

# An Introduction to the Cycle 10 ALMA Observing Tool

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



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



# Where is the OT?



On the science portal under Proposing, click on Observing Tool

The screenshot shows a Safari browser window displaying the ALMA science portal. The main navigation bar includes 'About', 'Science', 'Proposing', 'Observing', 'Data', 'Processing', 'Tools', and 'Documents'. The 'Proposing' menu is open, listing various options such as 'Cycle 8 2021', 'Supplemental Call', 'ALMA Proposal Review', 'Proposing Guidance', 'Cycle 8 2021 Proposer's Guide', 'Cycle 8 Capabilities', 'Observing Tool', 'Sensitivity Calculator', 'Proposal Template', 'Duplicate Observations', 'ALMA Primer', 'Technical Handbook', and 'DDT proposals'. The 'Observing Tool' option is highlighted in blue, and a sub-menu is visible with 'Troubleshooting' and 'OT Video Tutorials' options. The background of the website features a banner for the Atacama Large Millimeter/submillimeter Array with the text 'In search of our Cosmic Origins' and a 'Science Highlight: Norr...' section with an image of the REBELS-29 field.

As part of targets we colleagues

The image RFRFI S-1:

# Installing the ALMA OT



You will land here to access the OT's installer



About Science **Proposing** Observing

## Observing Tool

The ALMA Observing Tool (OT) is a Java desktop application used for preparing and submitting Director's Discretionary capabilities of ALMA as described in the [Cycle 8 2021 Call](#)

## Download & Installation

The OT should run on all common operating systems and installed, but the Cycle 8 version of the OT will come with version of the OT is no longer available. (Web Start remain installer or manually with a tarball distribution.

It is recommended that the OT be installed using the ALM defaults, including the amount of memory the OT may use possible, but the OT will detect if an update is available a **would not run on macOS Catalina due to security issue**

The **tarball** version must be installed manually and the ins

Installer

Tarball



This takes you to the installer's own page



## Installer Page

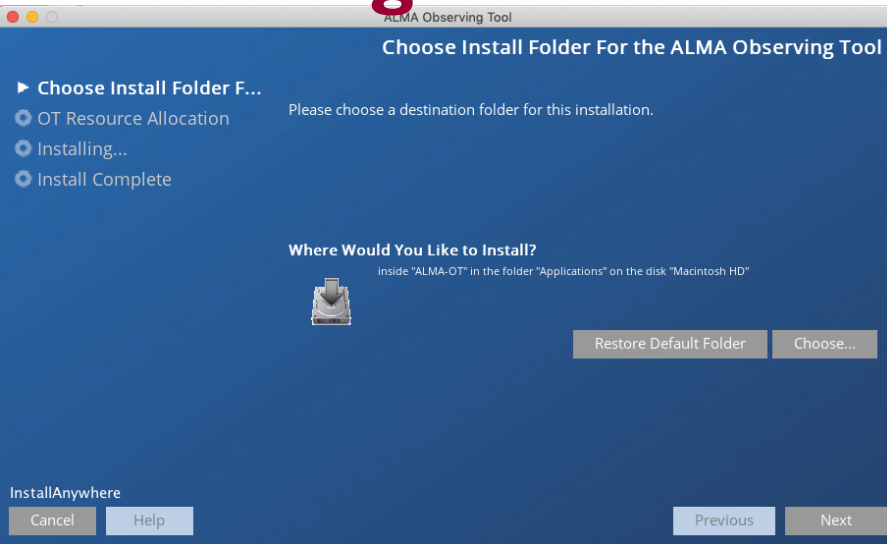


- [Mac OS Installer](#)
- [Linux Installer](#)
- [Windows Installer](#)

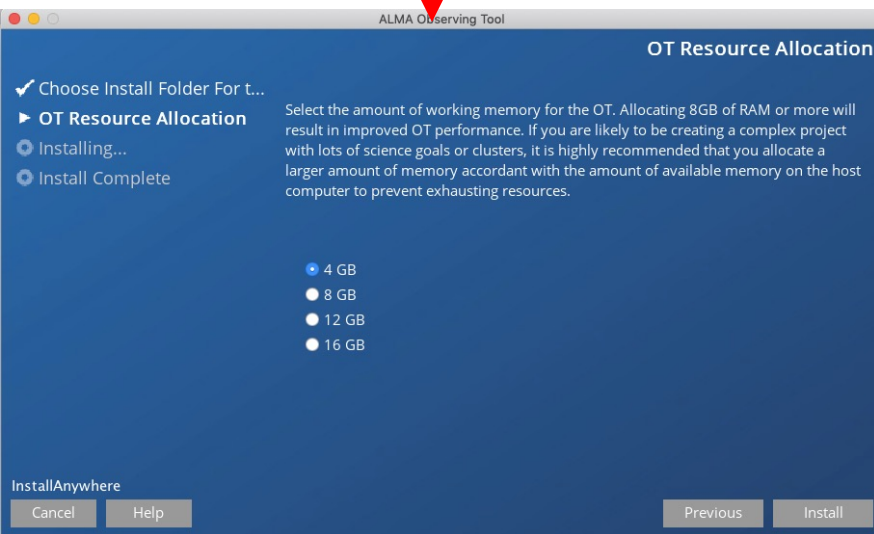
An installer .zip is downloaded that expands to the installer application



# Installing the ALMA OT



The installation package will ask where to install with a default in 'Applications' for MacOS

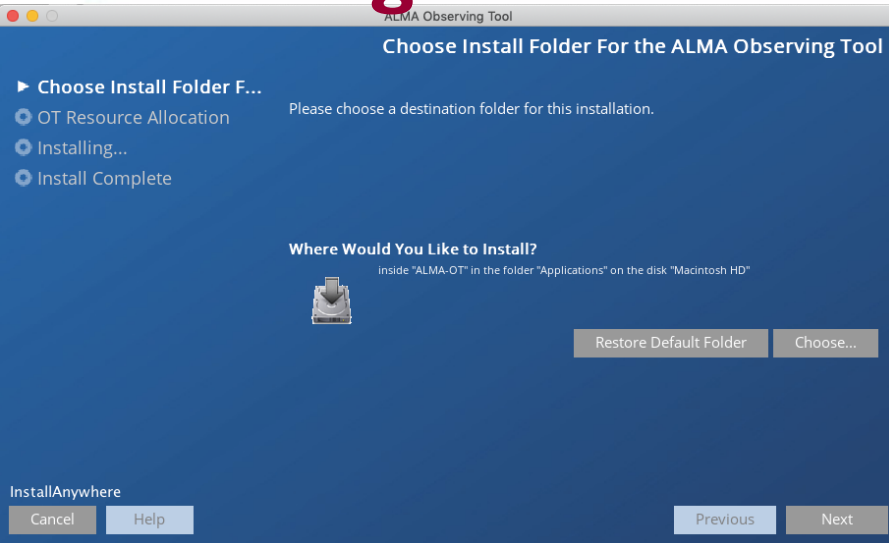


It will ask for a heap size. Larger is better. You can specify a number greater than your machine memory without causing problems

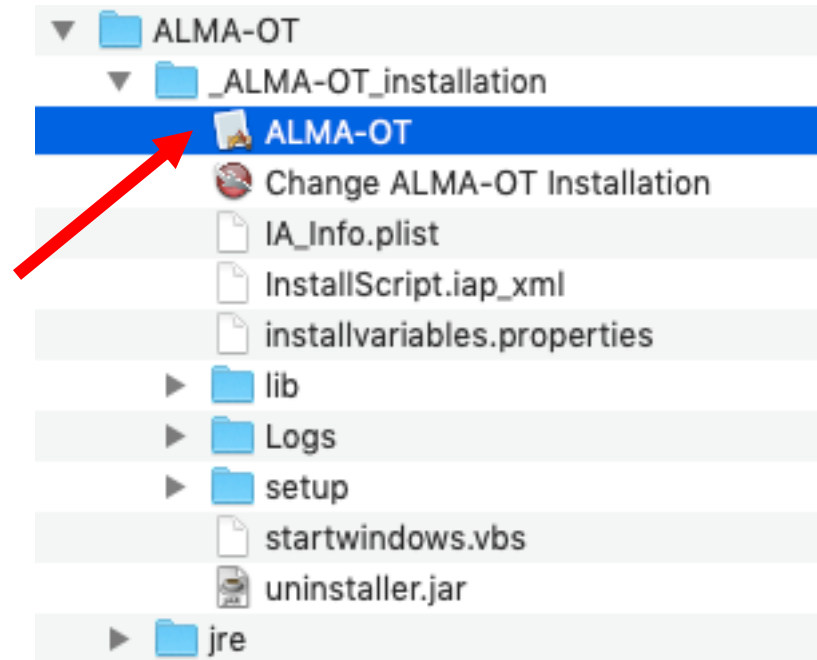
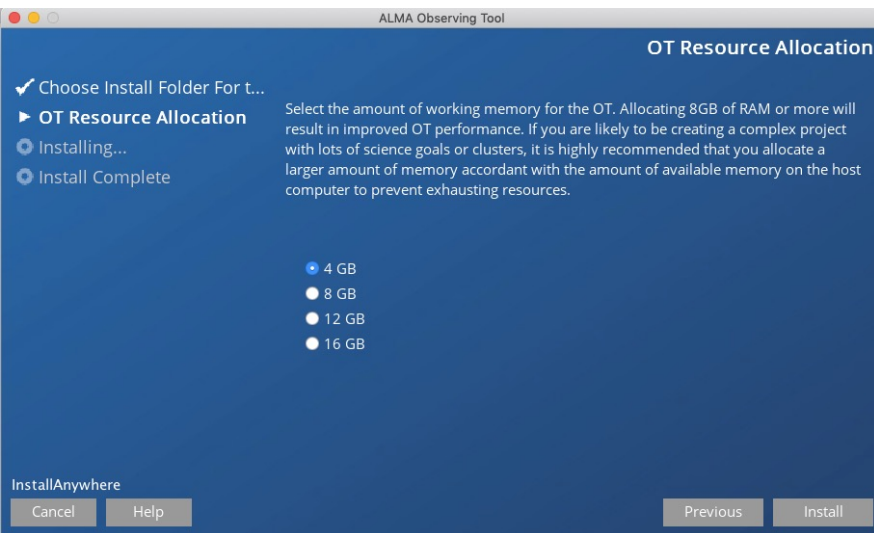




# Installing the ALMA OT



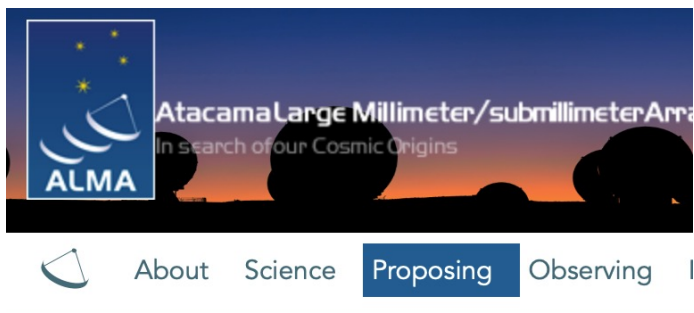
After installation there will be an application in the destination directory and an icon on the desktop



# If the installer doesn't work for you



There is a manual installation available for each OS



## Observing Tool

The ALMA Observing Tool (OT) is a Java desktop application used for preparing and submitting Director's Discretionary capabilities of ALMA as described in the [Cycle 8 2021 Call](#)

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It is recommended that the OT be installed using the ALM defaults, including the amount of memory the OT may use possible, but the OT will detect if an update is available a **would not run on macOS Catalina due to security issue**

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Installer

Tarball



To the OT tarball's page

## Tarball Download Page

If you experience problems with the new OT Installer, the tarball version re to use a pre-installed version of Java 11, a fourth version of the tarball inst

The installation instructions for the tarball version are:

**1. Download the tarball** in your preferred format:

Take the JRE



- [OT tarball for MacOS with a x64-based JRE included](#)
- [OT tarball for Linux with a x64-based JRE included](#)
- [OT tarball for Windows with a x64-based JRE included](#)
- [OT tarball with no JRE included](#)

**2. Unpack the tarball** (it will unpack into its own directory)

**3. Run post-installation setup**

■ Linux or Mac OS:

```
cd ALMAOT-C8-2021/setup
./Setup-Linux.sh
cd ..
```

Would be Cycle9 now

■ MS Windows

- > Go to the ALMAOT-C8-2021/setup directory
- > Double click "Setup-Windows" (may read "Setup-Windows.cmd")

**4. Start up the OT**

■ Mac OS:

./ALMA-OT.app or double-click in a Finder window

■ Linux:

./ALMA-OT.sh or double-click in a window manager if this is config

■ MS Windows

Double-click "ALMA-OT" (might read "ALMA-OT.cmd")

# When the ALMA OT starts

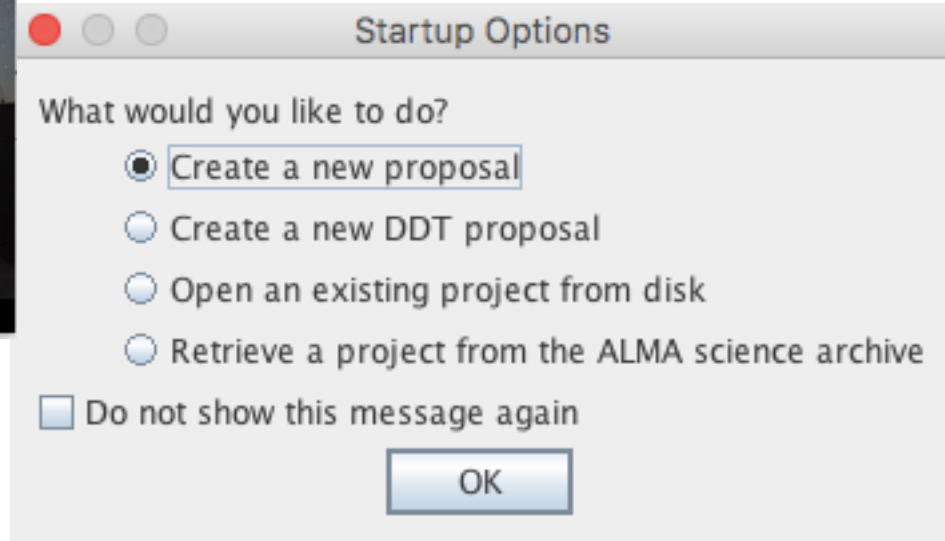


PI: Make sure to use the Cycle 9 OT from the Science Portal

First you see this



Then you see this





# The Project node in the J-tree

The screenshot shows the ALMA Observing Tool interface. The top menu bar includes File, Edit, View, Tool, Search, and Help. The main workspace is divided into several panes: Project Structure (left), Editors (right), and Overview (bottom). The Project Structure pane shows a J-tree with 'Project' and 'Proposal' nodes. The Editors pane shows a form for 'Principal Investigator' and 'Main Project Information'. The Overview pane contains contextual help and a flowchart for 'Phase I: Science Proposal'.

**Project Structure**

Proposal Program

Unsubmitted Proposal

- Project
- Proposal

**Editors**

Spectral Spatial Project

Principal Investigator

Select PI...

Main Project Information

Priority

None Assigned

**Overview**

Contextual Help

- Please ensure you and your co-Is are registered with the [ALMA Science Portal](#)
- Create a new proposal by either:
  - Selecting *File > New Proposal*
  - Clicking on the icon in the toolbar
  - Or clicking on this [link](#)
- 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

This is a J-tree ☺  
Use the key icons to expand/contract nodes

- A clean slate. From here, you can:
- Start a new proposal
    - Add blank Science Goals (SG)
  - Recall a project from the archive
    - As new or to use as a template
    - Or look at it as-is

Grab and move stiped bars to resize the panes

arrowheads minimize, maximize panes

# The Proposal node in the J-tree

The screenshot shows the 'Proposal' node in the J-tree on the left and the 'Proposal Information' form in the main editor. The form includes fields for Proposal Title, Proposal Cycle (2021.1), and an abstract. Below these are sections for Proposal Type (with radio buttons for Regular, Large Program, Target Of Opportunity, Phased Array, and VLBI) and Scientific Category (with radio buttons for various astrophysical topics). A list of keywords is provided for selection, and a 'Student project' checkbox is at the bottom. A 'Feedback' section with 'Validation', 'Validation History', and 'Log' tabs is visible at the bottom of the form.

**Project Structure**  
Submitted Proposal  
Project  
Proposal  
Planned Observing

**Editors**  
Spectral Spatial Proposal

Proposal Information

Proposal Title  
Proposal Cycle: 2021.1  
This is an abstract

Abstract (max. 1200 characters)

Proposal Type  
 Regular  Target Of Opportunity  VLBI  
 Large Program  Phased Array .P proposals in Receiver band 3

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  
Outflows, jets and ionized winds  
High-mass star formation  
Intermediate-mass star formation  
Low-mass star formation  
Pre-stellar cores, Infra-Red Dark Clouds (IRDC)

Student project

Investigators

Feedback  
Validation Validation History Log

Description Connection

This page has your meta information, proposal title, abstract, proposal type, scientific category (for the review panels) etcetera

This is the J-tree and the proposal node is where you provide a broad description

We'll move down the nodes of the J-tree in the course of these slides

You can search the J-tree for names of nodes, details are in (?) help

Keywords appear after proposal type is chosen

# New! Joint Proposals w/VLA, VLT, JWST- I

Project Structure

Unsubmitted Proposal

- Casting Light on Chameleon's Dark CO
  - Proposal
    - Planned Observing
      - ScienceGoal (Chameleon's dark CO view)

Editors

Spectral Spatial Proposal

Student project

Joint Proposals

Is this a Joint Proposal?  Yes  No

Investigators

Type	Full name	Email	Affiliation	ALMA ID	Execution
------	-----------	-------	-------------	---------	-----------

Joint Proposals

Is this a Joint Proposal?  Yes  No

Type of Joint Proposal  Main  Partner

Is ALMA the Main partner?  
- During the ALMA call it must be  
- Outside the ALMA call, it can't be

Observatory	Project Code	Requested Time
JWST	N/A	0.00 h
VLA	N/A	0.00 h
VLT	N/A	0.00 h

+ Edit the list of partners  
+ Provide info about each partners observing

Add Partner Observatory Remove Partner Observatory

Please provide the technical justification for the time requested on JWST as a joint proposal

Please provide the technical justification for the time requested on VLA as a joint proposal



# New! Joint Proposals w/VLA, VLT, JWST- II

Project Structure

Unsubmitted Proposal

- Casting Light on Chameleon's Dark CO
  - Proposal
    - Planned Observing
      - ScienceGoal (Chameleon's dark CO view)

Editors

Spectral Spatial Proposal

Student project

Joint Proposals

Is this a Joint Proposal?  Yes  No

Investigators

Type	Full name	Email	Affiliation	ALMA ID	Execution
------	-----------	-------	-------------	---------	-----------

Joint Proposals

Is this a Joint Proposal?  Yes  No

Type of Joint Proposal  Main  Partner

**Is ALMA the Main partner?**

- During the ALMA call it must be
- Outside the ALMA call it can't be

Observatory	Project Code	Requested Time
JWST	N/A	0.00 h
VLA	N/A	0.00 h
VLT	N/A	0.00 h

**Edit the list of partners**  
Provide info about partners if ALMA is main

Please provide the technical justification for the time requested on JWST as a joint proposal

Please provide the technical justification for the time requested on VLA as a joint proposal

# Proposal: pick PI, Col & designate reviewer

The screenshot shows the ALMA proposal system interface. The 'Investigators' table is visible, with a red arrow pointing to the 'Reviewer' checkbox in the first row. A red text annotation above the table reads: "For DPR. Can be a Co-I but someone must be indicated". A yellow callout box with the text "Select PI/Co-I's from registered ALMA users (only)" has red arrows pointing to the 'Select PI' button in the bottom toolbar and the 'Find Investigators' button in the search dialog. The search dialog shows a search for 'aguirre' and a table of results.

Type	Full name	Email	Affiliation	ALMA ID	Executive	Reviewer
PI	Alvaro Aguirre	alvaro.aguirre@alma.cl	Department of Physic...	aaaaaaaaa	Chile	<input checked="" type="checkbox"/>

Investigator search constraints

Name contains

Full name	Email	Affiliation	ALMA ID
Alvaro Aguirre	alvaro.aguir...	Department...	aaaaaaaaa

**Select PI/Co-I's from registered ALMA users (only)**

**For DPR. Can be a Co-I but someone must be indicated**

# Scroll down, pick reviewer/mentor



**Project Structure**

- Project
  - Proposal
    - Planned Observing

**Editors**

Spectral Spatial Proposal

Select PI Add CoPI Add Col Remove Collaborator Add from Proposal

**Reviewer Information**

Please designate a reviewer who will participate in the distributed review process. The reviewer may be the PI of the proposal or one of the co-Is. A student (without a PhD) may serve as the reviewer only if s/he is the PI of the proposal and a mentor (with a PhD) is identified. The mentor does not need to be a co-I on the proposal

Reviewers are requested to update their user profiles with combinations of scientific categories and keywords which describe their area(s) of expertise using the new 'Expertise' tab in <https://asa.alma.cl/UserRegistration/secure/updateAccount.jsp>. Available expertise information will be used in the distribution of proposal assignments.

Reviewer has a PhD?  No  Yes **Mentor not needed if "yes"**

**Student PI picks PhD mentor**

Select Mentor

Mentor name

Mentor has a PhD?  No  Yes **PhD status of mentor must be confirmed**

Science Case

Please ensure that your science case is properly anonymized following instructions on the Science Portal

Science Case (Mandatory, PDF, 4 pages max.)  Attach... Detach View...

Duplicate observations

Briefly justify any new observations that duplicate archival data or accepted programs. Information regarding the ALMA Duplication Policy and how to search archival data and accepted programs can be found at: <http://almascience.org/proposing/duplications>.

Observatory Use Only



# Attach the science case as a .pdf



Project Structure | Editors

Proposal | Program | Spectral | Spatial | Proposal

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing

Select PI | Add CoPI | Add Col | Remove Collaborator | Add from Proposal

**Reviewer Information**

**New!**

Please designate a reviewer who will participate in the distributed review process. The reviewer may be the PI of the proposal or one of the co-Is. A student (without a PhD) may serve as the reviewer only if s/he is the PI of the proposal and a mentor (with a PhD) is identified. The mentor does not need to be a co-I on the proposal

Reviewers are requested to update their user profiles with combinations of scientific categories and keywords which describe their area(s) of expertise using the new 'Expertise' tab in <https://asa.alma.cl/UserRegistration/secure/updateAccount.jsp>. Available expertise information will be used in the distribution of proposal assignments.

Reviewer has a PhD?  No  Yes

**Student PI picks PhD mentor** | Select Mentor

Mentor name

Mentor has a PhD?  No  Yes **PI confirms status of mentor**

**Science Case**

Please ensure that your science case is properly anonymized following instructions on the Science Portal

Science Case (Mandatory, PDF, 4 pages max.)  **Attach...** | Detach | View...

Attach a science case, max 4 page .pdf including figures

The .pdf may not contain more than 15% of its text in a font below 12pt  
*Some .pdf creation software pads files with hidden text in small fonts*

Large proposals are allowed 6 pages and require an additional one page management plan

# Justify duplicative observing



Project Structure

Editors

Proposal Program

Spectral Spatial Proposal

Unsubmitted Proposal

Project

Proposal

Planned Observing

Select PI Add CoPI Add Col Remove Collaborator Add from Proposal

Reviewer Information

Please designate a reviewer who will participate in the distributed review process. The reviewer may be the PI of the proposal or one of the co-Is. A student (without a PhD) may serve as the reviewer only if s/he is the PI of the proposal and a mentor (with a PhD) is identified. The mentor does not need to be a co-I on the proposal

Reviewers are requested to update their user profiles with combinations of scientific categories and keywords which describe their area(s) of expertise using the new 'Expertise' tab in <https://asa.alma.cl/UserRegistration/secure/updateAccount.jsp>. Available expertise information will be used in the distribution of proposal assignments.

Reviewer has a PhD?  No  Yes

Select Mentor

Mentor name

Science Case (Mandatory, PDF, 4 pages max.)

Duplicate observations

Attach... Detach View..

Briefly justify any new observations that duplicate archival data or accepted programs. Information regarding the ALMA Duplication Policy and how to search archival data and accepted programs can be found at: <http://almascience.org/proposing/duplications>.

Observatory Use Only

Justification of duplication of observations

This replaces an earlier mechanism whereby project codes were given

Give a concise justification if asking to duplicate previous observations or *accepted* proposals. This is not used if resubmitting a rejected proposal

# Do some science - add a Science Goal



**You can right-click and add blank Science Goals or use options of the File menu as shown on the next slide)**

**You can clone science goals when you have them**

**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**

```
graph LR; A[New Science Proposal] --> B[Create Science Goals]; B --> C[Validate Science Proposal]; C --> D[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



- File
- Edit
- View
- Tool
- Search
- Help
- 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 ⌘-V
- Submit Project
- Preferences
- Save Preferences
- Quit

Editors

Spectral Spatial Title goes here

From ALMA Archive... al Investigator

Select PI...

Main Project Information

Project Title goes here

Assigned Priority



Project Code None Assigned

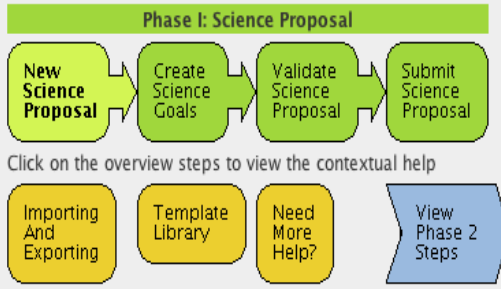
*Since Cycle 4, a previously-submitted project can be opened as a new one from the archive*

*Since Cycle 6, an old DDT proposal can be opened from the archive as a new proposal*

**The alma template library is no longer included after so much experience with real observing**

**Click here to simultaneously access another project from disk or archive, which you can use to copy/paste nodes into a new project**

- Science Portal
- are registered with the [ALMA](#)
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.



File Edit View Tool Search Help



## Project Structure

Proposal Program

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing

^ v ?

Anticenter Dark Neutral Matter (read-only)

- Anticenter Dark Neutral Matter
  - Proposal
    - Planned Observing
      - ScienceGoal (34 Sources-Dark neutral matter in absorption in the Galactic anti-centre)

- Planned Observing
  - ScienceGoal (34 Sources-Dark neutral matter in absorption in the Galactic anti-centre)

- Cut ⌘-X
- Copy ⌘-C
- Paste ⌘-V
- Clone node
- Show Printable Summary of ScienceGoal
- Generate a PDF of Whole Proposal
- Display Project Time Summary
- Expand all ⌘-Z
- Collapse all
- Find previous ⌘-↑
- Find next ⌘-↓
- Delete ⌘-X

## Editors

Spectral Spatial ScienceGoal (34 Sources-Dark neutral matter in absorption in the Galactic anti-centre )

General (Optional)

Science Goal Name 

Narrowband 88 - 98 GHz molecular absorption from gas at the H I → H<sub>2</sub> transition in Galactic anti-center cloud complexes, seen against background point-like QSO; and one broad spectral window for phase cal.

Description

**PROJECTS AS TEMPLATES**

This science goal in the template can be copied whole into new Planned Observing. Works with any node. Sub-nodes in target SG are overwritten when copy/pasting

aj0510+1800-2990-0.33	
29+2756-195-0.20	aj0356+2903-151-0.21
09+1352-413-0.09	aj0213+1820-161-0.13
0+1437i-326-0.68	J0449+1121i-887-0.50
1+1731i-213-0.46	J0433+0521i-2178-0.30
28 J0407+0742i-990-0.26	J0426+0518i-372-0.29
57+2319i-160-0.18	J0400+0550i-217-0.27
0.21 J0329+3510i-254-0.27	J0334+0800i-331-0.39

Resolve

System Object? Name of object System  Sexagesimal display? Parallax  RA PM RA  Dec PM DEC  Velocity    z  Doppler Type  Individual Pointing(s)  1 Rectangular Field

Properties



**Project Structure**

Proposal Program

Unsubmitted Proposal

- Project
  - Proposal

**Editors**

Spectral Spatial **ScienceGoal (B6 12CO (2-1): NGC3256 mosaic)**

General (Optional)

Science Goal Name

This is a project to observe the nearby starburst galaxy NGC3256 in the B6 band 6 in the emission line of 12CO (2-1). As the source is extended, a mosaic will be used to cover the 30x30 arcsec area of interest.

Description

Launch Editor

**NGC3256**

Source

Source Name

Choose a Solar System Object?  Name of object

**You're now ready to flesh out the Science Goal (SG)**

**Give the SG a brief, descriptive name.**

**A description is useful for you, for the technical assessors, and for your Contact Scientist after your project is approved. But it's optional**

File Edit View Tool Search Help



## Project Structure

Proposal Program

## Unsubmitted Proposal

- ▶ Casting Light on Chameleon's Dark CO
  - ▶ Proposal
    - ▶ Planned Observing
      - ▶ ScienceGoal (Chameleon's dark CO)
        - ▶ General
        - ▶ **Field Setup**
        - ▶ Spectral Setup
        - ▶ Calibration Setup
        - ▶ Control and Performance
        - ▶ Technical Justification



## Editors

Spectral Spatial Field Setup

Source Name  Resolve

Choose a Solar System Object?  Name of object

System  Sexagesimal display?  Parallax

Source Coordinates RA  PM RA    
 Dec  PM DEC

Source Radial Velocity    z  Doppler Type

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Continuum Flux Density per Synthesized Beam  Continuum Linear Polarization  per centContinuum Circular Polarization  per centPeak Line Flux Density per Synthesized Beam  Line Width  Line Linear Polarization  per centLine Circular Polarization Percentage  per cente  Relative  Absolute

RA [arcsec]	Dec [arcsec]
-0.00000	-0.00000
24.00000	26.00000
-12.00000	12.00000
20000.00000	-0.00000

Add

Delete

Reset

Import

Export

Add Source

Load from File...

Export to File...

Clone Source

Delete Source

Delete All Sources

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

File Edit View Tool Search Help



## Project Structure

Proposal Program

## Unsubmitted Proposal

- 📁 Casting Light on Chameleon's Dark CO
  - 📁 Proposal
    - 📁 Planned Observing
      - 📁 ScienceGoal (Chameleon's dark CO)
        - 📄 General
        - 📄 **Field Setup**
        - 📄 Spectral Setup
        - 📄 Calibration Setup
        - 📄 Control and Performance
        - 📄 Technical Justification

## Editors

Spectral Spatial Field Setup

Source Name  Resolve

Choose a Solar System Object?  Name of object

System  Sexagesimal display?

Parallax

Source Coordinates RA  PM RA

Dec  PM DEC

Source Radial Velocity    z  Doppler Type

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source ?

**Super-annoying? The OT will issue a validation warning whenever the velocity is left at the 0 km/s default. An archive issue.**

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

Line Width

Line Linear Polarization  per cent

Line Circular Polarization Percentage  per cent

Relative  Absolute

RA [arcsec]	Dec [arcsec]
-0.00000	-0.00000
24.00000	26.00000
-12.00000	12.00000
20000.00000	-0.00000

Add

Delete

Reset

Import

Export

Add Source

Load from File...

Export to File...

Clone Source

Delete Source

Delete All Sources



Project Structure

Proposal Program

Unsubmitted Proposal

- Casting Light on Chameleon's Dark CO
  - Proposal
    - Planned Observing
      - ScienceGoal (Chameleon's dark CO)

Editors

Spectral

Source Name: J1136-6827-0.4 Resolve

Choose a Solar System Object?  Name of object: Unspecified

System: ICRS Sexagesimal display?

Parallax: 0.00000 mas

Source Coordinates: RA: 11:36:02.0970 PM RA: 0.00  
Dec: -68:27:05.810 PM DEC: 0.00

Source Radial Velocity: 0.000 km/s  Isrk  z: 0.000000000 Doppler

Target Type:  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Continuum Flux Density per Synthesized Beam: 1.00000 Jy

Continuum Linear Polarization: 4.0 per cent

Continuum Circular Polarization: 0.0 per cent

Peak Line Flux Density per Synthesized Beam: 0.10000 Jy

Line Width: 3.5 km/s

Line Linear Polarization: 0.0 per cent

Line Circular Polarization Percentage: 2.0 per cent

Field Center Coordinates

Coord Type:  Relative

Offset Unit: arcsec

#Pointings: 1

RA [arcsec]: 0.00000

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

Source name, position, proper motion, velocity, velocity rest frame. use "Isrk" for  $v_{LSR}$

When you resolve a source name from the server, check all the returned info, some may be unwanted

Rectangular mosaic or 1/more offset 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

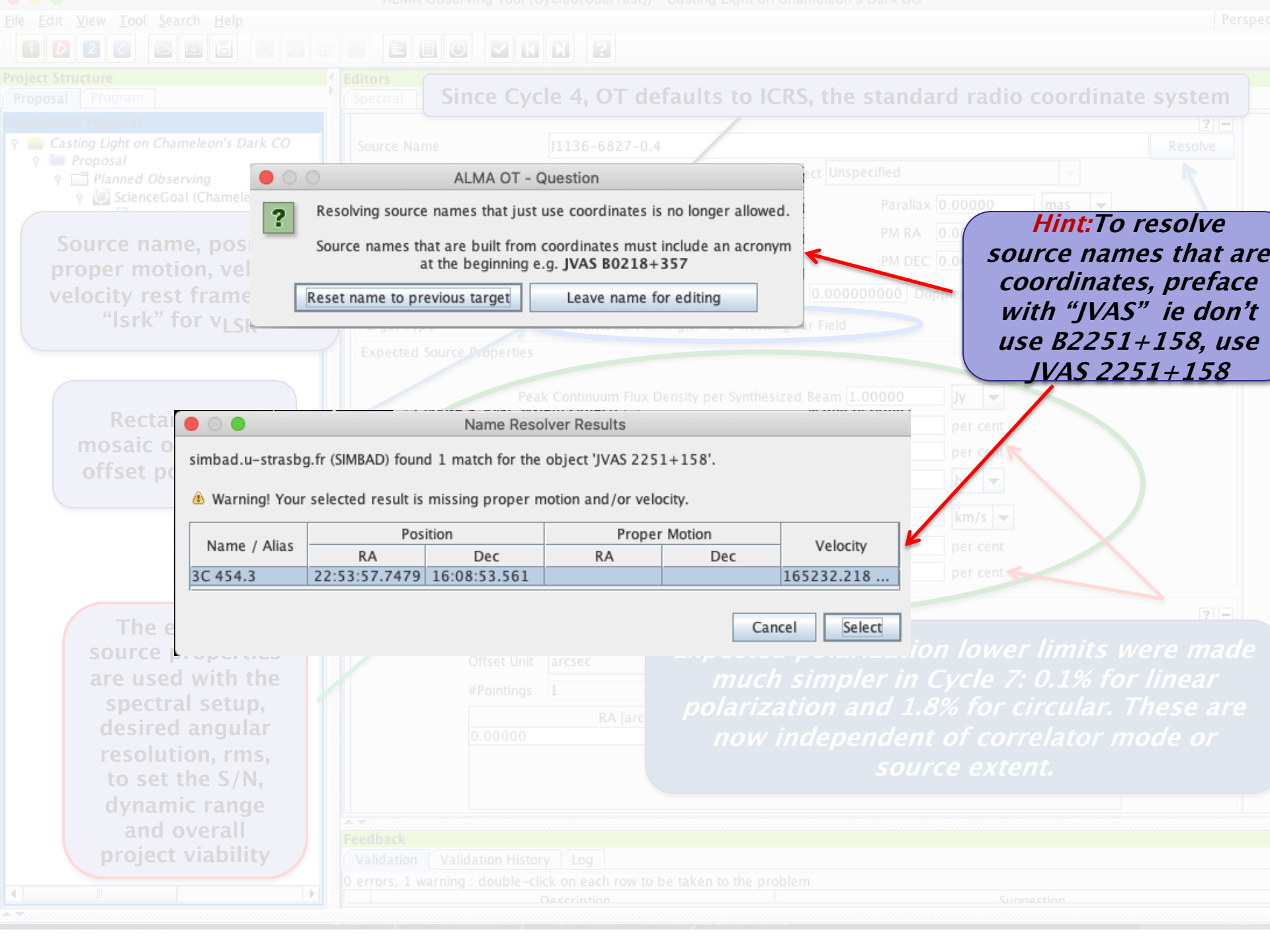
Expected polarization lower limits were made much simpler in Cycle 7: 0.1% for linear polarization and 1.8% for circular. These are now independent of correlator mode or source extent.

Feedback

Validation Validation History Log

0 errors, 1 warning : double-click on each row to be taken to the problem

Description	Suggestion
-------------	------------



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

**ALMA OT - Question**

Resolving source names that just use coordinates is no longer allowed.  
Source names that are built from coordinates must include an acronym at the beginning e.g. JVAS B0218+357

Reset name to previous target    Leave name for editing

**Hint:** To resolve source names that are coordinates, preface with "JVAS" ie don't use B2251+158, use JVAS 2251+158

**Name Resolver Results**

simbad.u-strasbg.fr (SIMBAD) found 1 match for the object 'JVAS 2251+158'.  
Warning! Your selected result is missing proper motion and/or velocity.

Name / Alias	Position		Proper Motion		Velocity
	RA	Dec	RA	Dec	
3C 454.3	22:53:57.7479	16:08:53.561			165232.218 ...

Cancel    Select

Lower polarization lower limits were made much simpler in Cycle 7: 0.1% for linear polarization and 1.8% for circular. These are now independent of correlator mode or source extent.

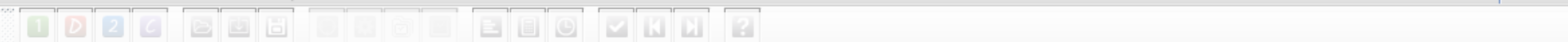
Source name, position, proper motion, velocity rest frame "lsrk" for VLSR

Rectangular mosaic offset p

The element source properties are used with the spectral setup, desired angular resolution, rms, to set the S/N, dynamic range and overall project viability

**Feedback**  
Validation    Validation History    Log  
0 errors, 1 warning : double-click on each row to be taken to the problem

Description	Suggestion
-------------	------------



Project Structure

- Proposal
- Program
- Unsubmitted Proposal
  - Casting Light on Chameleon's Dark CO
    - Proposal
    - Planned Observing
    - ScienceGoal (Chameleon's dark CO)

Editors

Spectral

Source Name: J1136-6827-0.4 Resolve

Choose a Solar System Object?  Name of object: Unspecified

System: ICRS Sexagesimal display?

Source Coordinates: RA: 11:36:02.0970 Dec: -68:27:05.810

Source Radial Velocity: 0.000 km/s  lsrk  z: 0.000000000 Doppler

Target Type:  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Line Circular Polarization Percentage: 2.0 per cent

Field Center Coordinates

Coord Type:  Relative  Absolute

Offset Unit: arcsec

#Pointings: 1

RA [arcsec]	Dec [arcsec]
0.00000	0.00000

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

Source name, position, proper motion, velocity, velocity rest frame. use "lsrk" for  $v_{LSR}$

When you resolve a source name from the server, check all the returned info, some may be junk

Rectangular mosaic or 1/more offset pointings?

Only give polarization percentage for the polarization kind you wish to observe. The OT and pipeline key on the percentages to choose which is the goal of the project, and the sensitivities and pointing possibilities of linear and circular are not the same

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

Feedback

Validation Validation History Log

0 errors, 1 warning : double-click on each row to be taken to the problem

Description	Suggestion
-------------	------------

When you toggle the coordinate system between ICRS and Galactic the OT will convert between them

When using the spatial visualizer, the OT will find the correct image center for a position specified in galactic coordinates, but images returned by the standard image query servers are always in ICRS

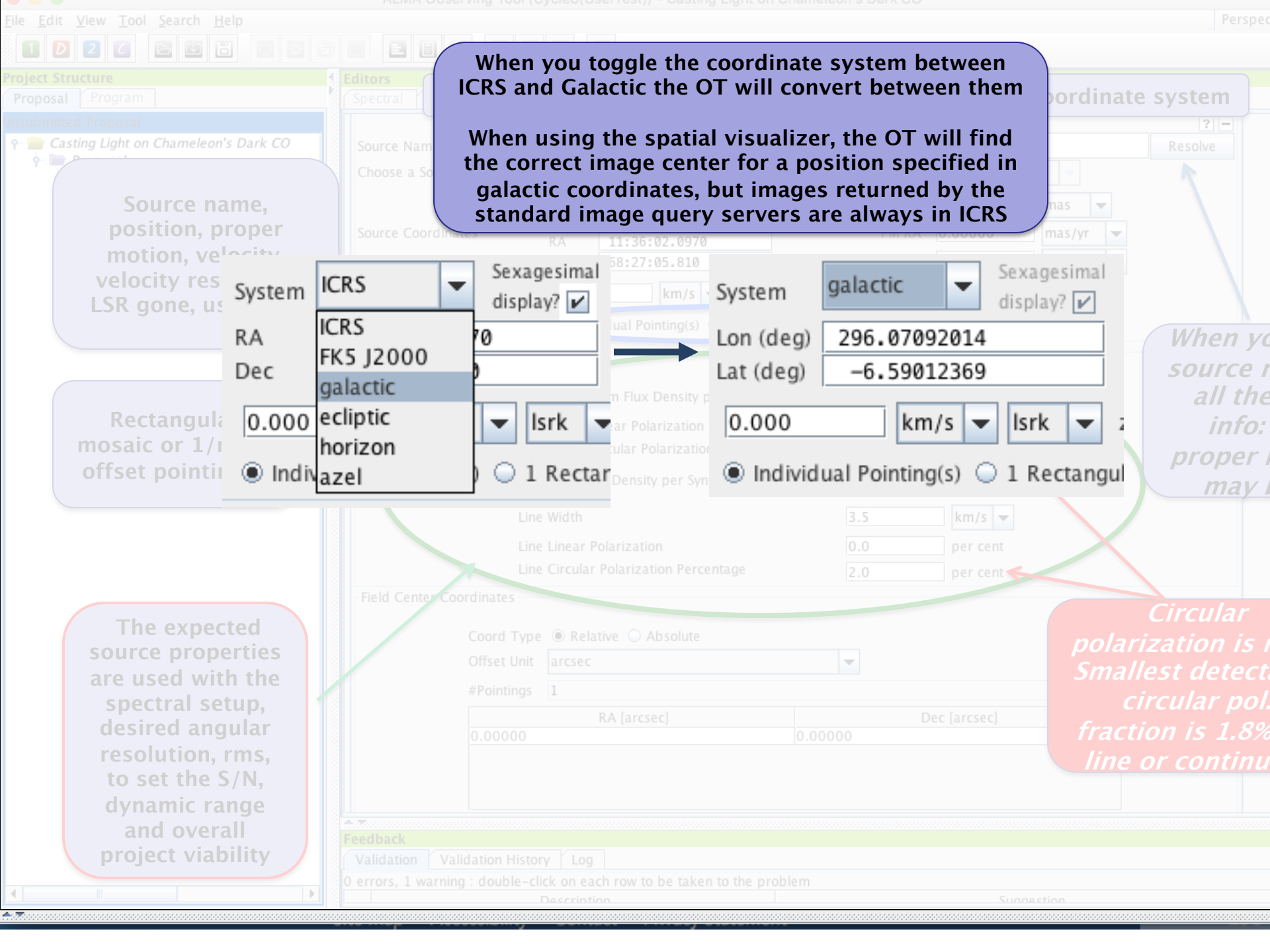
Source name, position, proper motion, velocity, LSR gone, us

Rectangular mosaic or 1/r offset pointing

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

When you source n all the info: proper may

Circular polarization is Smallest detected circular pol. fraction is 1.8% line or continu



File Edit View Tool Search Help



## Project Structure

Proposal Program

## Unsubmitted Proposal

- 📁 Casting Light on Chameleon's Dark CO
  - 📁 Proposal
    - 📁 Planned Observing
      - 📁 ScienceGoal (Chameleon's dark CO)
        - 📄 General
        - 📄 Field Setup
        - 📄 Spectral Setup
        - 📄 Calibration Setup
        - 📄 Control and Performance
        - 📄 Technical Justification

## Editors

Spectral Spatial Field Setup

Source Name  Resolve

Choose a Solar System Object?  Name of object

System  Sexagesimal display?  Parallax

Source Coordinates RA  PM RA

Dec  PM DEC

Source Radial Velocity    z  Doppler Type

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

**Individual pointings around a single target must overlap another pointing at the edges of their HPBW and all must be within 5° of the source coordinate**

**Pointings can be given as offsets or absolute sky positions, the OT will convert between those if you check/uncheck Coord Type**

**Read/write field sources to/from text files. Format is described in help for 'field source' or write one out and examine it**

**Read/write a text file See help for format or write a file**

Coord Type  Relative  AbsoluteOffset Unit #Pointings 

RA [arcsec]	Dec [arcsec]
-0.00000	-0.00000
24.00000	26.00000
-12.00000	12.00000
20000.00000	-0.00000

← Illegal!

Add Delete Reset Import Export

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



File Edit View Tool Search Help

## Project Structure

Proposal Program

## Unsubmitted Proposal

- 📁 Casting Light on Chameleon's Dark CO
  - 📁 Proposal
    - 📁 Planned Observing
      - 📁 ScienceGoal (Chameleon's dark CO)
        - 📄 General
        - 📄 Field Setup
        - 📄 Spectral Setup
        - 📄 Calibration Setup
        - 📄 Control and Performance
        - 📄 Technical Justification

## Editors

Spectral Spatial Field Setup

Source Name  Resolve

Choose a Solar System Object?  Name of object

System  Sexagesimal display?

Parallax

Source Coordinates RA  PM RA

Dec  PM DEC

Source Radial Velocity    z  Doppler Type

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties Line Circular Polarization Percentage  per cent

Field Center Coordinates

Coord Type  Relative  Absolute

Offset Unit

#Pointings

RA [arcsec]	Dec [arcsec]
-0.00000	-0.00000
24.00000	26.00000
-12.00000	12.00000
20000.00000	-0.00000

**Illegal!**

Add Delete Reset Import Export

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

Pointings must overlap another pointing at the edges of their HPBW and all must be within 5° of the source coordinate

Pointings can be given as offsets or absolute sky positions, the OT will convert between those if you check/uncheck Coord Type

File Input in **galactic coordinates** has been possible since Cycle 6! *l,b* input in decimal degrees is assumed if coordinate entries have no colons! A hack.

Read/write a text file  
See help for format

Project Structure

- Unsubmitted Proposal
- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (Copy of 34 Sources)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

Editors

Spectral Spatial Field Setup

Input source details and mapping info or use the Visual Editor on the spatial tab.  
You must choose between checking 1 Rectangular Field on all sources or none.  
Check 1 Rectangular Field on the first source before adding others to put rectangular mosaics around multiple sources.

aj0426+2327-210-0.54	aj0439+3045-154-0.87	aj0445+0715-305-0.12	aj0510+1800-2990-0.33
aj0231+1322-790-0.12	aj0242+1742-168-0.08	aj0329+2756-195-0.20	aj0356+2903-151-0.21
J0502+1338i-600-0.56	aj0203+1134-151-0.14	aj0209+1352-413-0.09	aj0213+1820-161-0.13
J0437+2940i-224-0.98	J0438+3004i-478-0.95	J0440+1437i-326-0.68	J0449+1121i-887-0.50
J0427+0457i-233-0.33	J0437+2037i-245-0.53	J0431+1731i-213-0.46	J0433+0521i-2178-0.30
J0403+2600i-327-0.20	J0406+0637i-330-0.28	J0407+0742i-990-0.26	J0426+0518i-372-0.29
J0357+2319s-170-0.18	J0357+2319i-160-0.18	J0400+0550i-217-0.27	J0401+0413i-550-0.34
J0325+2224i-400-0.21	J0329+3510i-254-0.27	J0334+0800i-331-0.39	J0336+3218i-1050-0.73
J0211+1051i-547-0.14		J0252+1718i-342-0.22	

Source

Source Name

Choose a Solar System Object

Source Coordinates

Source Radial Velocity

Target Type

Expected Source Properties

Line Width

Line Linear Polarization

Line Circular Polarization

Resolve

mas

mas/yr

mas/yr

ADIO

km/s

per cent

per cent

Sources having a common spectral setup, observing pattern (single pointings or rectangular mosaic), rms ... can (if possible, should!) be put in the same Science Goal no matter how far apart they are, let the OT cluster them

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

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

Rectangular mosaic or 1/more pointings?

The expected source properties are used with the spectral setup, desired angular resolution, rms, to set the S/N, dynamic range and overall project viability

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

The resulting clusters have a maximum separation between sources of 1° for long baseline configurations and 10° otherwise

The resulting clusters and the configurations that will be used to observe them can be examined using the time estimate at the Ctrl & Performance node

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

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

# The spatial visualizer

The screenshot shows the 'Project - Observing Tool for ALMA, version Cycle2Test2' interface. The 'Editors' pane at the top has three tabs: 'Spectral', 'Spatial', and 'Field Setup'. The 'Spatial' tab is selected and circled in red. It displays a star field with a green rectangular field of view (FOV) overlaid. A red arrow points from a callout box to the 'Field Setup' node in the 'Project Structure' tree on the left. Another red arrow points from a callout box to the 'Image Query' section at the bottom, where the 'Image Server' is set to 'Digitized Sky (Version II) at ESO'. A third red arrow points from a callout box to the 'Image File Name' field, which contains a file path. The right-hand side of the interface contains various configuration panels, including 'Source Properties' with fields for 'Source Radial Velocity' (2794.200 km/s), 'Target Type' (1 Rectangular Field), and 'Expected Source Properties' with fields for flux density and polarization. At the bottom, there is an 'Overview' section and a 'Contextual Help' button.

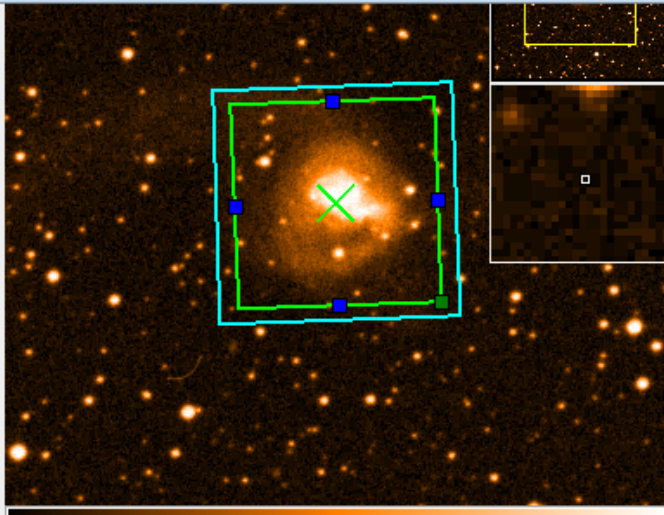
The Spatial tab gives a graphical visualization of the Field Setup.

when you click on this node you will now land on its visualizer tab

Select a background image from an online image server

Editors

Spectral Spatial Field Setup



1x 469, 175 13357.0  
10:27:35.522, -43:56:25.99 (J2000)  
Image Filename emijan\jsky3\cache\jsky9043341093951517820.fits

FOV Parameters

Representative Frequency (Sky) 231.546 GHz  
Antenna Diameter  12m  7m  
Antenna Beamsize (HPBW) 26.706 arcsec  
Show Antenna Beamsize

Image Query

Image Server Digitized Sky (Version 1)  
Image Size(arcmin) 10.0

## 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).

**HPBWs for 12m antennas are  $1.13\lambda/D$**

Line Width 0.00000 km/s  
Line Polarization Percentage 0.0 %

Rectangle

Coords Type  ABSOLUTE  RELATIVE

Field Center Coordinates  
System J2000  
Offset(Longitude) 0.00000  
Offset(Latitude) 0.00000

Length 2.0 arcmin  
q length 2.0 arcmin  
Position Angle 0.00000 deg

Spacing 0.48112 Fraction of main beam

#Pointings 12m Array 105 7m Array 39

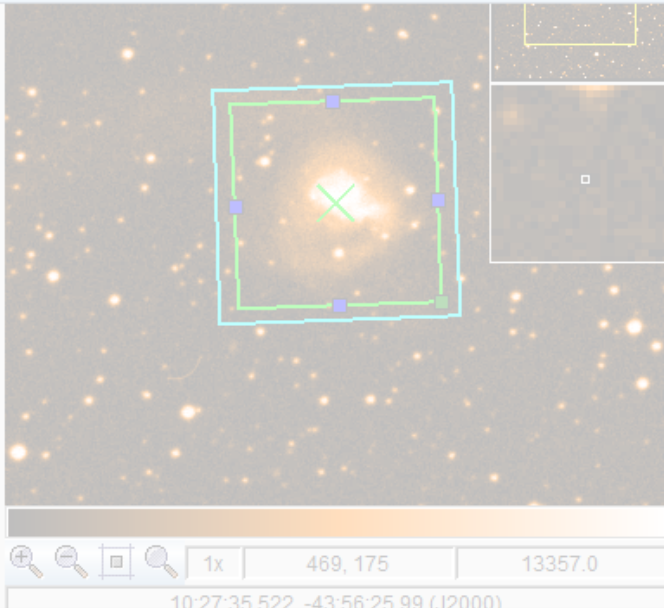
**Estimated number of 7m Array pointings**

**No more than 150 12m Array pointings**



Editors

Spectral Spatial Field Setup



## 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  $1.13\lambda/D$**

Line Width  km/s  
Line Polarization Percentage  %

**Mosaicking is allowed for linear polarization continuum observing in Bands 3-7, both rectangular and custom - individual pointings overlapping at the beam FWHM**

**Estimated number of 7m Array pointings**

**No more than 150 12m Array pointings.**

length  arcmin  
q length  arcmin  
Position Angle  deg  
Spacing  fraction of main beam  
#Pointings 12m Array  7m Array

# Crafting mosaics

The screenshot displays the 'Project - Observing Tool for ALMA, version Cycle2Test2' interface. The main window shows a 'Spatial Image' of NGC3256. A toolbar above the image contains various icons, with a folder icon circled in red. A red arrow points from a callout box to this icon. Another red arrow points from a callout box to a checkbox in the 'Expected Source Properties' section of the right-hand panel.

**You can load a local fits image**

**You can turn on/off the mosaic beam pattern**

**NGC3256**

Source

Source Name: NGC3256

Choose a Solar System Object?  Name of object: Unspecified

System: ICRS Sexagesimal display?  Parallax: 0.000

Source Coordinates: RA: 10:27:51.6000 PM RA: 0.000  
Dec: -43:54:18.000 PM DEC: 0.000

Source Radial Velocity: 2794.200 km/s hel z: 0.009364291

Target Type:  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Continuum Flux Density per Beam: 0.17400 Jy

Continuum Polarization Percentage: 0.0

Peak Line Flux Density per Beam: 0.00000 Jy

Line Width: 0.00000 km/s

Line Polarization Percentage: 0.0

Rectangle

Coords Type:  ABSOLUTE  RELATIVE

System: J2000

et(Longitude): 0.00000 arcsec

# Crafting and displaying mosaics

**You can load a local fits image**

**Each circle is the size of the hpbw & the pattern is centered on the pointing center**

Project - Observing Tool for ALMA, version Cycle2Test2

File Edit View Tool Search Help

Project Structure

Unsubmitted Proposal

Project

Proposal

Planned Observing

ScienceGoal (Cop)

General

Field Setup

Spectral Setup

Calibration Set

Control and Pe

Technical Just

Editors

Spectral Spatial Field Setup

Spatial Image

NGC3256

Source

Source Name NGC3256

Choose a Solar System Object?  Name of object Unspecified

System ICRS Sexagesimal display?  Parallax 0.000

Source Coordinates RA 10:27:51.6000 PM RA 0.000

Dec -43:54:18.000 PM DEC 0.000

Source Radial Velocity 2794.200 km/s hel z 0.009364291

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Continuum Flux Density per Beam 0.17400 Jy

Continuum Polarization Percentage 0.0

Peak Line Flux Density per Beam 0.00000 Jy

Line Width 0.00000 km/s

Line Polarization Percentage 0.0

Rectangle

Coords Type  ABSOLUTE  RELATIVE

System J2000

Offset(Longitude) 0.00000 arcsec

Image Filename emijan\jsky3\cache\jsky9043341093951517820.fits

1x 388, 468 13678.0

10:27:42.245, -43:51:24.64 (J2000)

Overview

Contextual Help

Phase I: Science Proposal

# Crafting and displaying mosaics

Project - Observing Tool for ALMA, version Cycle2Test2

File Edit View Tool Search Help

Project Structure

Editors

Spatial Image

NGC3256

Source

Source Name NGC3256

Choose a Solar System Object?  Name of object Unspecified

System ICRS Sexagesimal display?

Parallax 0.000

Source Coordinates RA 10:27:51.6000 PM RA 0.000

Dec -43:54:18.000 PM DEC 0.000

0.009364291

ar Field

Peak Continuum Flux Density per Beam 0.17400 Jy

Continuum Polarization Percentage 0.0

Peak Line Flux Density per Beam 0.00000 Jy

Line Width 0.00000 km/s

Line Polarization Percentage 0.0

Rectangle

Coords Type  ABSOLUTE  RELATIVE

System J2000

Offset(Longitude) 0.00000 arcsec

Image Filename remijan\jsky3\cache\jsky9043341093951517820.fits

1x 388,468 13678.0

10:27:42.245, -43:51:24.64 (J2000)

Each circle is the size of the hpbw & the pattern is centered on the pointing center

You can load a local fits image

Recent: The tiling algorithm now allows an even number of pointings in one row

Contextual Help

Phase I: Science Proposal



# The Spectral Setup Tab

## Project Structure

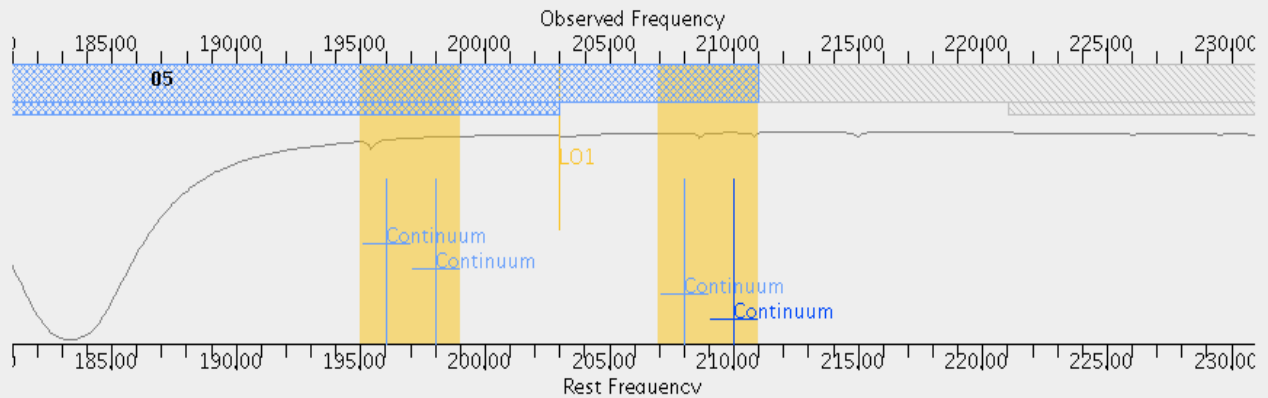
- Unsubmitted Proposal
  - Project
    - Proposal
      - Planned Observing
        - ScienceGoal (Copy of Chameleon's data)
          - General
          - Field Setup
          - Spectral Setup**
          - Calibration Setup
          - Control and Performance
          - Technical Justification

when you click on this node you will land on its visualizer tab

## Editors

Spectral Spatial Spectral Setup

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



Overlays:  Receiver Bands  Transmission  DSB Image  Spectral Lines

Water Vapour Column Density:  Automatic Choice  Manual Choice 1.796mm (5th Octile)

Viewport:

Overlaid lines are saved with the project see below

Bands 9,10 are double sideband but sidebands are correlated separately using 90° Walsh switching. 90° Walsh switching has been on by default since Cycle 7

Spectral Type

Spectral Line  
 Single Continuum  
 Spectral Scan

Produce image sidebands (Bands 9 and 10 only)

Polarization products desired  XX  DUAL

Band 5 enabled in Cycle 6, overlaps more with Band 4 since Cycle 7

Receiver Band 5 [163.0-211.0 GHz]

Sky Frequency 203.00000 GHz

# NEW! BAND 1 35 – 50 GHz Spectral Line, Continuum and VLBI



**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

Single Continuum

Receiver Band 1 [35.0–50.0 GHz]

Sky Frequency 1 [35.0–50.0 GHz]  
3 [84.0–116.0 GHz]  
4 [125.0–163.0 GHz]  
5 [158.0–211.0 GHz]  
6 [211.0–275.0 GHz]  
7 [275.0–373.0 GHz]  
8 [385.0–500.0 GHz]  
9 [602.0–720.0 GHz]

Rest Frequency

High spectral resolution (FDM)

Baseband-1

Fraction	Centre Freq (rest,topo)	Centre Freq (sky,topo)	Transition	Bandwidth, Resolution (smoothed)	Spec Avg.	Representative Window
1(Full)	36.00000 G...	36.00000 G...	Single Continu...	1875.000 MHz(15614 km/s), 31.250 MHz(260.237 km/s) (2-bit)	1	<input type="radio"/>

Full polarization is **NOT** Possible In Band 1 Yet

**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

Spectral Line

Baseband-1

Fraction	Centre Freq (rest,lsrk)	Centre Freq (sky,bar)	Transition	Bandwidth, Resolution (smoothed)	Spec Avg.	Representative Window
1(Full)	37.00000 G...	36.99876 G...	Methy cyanide	117.188 MHz( 950 km/s), 488.281 kHz( 3.956 km/s) (2-bit)	16	<input checked="" type="radio"/>





## 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)				Spec. Avg.	Representative Window
1(Full)	98.70000 GHz	98.69607 GHz	continuum	1875.000 MHz	1	<input type="radio"/>

Scrolled down from previous slide

ADD spectral windows to get started!

Add spectral window centred on a spectral line

Add spectral window manually

Delete

 Show image spectral windows

Baseband-2

1/2	97.99517 GHz	97.99127 GHz	I-C3H v=0 J=9...	58.594 MHz( 179 km/s), 70.557 kHz( 0.216 km/s)	2	<input type="radio"/>
1/2	97.98095 GHz	97.97705 GHz	CS v=0 2-1	58.594 MHz( 179 km/s), 61.035 kHz( 0.187 km/s)	1	<input type="radio"/>

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(...	58.594 MHz( 203 km/s), 61.035 kHz( 0.211 km/s)	1	<input type="radio"/>
1/2	87.31690 GHz	87.31342 GHz	CCH v=0 N=1-...	58.594 MHz( 201 km/s), 61.035 kHz( 0.210 km/s)	1	<input type="radio"/>

Add spectral window centred on a spectral line

Add spectral window manually

Delete

 Show image spectral windows

This option will call up the spectral line picker. Spectral windows added this way retain line id and other info from the Splatologue

Frequencies may also be entered by hand

## 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

# Online Spatalogue is accessible again after an absence in Cycle 8

Create spectral windows centred on spectral lines

**Transition Filter**

\*  
e.g. CO<sup>2-1</sup> or "oxide"  
 Include description

**Frequency Filters**

ALMA Band  
1 2 3 4 5 6 7 8 9 10

Sky Frequency (GHz)  
Min  Max

**Receiver/Back End Configuration**

All lines  
 Potentially selectable lines  
 Lines in defined spws  
 Filtering unobservable lines

**Upper-state Energy (K)**

Min  Max

**Molecule Filter / Environment**

Show

Can't find the transition you're looking for in the offline pool? Find more in the online Spatalogue.

**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 already selected columns.)

Transition $\Delta$	Description	Rest Freque... $\Delta$	Sky Frequency	Upper-state Ene...	Lovas Inten...	Sij $\mu^2$	Catalog
C13CH N=1-0, J=3/2-1/2, F1=1-0, F=3...	Ethynyl	85.256952 GHz	85.254936 ...	4.092 K	0.07	0.754 D <sup>2</sup>	Offline
t-CH3CH2OH 6(0,6)-5(1,5)	trans-Ethanol	85.265503 GHz	85.263486 ...	17.483 K	0.25	5.343 D <sup>2</sup>	Offline
CH3CN v8=1 J=9-8, K=-1--3	Methyl Cyanide	85.267374 GHz	85.265357 ...	585.474 K		0.001 D <sup>2</sup>	Offline
H2CO 50(6,44)-50(6,45)	Formaldehyde	85.310678 GHz	85.308661 ...	4881.916 K		6.63 D <sup>2</sup>	Offline
CC13CCH N=9-8, J=19/2-17/2, F1=17/...	1,3-Butadiynyl radical	85.331915 GHz	85.329897 ...	20.474 K	0.03	6.372 D <sup>2</sup>	Offline
CC13CCH N=9-8, J=19/2-17/2, F1=19/...	1,3-Butadiynyl radical	85.331917 GHz	85.329898 ...	20.473 K	0.03	7.12 D <sup>2</sup>	Offline
CC13CCH N=9-8, J=19/2-17/2, F1=19/...	1,3-Butadiynyl radical	85.331935 GHz	85.329916 ...	20.473 K	0.03	7.888 D <sup>2</sup>	Offline
CC13CCH N=9-8, J=19/2-17/2, F1=17/...	1,3-Butadiynyl radical	85.331936 GHz	85.329918 ...	20.473 K	0.03	7.138 D <sup>2</sup>	Offline
c-HCCCH v=0 2(1,2)-1(0,1)	Cyclopropenylidene	85.338893 GHz	85.336875 ...	6.445 K	3.1	52.945 D <sup>2</sup>	Offline
HCS+ 2-1	Thioformylum	85.347869 GHz	85.345850 ...	6.143 K	0.4	7.668 D <sup>2</sup>	Offline
CH3OH v t=1 14(10,4)-14(11,3)	Methanol	85.355421 GHz	85.353402 ...	1156.266 K		5.135 D <sup>2</sup>	Offline
U-85396	UNIDENTIFIED	85.466279 GHz	85.466279 ...				Offline
CH3CCH v...	UNIDENTIFIED	85.484578 GHz	85.484578 ...				Offline
CH3CCH v...	UNIDENTIFIED	85.487593 GHz	85.487593 ...	2424.382 K		0.675 D <sup>2</sup>	Offline
CH3CCH v...	UNIDENTIFIED	85.490578 GHz	85.490578 ...		0.18		Offline
CH3CCH v...	UNIDENTIFIED	85.492600 GHz	85.492600 ...				Offline
U-85468.3	UNIDENTIFIED	85.468300 GHz	85.466279 ...		1.84		Offline
U-85486.6	UNIDENTIFIED	85.486600 GHz	85.484578 ...		0.22		Offline
CH3CN v8=1 J=65-65, K=2-0	Methyl Cyanide	85.489615 GHz	85.487593 ...	2424.382 K		0.675 D <sup>2</sup>	Offline
U-85492.6	UNIDENTIFIED	85.492600 GHz	85.490578 ...		0.18		Offline
CH3C4H 21(0)-20(1)	Methyl diacetylene	85.497333 GHz	85.495311 ...	55.32 K		58.628 D <sup>2</sup>	Offline
CH3C4H 21(0)-20(0)	Methyl diacetylene	85.498166 GHz	85.496144 ...	47.402 K	0.1	58.699 D <sup>2</sup>	Offline
U-85499.3	UNIDENTIFIED	85.499300 GHz	85.497278 ...		-0.1		Offline
CH3CN v8=1 J=39-39, K=3-1	Methyl Cyanide	85.500670 GHz	85.498648 ...	1239.893 K		0.15 D <sup>2</sup>	Offline
CH3OH v t=1 22(8,14)-22(6,16)	Methanol	85.501157 GHz	85.499135 ...	1180.751 K		0.043 D <sup>2</sup>	Offline
U-85506	UNIDENTIFIED	85.506000 GHz	85.503078 ...		0.1		Offline

**Select one or more lines from a splatalogue-based list you can filter using the tools at left (see below)**

**Spectral windows in this baseband (maximum of four)**

Transition $\Delta$	Description	Rest Frequency $\Delta$	Sky Frequency
U-85468.3	UNIDENTIFIED	85.468300 GHz	85.466279 GHz

**Transition Filter**

\*  
e.g. CO<sup>2-1</sup> or "oxide"

Include description

---

**Frequency Filters**

ALMA Band

1 2 3 4 5 6 7 8 9

Sky Frequency (GHz)

Min  Max

**Receiver/Back End Configuration**

All lines

Potentially selectable lines

Lines in defined spws

Filtering unobservable lines

**Upper-state Energy (K)**

Min  Max

**Molecule Filter / Environment**

Show

Can't find the transition you're looking for in the offline pool? Find more in the online Splatalogue.

**Filter by name**

**The line lists can be long, so use filters**

**Filter by receiver band / frequency**

**The Receiver/Back End Configuration Filters were revised in Cycle 7**  
**Potentially selectable => in either sideband**

**Before Cycle 7 this used a slider**

**The online Splatalogue is accessible again in Cycle 9 after being out of action in Cycle 8**

Transition	Description	Rest Frequency	Sky Frequency	Energy	Other	Status
CH <sub>3</sub> NH <sub>2</sub> 4(1)A <sub>2</sub> -4(0)A <sub>1</sub> , F=5-5	Methylamine	86.074729 GHz	86.072693 ...	25.405 K	7.29 D <sup>2</sup>	Offline
CH <sub>3</sub> NH <sub>2</sub> 4(1)A <sub>2</sub> -4(0)A <sub>1</sub> , F=5-5	Methylamine	86.075367 GHz	86.073331 ...	25.405 K	2.193 D <sup>2</sup>	Offline
CH <sub>3</sub> NH <sub>2</sub> 4(1)A <sub>2</sub> -4(0)A <sub>1</sub>	Methylamine	86.075367 GHz	86.073331 ...	25.405 K	2.193 D <sup>2</sup>	Offline
CH <sub>3</sub> NH <sub>2</sub> 4(1)A <sub>2</sub> -4(0)A <sub>1</sub> , F=4-4	Methylamine	86.075367 GHz	86.073331 ...	25.405 K	2.193 D <sup>2</sup>	Offline
SO 3Σ v=0 2(2)-1(1)	Sulfur Monoxide	86.093950 GHz	86.091914 ...	19.314 K	1.7 3.534 D <sup>2</sup>	Offline
			86.107150 ...	43.712 K	0 D <sup>2</sup>	Offline
			86.109483 ...	109.97 K	0.007 D <sup>2</sup>	Offline
			86.131163 ...		0.5	Offline
			86.145963 ...		0.5	Offline
U-86151.6	UNIDENTIFIED	86.151600 GHz	86.149562 ...		0.6	Offline
13CH <sub>3</sub> OH v <sub>t</sub> =1 5(3,3)-6(2,5)	Methanol	86.168150 GHz	86.166112 ...	451.624 K	0.162 D <sup>2</sup>	Offline
				23.345 K	1.6	Offline
					0.9	Offline
					0.9	Offline
				1227.895 K	7.175 D <sup>2</sup>	Offline
					0.9	Offline
				8.357 K	2.994 D <sup>2</sup>	Offline
				8.357 K	5.709 D <sup>2</sup>	Offline
				8.357 K	0.28 23.651 D <sup>2</sup>	Offline
CH <sub>3</sub> OCH <sub>3</sub> 2(2,0)-2(1,1) AA	Dimethyl ether	86.228720 GHz	86.226681 ...	8.357 K	8.981 D <sup>2</sup>	Offline
U-86239.6	UNIDENTIFIED	86.239600 GHz	86.237560 ...		1.7	Offline
				1775.339 K	17.4 19.495 D <sup>2</sup>	Offline
					1.6	Offline
					0.8	Offline
				86.252808 ...	716.792 K	0.6 124.513 D <sup>2</sup>
U-86259.7	UNIDENTIFIED	86.259700 GHz	86.257660 ...		0.12	Offline

Spectral windows in this baseband (maximum of four)

Transition	Description	Rest Frequency	Sky Frequency
our pseudo continuum		88.000000 GHz	87.997919 GHz

Remove spectral window(s)

## Project Structure

Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (Copy of Chameleon's data)
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	Spec. Avg.	Representative Window
(Full)	98.70000 GHz	98.69607 GHz	continuum	1	<input type="radio"/>

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

Since Cycle7 the OT will give validation warnings if any part of a spw is closer than 30 MHz to the baseband edge OR more than half of the spw is within (30 MHz + the line width) of the baseband edge

Default spectral binning is 2 but can be set to other values with justification

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

97.99127 GHz	97.99127 GHz	I-C3H v=0 J=9...	58.594 MHz( 179 km/s), 70.557 kHz( 0.216 km/s)	2	<input type="radio"/>
97.97705 GHz	97.97705 GHz	CS v=0 2-1	58.594 MHz( 179 km/s), 61.035 kHz( 0.187 km/s)	1	<input type="radio"/>
86.66731 GHz	86.66731 GHz	HCO 1(0,1)-0(...	58.594 MHz( 198 km/s), 61.035 kHz( 0.206 km/s)	1	<input type="radio"/>
87.31342 GHz	87.31342 GHz	CCH v=0 N=1-...	58.594 MHz( 197 km/s), 61.035 kHz( 0.205 km/s)	1	<input type="radio"/>

## Baseband-4

1/2	88.63160 GHz	88.62807 GHz	HCN v=0 J=1-0	58.594 MHz( 198 km/s), 61.035 kHz( 0.206 km/s)	1	<input checked="" type="radio"/>
1/2	89.18853 GHz	89.18498 GHz	HCO+ v=0 1-0	58.594 MHz( 197 km/s), 61.035 kHz( 0.205 km/s)	1	<input type="radio"/>

spectral window manually

Delete

 Show image spectral windows

the sensitivity entered on the 'Control and Performance' page to estimate the required shown in the 'Spatial Visual' editor. If the transition you are most interested in does

# New! 4bit sampling when 1 spectral window occupies a whole baseband

ALMA Observing Tool (Cycle 10 (Phase1)) - Anticenter Dark Neutral Matter

File Edit View Tool Search Help

Project Structure

- Proposal
- Program
- Unsubmitted Proposal
  - Anticenter Dark Neutral Matter
    - Proposal
      - Planned Observing
        - ScienceGoal (34 Sources-Dark
          - General
          - Field Setup
          - Spectral Setup
          - Calibration Setup
          - Control and Performance
          - Technical Justification

Editors

Spectral Spatial Spectral Setup

Polarization products desired  XX  DUAL  FULL

Spectral Setup Errors

Spectral Line

Baseband-1

Fraction	Centre Freq (rest,lsrk)	Centre Freq (sky,bar)	Transition	bandwidth, Resolution (smoothed)	Spec Avg	Representative Window
1(Full)	88.00000 G...	87.99792 G...	our pseudo c...	1875.000 MHz( 6388 km/s), 1.129 MHz( 3.846 km/s) (2-bit)	2	<input type="radio"/>
				117.188 MHz( 399 km/s), 282.227 kHz( 0.961 km/s) (4-bit)		
				234.375 MHz( 798 km/s), 141.113 kHz( 0.481 km/s) (2-bit)		
				234.375 MHz( 798 km/s), 564.453 kHz( 1.923 km/s) (4-bit)		
				468.750 MHz( 1597 km/s), 282.227 kHz( 0.961 km/s) (2-bit)		
				468.750 MHz( 1597 km/s), 1.129 MHz( 3.846 km/s) (4-bit)		
				937.500 MHz( 3194 km/s), 564.453 kHz( 1.923 km/s) (2-bit)		
				937.500 MHz( 3194 km/s), 2.258 MHz( 7.692 km/s) (4-bit)		
				1875.000 MHz( 6388 km/s), 1.129 MHz( 3.846 km/s) (2-bit)		

Add spectral window centred on a spectral line

Baseband-2

1/2	86.33992 G...	86.33788 G...	H13CN v=0 J...	58.594 MHz( 203 km/s), 70.557 kHz( 0.245 km/s) (2-bit)	2	<input type="radio"/>
1/2	86.75429 G...	86.75224 G...	H13CO+ 1-0	58.594 MHz( 202 km/s), 70.557 kHz( 0.244 km/s) (2-bit)	2	<input type="radio"/>

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

Baseband-3

1/2	86.67076 G...	86.66871 G...	HCO 1(0,1)-0...	58.594 MHz( 203 km/s), 70.557 kHz( 0.244 km/s) (2-bit)	2	<input type="radio"/>
1/2	87.31690 G...	87.31483 G...	CCH v=0 N=...	58.594 MHz( 201 km/s), 61.035 kHz( 0.210 km/s) (2-bit)	1	<input type="radio"/>

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

Baseband-4

1/2	88.63160 G...	88.62950 G...	HCN v=0 J=1...	58.594 MHz( 198 km/s), 61.035 kHz( 0.206 km/s) (2-bit)	1	<input type="radio"/>
1/2	89.18853 G...	89.18642 G...	HCO+ v=0 1-0	58.594 MHz( 197 km/s), 61.035 kHz( 0.205 km/s) (2-bit)	1	<input checked="" type="radio"/>

Double click here to select bandwidth & resolution from a dropdown list

**New!!** 4bit sampling modes are available when 1 spw fills a whole baseband





**Project Structure**

Proposal Program

Unsubmitted Proposal

- Anticenter Dark Neutral Matter
  - Proposal
    - Planned Observing
      - ScienceGoal (34 Sources-Dark)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

**Editors**

Spectral Spatial Spectral Setup

Polarization products desired

Spectral Setup Errors

Spectral Line

Baseband-1

Fractio	Centre Freq (rest,lsrk)	Centre Freq (sky,bar)	Transition	Bandwidth, Resolution (smoothed)	Spec Avg.	Representativ Window
1(Full)	88.00000 G...	87.99792 G...	our pseudo ...	1875.000 MHz( 6388 km/s), 1.129 MHz( 3.846 km/s) (2-bit)	2	<input type="radio"/>
				117.188 MHz( 399 km/s), 282.227 kHz( 0.961 km/s) (4-bit)		
				234.375 MHz( 798 km/s), 141.113 kHz( 0.481 km/s) (2-bit)		
				234.375 MHz( 798 km/s), 564.453 kHz( 1.923 km/s) (4-bit)		
				468.750 MHz( 1597 km/s), 282.227 kHz( 0.961 km/s) (2-bit)		
				468.750 MHz( 1597 km/s), 1.129 MHz( 3.846 km/s) (4-bit)		
				937.500 MHz( 3194 km/s), 564.453 kHz( 1.923 km/s) (2-bit)		
				937.500 MHz( 3194 km/s), 2.258 MHz( 7.692 km/s) (4-bit)		
				1875.000 MHz( 6388 km/s), 1.129 MHz( 3.846 km/s) (2-bit)		

Baseband-2

1/2	86.33992 G...	86.33788 G...	H13CN v=0 J...	58.594 MHz( 203 km/s), 70.557 kHz( 0.245 km/s) (2-bit)	2	<input type="radio"/>
1/2	86.75429 G...	86.75224 G...	H13CO+ 1-0	58.594 MHz( 202 km/s), 70.557 kHz( 0.244 km/s) (2-bit)	2	<input type="radio"/>

Baseband-3

1/2	86.67076 G...	86.66871 G...	HCO 1(0,1)-0...	58.594 MHz( 203 km/s), 70.557 kHz( 0.244 km/s) (2-bit)	2	<input type="radio"/>
1/2	87.31690 G...	87.31483 G...	CCH v=0 N=...	58.594 MHz( 201 km/s), 61.035 kHz( 0.210 km/s) (2-bit)	1	<input type="radio"/>

Buttons: Add spectral window centred on a spectral line, Add spectral window manually, Delete, Show image spectral windows

**Failing to rename a new spw brings a validation error! Picky picky.**

**Spectral specs share a base-band so the sum of shares can't exceed 1. Choices for resolution change with this fraction**



# The spectral setup has a visualizer for spectral windows and spectral lines

**The spectral tab gives a graphical visualization of the spectral setup. The orange vertical bars are sidebands. This setup is okay!**

Drag the green slider to slide the VIEW

Drag the yellow vertical to move the first LO

Click in the yellow area to MAGNIFY

Zoom in here to start

Contextual Help Phase I: Science Proposal

File Edit View Tool Search Help

Project Structure

Unsubmitted Proposal

Project

Planned Observing

ScienceGoal (Copy of B6 12CO (2-1): N...

General

Field Setup

Spectral Setup

Calibration Setup

Control and Performance

Technical Justification

Editors

Spectral Spectral Setup

Visualization

In the table below, it is possible to define up to 16 spectral windows. Each baseband is 2GHz wide and can be separately configured i.e. Note that for bands 3, 4, 6, 7 and 8, it is not possible to put 3 baseba

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

Observed Frequency

Rest Frequency

Overlays:  Receiver Bands  Transmission  Overlay Lines  DSB Image

Water Vapour Column Density:  Automatic Choice  Manual Choice 1.262mm (4th Octile)

Viewport:

Feedback

Validation Validation History Log

Description Suggestion

Overview

# The spectral setup has a visualizer for spectral windows and spectral lines

The screenshot displays a software interface for spectral setup. On the left, the 'Project Structure' pane shows a tree view under 'Unsubmitted Proposal' with folders for 'Planned Observing' and 'ScienceGoal (Copy of B6 12CO (2-1): N...'. Below this is a 'Template library' section with a list of proposal templates.

The main 'Editors' pane is titled 'Spectral Setup' and contains a 'Visualisation' section. It includes text explaining that up to 16 spectral windows can be defined per baseband, with a total fraction per baseband not exceeding a certain limit. It also provides instructions for zooming and panning. The visualization shows a frequency spectrum from 190,000 to 250,000. The top part is labeled 'Observed Frequency' and shows several colored bands (green, yellow, blue) representing different spectral windows. A specific band is labeled '06'. Below this, a line plot shows spectral lines, with one prominent line labeled 'CO v=0 2-1'. The bottom part of the plot is labeled 'Rest Frequency'.

A callout box with a red arrow points to the 'Water Vapour Column Density' control, which has two radio buttons: 'Automatic Choice' (selected) and 'Manual Choice'. The manual choice is set to '1.262mm (4th Octile)'. Other controls include 'Overlays' (Receiver Bands, Transmission, Overlay Lines, DSB Image) and 'Viewport' (Pan to Line, Zoom to Band, Reset).

At the bottom, there is a 'Feedback' section with tabs for 'Validation', 'Validation History', and 'Log'. Below this is a table with columns for 'Description' and 'Suggestion'.

At the very bottom, there is a 'Contextual Help' section and a green bar labeled 'Phase I: Science Proposal'.

# Continuum & choice of resolution

ALMA Observing Tool (Validation OT) - Project

File Edit View Tool Search Help

Perspective 1

Project Structure

Unsubmitted Proposal

Project

Proposal

Planned Observing

ScienceGoal (Sci)

General

Field Setup

Spectral Setup

Calibration S

Control and

Technical Jus

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

Single Continuum

Receiver Band 3 [84.0-116.0 GHz]

Reset to Standard Frequency

Sky Frequency 97.50000 GHz

Rest Frequency 97.500000 GHz

Low spectral resolution (TDM)

High spectral resolution (FDM)

Standard single continuum setups, can be modified with justification

PI can choose spectral resolution

Fraction	Centre Freq (rest,topo)	Centre Freq (sky,topo)	Transition	Bandwidth, Resolution (smoothed)	Spec Avg.	Representativ Window
1(Full)	90.50000 GHz	90.50000 GHz	Single Continuu...	1875.000 MHz( 6211 km/s), 1.129 MHz( 3.740 km/s)	2	<input type="radio"/>

Baseband-2

1(Full)	92.50000 GHz	92.50000 GHz	Single Continuu...	1875.000 MHz( 6077 km/s), 1.129 MHz( 3.659 km/s)	2	<input type="radio"/>
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# Full Continuum & Polarization

ALMA Observing Tool (Validation OT) - Project

File Edit View Tool Search Help Perspective 1

**Project Structure**

- Unsubmitted Proposal
  - Project
    - Proposal
      - Planned Observing
        - ScienceGoal (Sci...)
          - General
          - Field Setup
          - Spectral Setu...
          - Calibration S...
          - Control and...
          - Technical Jus...

**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

Single Continuum

Receiver Band 3 [84.0-116.0 GHz]  
Reset to Standard Frequency

Sky Frequency 97.50000 GHz

Rest Frequency 97.500000 GHz

Low spectral resolution (T...)  
 High spectral resolution (F...)

**New!**  
Polarization possible in Band 3 for SOLAR

Standard single continuum setups, can be modified with justification

Full polarization is available for single pointings w/ Standalone ACA

Full Polarization for Bands 3 - 7  
And for SOLAR in Band 3  
If FULL is specified, an expected line or continuum polarization percentage > 0 must be given in the field setup

You can edit the frequencies used for continuum polarization.

Fraction	Centre Freq (rest,topo)	Centre Freq (sky,topo)	Resolution
1(Full)	90.50000 GHz	90.50000 GHz	1.129 MHz

Baseband-2

1(Full)	92.50000 GHz	92.50000 GHz	Single Continuum	1875.000 MHz( 6077 km/s),	1.129 MHz( 3.659 km/s)	2
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# Polarization - suggestion

File Edit View Tool Search Help Perspective 1

Project Structure: Unsubmitted Proposal, Project, Proposal, Planned Observing, ScienceGoal (Copy of Chameleon's d, General, Field Setup, Spectral Setup, Calibration Setup, Control, Techn

Editors: Spectral, Spatial, Spectral Setup

Spectral Type:  Single Continuum,  Spectral Scan

Produce image sidebands (Bands 9 and 10 only)

Polarization products desired:  XX  DUAL  FULL

Receiver Band: 4 [125.0-163.0 GHz], 3 [84.0-116.0 GHz], 1 [37.0-163.0 GHz]

Baseband-2:  Show image s, 1(Full) | 140.000

Baseband-3:  Show image s, 1(Full) | 150.00000

Baseband-4:  Show image spectral windows, 1(Full) | 152.00000 GHz | 152.00000 GHz | Single Continuum | 1875.000 MHz( 3698 km/s), 62.500 MHz(123.270 km/s)

**Standard single continuum setups, can be modified with justification**

**Suggestion:**

**Polarization Schedule blocks are 3+ hours long to get parallactic angle coverage and the rms noise may be much less than specified on the ctrl&perf page**

**TECHNICAL JUSTIFICATION shows the actual expected rms noise and various S/N ratios**

**Full Polarization for Bands 3 - 7**  
User can edit frequencies used for continuum polarization. If FULL is specified, an expected polarization percentage must be given with the field setup tab



# Automated spectral scan - I



agt Project - Observing Tool for ALMA, version Cycle2Test2

File Edit View Tool Search Help

Perspective 1

## Project Structure

- Proposal
- Program
- Unsubmitted Proposal
  - Project
    - Proposal
      - Planned Observing
        - ScienceGoal (Copy)
          - General
          - Field Setup
          - Spectral Setup
          - Calibration Setu

## Editors

### Spectral Spatial Spectral Setup

Spectral Type

Spectral Line

Single Continuum

Spectral Scan

Polarization products desired  XX  DUAL  FULL

Total Power spectral scans did appear in Cycle 10!

Spectral scans may be used with 7m observing including standalone 7-m and NEW!!! TP Bands 3-8

Automated Spectral Scan mode and tunings

Spectral scan observing was made more efficient in Cycle 7 by joining all calibrator tunings to lessen the number of antenna pointing calibrations

Spectral Setup Errors

Spectral Scan

95.0 GHz

107.0 GHz

95.8896 GHz - 108.0020 GHz

Achieved scan range (sky)

95.0 GHz - 110.0 GHz

Bandwidth, Resolution (Hanning smoothed)

1875.000 MHz, 976.563 kHz

1

102.50000 GHz

is used in conjunction with the sensitivity entered on ...  
ed observing time and to set the size of the antenna beam shown in ...  
defaults to the average mid-frequency of the achieved scan range but may be ...  
subsequently set by the user to any frequency within the achieved scan range.

Tuning (Max. 5)	SPW 1 (GHz)	SPW 2 (GHz)
1	95.9375 GHz	97.8125 GHz
2	99.6875 GHz	101.5625 GHz
3	103.4375 GHz	105.3125 GHz
4	107.1875 GHz	109.0625 GHz

Feedback

# Automated spectral scan - II



Project - Observing Tool for ALMA, version Cycle2Test2

File Edit View Tool Search Help Perspective 1

Project Structure: Proposal, Program, Unsubmitted Proposal, Project, Planned Observing, ScienceGoal (Copy), General, Field Setup, Spectral Setup, Calibration Setu, Control and Perf, Technical Justifi

Editors: Spectral, Spatial, Spectral Setup

Visualisation

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

Observed Frequency: 100,000, 105,000, 110,000, 115,000

Rest Frequency: 85,000, 90,000, 95,000, 100,000, 105,000, 110,000, 115,000

Overlays:  Receiver Bands  Transmission  Overlay Lines  DSB Image

Spectral Scan:  Requested Scan  Tuning 1  Tuning 2  Tuning 3  Tuning 4

Water Vapour Column Density:  Automatic Choice  Manual Choice 1.262mm (4th Octile)

Viewport:

Spectral Type:  Spectral Line  Single Continuum  Spectral Scan

Feedback

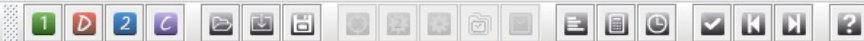
# Saving spw & line rest frequencies



ALMA Observing Tool (FEB2017) - Project

File Edit View Tool Search Help

Perspective 1



Project Structure

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (Copy of Chameleon's data) (selected)
        - General
        - Field Setup
        - Spectral Setup (selected)
        - Calibration Setup
        - Control and Performance
        - Technical Justification

Editors

Spectral Spatial Spectral Setup

### Representative Frequency

The representative frequency is used in conjunction with the sensitivity entered on the 'Control and Performance' editor to set the size of the antenna beam shown in the 'Spatial Visual' editor. If the frequency is not in the centre of the chosen spectral window, its frequency can be changed here. The sky position is shown in the targets table below.

152.00000 GHz

### Rest Frequencies

Please set the rest frequencies of spectral lines that will be observed. These will be used to set the velocity scale and will enhance the ALMA Science Archive. We recommend setting these once the spectral setup is fully defined.

Define Rest Frequencies

This calls a version of the spectral line picker to add rest frequencies that you may wish to note. This can be used later in data reduction to set velocity scales for lines that fall within a spectral window

Targets

Source Name	Velocity	System	Representative Frequency (Sky)
J0942-7731...	0.0 km/s	lsrk	152.0000 GHz
J1058-8003...	0.0 km/s	lsrk	152.0000 GHz
J1136-6827...	0.0 km/s	lsrk	152.0000 GHz
J1145-6954...	0.0 km/s	lsrk	152.0000 GHz
J1147-6753...	0.0 km/s	lsrk	152.0000 GHz
J1152-8344...	0.0 km/s	lsrk	152.0000 GHz
J1224-8313...	0.0 km/s	lsrk	152.0000 GHz
B1251-713...	0.0 km/s	lsrk	152.0000 GHz
J1312-7724...	0.0 km/s	lsrk	152.0000 GHz
J1550-8258...	0.0 km/s	lsrk	152.0000 GHz
J1617-7717...	0.0 km/s	lsrk	152.0000 GHz
J1723-7713...	0.0 km/s	lsrk	152.0000 GHz
J1733-7935...	0.0 km/s	lsrk	152.0000 GHz

List of targets, velocities & representative frequencies

Select one to visualize its spectral window setup

Cycle 9 bug reset choice at validation

# Viewing spw & line rest frequencies

The screenshot displays the ALMA Observing Tool interface. On the left, the 'Project Structure' pane shows a tree view with 'Planned Observing' > 'ScienceGoal (Copy of 34 Sources)' > 'Spectral Setup' selected. The main 'Editors' pane is in 'Spectral Setup' mode, showing a 'Visualisation' of the spectral setup. The top plot shows 'Observed Frequency' (MHz) from 84,000,000 to 92,000,000. The bottom plot shows 'Rest Frequency' (MHz) from 84,000,000 to 92,000,000. A red arrow points to a green vertical line at approximately 84,496 MHz, labeled 'U-84496'. Other spectral lines are labeled with their rest frequencies: 'U-85486.5', 'U-85468.3', 'HCO 1(0,1)-0(0,0), J=3, 2-1/2, F=2-1', 'H13CO+ 1-0', 'H13CN v=0 J=1-0', 'CCH v=0 N=1-0, J=3, 2-1/2, F=2-1', 'HCO+ v=0 1-0', and 'HCN v=0 J=1-0'. Below the plots, the 'Overlays' section has checkboxes for 'Receiver Bands', 'Transmission', 'DSB Image', and 'Spectral Lines', all of which are checked. A red arrow points to the 'Spectral Lines' checkbox. The 'Water Vapour Column Density' is set to 'Automatic Choice' with a value of '5.186mm (7th Octile)'. A blue callout box at the bottom center contains the text: 'All the spw centers, saved overlaid lines and defined rest frequencies will be visualized even if they can't or won't be observed'. The 'Spectral Type' is set to 'FULL'.

ALMA Observing Tool (Cycle7(2018dec-20190121)) - Project

File Edit View Tool Search Help Perspective 1

Project Structure

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (Copy of 34 Sources)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

All the spw centers, saved overlaid lines and defined rest frequencies will be visualized even if they can't or won't be observed

# Bands 9 & 10 - sideband separation (90° Walsh)

ALMA Observing Tool (FEB2017) - Cycle 5 Kelvin Sensitivity Test

Perspective 1

File Edit View Tool Search Help

Project Structure

Proposal Program

Unsubmitted Proposal

Cycle 5 Kelvin

Prop

Prop

Editors

Spectral

Spatial

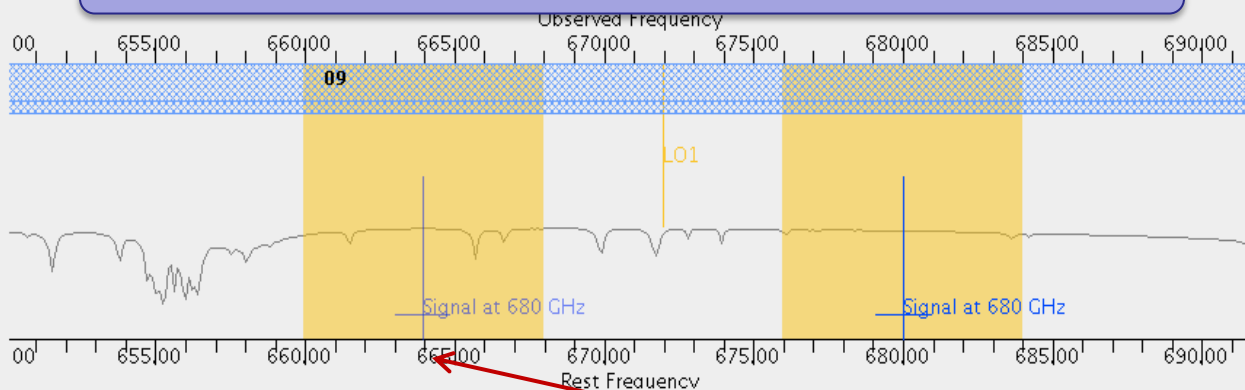
Spectral Setup

Left/right

Note: M

Only 1.875 GHz bandwidth, line or continuum

Bands 9 & 10 have double sideband receivers 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 level is not affected because only a correlated signal can be separated



Overlays:  Receiver Bands  Transmission  DSB Image  Spectral Lines   
Water Vapour Column Density:  Automatic Choice  Manual Choice (0.658 g/cm (2nd Octile))  
Viewport:

See where lines in one sideband appear in other if checked

On by default since Cycle 7

Record both sidebands?

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

Fraction	Centre Freq (rest,lsrk)	Centre Freq (sky,bar)	Transition	Bandwidth, Resolution (smoothed)	Spec. Store Avg. Image	Representativ Window
1(Full)	679.99934 GHz	680.00000 GHz	Signal at 680 ...	1875.000 MHz( 827 km/s), 1.129 MHz( 0.498 km/s)	2 <input checked="" type="checkbox"/>	<input checked="" type="radio"/>

Only 1.875 GHz bandwidth, line or continuum allowed



# Passive phasing of the 12m array for VLBI of weak sources - I



ALMA Observing Tool (2020JanUserTest) - Project

File Edit View Tool Search Help

Perspective 1

Project Structure

- Unsubmitted Proposal
  - Project
    - Proposal
      - Planned Observing
        - ScienceGoal (Science)

Editors

Spectral Spatial Field Setup

Input source details and mapping info or use the Visual Editor on the spatial tab.  
You must choose between checking 1 Rectangular Field on all sources or none.  
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

System ICRS Sexagesimal display?  Parallax 0.00000 mas

Source Coordinates 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 Isrk z 0.000000000 Doppler Type RADIO

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Passive phasing is required (science target < 0.5 Jy)

For VLBI observation of weak, unresolved sources the 12m array may be phased up if a bright enough phase calibrator is known within  $5^\circ$  of the science target

This possibility appears for VLBI proposals. The default is unchecked.



# Passive phasing of the 12m array for VLBI of weak sources - II

ALMA Observing Tool (2020JanUserTest) - Project

File Edit View Tool Search Help

Perspective 1

Project Structure

Unsubmitted Proposal

Project

Proposal

Planned Observing

ScienceGoal (Science Goal)

General

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)

System-defined calibration (force separate amplitude calibration using solar-system object)

User-defined calibration

- When first selected, the table shows a reasonable set of calibrators to include.
- *Dynamic Calibrators* are found by a source catalogue query executed at project execution time. Edit the query with *Edit Criteria...*
- *Fixed Calibrators* are calibrators specified now, at project creation time. Specify which calibrator should be observed with *Edit Target...*

Add Dynamic Calibrator... Add Fixed Calibrator... Delete Selected Calibration

Calibration Intent	Target Type	Source Name	RA	Dec	
Polarization	Dynamic Calibrator		00:00:00.0000 ...	00:00:00.000 ± 20...	Edit Criteria...
Amplitude	Dynamic Calibrator		00:00:00.0000 ...	00:00:00.000 ± 20...	Edit Criteria...
Bandpass	Dynamic Calibrator		00:00:00.0000 ...	00:00:00.000 ± 20...	Edit Criteria...
Phase	Fixed Target	A nearby fixed phase cal	01:00:00.0000	-23:00:00.000	Edit Target...

In this case a suitable phase calibrator must be fixed, in place of the usual runtime calibrator query

The default query phase cal should be removed

Additional technical justification will be requested



New! Passive phasing extended to Bands 1,3,6,7 line and continuum

**Capabilities are somewhat complex, please see the proposer's handbook**

- Baseband 1 (BB1) need not be associated with an SiO line, even for Band3
- For Receiver Bands 1 & 3, BB1 must be in VLBI mode, i.e. its bandwidth must be 1875 MHz; only one spw should be allowed; its centre frequency will be the same as in the default single continuum setup but may be modified by the user.
- For Band 6 & Band 7 at least one baseband must be in VLBI mode (but not necessarily BB1): its bandwidth should be 1875 MHz bandwidth and only one spw is allowed; the default center frequency will be the same as in the single continuum setup but can be modified by the user
- The other BBs are treated as normal ALMA BBs.

# Enhanced positional accuracy - 1<sup>st</sup> step to astrometry



Perspective 1

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)

System-defined calibration (force separate amplitude calibration using solar-system object)

User-defined calibration

- When first selected, the table shows a reasonable set of calibrators to include.
- *Dynamic Calibrators* are found by a source catalogue query executed at project execution time. Edit the query with *Edit Criteria...*
- *Fixed Calibrators* are calibrators specified now, at project creation time. Specify which calibrator should be observed with *Edit Target...*

Calibration Intent	Target Type	Source Name	RA	Dec	
Amplitude	Dynamic Calibrator		00:00:00.0000 ± 0...	00:00:00.000 ± 0.0...	<input type="button" value="Edit Criteria..."/>
Bandpass				0 ± 0.0...	<input type="button" value="Edit Criteria..."/>
Phase				0 ± 0.0...	<input type="button" value="Edit Criteria..."/>

**At the bottom of the Calibration Setup page an “astrometry” option**

Astrometry

If you wish positional accuracy that is better than that provided by default (see the Proposer's Guide for more information) then select enhanced accuracy.

Standard positional accuracy (default)

Enhanced positional accuracy

**Uses extra calibration and a bright grid calibrator must be within 5°**



# The Control and Performance Page



## Project Structure

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (Science Goal)
        - 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 ( $1.13 * \lambda / D$ )	12m <input type="text" value="58.074 arcsec"/>	7m <input type="text" value="99.555 arcsec"/>	
Number of Antennas	12m <input type="text" value="43"/>	7m <input type="text" value="10"/>	TP <input type="text" value="3"/>
	ACA 7m configuration	Most compact 12m configuration	Most extended 12m configuration
Longest baseline	<input type="text" value="0.049 km"/>	<input type="text" value="0.161 km"/>	<input type="text" value="8.548 km"/>
Synthesized beamsize	<input type="text" value="13.190 arcsec"/>	<input type="text" value="3.514 arcsec"/>	<input type="text" value="0.102 arcsec"/>
Shortest baseline	<input type="text" value="0.009 km"/>	<input type="text" value="0.015 km"/>	<input type="text" value="0.113 km"/>
Maximum recoverable scale	<input type="text" value="68.450 arcsec"/>	<input type="text" value="29.934 arcsec"/>	<input type="text" value="1.477 arcsec"/>

Desired Performance

Desired Angular Resolution (Synthesized Beam)  Single  Range  Any  Standalone ACA

Largest Angular Structure in source

Desired sensitivity per pointing   equivalent to

Bandwidth used for Sensitivity  Frequency Width

Override OT's sensitivity-based time estimate (must be justified)  Yes  No Enter total time estimate

Science Goal Breakdown:

Simultaneous 12-m and ACA observations  Yes  No

Are the observations time-constrained?  Yes  No

New look, better description, same great function





# The Control and Performance Page



ALMA Observing Tool (FEB2017) - Cycle 5 Kelvin Sensitivity Test

File Edit View Tool Search Help

Project Structure: Unsubmitted Proposal

- 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
        - 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 ( $1.13 * \lambda / D$ )	12m	65.288 arcsec
Number of Antennas	12m	43
ACA 7m configuration		
Longest baseline		0.049 km
Synthesized beamsize		14.158 arcsec
Shortest baseline		0.009 km
Maximum recoverable scale	75.610 arcsec	33.005 arcsec 0.568 arcsec

**Control and Performance shows what resolution and angular scales are observable and defines required angular resolution, sensitivity, largest angular scale, etc**

Desired Performance

Desired Angular Resolution (Synthesized Beam)  Single  Range  Any  Standalone ACA

arcsec to  arcsec

Largest Angular Structure in source  arcsec

Desired sensitivity per pointing  K equivalent to  @ 1.05 "

will provide  @ 3.00 "

Bandwidth used for Sensitivity  Frequency Width

**Specify the desired rms Jy/beam noise level and the bandwidth over which that should be measured**

**For spectral line the bandwidth for sensitivity must not be less than the channel spacing in the representative spectral window**



## Project Structure

Proposal Program

## Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (Copy of Chameleon's d...
      - 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 ( $1.13 * \lambda / D$ )	12m	<input type="text" value="38.309 arcsec"/>	7m	<input type="text" value="65.672 arcsec"/>
Number of Antennas	12m	<input type="text" value="43"/>	7m	<input type="text" value="10"/>
			TP	<input type="text" value="3"/>
	ACA 7m configuration	Most compact 12m configuration	Most extended 12m configuration	
Longest baseline	<input type="text" value="0.049 km"/>	<input type="text" value="0.161 km"/>	<input type="text" value="16.197 km"/>	
Synthesized beamsize	<input type="text" value="10.103 arcsec"/>	<input type="text" value="2.906 arcsec"/>	<input type="text" value="0.033 arcsec"/>	
Shortest baseline	<input type="text" value="0.009 km"/>	<input type="text" value="0.015 km"/>	<input type="text" value="0.256 km"/>	
Maximum recoverable scale	<input type="text" value="47.725 arcsec"/>	<input type="text" value="24.192 arcsec"/>	<input type="text" value="0.409 arcsec"/>	

## Desired Performance

Desired Angular Resolution (Synthesized Beam)  Single  Range  Any  Standalone ACA

Largest Angular Structure in source

Desired sensitivity per pointing   equivalent to

Bandwidth used for Sensitivity  Frequency Width

Science Goal Breakdown:  
time estimate, clustering, beam and configurations

Override OT's sensitivity-based  
time estimate (must be justified)  Yes  No

Are the observations time-constrained?  Yes  No

**Flux - Temperature  
conversion at the  
desired resolution**

File Edit View Tool Search Help



## Project Structure

Proposal Program

Unsubmitted Proposal

- Project name
  - Proposal
    - Planned Observing
      - ScienceGoal (Copy of 34 Sources)
        - 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 observation

## Control and Performance

## Configuration Information

Antenna Beamsize (  $1.13 * \lambda / D$  ) 12m 8.260 arcsec

Number of Antennas 12m 43

ACA 7m configuration Mos

Longest baseline 0.049 km 0.16

Synthesized beamsize 2.046 arcsec 0.62

Shortest baseline 0.009 km 0.01

Maximum recoverable scale 10.413 arcsec 4.773

## Desired Performance

Desired Angular Resolution (Synthesized Beam)  Single  Range  Any  Standalone ACA

0.10000 arcsec to 0.20000 arcsec

Largest Angular Structure in source 1.00000 arcsec

Desired sensitivity per pointing 0.50000 Jy

Bandwidth used for Sensitivity AggregateBandWidth

Override OT's sensitivity-based time estimate (must be justified)  Yes  No

Science Goal Breakdown: (time estimate, clustering, beam and configurations) Planning and Time

Simultaneous 12-m and ACA observations  Yes  NoAre the observations time-constrained?  Yes  No**RANGE:**

You can specify an acceptable range of angular resolution for the 12m array. This implies a set of configuration possibilities, use the planning & time estimate to see what they are

Since Cycle 6 the min and max allowed user-input angular resolutions are  $\frac{1}{2}$  the smallest and twice the largest of the values shown for the 12m configurations

File Edit View Tool Search Help



## Project Structure

Proposal Program

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (Copy of Chameleon's d...
        - 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 ( $1.13 * \lambda / D$ )	12m	<input type="text" value="38.309 arcsec"/>	7m	<input type="text" value="65.672 arcsec"/>		
Number of Antennas	12m	<input type="text" value="43"/>	7m	<input type="text" value="10"/>	TP	<input type="text" value="3"/>
		ACA 7m configuration	Most compact 12m configuration	Most extended 12m configuration		
Longest baseline	<input type="text" value="0.049 km"/>	<input type="text" value="0.161 km"/>	<input type="text" value="2.517 km"/>			
Synthesized beamsize	<input type="text" value="10.103 arcsec"/>	<input type="text" value="2.906 arcsec"/>	<input type="text" value="0.236 arcsec"/>			
Shortest baseline	<input type="text" value="0.009 km"/>	<input type="text" value="0.015 km"/>	<input type="text" value="0.015 km"/>			
Maximum recoverable scale	<input type="text" value="47.725 arcsec"/>	<input type="text" value="24.192 arcsec"/>	<input type="text" value="3.555 arcsec"/>			

## Desired Performance

Desired Angular Resolution (Synthesized Beam)  Single  Range  Any  Standalone ACA

Desired sensitivity per pointing

Bandwidth used for Sensitivity

Science goal integration time

Override OT's sensitivity-based time estimate (must be justified)

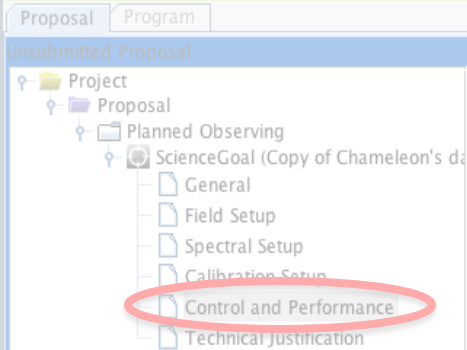
Are the observations time-constrained?  Yes  No

With "ANY" there is no largest angular scale (0 by definition) or angular resolution and the project is supposed to be suited to any non-LB configuration

The "ANY" option replaced older ways of specifying a point source but is more general



## Project Structure



## 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 ( $1.13 * \lambda / D$ )	12m	<input type="text" value="38.309 arcsec"/>	7m	<input type="text" value="65.672 arcsec"/>		
Number of Antennas	12m	<input type="text" value="43"/>	7m	<input type="text" value="10"/>	TP	<input type="text" value="3"/>
		ACA 7m configuration	Most compact 12m configuration	Most extended 12m configuration		
Longest baseline	<input type="text" value="0.049 km"/>	<input type="text" value="0.161 km"/>	<input type="text" value="2.517 km"/>			
Synthesized beamsize	<input type="text" value="10.103 arcsec"/>	<input type="text" value="2.906 arcsec"/>	<input type="text" value="0.236 arcsec"/>			
Shortest baseline	<input type="text" value="0.009 km"/>	<input type="text" value="0.015 km"/>	<input type="text" value="0.015 km"/>			
Maximum recoverable scale	<input type="text" value="47.725 arcsec"/>	<input type="text" value="24.192 arcsec"/>	<input type="text" value="3.555 arcsec"/>			

## Desired Performance

Desired Angular Resolution (Synthesized Beam)  Single  Range  Any  Standalone ACA

Desired sensitivity per pointing

Bandwidth used for Sensitivity

Science goal integration time

Override OT's sensitivity-based time estimate (must be justified)

Are the observations time-constrained?  Yes  No

**ANY may not be the best choice even if you really don't care. Using very compact arrays for very northerly sources increases times from shadowing**

**The most extended configurations place stronger demands on phase calibration**



## Project Structure

Proposal Program

## Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (Copy of Chameleon's d
        - 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 ( $1.13 * \lambda / D$ )	12m	38.309 arcsec	7m	65.672 arcsec
Number of Antennas	12m	43	7m	10
		ACA 7m configuration	Most compact 12m configuration	Most compact 7m 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

Desired Angular Resolution (Synthesized Beam)  Single  Range  Any  Standalone ACA

Largest Angular Structure in source  arcsec

Desired sensitivity per pointing

Bandwidth used for Sensitivity

Science goal integration time

Override OT's sensitivity-time estimate (must be justified)

Are the observations time-critical?

**Bands 9-10 can be used with Standalone ACA**

**Full polarization for single pointings w/ Standalone ACA**

**With Standalone ACA there is a variable largest angular scale but angular resolution is fixed by the observing frequency in the representative spectral window**



Note: The operation is longer than details.

Input Parameters

Requested sensitivity 500.0 mJy  
Bandwidth used for sensitivity 1.875 GHz  
Representative frequency (sky, first source) 704.983 GHz

Estimated Total time for Science Goal 3.40 h

Use the planning&time estimate popup to see how your sources will be observed, how they may have been clustered and how the time is being used. When many combinations of configurations are shown, the 1<sup>st</sup> choice minimizes 12m time

Cluster 4	Cluster 5	Cluster 6	Cluster 7	Cluster 8	Cluster 9
Cluster 1	Cluster 2		Cluster 3		

Source Name	RA	Dec	Velocity
j0252+1718i-342-0...	02:52:07.7190	17:18:42.686	0.000 km/s
aj0242+1742-168-...	02:42:24.2680	17:42:58.849	0.000 km/s
aj0231+1322-790-...	02:31:45.8940	13:22:54.716	0.000 km/s

Possible Configuration Combinations

12-m (1)	12-m (2)	7-m	TP	Nominal Beam(")	Max expected axial ratio
C43-4	None	No	No	0.973863 x 1.10910	1.5

arcsec 7m 14.159 arcsec

7m 10 TP 3

Most compact 12m configuration Most extended 12m configuration

The time estimate popup shows how the OT has grouped targets into clusters and what combinations of synthesis + TP will be used to observe them

This also shows how your time is distributed among the various things that happen

The beam ellipticity is shown with the maximum axial ratio that will be allowed during scheduling

Use "planning&time estimate" to see what combinations are possible, what was chosen

Input Parameters

Precipitable water vapour (all sources) 0.472mm (1st Octile)

Time required for 12m (1) [C43-4]

Time on source per pointing (first source) 1.75 min [ 10.18 ms]  
Total number of pointings (all sources) 3  
Number of tunings 1  
Total time on source 5.24 min [29.40 ms]  
Total calibration time 15.60 min  
Other overheads 1.97 min  
Total time for 1 SB execution 22.80 min  
Number of SB executions 1  
Total time to complete SB 22.80 min

Calibration Breakdown per SB execution

2 x Pointing 4.00 min

Close

# SG Planning and Time Estimates

ALMA Observing Tool (2015.8) - Debris Disk Structure around Nearby Sun-like Stars (2015)

Time Estimate

File Edit View Tool Search Help



Project Structure

Proposal Program

- Debris Disk Structure around Nearby Sun-like Stars
  - Science Plan
    - ScienceGoal (HD 10647) - generat
      - General
      - Field Setup
      - Spectral Setup
      - Calibration Setup
      - Control and Performance
      - Technical Justification
      - SG OUS (HD 10647)
        - Group OUS
          - Member OUS (HD\_10647)
            - HD\_10647\_a\_06\_TE
              - Group 1 : Calibra
              - Group 2 : Science
              - 6 Targets
                - query Pointing
                - query Pointing
                - query Amplitu

Editors

Spectral Spatial Control and Performance

These parameters are used to control various aspects of the observations, including th

Control and Performance

Configuration Information

Antenna Beamsize ( $1.13 * \lambda / D$ )	12m	25.260 arcsec	7m	43.3
Number of Antennas	12m	40	7m	10
ACA 7m configuration	Most compact			
Longest baseline	0.049 km	0.157 km		
Synthesized beamsize	5.712 arcsec	1.721 arcsec		

**scroll down in the planning popup to see a breakdown of how the required time is comprised by its various constituents**

**This project needs 12m + 7m synthesis owing to the combination of angular resolution and largest angular scale**

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	0.01400 mJy
Bandwidth used for sensitivity	7.500 GHz
Representative frequency (sky, first source)	230.52 GHz

**Estimated Total time for Science Goal** 6.02 h

SB-1

**Input Parameters**

Precipitable water vapour (all sources)	1.796mm (5th Octile)
<b>Time required for C40-3</b>	
Time on source per pointing (first source)	1.44 h [1.43 h]
Total number of pointings (all sources)	1
Number of tunings	1
Total time on source	1.44 h [1.43 h]
Total calibration time	49.50 min
Other overheads	14.30 min
Total time for 1 SB execution	1.25 h
Number of SB executions	2
Total time to complete SB	2.51 h

**Calibration Breakdown per SB execution**

5 x Pointing	35.00 min
1 x SidebandRatio	1.58 min
1 x Amplitude	2.50 min
1 x Bandpass	5.00 min
6 x Phase	3.00 min
2 x CheckSource	2.00 min
7 x Atmospheric	4.67 min
Calibration overheads	5.40 min

**Additional Arrays**

ACA 7-m time (t_12m x 1.40)	3.51 h
Total ACA time (max[t_7-m, t_TP])	3.51 h

**Estimated total time for SB-1** 6.02 h

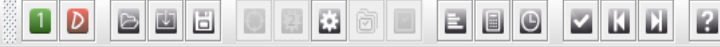
Close

# Single source time estimates

ALMA Observing Tool (2015.8) - Debris Disk Structure around Nearby Sun-like Stars (2015)

Time Estimate

File Edit View Tool Search Help



**Project Structure**

- Proposal
- Program
- Debris Disk Structure around Nearby Sun-like Stars
  - Science Plan
    - ScienceGoal (HD 10647) - generat
      - General
      - Field Setup
      - Spectral Setup
      - Calibration Setup
      - Control and Performan
      - Technical Justification
      - SG OUS (HD 10647)
        - Group OUS
          - Member OUS (H
            - HD\_10647\_
              - Group 1
              - Group 2
              - 6 Target
                - query
                - query
                - query

**Editors**

Spectral Spatial Control and Performance

These parameters are used to control various aspects of the observations, including th

Control and Performance

Configuration Information

Antenna Beamsize (  $1.13 * \lambda / D$  ) 12m 25.260 arcsec 7m 43.3

Note that the OT calculates the number of executions based on an estimate of the maximum duration of an SB. This means that adding a little bit of on-source or calibration time can cause a significantly larger total time if another execution is implied

Cycle3 Template Library (read-only)

- Cycle3 Template Library
- Science Plan

Desired sensitivity per pointing 0.00001 Jy

Bandwidth used for Sensitivity AggregateBandWidth

Science Goal Breakdown:  
time estimate, clustering, beam and configurations Planning and Tim

Override OT's sensitivity-based time estimate (must be justified)  Yes  No

Are the observations time-constrained?  Yes  No

**Feedback**

Validation Validation History Log

Description
-------------

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	0.01400 mJy
Bandwidth used for sensitivity	7.500 GHz
Representative frequency (sky, first source)	230.52 GHz

**Estimated Total time for Science Goal 6.02 h**

**Input Parameters**

Precipitable water vapour (all sources)	1.796mm (5th Octile)
---	----------------------

**Time required for C40-3**

Time on source per pointing (first source)	1.44 h [1.43 h]
Total number of pointings (all sources)	1
Number of tunings	1
Total time on source	1.44 h [1.43 h]
Total calibration time	49.50 min
Other overheads	14.30 min
Total time for 1 SB execution	1.25 h
Number of SB executions	2
Total time to complete SB	2.51 h

**Calibration Breakdown per SB execution**

3 x Pointing	36.00 s
1 x SidebandRatio	1.58 min
1 x Amplitude	2.50 min
1 x Bandpass	5.00 min
6 x Phase	3.00 min
2 x CheckSource	2.00 min
7 x Atmospheric	4.67 min
Calibration overheads	5.40 min

**Additional Arrays**

ACA 7-m time (t_12m x 1.40)	3.51 h
Total ACA time (max(t_7-m,t_TP))	3.51 h

**Estimated total time for SB-1 6.02 h**

Close

File Edit View **Tool** Search Help

- ALMA Calibrator Selection Tool...
- ALMA LO Configuration Tool...
- Sensitivity Calculator...
- Generate SBs from the Selected Goal
- 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

**Display Project Time Summary**

**Use Tool->display project time summary on the main menu to see these summaries per science goal**

**Total and Calibration Times**

Science Goal	12-m Ext.		12-m Compact		12-m Ext. + Compact		ACA 7-m		ACA TP		Overall	
	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.
MSXiiiRA16a1	51.12 min	24.75 min	-	-	51.12 min	24.75 min	-	-	-	-	51.12 min	24.75 min
MSXiiiRA16a2	51.12 min	24.75 min	-	-	51.12 min	24.75 min	-	-	-	-	51.12 min	24.75 min
MSXiiiRA16a3	51.97 min	24.75 min	-	-	51.97 min	24.75 min	-	-	-	-	51.97 min	24.75 min
MSXiiiRA16a4	51.12 min	24.75 min	-	-	51.12 min	24.75 min	-	-	-	-	51.12 min	24.75 min
MSXiiiRA16b1	1.29 h	29.95 min	-	-	1.29 h	29.95 min	-	-	-	-	1.29 h	29.95 min
MSXiiiRA16b2	1.29 h	29.95 min	-	-	1.29 h	29.95 min	-	-	-	-	1.29 h	29.95 min
Overall	6.01 h	2.65 h	-	-	6.01 h	2.65 h	-	-	-	-	6.01 h	2.65 h

Template library. Turn the keys on the JTr...

- Template library. Turn the keys on the
- Proposal
  - Planned Observing
    - ScienceGoal (B3 spectral sv
    - ScienceGoal (B7 continuum
    - ScienceGoal (B7 CO(9-8): C
    - 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

**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
MSXiiiRA16a1	54.85 GB	-	-	18.31 MB/s	-	-
MSXiiiRA16a2	54.85 GB	-	-	18.31 MB/s	-	-
MSXiiiRA16a3	55.77 GB	-	-	18.31 MB/s	-	-
MSXiiiRA16a4	54.85 GB	-	-	18.31 MB/s	-	-
MSXiiiRA16b1	83.35 GB	-	-	18.31 MB/s	-	-
MSXiiiRA16b2	83.35 GB	-	-	18.31 MB/s	-	-
Overall	387.01 GB	-	-			

OK

## Total and Calibration Times

Science Goal	12-m (1)		12-m (2)		12-m (1+2)		ACA 7-m		ACA TP		Overall	
	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
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	
	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
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

**Especially when using a RANGE of angular resolution:**

**Rules are operating under the hood to choose among the possible configuration choices and they may be biased toward the low resolution end of an angular range because less 12m time is needed. *Variations in the range can cause disproportionately large differences in the time.***

**In the cases above only the upper end of a range changes, from 1" to 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**



# Time-constrained observing

**A file format is defined in the help to allow importing a list of time constraints**

**Entering time-constrained observations → Dates, Epochs or Monitoring**  
With appropriate justification or additional information

Project - Observing Tool for ALMA, version Cycle2Test2

File Edit View Tool Search Help

Perspective 1

Project Structure

Proposed Observations

Do you request complementary ACA Observations?  Yes  No

Suggest

Time Estimate

Are the observations time-constrained?  Yes  No

Number of time windows specified : 1

Start Date/Time (UTC) End Date/Time (UTC)

2013-10-02 13:17 2013-10-02 13:18

Please specify one or more suitable time windows for your observation

Your observation will be scheduled once during

Specific Dates Multiple Epochs Continuous Monitoring

October 2013

S	M	T	W	T	F	S
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

Feedback

Contextual Help

Phase I: Science Proposal



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

ALMA LO Configuration Tool...

Sensitivity Calculator

Common Parameters

Dec	00:00:00.000
Polarization	Dual
Observing Frequency	345.00000 GHz
Bandwidth per Polarization	7.50000 GHz
Water Vapour	<input checked="" type="radio"/> Automatic Choice <input type="radio"/> Manual Choice
Column Density	0.913mm (3rd Octile)
Trx, tau, Tsky	75 K, 0.158, 39.538 K
Tsys	157.027 K

Individual Parameters

	12m Array	7m Array	Total Power Array
Number of Antennas	43	10	3
Resolution	0.00000 arcsec	5.97455 arcsec	16.9 arcsec
Sensitivity (rms)	0.00000 uJy	0.00000 uJy	0.00000 uJy
(equivalent to)	Unknown K	0.00000 K	0.00000 K
Integration Time	60.00000 s	60.00000 s	60.00000 s

Integration Time Unit Option: Automatic

Sensitivity Unit Option: Automatic

Calculate Integration Time Calculate Sensitivity Close

A valid sensitivity must be entered in order to calculate an integration time.

Using this tool or options in the spectral visualizer's opacity display will not affect the OT's observing time calculation

# Technical Justification - I

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 Groundhog Day Test
- 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

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.

# Technical Justification - I



The screenshot shows the ALMA proposal software interface. The 'Project Structure' pane on the left shows a tree view with 'Technical Justification' selected and circled in red. The 'Editors' pane at the top has 'Technical Justification' selected. The main editor area is titled 'Imaging' and contains the following text:

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

**NEW!** Separate justification text required when observing parameters result in dynamic range exceeding some system limits

Excessively High Imaging and/or Spectral Dynamic Range. Please explain why this is required and how this can be achieved.

**Conditions on SDR = continuum flux/line RMS)**

SDR > 1000 if using Band 6 or lower

SDR > 400 if using Band 7

SDR > 250 if using Band 8

SDR > 170 if using Band 9

SDR > 150 if using Band 10

**Conditions on**

**c-IDR = peak continuum flux density / map rms and  
l-IDR = peak line flux / map rms**

c-IDR and/or l-IDR > 50 if using  
band 8, 9, or 10

c-IDR and/or l-IDR > 50 if using  
configurations C-6 up to C-10

c-IDR and/or l-IDR > 100 if using  
ACA or configurations C-1 to C-5  
and observing at band 7 or lower

Here would be the regular required correlator justification

# When the time is ripe ... validate & submit

Project - Observing Tool for ALMA, version Cycle2Test2

Note the spiffy new icons!

Editors

Spectral Spatial Project

Select PL...

Project Assigned Priority Project Code None Assigned

Feedback

Validation Validation History Log

Description Suggestion

Click in either place to check that your project will validate in the OT. If it doesn't validate when you submit, the archive will reject it.

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

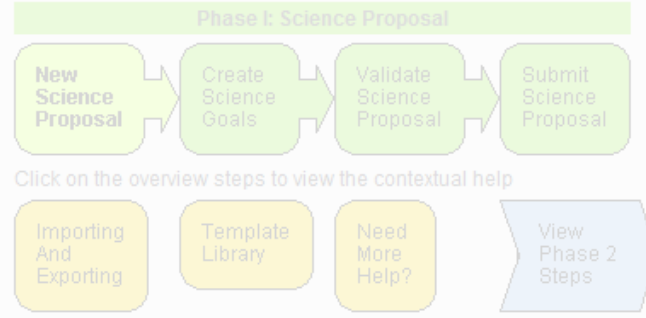
Click on the overview steps to view the contextual help

Importing And Exporting Template Library Need More Help? View Phase 2 Steps

# When the time is ripe ... validate & submit

The screenshot shows the ALMA Observing Tool interface. The menu bar includes 'New Proposal', 'New DDT Proposal', 'Open Project', 'Open Project as New Proposal', 'Save', 'Save As...', 'Show ALMA Template Library', 'Use Project as Template', 'Validate', 'Submit Project', 'Preferences', 'Save Preferences', and 'Quit'. The 'Validate' option is highlighted with a red arrow. A blue callout box points to the 'Validate' menu item and the toolbar icon, containing the text: 'Click in either place to make sure that your project will be validated by the OT. If it doesn't validate when you submit, the archive will reject it.' A purple callout box below it says: 'The OT lets you know while it's validating.' A 'Validating' dialog box is open in the foreground, displaying the text: 'The project is being validated, please wait.' and a 'Cancel' button. The background interface also shows a toolbar with a checkmark icon and a 'Select PL...' button.

- 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.





File Edit View Tool Search Help



## Project Structure

Proposal Program

Unsubmitted Proposal

- Observing Tool for ALMA Cycle3 Groundhog Day Test
  - 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 the J...

- Proposal
  - Planned Observing
    - ScienceGoal (B3 spectral)
    - ScienceGoal (B7 continuum)
    - ScienceGoal (B7 CO(9-8))
    - ScienceGoal (B9 continuum)
    - ScienceGoal (B3 spectral)
    - 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)
    - ScienceGoal (B9 spectral)
    - ScienceGoal (B3 continuum)
    - ScienceGoal (B6 continuum)

## Editors

Spectral Spatial ScienceGoal (Science Goal)

System J2000  Sexagesimal display?

Parallax 0.00000 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 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 should take you to the problem directly

**New!** The text in these messages can be copied

## Feedback

Validation Validation History Log

9 errors, 0 warnings

Description	Suggestion
<input checked="" type="checkbox"/> No Principal Investigator specified	Select the top level Project node in the tree and fill in the Principal Investigator field
<input checked="" type="checkbox"/> No scientific category defined	Select Proposal node and set a scientific category
<input checked="" type="checkbox"/> No document found - you must add a Science Case to your proposal	Select the proposal node in the Proposal tab and add your document
<input checked="" type="checkbox"/> Must select a minimum of 1 science keywords	Select the Proposal node and then add some science keywords (minimum 1
<input checked="" type="checkbox"/> 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
<input checked="" type="checkbox"/> 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

# When the time is ripe ... validate & submit

Project - Observing Tool for ALMA, version Cycle2Test2

Editors: Spectral, Spatial, Project

Principal Investigator: [?]

ALMA Observing Tool (Validation OT) - CRIS

File Edit View Tool Search Help

Main Project Information [?]

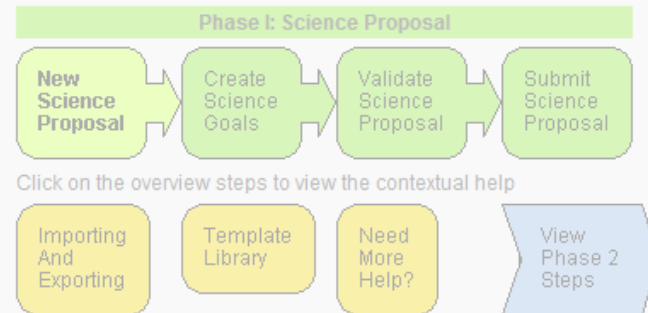
Project: [ ]  
Assigned Priority: [ ]  
Project Code: None Assigned

Feedback: Validation, Validation History, Log

Description: [ ] Suggestion: [ ]

**When you are satisfied that your proposal is complete, use the top level File menu to submit it to the archive**

- 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.



# When the time is ripe ... validate & submit

Project - Observing Tool for ALMA, version Cycle2Test2

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

ALMA Observing Tool (Validation OT) - CRIS

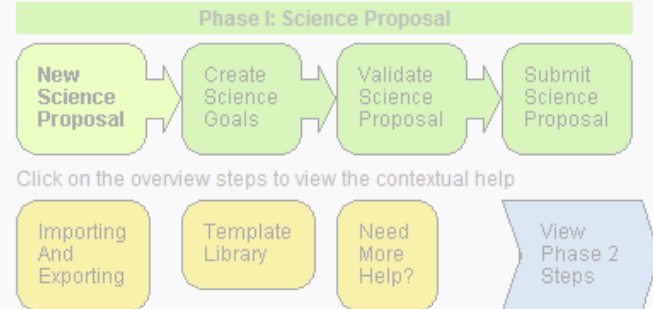
File Edit View Tool Search Help

Submit Project to ALMA

Or use the upload icon below the main menu

When you are satisfied that your proposal is complete, use the top level File menu to submit it to the archive

- 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.



# Recap

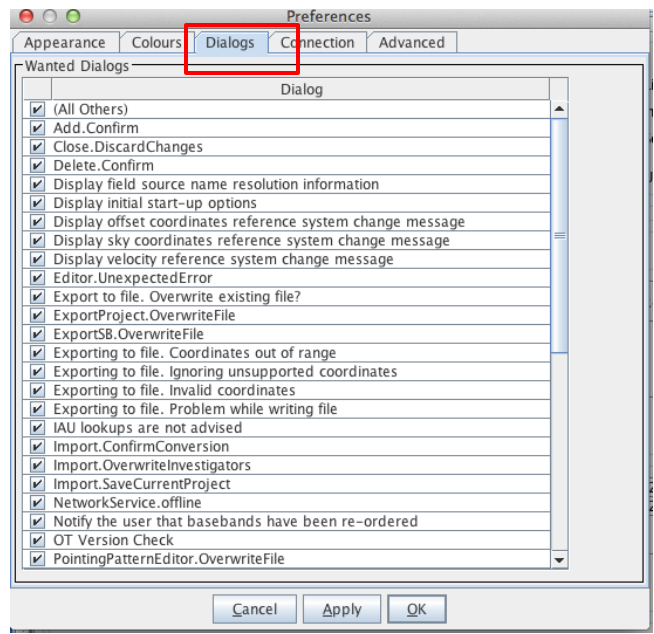
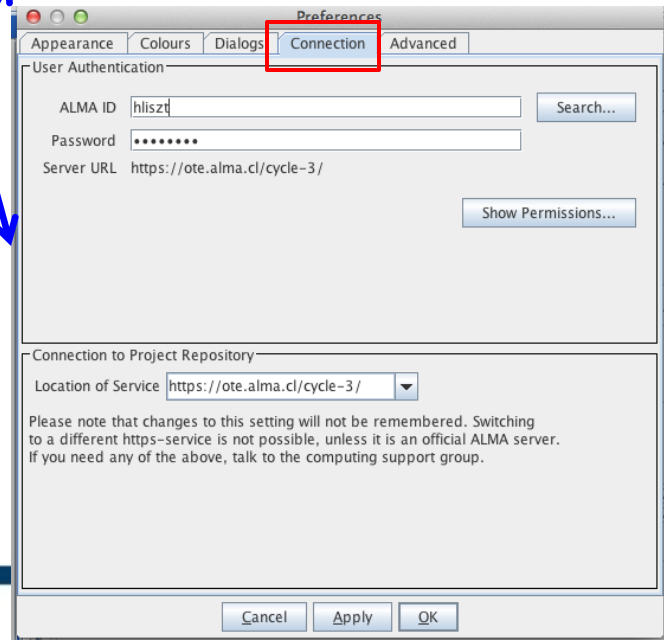
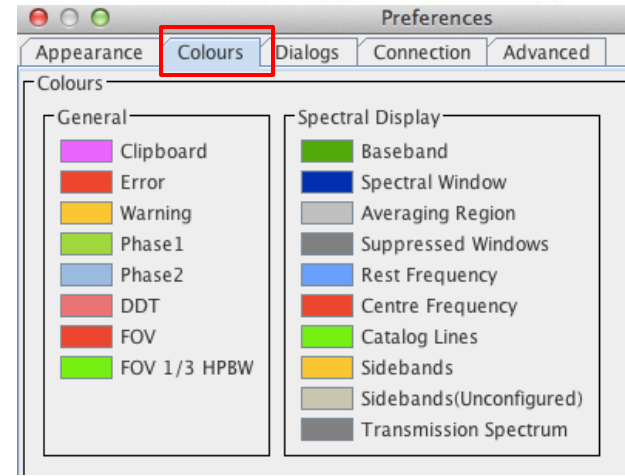
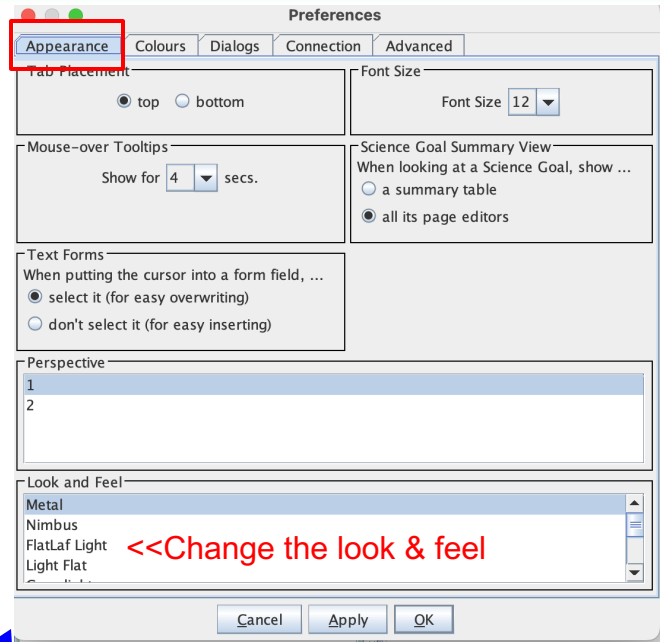
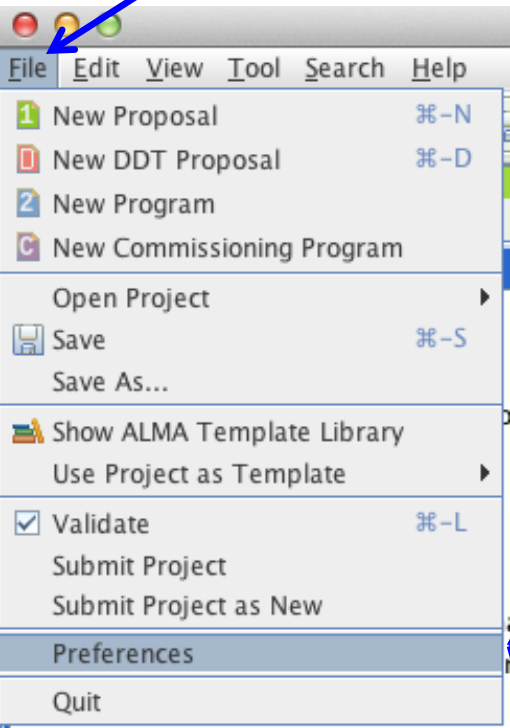


**ALMA OT Release Notes for the Cycle 9 Phase 1 release**

The most important changes to the OT since the last release are:

1. New capability: Observations using Band 8 with all configurations, plus Band 9 in C-8 and -9 and Band 10 in C-8.
2. New capability: VLBI in Band 7 and spectral-line observing (SiO) in Band 3.
3. New capability: Mapping of rectangular regions using the Total Power array for solar observing.
4. The OT GUI can be made more modern by selecting a 'flat' look and feel. This also appears to speed up the GUI's response times.
5. Submission is now possible using a button on the toolbar.
6. The decision as to whether band-to-band observing is required is now based on a search of the calibrator catalogue. This requires internet connectivity and time estimates made in the absence of an internet connection will assume B2B for Bands 7 to 10 where nominal configurations C-8 and larger are required.
7. The algorithm for tiling a rectangular area with mosaic pointings has been updated such that is now possible to have an even number of pointings along a single row. In general, it is likely that there will be small differences in the number pointings compared to previous versions of the OT.
8. On-line searches of the Splatalogue are again possible.
9. If a custom mosaic has been defined, the spatial visualiser will now show the pointings of the 7-m array (previously it just showed the 12-m pointings with the 7-m antenna beamsize).
10. When importing, the ASCII table of source details is now treated as being case-insensitive.
11. A warning is given if not all basebands have been used. Using all basebands is strongly encouraged as this makes calibration much easier.
12. A warning will be given if a velocity has not been entered for all sources. This is to encourage users to give source velocity information, mainly for use in the ALMA Science Archive. Solar-system objects are exempt.
13. A warning will be given if the Representative Window lies in a part of the frequency spectrum where the atmospheric transmission is less than 5%. A validation error will result if the spectral window is not representative.
14. An ephemeris that is not being used will be deleted at save or submission time.
15. The user-defined calibration interface has been overhauled, although the changes are mostly cosmetic.

# Use preferences to customize





- The same cut and paste commands you use outside the OT for text also work inside it since Cycle 5
- Ctrl-Z global shortcut will expand out all 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 is deprecated



- In the J-tree: Holding down the alt key in combination with the up/down arrows will move from a node in one SG to the same node in the adjacent SG (try it when you have more than one SG)
- Ctrl-B will generate all SB's for items lower in tree

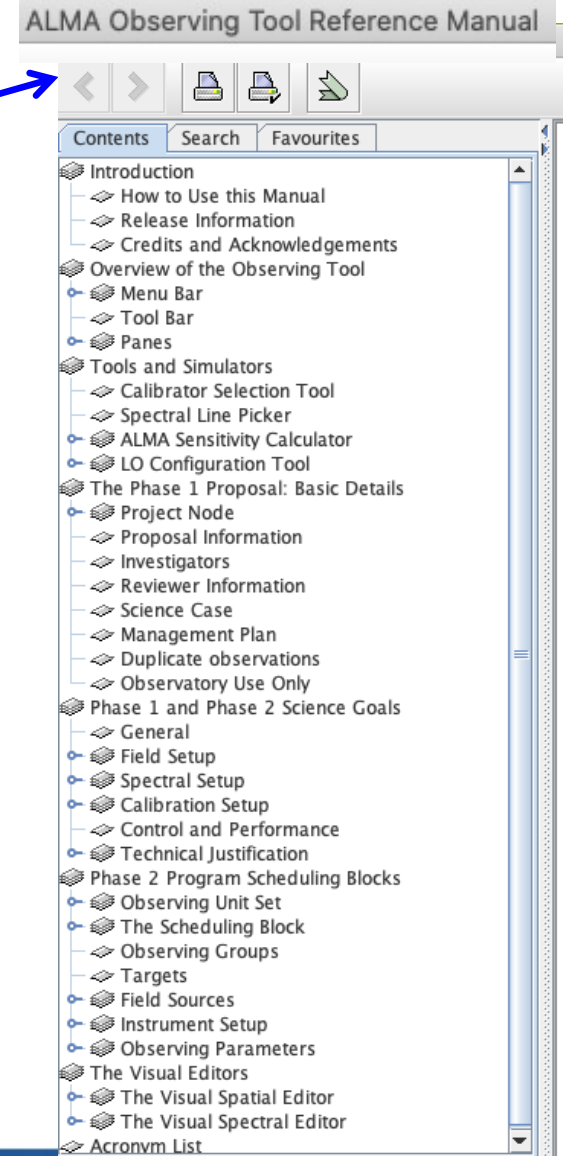
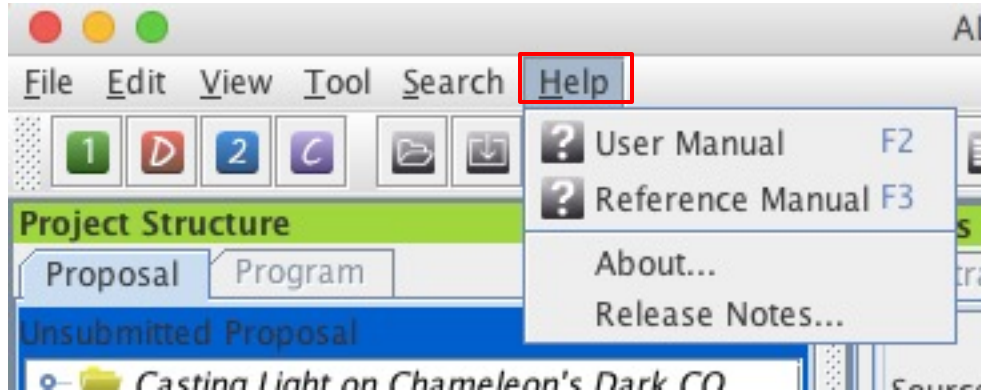
# NEW!!! Undo/Redo in Text Editing



The standard Ctrl-Z (undo) and Ctrl-Y (redo) functionality are now available in most text edit fields:

- Source coordinates in the field setup
- The frequency input fields of the spectral setup
- The LAS input field in the control and performance page
- Any of the text fields in the Technical Justification editor
- Description field of General node associated with an SG
- Fields in a science parameters editor
- Frequency input fields in the spectral spec editor
- Time-related input fields in correlator configuration

# Don't be afraid to ask for directions



Suggestion: input file formats are shown in the help sections that you invoke with a local "?" button but writing to a file provides an example most directly

# The motherships are always there

ALMA



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



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## 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

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## Status

[ALMA Cycle 5 Pre-Announcement](#)

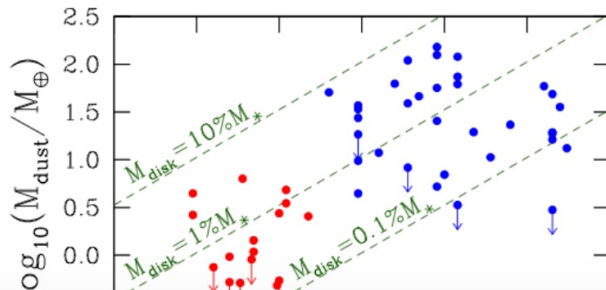
Refereed publications:

Last observed source:

Current configuration: C40-2

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## 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](http://www.almascience.org)  
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## News

General MAR 24

Cycle 7 observation suspension and the delay of the Cycle 8 proposal







**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.