An Introduction to the Cycle 4 ALMA Observing Tool

How to turn that great idea into ALMA data...



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Atacama Large Millimeter/submillimeter Array Expanded Very Large Array Robert C. Byrd Green Bank Telescope Very Long Baseline Array





ALMA Cycle 4 Planning

 ALMA Cycle 4 will provide 3000 hours of 12-m array science observations. The remaining time on ALMA will be reserved for engineering, computing and scientific testing to extend and optimize ALMA capabilities.

Dates to remember:

- 22 March 2016 Call for Proposals

- 21 April 2016 Proposal deadline

August 2016 Review results sent to Pls

October 2016 Start of ALMA Cycle 4 observations

September 2017 End of Cycle 4 observations





Cycle 4 Capabilities

- At least forty (40) antennas in the 12-m Array, ten (10) 7-m antennas (for short baselines) and three (3) 12-m antennas (for zero-spacing)
- Receiver bands 3, 4, 6, 7, 8, 9, & 10 (wavelengths of about 3.1, 2.1, 1.3, 0.87, 0.74, 0.44, and 0.35 mm, respectively)
- Nine 12-m array configurations with maximum baselines from 155 m to 12.6 km
- Maximum baselines of 2.7 km for Bands 8, 9 and 10, 5.3 km for Band 7, 12.6 km for Bands 3, 4, & 6
- Spectral line, continuum, and mosaic observations
- Single pointing, on axis, full (linear) polarization capabilities for continuum and full spectral resolution observations in Band 3, 6 and 7 on the 12-m array





Cycle 4 Capabilities

- Cycle 4 observing modes will be classified as standard or non-standard, and up to 20% of the observing time will be allocated to proposals requesting non-standard modes, which include:
- Bands 8, 9 & 10 observations
- Band 7 observations with maximum baselines > 2.7 km
- All polarization observations
- Spectral Scans
- Bandwidth switching projects (less than 1GHz aggregate bandwidth over all spectral windows)
- Solar Observations
- VLBI observations
- User-specified calibrations





New Capabilities to Note:

In Cycle 4, the following opportunities will be available to Proposers for the first time.

- ACA stand-alone mode
 - Proposals will be accepted to use the ACA in a stand-alone capacity for spectral line (7m Array plus Total Power Array) or continuum (7m Array) observations.
- Large Programs
 - defined as more than 50 hours of observations with either the 12-m Array or the ACA in stand-alone mode.
- Millimeter-wavelength VLBI
 - Proposals will be accepted for Very Long Baseline Interferometry (VLBI) observations with ALMA in Bands 3 and 6 continuum, in concert with an existing VLBI network: the Global mm-VLBI Array (GMVA) at 3 mm and a new NRAO/Event Horizon Telescope Consortium (EHTC) network at 1.3 mm. In addition to submitting an ALMA proposal, VLBI programs must also submit a proposal to the appropriate VLBI network according to their deadlines. Additional information about proposing with ALMA using these networks will be made available in mid-January 2016.
- Solar observations Bands 3 and 6.



Once you have done this...

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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

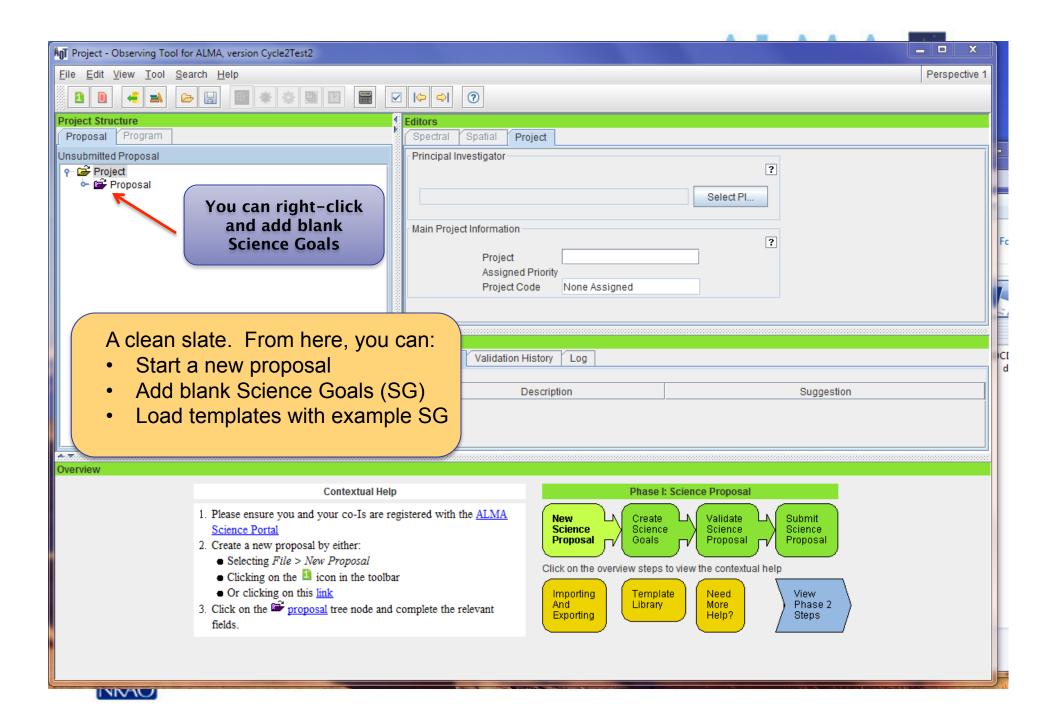
Extensive documentation is available to help you work with the OT and optimally prepare your proposal:

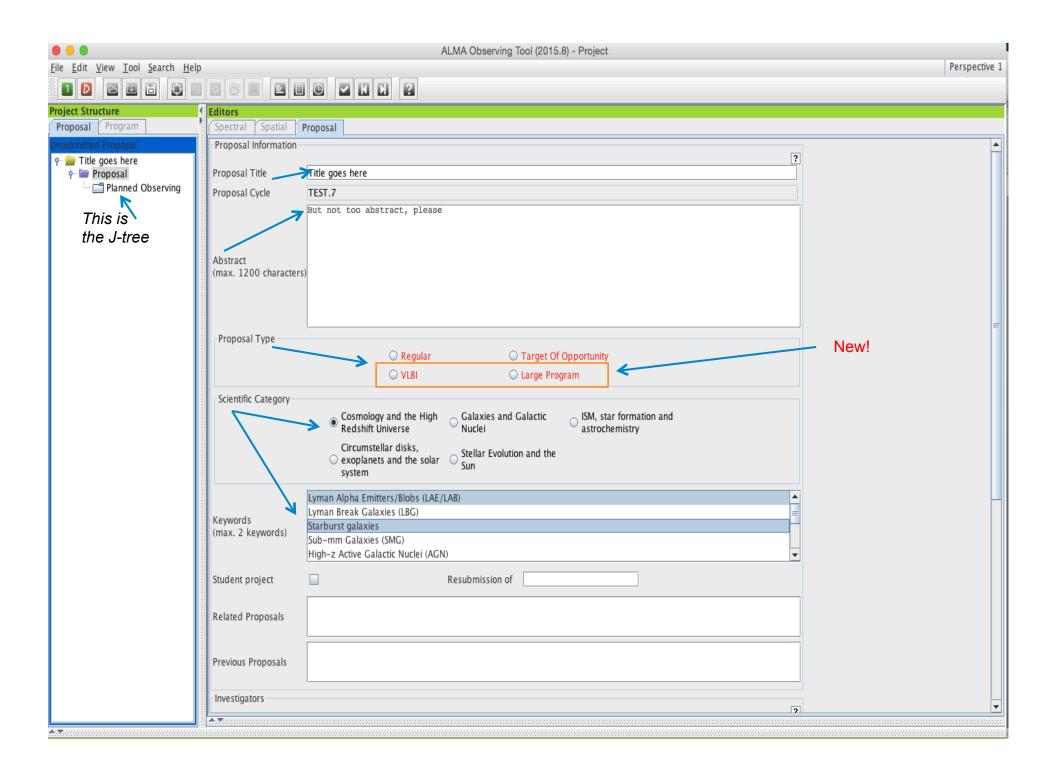
- If you are a novice OT user you should start with the OT Quickstart Guide, which takes you through the basic steps of ALMA proposal preparation.
- Audio-visual illustrations of different aspects of the OT can be found in the OT video tutorials. These are recommended for novices and advanced users alike.
- 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.

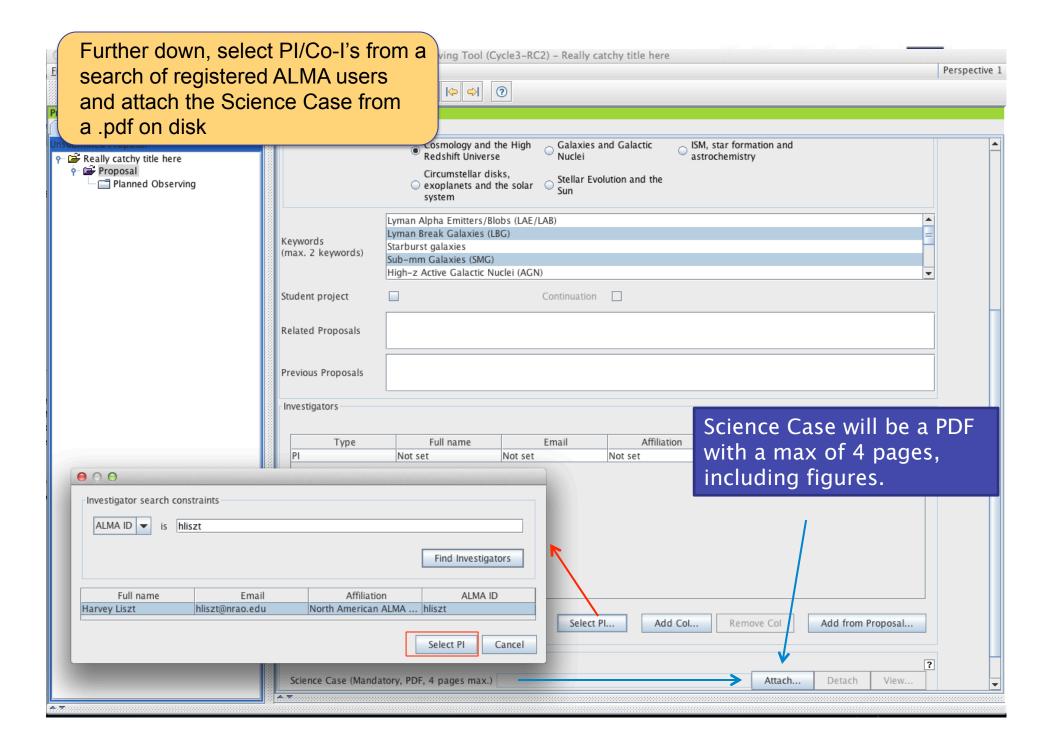


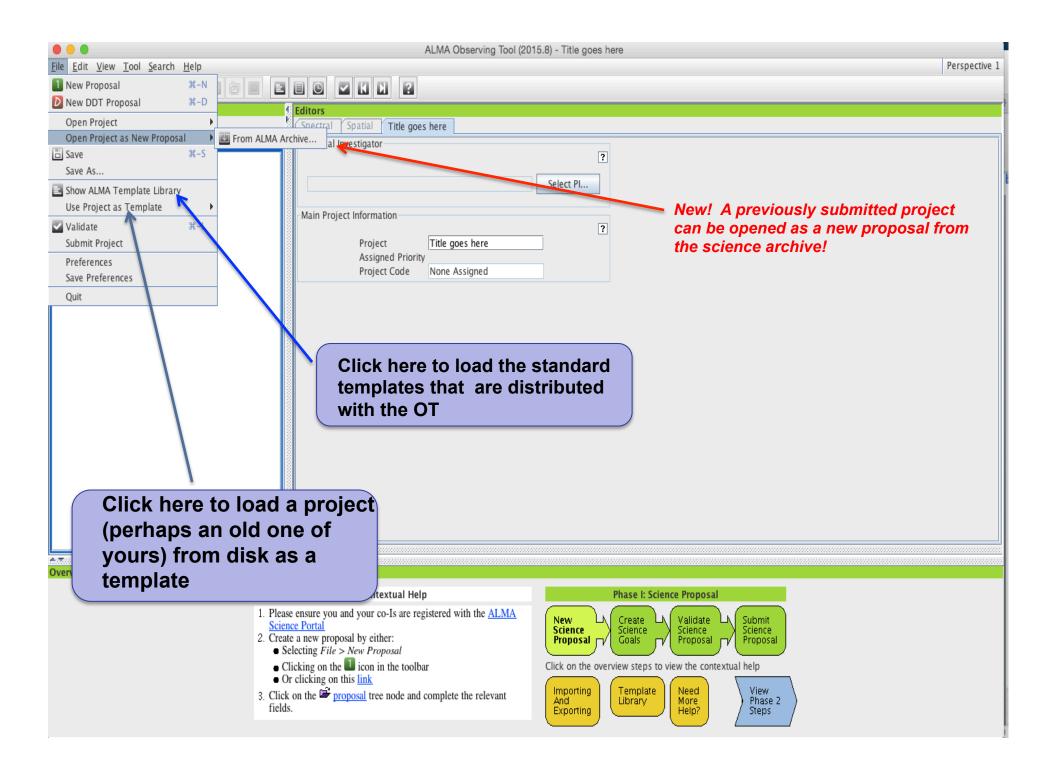
Expanded Very Large Array Robert C. Byrd Green Bank Telescope Very Long Baseline Array

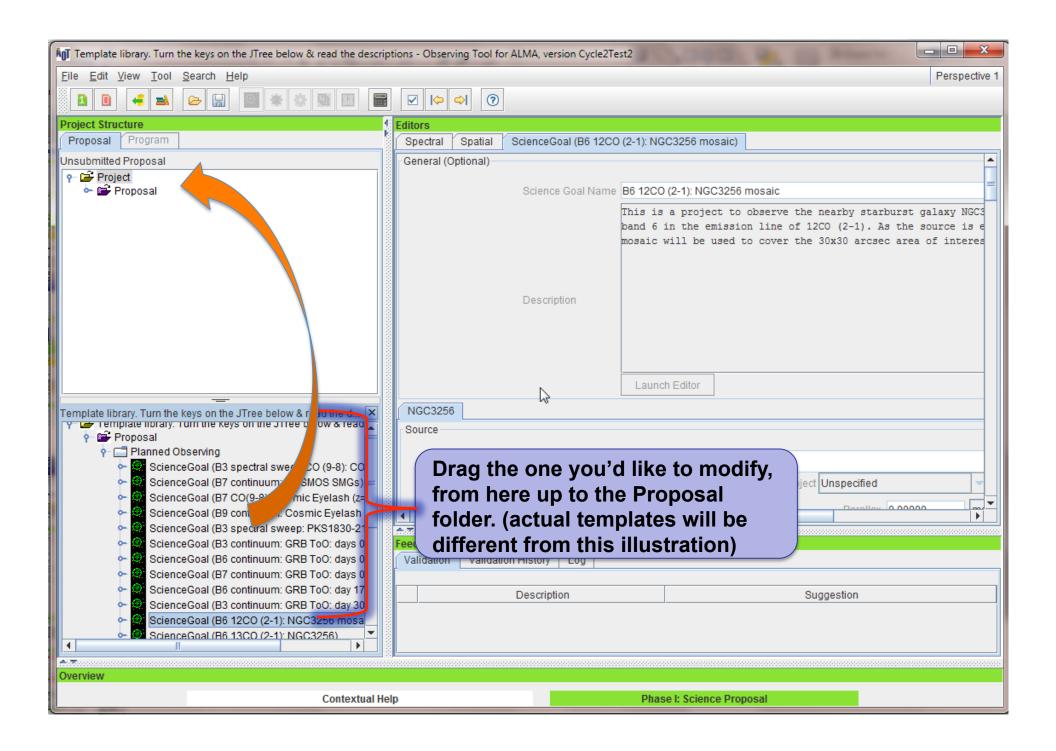


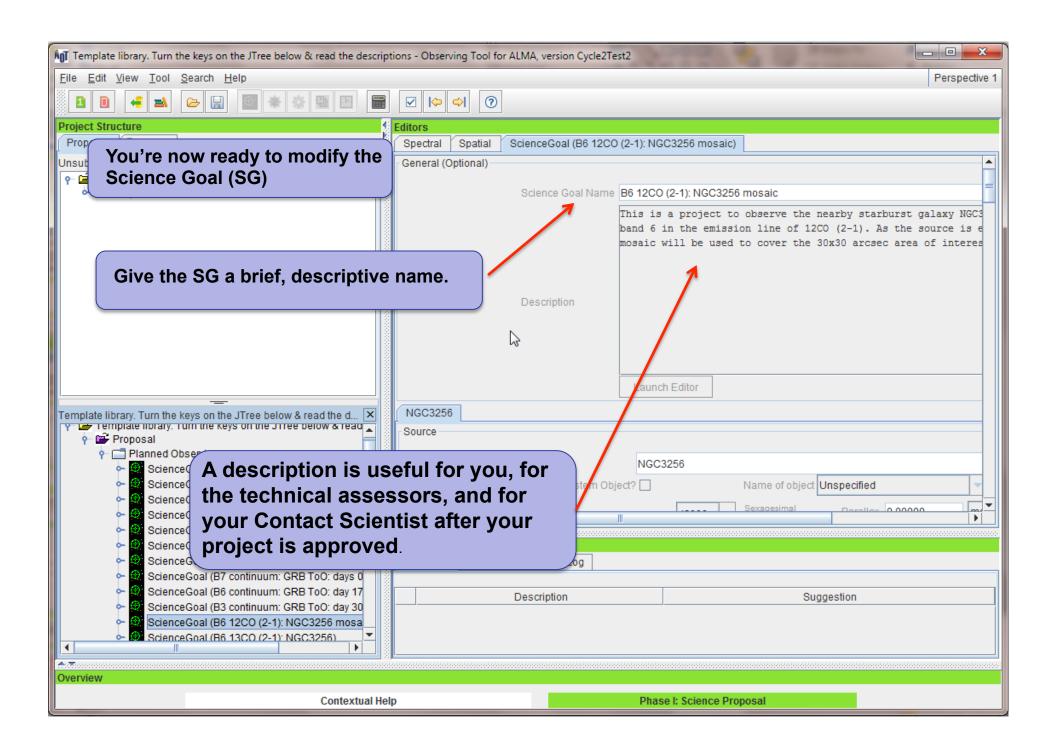


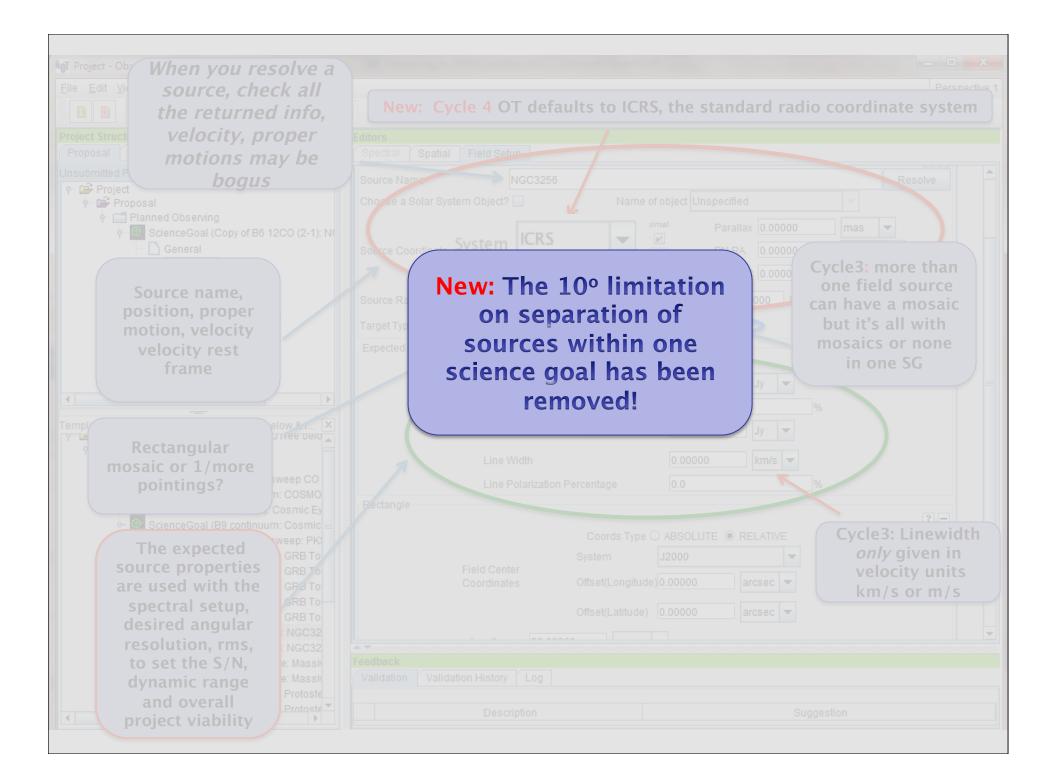


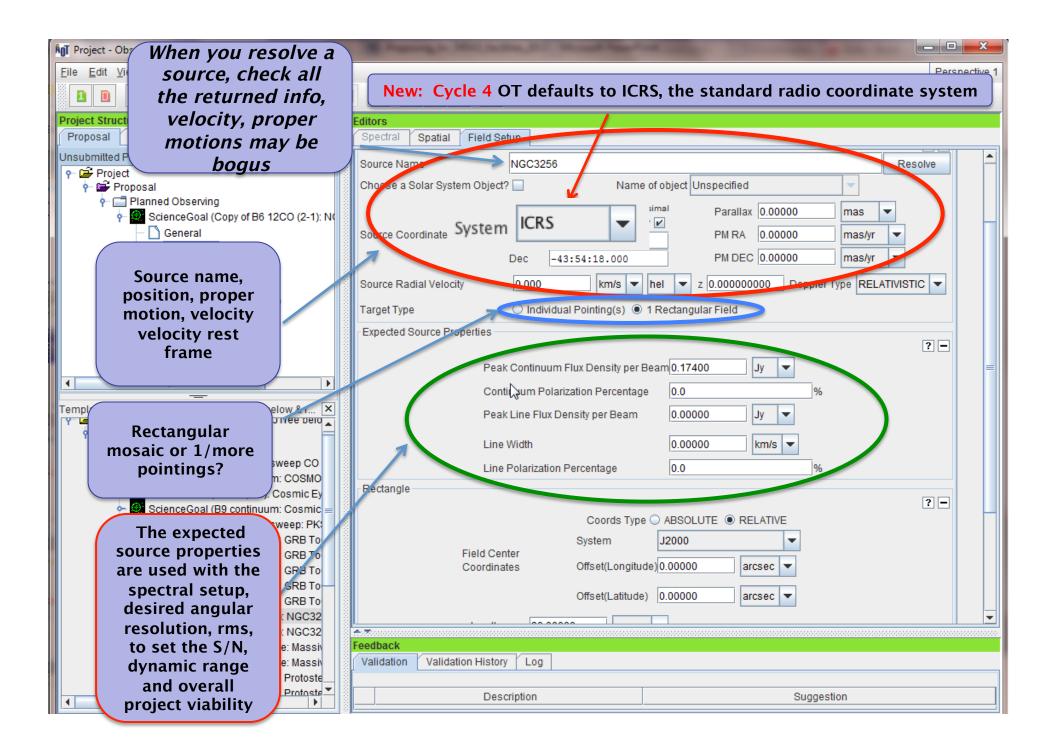


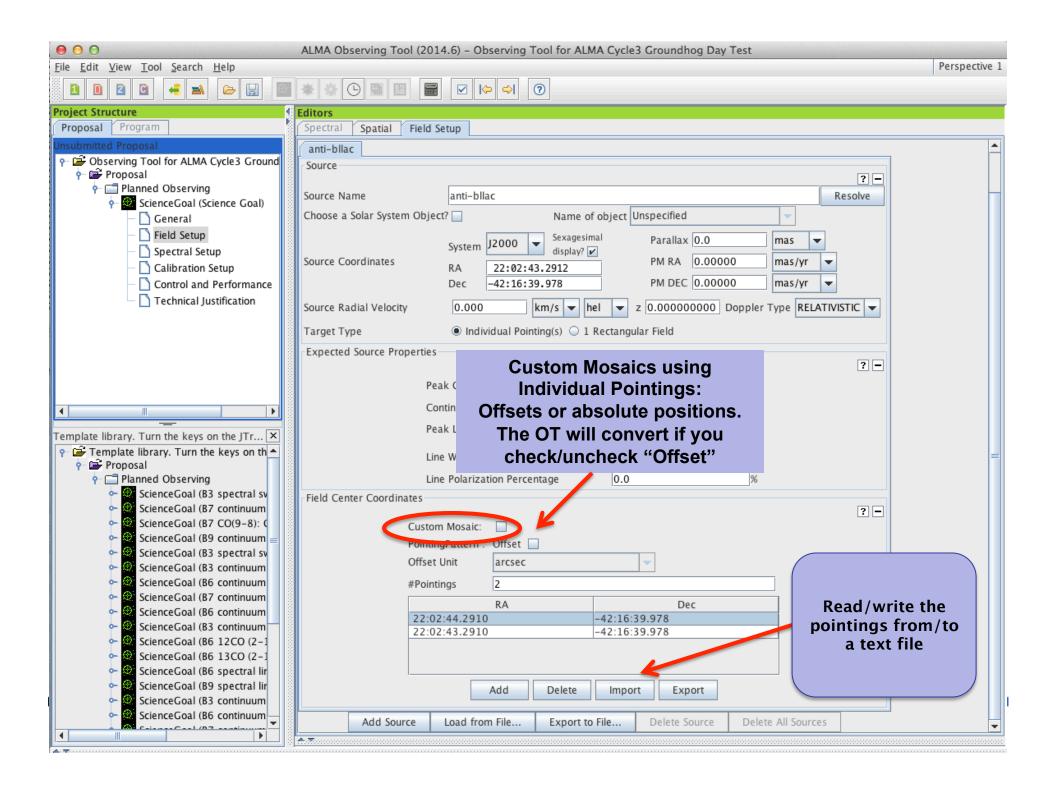


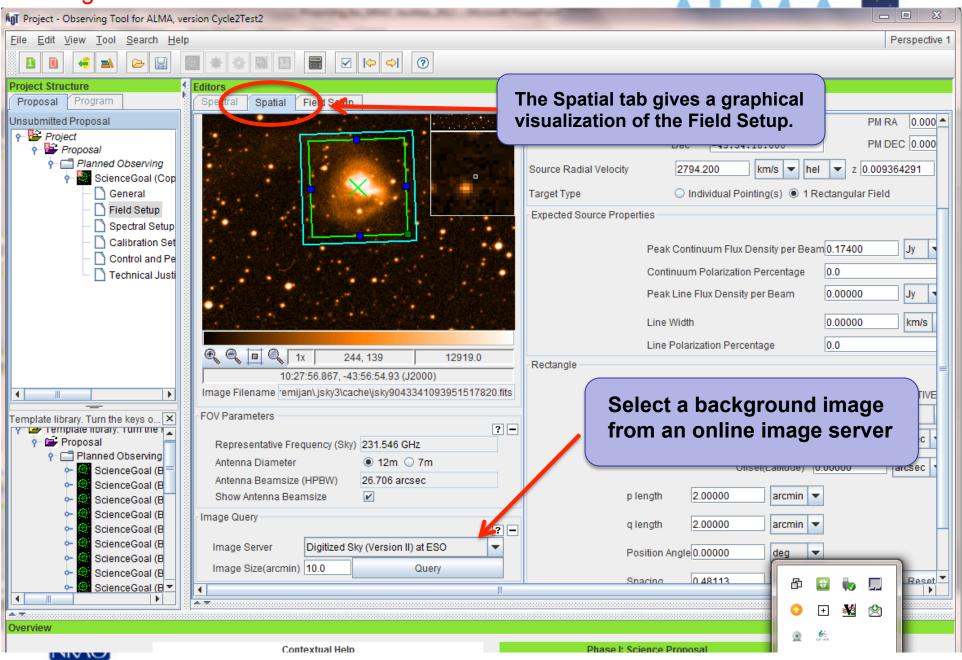


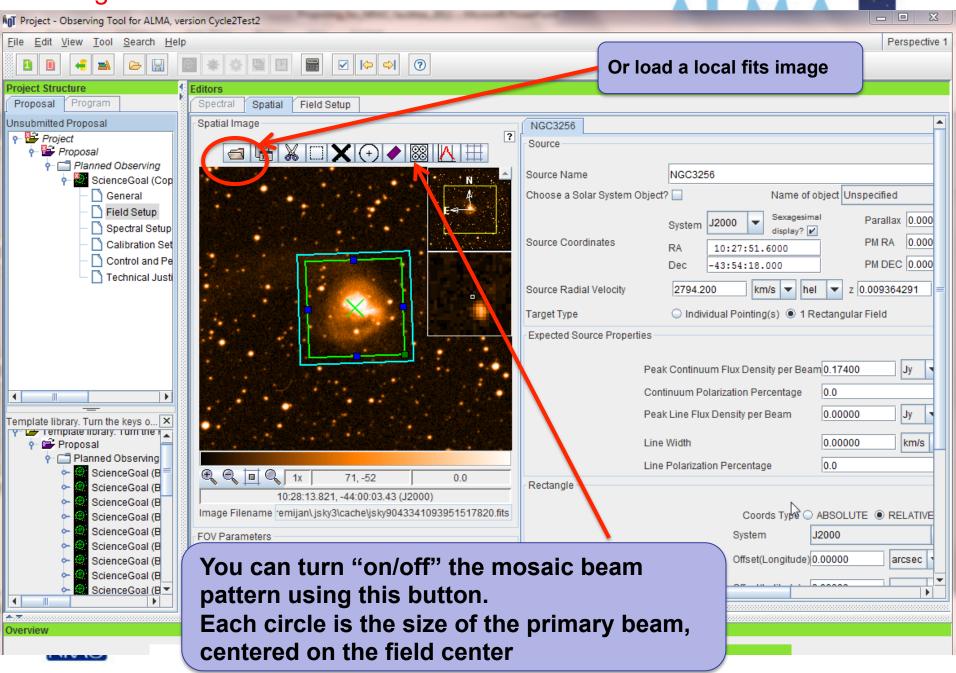


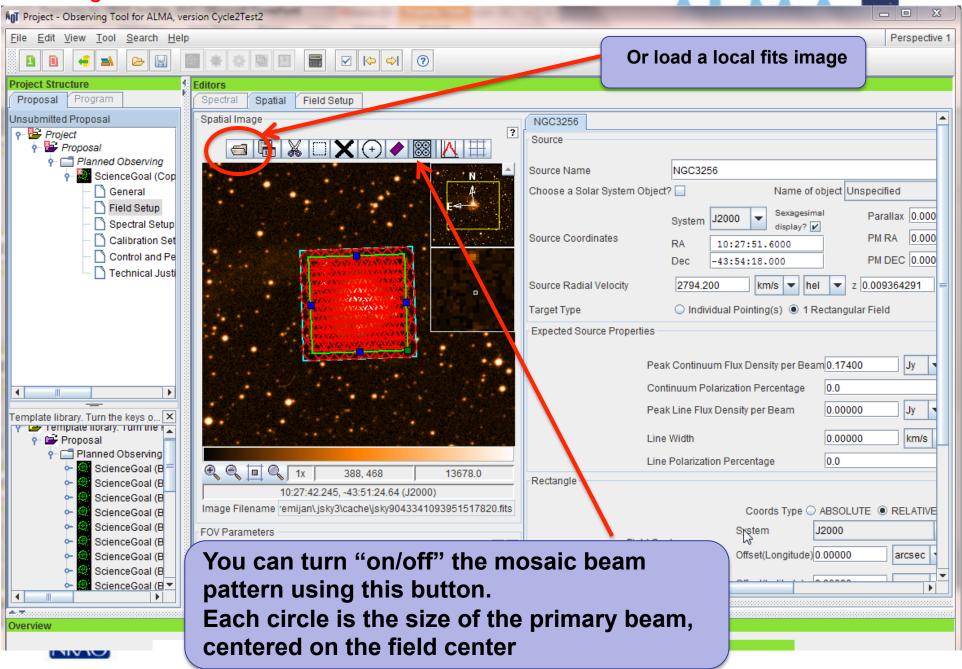


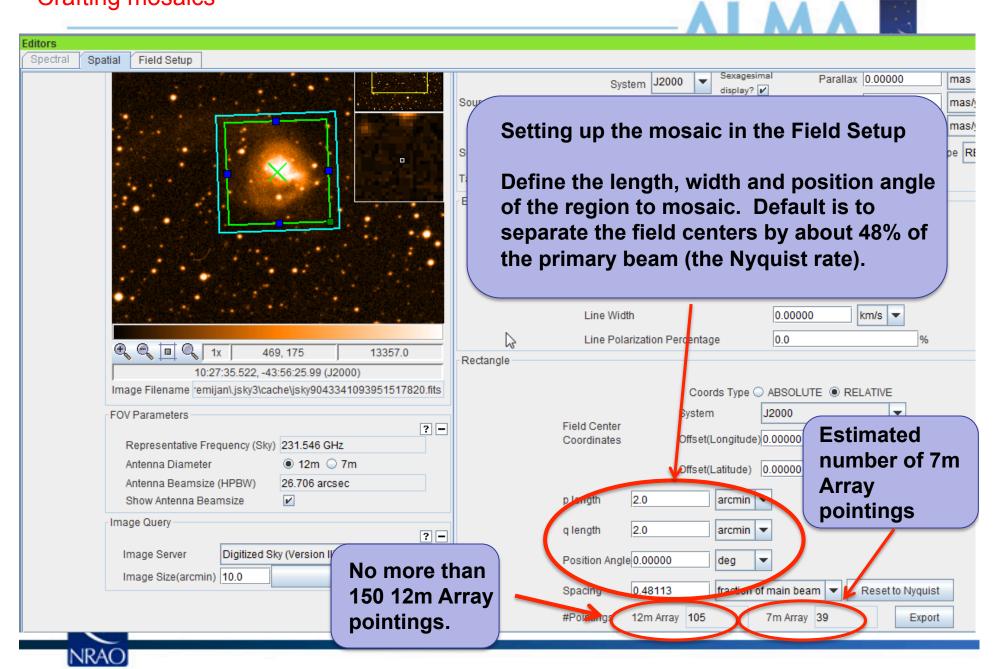


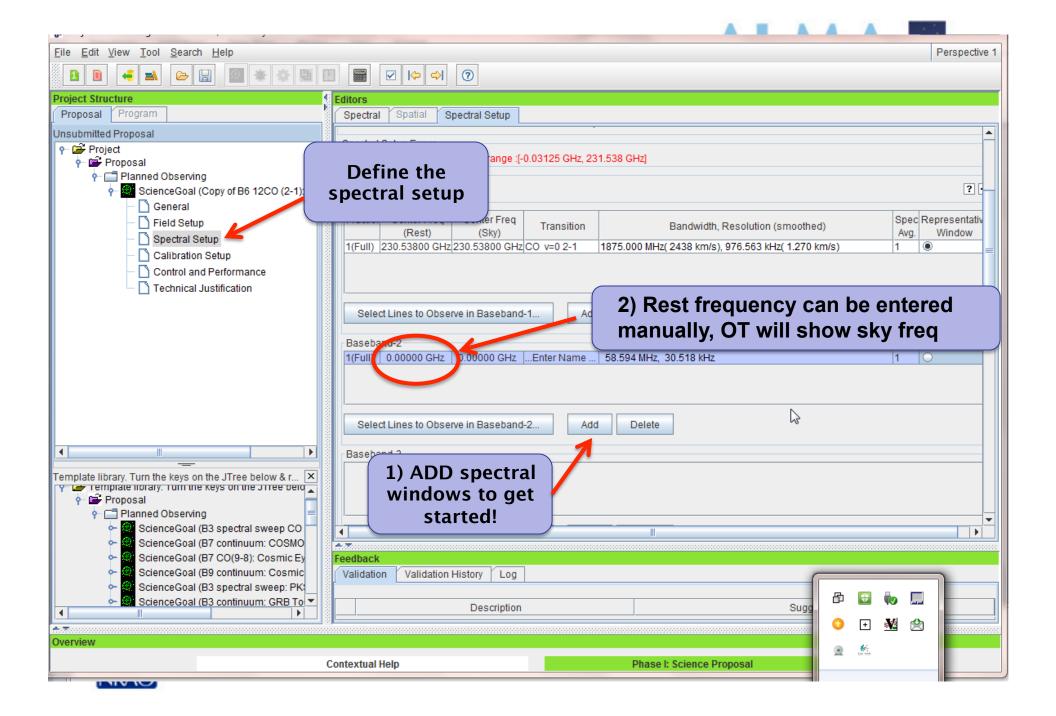


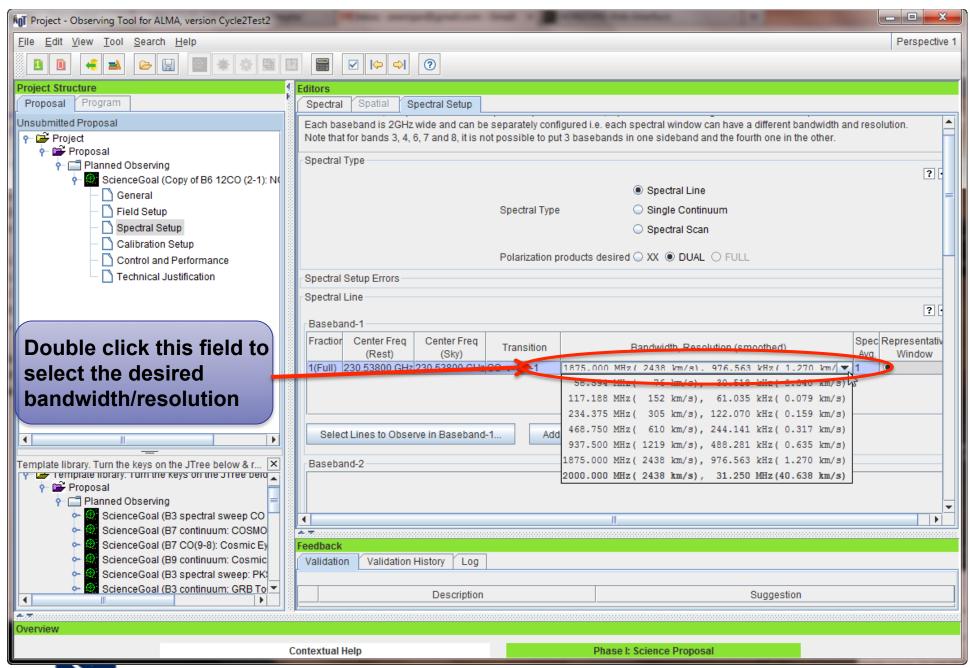




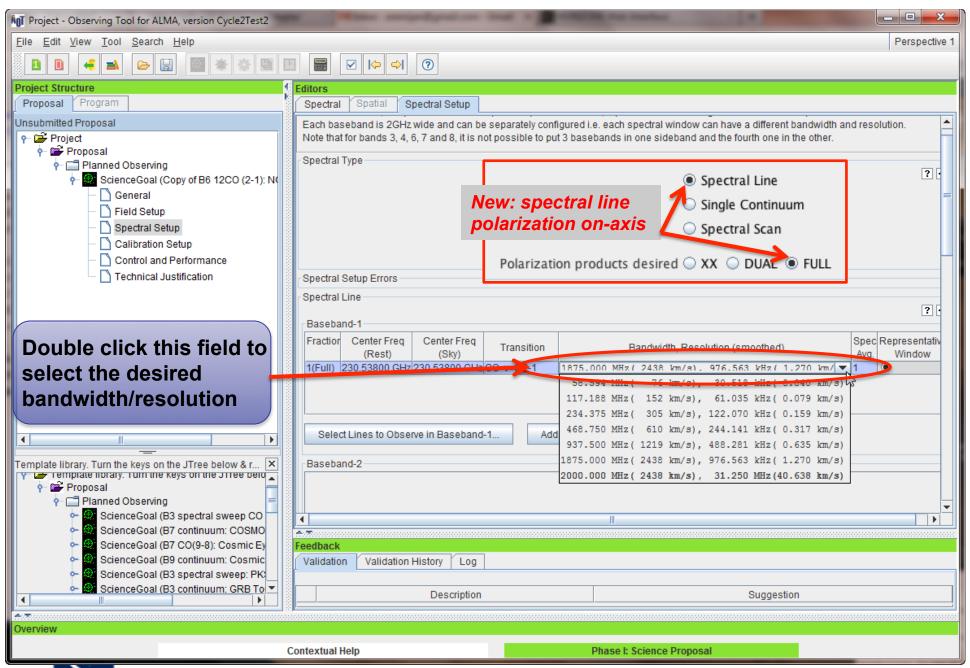






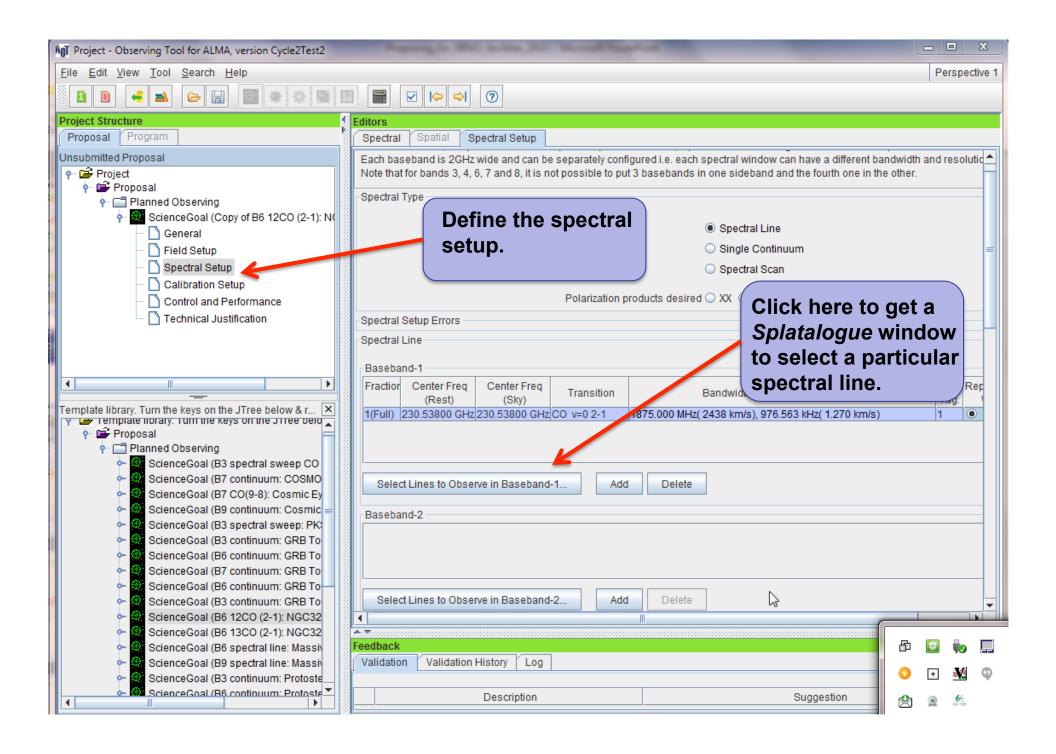


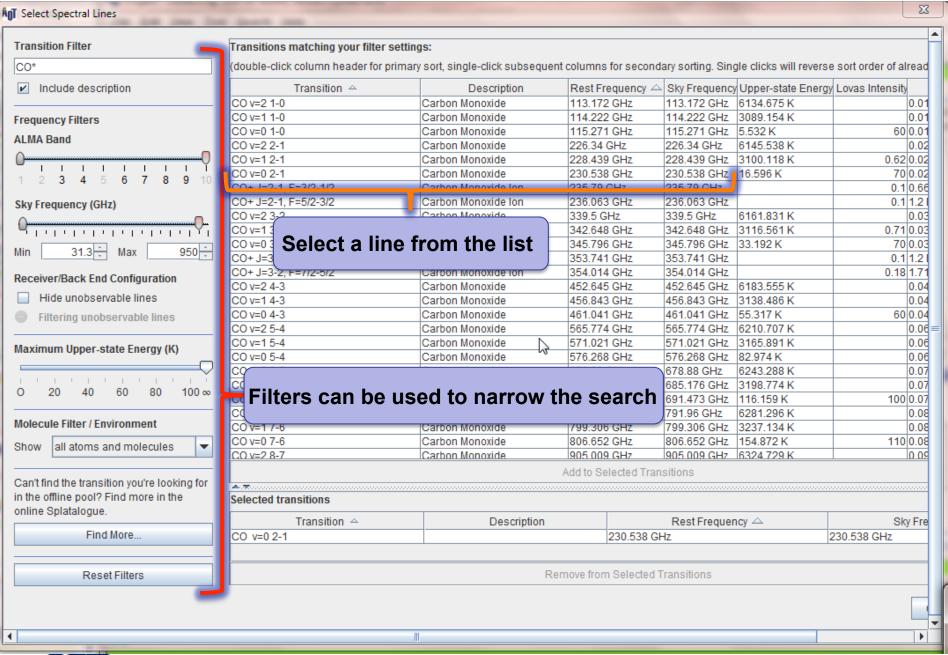




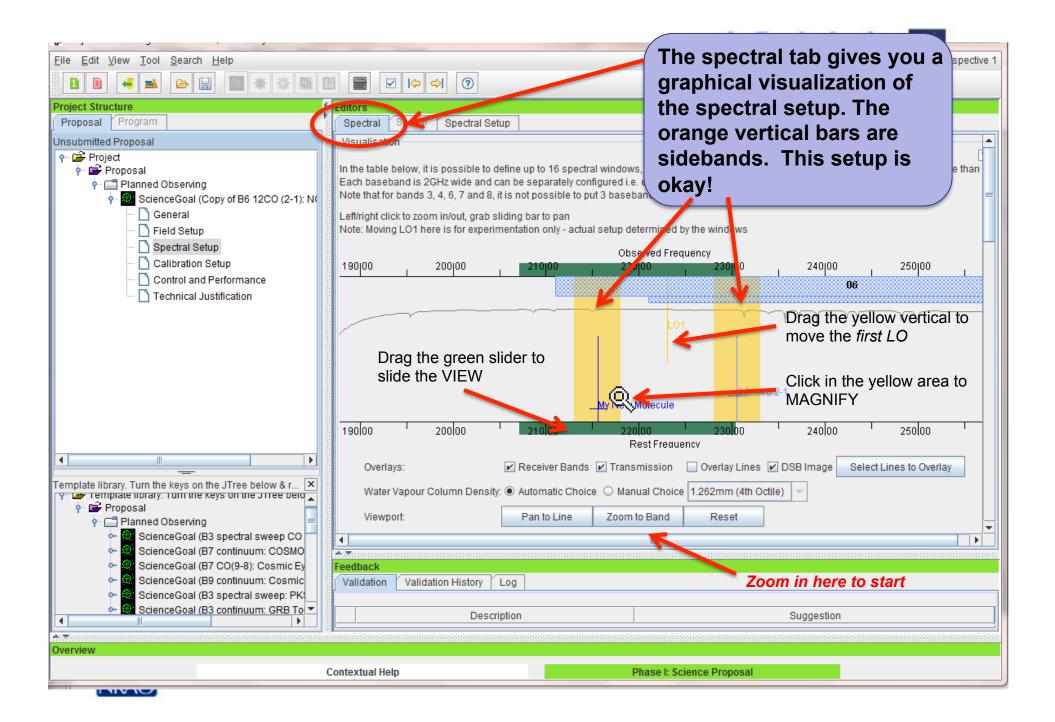




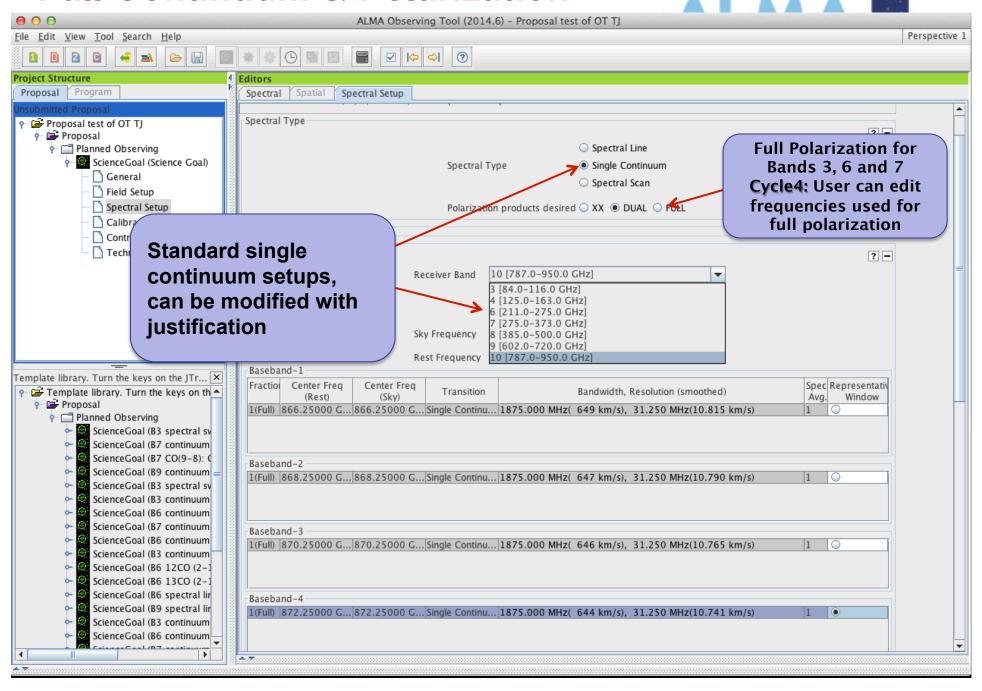




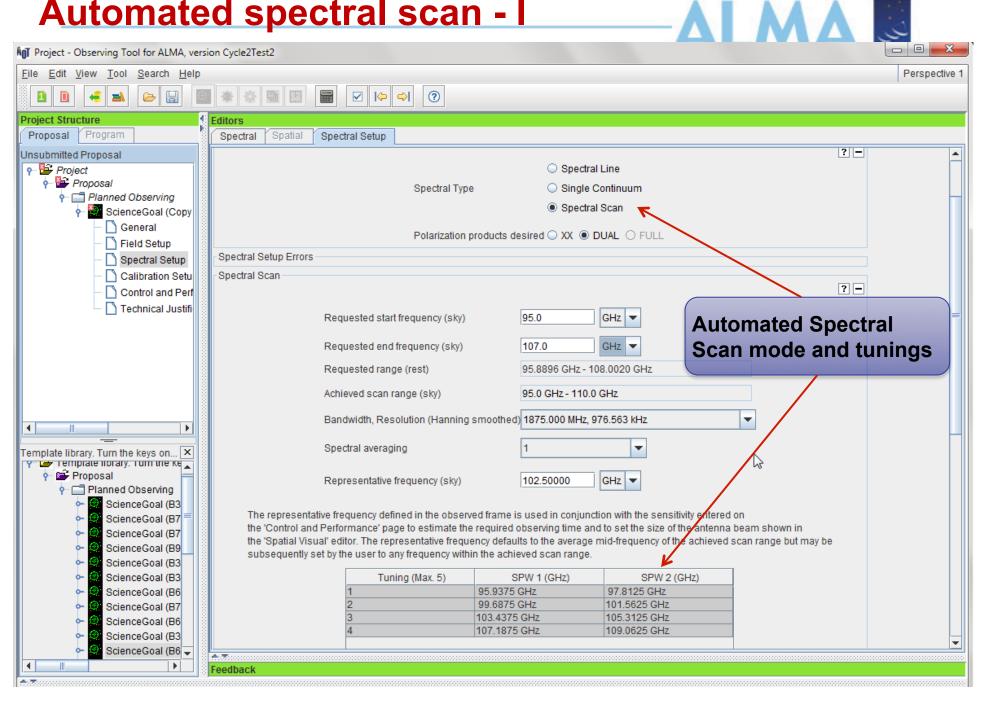




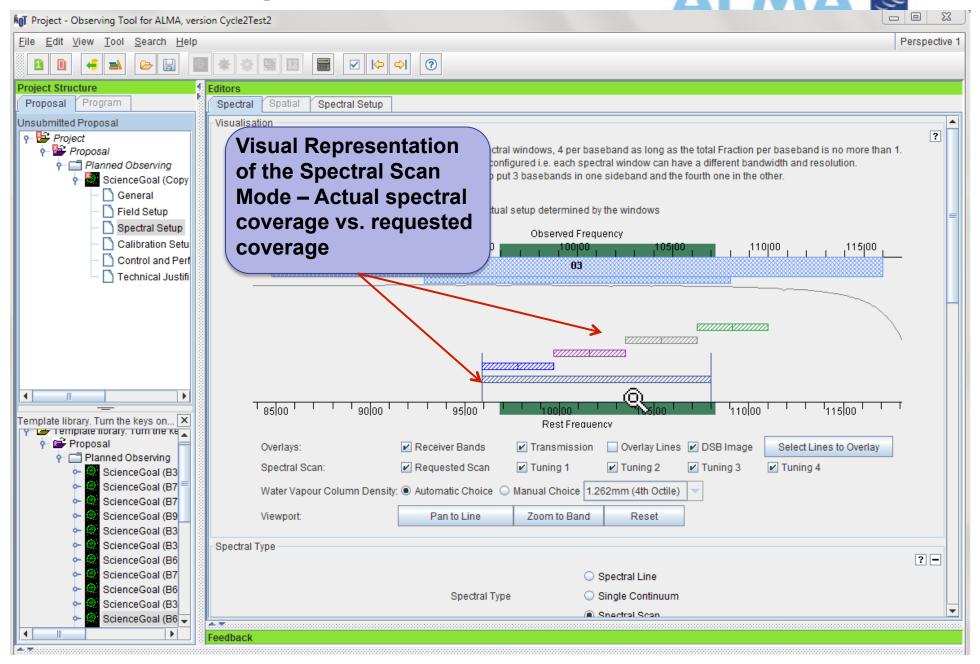
Full Continuum & Polarization

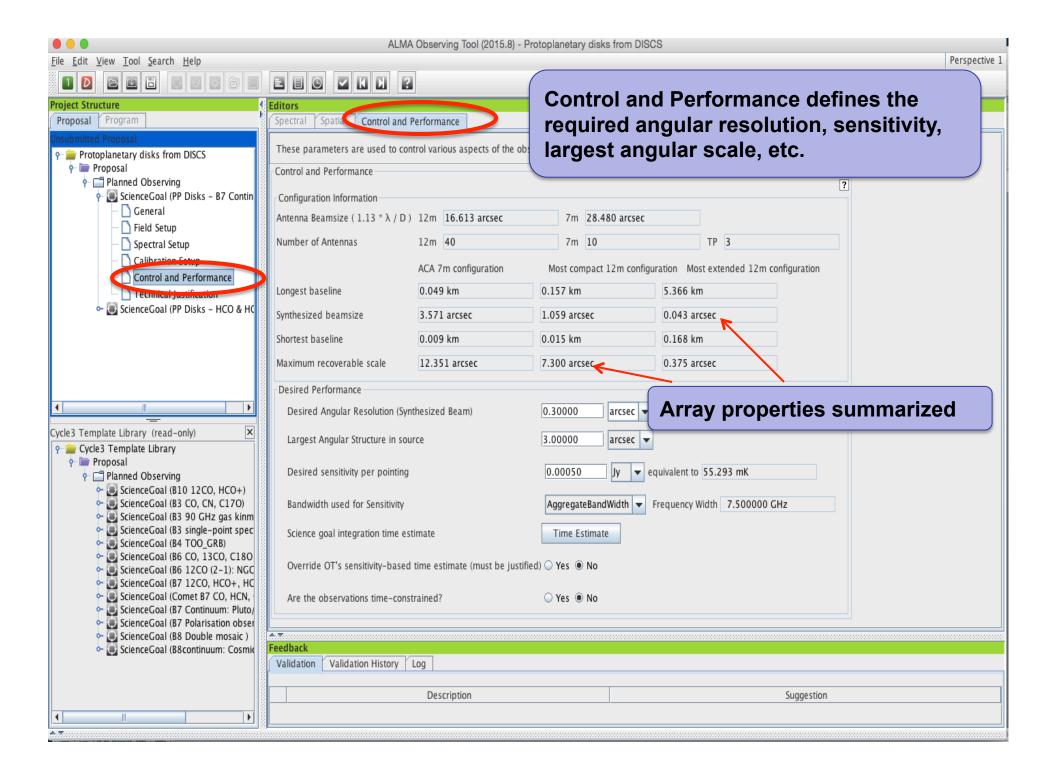


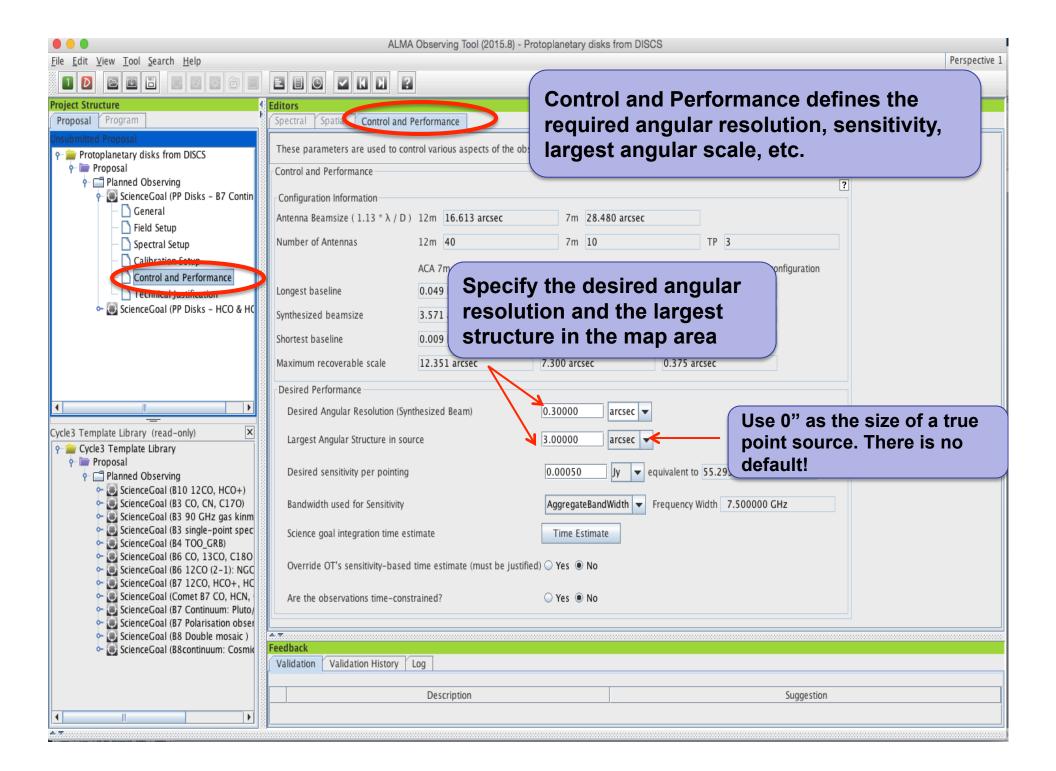
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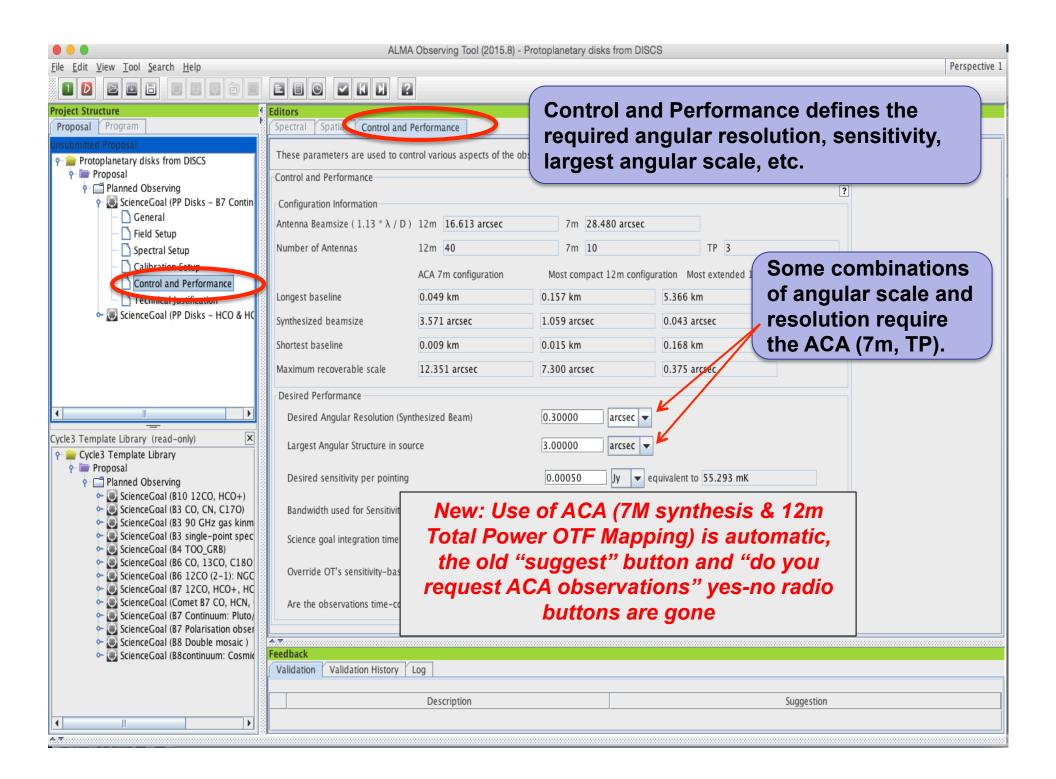


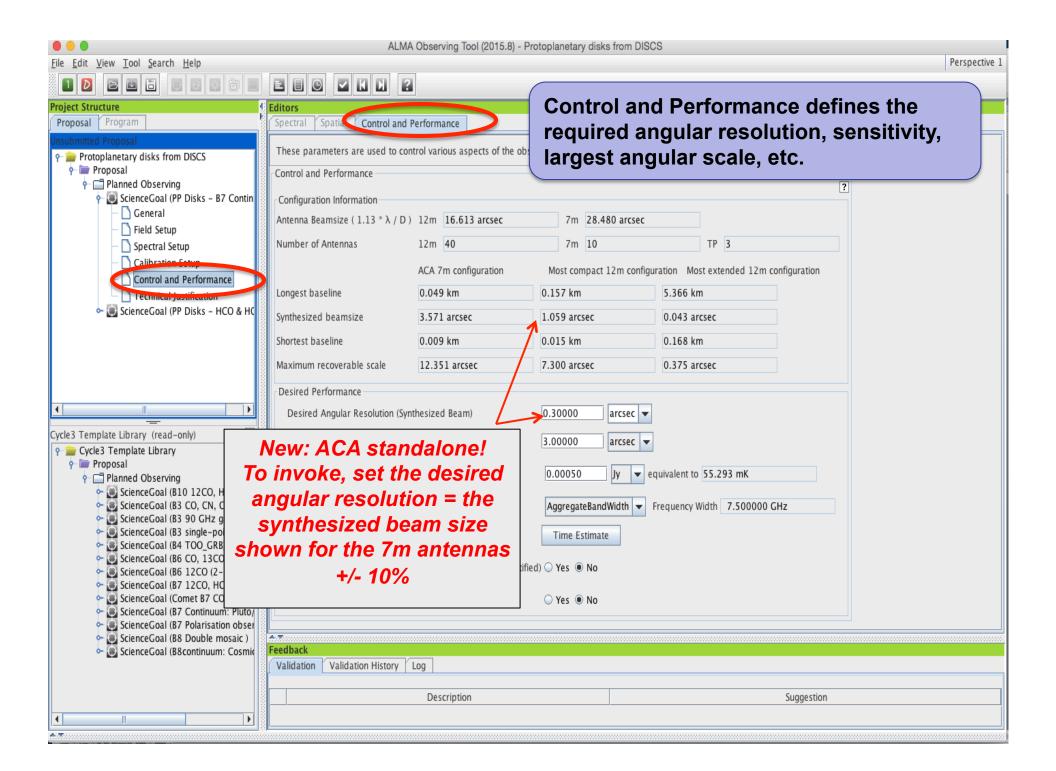
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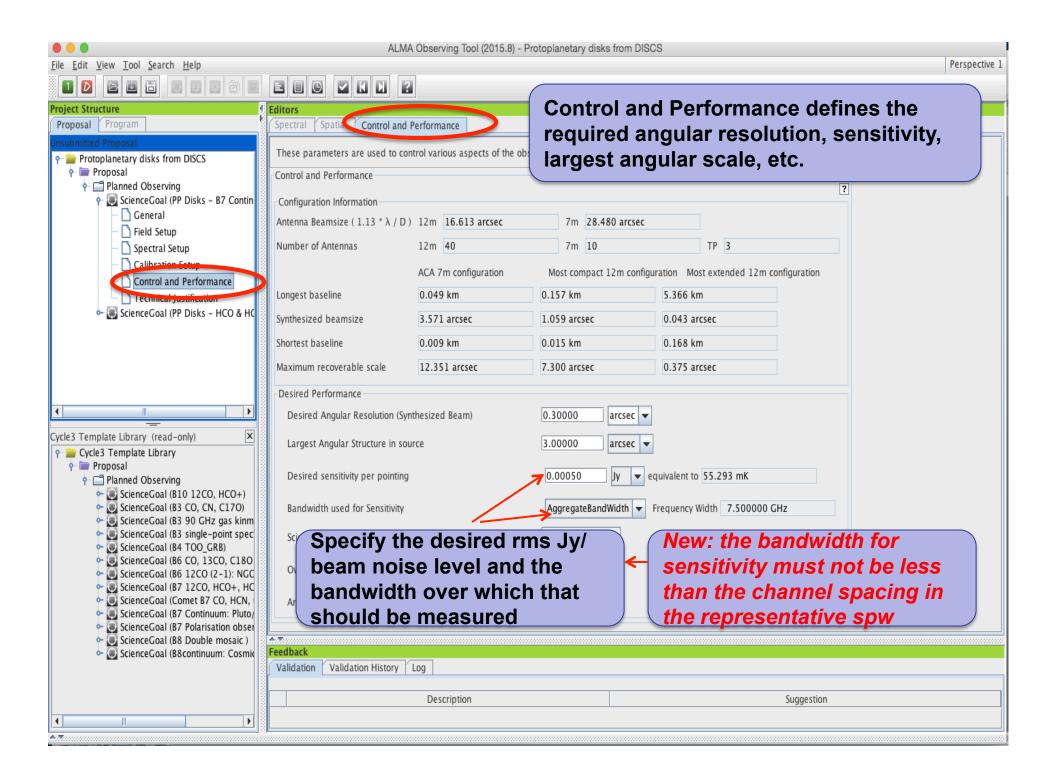




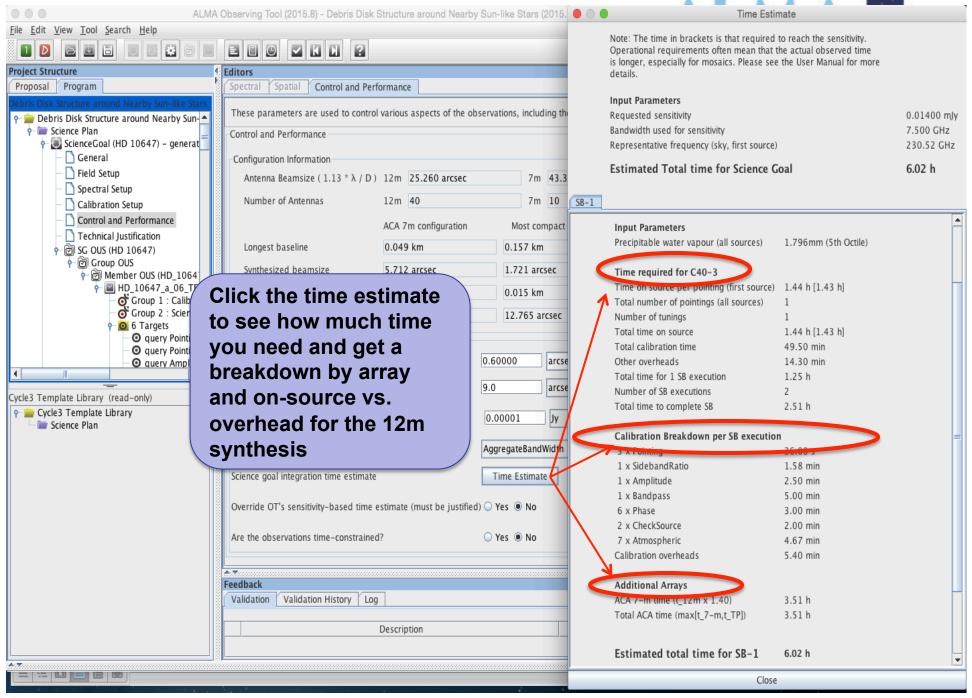




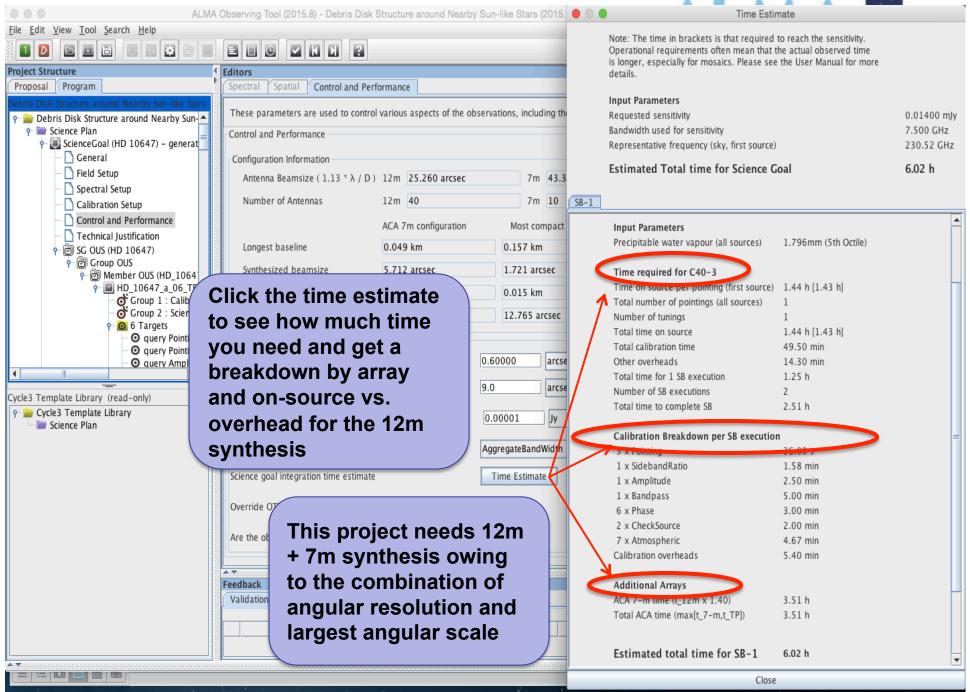




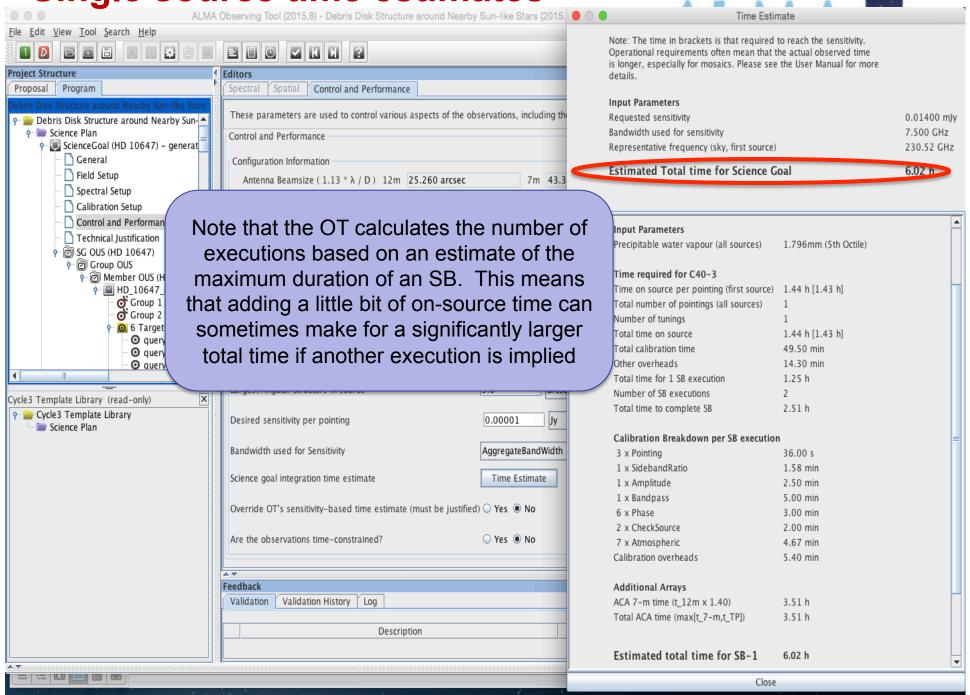
SG Time Estimates

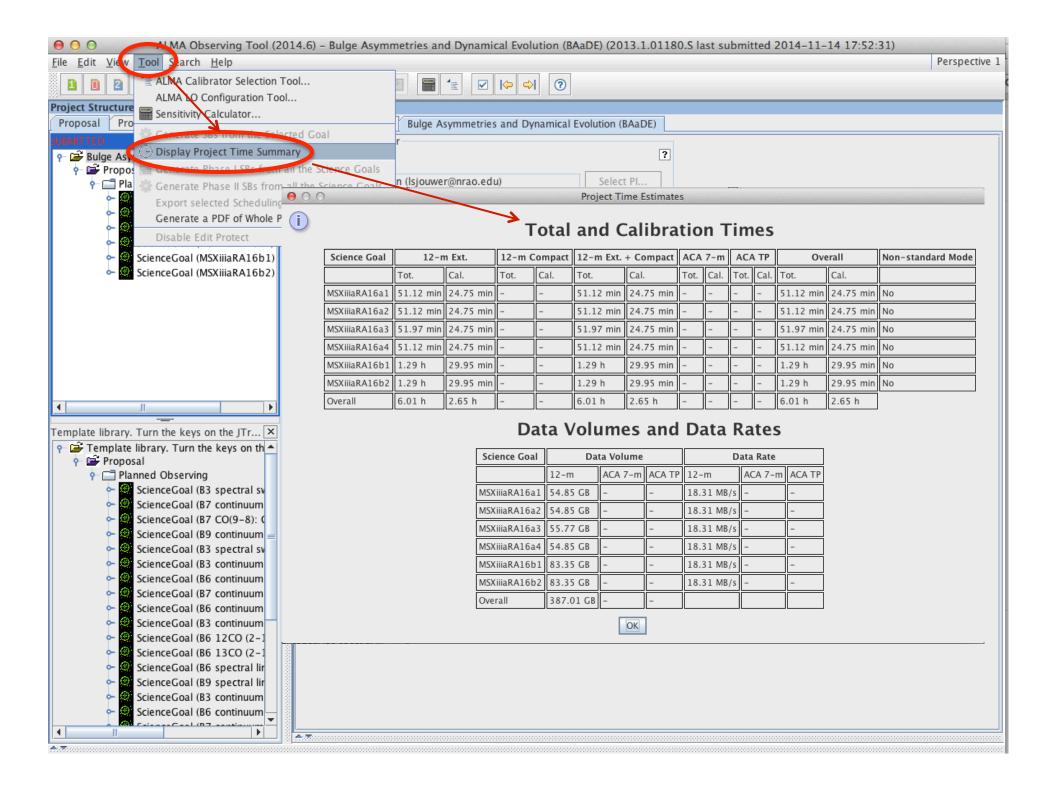


SG Time Estimates

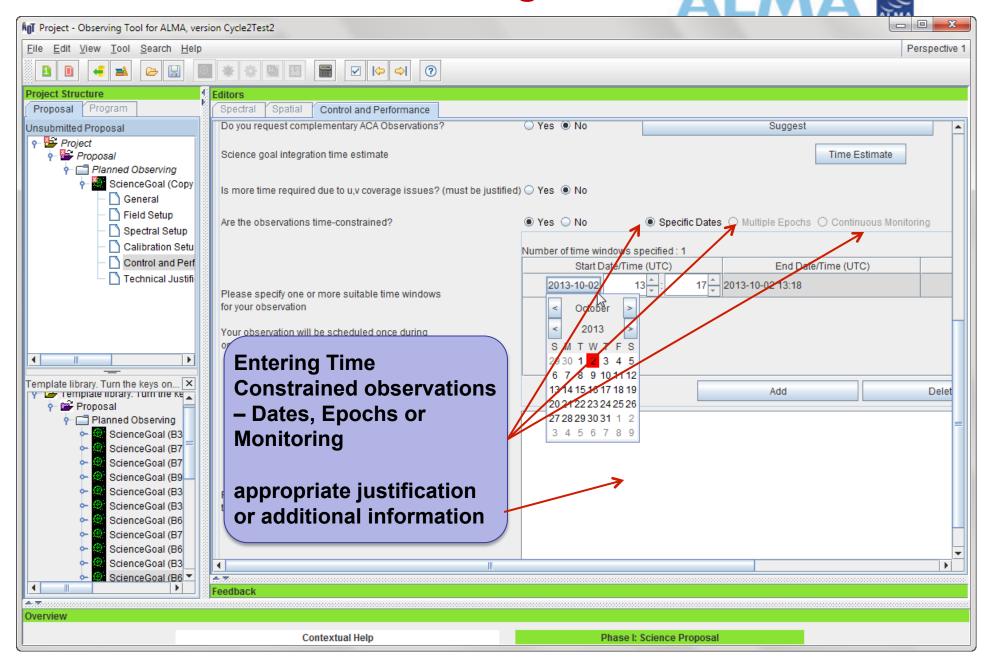


Single source time estimates

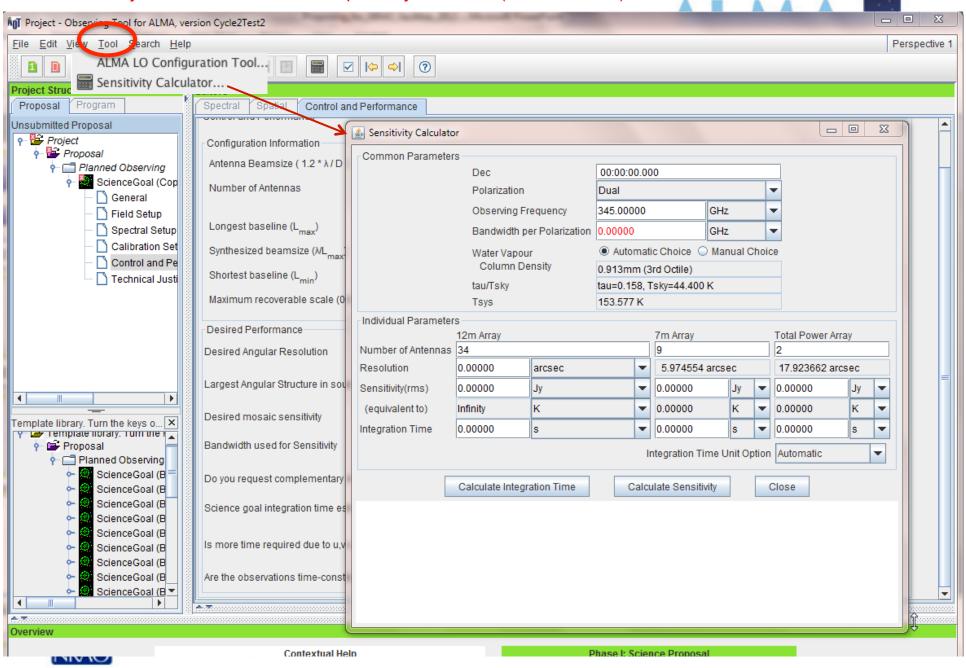




Time constrained observing



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



Tech Justification (New at Cycle 3)

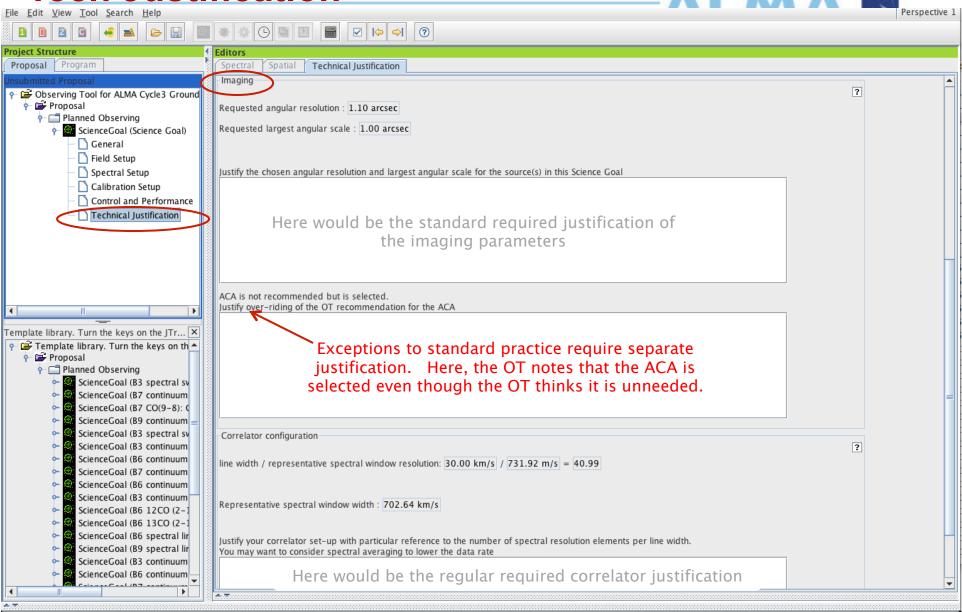
ALMA Observing Tool (2014.6) - Observing Tool for Al-MA Cycle 3 Groundhoc Day Test File Edit View Tool Search Help Perspective 1 Project Structure Proposal Program Spectral Spatial Technical Justification Enter a Technical Justification for this Science Goal, paying special attention to the parameters reproduced below. Observing Tool for ALMA Cycle3 Ground roposal 🚰 Sensitivity Planned Observing ? ScienceGoal (Science Goal) Requested RMS over 2.4414062500000005E-4 GHz is 3.00 mJy For a peak flux density of 30.00 mJy, the achieved S/N is 10.0 General Field Setup Achieved RMS over the total 351.56 MHz bandwidth is 111.80 uJy For a continuum flux density of 100.00 mJy, the achieved S/N is 894.4 Spectral Setup For a peak line flux of 30.00 mJy, the achieved S/N over 1/3 of the source line width (30.00 km/s / 3 = 10.00 km/s) is 26.1 Calibration Setup Line width / bandwidth used for sensitivity 30.00 km/s / 731.92 m/s = 40.99 Technical Justification Dynamic Range: 33.33 Justify your requested RMS and resulting S/N for the spectral line and/or continuum observations. For line observations also justify the bandwidth used for the sensitivity calculation. Here would be the standard required justification of Template library. Turn the keys on the JTr... 🗙 the sensitivity parameters • 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 There are separate sections for Sensitivity, Imaging and Correlator ScienceGoal (B3 continuum ScienceGoal (B6 continuum ScienceGoal (B7 continuum Each requires its own 50+ word justification ScienceGoal (B6 continuum ScienceGoal (B3 continuum) ScienceGoal (B6 12CO (2-) Each comes with a summary of the requested input information to ScienceGoal (B6 13CO (2-1 detail the different technical aspects of your program. ScienceGoal (B6 spectral lir ScienceGoal (B9 spectral lir ScienceGoal (B3 continuum



ScienceGoal (B6 continuum

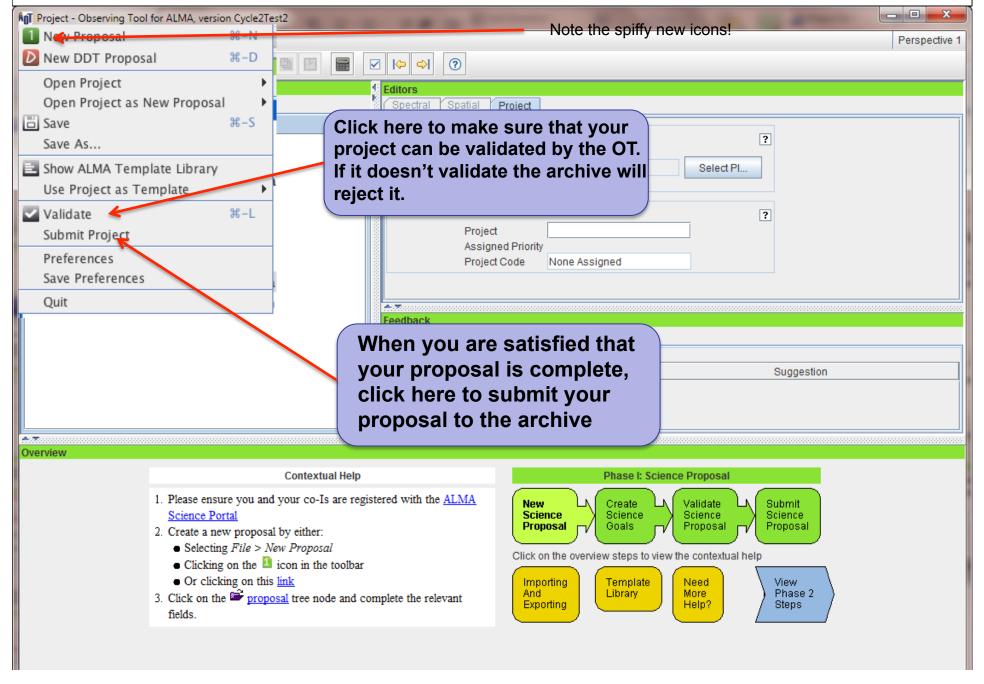
Tech Justification

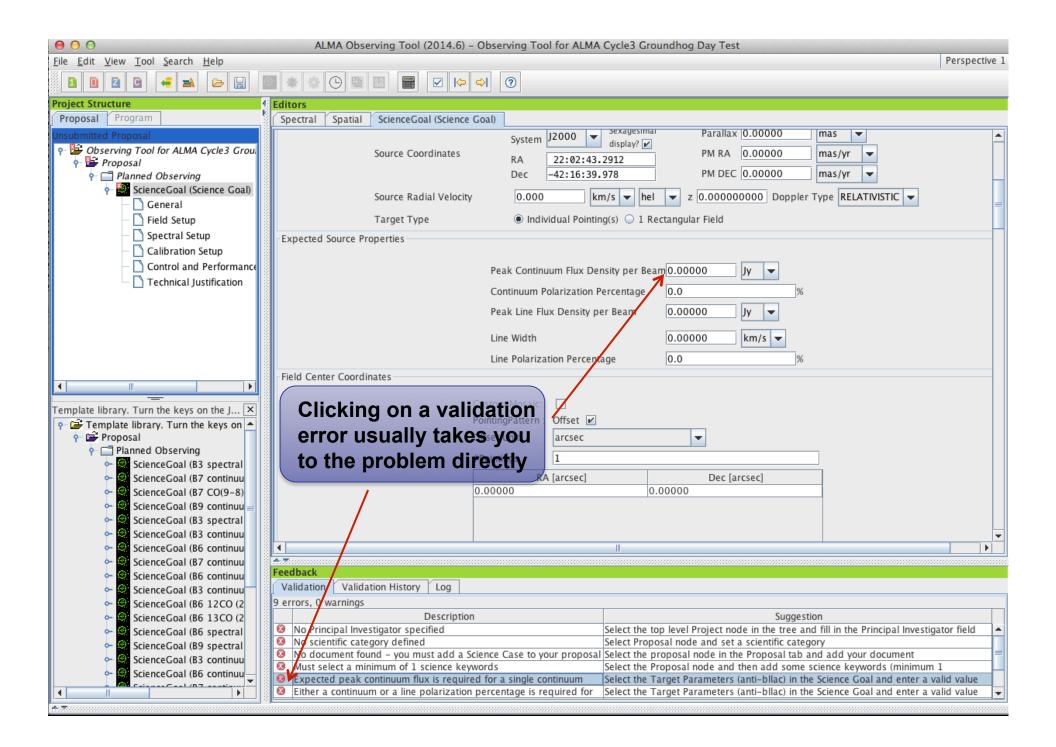






When the time is ripe ... validate & submit





Summary: New for Cycle 4 OT



For Cycle 4, some notable new "ALMA" features:

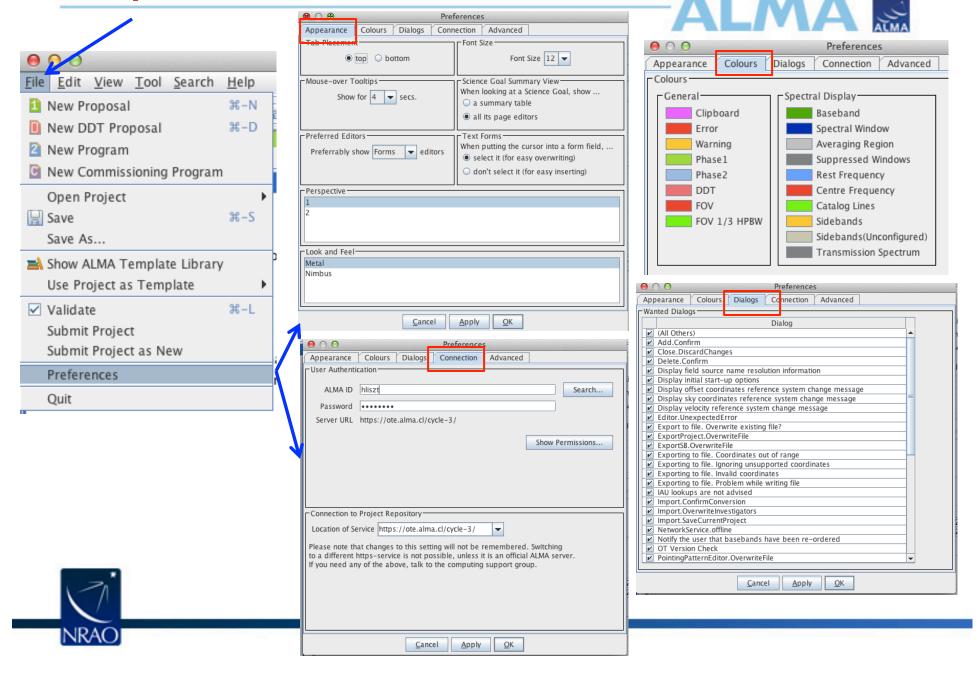
- + Large, VLBI and ACA-standalone projects to invoke ACA-standalone set desired angular resolution = 7m synthesized hpbw
- + On-axis spectral line polarization
- + 40 12-m array, 10 7-m array, 3 TP antennas

There are also new "OT" features:

- + The 10° size limitation on SG is gone, the OT will cluster your targets for you
- + Inclusion of the ACA is automatic, no more "suggest" and "do you request"
- + The bandwidth for sensitivity can't be smaller than representative spw's channel spacing
- + ICRS generally replaces "FK5 J2000"
- + Cut/paste commands are the same inside the OT and outside in your OS



Use preferences to customize

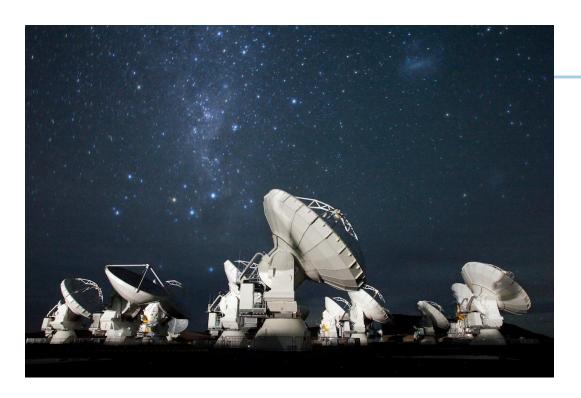


A Few OT Tips...



- New: The same cut and paste commands you use outside the OT for text also now work inside it
- Ctrl-Z global shortcut will expand out succeeding items in the J-tree (try it, you'll see what we mean)
- 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 does galactic-celestial conversion automatically
 - Cannot convert in other ways, eg not FK5 J2000 to ICRS. FK5 J2000 now deprecated







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.