An Introduction to the Cycle 5 ALMA Observing Tool

How to turn that great idea into an ALMA proposal...

[Your Name as Presenter here]

Author: Harvey Liszt

Atacama Large Millimeter/submillimeter Array
Expanded Very Large Array
Very Long Baseline Array

NRAO

ALMA Cycle 5 Planning

- ALMA Cycle 4 will provide 4000 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:
  - 21 March 2017   Call for Proposals
  - **20 April 2017   Proposal deadline**
  - August 2017   Review results sent to PIs
  - October 2017   Start of ALMA Cycle 5 observations
  - September 2018   End of Cycle 5 observations

Cycle 5 Capabilities

- **Antennas:** At least 43 antennas in the 12-m Array, ten 7-m antennas (for short baselines) and three 12-m antennas (for single dish maps)
- **Receiver bands:** 3, 4, 5, 6, 7, 8, 9, & 10 (wavelengths of about 3.1, 2.1, 1.5, 1.3, 0.87, 0.74, 0.44, and 0.35 mm, respectively)
- **Baselines:** Maximum baselines up to 3.7 km for Bands 8, 9, and 10; up to 6.8 km for Band 7; and >15 km for Bands 3, 4, 5 & 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, 4, 5, 6 and 7 on the 12-m array

Cycle 5 Capabilities

Cycle 5 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 > 5 km
- All full polarization observations
- Spectral Scans
- Bandwidth switching projects (less than 1GHz aggregate bandwidth over all spectral windows)
- Solar Observations
- VLBI observations
- Non-standard calibrations (user-defined calibrations selected in the OT)

New Capabilities to Note:

In Cycle 5, the following opportunities will be available to Proposers for the first time.

- 90 Degree Walsh switching at Bands 9 & 10 for both the 12m and the ACA

- Large Programs
  - defined as more than 50 hours of observations with either the 12-m Array or the ACA in stand-alone mode.

- VLBI full polarization continuum observations at selected frequencies in Bands 3, 6, and 7
  - Proposals will be accepted for Very Long Baseline Interferometry (VLBI) observations with ALMA 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.

- Solar observations (Interferometry + Total Power continuum) at selected frequencies in Bands 3 and 6.

Proposal Checklist
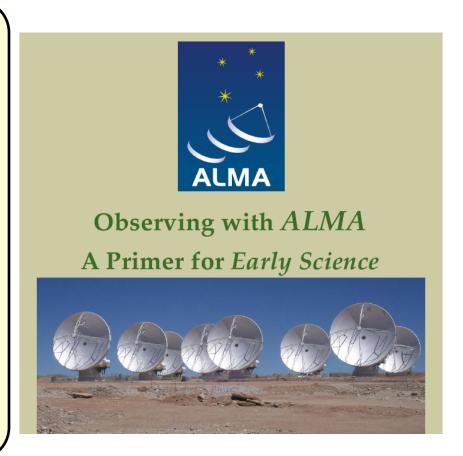
- Read relevant documentation (CfP Guide, Primer, etc.)
- Create an ALMA account by registering at the Science Portal (almascience.org)
- Download the Observing Tool (OT) & related guides
- Prepare the Science Case
    - New capabilities for Cycle 5!
- Prepare Science Goals (sources, frequency & correlator setup, integration times) within the OT
- Make use of the Helpdesk & the Knowledgebase

Cycle 5 Documentation & Timeline
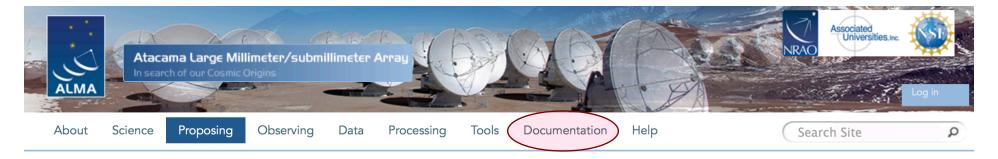
- Call for Proposals
- ALMA Primer
- OT Guide
- ALMA Tech Handbook
- Helpdesk Knowledgebase

- Timeline for Cycle 5
  - Mar. 21 – Call for Proposals
  - Apr. 20 – Proposal Deadline
  - August – Review Complete
  - October – Start of Cycle 5
  - Duration – 11 months/year

Observing with *ALMA*

A Primer for *Early Science*

Downloading the ALMA OT

Atacama Large Millimeter/submillimeter Array
In search of our Cosmic Origins

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

Log in

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 4* release of the OT is configured for the present capabilities of ALMA as described in the Cycle 4 Call For Proposals. Note that in order to submit proposals you will have to register with the ALMA Science Portal beforehand.

Note that preparation of Cycle 3 Phase 1 and DDT proposals needs to be done using the Cycle 3 version of the Observing Tool. This version of the OT can be found in the DDT page, or the Phase 2 menu.
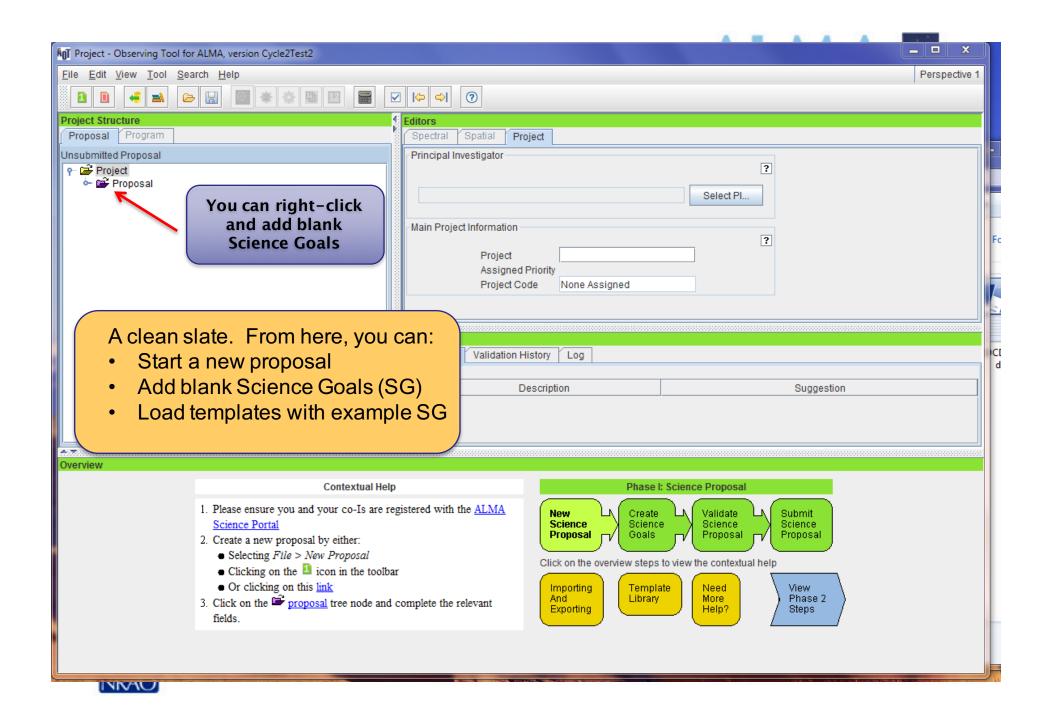
Download & Installation
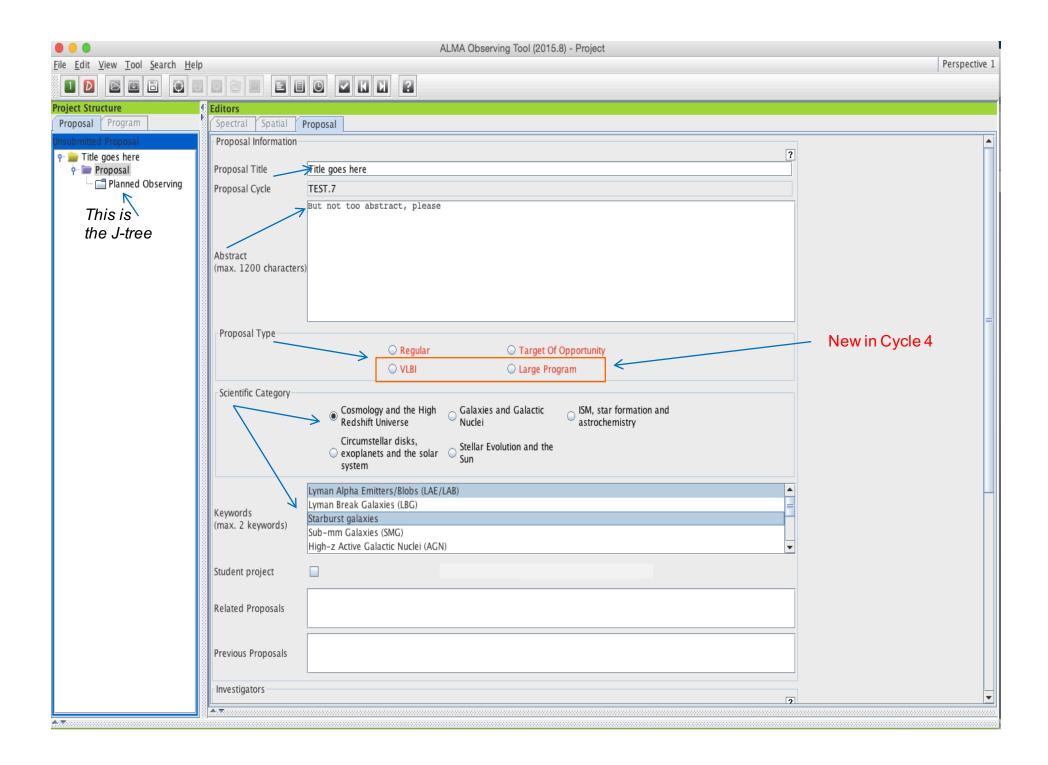
The OT will run on most common operating systems, as long as you have **Java 8** installed (see the troubleshooting page if you are experiencing Java problems). The ALMA OT is available in two flavours: Web Start and tarball.
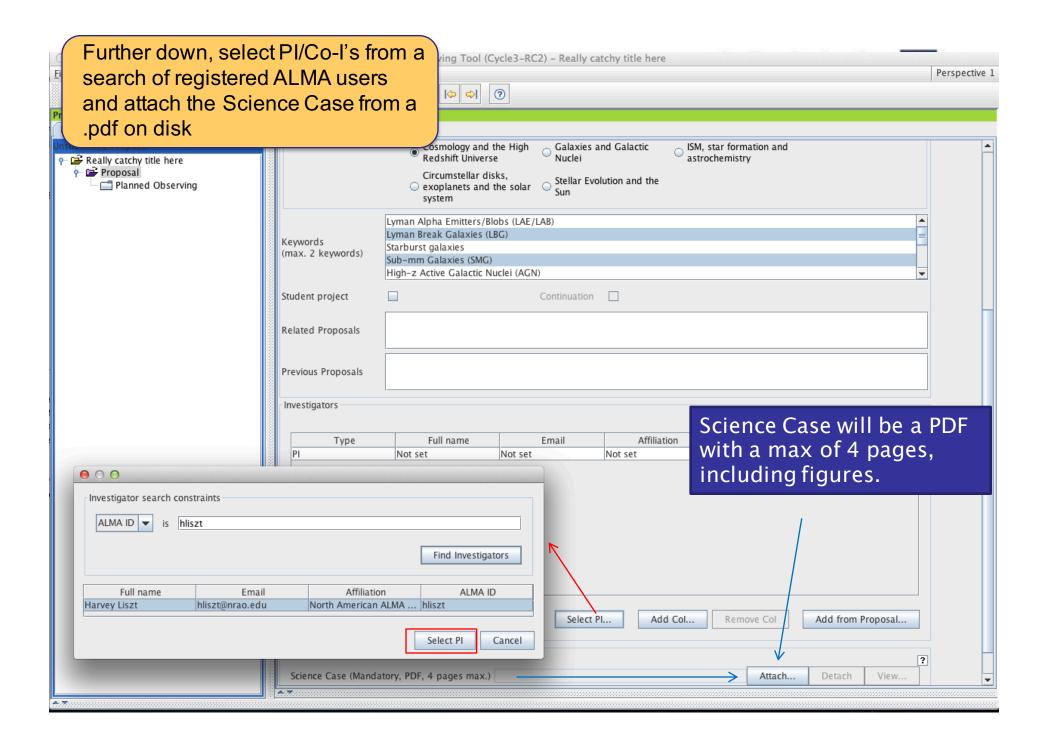
The **Web Start** application is the recommended way of using the OT. It has the advantage that the OT is automatically downloaded and installed on your computer and it will also automatically detect and install updates. There are some issues with Web Start, particularly that it does not work with the 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.
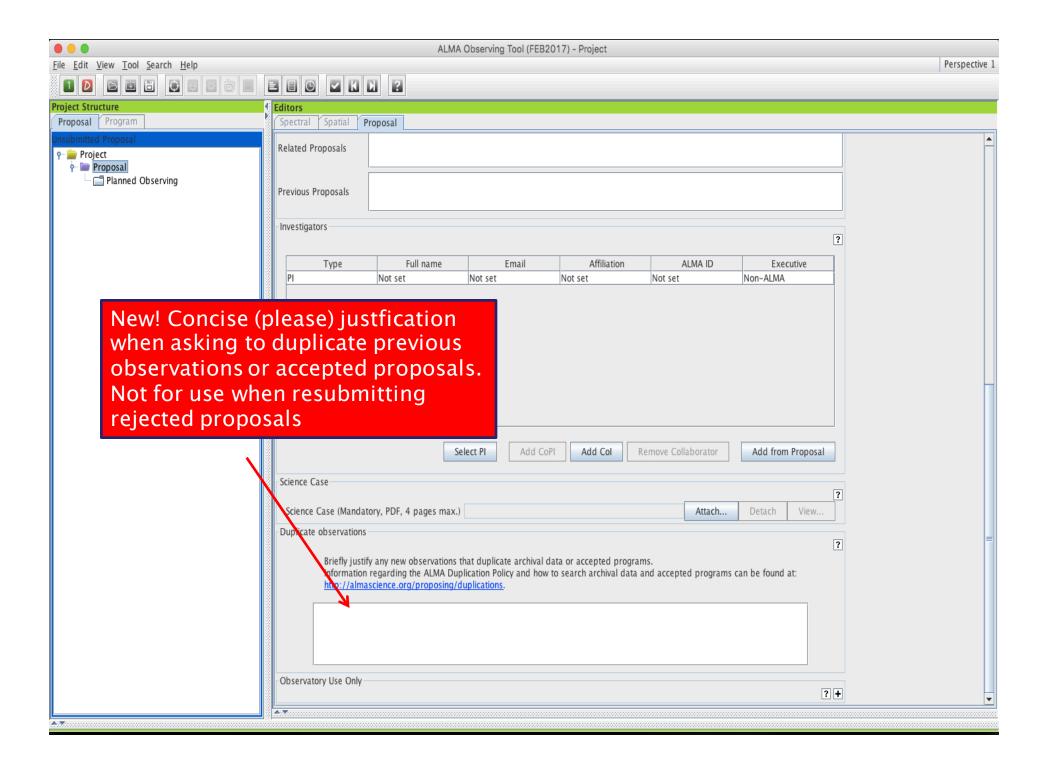
The **tarball** version must be installed manually and will not automatically update itself, however there should be no installation issues. For Linux users, we also provide a download complete with a recommended version of the Java Runtime Environment. Please use this if you have any problems running the OT tarball install with your default Java.

Webstart   Tarball

Further down, select PI/Co-I's from a search of registered ALMA users and attach the Science Case from a .pdf on disk

... ving Tool (Cycle3-RC2) – Really catchy title here

Perspective 1

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...

Science Case

- Must include:
  - Astronomical Importance
  - Estimated intensity, S/N
- May include:
  - Figures
  - Tables
  - References

- Free-form PDF document
  - 12+ font, English only
  - 20 MB file size
  - 4 pages (6 for Large Projects)

Table 1: Cycle 5 Configuration Schedule
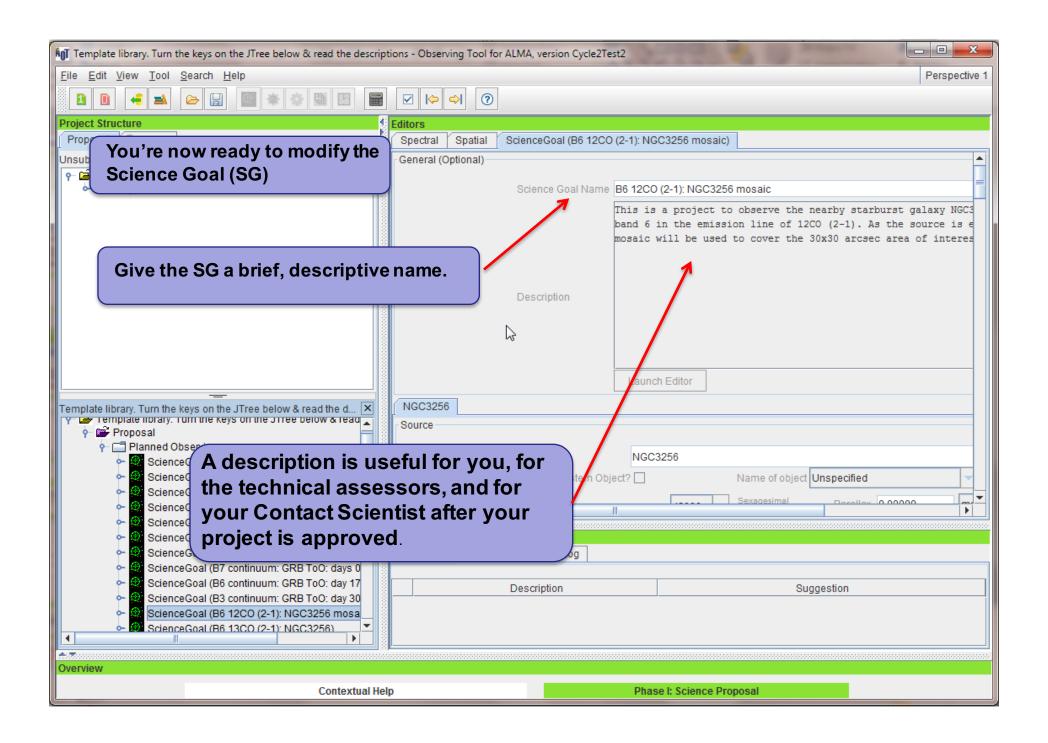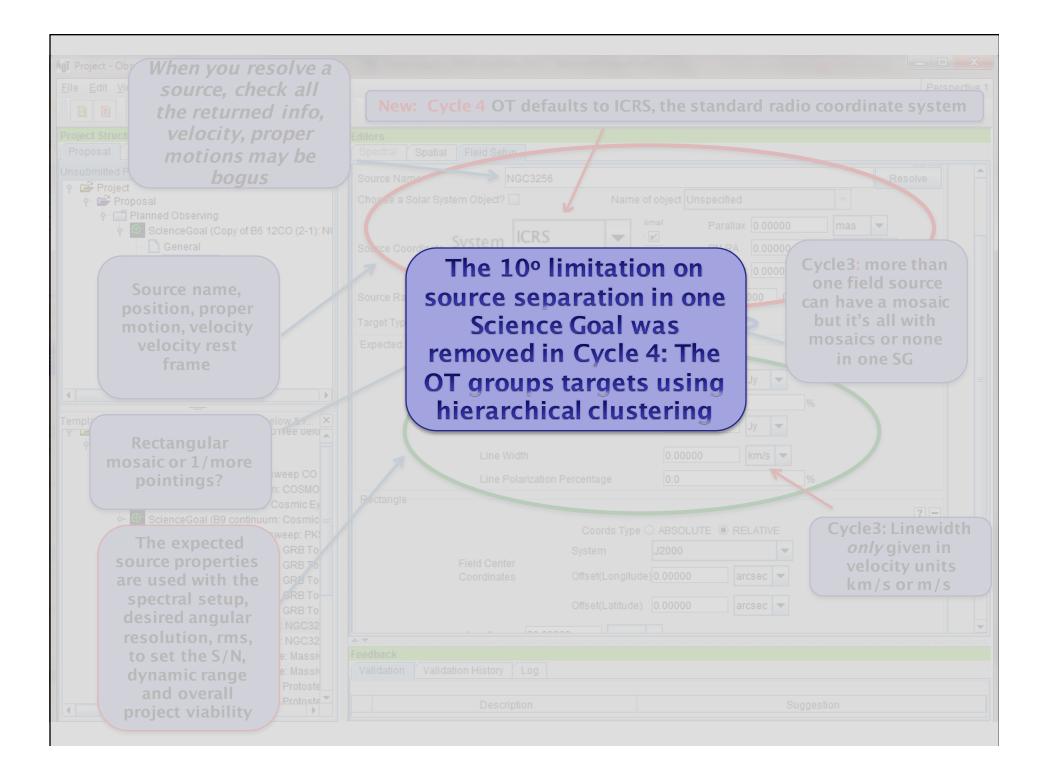
Start date	Configuration	Longest baseline	LST for best observing conditions
2017 October 1	C43-7	3.7 km	~ 21h - 10h
2017 October 5	C43-8	6.8 km	~ 22h - 11h
2017 October 25	C43-9	12.8 km	~ 23h - 12h
2017 November 10	C43-10	16.5 km	~ 1h - 13h
2017 December 1-18	No observations due to large antenna reconfiguration		
2017 December 19	C43-6	1.8 km	~ 4h - 15h
2018 January 10	C43-5	1.1 km	~ 5h - 17h
2018 February 1-28	No observations due to February shutdown		
2018 March 1	C43-4	0.7 km	~ 8h - 21h
2018 March 30	C43-3	0.46 km	~ 10h - 0h
2018 May 15	C43-2	0.27 km	~ 12h - 3h
2018 June 15	C43-1	0.15 km	~ 14h - 5h
2018 July 15	C43-2	0.27 km	~ 17h - 7h
2018 August 15	C43-3	0.46 km	~ 18h - 8h
2018 August 30	C43-4	0.7 km	~ 19h - 9h
2018 September 15	C43-5	1.1 km	~ 20h - 10h

ALMA Observing Tool (2015.8) - Title goes here

Perspective 1

File Edit View Tool Search Help

New Proposal   ⌘-N
New DDT Proposal   ⌘-D
Open Project ▸
Open Project as New Proposal ▸   From ALMA Archive...
Save   ⌘-S
Save As...
Show ALMA Template Library
Use Project as Template ▸
Validate   ⌘
Submit Project
Preferences
Save Preferences
Quit

Editors

Spectral   Spatial   Title goes here

al Investigator

[?]

Select PI...

Main Project Information

[?]

Project   Title goes here
Assigned Priority
Project Code   None Assigned

Since Cycle 4, a previously-submitted project can be opened as a new proposal from the science archive

Click here to load the standard templates that are distributed with the OT

Click here to load a project (perhaps an old one of yours) from disk as a template

Overv

extual 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

Drag the one you'd like to modify, from here up to the Proposal folder. (actual templates will be different from this illustration)

Hint: you can also drag&drop or copy&paste elements between Science Goals in your project

When you resolve a source, check all the returned info, velocity, proper motions may be bogus

New: Cycle 4 OT defaults to ICRS, the standard radio coordinate system

Source name, position, proper motion, velocity velocity rest frame

The 10° limitation on source separation in one Science Goal was removed in Cycle 4: The OT groups targets using hierarchical clustering

Cycle3: more than one field source can have a mosaic but it's all with mosaics or none in one SG

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

Cycle3: Linewidth only given in velocity units km/s or m/s

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 s
      - ScienceGoal (B7 continuum
      - ScienceGoal (B7 CO(9–8):
      - ScienceGoal (B9 continuum
      - ScienceGoal (B3 spectral s
      - 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 li
      - ScienceGoal (B9 spectral li
      - ScienceGoal (B3 continuum
      - ScienceGoal (B6 continuum
      - ScienceGoal (B7 continuum

Editors

Spectral | Spatial | Field Setup

anti-bllac

Source

Source Name: anti-bllac   [Resolve]

Choose a Solar System Object? ☐   Name of object: Unspecified

System: J2000   Sexagesimal display? ✔   Parallax: 0.0   mas

Source Coordinates
RA: 22:02:43.2912   PM RA: 0.00000   mas/yr
Dec: -42:16:39.978   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 Dens
Continuum Polarization Per ... %
Peak Line Flux Density per
Line Width
Line Polarization Percentag ... %

Field Center Coordinates

Custom Mosaic: ☐
Pointing Pattern: Offset ☐
Offset Unit: arcsec
#Pointings: 2

RA
22:02:44.2910
22:02:43.2910

[Add] [Delete] [Import] [Export]

[Add Source] [Load from File...] [Export to File...] [Delete Source] [Delete All Sources]

NEW! CUSTOM MOSAICS ARE GONE! ALL OFFSET POINTINGS MUST OVERLAP

NEW! And they must lie with 5° of the source

ALMA Observing Tool (FEB2017) - Project

File Edit View Tool Search Help

Perspective 1

Project Structure

Proposal | Program

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (Science Goal)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

Editors

Spectral | Spatial | Field Setup

Check 1 Rectangular Field on the first source before adding others to put rectangular mosaics around multiple sources.

SinglePoint

Source

Source Name _____ Resolve

Choose a Solar System Object? ☐   Name of object Unspecified

Source Coordinates
System ICRS ▾   Sexagesimal display? ☑   Parallax 0.00000 mas ▾
RA 00:00:00.0000   PM RA 0.00000 mas/yr ▾
Dec 00:00:00.000   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
Continuum Polarization Percentage
Peak Line Flux Density per Synthesized Beam
Line Width
Line Polarization Percentage

Coord Type ⦿ Relative ○ Absolute
Offset Unit arcsec ▾
#Pointings 1

RA [arcsec]	Dec [arcsec]
0.00000	0.00000

Add | Delete | Import | Export

Add Source | Load from File... | Export to File... | Clone Source | Delete Source | Delete All Sources

Individual offset pointings, must overlap in Cycle 5
Can be offsets or absolute positions. The OT will convert if you check/uncheck Coord Type

Read/write the offset pointings from/to a text file

NEW!! Option to clone an entire Field Source in addtion to add, load, export ..

Crafting mosaics

The Spatial tab gives a graphical visualization of the Field Setup.

New Cycle 5: when you click on this node you will now land on its visualizer tab

Select a background image from an online image server

Crafting mosaics

Or load a local fits image

You can turn "on/off" the mosaic beam pattern using this button.
Each circle is the size of the primary beam, centered on the field center

Crafting mosaics

Or load a local fits image

You can turn "on/off" the mosaic beam pattern using this button.
Each circle is the size of the primary beam, centered on the field center

Crafting mosaics

Setting up the mosaic in the Field Setup

Define the length, width and position angle of the region to mosaic. Default is to separate the field centers by about 48% of the primary beam (the Nyquist rate).
HPBW for the 12m antennas are 1.13λ/D

Estimated number of 7m Array pointings

No more than 150 12m Array pointings.

ALMA Observing Tool (FEB2017) - Project

Defining the spectral setup has a new look and new features

New Cycle 5: when you click on this node you will now land on its visualizer tab

NEW! Overlaid lines saved with the project

NEW! Bands 9,10 are DSB but you can correlate sidebands separately using 90° Walsh switching for 1875 MHz-wide line & continuum See below

NEW! Band 5 enabled, overlaps slightly with B4

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)

O 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
CO+ J=2-1, F=3/2-1/2	Carbon Monoxide Ion	235.79 GHz	235.79 GHz		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	Carbon Monoxide	342.648 GHz	342.648 GHz	3116.561 K	0.71 0.03
CO v=0 3	Carbon Monoxide	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
CO			678.88 GHz	6243.288 K	0.07
CO			685.176 GHz	3198.774 K	0.07
CO			691.473 GHz	116.159 K	100 0.07
CO			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

NRAO

File   Edit   View   Tool   Search   Help

Perspective 1

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
        - Technical Justification

Editors

Spectral   Spatial   Spectral Setup

Spectral Line

Baseband-1

Fraction	Centre Freq (rest,lsrk)	Centre Freq (sky,bar)	Transition	Bandwidth, Resolution (smoothed)	Spec. Avg.	Representative Window
1(Full)	98.70000 GHz	98.69667 GHz	continuum	1875.000 MHz(5695 km/s), 31.250 MHz(94.923 km/s)	1	○

NEW!! Sky frequency shown in barycentric frame so rest and sky frequency differ even when $V_{lsrk}=0$

Add spectral window manually   Delete   ☐ Show image spectral windows

| | | | | 58.594 MHz(179 km/s), 70.557 kHz(0.216 km/s) | 2 | ○ |
| | | | | 58.594 MHz(179 km/s), 61.035 kHz(0.187 km/s) | 1 | ○ |

Add spectral window centred on a spectral line   Add spectral window manually   Delete   ☐ Show image spectral windows

Baseband-3

| 1/2 | 86.67076 GHz | 86.66731 GHz | HCO 1(0,1)-0(... | 58.5 | | | 1 | ○ |
| 1/2 | 87.31690 GHz | 87.31342 GHz | CCH v=0 N=1-... | 58.5 | | | 1 | ○ |

NEW!! Default spectral binning is 2

Add spectral window centred on a spectral line   Add spectral window manually   Delete   ☐ Show image spectral windows

Baseband-4

| | | 1-0 | 58.594 MHz(198 km/s), 61.035 kHz(0.206 km/s) | 1 | ● |
| | | -0 | 58.594 MHz(197 km/s), 61.035 kHz(0.205 km/s) | 1 | ○ |

NEW! Once a window is defined with a rest frequency within, the window must always thereafter contain that rest frequency or the OT will complain

Add spectral window manually   Delete   ☐ Show image spectral windows

Representative Frequency

The representative frequency is used in conjunction with the sensitivity entered on the 'Control and Performance' page to estimate the required observing time and to set the size of the antenna beam shown in the 'Spatial Visual' editor. If the transition you are most interested in does

NRAO

Full Continuum & Polarization

Full Polarization for Bands 3, 4, 5, 6 and 7 User can edit frequencies used for full polarization

Standard single continuum setups, can be modified with justification

Automated spectral scan - I

Automated spectral scan - II

Visual Representation of the Spectral Scan Mode – Actual spectral coverage vs. requested coverage

Saving spw & line rest frequencies

Sideband separation (90° Walsh)

NEW!
Bands 9,10 have double sideband rcvrs but the sidebands can be separated using an additional phase-switching step, 90° Walsh switching. This can be turned on solely to reject lines in the image sideband, but once enabled, the two SB may be stored separately. Note that the noise is not affected because only a correlated signal can be separated.

See where lines in one SB appear in the other if checked

Turn it on

Record both SB

Only 1.875 GHz bandwidth, line or continuum

Time Estimate

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	3.500 mJy
Bandwidth used for sensitivity	7.500 GHz
Representative frequency (sky, first source)	152.00 GHz

Estimated Total time for Science Goal   **24.00 h**

Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4

Source Name	RA	Dec	Velocity
J1723-7713-350	17:23:50.8450	-77:13:50.540	0.000 km/s
J1617-7717-1600	16:17:49.2760	-77:17:18.460	0.000 km/s
J1550-8258-405	15:50:59.1420	-82:58:06.840	0.000 km/s
J1733-7935-1130	17:33:40.7000	-79:35:55.710	0.000 km/s

Possible Configuration Combinations

12-m (1)	12-m (2)	7-m	TP
C43-1	None	No	No
C43-2	None	No	No
C43-3	None	No	No

Input Parameters

Precipitable water vapour (all sources)	2.748mm (6th Octile)

Time required for 12m (1)

Time on source per pointing (first source)	18.14 min [70.69 ms]
Total number of pointings (all sources)	4
Number of tunings	1
Total time on source	1.21 h [295.66 ms]
Total calibration time	33.15 min
Other overheads	13.60 min
Total time for 1 SB execution	1.50 h
Number of SB executions	2
Total time to complete SB	3.00 h

Calibration Breakdown per SB execution*

2 x Pointing	4.00 min
1 x Amplitude/bandpass	5.00 min
2 x Polarization	4.00 min

Close

---

ng Tool (FEB2017) - Project

Perspective 1

s aspects of the observations, including the required antenna configurations and integration times.

.309 arcsec		7m	65.672 arcsec		
		7m	10	TP	3

configuration   Most compact 12m configuration   Most extended 12m configuration

n	0.161 km	16.197 km
arcsec	2.906 arcsec	0.033 arcsec
n	0.015 km	0.256 km
arcsec	24.192 arcsec	0.409 arcsec

d Beam) ○ Singl ⦿ Range ○ Any ○ Standalone ACA

| 1.0 | arcsec ▼ | to | 3.0 | arcsec ▼ |

| 3.0 | arcsec ▼ |

| 0.00350 | Jy ▼ |

AggregateBandWidth ▼

Time Estimate

○ Yes ⦿ No

○ Yes ⦿ No

RANGE:
You can specify an acceptable range of angular resolution. This implies a set of configuration possibilities, use the time estimate to see them

Project Summary

Total and Calibration Times

Science Goal	12–m (1)		12–m (2)		12–m (1+2)		ACA 7–m		ACA TP		Overall		Non–standard Mode
	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	
At ar 1"	1.03 d	6.21 h	9.92 h	2.48 h	1.45 d	8.70 h	–	–	–	–	1.45 d	8.70 h	No
Overall	1.03 d	6.21 h	9.92 h	2.48 h	1.45 d	8.70 h	–	–	–	–	1.45 d	8.70 h	

Total and Calibration Times

Science Goal	12–m (1)		12–m (2)		12–m (1+2)		ACA 7–m		ACA TP		Overall		Non–standard Mode
	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	
At ar 3"	31.53 min	13.83 min	–	–	31.53 min	13.83 min	2.63 h	1.15 h	–	–	3.15 h	1.38 h	No
Overall	31.53 min	13.83 min	–	–	31.53 min	13.83 min	2.63 h	1.15 h	–	–	3.15 h	1.38 h	

Use Tool->display project time summary to see these

When using RANGE:
Rules are operating under the hood to choose among the possible configuration choices and they may be biased toward the low resolution end of a range because less 12m time is needed. See above for an example where is a factor 50 difference in 12m time for ar = 1" vs. ar = 3"

Be careful that the OT is not making choices for you that you would not make for yourself. Before submitting with a range, narrow it and use the project time summary to examine the choices the OT is making

NRAO

Time Estimate

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	3.500 mJy
Bandwidth used for sensitivity	7.500 GHz
Representative frequency (sky, first source)	152.00 GHz
Estimated Total time for Science Goal	**24.00 h**

Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4

Source Name	RA	Dec	Velocity
J1723-7713-350	17:23:50.8450	-77:13:50.540	0.000 km/s
J1617-7717-1600	16:17:49.2760	-77:17:18.460	0.000 km/s
J1550-8258-405	15:50:59.1420	-82:58:06.840	0.000 km/s
J1733-7935-1130	17:33:40.7000	-79:35:55.710	0.000 km/s

Possible Configuration Combinations

12-m (1)	12-m (2)	7-m	TP
C43-1	None	No	No
C43-2	None	No	No
C43-3	None	No	No

Input Parameters

Precipitable water vapour (all sources)	2.748mm (6th Octile)

Time required for 12m (1)

Time on source per pointing (first source)	18.14 min [70.69 ms]
Total number of pointings (all sources)	4
Number of tunings	1
Total time on source	1.21 h [295.66 ms]
Total calibration time	33.15 min
Other overheads	13.60 min
Total time for 1 SB execution	1.50 h
Number of SB executions	2
Total time to complete SB	3.00 h

Calibration Breakdown per SB execution[*]

2 x Pointing	4.00 min
1 x Amplitude/bandpass	5.00 min
2 x Polarization	4.00 min

Close

ng Tool (FEB2017) - Project

Perspective 1

aspects of the observations, including the required antenna configurations and integration times.

.309 arcs

The time estimate is where you can see how the OT has grouped your targets into clusters, each of which will be in a different schedule block

configurati

arcsec

	0.015 km	0.256 km
arcsec	24.192 arcsec	0.409 arcsec

d Beam) ○ Single ● Range ○ Any ○ Standalone ACA

1.0 | arcsec ▼ | to 3.0 | arcsec ▼

3.0 | arcsec ▼

0.00350 | Jy ▼ | equivalent to 20.581 mK | @ 3.00 "

and 0.18522 K | @ 1.00 "

AggregateBandWidth ▼ | Frequency Width 7.500000 GHz

Time Estimate

○ Yes ● No

○ Yes ● No

SG Time Estimates

Click the time estimate to see how much time you need and get a breakdown by array and on-source vs. overhead for the 12m synthesis

SG Time Estimates

Single source time estimates

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...
- Generate SBs from the Selected Goal
- Display Project Time Summary
- Generate Phase I SBs from all the Science Goals
- Generate Phase II SBs from all the Science Goals
- Export selected Scheduling
- Generate a PDF of Whole P
- Disable Edit Protect

Project Structure

Proposal | Pro   Bulge Asymmetries and Dynamical Evolution (BAaDE)

SUBMITTED
- Bulge As
  - Propos
    - Pla   n (lsjouwer@nrao.edu)   Select Pl...
      - ScienceGoal (MSXiiiaRA16b1)
      - ScienceGoal (MSXiiiaRA16b2)

Project Time Estimates

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

Template library. Turn the keys on the JTr... X
- 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
      - ScienceGoal (B7 continuum

Time constrained observing

Entering Time Constrained observations – Dates, Epochs or Monitoring

appropriate justification or additional information

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

Tech Justification

Screenshot of the ALMA Observing Tool (2014.6) – Observing Tool for ALMA Cycle3 Groundhog Day Test, showing the Technical Justification editor.

- File Edit View Tool Search Help   Perspective 1

Project Structure

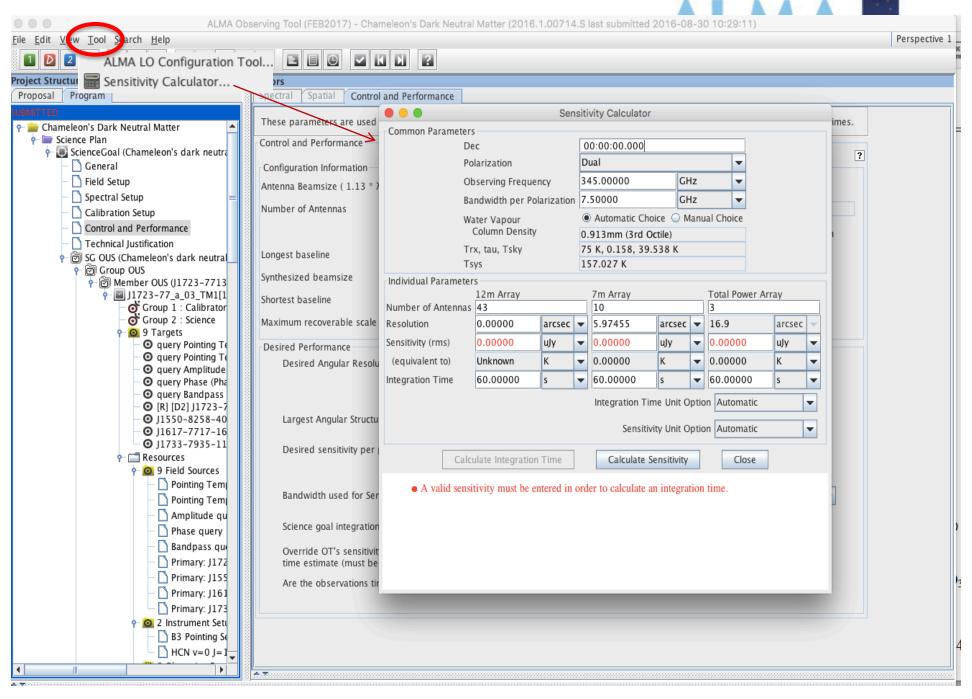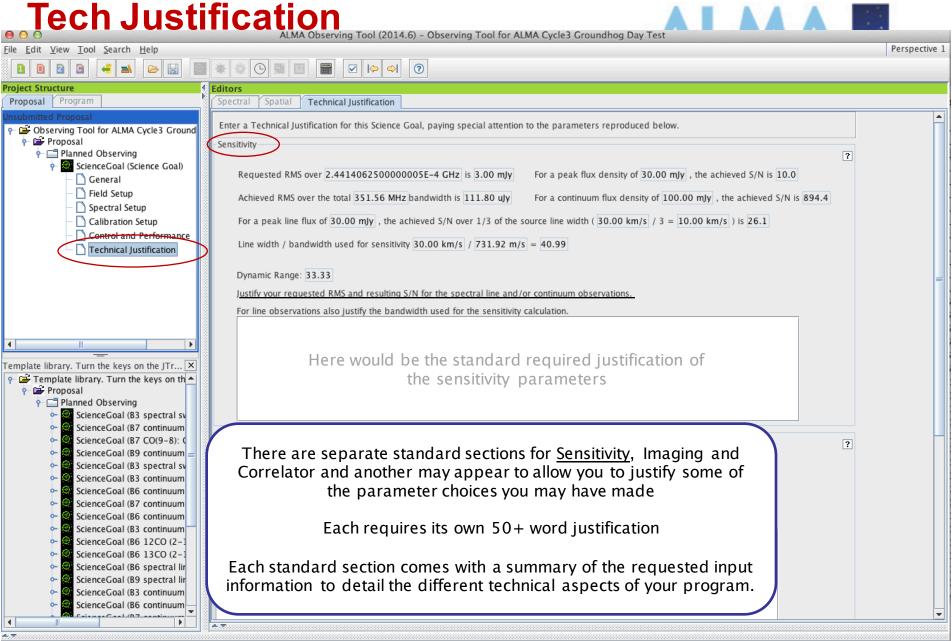Proposal | Program

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**

Editors

Spectral | Spatial | **Technical Justification**

Enter a Technical Justification for this Science Goal, paying special attention to the parameters reproduced below.

Sensitivity

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

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

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

Line width / bandwidth used for sensitivity 30.00 km/s / 731.92 m/s = 40.99

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 the sensitivity parameters

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 lin
      - ScienceGoal (B9 spectral lin
      - ScienceGoal (B3 continuum
      - ScienceGoal (B6 continuum

There are separate standard sections for Sensitivity, Imaging and Correlator and another may appear to allow you to justify some of the parameter choices you may have made

Each requires its own 50+ word justification

Each standard section comes with a summary of the requested input information to detail the different technical aspects of your program.

NRAO

Tech Justification

When the time is ripe … validate & submit

Note the spiffy new icons!

Click here to make sure that your project can be validated by the OT. If it doesn't validate the archive will reject it.

When you are satisfied that your proposal is complete, click here to submit your proposal to the archive

Project - Observing Tool for ALMA, version Cycle2Test2

Perspective 1

New Proposal ⌘-N
New DDT Proposal ⌘-D
Open Project ▶
Open Project as New Proposal ▶
Save ⌘-S
Save As…
Show ALMA Template Library
Use Project as Template ▶
Validate ⌘-L
Submit Project
Preferences
Save Preferences
Quit

Editors
Spectral | Spatial | Project

Select PI...

Project
Assigned Priority
Project Code   None Assigned

Feedback

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 [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

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
        - 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
      - ScienceGoal (B7 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

Mosaic

PointingPattern   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

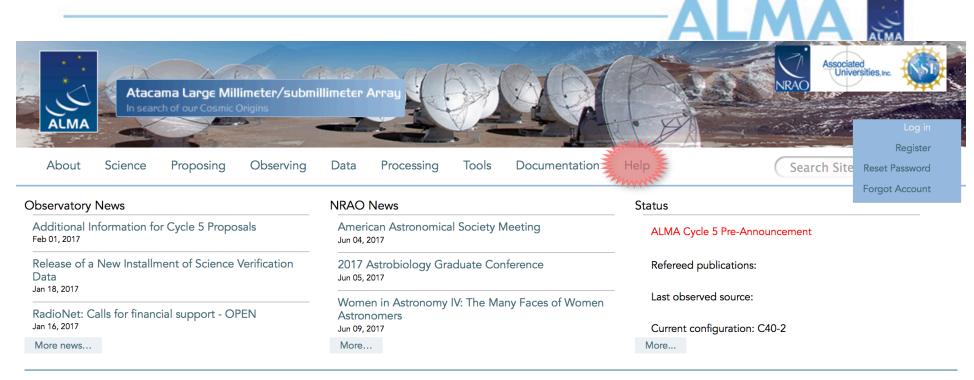| Description	Suggestion
✖ No Principal Investigator specified	Select the top level Project node in the tree and fill in the Principal Investigator field
✖ No scientific category defined	Select Proposal node and set a scientific category
✖ No document found – you must add a Science Case to your proposal	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

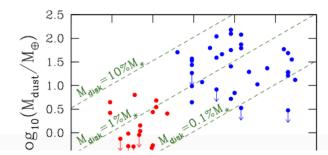# Use preferences to customize

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

Atacama Large Millimeter/submillimeter Array
In search of our Cosmic Origins

About   Science   Proposing   Observing   Data   Processing   Tools   Documentation   Help   Search Site

Observatory News

Additional Information for Cycle 5 Proposals
Feb 01, 2017

Release of a New Installment of Science Verification Data
Jan 18, 2017

RadioNet: Calls for financial support - OPEN
Jan 16, 2017

More news…

NRAO News

American Astronomical Society Meeting
Jun 04, 2017

2017 Astrobiology Graduate Conference
Jun 05, 2017

Women in Astronomy IV: The Many Faces of Women Astronomers
Jun 09, 2017

More…

Status

ALMA Cycle 5 Pre-Announcement

Refereed publications:

Last observed source:

Current configuration: C40-2

More…

Science Highlights - Possible Disk Truncation in Ophiuchus Brown Dwarfs

The sensitivity, resolution and the wavelength coverage of ALMA makes it an ideal tool for studying the properties of the cold outer disks of young stars and low mass objects. Such observations can aid us in understanding the formation of their central objects and their likelihood of ultimately hosting planets. In a recent Astronomy & Astrophysics paper, Dr. Testi and his collaborators made use of ALMA Band 7 to observe an unbiased sample of spectroscopically confirmed Ophiuchus brown dwarfs with infrared excesses.
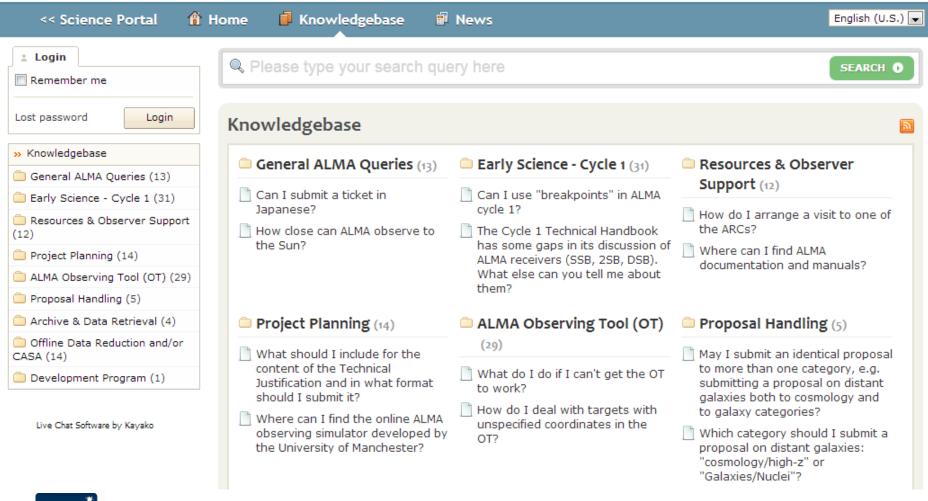
www.almascience.org
ALMA Science Portal @ NRAO

I could use a hand...

Have no fear, the ALMA Helpdesk is here...

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.