

# An Introduction to the Cycle 7 ALMA Observing Tool

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



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Example from: Kate Rowlands

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



# ALMA Cycle 7 Planning

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

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

# Configuration plan

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

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

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

# Documentation

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



Observing with *ALMA*  
*A Primer for Early Science*



# Downloading the ALMA OT



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



Associated Universities, Inc.



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Search Site



## Observing Tool

The ALMA Observing Tool (OT) is a Java application used for the preparation and submission of ALMA Phase 1 (observing proposal) and Phase 2 (telescope runfiles for accepted proposals) materials. It is also used for preparing and submitting Director's Discretionary Time (DDT) proposals. The current Cycle 6 release of the OT is configured for the present capabilities of ALMA as described in the Cycle 6 Call For Proposals. Note that in order to submit proposals you will have to register with the ALMA Science Portal beforehand.

## Download & Installation

The OT will run on most common operating systems, as long as a **64-bit version of Java 8** is installed ([see the troubleshooting page](#) if you are experiencing Java problems). The ALMA OT is available in two flavours: Web Start and tarball.

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

The **tarball** version must be installed manually and may require additional configuration and installation issues.

Webstart

Tarball

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

## Documentation

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

NRAO

# Proposal Checklist

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

# Let's make a proposal!



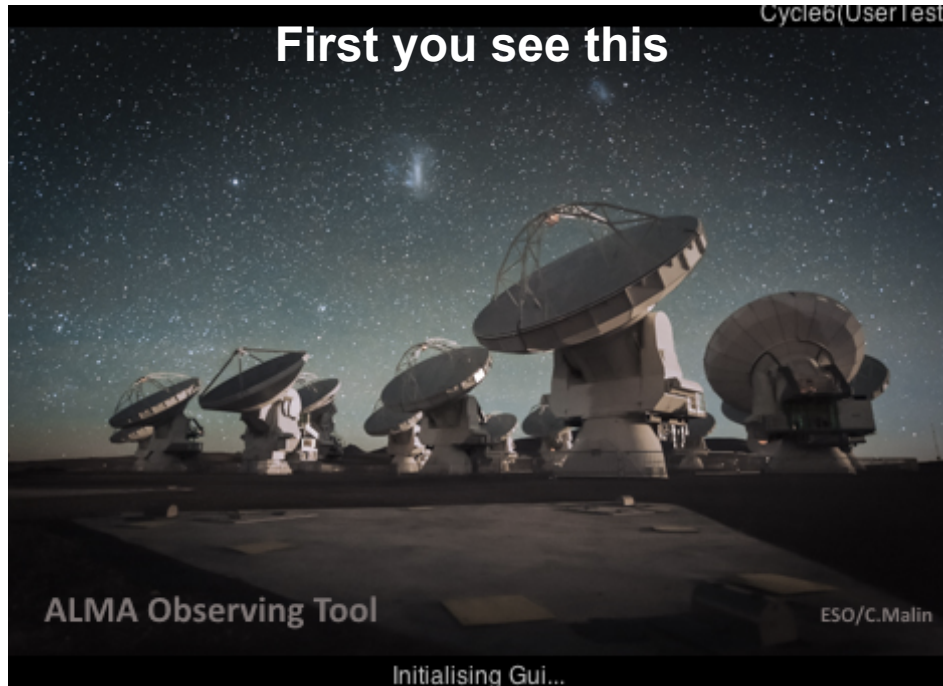
## Open up your freshly downloaded OT



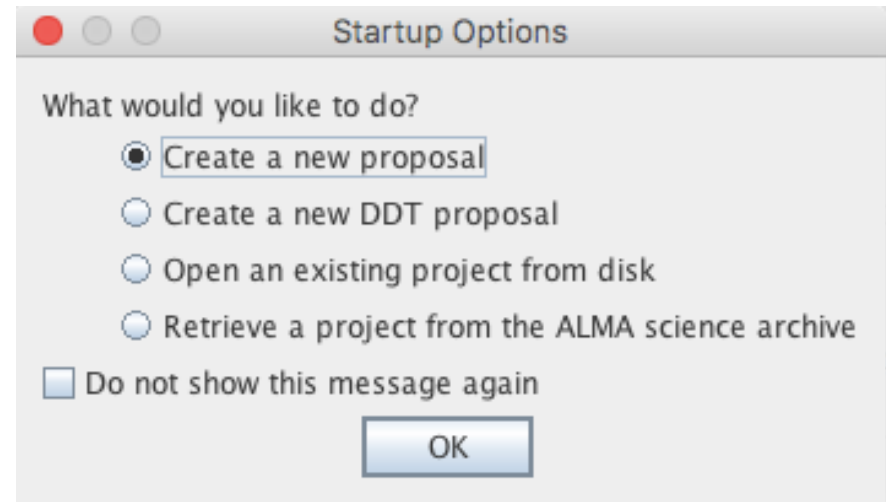
# When the ALMA OT starts



First you see this



Then you see this







## Project Structure

Proposal Program

Unsubmitted Proposal

- Project
- Proposal

## Editors

Spectral Spatial Project

Principal Investigator

 Select Pl...

Main Project Information

Project

From here, you can:

- Start a new proposal
- Add blank Science Goals (SG)
- Load templates with example SG

Description



Suggestion

Resize by grabbing these bars and moving up/down

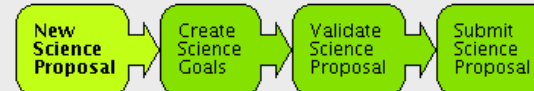
## Overview

arrowheads minimize, maximize panes

## Contextual Help

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

## Phase I: Science Proposal



Click on the overview steps to view the contextual help

Importing And Exporting

Template Library

Need More Help?

View Phase 2 Steps



Project Structure

Proposal Program

Insubmitted Proposal  
Project  
Proposal  
Planned Observing

Your proposal's tree

Search your proposal tree here



Editors

Spectral Spatial Proposal

Proposal Title

Proposal Cycle 2018.1

Abstract (max. 1200 characters)

Proposal Type  
 Regular  Target Of Opportunity  
 VLBI  Large Program

Scientific Category  
 Cosmology and the High Redshift Universe  Galaxies and Galactic Nuclei  ISM, star formation and astrochemistry  
 Circumstellar disks, exoplanets and the solar system  Stellar Evolution and the Sun

Please select one or two keywords

Student project

Related Proposals

Previous Proposals

Investigators

This goes on your proposal's cover page!

Help with the tree is here!



**Project Structure**

Proposal Program

Unsubmitted Proposal

- Really catchy title here
  - Proposal
    - Planned Observing

**Editors**

Spectral Spatial Proposal

Cosmology and the High Redshift Universe
  Galaxies and Galactic Nuclei
  ISM, star formation and astrochemistry

Circumstellar disks, exoplanets and the solar system
  Stellar Evolution and the Sun

Keywords (max. 2 keywords)

- Lyman Alpha Emitters/Blobs (LAE/LAB)
- Lyman Break Galaxies (LBG)
- Starburst galaxies
- Sub-mm Galaxies (SMG)
- High-z Active Galactic Nuclei (AGN)

Student project  Continuation

Related Proposals

Previous Proposals

Investigators

Type	Affiliation
PI	Not set

Select PI/Co-I's from registered ALMA Users

Science Case is a .pdf, max 4 pages  
The .pdf must not be < 12pt font

Investigator search constraints

ALMA ID is hliszt

Find Investigators

Full name	Email	Affiliation	ALMA ID
Harvey Liszt	hliszt@nrao.edu	North American ALMA ...	hliszt

Select PI

Attach your Science Case as a PDF

Select PI... Add Col... Remove Col... Add from Proposal...

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

Attach... Detach View...

## Science Case

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



**Project Structure**

Proposal Program

Unsubmitted Proposal

- Project
  - Proposal

**Editors**

Spectral Spatial Proposal

Proposal Information

Proposal Title

Proposal Cycle 2019.1

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

**To add a Science Goal you may**

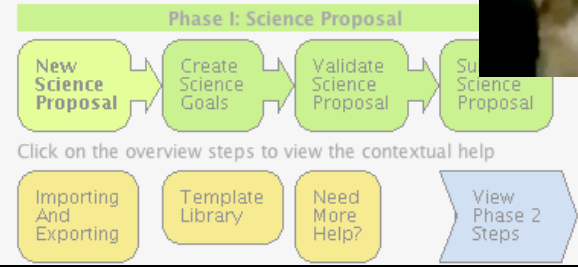
- (1) Left-click the “New Science Goal” button
- (2) Right-click and add blank Science Goals, or
- (3) Use options in the File menu

**Let's make a science goal!**



**Contextual Help**

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  - Clicking on the icon in the toolbar
  - Or clicking on this [link](#)
- Click on the [proposal](#) tree node and complete the relevant fields.



## Example - mapping out CO(1-0)

- Methodology – Using a single pointing, obtain a spectral line observation of the 12CO(1-0) line at 10 km/s resolution. The CO gas traces molecular hydrogen gas and will be used to map the gas velocity and distribution.
- Source – NGC 4797
- RA, Dec = 12:54:55.166, +27:24:45.55
- $z = 0.0262$
- Requirements – S/N=5 on the 12CO(1-0) line (rest frequency 115.271 GHz).
  - Peak line flux of 4.60 mJy/beam.
  - Desired sensitivity per pointing of 920  $\mu$ Jy/beam.
  - Line width = 450 km/s.
- Dual polarization products.
- Correlator setup: band 3, 1875 MHz bandwidth, 1.129 kHz (3 km/s) resolution.
- Set the bandwidth used for sensitivity to 10 km/s because we will spectrally average to this channel width during data reduction.
- Largest angular scale (LAS) = 2.0", resolution = 1.5". The LAS of the CO gas in NGC4797 is 2" because in early-type galaxies such as NGC 4797 the gas is usually found within 0.5 effective radii (Davis et al. 2013).



## Project Structure

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (12CO (1-0) NGC 4797)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup

Give your SG a short name

And a description!

## Editors

Spectral Spatial ScienceGoal (Science Goal)

Science Goal Name 12CO (1-0) NGC 4797

Description

Observe 12CO(1-0) line at 10 km/s resolution in NGC4797. The CO gas traces molecular hydrogen gas and will be used to map the gas velocity and distribution. The LAS of the CO gas in NGC4797 is 2" because in early-type galaxies such as NGC 4797 the gas is usually found within 0.5 effective radii.

SinglePoint

Source

Resolve

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 lsrk z 0.000000000 Doppler Type RADIO

Target Type

 Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Continuum Flux Density per Synthesized Beam 0.00000 Jy

Continuum Linear Polarization 0.0 per cent

Continuum Circular Polarization 0.0 per cent



Peak Line Flux Density per Synthesized Beam 0.00000 Jy

Line Width 0.00000 km/s

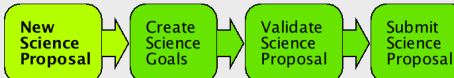
Line Linear Polarization 0.0 per cent

## Overview

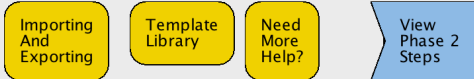
## Contextual Help

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  - Or clicking on this [link](#)
- Click on the  [proposal](#) tree node and complete the relevant fields.

## Phase I: Science Proposal



Click on the overview steps to view the contextual help





**Project Structure**

- Unsubmitted Proposal
  - Project
    - Proposal
      - Planned Observing
        - ScienceGoal (12CO (1-0) NGC 4797)
          - General
          - Field Setup**
          - Spectral Setup
          - Calibration Setup
          - Control and Performance
          - Technical Justification

**Editors**

Spectral Spatial Field Setup

Spatial Image

12:55:09.623, +27:25:55.03 (J2000)  
Image Filename r:/jsky3/cache/jsky1684837259666153140.fits

FOV Parameters

**NGC 4797**

Source

Source Name: NGC 4797 [Resolve]

Choose a Solar System Object?  Name of object: Unspecified

System: ICRS Sexagesimal display?  Parallax: 0.00000 mas

Source Coordinates: RA: 12:54:55.1660 PM RA: 0.00000 mas/yr  
Dec: 27:24:45.550 PM DEC: 0.00000 mas/yr

Source Radial Velocity: 7654.027 km/s lsrk z: 0.026200000 Doppler Type: RADIO

Target Type:  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Continuum Flux Density per Synthesized Beam: 0.00000 Jy

Continuum Linear Polarization: 0.0 per cent

Continuum Circular Polarization: 0.0 per cent

Peak Line Flux Density per Synthesized Beam: 4.60000 mJy

Line Width: 450.00000 km/s

Line Linear Polarization: 0.0 per cent

Line Circular Polarization: 0.0 per cent

Field Center Coordinates

Coord Type:  Relative  Absolute

Offset Unit: arcsec

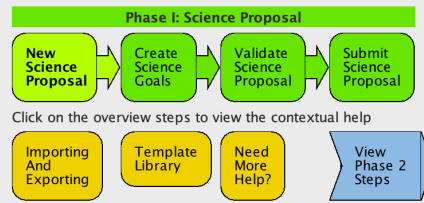
#Pointings: 1

RA [arcsec]	Dec [arcsec]
0.00000	0.00000

Add Delete Reset Import Export

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

- Contextual Help**
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**Project Structure**

- Unsubmitted Proposal
  - Project
    - Proposal
      - Planned Observing
        - ScienceGoal (12CO (1-0) NGC 4797)
          - General
          - Field Setup**
          - Spectral Setup
          - Calibration Setup
          - Control and Performance
          - Technical Justification

Generally, enter source properties here

Used to assess project viability!

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

**Editors**

Spectral Spatial Field Setup

Spatial Image

12:55:09.623, +27:25:55.03 (J2000)  
Image Filename /jjsky3/cache/jsky1684837259666153140.fits  
FOV Parameters

**NGC 4797**

Source

Source Name NGC 4797 Resolve

Choose a Solar System Object?  Name of object Unspecified

System ICRS Sexagesimal display?  Parallax 0.00000 mas

Source Coordinates RA 12:54:55.1660 PM RA 0.00000 mas/yr

Dec 27:24:45.550 PM DEC 0.00000 mas/yr

Source Radial Velocity 7654.027 km/s Doppler Type RADIO

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Line Flux Density per Synthesized Beam 4.60000 mJy

Line Width 450.00000 km/s

Line Linear Polarization 0.0 per cent

Line Circular Polarization 0.0 per cent

Field Center Coordinates

Coord Type  Relative  Absolute

Offset Unit arcsec

#Pointings 1

RA [arcsec]	Dec [arcsec]
0.00000	0.00000

Add Delete Reset Import Export

Used for mosaicking!

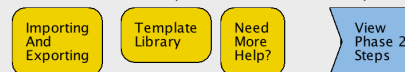
**Contextual Help**

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**Phase I: Science Proposal**



Click on the overview steps to view the contextual help





**Project Structure**

- Unsubmitted Proposal
- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (12CO (1-0))
        - General
        - Field Setup**
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

Let's start entering our science goal:

**Editors**

Spectral Spatial Field Setup

Spatial Image

12:55:09.623, +27:25:55.03 (J2000)

Image Filename r:/jsky3/cache/jsky1684837259666153140.fits

FOV Parameters

Representative Frequency (Sky) 112.328 GHz

Antenna Diameter

Antenna Beamsize

Show Antenna Beams

Image Query

Image Server Digitized Sky (Version II) at ESO

Image Size(arcmin) 10.0

Query

Click "Query" to see what comes up!

**NGC 4797**

Source

Source Name **NGC 4797** Resolve

Choose a Solar System Object?  Name of object Unspecified

System ICRS Sexagesimal display?  Parallax 0.00000 mas

Source Coordinates RA **12:54:55.1660** PM RA 0.00000 mas/yr

Dec **27:24:45.550** PM DEC 0.00000 mas/yr

Source Radial Velocity 7654.027 km/s lsrk z **0.026200000** Doppler Type RADIO

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Continuum Flux Density per Synthesized Beam 0.00000 Jy

Continuum Linear Polarization 0.0 per cent

Continuum Circular Polarization 0.0 per cent

Peak Line Flux Density per Synthesized Beam **4.60000** mJy

Line Width **450.00000** km/s

Line Linear Polarization 0.0 per cent

Line Circular Polarization 0.0 per cent

Field Center Coordinates

Coord Type  Relative  Absolute

Offset Unit arcsec

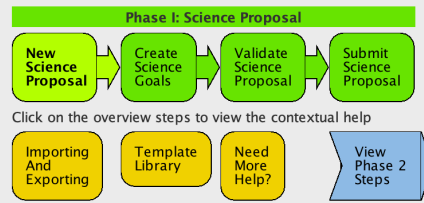
#Pointings 1

RA [arcsec]	Dec [arcsec]
0.00000	0.00000

Add Delete Reset Import Export

Always check your units!

- Contextual Help**
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# The spectral setup tab

ALMA Observing Tool (Cycle6(Phase2)) - Project

File Edit View Tool Search Help

Project Structure

Unsubmitted Proposal

Project

Proposal

Planned Observing

ScienceGoal (12CO (1-0) NGC 4725)

General

Field Setup

Spectral Setup

Calibration Setup

Control and Performance

Technical Justification

Editors

Spectral Spatial Spectral Setup

Visualisation

In the table below, it is possible to define... Each baseband is 2GHz wide and can be... Note that for bands 3 to 8, it is not possible to... for baseband is no more than 1. width and resolution.

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

100,0000 200,0000 300,0000 400,0000 500,0000 600,0000 700,0000 800,0000 900,0000 1000,0000

03 04 05 06 07 08 09 10

Overlays:  Receiver Bands  Transmission  DSB Image  Spectral Lines Select Lines to Overlay

Water Vapour Column Density:  Automatic Choice  Manual Choice 5.186mm (7th Octile)

Viewport: Pan to Spectral Window Zoom to Band Reset

Spectral Type

Spectral Line  
 Single Continuum  
 Spectral Scan

Produce image sidebands (Bands 9 and 10 only)

Polarization products desired  XX  DUAL  FULL

Spectral Setup Errors

No spectral window in the list. No suitable receiver band for the range :[0.0 GHz, 0.0 GHz]

Spectral Line

Band 1

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

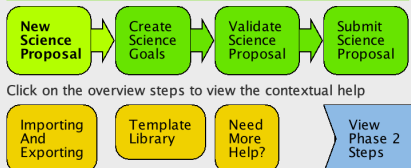
Clicking here gets you to the spectral tab

Overview

## Contextual Help

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  - Clicking on the icon in the toolbar
  - Or clicking on this [link](#)
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## Phase I: Science Proposal



**Project Structure**

Proposal Program

Unsubmitted Proposal

- Project
  - Proposal
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        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

**Editors**

Spectral Spatial Spectral Setup

In the table below, it is possible to define up to 16 spectral windows, 4 per baseband as long as the total Fraction per baseband is no more than 1. Each baseband is 2GHz wide and can be separately configured i.e. each spectral window can have a different bandwidth and resolution. Note that for bands 3 to 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.

Spectral Type

Spectral Type

Spectral Line  
 Single Continuum  
 Spectral Scan

Produce image sidebands (Bands 9 and 10 only)  
Polarization products desired  XX  DUAL  FULL

Spectral Setup Errors  
No spectral window in the list. No suitable receiver band for the range :[0.0 GHz, 0.0 GHz]

Spectral Line

Fractio	Centre Freq (rest,lsrk)	Centre Freq (sky,bar)	Transition	Bandwidth, Resolution (smoothed)	Spec Avg,	Representativ Window
---------	-------------------------	-----------------------	------------	----------------------------------	-----------	----------------------

Baseband-1

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

Baseband-2

Add spectral window centred on a spectral line Add spectral window manually Del



Baseband-3

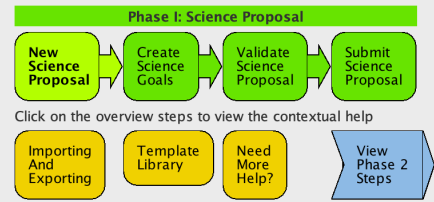
**ADD spectral windows to get started!**

**You can also do this by hand**

**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.



# Use the spectral-line picker to find your lines

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 84 Max 116

Receiver/Back End Configuration

All lines

Potentially selectable lines

Lines in defined spws

Filtering unobservable lines

Upper-state Energy (K)

Min 0 Max 0

Molecule Filter / Environment

Show all atoms and molecules

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

Search Online

Reset Filters

Transitions matching your filter settings:  
(double-click column header for primary sort, single-click subsequent columns for secondary sorting. Single clicks will reverse sort order of already selected columns.)

Transition ^	Description	Rest Freque... ^	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							Offline
CH3CCH v=0							Offline
CH3CCH v=0							Offline
CH3CCH v=0							Offline
CH3CCH v=0							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	85.503978 ...		0.1		Offline

Select one or more lines from a splatalogue-based list you can filter using the tools at left

Add to spectral window list

Spectral windows in this baseband (maximum of four)

Transition ^	Description	Rest Frequency ^	Sky Frequency
U-85468.3	UNIDENTIFIED	85.468300 GHz	85.466279 GHz

Remove spectral window(s)

Cancel Ok

# Use the spectral-line picker to find your lines

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

Include description

Frequency Filters  
ALMA Band  
Sky Frequency (GHz)  
Min 31.3 Max 950

Receiver/Back End Configuration  
 Hide unobservable lines  
 Filtering unobservable lines

Maximum Upper-state Energy (K)  
0 20 40 60 80 100 ∞

Molecule Filter / Environment  
Show all atoms and molecules

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

Search Online  
Reset Filters

Overlay lines

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	Description	Rest Frequency	Sky Frequency	Upper-state Energy	Lovas Intensity	Sij $\mu^2$	Catalog
CO v=2 1-0	Carbon Monoxide	113.172380 GHz	110.282966 GHz	6134.675 K		0.012 D <sup>2</sup>	Offline
CO v=1 1-0	Carbon Monoxide	114.221757 GHz	111.305552 GHz	3089.154 K		0.012 D <sup>2</sup>	Offline
CO v=0 1-0	Carbon Monoxide	115.271202 GHz	112.328203 GHz	5.532 K	60	0.012 D <sup>2</sup>	Offline
CO v=2 2-1	Carbon Monoxide	226.340357 GHz	220.561642 GHz	6145.538 K		0.024 D <sup>2</sup>	Offline
CO v=1 2-1	Carbon Monoxide	228.439110 GHz	222.606812 GHz	3100.118 K	0.62	0.024 D <sup>2</sup>	Offline
CO v=0 2-1	Carbon Monoxide	230.538000 GHz	224.652115 GHz	16.596 K	70	0.024 D <sup>2</sup>	Offline
CO+ J=2-1, F=3/2 -1/2	Carbon Monoxide Ion	235.789605 GHz	229.769640 GHz		0.1	0.668 D <sup>2</sup>	Offline
CO+ J=2-1, F=5/2 -3/2	Carbon Monoxide Ion	236.062574 GHz	230.035640 GHz		0.1	1.2 D <sup>2</sup>	Offline
CO v=2 3-2	Carbon Monoxide	339.499527 GHz	330.831736 GHz	6161.831 K		0.036 D <sup>2</sup>	Offline
CO v=1 3-2	Carbon Monoxide	342.647656 GHz	333.899489 GHz	3116.561 K	0.71	0.036 D <sup>2</sup>	Offline
CO v=0 3-2	Carbon Monoxide	345.795990 GHz	336.967443 GHz	33.192 K	70	0.036 D <sup>2</sup>	Offline
CO+ J=3-2, F=5/2 -3/2	Carbon Monoxide Ion	353.741285 GHz	344.709886 GHz		0.1	1.2 D <sup>2</sup>	Offline
CO+ J=3-2, F=7/2 -5/2	Carbon Monoxide Ion	354.014254 GHz	344.975886 GHz		0.18	1.713 D <sup>2</sup>	Offline
CO v=2 4-3	Carbon Monoxide	452.645486 GHz	441.088955 GHz	6183.555 K		0.048 D <sup>2</sup>	Offline
CO v=1 4-3	Carbon Monoxide	456.842991 GHz	445.179294 GHz	3138.486 K		0.048 D <sup>2</sup>	Offline
CO v=0 4-3	Carbon Monoxide	461.043768 GHz	449.268897 GHz	55.217 K	60	0.048 D <sup>2</sup>	Offline
CO v=2 5-4	Carbon Monoxide	551.000000 GHz	540.000000 GHz			0.061 D <sup>2</sup>	Offline
CO v=1 5-4	Carbon Monoxide	551.000000 GHz	540.000000 GHz			0.061 D <sup>2</sup>	Offline
CO v=0 5-4	Carbon Monoxide	551.000000 GHz	540.000000 GHz			0.061 D <sup>2</sup>	Offline
CO v=2 6-5	Carbon Monoxide	661.000000 GHz	650.000000 GHz			0.073 D <sup>2</sup>	Offline
CO v=1 6-5	Carbon Monoxide	661.000000 GHz	650.000000 GHz			0.073 D <sup>2</sup>	Offline
CO v=0 6-5	Carbon Monoxide	661.000000 GHz	650.000000 GHz		100	0.073 D <sup>2</sup>	Offline
CO v=2 7-6	Carbon Monoxide	771.000000 GHz	760.000000 GHz			0.085 D <sup>2</sup>	Offline
CO v=1 7-6	Carbon Monoxide	771.000000 GHz	760.000000 GHz			0.085 D <sup>2</sup>	Offline

Use "Add to Selected Transitions" to select CO(1-0)

Add to Selected Transitions

Selected Transitions

Transition	Description	Rest Frequency	Sky Frequency
CO v=0 1-0	Carbon Monoxide	115.271202 GHz	112.328203 GHz

Remove from selected transitions

Cancel Ok

## Project Structure

- Proposal
- Program
- Unsubmitted Proposal
- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (12CO (1-0) NGC 4797)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

## Editors

Spectral Spatial Spectral Setup

In the table below, it is possible to define up to 16 spectral windows, 4 per baseband as long as the total Fraction per baseband is no more than 1. Each baseband is 2GHz wide and can be separately configured i.e. each spectral window can have a different bandwidth and resolution. Note that for bands 3 to 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.

Spectral Type

Spectral 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

Fractio	Centre Freq (rest,lsrk)	Centre Freq (sky,bar)	Transition	Bandwidth, Resolution (smoothed)	Spec Avg.	Representativ Window
1(Full)	115.27120 G...	112.33120 G...	CO v=0 1-0	1875.000 MHz ( 5004 km/s), 1.129 MHz ( 3.013 km/s)		<input checked="" type="radio"/>
				58.594 MHz ( 156 km/s), 35.278 kHz ( 0.094 km/s)		
				117.168 MHz ( 313 km/s), 70.557 kHz ( 0.189 km/s)		
				234.375 MHz ( 626 km/s), 141.113 kHz ( 0.377 km/s)		
				468.750 MHz ( 1251 km/s), 282.227 kHz ( 0.753 km/s)		
				937.500 MHz ( 2502 km/s), 564.453 kHz ( 1.506 km/s)		
				1875.000 MHz ( 5004 km/s), 1.129 MHz ( 3.013 km/s)		
				1875.000 MHz ( 5004 km/s), 1.129 MHz ( 3.013 km/s)		

Baseband-2

Add spectral window centred on a spectral line

Add spectral window manually

Delete  Show image spectral windows

Baseband-3



Add spectral window centred on a spectral line

Add spectral window manually

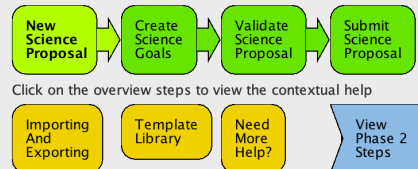
Delete  Show image spectral windows

## Overview

## Contextual Help

- 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



**Project Structure**

Proposal Program

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (12CO (1-0) NGC 4797)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

**Editors**

Spectral Spatial Spectral Setup

In the table below, it is possible to define up to 16 spectral windows, 4 per baseband as long as the total Fraction per baseband is no more than 1. Each baseband is 2GHz wide and can be separately configured i.e. each spectral window can have a different bandwidth and resolution. Note that for bands 3 to 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.

Spectral Type [?] [-]

Spectral Setup Errors

Spectral Line [?] [-]

Baseband-1	Fraction	Centre Freq (GHz)	Centre Freq (GHz)	Transition	Bandwidth, Resolution (smoothed)	Spec Avg. Window	Representative Window
1(Fu...)	115.27120 G...	112.33120 G...	CCv=0 1-0	1875.000 MHz( 5004 km/s), 1.129 MHz( 3.013 km/s)	2	<input checked="" type="radio"/>	

Show image spectral windows

Baseband-2

**Sky frequency is shown in barycentric frame**

**Spectral specs share a baseband so the sum of shares can't exceed 1**

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

**Overview**

**Contextual Help**

- 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**

```

    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





**Project Structure**

Proposal Program

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (12CO (1-0) NGC 4797)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

**Editors**

Spectral Spatial Spectral Setup

Visualisation

In the table below, it is possible to define up to 16 spectral windows, 4 per baseband as long as the total Fraction per baseband is no more than 1. Each baseband is 2GHz wide and can be separately configured i.e. each spectral window can have a different bandwidth and resolution. Note that for bands 3 to 8, it is not possible to put 3 basebands in one sideband and the fourth one in the other.

Left/right click to zoom in/out, grab sliding bar to pan  
Note: Moving LO1 here is for experimentation only - actual setup determined by the windows

Observed Frequency: 90,0000, 95,0000, 105,0000, 110,0000, 115,0000, 120,0000

Rest Frequency: 0,0000, 95,0000, 100,0000, 105,0000, 110,0000, 115,0000, 120,0000, 125,0000

CO v=0 1-0

LO1

Overlays:  Receiver Bands  Transmission  DSB Image  Spectral Lines

Water Vapour Column Density:  Automatic Choice  Manual Choice 5.186mm (7th Octile)

Viewport:

Spectral Type

Spectral Line  
 Single Continuum  
 Spectral Scan

Produce image sidebands (Bands 9 and 10 only)

Polarization products desired  XX  DUAL  FULL

Spectral Setup Errors

Spectral Line

Baseband-1

**Overview**

Contextual Help

- 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**

Click on the overview steps to view the contextual help

# Automated spectral scan - I



Project - Observing Tool for ALMA, version Cycle2Test2

File Edit View Tool Search Help Perspective 1

**Project Structure**

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

**Editors**

Spectral Spatial Spectral Setup

Spectral Type

- Spectral Line
- Single Continuum
- Spectral Scan

Polarization products desired  XX  DUAL  FULL

Spectral Setup Errors

Spectral Scan

Requested start frequency (sky) 95.0 GHz

Requested end frequency (sky) 107.0 GHz

Requested range (rest) 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

Spectral averaging 1

Representative frequency (sky) 102.50000 GHz

Automated Spectral Scan mode and tunings

The representative frequency defined in the observed frame 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. The representative frequency 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

Project Structure

Proposal Program

Unsubmitted Proposal

- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (12CO (1-0) NGC 4797)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

Editors

Spectral Spatial 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

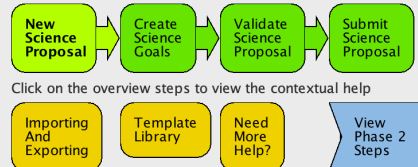
The OT will take care of calibration for you!

## 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





## Project Structure

Proposal Program

## 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 **Control and Performance**

These parameters are used to control various aspects of the observing program.

## 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

**Array properties summarized**

Largest Angular Structure in source	<input type="text" value="0.00000"/>	arcsec		
Desired sensitivity per pointing	<input type="text" value="0.00350"/>	Jy	equivalent to	<input type="text" value="20.581 mK"/>
Bandwidth used for Sensitivity	AggregateBandWidth	Frequency Width	<input type="text" value="7.500000 GHz"/>	
Science goal integration time estimate	<input type="button" value="Time Estimate"/>			
Override OT's sensitivity-based time estimate (must be justified)	<input type="radio"/> Yes <input checked="" type="radio"/> No			
Are the observations time-constrained?	<input type="radio"/> Yes <input checked="" type="radio"/> No			

**Control and Performance defines the required angular resolution, sensitivity, largest angular scale, etc.**



## 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 12n ACA

Longest baseline 0.0

Synthesized beamsize 10.

Shortest baseline 0.0

Maximum recoverable scale 47.72

Angular resolution can be selected here, and is important for considering which configurations/combinations of arrays are used

## Desired Performance

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

3.00000 arcsec

Largest Angular Structure in source

2.0 arcsec

Desired sensitivity per pointing

0.00350 Jy equivalent to 20.581 mK

Bandwidth used for Sensitivity

AggregateBandWidth Frequency Width 7.500000 GHz

Science goal integration time estimate

Time Estimate

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

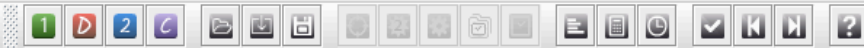
 Yes  No

Are the observations time-constrained?

 Yes  No

Flux - Temperature conversion

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  7m

Number of Antennas 12m  7m  TP

Shortest baseline 12m configuration  Most extended 12m configuration

Shortest baseline 7m configuration

Maximum recoverable scale 12m configuration  7m configuration

## 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

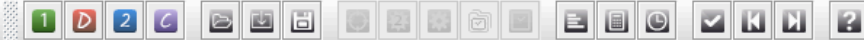
Science goal integration time estimate

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

Are the observations time-constrained?  Yes  No

**Largest angular structure and desired angular resolution used to find which arrays are used!**





## 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	7m	111.922 arcsec		
Number of Antennas	12m	43	7m	10	TP	3
	ACA 7m configuration		Most compact 12m configuration		Most extended 12m configuration	
Longest baseline	0.049 km	0.161 km	16.197 km			
Synthesized beamsize	14.158 arcsec	3.882 arcsec	0.048 arcsec			
Shortest baseline	0.009 km	0.015 km	0.256 km			
Maximum recoverable scale	75.610 arcsec	33.005 arcsec	0.568 arcsec			

## Desired Performance

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

1.05000 arcsec to 3.00000 arcsec

Largest Angular Structure in source 29.00000 arcsec

Desired sensitivity per pointing 0.10000 K equivalent to 721.13 uJy @ 1.05 "

will provide 12.316 mK @ 3.00 "

Bandwidth used for Sensitivity RepresentativeWindowResolution Frequency Width 0.141113 MHz

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



## Project Structure

- Unsubmitted Proposal
- Project
  - Proposal
    - Planned Observing
      - ScienceGoal (12CO (1-0) NGC 4797)
        - General
        - Field Setup
        - Spectral Setup
        - Calibration Setup
        - Control and Performance
        - Technical Justification

Let's enter in the properties we had from our science goals

## Editors

Spectral Spatial Control and Performance

These parameters are used to control various aspects of the observations, including the required antenna configurations and integration times.

## Control and Performance

## Configuration Information

Antenna Beamsize ( $1.13 * \lambda / D$ )	12m 51.839 arcsec	7m 88.866 arcsec
Number of Antennas	12m 43	7m 10 TP 3
	ACA 7m configuration	Most compact 12m configuration Most extended 12m configuration
Longest baseline	0.049 km	0.161 km 16.197 km
Synthesized beamsize	13.401 arcsec	3.664 arcsec 0.047 arcsec
Shortest baseline	0.009 km	0.015 km 0.256 km
Maximum recoverable scale	62.992 arcsec	30.981 arcsec 0.531 arcsec

## Desired Performance

Desired Angular Resolution (Synthesized Beam)	<input type="radio"/> Single <input type="radio"/> Range <input type="radio"/> Any <input type="radio"/> Standalone ACA
	<input type="text" value="1.50000"/> <input type="text" value="arcsec"/>
Largest Angular Structure in source	<input type="text" value="2.00000"/> <input type="text" value="arcsec"/>
Desired sensitivity per pointing	<input type="text" value="920.00000"/> <input type="text" value="uJy"/> equivalent to <input type="text" value="39.623"/> mK
Bandwidth used for Sensitivity	<input type="text" value="User"/> <input type="text" value="Frequency Width"/> <input type="text" value="10.00000"/> <input type="text" value="km/s"/>

Science goal integration time estimate

Time Estimate

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



Simultaneous 12-m and ACA observations  
Are the observations time-constrained?

Check your units here!

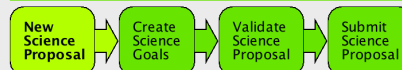
Use the time estimate to see what combinations are possible, what was chosen

## Overview

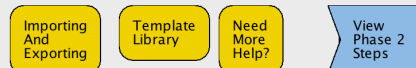
## Contextual Help

- 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



Click on the overview steps to view the contextual help



# Use the time estimate popup to see how your sources will be observed

Note: The time in brackets is that required to reach the sensitivity. Operational requirements often mean that the actual observed time is longer, especially for mosaics. Please see the User Manual for more details.

### Input Parameters

Requested sensitivity 0.9200 mJy  
Bandwidth used for sensitivity 10.000 km/s  
Representative frequency (sky, first source) 112.331 GHz

**Estimated Total time for Science Goal**

**59.43 min**

**Total time needed!**

**The time estimate popup shows what combinations of arrays can be used and how your pointings are clustered**

**We can also see how much time we're spending on overheads and on-source**

Cluster 1

Source Name	RA	Dec	Velocity
NGC4797	12:54:55.1660	27:24:45.550	7654.027 km/s

Possible Configuration Combinations

12-m (1)	12-m (2)	7-m	TP	Nominal Beam(°)	Max expected axial ratio
C43-3	None	No	No	1.345 x 1.737	2.5

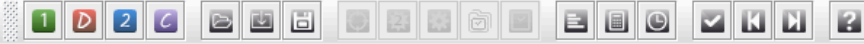
Input Parameters

Precipitable water vapour (all sources)	5.186mm (7th Octile)
---	----------------------

Time required for 12m (1) [C43-3]

Time on source per pointing (first source)	38.81 min [ 38.78 min]
Total number of pointings (all sources)	1
Number of tunings	1
Total time on source	38.81 min [38.78 min]





**Project Structure**

Proposal Program

Unsubmitted Proposal

- Cycle 5 Kelvin Sensitivity Test
  - Proposal
    - Planned Observing
      - ScienceGoal (Range 1.05" .. 3" las)
        - General
        - Field Setup
        - Spectral Setup
        - 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

**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	7m	111.922 arcsec		
Number of Antennas	12m	43	7m	10	TP	3
		ACA 7m configuration	Most compact 12m configuration	Most extended 12m configuration		
Longest baseline		0.049 km	0.161 km	16.197 km		
Synthesized beamsize		14.158 arcsec	3.882 arcsec	0.048 arcsec		
Shortest baseline		0.009 km	0.015 km	0.256 km		
Maximum recoverable scale		75.610 arcsec	33.005 arcsec	0.568 arcsec		

Desired Performance

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

1.05000 arcsec to 3.00000 arcsec

Largest Angular Structure in source 29.00000 arcsec

Desired sensitivity per pointing 0.10000 K equivalent to 721.13 uJy @ 1.05 "

will provide 12.316 mK @ 3.00 "

Bandwidth used for Sensitivity RepresentativeWindowResolution Frequency Width 0.141113 MHz

Science goal integration time estimate Time Estimate

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

Are the observations time-constrained?

Yes  No

Yes  No

**If you have time constraints or want to override the OT's time estimate, you can do so here:**

# Tech Justification

Project Structure

- Unsubmitted Proposal
  - Project
    - Proposal
      - Planned Observing
        - ScienceGoal (12CO (1-0) NGC 4797)
          - General
          - Field Setup
          - Spectral Setup
          - Calibration Setup
          - Control and Performance
          - Technical Justification

Editors

Spectral Spatial **Technical Justification**

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

Sensitivity

Requested RMS over 10.000 km/s is 920.00  $\mu$ Jy For a peak flux density of 4.60 mJy the S/N is 5.0

Achieved RMS over the total 1.875 GHz bandwidth is 41.04  $\mu$ Jy For a continuum flux density of 0.00 Jy, the achieved S/N is 0.0

For a peak line flux of 4.60 mJy, the achieved S/N over 1/3 of the source line width ( 450.00 km/s / 3 = 150.00 km/s ) is 19.4

Line width / bandwidth used for sensitivity ( 450.00 km/s / 10.00 km/s ) = 45.00

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.

Imaging

Requested angular resolution 1.50 arcsec

Requested Largest Angular Scale 2.00 arcsec

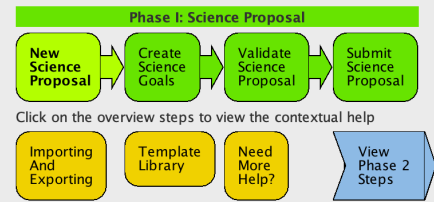
Justify the chosen angular resolution and largest angular scale for the source(s) in this Science Goal

Each technical justification requires its own 50+ word blurb.  
The OT kindly reminds you of your input parameters in each section,  
so read the prompts!

Overview

Contextual Help

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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.



# Tech Justification



File Edit View Tool Search Help

Project Structure

- Proposal
- Program
- Unsubmitted Proposal
- Observing Tool for ALMA Cycle3 Ground
- Proposal
  - Planned Observing
    - ScienceGoal (Science Goal)
      - General
      - Field Setup
      - Spectral Setup
      - Calibration Setup
      - Control and Performance
      - Technical Justification

Editors

Spectral Spatial Technical Justification

Imaging

Requested angular resolution : 1.10 arcsec

Requested largest angular scale : 1.00 arcsec

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

Here would be the standard required justification of the imaging parameters

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

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

Correlator configuration

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

Representative spectral window width : 702.64 km/s

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

Here would be the regular required correlator justification

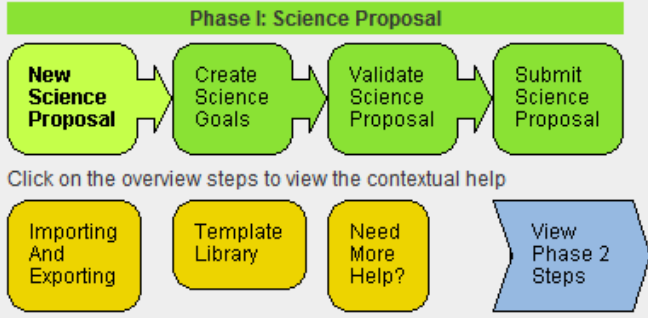
# When the time is ripe ... validate & submit

The screenshot shows the 'Project - Observing Tool for ALMA, version Cycle2Test2' window. The 'File' menu is open, and the 'Validate' option is highlighted with a red arrow. A callout box points to this option with the text: 'Click here to make sure that your project can be validated by the OT. If it doesn't validate the archive will reject it.' The main window displays the 'Editors' section with tabs for 'Spectral', 'Spatial', and 'Project'. Below this is a form with fields for 'Project', 'Assigned Priority', and 'Project Code' (set to 'None Assigned'). A 'Select PL...' button is also visible. The 'Feedback' section at the bottom has tabs for 'Validation', 'Validation History', and 'Log', with a table below it.

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

**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.



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

The screenshot shows the 'Project - Observing Tool for ALMA, version Cycle2Test2' window. The 'File' menu is open, and the 'Validate' option is highlighted with a red arrow. A callout box with a purple background and black text says: 'Once your proposal can validate, submit it to the archive!'. The main window displays the 'Editors' tab with fields for 'Principal Investigator', 'Main Project Information', 'Project', 'Assigned Priority', and 'Project Code'. The 'Project Code' field contains 'None Assigned'. There is also a 'Feedback' section and a 'Suggestion' field.

Once your proposal can validate, submit it to the archive!

**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

# Problems???

The screenshot shows the Observing Tool (2014.6) interface. The main editor window is titled 'ScienceGoal (Science Goal)' and contains several sections: 'Source Coordinates' (System: J2000, RA: 22:02:43.2912, Dec: -42:16:39.978), 'Source Radial Velocity' (0.000 km/s), 'Target Type' (Individual Pointing(s)), and '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%). A red arrow points from the 'Peak Continuum Flux Density per Beam' field to a validation error in the feedback window.

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

**Feedback**

Validation | Validation History | Log

9 errors, 0 warnings

Description	Suggestion
No Principal Investigator specified	Select the top level Project node in the tree and fill in the Principal Investigator field
No scientific category defined	Select Proposal node and set a scientific category
No document found - you must add a Science Case to your proposal	Select the proposal node in the Proposal tab and add your document
Must select a minimum of 1 science keywords	Select the Proposal node and then add some science keywords (minimum 1
Expected peak continuum flux is required for a single continuum	Select the Target Parameters (anti-bllac) in the Science Goal and enter a valid value
Either a continuum or a line polarization percentage is required for	Select the Target Parameters (anti-bllac) in the Science Goal and enter a valid value



# Problems???

The screenshot shows the Observing Tool (2014.6) interface. The main window is titled "ScienceGoal (Science Goal)" and contains various configuration fields for a proposal. A feedback window at the bottom lists 9 errors, with the first error highlighted: "No Principal Investigator specified". A red arrow points from this error to a blue callout box that says "Clicking on a validation error usually takes you to the problem directly". Another red arrow points from the "Expected peak continuum flux is required for a single continuum" error to a field in the "Expected Source Properties" section.

**System:** J2000

**Source Coordinates:** RA: 22:02:43.2912, Dec: -42:16:39.978

**Source Radial Velocity:** 0.000 km/s

**Target Type:** Individual Pointing(s)

**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%

**Feedback:** 9 errors, 0 warnings

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

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

Still have problems?





### Observatory News

Announcement of 3mm VLBI in Cycle 7

Jan 07, 2019

ALMA Cycle 7 Pre-Announcement

Dec 19, 2018

Job Opening: Head of ALMA Department of Science Operations

Dec 05, 2018

More...

### NRAO News

Multi-Messenger Astrophysics: Insights from Combining Gravity and Radio Waves

Feb 16, 2019

ALMA Data Reduction Party

Mar 13, 2019

New Horizons in Planetary Systems

May 13, 2019

More...

### Status

Configuration Schedule  
Cycle 6 Highest Priority Projects

Refereed publications: 1309

Last observed source:

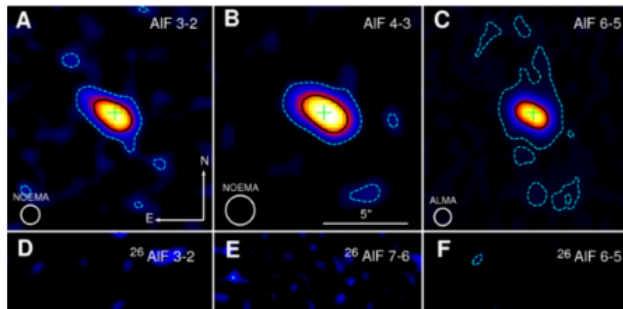
Northeast\_Section\_of\_NGC6334

Current configuration: C43-1

More...

## Science Highlights - An ALMA Detection of the Radioactive Molecule $^{26}\text{AlF}$ in a Stellar Merger Remnant.

[www.almascience.org](http://www.almascience.org)



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

# I could use a hand...

# ALMA

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### Latest Updates

*We've got nothing to display here*





**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.