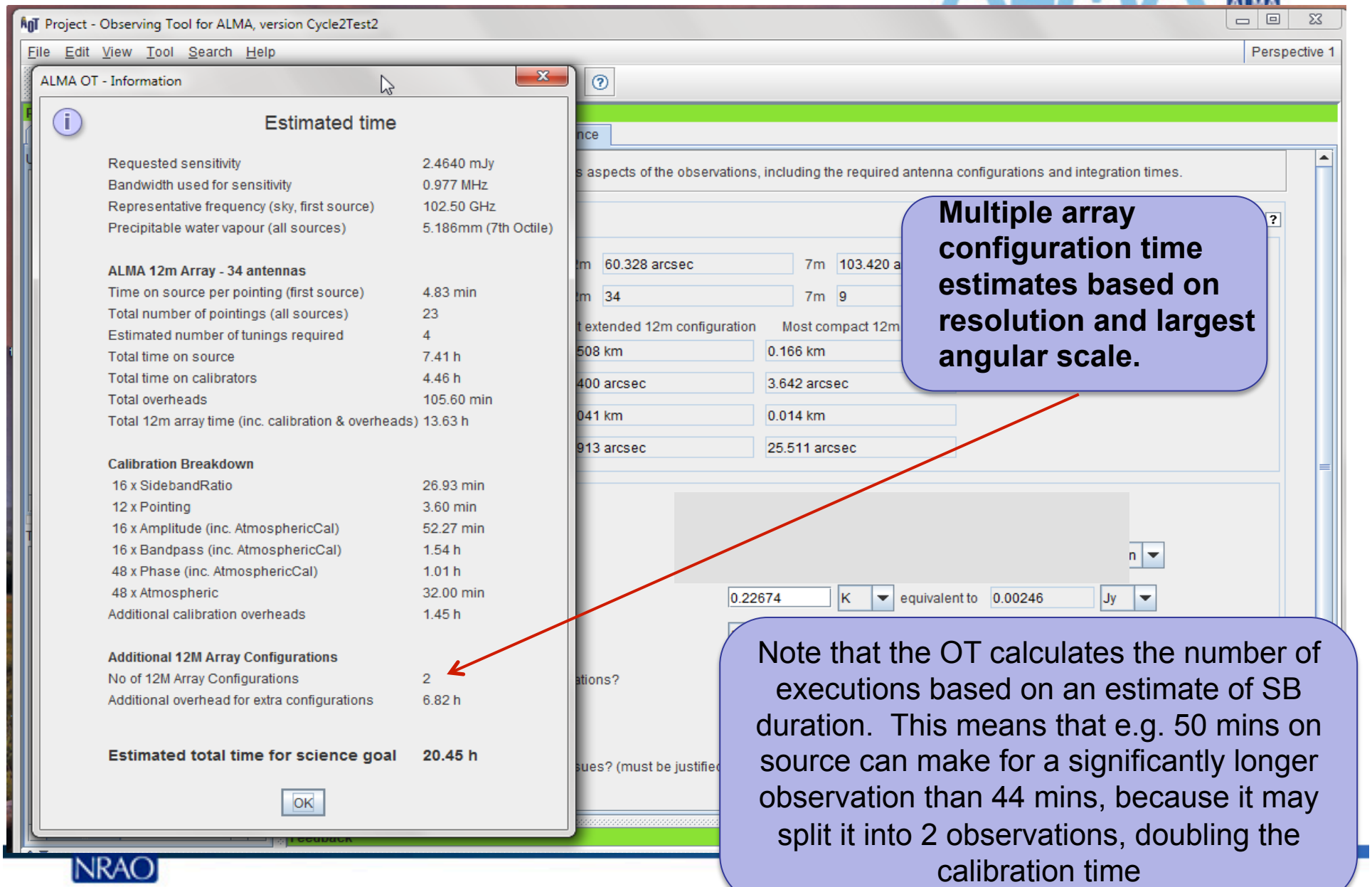
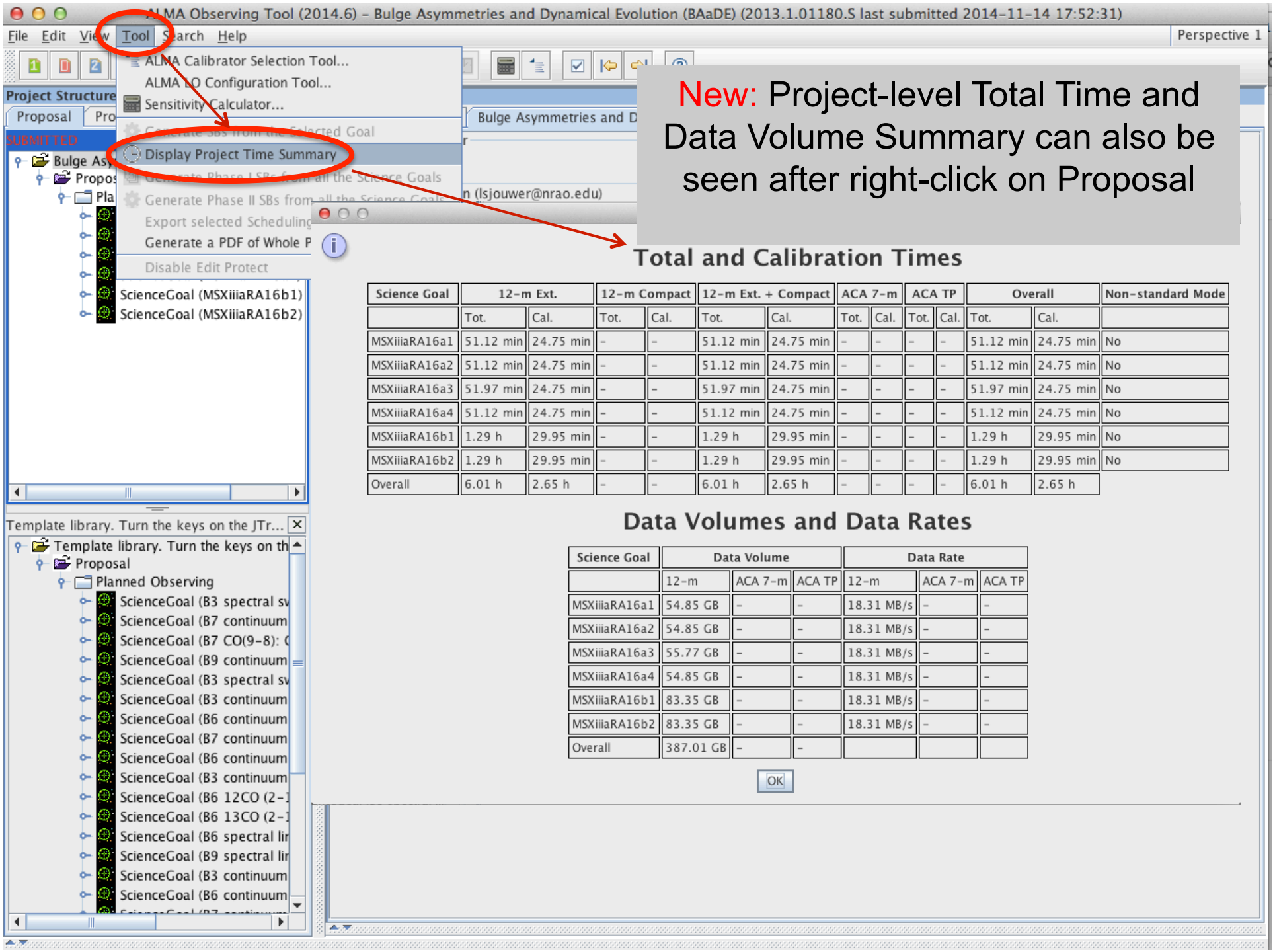
0.185 km
5.499 km
Synthesized beamsize (λ/Lmax)
0.994 arcsec
0.033 arcsec
Shortest baseline (Lmin)
0.015 km
0.212 km
Maximum recoverable scale (0.6λ/Lmin)
8.123 arcsec
0.541 arcsec
Desired Performance
Desired Angular Resolution
0.12000
arcsec
Largest Angular Structure in source
12.0
arcsec
Desired sensitivity per pointing
0.00000
Jy
equivalent to
Bandwidth used for Sensitivity
RepresentativeWindowResolution
Do you request complementary ACA Observations?
Yes
No
Suggest
Science goal integration tin
Override OT's sensitivity-b
Are the observations time-
ACA Necessity Estimator
ACA use is recommended
The ALMA Observing Tool suggests this observation needs the ACA because
the desired largest scale 12.0[arcsec] is large enough relative to the main array recoverable scale.
OK
Cancel
Feedback
Validation
Validation History
Log
Description
Suggestion
Template library. Turn the keys on the J...
Template library. Turn the keys on
Proposal
Planned Observing
ScienceGoal (B3 spectral
ScienceGoal (B7 continuu
ScienceGoal (B7 CO(9-8)
ScienceGoal (B9 continuu
ScienceGoal (B3 spectral
ScienceGoal (B3 continuu
ScienceGoal (B6 continuu
ScienceGoal (B7 continuu
ScienceGoal (B6 continuu
ScienceGoal (B3 continuu
ScienceGoal (B6 12CO (2
ScienceGoal (B6 13CO (2
ScienceGoal (B6 spectral
ScienceGoal (B9 spectral
ScienceGoal (B3 continuu
ScienceGoal (B6 continuu
Control and Performance defines the required angular resolution, sensitivity, largest angular scale, etc.
Some combinations of angular scale and resolution require the compact array.
The “Suggest” button will tell you when

Time estimates - I

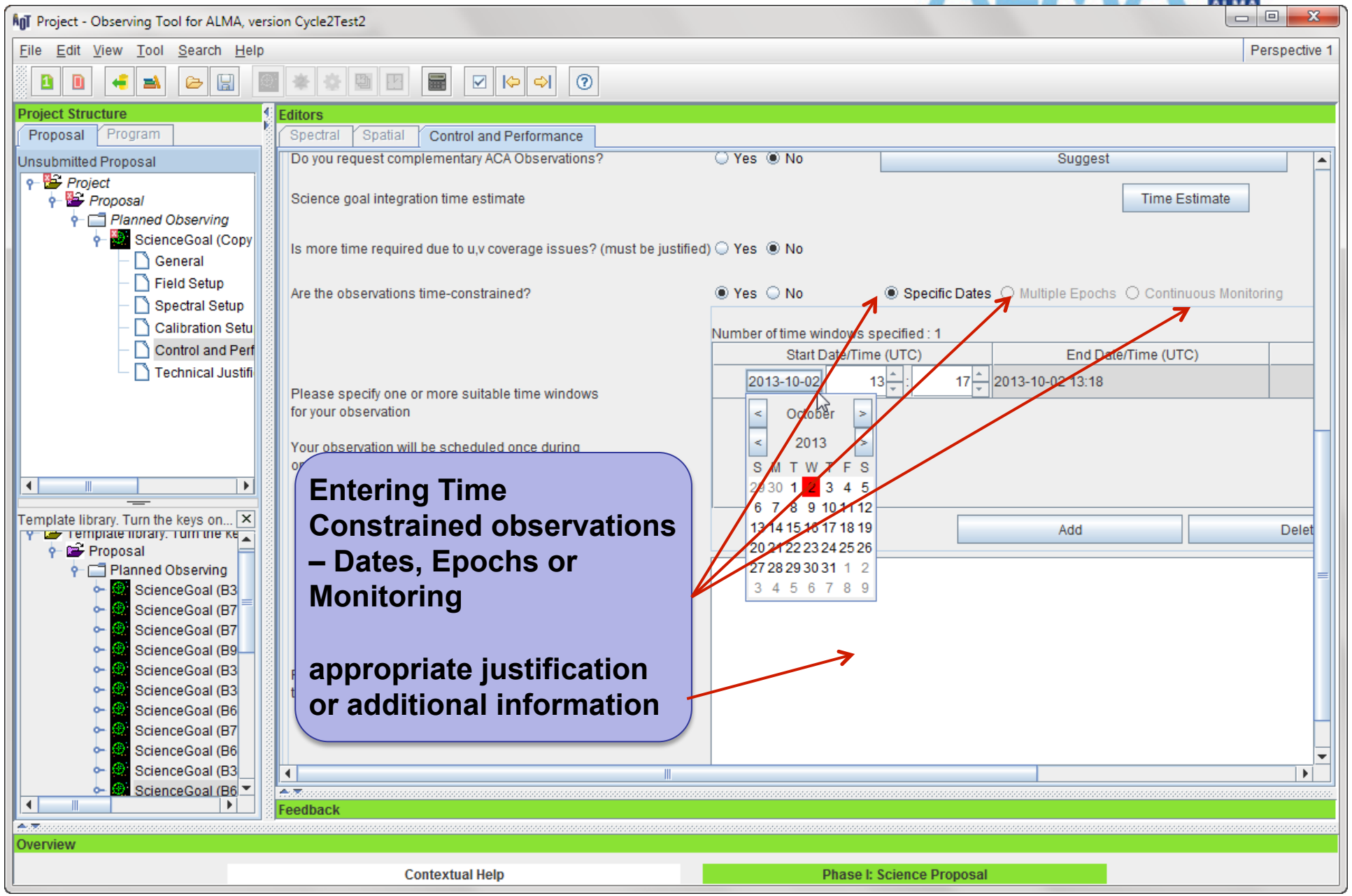


Time estimates - II

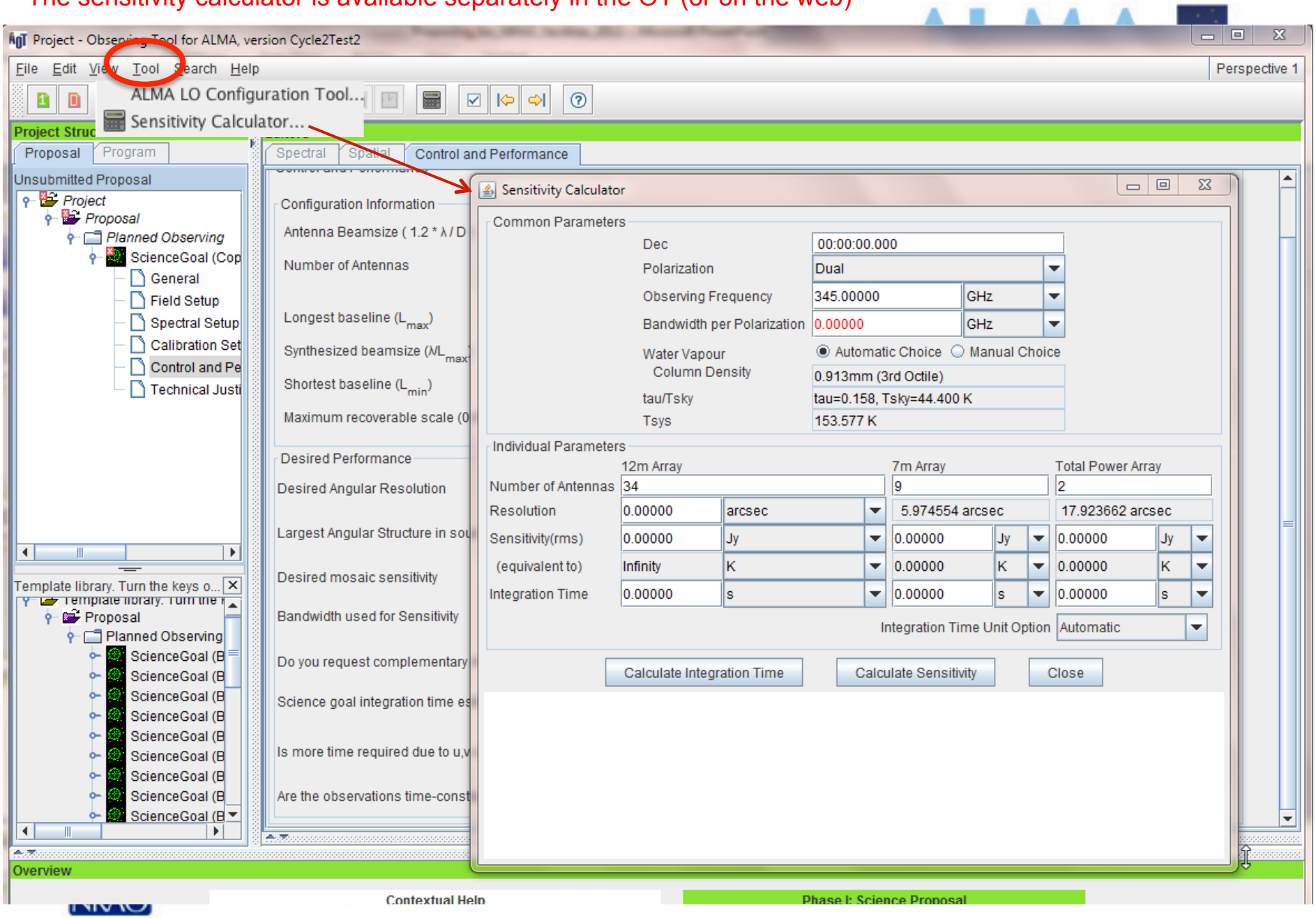



ALMA Observing Tool (2014.6) – Bulge Asymmetries and Dynamical Evolution (BAaDE) (2013.1.01180.S last submitted 2014-11-14 17:52:31)
File Edit View Tool Search Help
Perspective 1
ALMA Calibrator Selection Tool...
ALMA LO Configuration Tool...
Sensitivity Calculator...
Display Project Time Summary
Generate Phase II SBs from all the Science Goals
Export selected Scheduling
Generate a PDF of Whole P
Disable Edit Protect
Project Structure
Proposal
SUBMITTED
ScienceGoal (MSXiiiaRA16b1)
ScienceGoal (MSXiiiaRA16b2)
Template library. Turn the keys on the JTr...
Template library. Turn the keys on th
Proposal
Planned Observing
ScienceGoal (B3 spectral sv
ScienceGoal (B7 continuum
ScienceGoal (B7 CO(9-8): (
ScienceGoal (B9 continuum
ScienceGoal (B3 spectral sv
ScienceGoal (B3 continuum
ScienceGoal (B6 continuum
ScienceGoal (B7 continuum
ScienceGoal (B6 continuum
ScienceGoal (B3 continuum
ScienceGoal (B6 12CO (2-1
ScienceGoal (B6 13CO (2-1
ScienceGoal (B6 spectral lir
ScienceGoal (B9 spectral lir
ScienceGoal (B3 continuum
ScienceGoal (B6 continuum
Bulge Asymmetries and D
(lsjouwer@nrao.edu)
New: Project-level Total Time and Data Volume Summary can also be seen after right-click on Proposal
Total and Calibration Times
Science Goal | 12-m Ext. | | 12-m Compact | | 12-m Ext. + Compact | | ACA 7-m | | ACA TP | | Overall | | Non-standard Mode
| Tot. | Cal. | Tot. | Cal. | Tot. | Cal. | Tot. | Cal. | Tot. | Cal. | Tot. | Cal. |
MSXiiiaRA16a1 | 51.12 min | 24.75 min | - | - | 51.12 min | 24.75 min | - | - | - | - | 51.12 min | 24.75 min | No
MSXiiiaRA16a2 | 51.12 min | 24.75 min | - | - | 51.12 min | 24.75 min | - | - | - | - | 51.12 min | 24.75 min | No
MSXiiiaRA16a3 | 51.97 min | 24.75 min | - | - | 51.97 min | 24.75 min | - | - | - | - | 51.97 min | 24.75 min | No
MSXiiiaRA16a4 | 51.12 min | 24.75 min | - | - | 51.12 min | 24.75 min | - | - | - | - | 51.12 min | 24.75 min | No
MSXiiiaRA16b1 | 1.29 h | 29.95 min | - | - | 1.29 h | 29.95 min | - | - | - | - | 1.29 h | 29.95 min | No
MSXiiiaRA16b2 | 1.29 h | 29.95 min | - | - | 1.29 h | 29.95 min | - | - | - | - | 1.29 h | 29.95 min | No
Overall | 6.01 h | 2.65 h | - | - | 6.01 h | 2.65 h | - | - | - | - | 6.01 h | 2.65 h
Data Volumes and Data Rates
Science Goal | Data Volume | | | Data Rate | | |
| 12-m | ACA 7-m | ACA TP | 12-m | ACA 7-m | ACA TP
MSXiiiaRA16a1 | 54.85 GB | - | - | 18.31 MB/s | - | -
MSXiiiaRA16a2 | 54.85 GB | - | - | 18.31 MB/s | - | -
MSXiiiaRA16a3 | 55.77 GB | - | - | 18.31 MB/s | - | -
MSXiiiaRA16a4 | 54.85 GB | - | - | 18.31 MB/s | - | -
MSXiiiaRA16b1 | 83.35 GB | - | - | 18.31 MB/s | - | -
MSXiiiaRA16b2 | 83.35 GB | - | - | 18.31 MB/s | - | -
Overall | 387.01 GB | - | - | | |
OK

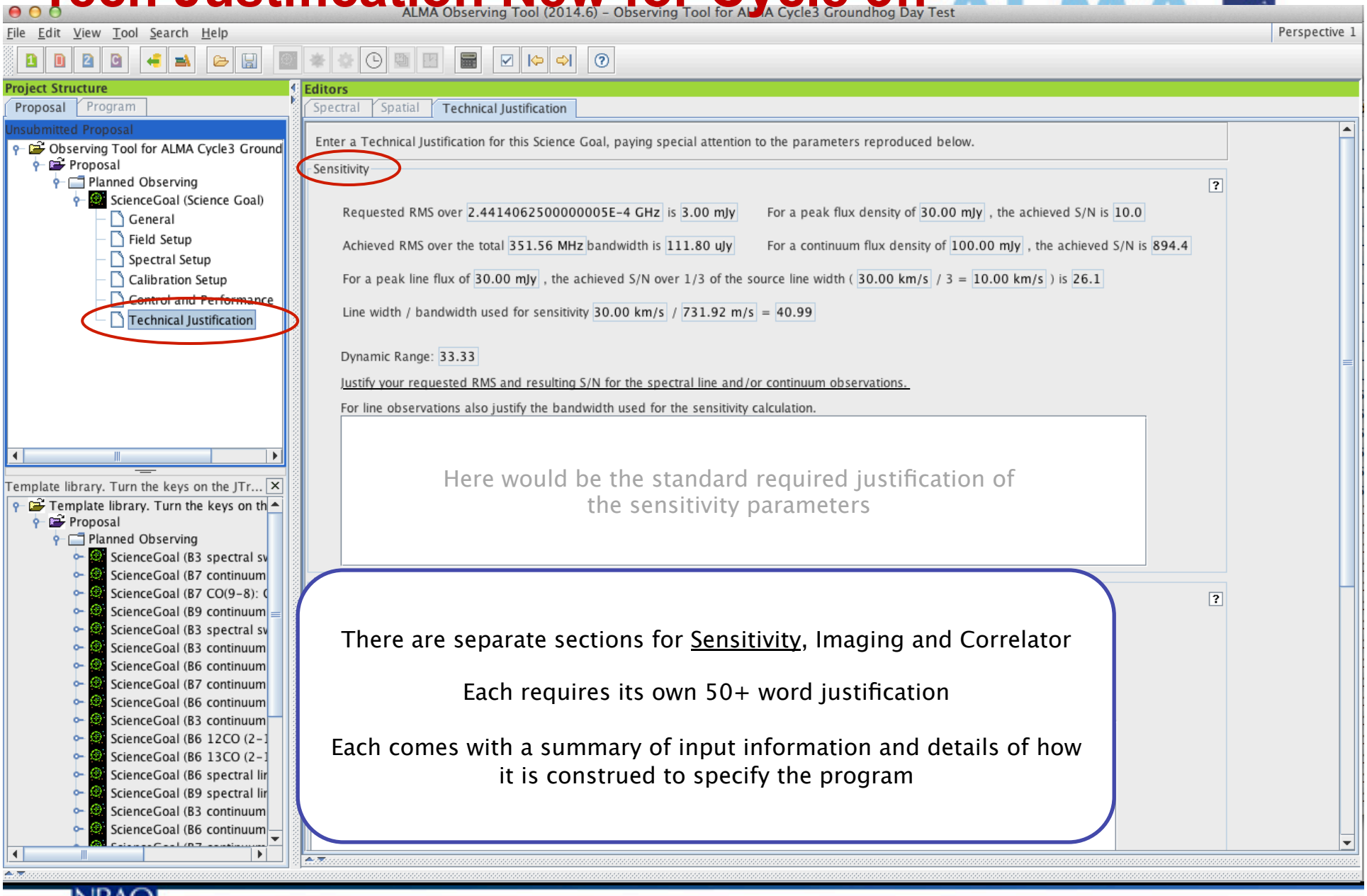
Time constrained observing



The sensitivity calculator is available separately in the OT (or on the web)



Tech Justification New for Cycle 3!!



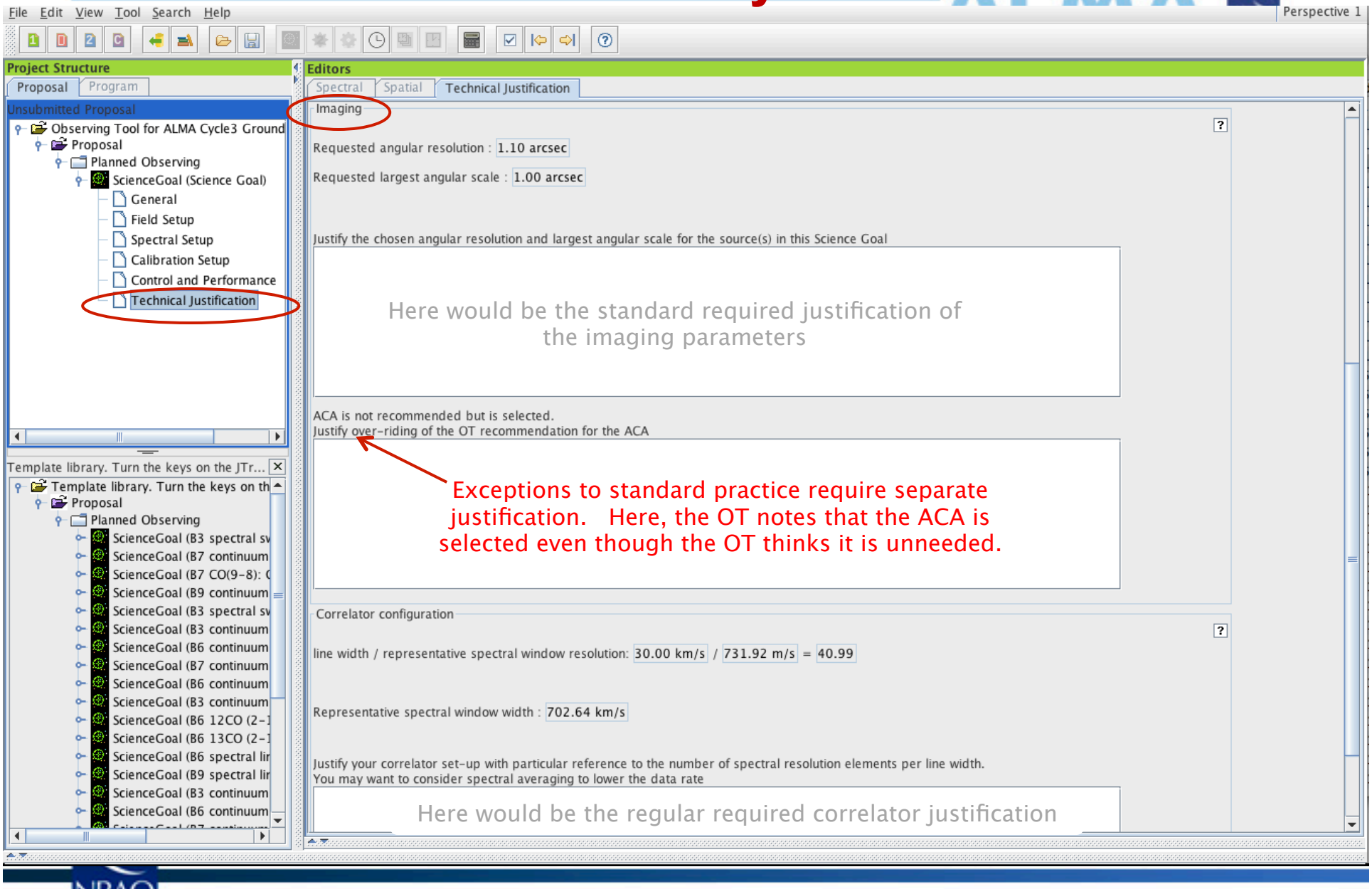
There are separate sections for Sensitivity, Imaging and Correlator

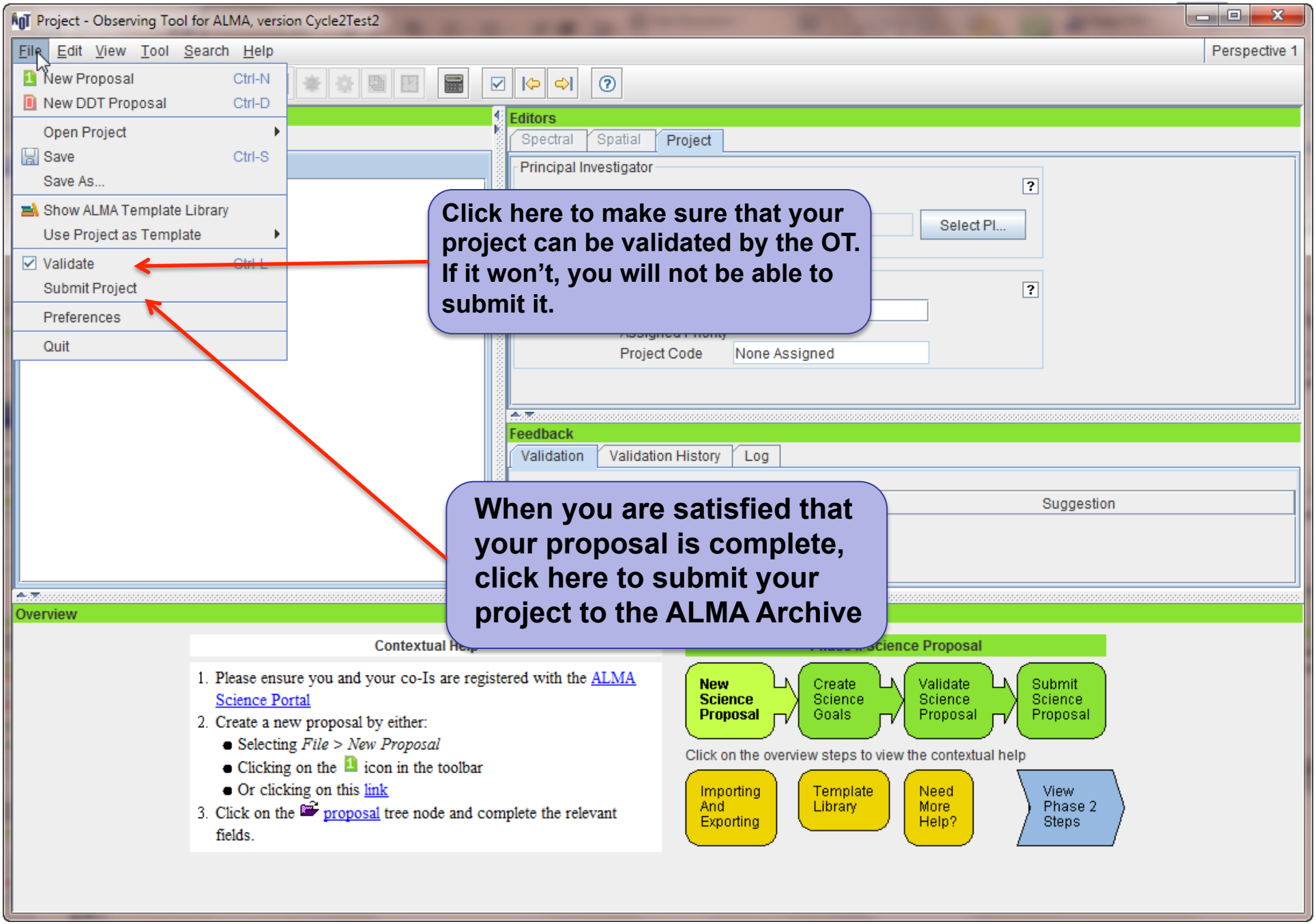
Each requires its own 50+ word justification

Each comes with a summary of input information and details of how it is construed to specify the program

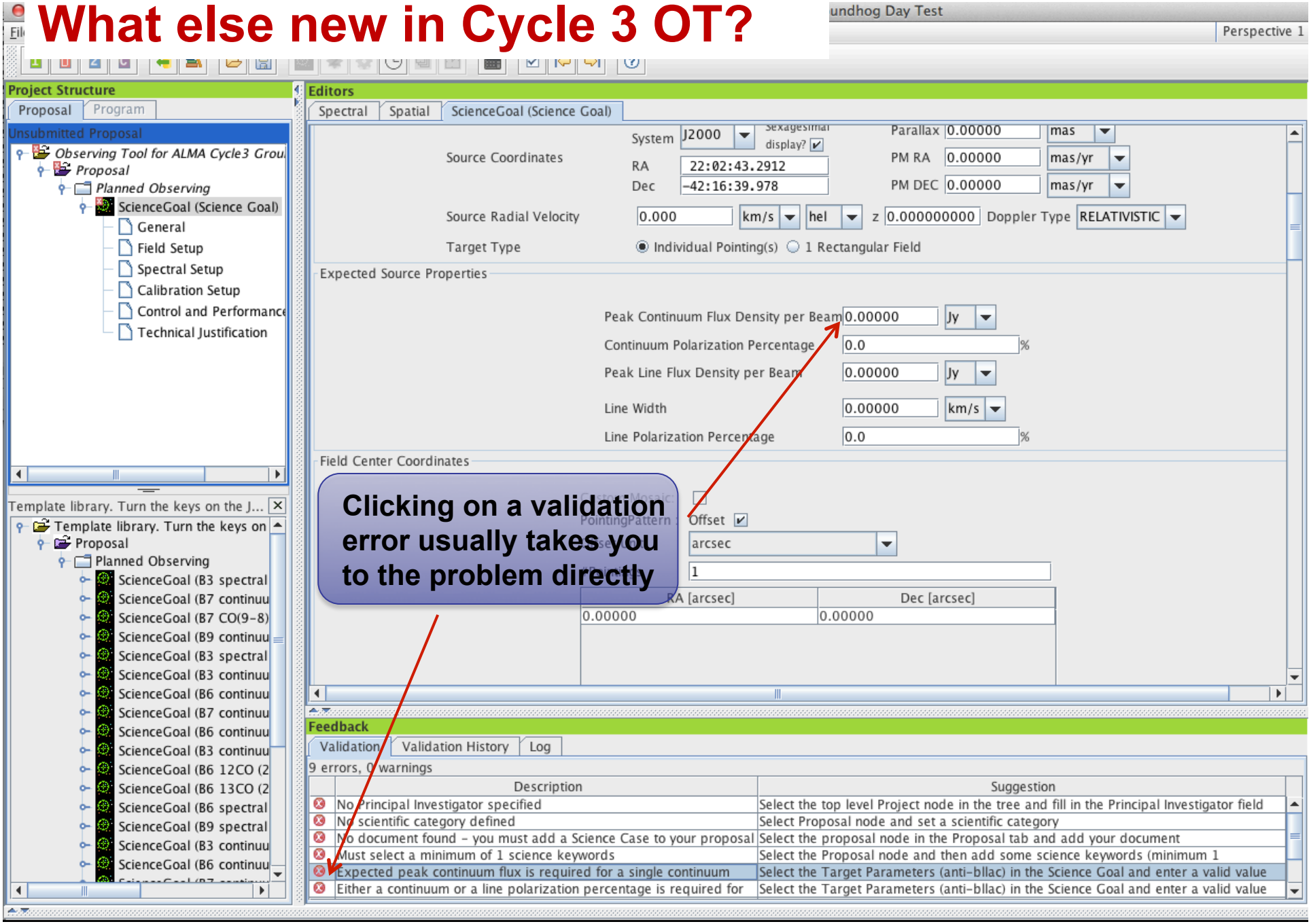
NRAO

Tech Justification New for Cycle 3




Project - Observing Tool for ALMA, version Cycle2Test2
File Edit View Tool Search Help
Perspective 1
New Proposal Ctrl-N
New DDT Proposal Ctrl-D
Open Project
Save Ctrl-S
Save As...
Show ALMA Template Library
Use Project as Template
Validate Ctrl-L
Submit Project
Preferences
Quit
Editors
Spectral Spatial Project
Principal Investigator
Select PI...
Project Code None Assigned
Feedback
Validation Validation History Log
Suggestion
Click here to make sure that your project can be validated by the OT. If it won't, you will not be able to submit it.
When you are satisfied that your proposal is complete, click here to submit your project to the ALMA Archive
Overview
Contextual Help
1. Please ensure you and your co-Is are registered with the ALMA Science Portal
2. Create a new proposal by either:
● Selecting File > New Proposal
● Clicking on the icon in the toolbar
● Or clicking on this link
3. Click on the proposal tree node and complete the relevant fields.
New Science Proposal
Create Science Goals
Validate Science Proposal
Submit Science Proposal
Click on the overview steps to view the contextual help
Importing And Exporting
Template Library
Need More Help?
View Phase 2 Steps

What else new in Cycle 3 OT?



Summary: New for Cycle 3 OT

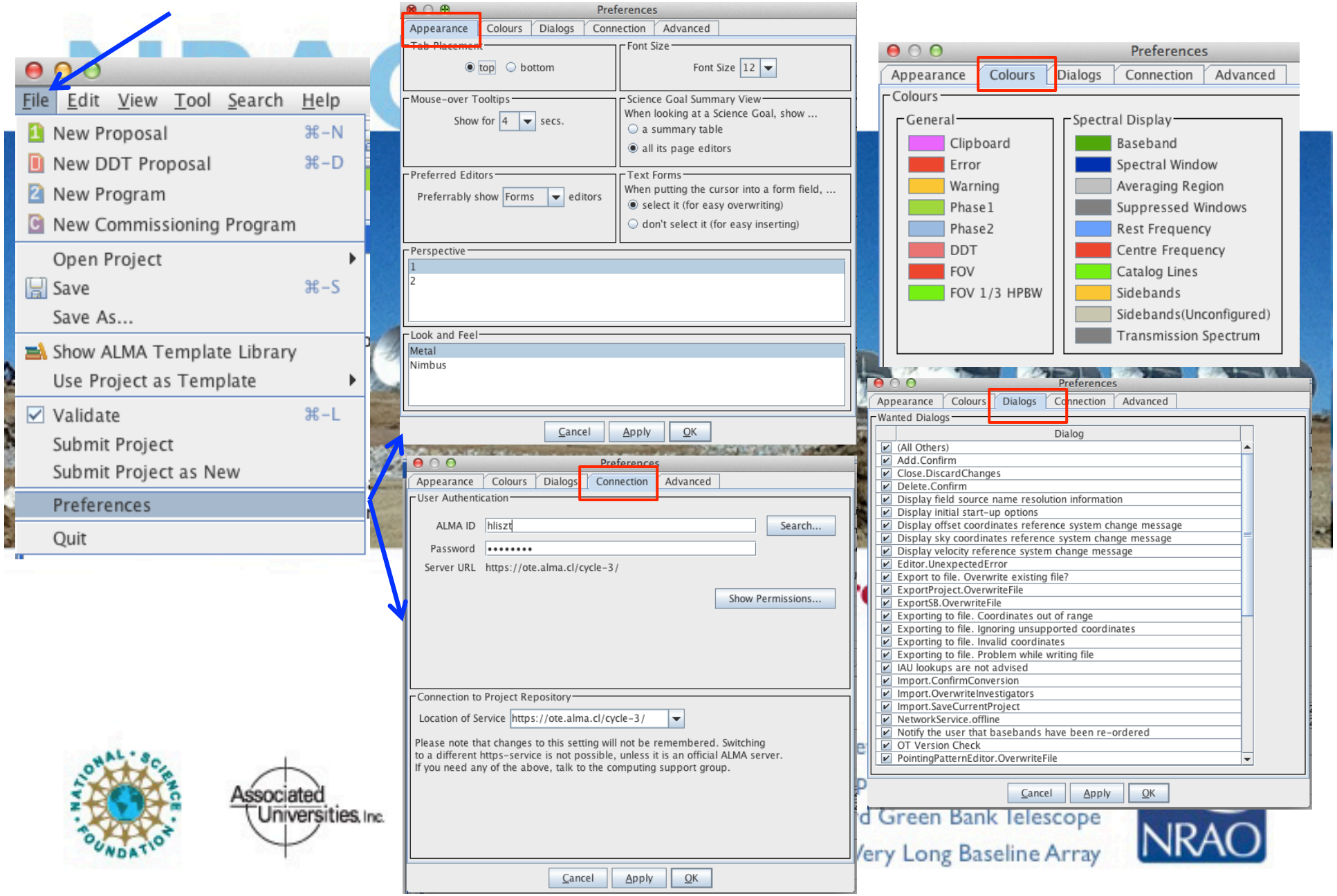
For Cycle 3, there are a relatively small number of new "ALMA" features:

+ Band 10 (780 – 950 GHz)
+ Free choice of TDM frequency for full polarization observations (Bands 3, 6 and 7)
+ 36 12-m array, 10 7-m array, 2 TP

There are more new "OT" features:

+ *Sesame* is now used to query source information
+ A Science Goal can contain multiple sources with rectangular field definitions
+ The TP mapping area is automatically calculated for custom mosaics or single pointings
+ Import/export of pointing positions has been updated slightly
+ Absolute positions can be used for pointing centers
+ “Point source” button has been removed, use 0 for LAS, *there is no default*
+ TP will not be scheduled if 7-m array can achieve the requested LAS
+ Various improvements to time-constrained interface
+ Technical Justification node completely overhauled
+ Total time for a proposal can be displayed in the main OT GUI – Under “Tool” in menu bar

Use preferences to customize



A Few OT Tips…

- In the OT, select, cut, copy, paste work with CTRL
  - Independent of what you do outside the OT
  - CTRL-A (sel) CTRL-x(cut) CTRL-c(copy) CTRL-v(ins)

- Holding down ALT when making choices in dropdown lists will convert to the unit or type of the new choice
  - Otherwise, only the description changes, not value

- OT can do galactic-celestial coord. Conversion
  - Not FK5 J2000 to ICRS, or to ecliptic etc.

ALMA

For more info:

https://almascience.nrao.edu/

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 and operation of ALMA.

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