



MANCHESTER
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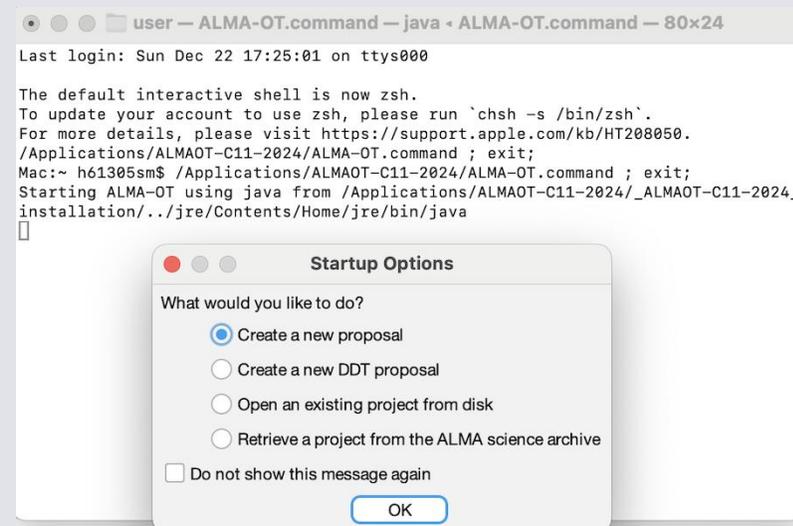
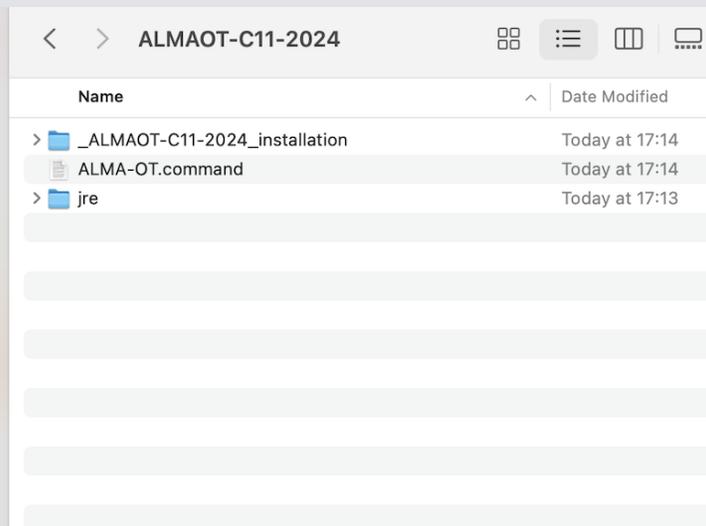
The Observing Tool

Şeyma Mercimek



What is the Observing Tool?

- The ALMA Observing Tool (OT) is a Java desktop application used for the preparation and submission of ALMA Phase 1 proposals and, for those which are accepted, Phase 2 materials (Scheduling Blocks).
- Starting to the OT:



Project >> Proposal >> Planned Observing

ALMA Observing Tool (Cycle 11 (Phase 2 Patch 1)) - Project

File Edit View Tool Search Help Perspective 1

Project Structure < Editors

Proposal Program > Spectral Spatial Project

Insubmitted Proposal

- Project
 - Proposal

Principal Investigator

Main Project Information

Project Assigned Priority Project Code None Assigned

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 tree node and complete the relevant fields.

Phase I: Science Proposal

New Science Proposal → Create Science Goals → Validate Science Proposal → Submit Science Proposal

Click on the overview steps to view the contextual help

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

ALMA Observing Tool (Cycle 11 (Phase 2 Patch 1)) - Proposal

File Edit View Tool Search Help Perspective 1

Project Structure < Editors

Proposal Program > Spectral Spatial Proposal

Insubmitted Proposal

- Star Formation-Test
 - Proposal
 - Planned Observing

Proposal Information

Proposal Title Star Formation-Test

Proposal Cycle 2024.1

Abstract (max. 1200 characters)

Great Proposal

Proposal Type

Regular Target Of Opportunity VLBI

Large Program Phased Array

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

Intermediate-mass star formation
Low-mass star formation
Pre-stellar cores, Infra-Red Dark Clouds (IRDC)
Astrochemistry
Inter-Stellar Medium (ISM)/Molecular clouds

Student project

Joint Proposals

Is this a Joint Proposal? Yes No

Project>>Proposal>>Planned Observing>>Science Case

The screenshot shows the 'Investigators' section of the proposal editor. It features a table with columns for Type, Full name, Email, Affiliation, ALMA ID, Executive, and Reviewer. A single row is visible with the following data:

Type	Full name	Email	Affiliation	ALMA ID	Executive	Reviewer
PI	Not set	Not set	Not set	Not set	Non-ALMA	<input checked="" type="checkbox"/>

Below the table are buttons for 'Select PI', 'Add CoPI', 'Add Col', 'Remove Collaborator', and 'Add from Proposal'. A 'Reviewer Information' dialog is open, showing an 'Investigator search constraints' field with the email 'seyma.mercimek@manchester.ac.uk' and a 'Find Investigators' button. Below the dialog is a table with columns for Full name, Email, Affiliation, and ALMA ID, containing one entry for Seyma Mercimek.

The screenshot shows the 'Science Case' section of the proposal editor. It includes instructions for designating a reviewer and a list of requirements for the science case. A red arrow points from the 'Science Case' section to the URL in the text below.

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 other investigators. A student (without a PhD) may serve as the reviewer only if they are the PI of the proposal and a mentor (with a PhD) is identified. The mentor does not need to be an investigator on the proposal.

Reviewers are requested to:

- Abide by the maximum number of Proposal Sets that are to be assigned for review to any individual (refer to the Proposer's Guide for more information).
- Update their user profiles with combinations of scientific categories and keywords which describe their area(s) of expertise using the new 'Expertise' tab in the link below. Available expertise information will be used in the distribution of proposal assignments.

<https://asa.alma.cl/UserRegistration/secure/updateAccount.jsp>

Reviewer has a PhD? No Yes

Select Mentor

Mentor name

Mentor has a PhD? No Yes

Science Case

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

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

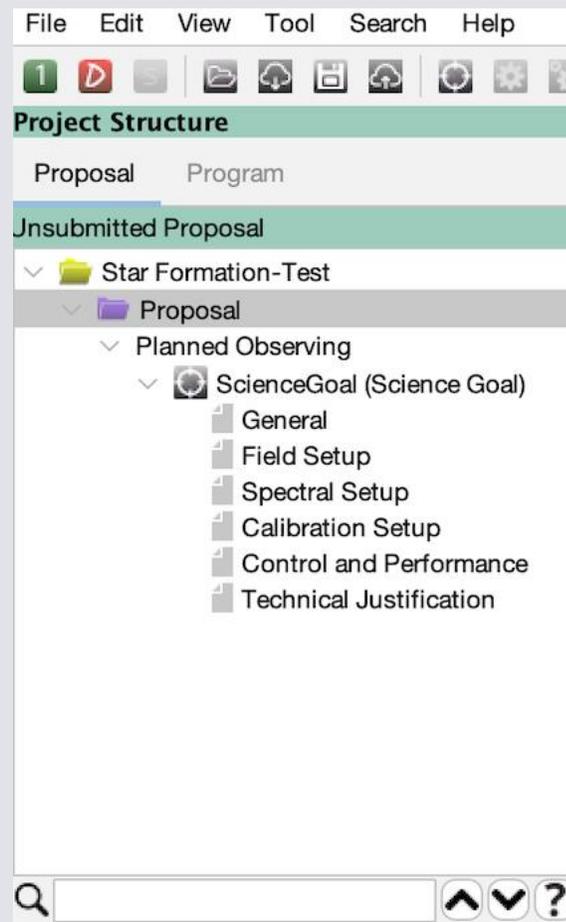
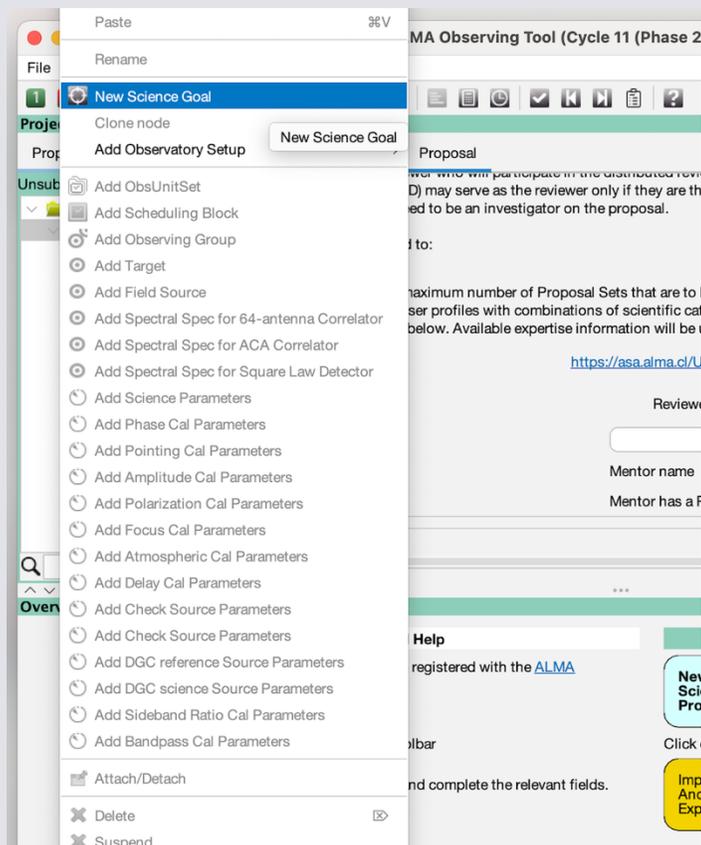
Duplicate observations

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: <https://asa.alma.cl/UserRegistration/secure/updateAccount.jsp>

Proposal template can be downloaded using this:

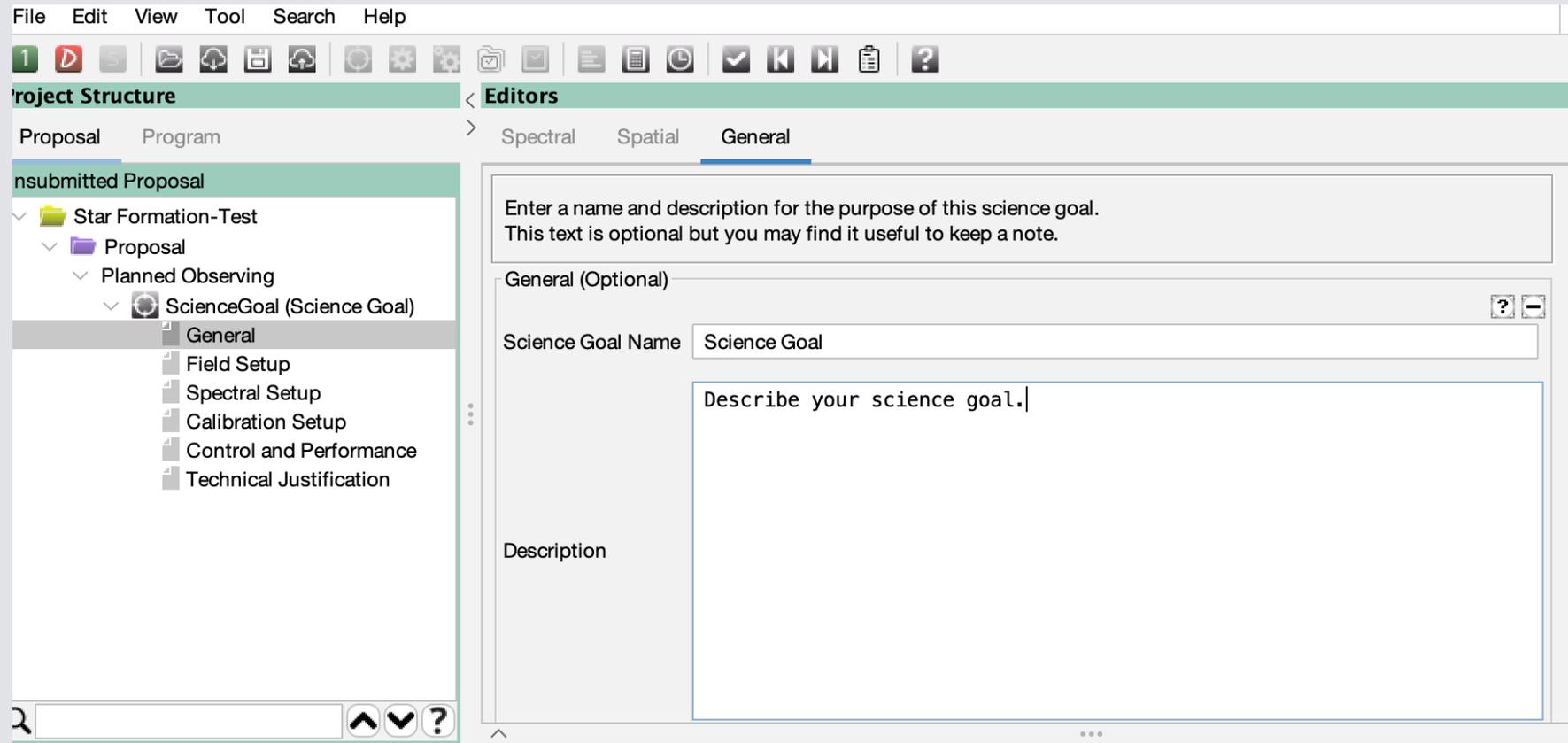
<https://almascience.eso.org/documents-and-tools/proposing/proposal-template>

Project>>Proposal>>Planned Observing>>Science Goal



Science Goal has six section to complete.

Project>>Proposal>>Planned Observing>>Science Goal>>General



Project >> Proposal >> Planned Observing >> Science Goal >> Field Setup

Source Information (W33A):

- Source Name: W33A
- System: ICRS
- RA: 18:14:39.5654
- Dec: -17:52:02.226
- Parallax: 0.39600 mas
- PM RA: -0.36000 mas/yr
- PM Dec: -2.22000 mas/yr
- Source Radial Velocity: 0.000 km/s
- Target Type: Individual Pointing(s)

Expected Source Properties:

- Peak Continuum Flux Density per Synthesized Beam: 1.00000 Jy
- Continuum Linear Polarization: 0.0 per cent
- Continuum Circular Polarization: 0.0 per cent
- Peak Line Flux Density per Synthesized Beam: 1.00000 Jy
- Line Width: 1.00000 km/s
- Line Linear Polarization: 0.0 per cent
- Line Circular Polarization: 0.0 per cent

Field Centre Coordinates:

- Coord Type: Relative
- Array Type: 12m
- Offset Unit: arcsec
- #Pointings: 12m Array 3

RA [arcsec]	Dec [arcsec]
10.00000	10.00000
20.00000	20.00000
30.00000	30.00000

If there are desired pointings..

Field Centre Coordinates:

- Coord Type: Relative Absolute
- Array Type: 12m
- Offset Unit: arcsec
- #Pointings: 12m Array 3

RA [arcsec]	Dec [arcsec]
10.00000	10.00000
20.00000	20.00000
30.00000	30.00000

Phase I: Science Proposal Flowchart:

```

    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

Project>>Proposal>>Planned Observing>>Science Goal>>Spectral Setup 1) Single Continuum

Fraction	Centre Freq (rest, topo)	Centre Freq (sky, topo)	Transition	Bandwidth, Resolution (smoothed)	Spec. Avg.	Representative Window
1(Full)	224.02690 GHz	224.00000 GHz	Single Continuum	1875.000 MHz(2509 km/s), 31.250 MHz(41.824 km/s) (2-bit)	1	<input type="radio"/>
1(Full)	226.02714 GHz	226.00000 GHz	Single Continuum	1875.000 MHz(2487 km/s), 31.250 MHz(41.454 km/s) (2-bit)	1	<input type="radio"/>
1(Full)	240.02882 GHz	240.00000 GHz	Single Continuum	1875.000 MHz(2342 km/s), 31.250 MHz(39.035 km/s) (2-bit)	1	<input type="radio"/>
1(Full)	242.02906 GHz	242.00000 GHz	Single Continuum	1875.000 MHz(2323 km/s), 31.250 MHz(38.713 km/s) (2-bit)	1	<input checked="" type="radio"/>

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 not fall in the centre of the chosen spectral window, its frequency can be changed here. The sky equivalents of the representative frequency are shown in the targets table below.

242.00000 GHz

Project >> Proposal >> Planned Observing >> Science Goal >> Spectral Setup 2) Spectral Line

Adding spectral windows either manually or from Splatalogue.

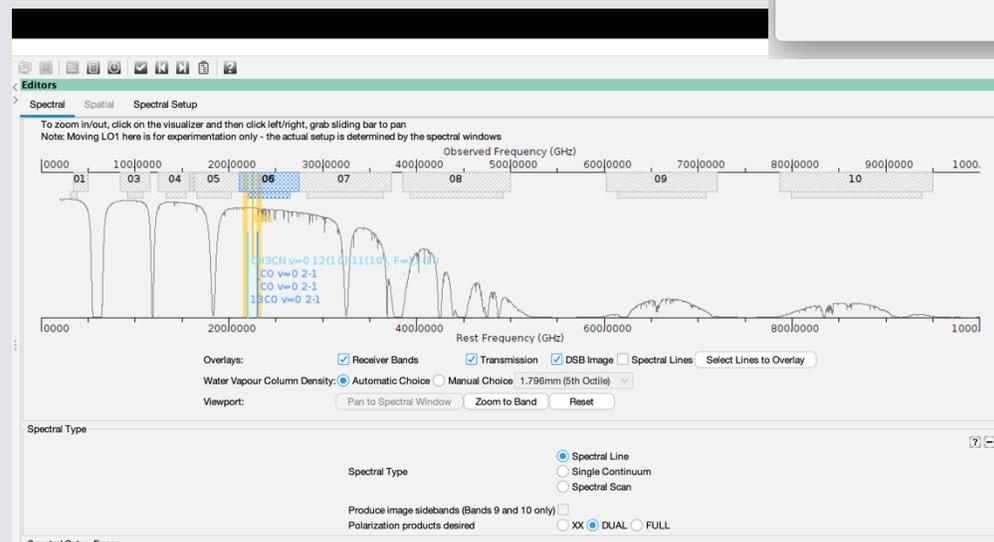
The screenshot shows the 'Spectral Setup' window with a table of spectral windows. A red box highlights the buttons 'Add spectral window centred on a spectral line' and 'Add spectral window manually'.

Fraction	Centre Freq (rest, lsrk)	Centre Freq (sky, bar)	Transition	Bandwidth, Resolution (smoothed)	Spec. Avg.	Representative Window
1(Full)	231.01742 GHz	231.00000 GHz	CO v=0-2-1	1875.000 MHz(2433 km/s), 31.250 MHz(40.556 km/s) (2-bit)	1	
1(Full)	230.53800 GHz	230.52062 GHz	CO v=0-2-1	117.188 MHz(152 km/s), 70.557 kHz(0.092 km/s) (2-bit)	2	
1(Full)	220.39868 GHz	220.38207 GHz	13CO v=0-2-1	58.594 MHz(80 km/s), 141.113 kHz(0.192 km/s) (4-bit)	2	
1(Full)	220.32385 GHz	220.30724 GHz	CH3CN v=0 12(10)-11(10)	937.500 MHz(1276 km/s), 564.453 kHz(0.768 km/s) (2-bit)	2	

The screenshot shows the 'Create spectral windows centred on spectral lines' dialog box. It features a search bar, a list of transitions with columns for Transition, Description, Rest Frequency, Sky Frequency, Upper-state Energy, Lovas Intensity, Sij μ², and Catalog. The 'Filtering unobservable lines' option is selected.

Transition	Description	Rest Frequency	Sky Frequency	Upper-state Energy	Lovas Intensity	Sij μ²	Catalog
NHD2 5(3,3)0a-5(2,3)0a	Ammonia	211.056848 GHz	211.040934 GHz	237.078 K		4.636 D ²	Offline
CH3OH v=1-0 12(-3,10)-13(2,11)	Methanol	211.095149 GHz	211.079233 GHz	243.738 K		0.021 D ²	Offline
H(4) 5	Hydrogen Recombination Line	211.110278 GHz	211.094360 GHz	0 yK			Offline
c-C3H 5(1,5)-4(1,4), J=11/2-9/2, F=6-5	Cyclopropenylidyne	211.117576 GHz	211.101658 GHz	29.183 K	1.13	32.461 D ²	Offline
c-C3H 5(1,5)-4(1,4), J=11/2-9/2, F=5-4	Cyclopropenylidyne	211.117834 GHz	211.101916 GHz	29.183 K	1.13	26.956 D ²	Offline
He(4) 5	Helium Recombination Line	211.196306 GHz	211.180382 GHz	0 yK			Offline
H2CO 3(1,3)-2(1,2)	Formaldehyde	211.211468 GHz	211.195543 GHz	32.059 K		1.9	43.489 D ²
CH3CN v=0 12(10)-11(10), F=1-0	Methyl Cyanide	211.272443 GHz	211.256513 GHz	2597.746 K		0.109 D ²	Offline
CH3CN v=0 12(10)-11(10), F=1-0	Methyl Cyanide	211.368329 GHz	211.352392 GHz	1172.411 K		0.001 D ²	Offline
CH3CN v=0 12(10)-11(10), F=1-0	Methyl Cyanide	211.407295 GHz	211.391355 GHz	731.742 K		0.005 D ²	Offline
29SiO v=2 5-4	Silicon Monoxide	211.425983 GHz	211.410042 GHz	3529.75 K		49.218 D ²	Offline
H213CO 20(3,17)-21(1,20)	Formaldehyde	211.435562 GHz	211.419620 GHz	825.618 K		0.298 D ²	Offline
CH3OH v=1-0 26(-2,24)-25(-1,24)	Methanol	211.451412 GHz	211.435469 GHz	1175.338 K		3.063 D ²	Offline
NH2D 19(16,4)0s-20(14,7)0s	Ammonia	211.516970 GHz	211.501022 GHz	3171.339 K		0 D ²	Offline
CH3OH v=1-0 21(-8,13)-22(-7,15)	Methanol	211.669260 GHz	211.653300 GHz	856.816 K		4.746 D ²	Offline
14CO 2-1	Carbon Monoxide	211.738511 GHz	211.722546 GHz	15.242 K		0.025 D ²	Offline
NH2D 19(16,3)0s-20(14,6)0s	Ammonia	211.768454 GHz	211.752487 GHz	4467.838 K		0 D ²	Offline
NH2D 19(16,4)0s-20(14,7)0s	Ammonia	211.768767 GHz	211.752800 GHz	4467.838 K		0 D ²	Offline
CH3OH v=1-0 16(2,15)-15(1,14) -- 30SiO v=0 5-4	Methanol	211.803245 GHz	211.787275 GHz	613.359 K		0.6	9.09 D ²
CH3OH v=1-0 16(2,15)-15(1,14) -- 30SiO v=0 5-4	Silicon Monoxide	211.853044 GHz	211.837070 GHz	30.503 K		4	47.99 D ²
13CH3OH v=1-0 12(-1,12)-11(2,9)	Methanol	212.020997 GHz	212.005011 GHz	182.107 K		0.04 D ²	Offline
CH3CN v=0 12(10)-11(10), F=1-0	Methyl Cyanide	212.097951 GHz	212.081959 GHz	2655.975 K		0.114 D ²	Offline
D13CO 3-2	Formylium	212.194490 GHz	212.178491 GHz	20.367 K		45.63 D ²	Offline

Selected spectral windows can be seen in the observed frequency range in the chosen ALMA band.



Project >> Proposal >> Planned Observing >> Science Goal >> Spectral Setup 3) Spectral Scan

Spectral Spatial **Spectral Setup**

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 Scan ?

Requested start frequency (sky) GHz

Requested end frequency (sky) GHz

Requested range (rest)

Achieved scan range (sky)

Bandwidth, Resolution (Hanning smoothed)

Spectral averaging

Representative frequency (sky) GHz

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)	SPW 3 (GHz)	SPW 4 (GHz)
1	218.9375 GHz	220.6406 GHz	234.9375 GHz	236.6406 GHz
2	222.3438 GHz	224.0469 GHz	238.3438 GHz	240.0469 GHz
3	225.7500 GHz	227.4531 GHz	241.7500 GHz	243.4531 GHz
4	229.1563 GHz	230.8594 GHz	245.1563 GHz	246.8594 GHz

Basically specifying frequency range

Project>>Proposal>>Planned Observing>>Science Goal>>Calibration Setup

The screenshot shows a software interface with a left-hand navigation pane and a main content area. The navigation pane is titled "Project Structure" and shows a tree view under "Insubmitted Proposal":

- Star Formation-Test
 - Proposal
 - Planned Observing
 - ScienceGoal (Science Goal)
 - General
 - Field Setup
 - Spectral Setup
 - Calibration Setup (highlighted)
 - Control and Performance
 - Technical Justification

The main content area is titled "Editors" and has tabs for "Spectral", "Spatial", and "Calibration Setup" (which is active). The "Calibration Setup" tab contains the following sections:

- Select calibration strategy.**
- Goal Calibrators** (with a help icon):
 - 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
- Astrometry** (with a help icon):
 - 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
- DGC Override (observatory-use only)** (with help and add icons)

Most of the time, the default option is chosen.

However, in the case of increased flux calibration, the second option can be chosen.

Project >> Proposal >> Planned Observing >> Science Goal >> Control and Performance

Decide the best observation features related to your scientific content.

The OT will give you details on the estimated observation.

Angular resolution:
-Giving range for the angular resolution can be the best option if you do not need to specify.

-Goals for source detection can have "any" option.

For extended emission:
The source emission when estimating the peak surface brightness.

Editors
Spectral Spatial **Control and Performance**

Antenna Beamsize (1.13 * λ / D) 12m 24.821 arcsec 7m 42.550 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	5.377 arcsec	1.364 arcsec	0.023 arcsec
Shortest baseline	0.009 km	0.015 km	0.256 km
Maximum recoverable scale	28.509 arcsec	12.174 arcsec	0.211 arcsec

Desired Performance

Desired Angular Resolution (Synthesized Beam) Single Range Any Standalone ACA
1.00000 arcsec

Largest Angular Structure in source 20.0 arcsec

Desired sensitivity per pointing 1.00000 Jy equivalent to 22.215 K

Bandwidth used for Sensitivity LargestWindowBandWidth Frequency Width 1.875000 GHz

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

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

Simultaneous 12-m and ACA observations Yes No

Are the observations time-constrained? Yes No

Planning and Time Estimate

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

Input Parameters

Requested sensitivity	1000 mJy
Bandwidth used for sensitivity	1.875 GHz
Representative frequency (sky, first source)	234.602 GHz

Estimated Total time for Science Goal **2.95 h**

Cluster 1

Source Name	RA	Dec	Velocity
W33A	18:14:39.5654	-17:52:02.226	36.000 km/s

Possible Configuration Combinations

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

Input Parameters

Precipitable water vapour (all sources)	1.796mm (5th Octile)
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Time required for 12m (1) [C-3]

Time on source per pointing (first source)	52.38 s [0.00 s]
Total number of pointings (all sources)	3
Number of tunings	5
Total time on source	13.10 min [50.90 us]
Total calibration time	44.37 min
Other overheads	2.42 min
Total time for 1 SB execution	59.88 min
Number of SB executions	1
Total time to complete SB	59.88 min

Calibration Breakdown per SB execution

10 x Phase	5.00 min
2 x Pointing	4.00 min
5 x Amplitude/bandpass	25.00 min
6 x Atmospheric	4.00 min
Calibration overheads	6.37 min

Close

Project>>Proposal>>Planned Observing>>Science Goal>>Technical Justification and Submit!

The screenshot shows the 'Technical Justification' section of the ALMA software. The interface includes a menu bar (File, Edit, View, Tool, Search, Help) and a toolbar. The 'Project Structure' pane on the left shows the hierarchy: Star Formation-Test > Proposal > Planned Observing > ScienceGoal (Science Goal) > Technical Justification. The main window contains the following text and input fields:

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

Sensitivity

Requested RMS over 1.875 GHz is 1.00 Jy For a peak flux density of 1.00 Jy, the S/N is 1.0

Achieved RMS over the total 33.203 GHz bandwidth is 60.54 uJy For a continuum flux density of 1.00 Jy, the achieved S/N is 16517.1

For a peak line flux of 1.00 Jy, the achieved S/N over 1/3 of the source line width (1000.00 m/s / 3 = 333.33 m/s) is 46.3

Note that one or more of the S/N estimates are < 3. Please double-check the RMS and/or line fluxes entered and/or address the issue below.

Line width / bandwidth used for sensitivity (1000.00 m/s / 2396.02 km/s) = 0.0004

Note that the bandwidth used for sensitivity is larger than 1/3 of the linewidth.
The S/N achieved for a resolution element that allows the line to be resolved will be lower than that reported.

Spectral Dynamic Range (continuum flux / line rms): 46.30

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.

... Fill all sections

Imaging

Requested angular resolution 1.00 arcsec

Requested Largest Angular Scale 20.00 arcsec

The screenshot shows the 'File' menu of the ALMA software. The menu items are:

- New Proposal ⌘N
- New DDT Proposal ⌘D
- New Supplemental Call Proposal
- Open Project >
- Open Project as New Proposal >
- Save ⌘S
- Save As
- Show ALMA Template Library
- Use Project as Template >
- Validate ⌘L
- Submit Project
- Preferences ⌘P
- Save Preferences
- Quit