An Introduction to the Cycle 7 ALMA Observing Tool

AKA: How to turn that great idea into an ALMA proposal!

Cassie Reuter

Authors: Harvey Liszt, Cassie Reuter

Example from: Kate Rowlands

Atacama Large Millimeter/submillimeter Array

Expanded Very Large Array

Very Long Baseline Array

ALMA Cycle 7 Planning

https://almascience.nrao.edu/news/alma-cycle-7-pre-announcement

19 March 2019 (15:00 UT)	Release of the ALMA Cycle 7 Call for Proposals and Observing Tool, and opening of archive for proposal submission
17 April 2019 (15:00 UT)	Proposal submission deadline
End of July 2019	Result of the proposal review sent to proposers
5 September 2019	Deadline for phase 2 submission by proposers
October 2019	Start of Cycle 7 observations
September 2020	End of Cycle 7 observations

Configuration plan

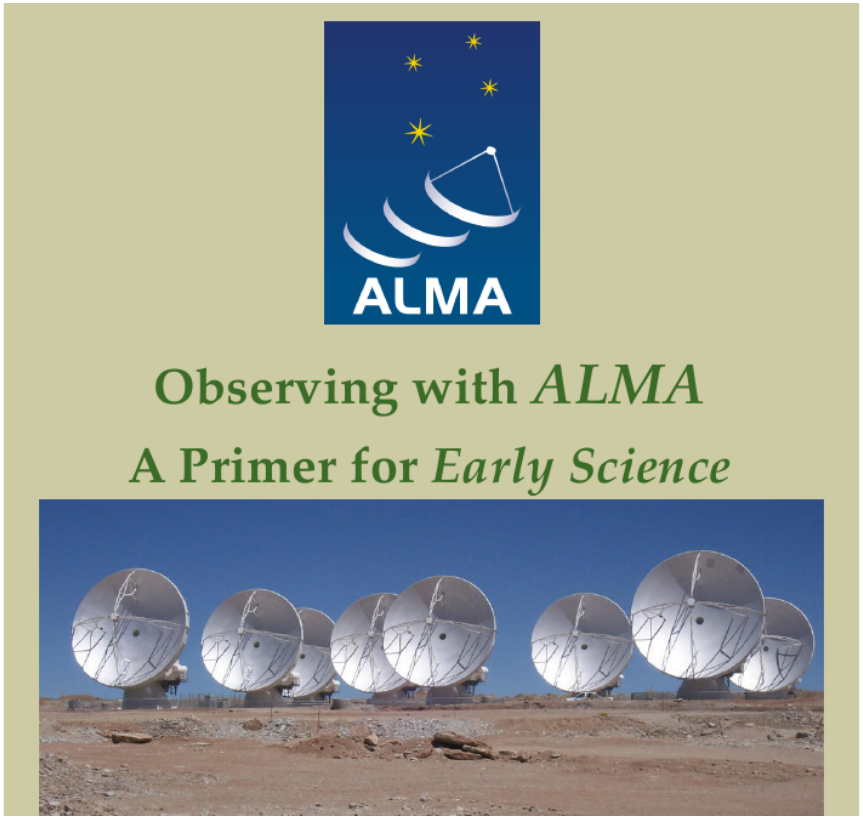
- The configuration schedule may determine when an object will be observed
- Consult Chapter 7 of Technical handbook for details and expected imaging properties!

Your favorite configuration might not be possible with favorite object, so check this before you submit!

Start date	Configuration	Longest baseline	LST for best observing conditions
2019 October 1	C43-4	0.78 km	~ 22—10 h
2019 October 20	C43-3	0.50 km	~ 23—11 h
2019 November 10	C43-2	0.31 km	~ 1—13 h
2019 November 30	C43-1	0.16 km	~ 2—14 h
2019 December 20	C43-2	0.31 km	~ 4—15 h
2020 January 10	C43-3	0.50 km	~ 5—17 h
2020 February 1	No observations due to maintenance		
2020 March 1	C43-4	0.78 km	~ 8—21 h
2020 March 20	C43-5	1.4 km	~ 9—23 h
2020 April 20	C43-6	2.5 km	~ 11—1 h
2020 May 20	C43-7	3.6 km	~ 13—3 h
2020 June 20	C43-8	8.5 km	~ 15—5 h
2020 July 11	C43-9	13.9 km	~16—6 h
2020 July 30	C43-10	16.2 km	~17—7 h
2020 August 20	C43-9	13.9 km	~19—8 h
2020 September 10	C43-8	8.5 km	~20—9 h

Documentation

- Call for Proposals
- ALMA Primer
- OT Guide
- ALMA Tech Handbook
- Helpdesk Knowledgebase



Downloading the ALMA OT

About Science **Proposing** Observing Data Processing Tools Documentation Help Search Site

Observing Tool

The ALMA Observing Tool (OT) is a Java application used for the preparation and submission of ALMA Phase 1 (observing proposal) and Phase 2 (telescope runfiles for accepted proposals) materials. It is also used for preparing and submitting Director's Discretionary Time (DDT) proposals. The current *Cycle 6* release of the OT is configured for the present capabilities of ALMA as described in the Cycle 6 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 a **64-bit version of Java 8** is 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 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 a lation issues.

Webstart Tarball

Using webstart is easier and has the advantage that it checks for and will download a newer version at startup

Documentation

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

NRAO

Proposal Checklist

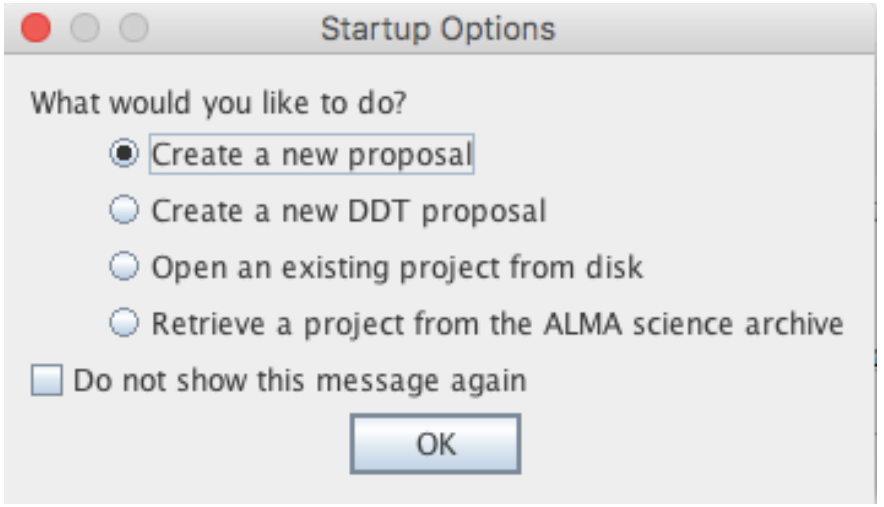
- ☐ Read relevant documentation (CfP, Guide, Primer, etc.)
- ☐ Create an ALMA account by registering at the Science Portal (almascience.org)
- ☑ Download the Observing Tool (OT) & related guides
- ☐ Prepare the Science Case
  - ☐ Note the new capabilities for this cycle!
- ☐ Prepare Science Goals (sources, frequency & correlator setup, integration times) within the OT
- ☐ Make use of the Helpdesk & the Knowledgebase

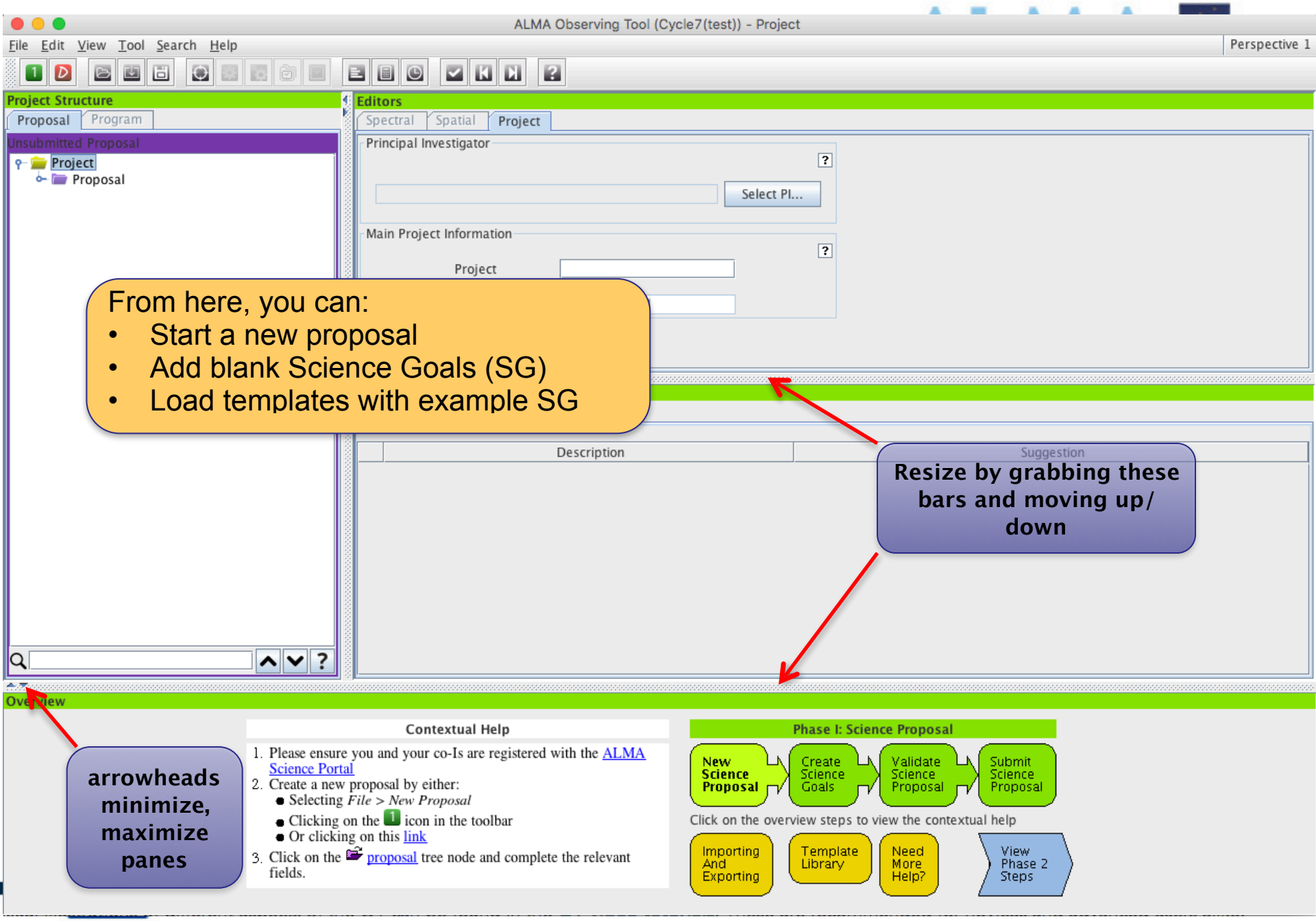
Let's make a proposal!

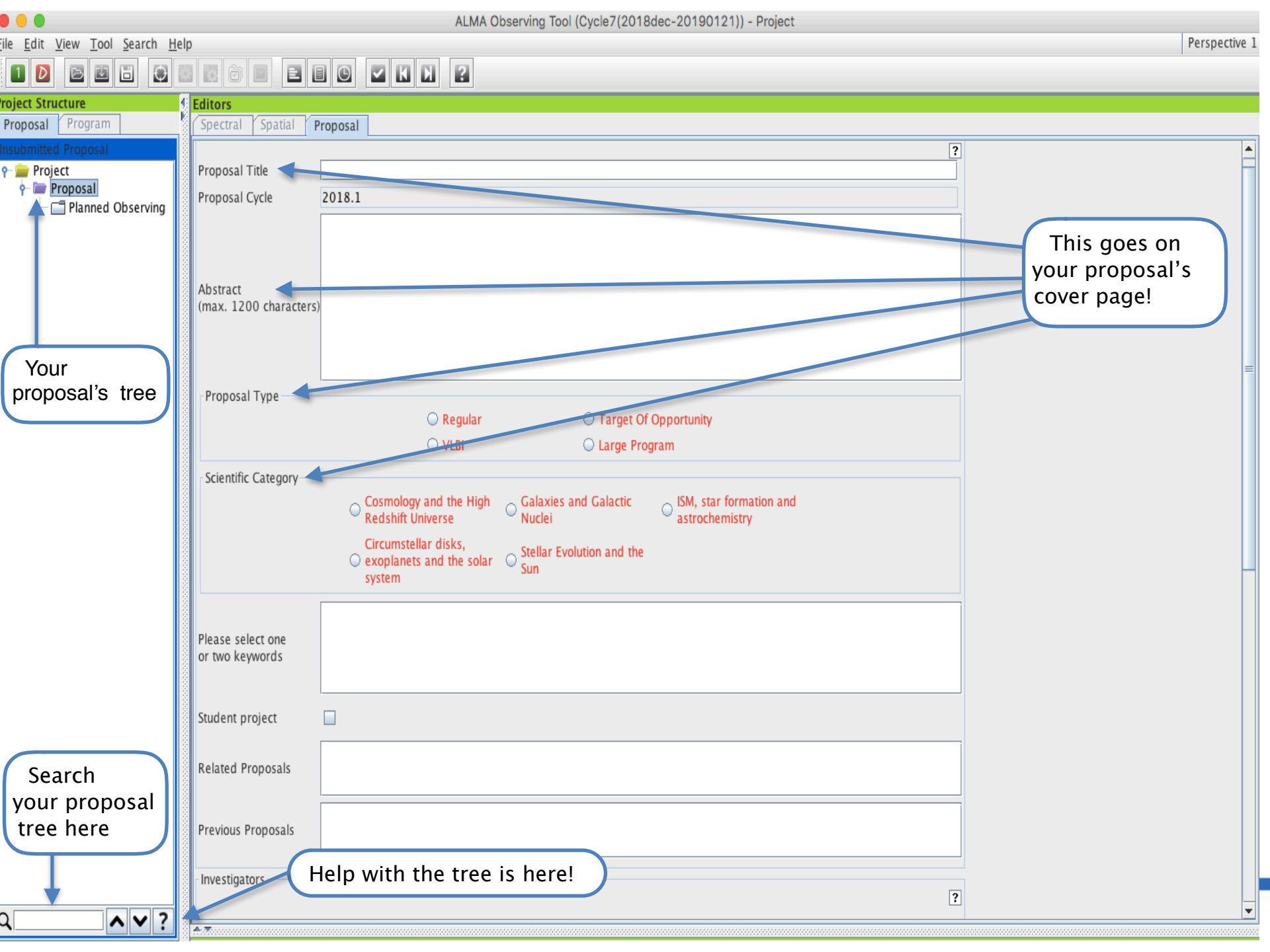
Open up your freshly downloaded OT

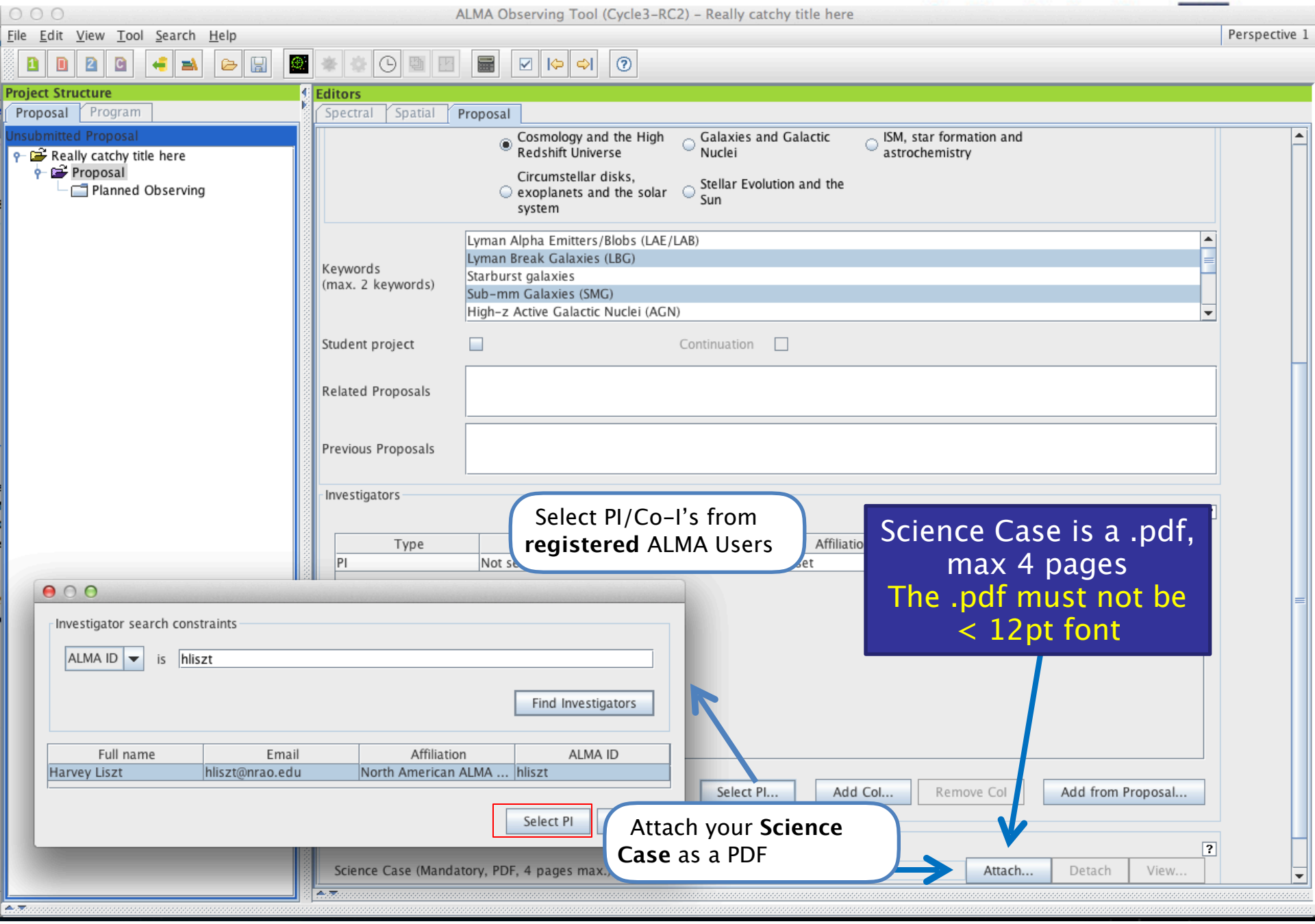
When the ALMA OT starts

Then you see this



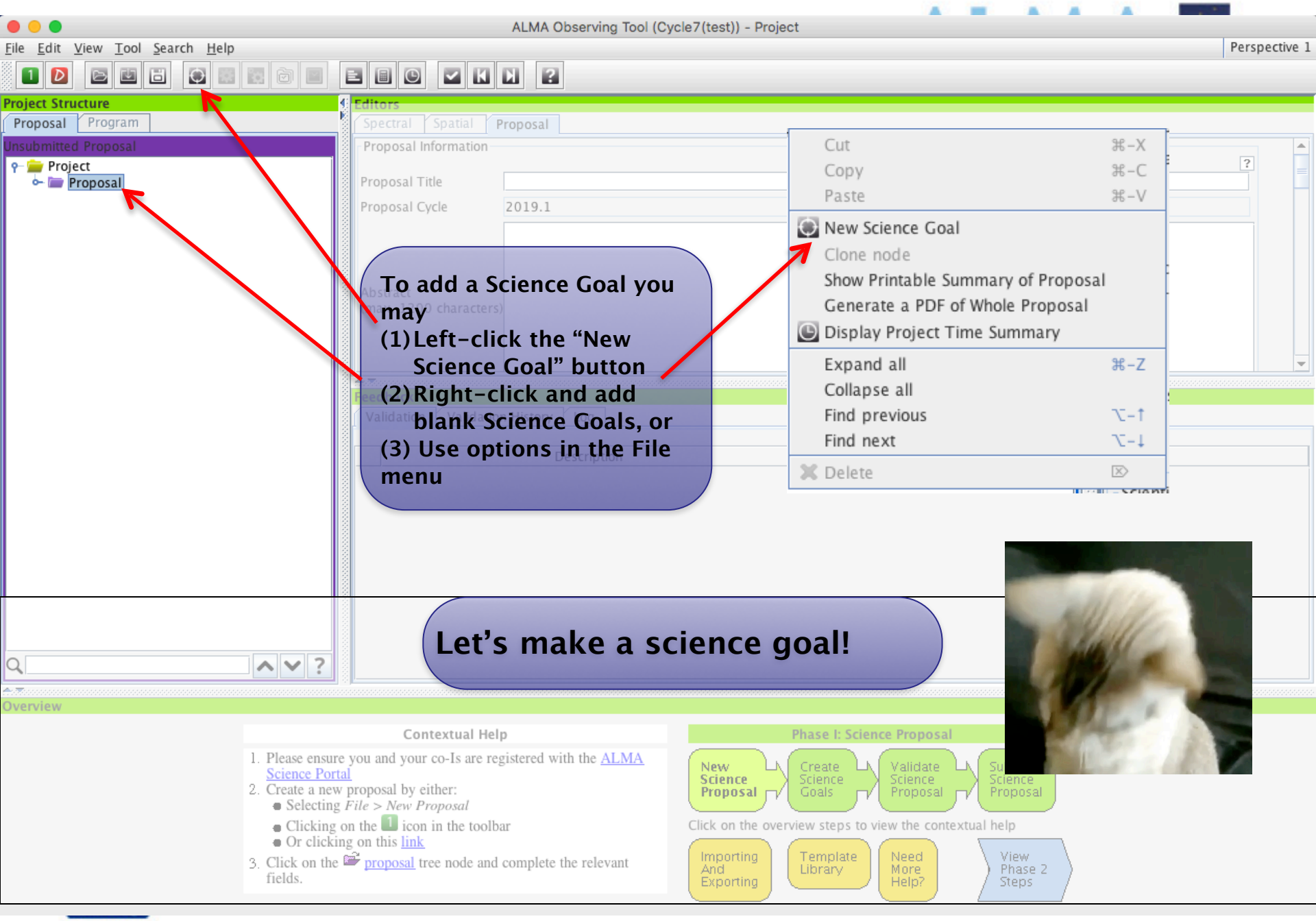

ALMA Observing Tool (Cycle7(test)) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Editors
Spectral Spatial Project
Principal Investigator
Select PI...
Main Project Information
Project
From here, you can:
• Start a new proposal
• Add blank Science Goals (SG)
• Load templates with example SG
Description
Suggestion
Resize by grabbing these bars and moving up/ down
arrowheads minimize, maximize panes
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


ALMA Observing Tool (Cycle7(2018dec-20190121)) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
Editors
Spectral Spatial Proposal
Proposal Title
Proposal Cycle
2018.1
Abstract
(max. 1200 characters)
Proposal Type
Regular
Target Of Opportunity
VLBI
Large Program
Scientific Category
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
Please select one or two keywords
Student project
Related Proposals
Previous Proposals
Investigators
This goes on your proposal's cover page!
Your proposal's tree
Search your proposal tree here
Help with the tree is here!


ALMA Observing Tool (Cycle3-RC2) – Really catchy title here
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Really catchy title here
Proposal
Planned Observing
Editors
Spectral Spatial Proposal
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
PI
Affiliation
Select PI/Co-I's from registered ALMA Users
Science Case is a .pdf, max 4 pages
The .pdf must not be < 12pt font
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
Select PI...
Add CoI...
Remove CoI
Add from Proposal...
Attach your Science Case as a PDF
Science Case (Mandatory, PDF, 4 pages max.)
Attach...
Detach
View...

Science Case

- Must include:
  - Astronomical Importance
  - Estimated intensity, S/N, size of target sample (when appropriate)
- May include:
  - Figures
  - Tables
  - References
- Free-form PDF document
  - 12+ font, English only
    - 10% of text or less in font below 12pt
  - 20 MB file size
  - 4 pages total (6 for Large Projects)


ALMA Observing Tool (Cycle7(test)) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Editors
Spectral Spatial Proposal
Proposal Information
Proposal Title
Proposal Cycle
2019.1
Cut ⌘-X
Copy ⌘-C
Paste ⌘-V
New Science Goal
Clone node
Show Printable Summary of Proposal
Generate a PDF of Whole Proposal
Display Project Time Summary
Expand all ⌘-Z
Collapse all
Find previous ⌥-↑
Find next ⌥-↓
Delete
To add a Science Goal you may
(1) Left-click the "New Science Goal" button
(2) Right-click and add blank Science Goals, or
(3) Use options in the File menu
Let's make a science goal!
Overview
Contextual Help
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New Science Proposal
Create Science Goals
Validate Science Proposal
Science Proposal
Click on the overview steps to view the contextual help
Importing And Exporting
Template Library
Need More Help?
View Phase 2 Steps

Example - mapping out CO(1-0)

• Methodology – Using a single pointing, obtain a spectral line observation of the 12CO(1–0) line at 10 km/s resolution. The CO gas traces molecular hydrogen gas and will be used to map the gas velocity and distribution.

• Source – NGC 4797
• RA, Dec = 12:54:55.166, +27:24:45.55
• z= 0.0262
• Requirements – S/N=5 on the 12CO(1–0) line (rest frequency 115.271 GHz).

– Peak line flux of 4.60 mJy/beam.
– Desired sensitivity per pointing of 920 μJy/beam.

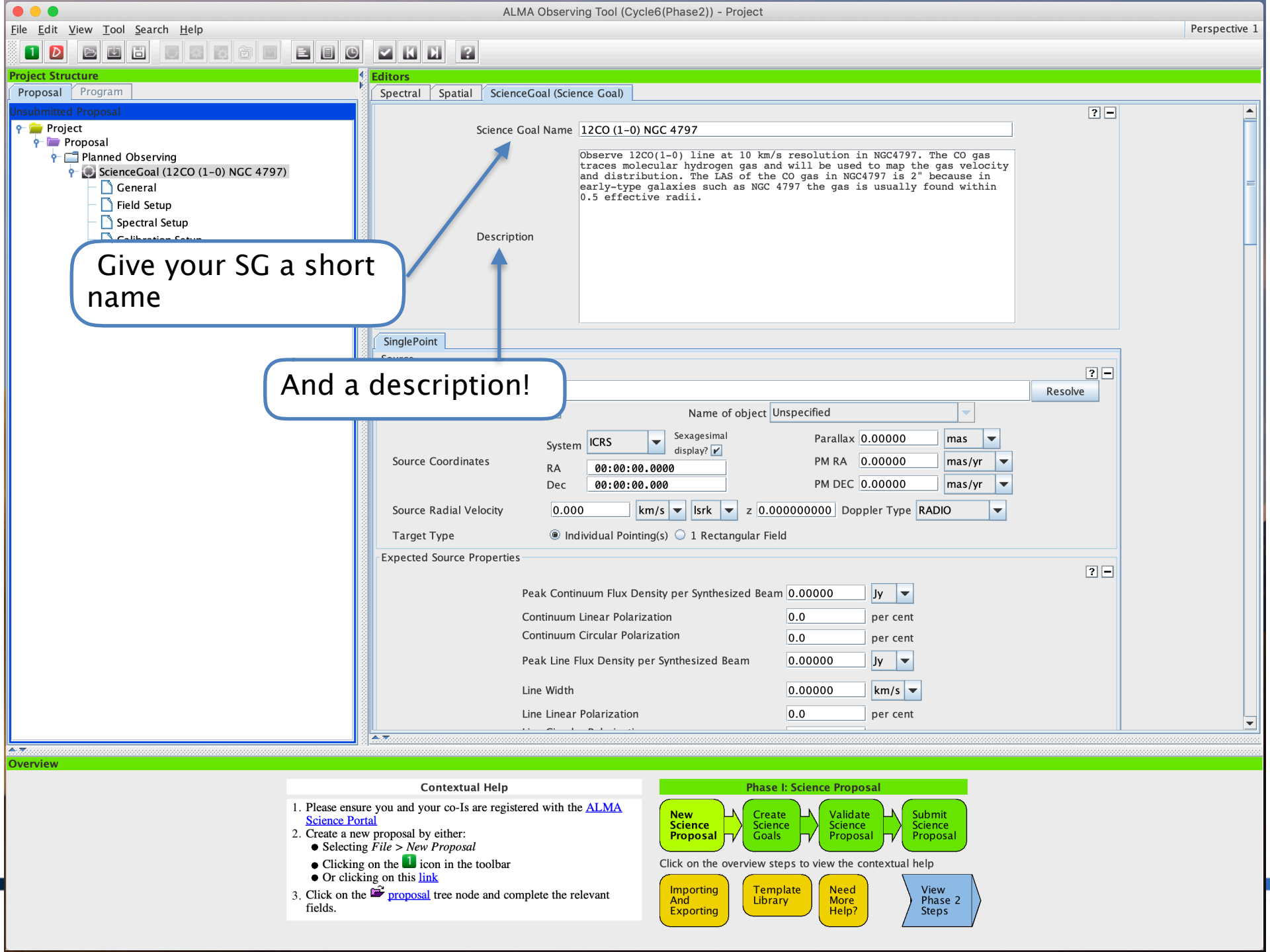
– Line width = 450 km/s.

• Dual polarization products.

• Correlator setup: band 3, 1875 MHz bandwidth, 1.129 kHz (3 km/s) resolution.

• Set the bandwidth used for sensitivity to 10 km/s because we will spectrally average to this channel width during data reduction.

• Largest angular scale (LAS) = 2.0", resolution = 1.5". The LAS of the CO gas in NGC4797 is 2" because in early-type galaxies such as NGC 4797 the gas is usually found within 0.5 effective radii (Davis et al. 2013).


ALMA Observing Tool (Cycle6(Phase2)) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (12CO (1-0) NGC 4797)
General
Field Setup
Spectral Setup
Editors
Spectral Spatial ScienceGoal (Science Goal)
Science Goal Name 12CO (1-0) NGC 4797
Description
Observe 12CO(1-0) line at 10 km/s resolution in NGC4797. The CO gas traces molecular hydrogen gas and will be used to map the gas velocity and distribution. The LAS of the CO gas in NGC4797 is 2" because in early-type galaxies such as NGC 4797 the gas is usually found within 0.5 effective radii.
Give your SG a short name
And a description!
SinglePoint
Resolve
Name of object Unspecified
Source Coordinates
System ICRS
Sexagesimal display?
RA 00:00:00.0000
Dec 00:00:00.000
Parallax 0.00000 mas
PM RA 0.00000 mas/yr
PM DEC 0.00000 mas/yr
Source Radial Velocity 0.000 km/s lsrk z 0.000000000 Doppler Type RADIO
Target Type Individual Pointing(s) 1 Rectangular Field
Expected Source Properties
Peak Continuum Flux Density per Synthesized Beam 0.00000 Jy
Continuum Linear Polarization 0.0 per cent
Continuum Circular Polarization 0.0 per cent
Peak Line Flux Density per Synthesized Beam 0.00000 Jy
Line Width 0.00000 km/s
Line Linear Polarization 0.0 per cent
Overview
Contextual Help
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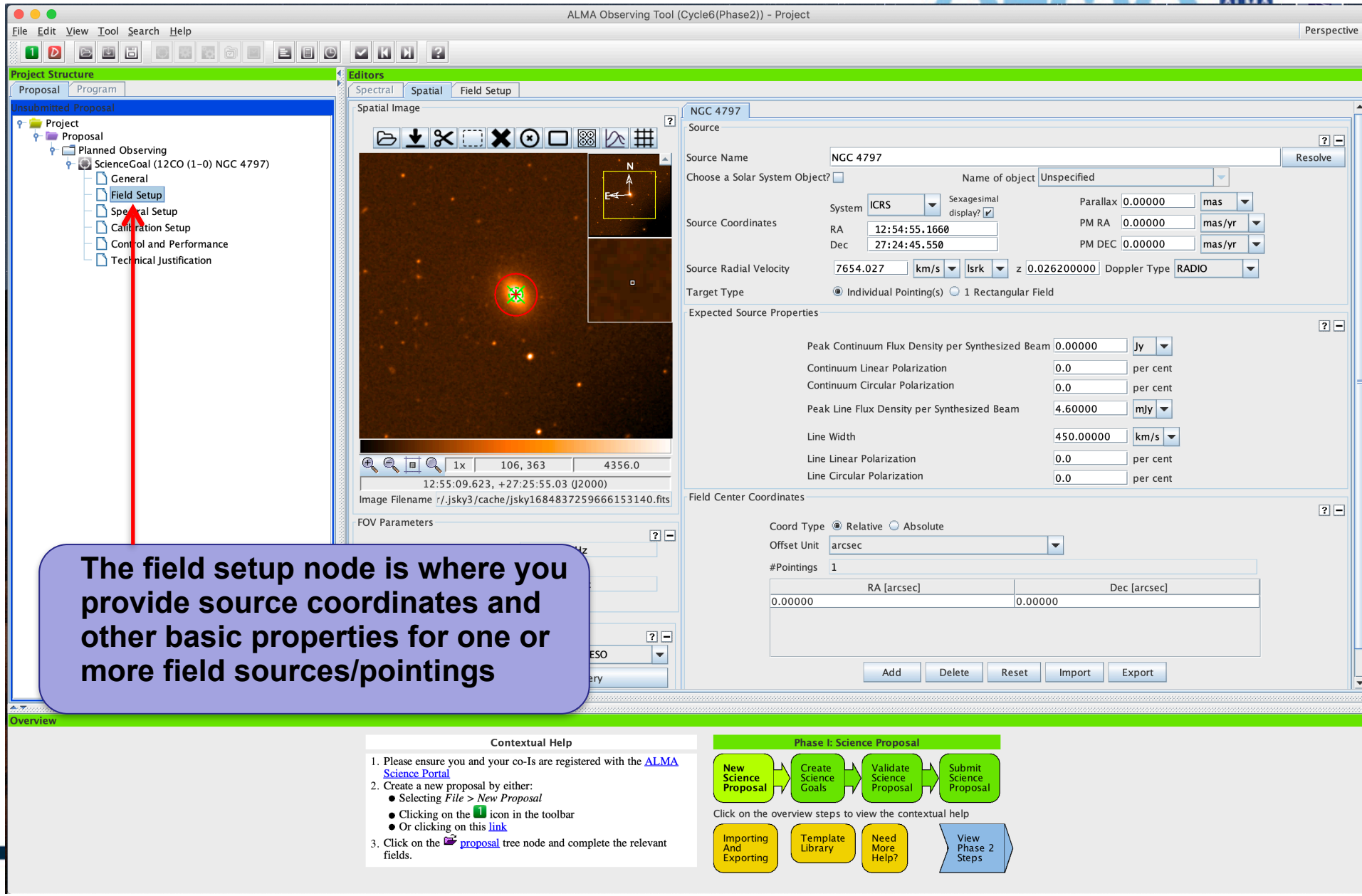
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ScienceGoal (12CO (1-0) NGC 4797)
General
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Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Editors
Spectral Spatial Field Setup
Spatial Image
N
E
1x 106, 363 4356.0
12:55:09.623, +27:25:55.03 (J2000)
Image Filename r/.jsky3/cache/jsky1684837259666153140.fits
FOV Parameters
NGC 4797
Source
Source Name NGC 4797 Resolve
Choose a Solar System Object?
Name of object Unspecified
Source Coordinates
System ICRS
Sexagesimal display?
RA 12:54:55.1660
Dec 27:24:45.550
Parallax 0.00000 mas
PM RA 0.00000 mas/yr
PM DEC 0.00000 mas/yr
Source Radial Velocity 7654.027 km/s lsrk z 0.026200000 Doppler Type RADIO
Target Type Individual Pointing(s) 1 Rectangular Field
Expected Source Properties
Peak Continuum Flux Density per Synthesized Beam 0.00000 Jy
Continuum Linear Polarization 0.0 per cent
Continuum Circular Polarization 0.0 per cent
Peak Line Flux Density per Synthesized Beam 4.60000 mJy
Line Width 450.00000 km/s
Line Linear Polarization 0.0 per cent
Line Circular Polarization 0.0 per cent
Field Center Coordinates
Coord Type Relative Absolute
Offset Unit arcsec
#Pointings 1
RA [arcsec] Dec [arcsec]
0.00000 0.00000
Add Delete Reset Import Export
The field setup node is where you provide source coordinates and other basic properties for one or more field sources/pointings
Overview
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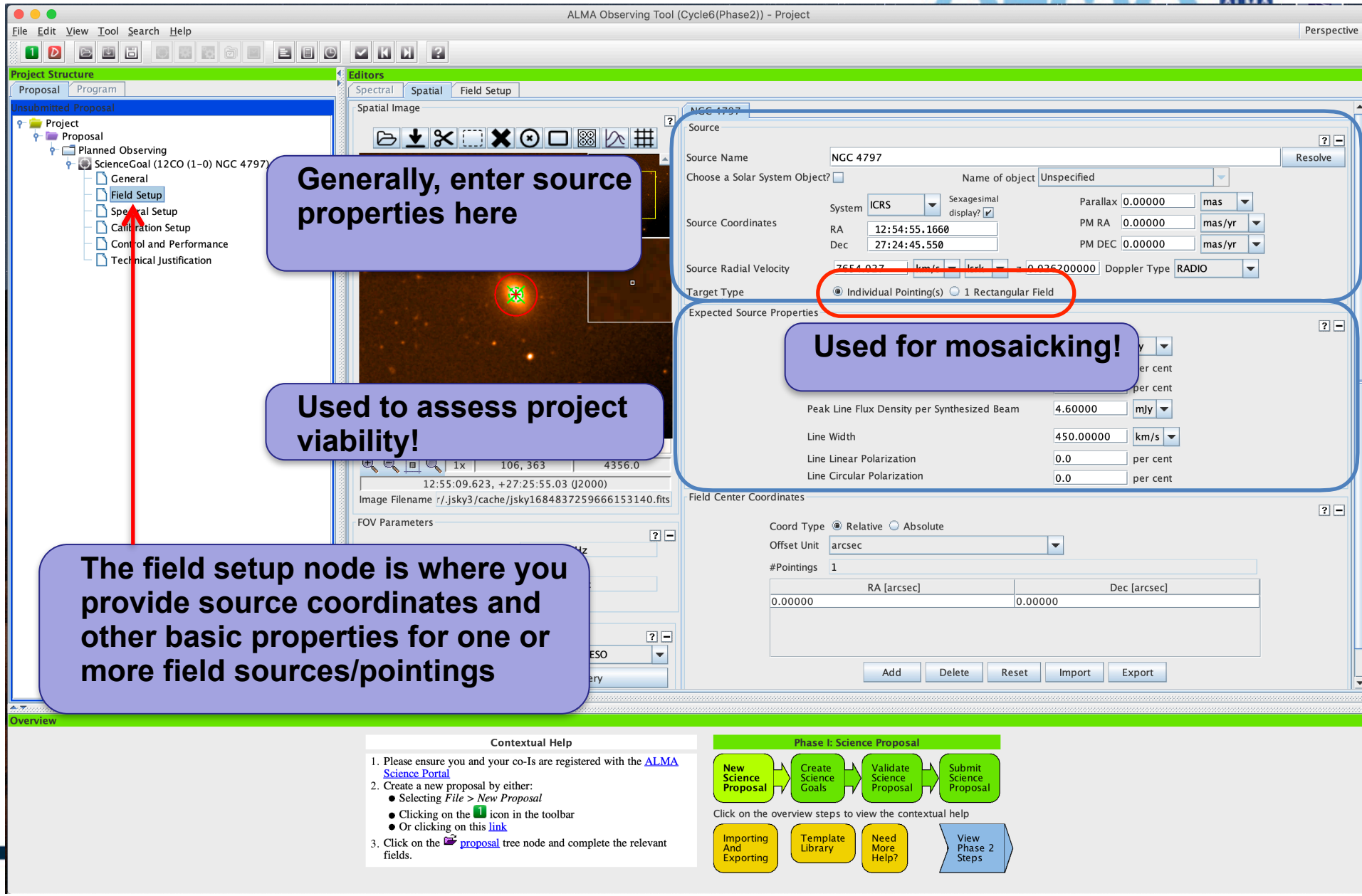
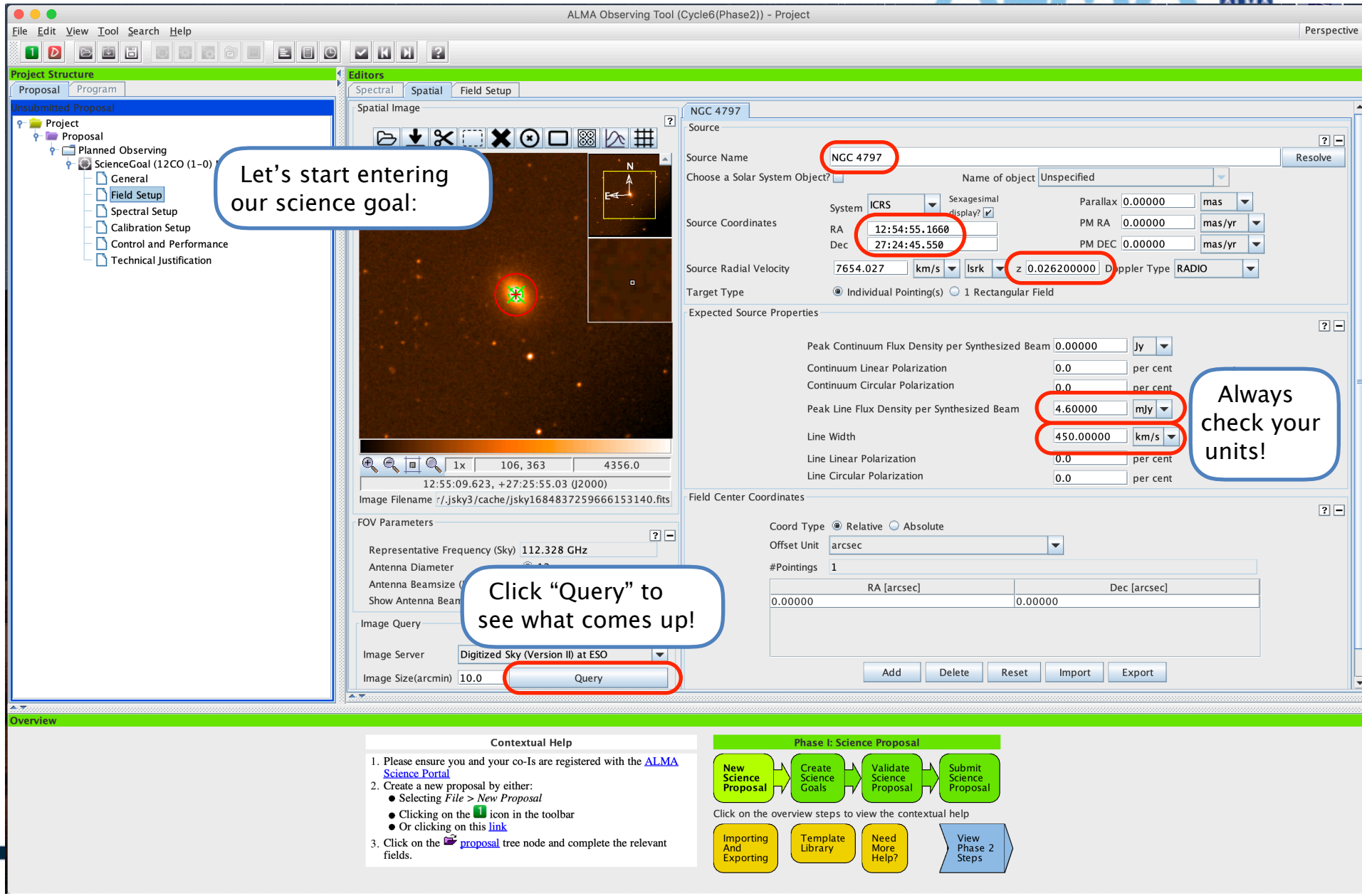


Generally, enter source properties here

Used for mosaicking!

Used to assess project viability!

The field setup node is where you provide source coordinates and other basic properties for one or more field sources/pointings


ALMA Observing Tool (Cycle6(Phase2)) - Project
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Perspective
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ScienceGoal (12CO (1-0)
General
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Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Editors
Spectral Spatial Field Setup
Spatial Image
Let's start entering our science goal:
NGC 4797
Source
Source Name
NGC 4797
Resolve
Choose a Solar System Object?
Name of object
Unspecified
Source Coordinates
System
ICRS
Sexagesimal display?
RA
12:54:55.1660
Dec
27:24:45.550
Parallax
0.00000
mas
PM RA
0.00000
mas/yr
PM DEC
0.00000
mas/yr
Source Radial Velocity
7654.027
km/s
lsrk
z
0.026200000
Doppler Type
RADIO
Target Type
Individual Pointing(s)
1 Rectangular Field
Expected Source Properties
Peak Continuum Flux Density per Synthesized Beam
0.00000
Jy
Continuum Linear Polarization
0.0
per cent
Continuum Circular Polarization
0.0
per cent
Peak Line Flux Density per Synthesized Beam
4.60000
mJy
Line Width
450.00000
km/s
Line Linear Polarization
0.0
per cent
Line Circular Polarization
0.0
per cent
Always check your units!
1x
106, 363
4356.0
12:55:09.623, +27:25:55.03 (J2000)
Image Filename
r/.jsky3/cache/jsky1684837259666153140.fits
FOV Parameters
Representative Frequency (Sky)
112.328 GHz
Antenna Diameter
Antenna Beamsize
Show Antenna Beam
Click "Query" to see what comes up!
Image Query
Image Server
Digitized Sky (Version II) at ESO
Image Size(arcmin)
10.0
Query
Field Center Coordinates
Coord Type
Relative
Absolute
Offset Unit
arcsec
#Pointings
1
RA [arcsec]
Dec [arcsec]
0.00000
0.00000
Add
Delete
Reset
Import
Export
Overview
Contextual Help
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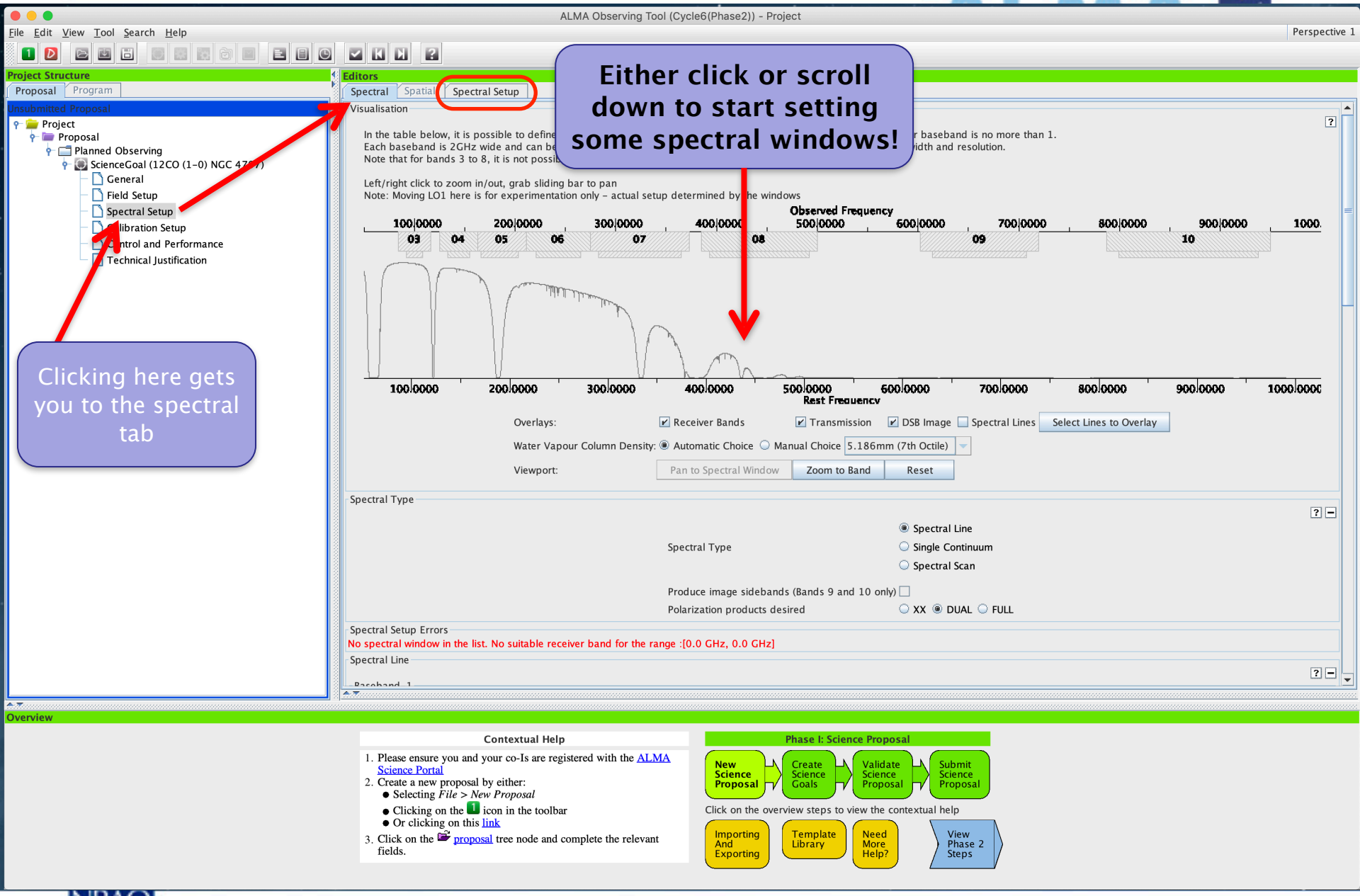
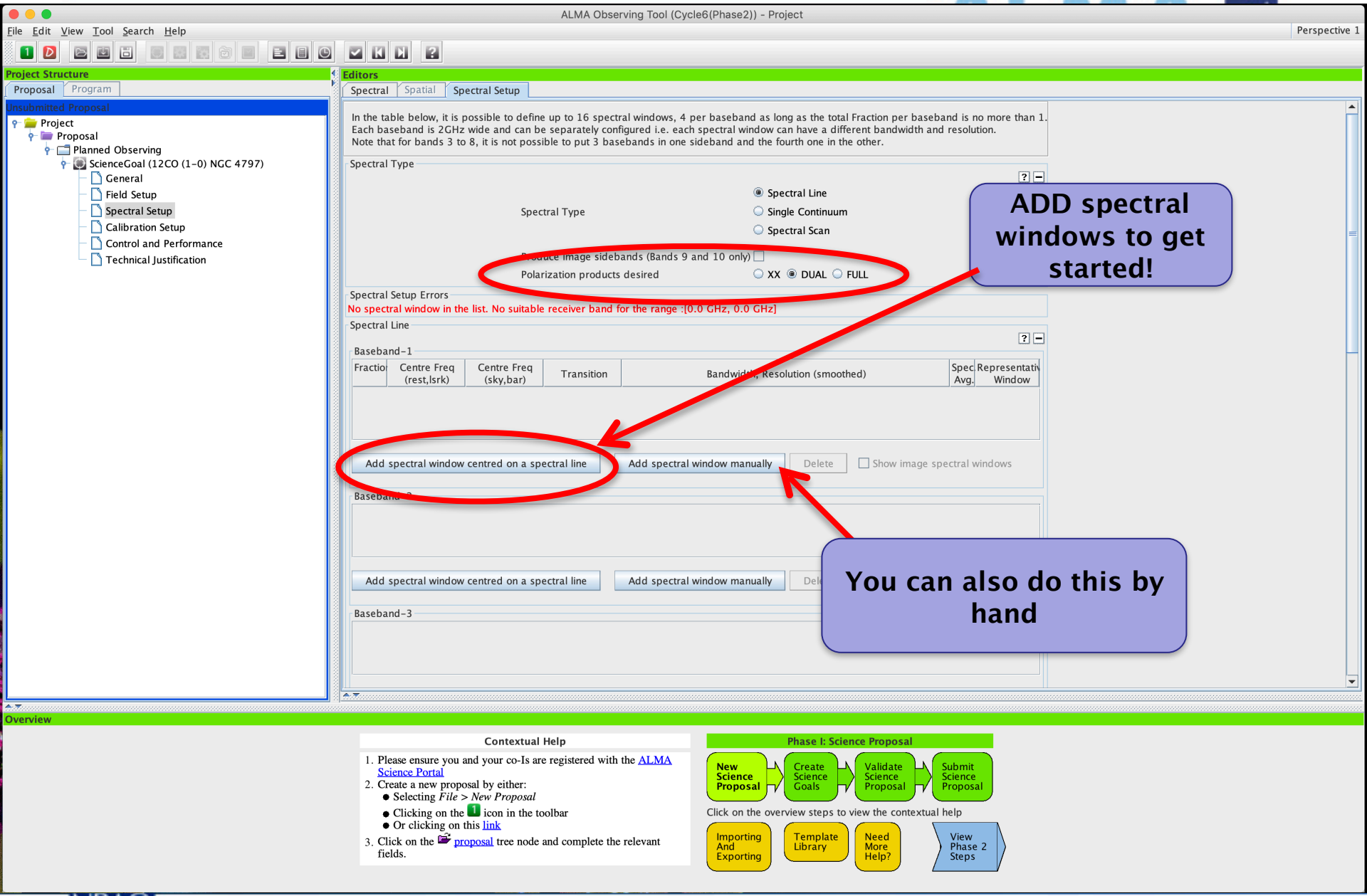
Need More Help?
View Phase 2 Steps

The spectral setup tab



Either click or scroll down to start setting some spectral windows!

Clicking here gets you to the spectral tab


ALMA Observing Tool (Cycle6(Phase2)) - Project
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Perspective 1
Project Structure
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ScienceGoal (12CO (1-0) NGC 4797)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
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 to 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
Produce image sidebands (Bands 9 and 10 only)
Polarization products desired
XX DUAL FULL
Spectral Setup Errors
No spectral window in the list. No suitable receiver band for the range :[0.0 GHz, 0.0 GHz]
Spectral Line
Baseband-1
Fractio
Centre Freq (rest,lsrk)
Centre Freq (sky,bar)
Transition
Bandwidth, Resolution (smoothed)
Spec Avg.
Representati Window
Add spectral window centred on a spectral line
Add spectral window manually
Delete
Show image spectral windows
Baseband-2
Add spectral window centred on a spectral line
Add spectral window manually
Baseband-3
ADD spectral windows to get started!
You can also do this by hand
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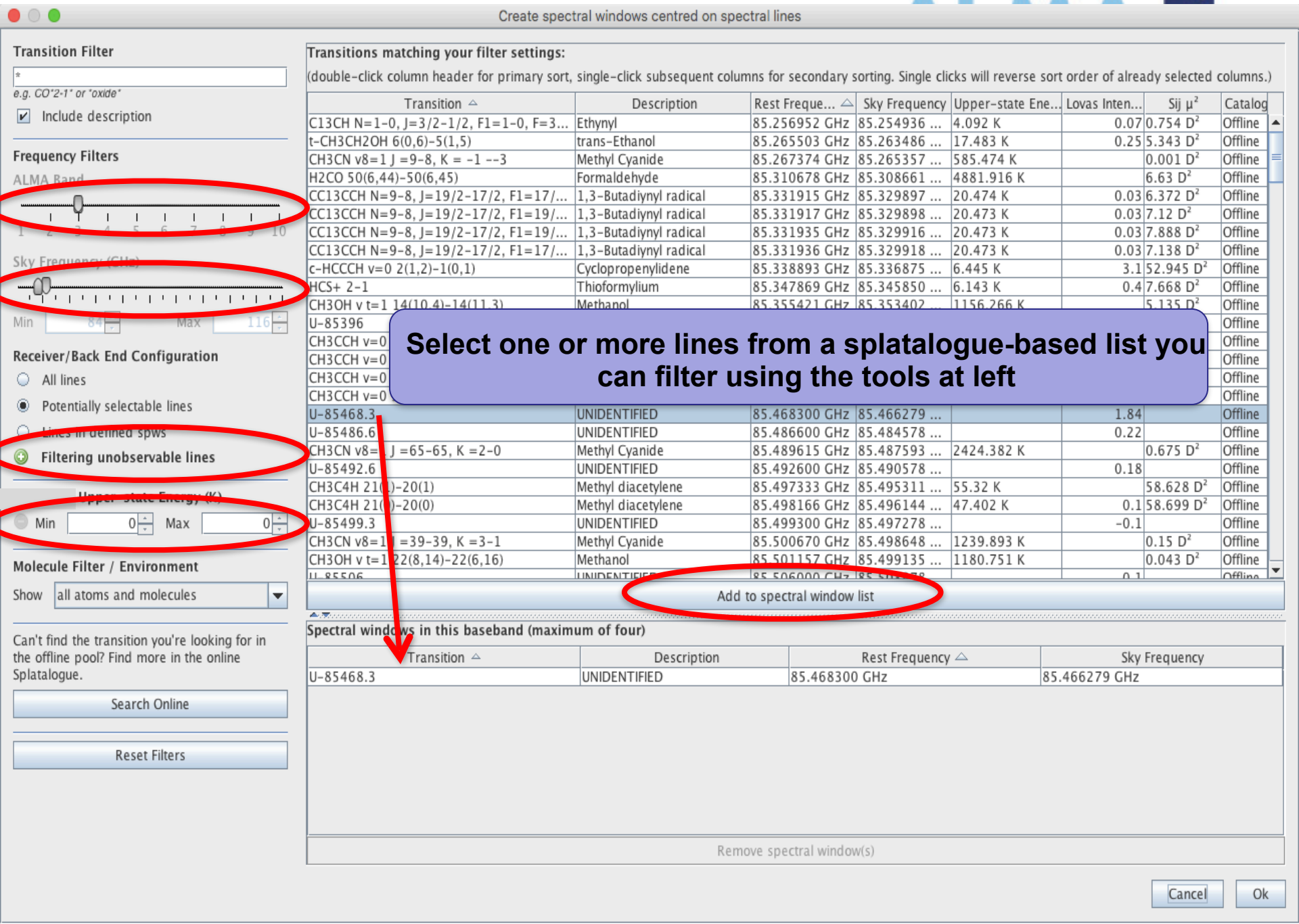
Use the spectral-line picker to find your lines



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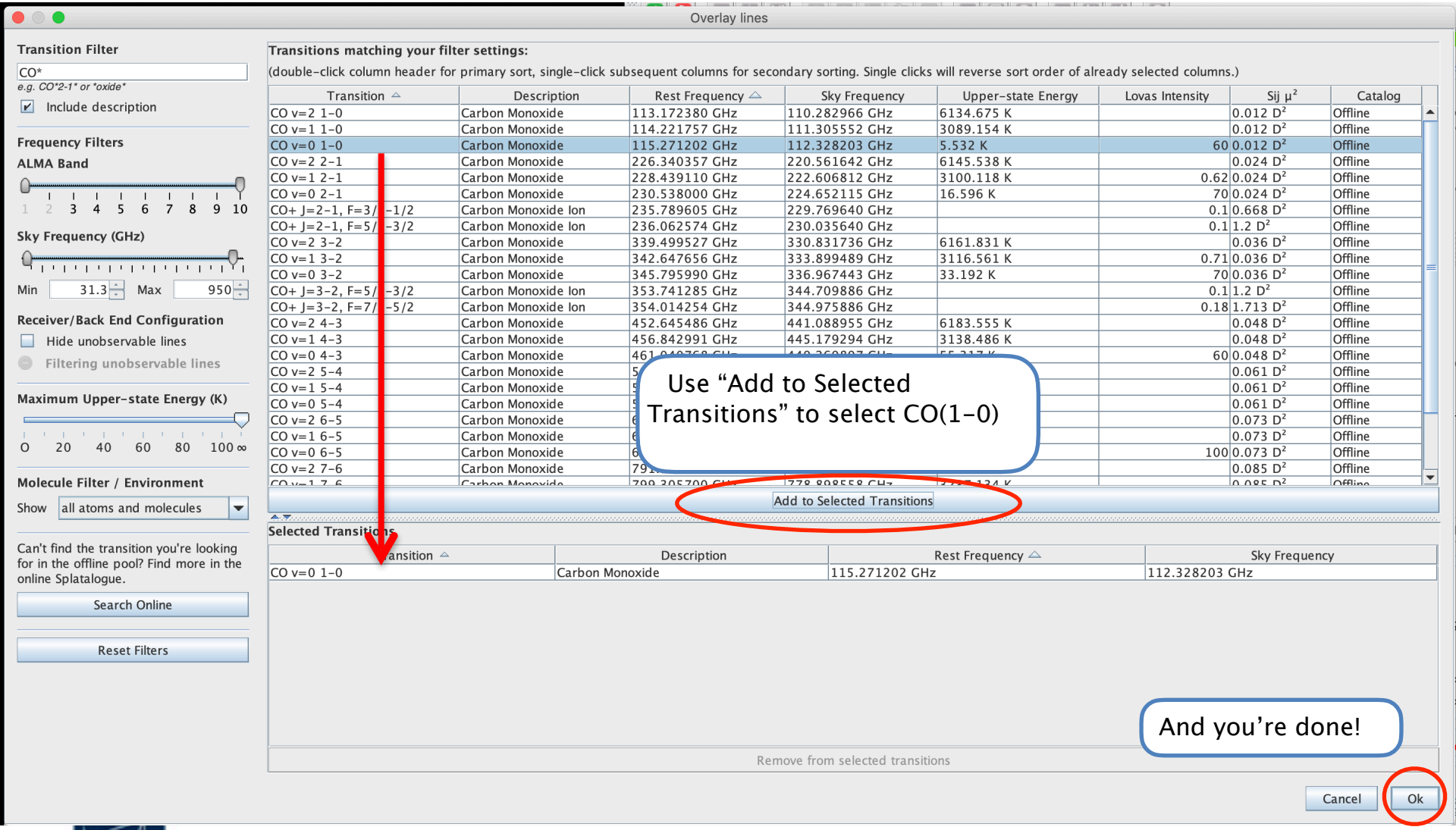

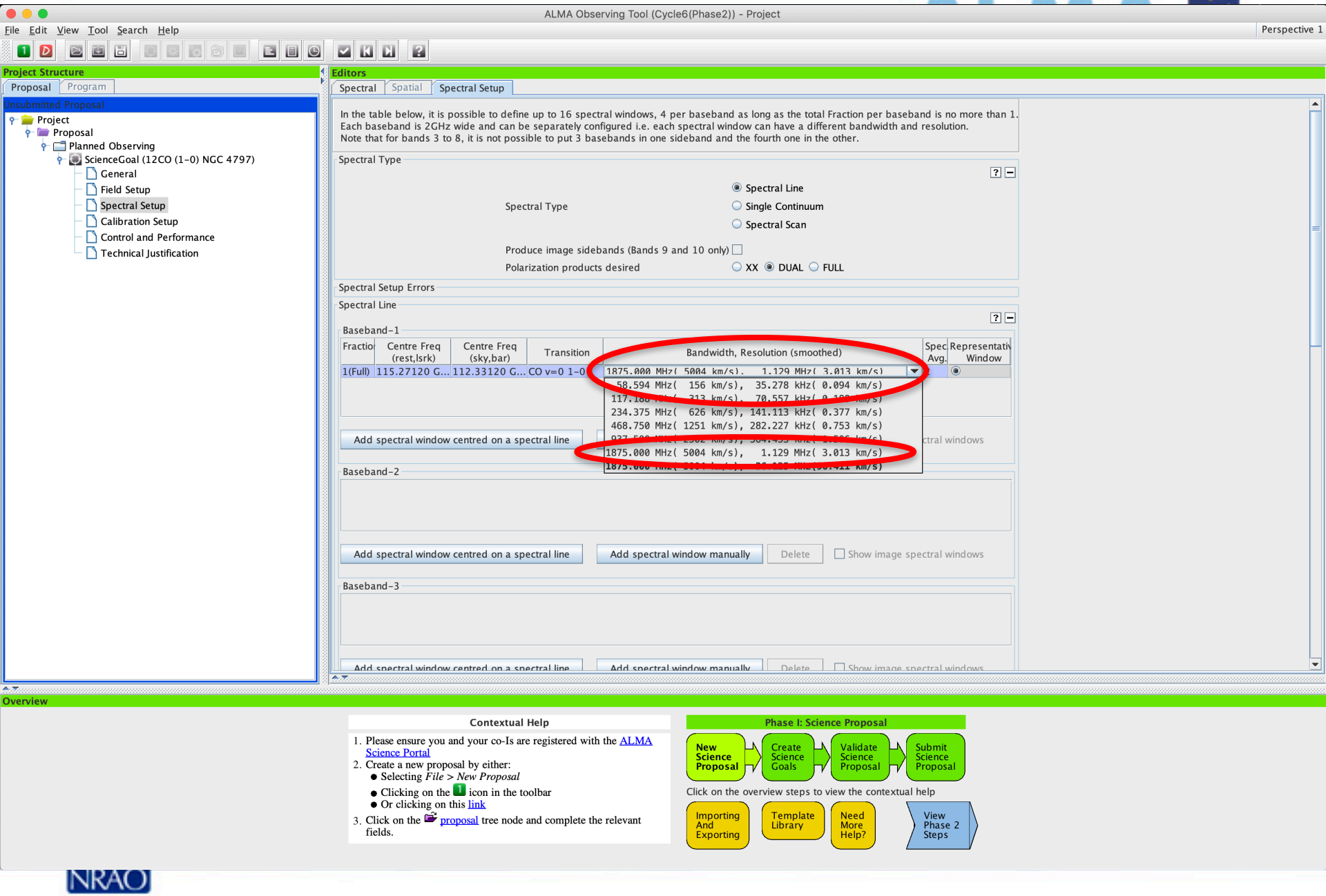
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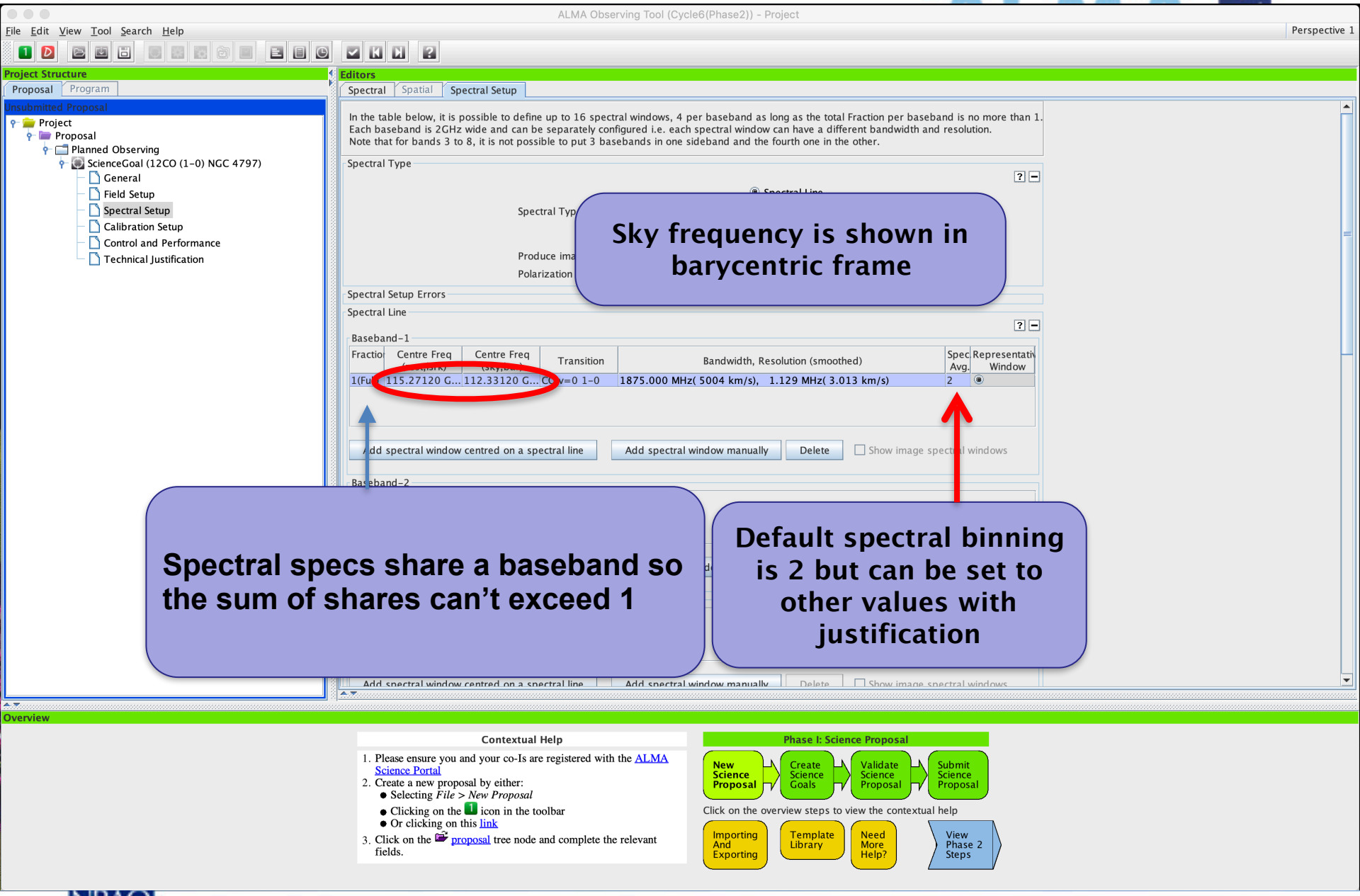
Polarization products desired
XX DUAL FULL
Spectral Setup Errors
Spectral Line
Baseband-1
Fractio
Centre Freq (rest,lsrk)
Centre Freq (sky,bar)
Transition
Bandwidth, Resolution (smoothed)
Spec Avg.
Representati Window
1(Full)
115.27120 G...
112.33120 G...
CO v=0 1-0
1875.000 MHz(5004 km/s), 1.129 MHz(3.013 km/s)
58.594 MHz(156 km/s), 35.278 kHz(0.094 km/s)
234.375 MHz(626 km/s), 141.113 kHz(0.377 km/s)
468.750 MHz(1251 km/s), 282.227 kHz(0.753 km/s)
1875.000 MHz(5004 km/s), 1.129 MHz(3.013 km/s)
Add spectral window centred on a spectral line
Baseband-2
Add spectral window centred on a spectral line
Add spectral window manually
Delete
Show image spectral windows
Baseband-3
Add spectral window centred on a spectral line
Add spectral window manually
Delete
Show image spectral windows
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


ALMA Observing Tool (Cycle6(Phase2)) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (12CO (1-0) NGC 4797)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
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 to 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.
Spectral Type
Spectral Setup Errors
Spectral Line
Baseband-1
Fractio
Centre Freq
Centre Freq
Transition
Bandwidth, Resolution (smoothed)
Spec Avg.
Representati Window
115.27120 G...
112.33120 G...
v=0 1-0
1875.000 MHz(5004 km/s), 1.129 MHz(3.013 km/s)
2
Add spectral window centred on a spectral line
Add spectral window manually
Delete
Show image spectral windows
Baseband-2
Sky frequency is shown in barycentric frame
Spectral specs share a baseband so the sum of shares can't exceed 1
Default spectral binning is 2 but can be set to other values with justification
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:
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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
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Template Library
Need More Help?
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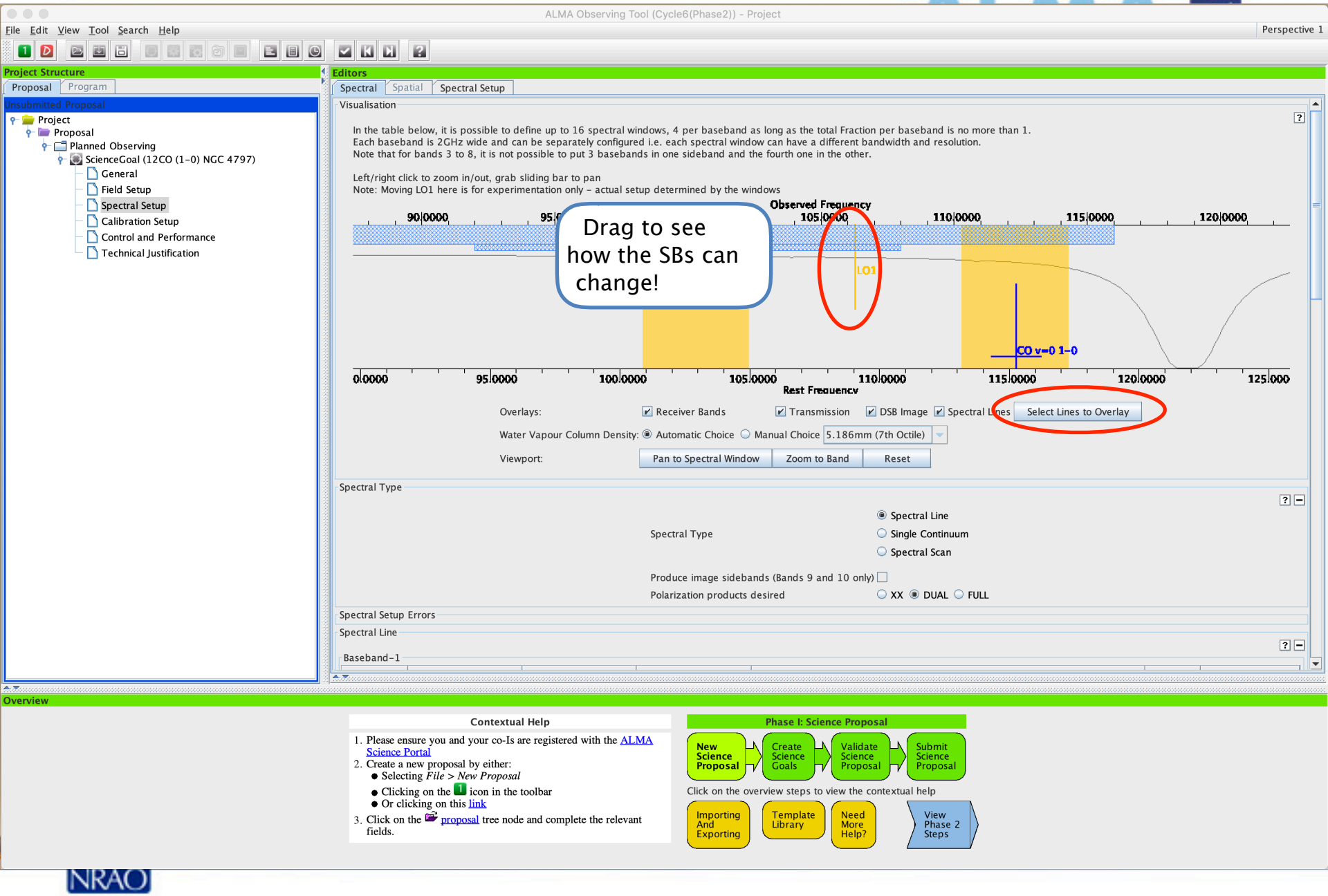
ALMA Observing Tool (Cycle6(Phase2)) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
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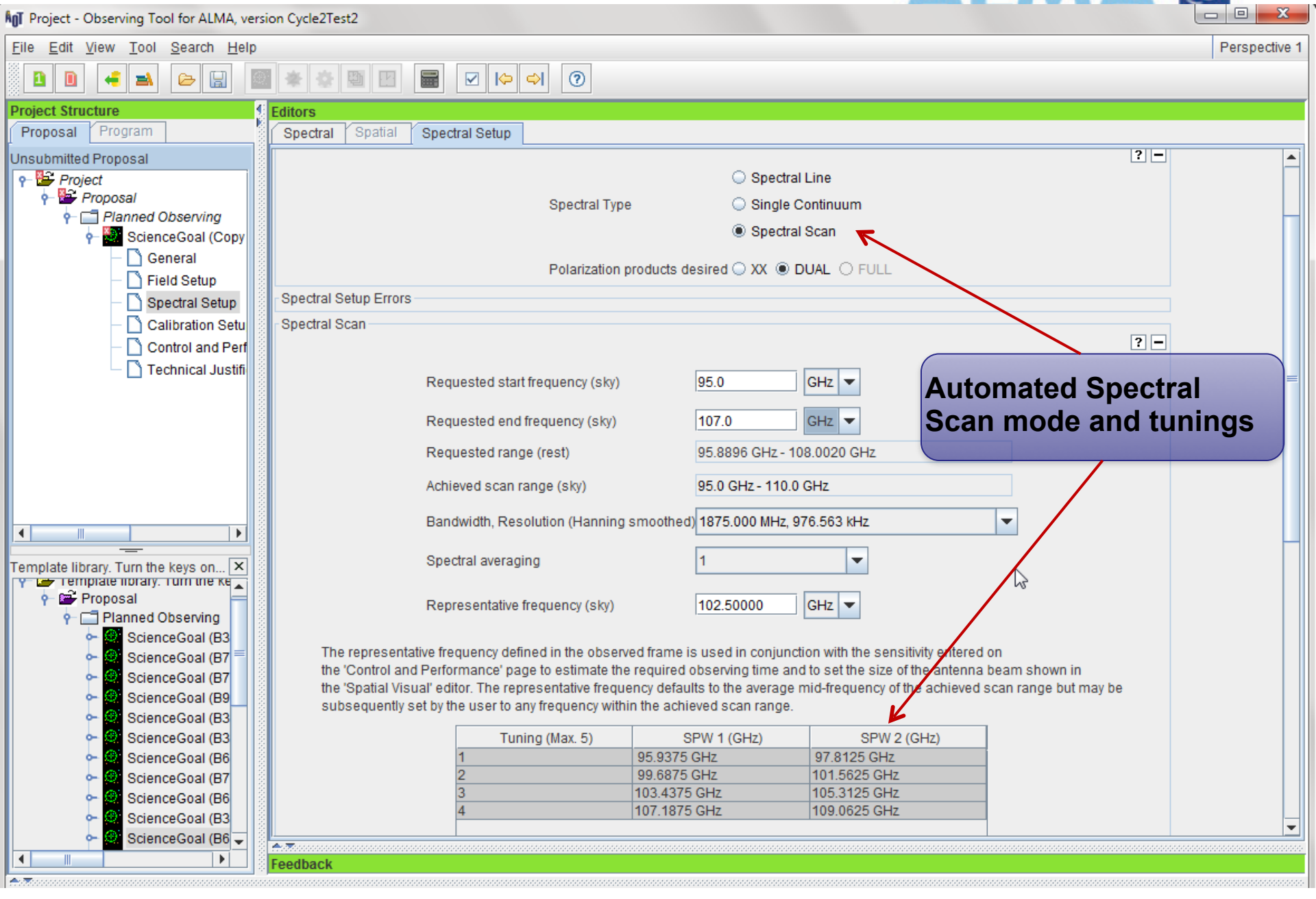
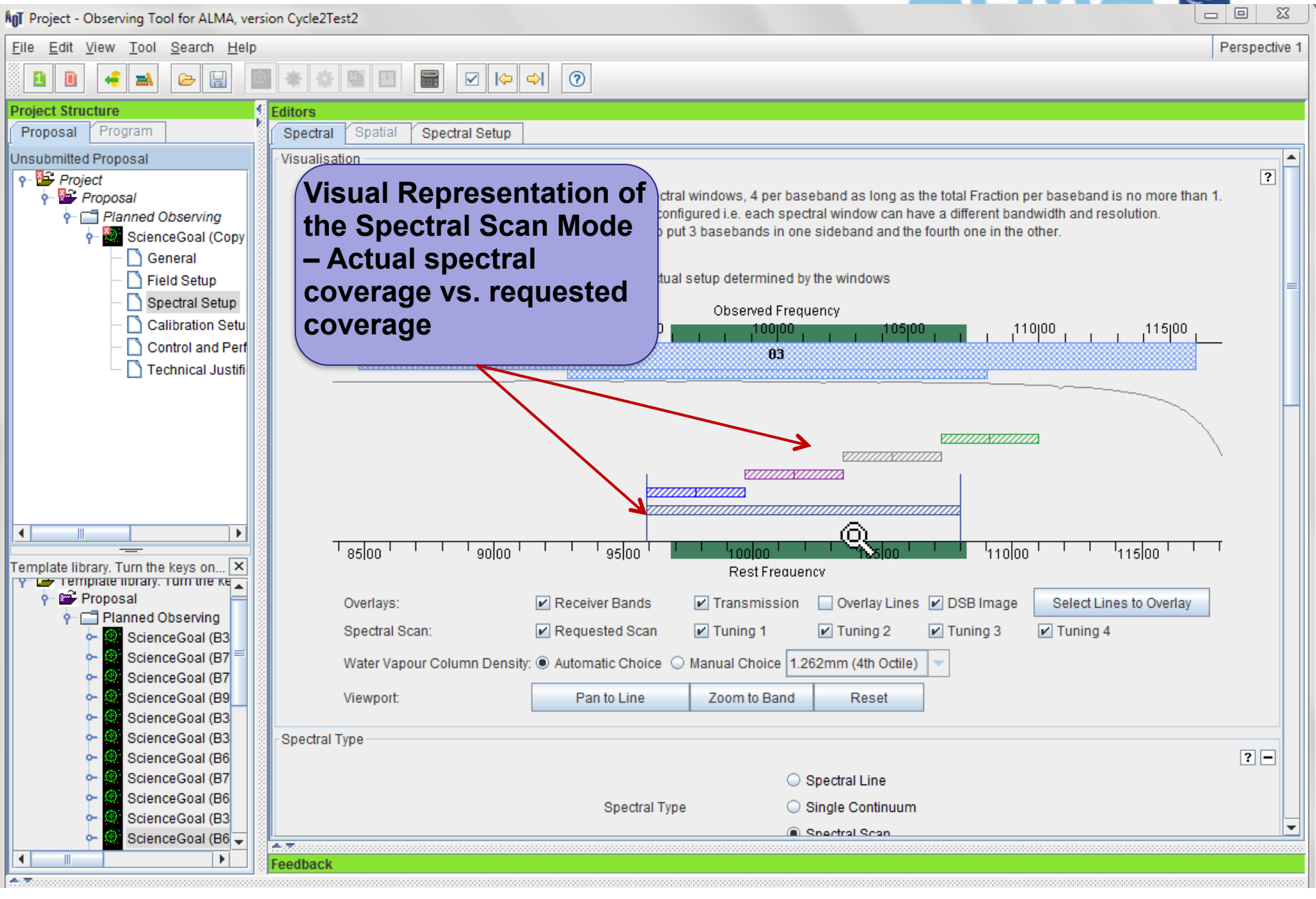
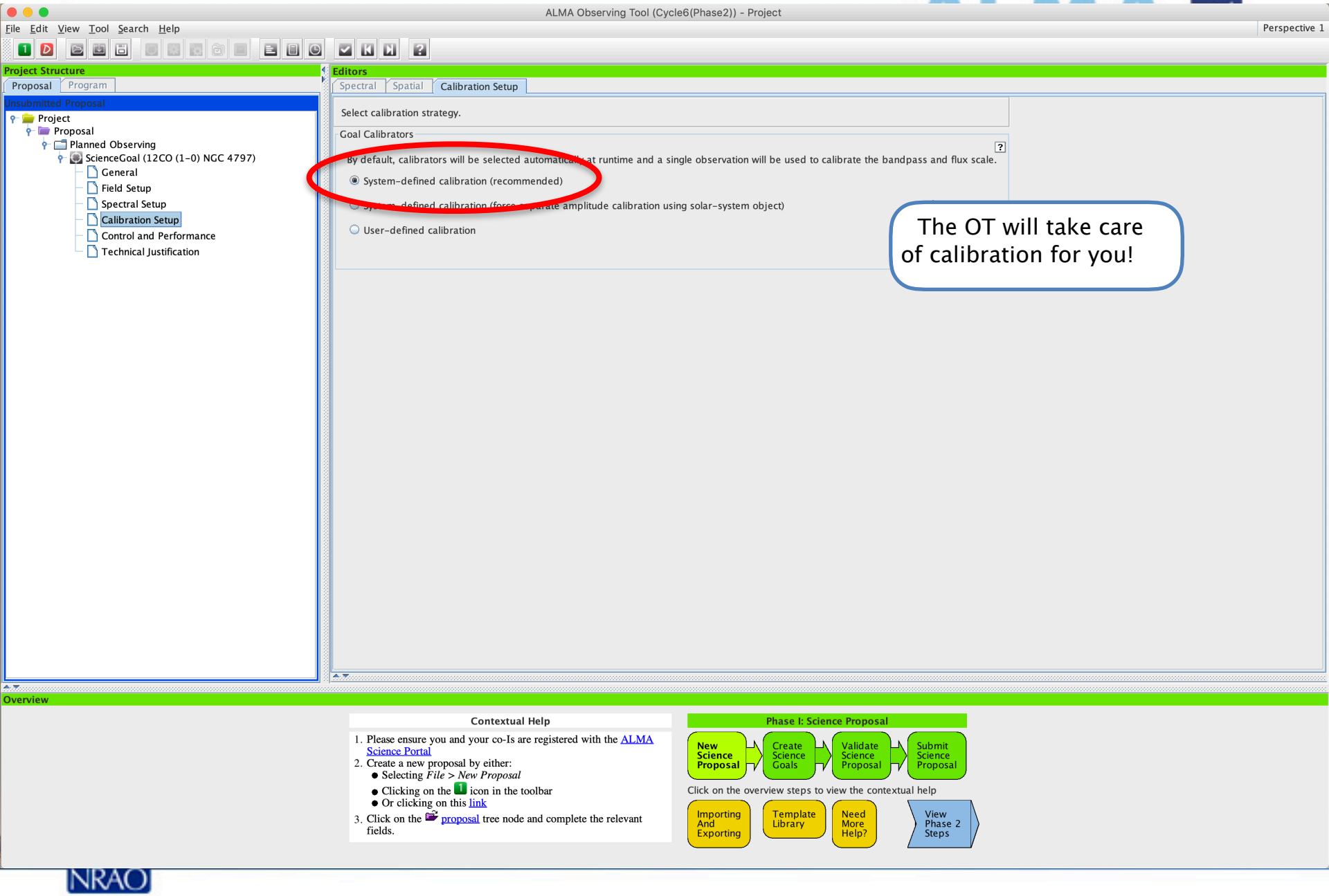
Project
Proposal
Planned Observing
ScienceGoal (12CO (1-0) NGC 4797)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Editors
Spectral Spatial Spectral Setup
Visualisation
In the table below, it is possible to define up to 16 spectral windows, 4 per 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 to 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.
Left/right click to zoom in/out, grab sliding bar to pan
Note: Moving LO1 here is for experimentation only – actual setup determined by the windows
Drag to see how the SBs can change!
Observed Frequency
90.0000
105.0000
110.0000
115.0000
120.0000
LO1
CO v=0 1-0
0.0000
95.0000
100.0000
105.0000
110.0000
115.0000
120.0000
125.000
Rest Frequency
Overlays: Receiver Bands Transmission DSB Image Spectral Lines Select Lines to Overlay
Water Vapour Column Density: Automatic Choice Manual Choice 5.186mm (7th Octile)
Viewport: Pan to Spectral Window Zoom to Band Reset
Spectral Type
Spectral Type
Spectral Line
Single Continuum
Spectral Scan
Produce image sidebands (Bands 9 and 10 only)
Polarization products desired XX DUAL FULL
Spectral Setup Errors
Spectral Line
Baseband-1
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 1 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

Automated spectral scan - I



Automated spectral scan - II




ALMA Observing Tool (Cycle6(Phase2)) - Project
File Edit View Tool Search Help
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Proposal
Planned Observing
ScienceGoal (12CO (1-0) NGC 4797)
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Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Editors
Spectral Spatial Calibration Setup
Select calibration strategy.
Goal Calibrators
By default, calibrators will be selected automatically at runtime and a single observation will be used to calibrate the bandpass and flux scale.
System-defined calibration (recommended)
User-defined calibration
The OT will take care of calibration for you!
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:
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New Science Proposal
Create Science Goals
Validate Science Proposal
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Need More Help?
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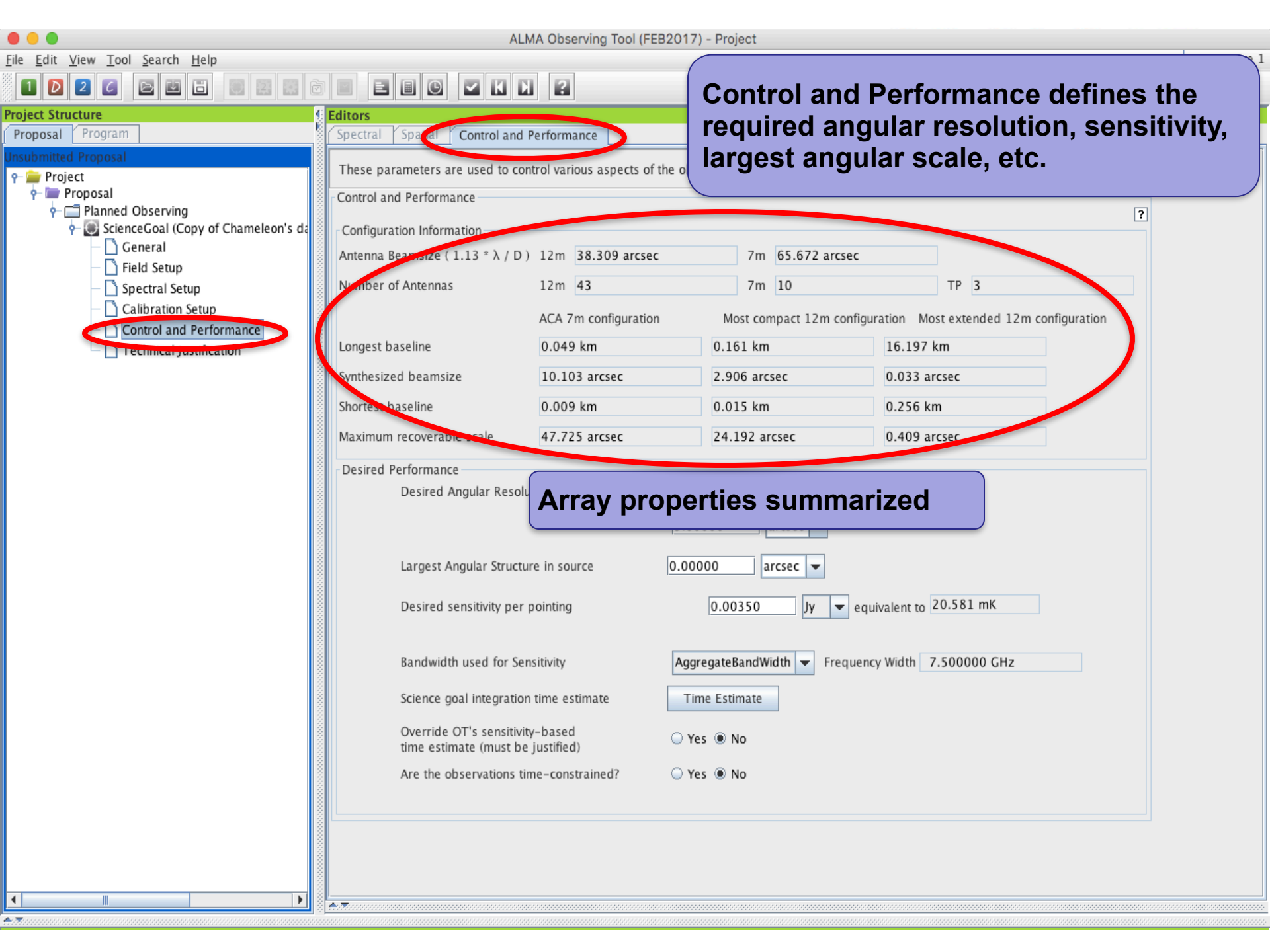
ALMA Observing Tool (FEB2017) - Project
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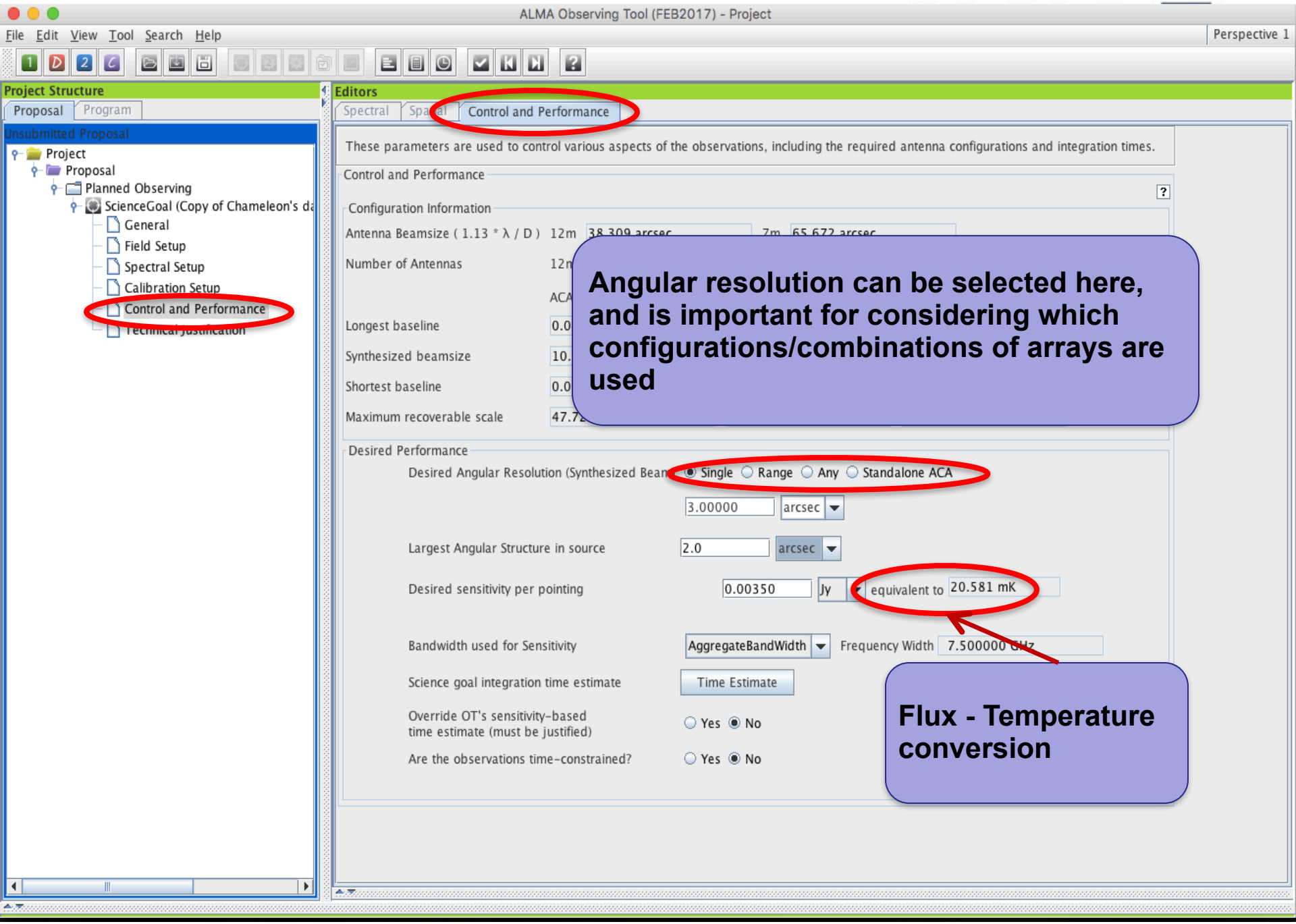
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (Copy of Chameleon's da
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Editors
Spectral
Control and Performance
These parameters are used to control various aspects of the o
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D) 12m 38.309 arcsec 7m 65.672 arcsec
Number of Antennas 12m 43 7m 10 TP 3
ACA 7m configuration
Most compact 12m configuration
Most extended 12m configuration
Longest baseline 0.049 km 0.161 km 16.197 km
Synthesized beamsize 10.103 arcsec 2.906 arcsec 0.033 arcsec
Shortest baseline 0.009 km 0.015 km 0.256 km
Maximum recoverable scale 47.725 arcsec 24.192 arcsec 0.409 arcsec
Desired Performance
Largest Angular Structure in source 0.00000 arcsec
Desired sensitivity per pointing 0.00350 Jy equivalent to 20.581 mK
Bandwidth used for Sensitivity AggregateBandWidth Frequency Width 7.500000 GHz
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
Control and Performance defines the required angular resolution, sensitivity, largest angular scale, etc.
Array properties summarized


ALMA Observing Tool (FEB2017) - Project
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Project
Proposal
Planned Observing
ScienceGoal (Copy of Chameleon's da
General
Field Setup
Spectral Setup
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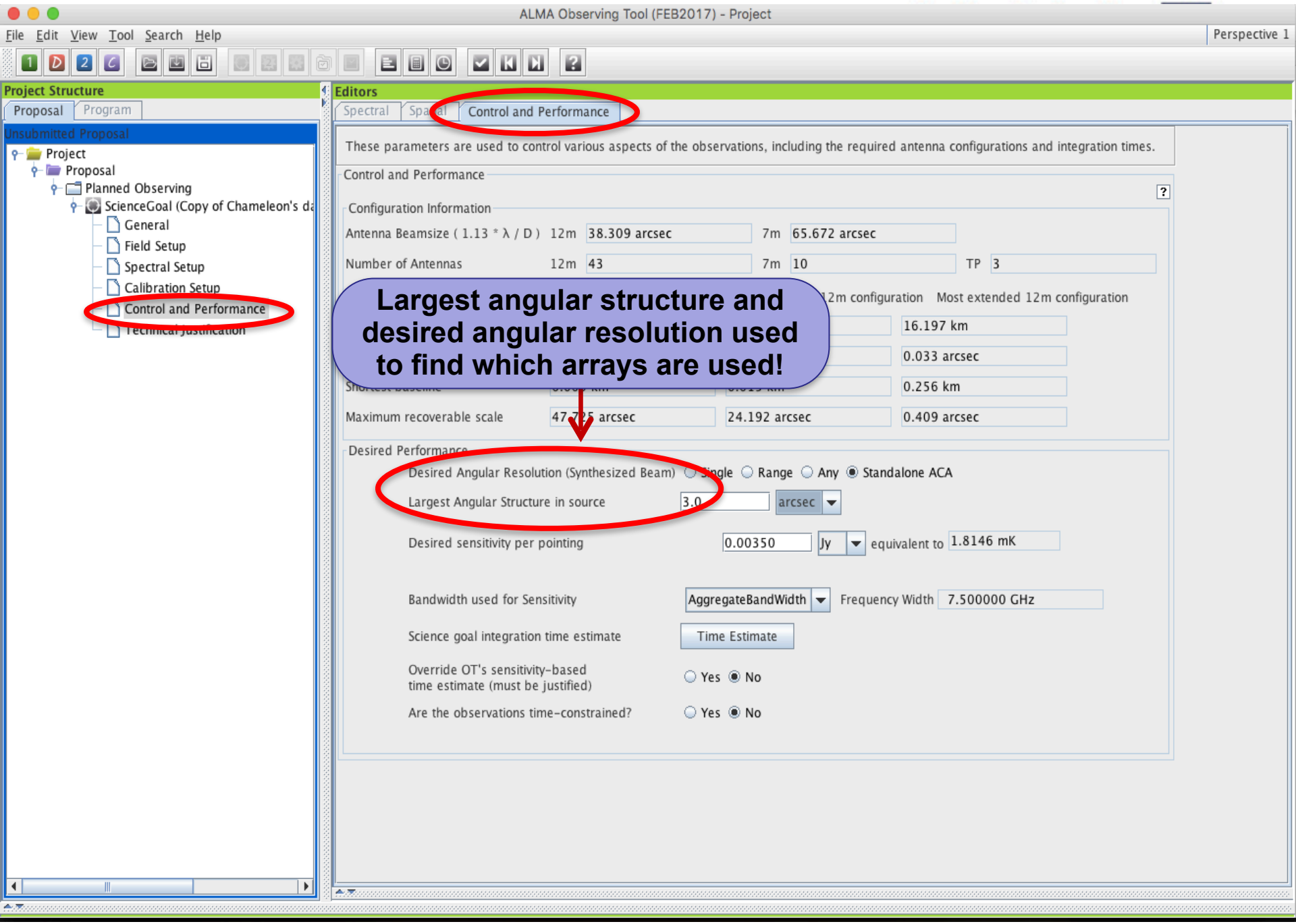
Control and Performance
Editors
Spectral Spatial Control and Performance
These parameters are used to control various aspects of the observations, including the required antenna configurations and integration times.
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D) 12m 38.309 arcsec 7m 65.672 arcsec
Number of Antennas 12m
ACA
Longest baseline 0.0
Synthesized beamsize 10.
Shortest baseline 0.0
Maximum recoverable scale 47.72
Angular resolution can be selected here, and is important for considering which configurations/combinations of arrays are used
Desired Performance
Desired Angular Resolution (Synthesized Beam) Single Range Any Standalone ACA
3.00000 arcsec
Largest Angular Structure in source 2.0 arcsec
Desired sensitivity per pointing 0.00350 Jy equivalent to 20.581 mK
Bandwidth used for Sensitivity AggregateBandWidth Frequency Width 7.500000 GHz
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
Flux - Temperature conversion


ALMA Observing Tool (FEB2017) - Project
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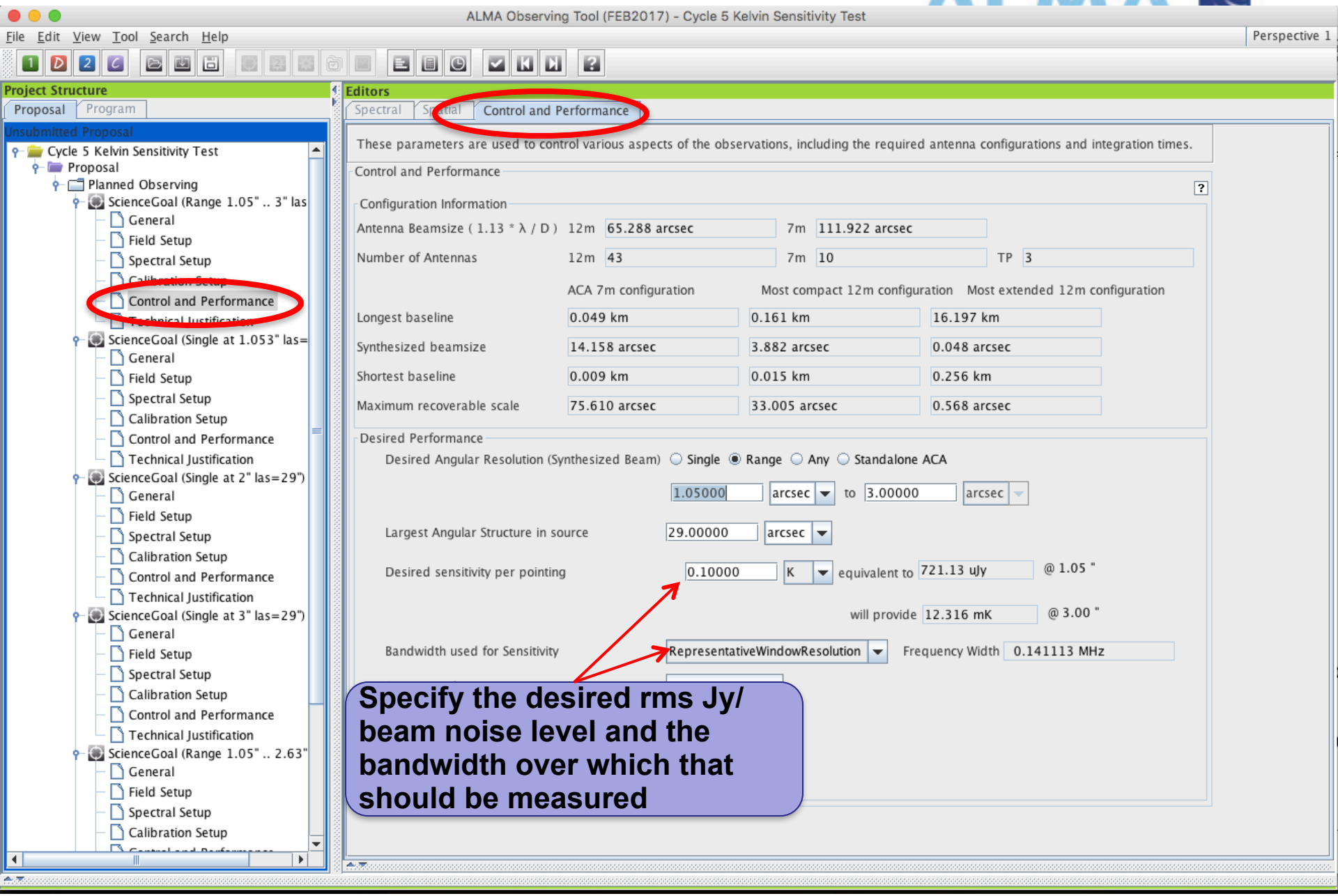
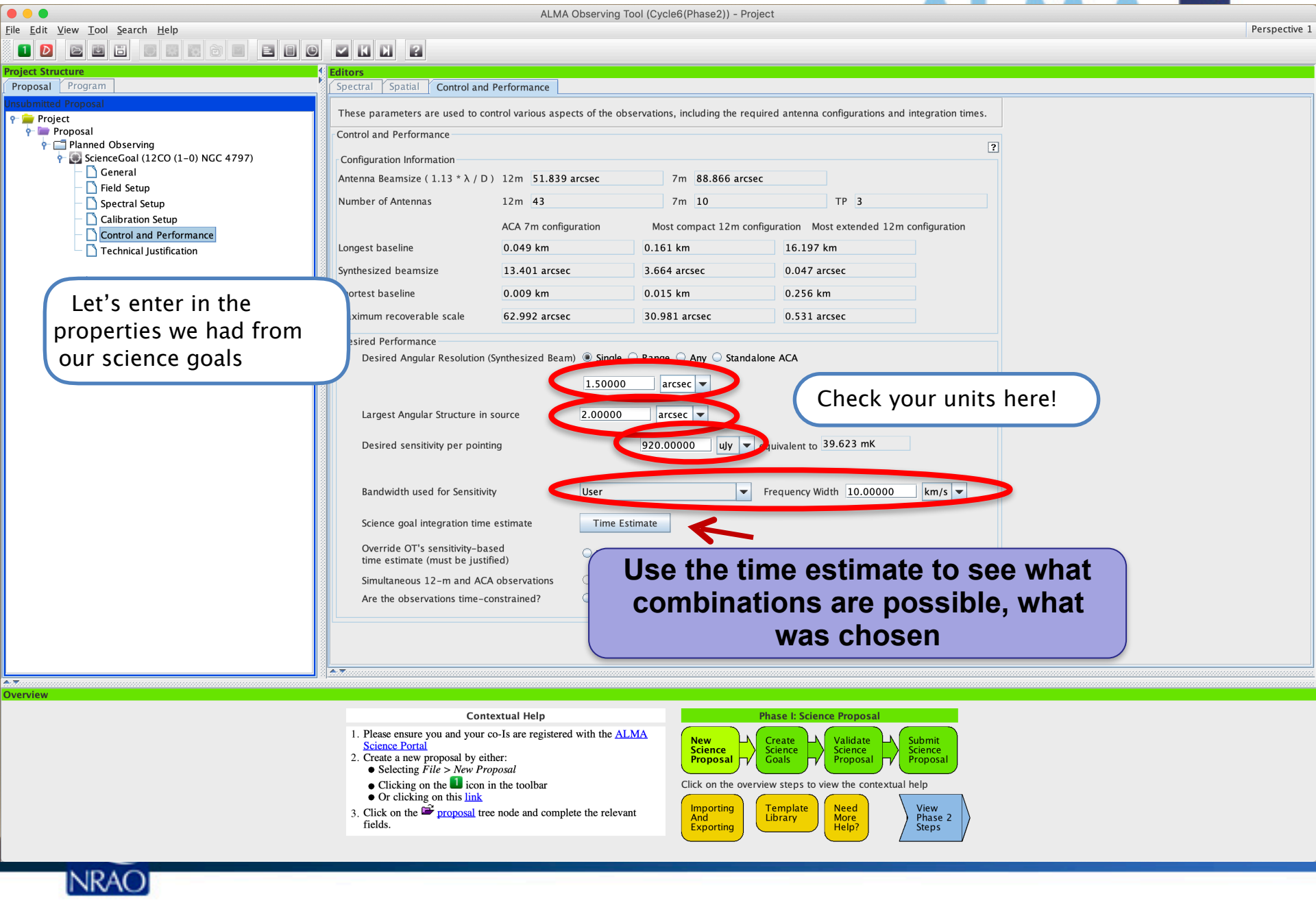
Project
Proposal
Planned Observing
ScienceGoal (Copy of Chameleon's da
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Editors
Spectral Spatial Control and Performance
These parameters are used to control various aspects of the observations, including the required antenna configurations and integration times.
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D) 12m 38.309 arcsec 7m 65.672 arcsec
Number of Antennas 12m 43 7m 10 TP 3
12m configuration
Most extended 12m configuration
16.197 km
0.033 arcsec
0.256 km
Maximum recoverable scale 47.725 arcsec 24.192 arcsec 0.409 arcsec
Largest angular structure and desired angular resolution used to find which arrays are used!
Desired Performance
Desired Angular Resolution (Synthesized Beam) Single Range Any Standalone ACA
Largest Angular Structure in source 3.0 arcsec
Desired sensitivity per pointing 0.00350 Jy equivalent to 1.8146 mK
Bandwidth used for Sensitivity AggregateBandWidth Frequency Width 7.500000 GHz
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


ALMA Observing Tool (FEB2017) - Cycle 5 Kelvin Sensitivity Test
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Cycle 5 Kelvin Sensitivity Test
Proposal
Planned Observing
ScienceGoal (Range 1.05" .. 3" las
General
Field Setup
Spectral Setup
Control and Performance
ScienceGoal (Single at 1.053" las=
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
ScienceGoal (Single at 2" las=29")
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
ScienceGoal (Single at 3" las=29")
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
ScienceGoal (Range 1.05" .. 2.63"
General
Field Setup
Spectral Setup
Calibration Setup
Editors
Spectral
Control and Performance
These parameters are used to control various aspects of the observations, including the required antenna configurations and integration times.
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D) 12m 65.288 arcsec 7m 111.922 arcsec
Number of Antennas 12m 43 7m 10 TP 3
ACA 7m configuration
Most compact 12m configuration
Most extended 12m configuration
Longest baseline 0.049 km 0.161 km 16.197 km
Synthesized beamsize 14.158 arcsec 3.882 arcsec 0.048 arcsec
Shortest baseline 0.009 km 0.015 km 0.256 km
Maximum recoverable scale 75.610 arcsec 33.005 arcsec 0.568 arcsec
Desired Performance
Desired Angular Resolution (Synthesized Beam) Single Range Any Standalone ACA
1.05000 arcsec to 3.00000 arcsec
Largest Angular Structure in source 29.00000 arcsec
Desired sensitivity per pointing 0.10000 K equivalent to 721.13 uJy @ 1.05 "
will provide 12.316 mK @ 3.00 "
Bandwidth used for Sensitivity RepresentativeWindowResolution Frequency Width 0.141113 MHz
Specify the desired rms Jy/ beam noise level and the bandwidth over which that should be measured


ALMA Observing Tool (Cycle6(Phase2)) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (12CO (1-0) NGC 4797)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Let's enter in the properties we had from our science goals
Editors
Spectral Spatial Control and Performance
These parameters are used to control various aspects of the observations, including the required antenna configurations and integration times.
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D) 12m 51.839 arcsec 7m 88.866 arcsec
Number of Antennas 12m 43 7m 10 TP 3
ACA 7m configuration
Most compact 12m configuration
Most extended 12m configuration
Longest baseline 0.049 km 0.161 km 16.197 km
Synthesized beamsize 13.401 arcsec 3.664 arcsec 0.047 arcsec
ortest baseline 0.009 km 0.015 km 0.256 km
ximum recoverable scale 62.992 arcsec 30.981 arcsec 0.531 arcsec
esired Performance
Desired Angular Resolution (Synthesized Beam) Single Range Any Standalone ACA
1.50000 arcsec
Largest Angular Structure in source 2.00000 arcsec
Desired sensitivity per pointing 920.00000 uJy quivalent to 39.623 mK
Check your units here!
Bandwidth used for Sensitivity User Frequency Width 10.00000 km/s
Science goal integration time estimate Time Estimate
Override OT's sensitivity-based time estimate (must be justified)
Simultaneous 12-m and ACA observations
Are the observations time-constrained?
Use the time estimate to see what combinations are possible, what was chosen
Overview
Contextual Help
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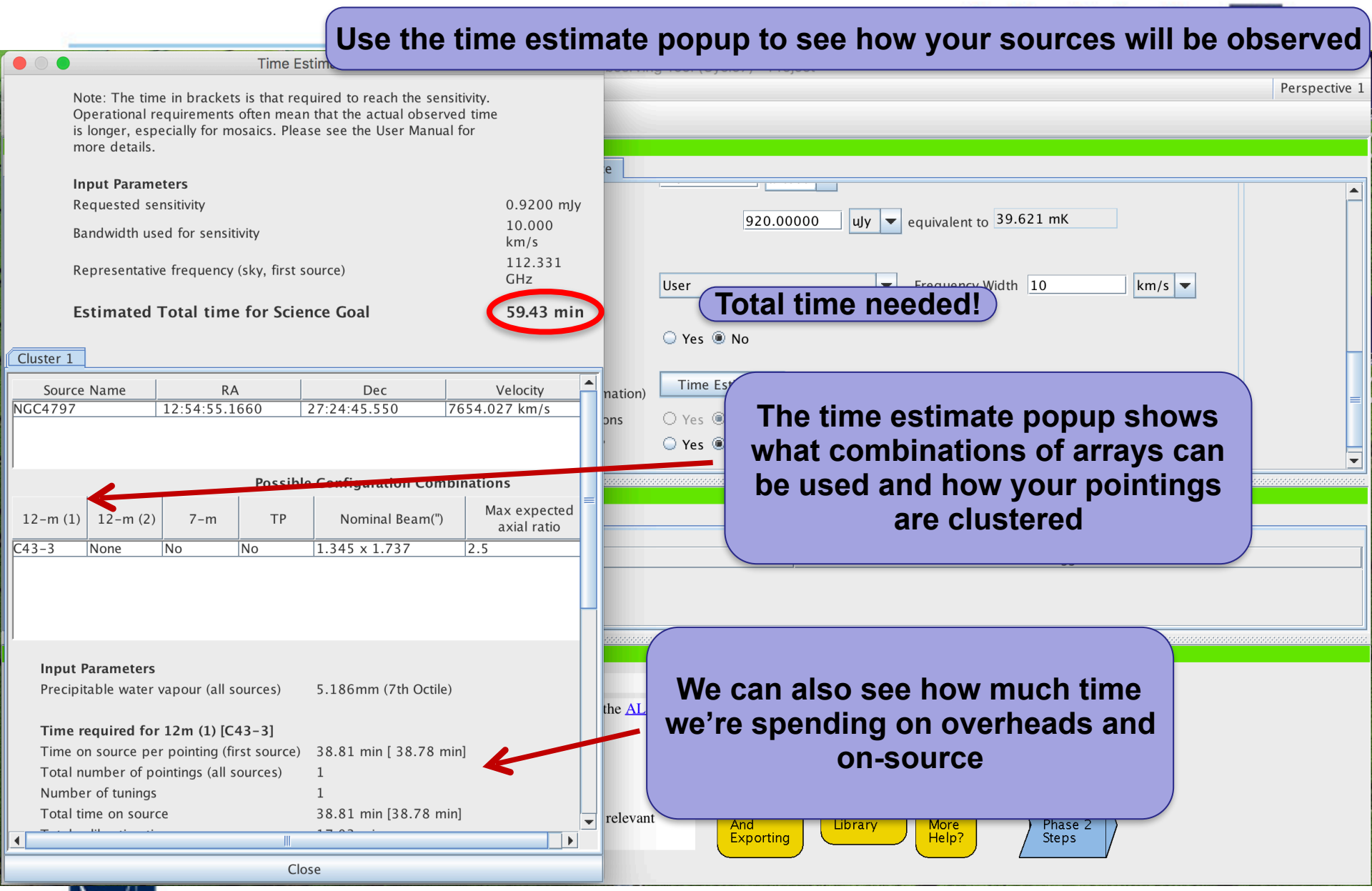
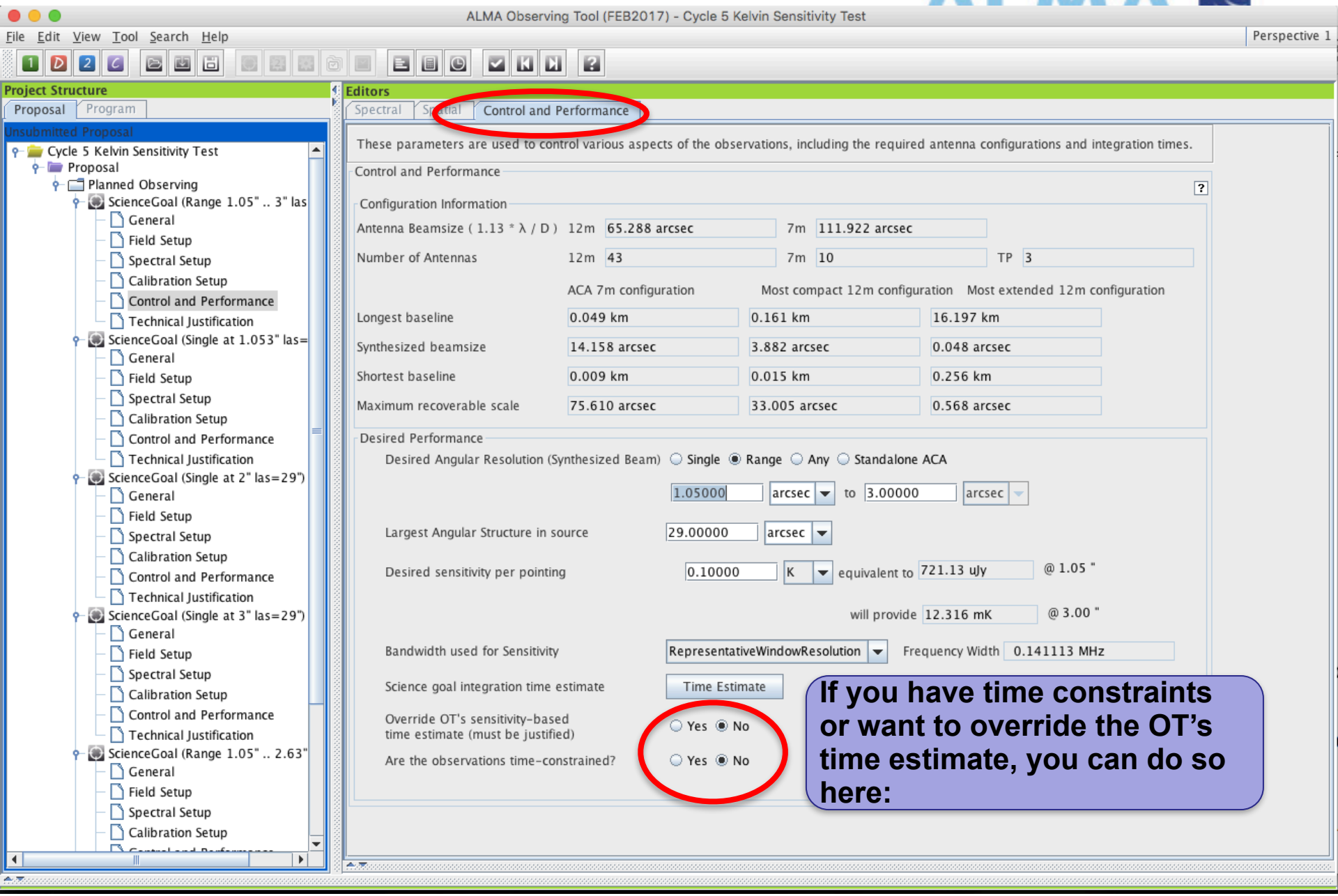
New Science Proposal
Create Science Goals
Validate Science Proposal
Submit Science Proposal
Click on the overview steps to view the contextual help
Importing And Exporting
Template Library
Need More Help?
View Phase 2 Steps
NRAO


Use the time estimate popup to see how your sources will be observed
Time Estim
Note: The time in brackets is that required to reach the sensitivity. Operational requirements often mean that the actual observed time is longer, especially for mosaics. Please see the User Manual for more details.
Input Parameters
Requested sensitivity 0.9200 mJy
Bandwidth used for sensitivity 10.000 km/s
Representative frequency (sky, first source) 112.331 GHz
Estimated Total time for Science Goal 59.43 min
Total time needed!
Cluster 1
Source Name | RA | Dec | Velocity
NGC4797 | 12:54:55.1660 | 27:24:45.550 | 7654.027 km/s
Possible Configuration Combinations
12-m (1) | 12-m (2) | 7-m | TP | Nominal Beam(") | Max expected axial ratio
C43-3 | None | No | No | 1.345 x 1.737 | 2.5
Input Parameters
Precipitable water vapour (all sources) 5.186mm (7th Octile)
Time required for 12m (1) [C43-3]
Time on source per pointing (first source) 38.81 min [38.78 min]
Total number of pointings (all sources) 1
Number of tunings 1
Total time on source 38.81 min [38.78 min]
Close
The time estimate popup shows what combinations of arrays can be used and how your pointings are clustered
We can also see how much time we're spending on overheads and on-source
Perspective 1
920.00000 uJy equivalent to 39.621 mK
User
Frequency Width 10 km/s
Yes No
And Exporting
Library
More Help?
Phase 2 Steps


ALMA Observing Tool (FEB2017) - Cycle 5 Kelvin Sensitivity Test
File Edit View Tool Search Help
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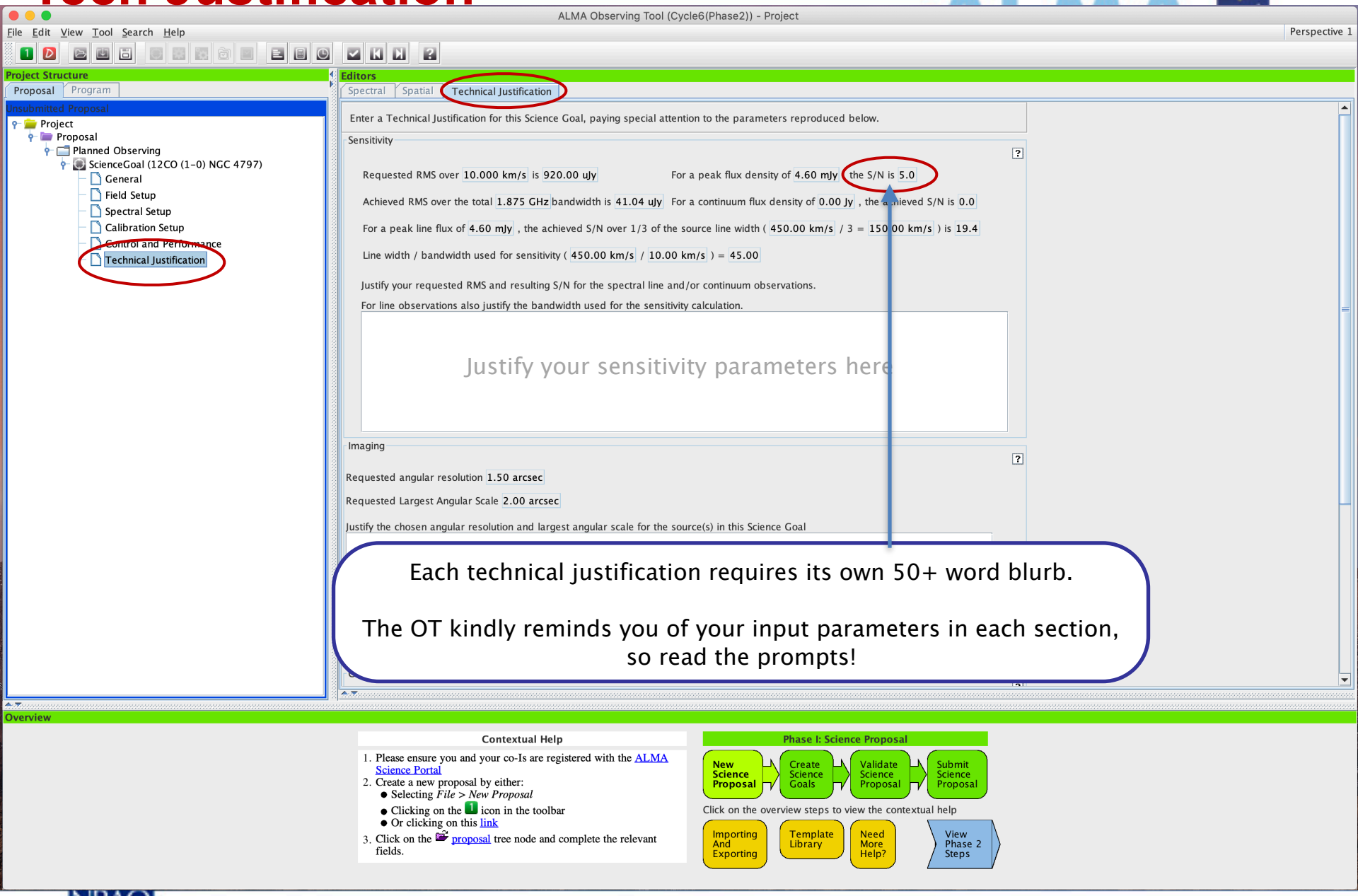
Cycle 5 Kelvin Sensitivity Test
Proposal
Planned Observing
ScienceGoal (Range 1.05" .. 3" las
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
ScienceGoal (Single at 1.053" las=
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
ScienceGoal (Single at 2" las=29")
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
ScienceGoal (Single at 3" las=29")
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
ScienceGoal (Range 1.05" .. 2.63"
General
Field Setup
Spectral Setup
Calibration Setup
Editors
Spectral
Control and Performance
These parameters are used to control various aspects of the observations, including the required antenna configurations and integration times.
Control and Performance
Configuration Information
Antenna Beamsize (1.13 * λ / D) 12m 65.288 arcsec 7m 111.922 arcsec
Number of Antennas 12m 43 7m 10 TP 3
ACA 7m configuration
Most compact 12m configuration
Most extended 12m configuration
Longest baseline 0.049 km 0.161 km 16.197 km
Synthesized beamsize 14.158 arcsec 3.882 arcsec 0.048 arcsec
Shortest baseline 0.009 km 0.015 km 0.256 km
Maximum recoverable scale 75.610 arcsec 33.005 arcsec 0.568 arcsec
Desired Performance
Desired Angular Resolution (Synthesized Beam) Single Range Any Standalone ACA
1.05000 arcsec to 3.00000 arcsec
Largest Angular Structure in source 29.00000 arcsec
Desired sensitivity per pointing 0.10000 K equivalent to 721.13 uJy @ 1.05 "
will provide 12.316 mK @ 3.00 "
Bandwidth used for Sensitivity RepresentativeWindowResolution Frequency Width 0.141113 MHz
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
If you have time constraints or want to override the OT's time estimate, you can do so here:

Tech Justification



Tech Justification

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 | Technical Justification

Imaging

Requested angular resolution : 1.10 arcsec

Requested largest angular scale : 1.00 arcsec

Justify the chosen angular resolution and largest angular scale for the source(s) in this Science Goal

Here would be the standard required justification of the imaging parameters

ACA is not recommended but is selected.
Justify over-riding of the OT recommendation for the ACA

Exceptions to standard practice require separate justification. Here, the OT notes that the ACA is selected even though the OT thinks it is unneeded.

Correlator configuration

line width / representative spectral window resolution: 30.00 km/s / 731.92 m/s = 40.99

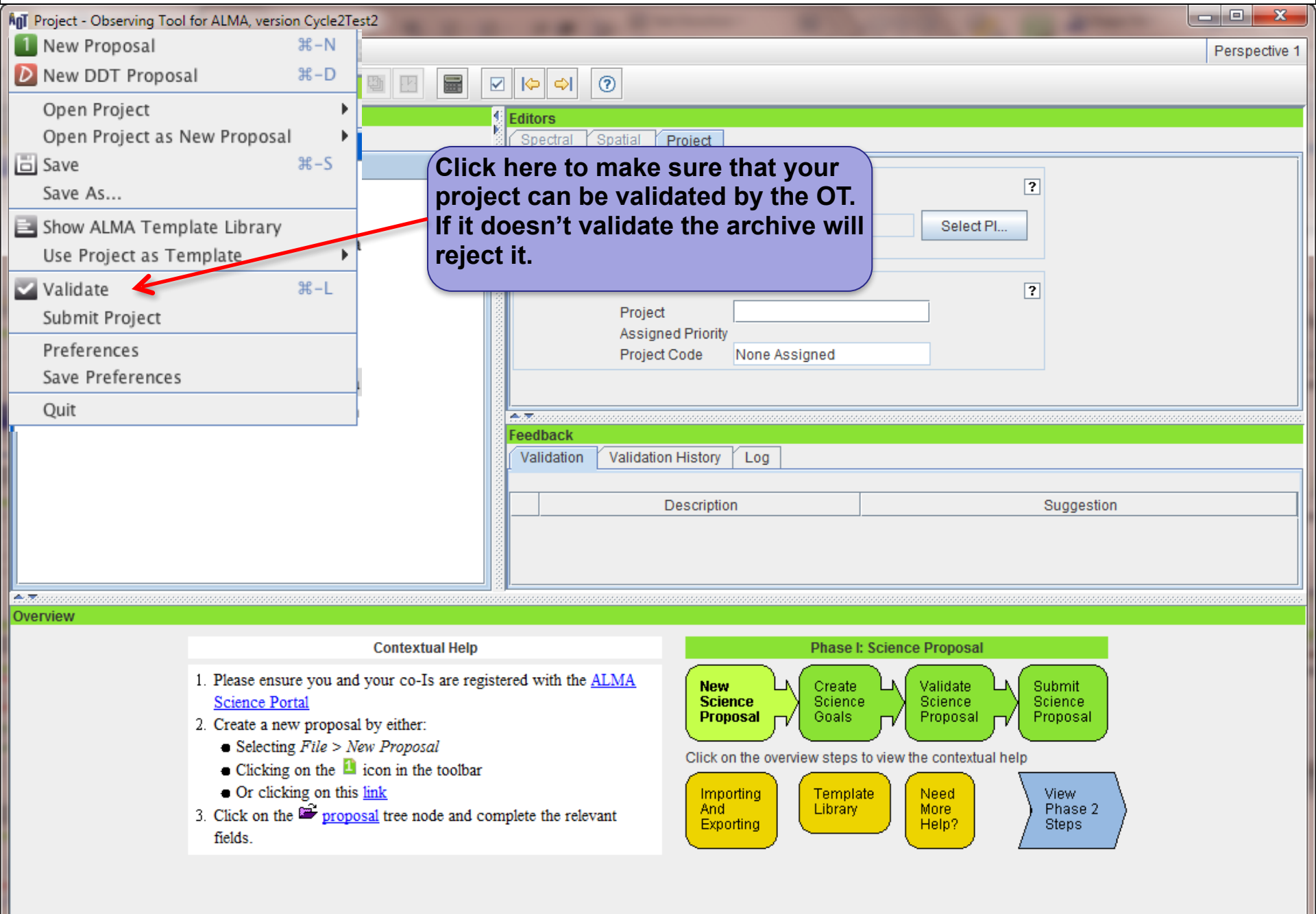
Representative spectral window width : 702.64 km/s

Justify your correlator set-up with particular reference to the number of spectral resolution elements per line width.
You may want to consider spectral averaging to lower the data rate

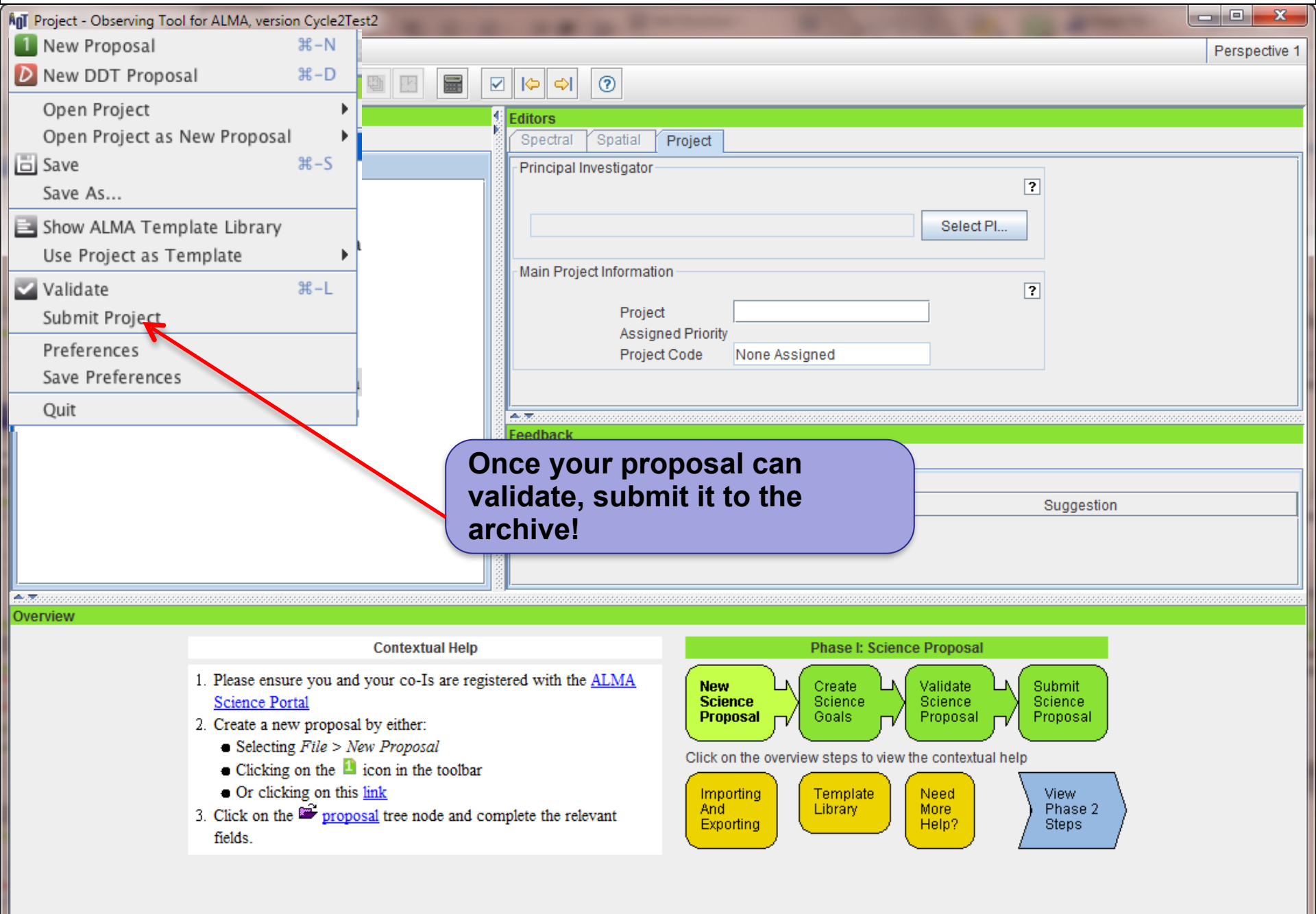
Here would be the regular required correlator justification

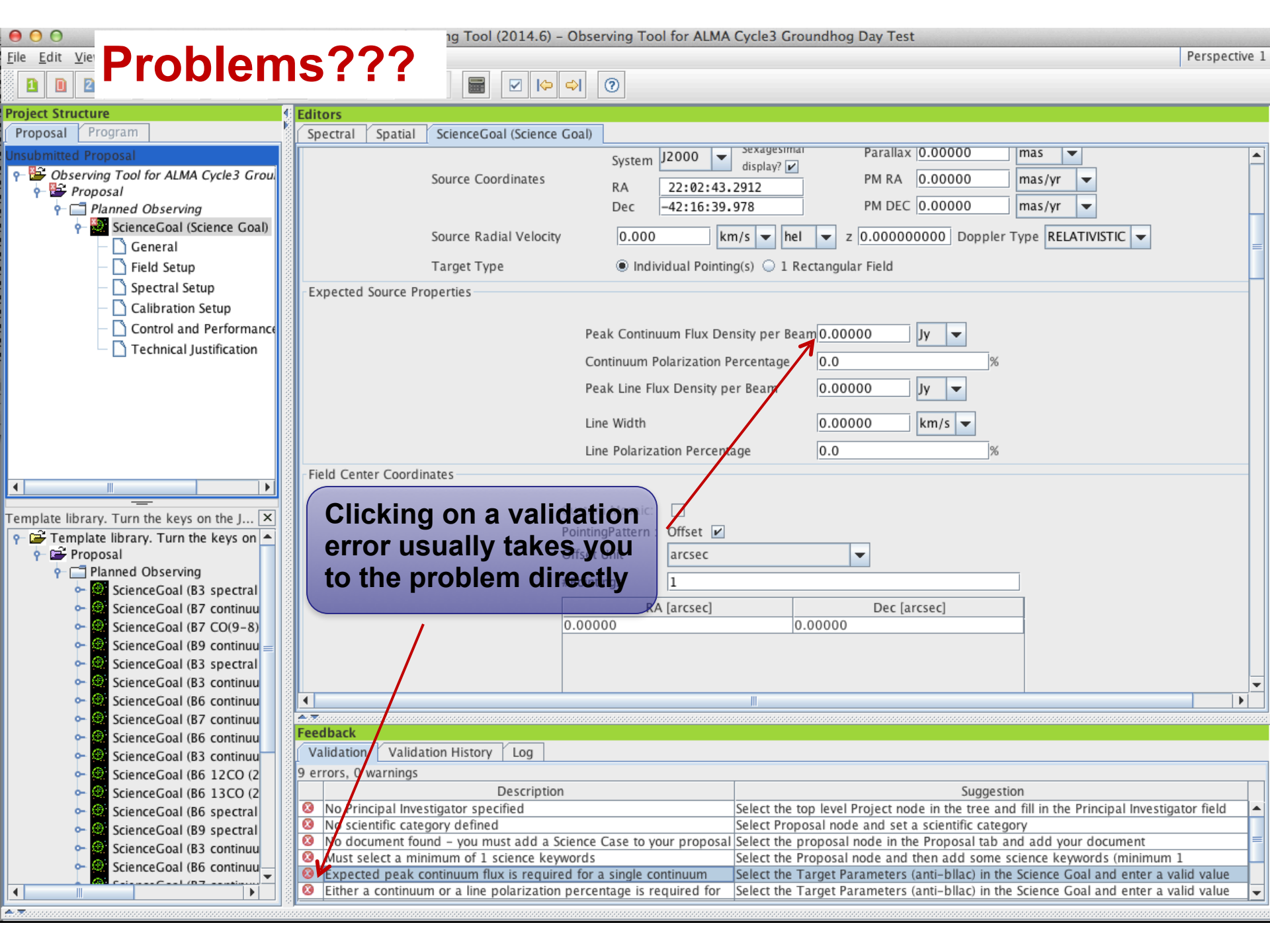
NRAO

When the time is ripe … validate & submit



When the time is ripe … validate & submit




Problems???
g Tool (2014.6) – Observing Tool for ALMA Cycle3 Groundhog Day Test
File Edit Vie
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
Calibration 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 Spatial ScienceGoal (Science Goal)
Source Coordinates
System J2000
Sexagesimal display?
RA 22:02:43.2912
Dec -42:16:39.978
Parallax 0.00000 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 Continuum Flux Density per Beam 0.00000 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 %
Field Center Coordinates
Offset
arcsec
1
RA [arcsec]
Dec [arcsec]
0.00000
0.00000
Clicking on a validation error usually takes you to the problem directly
Feedback
Validation Validation History Log
9 errors, 0 warnings
Description
Suggestion
No Principal Investigator specified
Select the top level Project node in the tree and fill in the Principal Investigator field
No scientific category defined
Select Proposal node and set a scientific category
No document found – you must add a Science Case to your proposal
Select the proposal node in the Proposal tab and add your document
Must select a minimum of 1 science keywords
Select the Proposal node and then add some science keywords (minimum 1
Expected peak continuum flux is required for a single continuum
Select the Target Parameters (anti-bllac) in the Science Goal and enter a valid value
Either a continuum or a line polarization percentage is required for
Select the Target Parameters (anti-bllac) in the Science Goal and enter a valid value

Problems???

ng Tool (2014.6) – Observing Tool for ALMA Cycle3 Groundhog Day Test

File Edit Vie

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
        - Calibration 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 | Spatial | ScienceGoal (Science Goal)

Source Coordinates
System J2000 Sexagesimal display? ✓
RA 22:02:43.2912
Dec -42:16:39.978
Parallax 0.00000 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 Continuum Flux Density per Beam 0.00000 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 %

Field Center Coordinates

PointingPattern
Offset ✓
arcsec
1
RA [arcsec]
0.00000

Clicking on a validation error usually takes you to the problem directly

Still have problems?

Feedback

Validation | Validation History | Log

9 errors, 0 warnings

Description
No Principal Investigator specified
No scientific category defined
No document found – you must add a Science Case to your propos
Must select a minimum of 1 science keywords
Expected peak continuum flux is required for a single continuum
Either a continuum or a line polarization percentage is required for

Atacama Large Millimeter/submillimeter Array
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Observatory News

Announcement of 3mm VLBI in Cycle 7
Jan 07, 2019

ALMA Cycle 7 Pre-Announcement
Dec 19, 2018

Job Opening: Head of ALMA Department of Science Operations
Dec 05, 2018

More…

NRAO News

Multi-Messenger Astrophysics: Insights from Combining Gravity and Radio Waves
Feb 16, 2019

ALMA Data Reduction Party
Mar 13, 2019

New Horizons in Planetary Systems
May 13, 2019

More…

Status

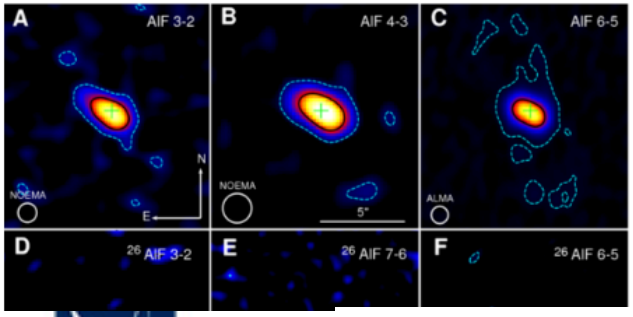
Configuration Schedule
Cycle 6 Highest Priority Projects

Refereed publications: 1309
Last observed source:
Northeast_Section_of_NGC6334
Current configuration: C43-1

More...

Science Highlights - An ALMA Detection of the Radioactive Molecule 26AlF in a Stellar Merger Remnant.

www.almascience.org



Although diffuse Galactic gamma-ray emission from the isotope of aluminum, ^{26}Al, was first detected in the 1980s, the identification of the source of emission has been hard to pinpoint due to the poor spatial resolution of gamma-ray observations. In a recent Nature paper, a team led by Dr. Kaminski has made use of sensitive, high-resolution observations with Band 6 and the newly commissioned Band 5 on ALMA, as well as observations with NOEMA, to detect millimeter-wave emission from an isotopologue of aluminum monofluoride (^{26}AlF) towards the stellar merger remnant CK Vul (aka *Nova 1670*; see Figure). These observations have provided information about the nature of one of the stars in the merger. I.e., in the case of CK Vul, the ^{26}Al is likely produced within a star with an initial stellar mass in the range of 0.8-2.5 M_{sun} that has already formed a condensed degenerate core. During the merger, the ^{26}Al from the outer layers of the helium core are ejected. The authors propose that, unless there is significant amounts of ^{26}Al in atomic phase, in molecules other than ^{26}AlF, and in solids.

ALMA Science Portal @ NRAO

I could use a hand...

ALMA

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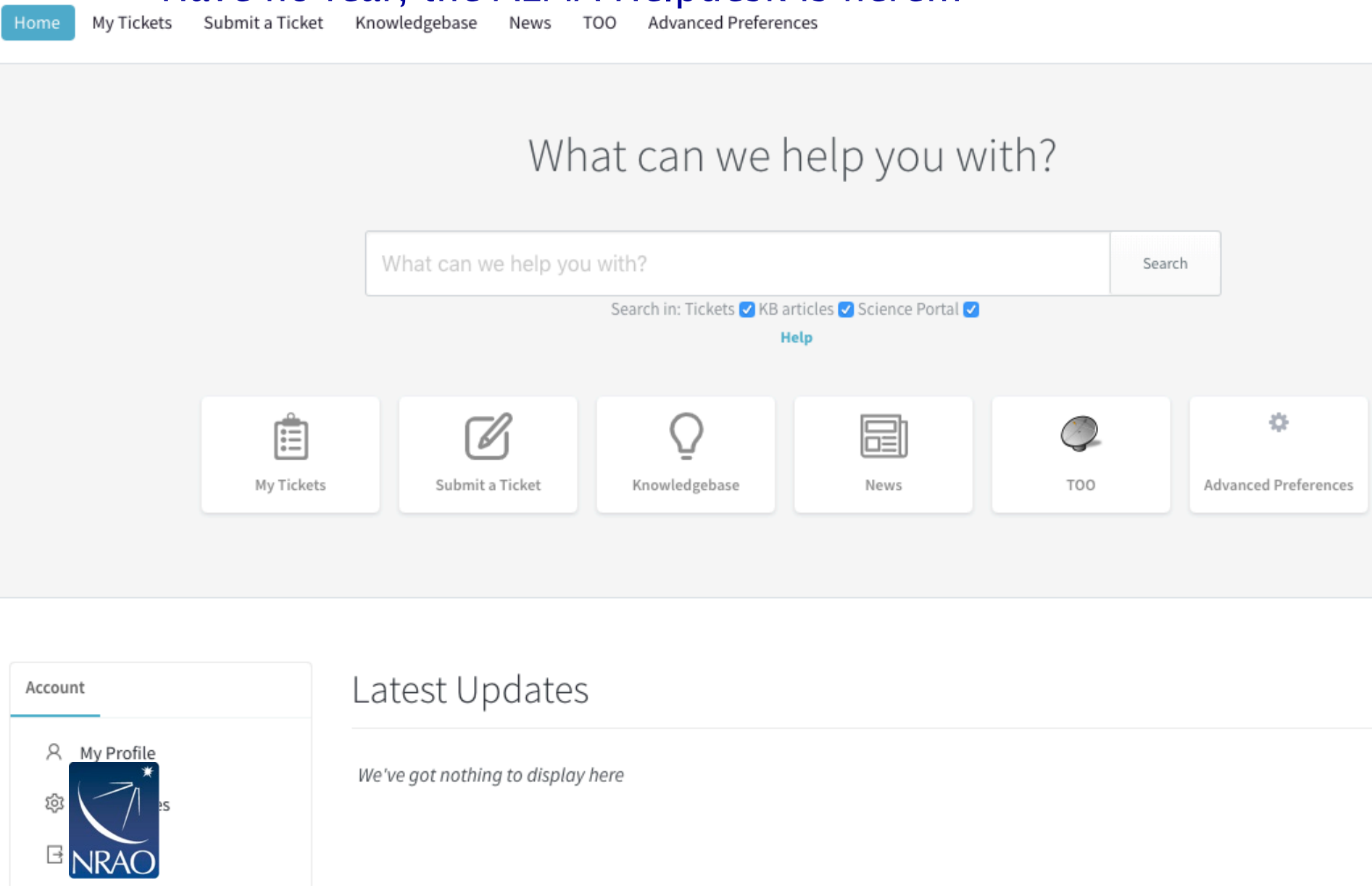

NRAO

I could use a hand...

ALMA

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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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