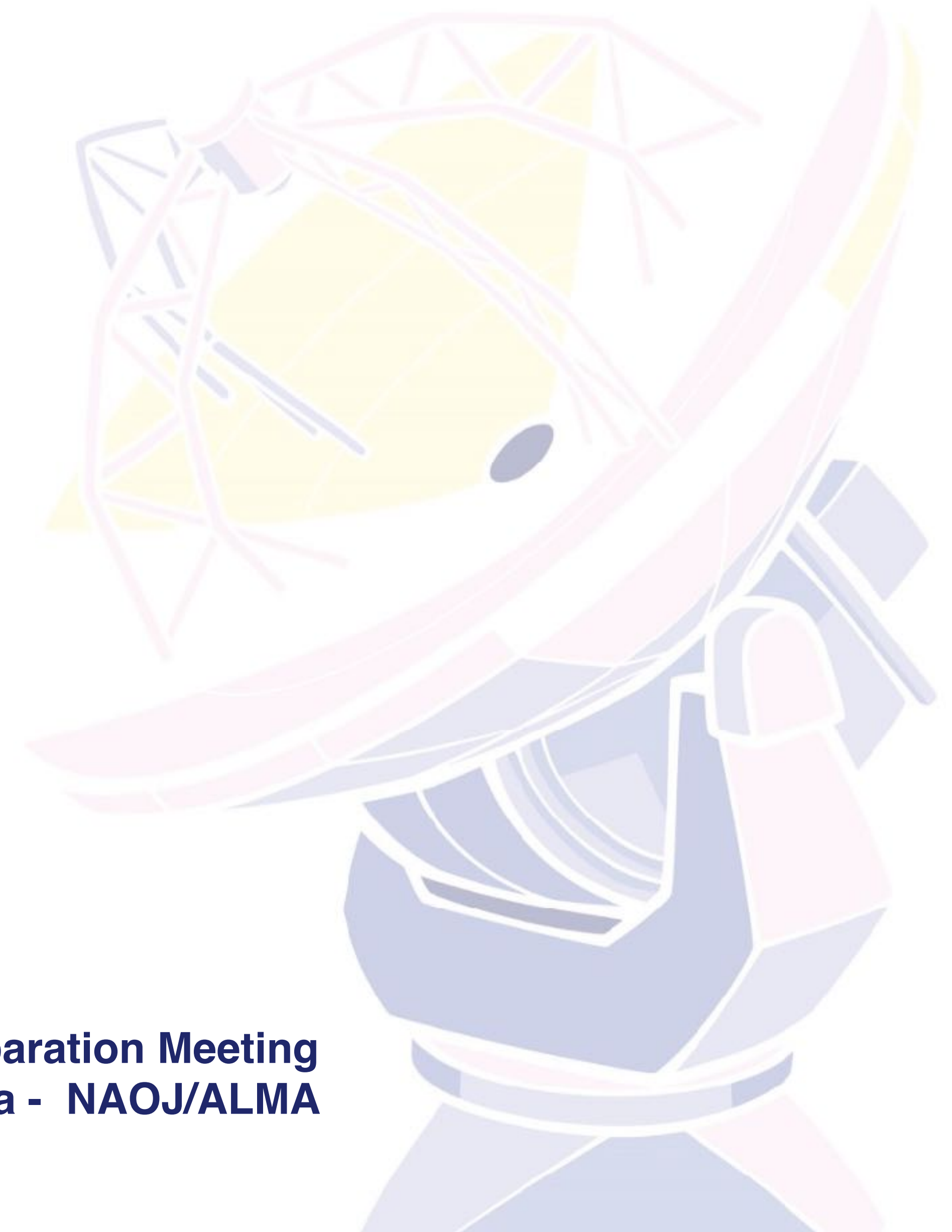


Observing Tool

Quick guide and new features - Cycle 10

ALMA Cycle 10 Proposal Preparation Meeting
Jorge A. Zavala - NAOJ/ALMA

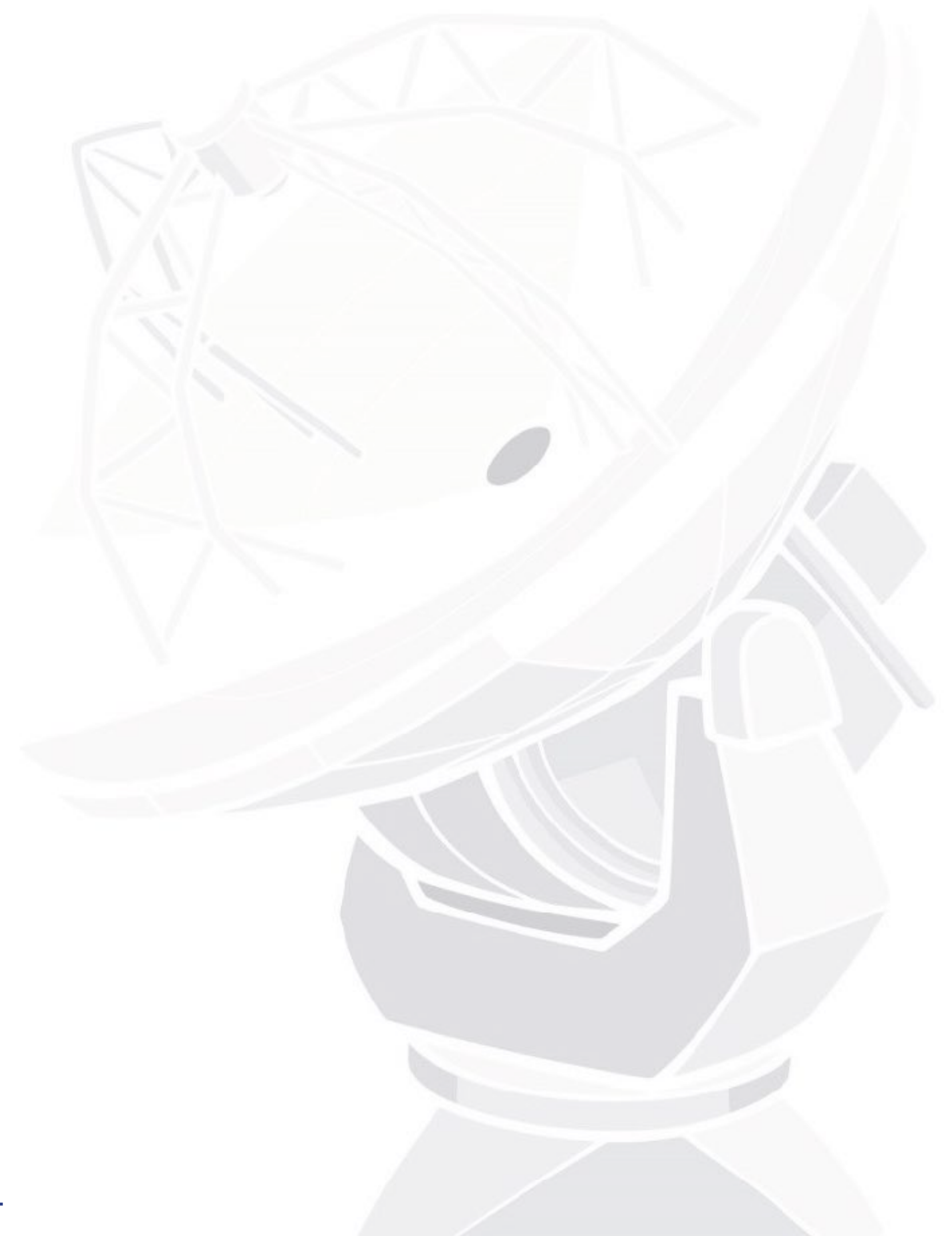


● Note that in order to submit proposals you will have to **register** with the ALMA Science Portal beforehand

● Proposers **must** use the appropriate version of the OT for the cycle 10



<https://almascience.nao.ac.jp/proposing/observing-tool>





Observing Tool

The ALMA Observing Tool (OT) is a Java desktop application used for the preparation and submission of proposals (Scheduling Blocks). It is also used for preparing and submitting Director's Discretionary Time (DDT) proposals and Science and Data Observing Time (SDOT) proposals. The OT is configured for the present capabilities of ALMA as described in the [Cycle 9 Call For Proposals](#). Note that the OT is not available for Cycle 10.

Download & Installation

The OT should run on all common operating systems and depends on a version of Java being available. In previous versions of the OT, a version of Java was installed, but the Cycle 9 version of the OT will come with its own version of Java 11. Since Java 11 does not include Web Start, this version of the OT is no longer available. The Cycle 9 OT can be downloaded from the [ALMA Observing Tool](#) page.

It is recommended that the OT be installed using the ALMA **OT Installer**. This uses a modern graphical installer that allows users to change various settings from their defaults, including the amount of memory the OT may use. The installation will produce an executable file. If the OT is already installed, the installation of the tool are no longer possible, but the OT will detect if an update is available at start-up and inform the user.

The **tarball** version must be installed manually and the instructions for doing this have not changed.

Installer

Documentation

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

- If you are a novice OT user you should start with the [OT Quickstart Guide](#), which takes you through the basic steps of ALMA proposal preparation.
- Audio-visual illustrations of different aspects of the OT can be found in the [OT video tutorials](#). These are recommended for novices and advanced users alike.
- More in-depth information on the OT can be found in the [User Manual](#), while concise explanations of all fields and menu items in the OT are given in the [Reference Manual](#). These two documents are also available within the OT under the Help menu.

Troubleshooting

If you have problems with the OT, particularly with installation and/or startup, please see the [troubleshooting page](#). A list of currently known bugs, their status and possible workarounds can be found on the regularly updated [known OT Issues](#) page. A further source of information is the [OT section of the ALMA Helpdesk Knowledgebase](#) - this contains a number of articles that deal with frequently-asked questions. After exploring these resources, if confusion over some aspect of the OT remains, or if a previously unidentified bug has been uncovered, please file a [Helpdesk ticket](#).

Observing Tool

Sensitivity Calculator

CASA Simulator

Observation Support Tool

Splatalogue

Science Ready Data Products

Toyama Microwave Atlas

Community-Developed

EU ARC network

Staff Tools

Japanese Virtual Obs.

Solar Ephemeris



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



1 What's new in Cycle 10?

The most important changes to the OT since the last release are the following.

- **New capabilities:**

- Joint Proposals with other facilities, including JWST, VLA and VLT (see Sec. 4).
 - Band 1 on the 12-m Array and for Stokes I only (no Stokes Q/U/V). This is anticipated to be available from March 2024.
 - Spectral scans that include Total Power observations (see Sec. 7.3).
 - 4x4-bit spectral modes for improved sensitivity on the 12-m Array (dual polarization, see Sec. 7.1).
 - Solar observations in full polarization in Band 3 using only the 12-m Array (see Sec. 7).
 - Phased array mode in Bands 1, 3, 6 and 7 (see Sec. 4).
 - VLBI in Bands 1, 3, 6 and 7, including flexible tuning for spectral lines (see Sec. 4 and 6).
- Band-to-band phase calibration will be available for high frequency observations on both the 7-m Array and all 12-m Array configurations. The decision as to whether band-to-band observing is required is now based on a search of the calibrator catalogue (see Sec. 7).
 - A warning will be triggered by the OT if line width entered by the PI in the Field Setup is much larger than the requested Spectral Resolution.
 - A new text box in the Technical Justification section is presented whenever the proposed observations require either high spectral dynamic range or high continuum/line imaging dynamic range.
 - Source names that are composed of only numbers are no longer allowed.
 - The standard Ctrl-Z (undo) and Ctrl-Y (redo) functionality are now available in several OT fields.



Starting the OT....

ALMA Observing Tool (Cycle 10 (Phase1)) - Project

File Edit View Tool Search Help

Perspective 1

Project Structure

Editors

Proposal Program

Spectral Spatial Proposal

Unsubmitted Proposal

Project

Proposal

Planned Observing

Proposal Information

Proposal Title

Proposal Cycle

Abstract

Proposal Type

Scientific Category

Please select one or two keywords

Student project

2023.1

Regular

Large Program

Target Of Opportunity

Phased Array

VLBI

Cosmology and the High Redshift Universe

Circumstellar disks, exoplanets and the solar system

Galaxies and Galactic Nuclei

Stellar Evolution and the Sun

ISM, star formation and astrochemistry

Joint Proposals

Is this a Joint Proposal?

Investigators

Yes

No

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

ALMA Observing Tool (Cycle 10 (Phase1)) - Project

File Edit View Tool Search Help

Perspective 1

Project Structure

Editors

Proposal Program

Spectral Spatial Proposal

Unsubmitted Proposal

Project

Proposal

Planned Observing

Proposal Information

Proposal Title

Proposal Cycle

Abstract

Proposal Type

Scientific Category

Please select one or two keywords

Student project

2023.1

Regular

Large Program

Target Of Opportunity

Phased Array

VLBI

Cosmology and the High Redshift Universe

Circumstellar disks, exoplanets and the solar system

Galaxies and Galactic Nuclei

Stellar Evolution and the Sun

ISM, star formation and astrochemistry

Joint Proposals

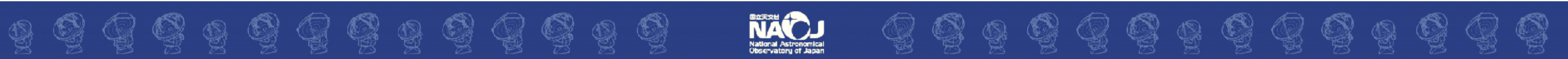
Is this a Joint Proposal?

Investigators

Yes

No

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



Starting the OT....

ALMA Observing Tool (Cycle 10 (Phase1)) - Project

File Edit View Tool Search Help

Perspective 1

Project Structure

Proposal Program

Unsubmitted Proposal

Project

Proposal

Planned Observing

Editors

Spectral Spatial Proposal

Joint Proposals with other facilities, including JWST, VLA, and VLT will be a in Cycle 10. Joint Proposals are dedicated to scientific projects that require obser with two or more observatories to achieve their scientific goals. A Joint Prop submitted to a single observatory, called the main observatory, for scientific peer which allows one observatory to award observing time on multiple telescopes. Th observatory is defined as the observatory requesting the most observing time. In t of ALMA, this is the amount of tine on the 12-m Array, or the 7-m Array for AC projects. Proposal with ALMA as the main and as a partener observatory can be with the OT; the first can be submitted only during the Call for Proposals, w latter at any time of the year. VLBI observations, Phased Array proposals and Programs are not allowed for Joint Proposal when ALMA is a partner observato

NEW

exoplanets and the solar system

Stellar Evolution and the Sun

Please select one or two keywords

Student project

Joint Proposals

Is this a Joint Proposal? Yes No

Investigators

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

Starting the OT... (a joint proposal?)

ALMA Observing Tool (Cycle 10 (Phase1)) - Project

File Edit View Tool Search Help

Perspective 1

Project Structure

Editors

Proposal Program

Spectral Spatial Proposal

Unsubmitted Proposal

Project

Proposal

Planned Observing

Proposal Information

Proposal Title

Project Code

Joint Proposals

Is this a Joint Proposal? ☒ Yes ☐ No

Type of Joint Proposal ☒ Main ☐ Partner

Observatory	Project Code	Requested Time
-------------	--------------	----------------

Add Partner Observatory

Remove Partner Observatory

Type of Joint Proposal ☒ Main ☐ Partner

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

Add Partner Observatory

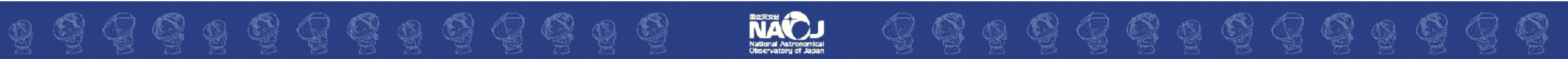
Remove Partner Observatory

Joint Proposals

Is this a Joint Proposal? ☐ Yes ☒ No

Investigators

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



Proposal editor...

FileEditViewToolSearchHelp

Perspective 1

Project Structure

Proposal

Program

Unsubmitted Proposal

Project

Proposal

Planned Observing

Editors

Spectral

Spatial

Proposal

Proposal Information

Proposal Title

Proposal Cycle

Abstract

Proposal Type

Scientific Category

Please select one or two keywords

Student project

2022.1

Regular

Large Program

Target Of Opportunity

Phased Array

VLBI

Cosmology and the High Redshift Universe

Circumstellar disks, exoplanets and the solar system

Galaxies and Galactic Nuclei

Stellar Evolution and the Sun

ISM, star formation and astrochemistry

☐

Investigators

Feedback

Validation

Validation History

Log



Proposal editor...

File Edit View Tool Search Help

1 [Icons]

Project Structure

Proposal Program

Unsubmitted Proposal

- Project
 - Proposal
 - Planned Observing

Editors

Spectral Spatial **Proposal**

Proposal Information

Proposal Title

Proposal Cycle 2022.1

Abstract (max. 1200 characters)

Proposal Type

- ☐ Regular
- ☐ Large Program
- ☐ Target Of Opportunity
- ☐ Phased Array
- ☒ VLBI

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 ☐

Investigators

Feedback

Validation Validation History Log

NEW

VLBI proposals use ALMA in conjunction with VLBI telescopes around the world and more flexible tunings are available starting from Cycle 10. They have a special VLBI proposal interface at the Science Goal level and the spectral setup is limited to pre-defined continuum and spectral-line observing setups in Bands 1, 3, 6, and 7. For line-observing, In Band 1 and 3 the first baseband's bandwidth will be fixed to 1875 MHz and only onw spectral window will be allowed. The same holds for Band 6 and 7, but such requirements are not necessarily bound to the first baseband. Users should normally select the system-defined calibration option as all necessary calibrations will be carried out by the observatory. Unlike standard proposals, VLBI observations require a time estimate (including overheads, which make up ~50 per cent of the expected time on source) rather than a sensitivity to be entered. Note that ALMA VLBI programs must also have been submitted to the appropriate VLBI network by their independent deadline.



Proposal editor...

File Edit View Tool Search Help

1 [Icons]

Project Structure

Proposal Program

Unsubmitted Proposal

- Project
 - Proposal
 - Planned Observing

Editors

Spectral Spatial Proposal

Proposal Information

Proposal Title

Proposal Cycle 2022.1

Abstract (max. 1200 characters)

Proposal Type

- ☐ Regular
- ☐ Large Program
- ☐ Target Of Opportunity
- ☐ VLBI
- ☐ Phased Array

Scientific Category

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

Student project ☐

Investigators

Feedback

Validation Validation History Log

NEW

VLBI proposals use ALMA in conjunction with VLBI telescopes around the world and more flexible tunings are available starting from Cycle 10. They have a special VLBI proposal interface at the Science Goal level and the spectral setup is limited to pre-defined continuum and spectral-line observing setups in Bands 1, 3, 6, and 7. For line-observing, In Band 1 and 3 the first baseband's bandwidth will be fixed to 1875 MHz and only one spectral window will be allowed. The same holds for Band 6 and 7, but such requirements are not necessarily bound to the first baseband. Users should normally select the system-defined calibration option as all necessary calibrations will be carried out by the observatory. Unlike standard proposals, VLBI observations require a time estimate (including overheads, which make up ~50 per cent of the expected time on source) rather than a sensitivity to be entered. Note that ALMA VLBI programs must also have been submitted to the appropriate VLBI network by their independent deadline.



Phased array observations are now possible in Band 1, 3, 6 and 7



Reviewers

Maximum 5 sets can be assigned to a reviewer

Reviewable expertise information will be used in the distribution of proposal assignments.

Reviewer has a PhD? ☒ No ☐ Yes

Select Mentor

Mentor name

Mentor has a PhD? ☐ No ☒ Yes

Proposal editor...



The fonts used in the PDFs must have a minimum size of 12 points. The OT will issue an **error** if >15 per cent of the text is smaller than 12 points. Be aware that an image cropped from another PDF may contain text that lay outside of the cropped area, even though this is not displayed.

Reviewers

Proposal review for proposals that are neither Large Programs or ToOs, will now be done using distributed peer review i.e. the reviewing will be done by the PIs submitting such proposals. Unless Large Program is selected, the OT will require that one of the investigators be selected as a proposal reviewer. If this person is the PI and does not have a PhD, a mentor can be named who would assist the PI with the reviewing.

Maximum 5 sets can be assigned to a reviewer

File Edit View Tool Search Help

1 [Icons]

Project Structure

Proposal Program

Unsubmitted Proposal

Project

Proposal

Planned Observing

ScienceGoal (Science Goal)

General

Editors

Spectral Spatial Proposal

Investigators

Type	Full name	Email	Affiliation	ALMA ID	Executive	Reviewer
PI	Jorge Zavala	jorge.zavala@nao.ac.jp	ALMA Project Office, Nation...	zavala	East Asia	<input checked="" type="checkbox"/>

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 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 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 Misato Fukagawa

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.)

Attach Detach View

Proposal editor...

Create new Science Goal

File Edit View Tool Search Help

1 [Icons]

Perspective 1

Project Structure

Proposal Program

Unsubmitted Proposal

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

Editors

Spectral Spatial Proposal

Proposal Information

Proposal Title

Proposal Cycle 2022.1

Abstract (max. 1200 characters)

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

Student project ☐

Investigators

Feedback

Validation Validation History Log



Field setup...

File Edit View Tool Search Help

Perspective 1

Project Structure

- Unsubmitted Proposal
 - Cycle 5 Quickstart Guide
 - Proposal
 - Planned Observing
 - ScienceGoal (Science Goal)
 - General
 - Field Setup**
 - Spectral Setup
 - Calibration Setup
 - Control and Performance
 - Technical Justification

Editors

Spectral Spatial Field Setup

Spatial Im

Helix nebula

Source

Source Name Helix nebula

Choose a Solar System Object? ☐ Name of object Unspecified

System ICRS Sexagesimal display? ☒

Source Coordinates

RA 00:00:00.0000

Dec 00:00:00.0000

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 Polarization Percentage 0.0 per cent

Peak Line Flux Density per Synthesized Beam 0.00000 Jy

Line Width 0.00000 km/s

Line Polarization Percentage 0.0 per cent

Coord Type ☒ Relative ☐ Absolute

Offset Unit arcsec

#Pointings 1

RA [arcsec]	Dec [arcsec]
0.00000	0.00000

Add Delete Import Export

Load from File... Export to File... Clone Source

Resolve source properties from SIMBAD

Name Resolver Results

cdsws.u-strasbg.fr (SIMBAD) found 1 match for the object 'Helix nebula'.

Name / Alias	Position		Proper Motion		Velocity
	RA	Dec	RA	Dec	
NGC 7293	22:29:38.5410	-20:50:13.640	32 mas/yr	-5 mas/yr	-15000 m/s

Cancel Select

Expected source properties

Clone the current source

Field setup...



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.



The frequencies in the spectral setup might change if you modify the velocity afterwards. Please, always double check the final spectral setup (future changes are hard to implement)

the velocity afterwards. Please, always double check the final spectral setup (future changes are hard to implement)

in a Science Goal, the OT uses a clustering algorithm to group sources within 10° into sub-arrays (SBs) (1° for long-baseline SGs) to allow good phase calibration of all sources. Information about the different source clusters can be found in the *Planning and Time Estimate* pop-up

Within a Science Goal, the OT uses a clustering algorithm to group sources within 10° into separate SBs (1° for long-baseline SGs) to allow good phase calibration of all sources. Information on the different source clusters can be found in the *Planning and Time Estimate* pop-up available from the *Control and Performance* node. A source cluster can contain a maximum of 150 pointings.



Field setup (VLBI)...

Project Structure

Proposal

Program

Unsubmitted Proposal

Project

Proposal

Planned Observing

ScienceGoal (Science Goal)

General

Field Setup

Spectral Setup

Calibration Setup

Control and Performance

Technical Justification

Editors

Spectral

Spatial

Field Setup

Spatial Image

SinglePoint

Source

NEW

The only source property required for VLBI observing is whether the source is so faint in single continuum (<0.35 Jy in band 1, <0.5 Jy in band 3 and 6, <0.57 Jy in Band 7), or in line observing (check the [Proposer's Guide](#) for the line flux limits) that passive phasing will be required. In this mode, the phasing up of the antennas in the 12-m Array is performed on a nearby calibrator and these then retained when observing the science target. This mode is enforced if the Phased Array is requested. If selected, it will be necessary to define a **fixed phase calibrator** in the *Calibration Setup*.

T_1

Source

Source Name

T_1

Resolve

Choose a Solar System Object?

☐

Name of object

Unspecified

System

ICRS

Sexagesimal display?

☒

Parallax

0.00000

mas

PM RA

0.00000

mas/yr

PM Dec

0.00000

mas/yr

Source Coordinates

RA

10:00:00.0000

Dec

-10:00:00.000

Source Radial Velocity

10.000

km/s

lsrk

z

0.000033358

Doppler Type

RADIO

Target Type

☒ Individual Pointing(s)

☐ 1 Rectangular Field

Expected Source Properties

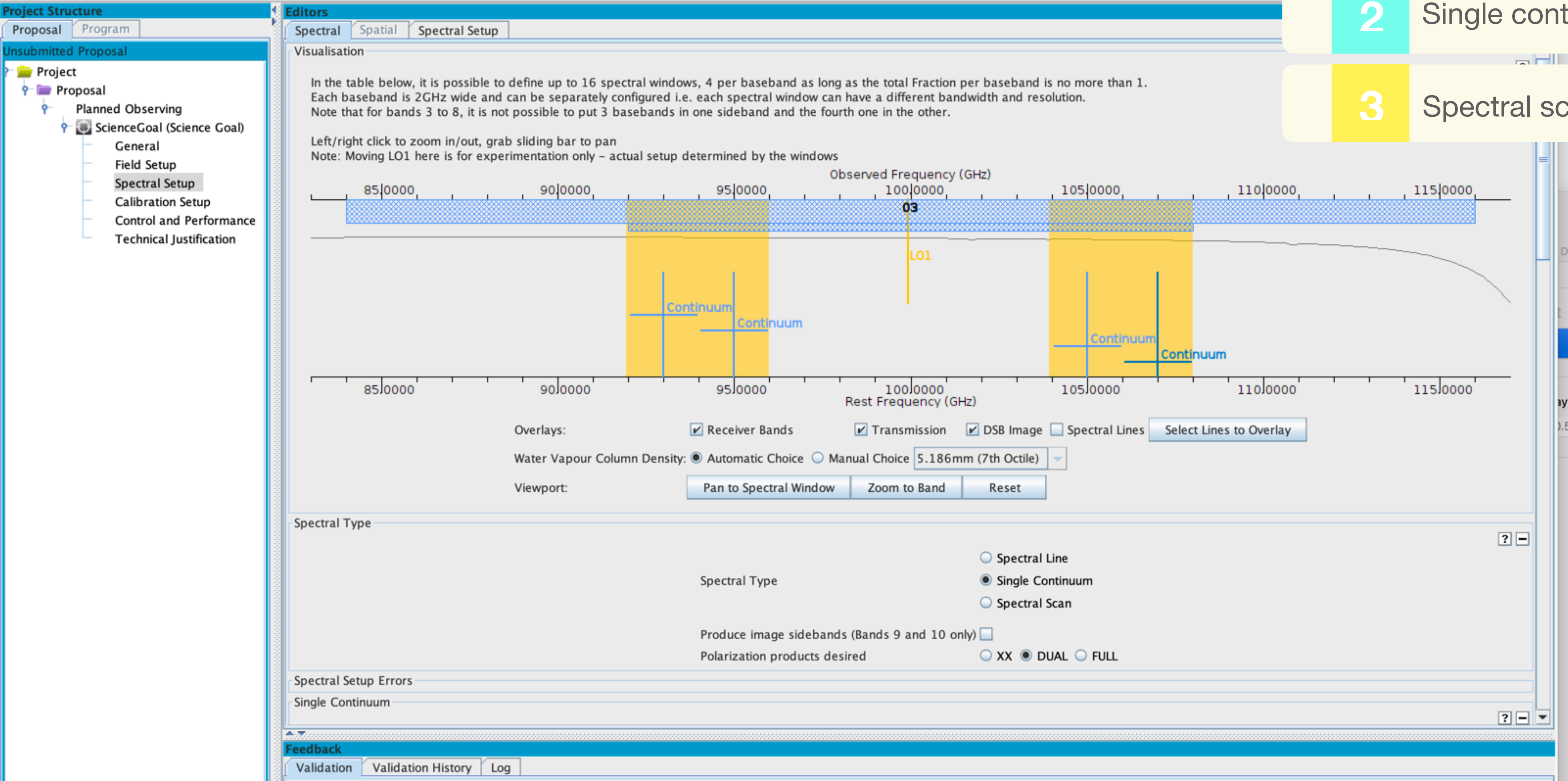
☐ Passive phasing is required (science target < 0.5 Jy)

Spectral setup...

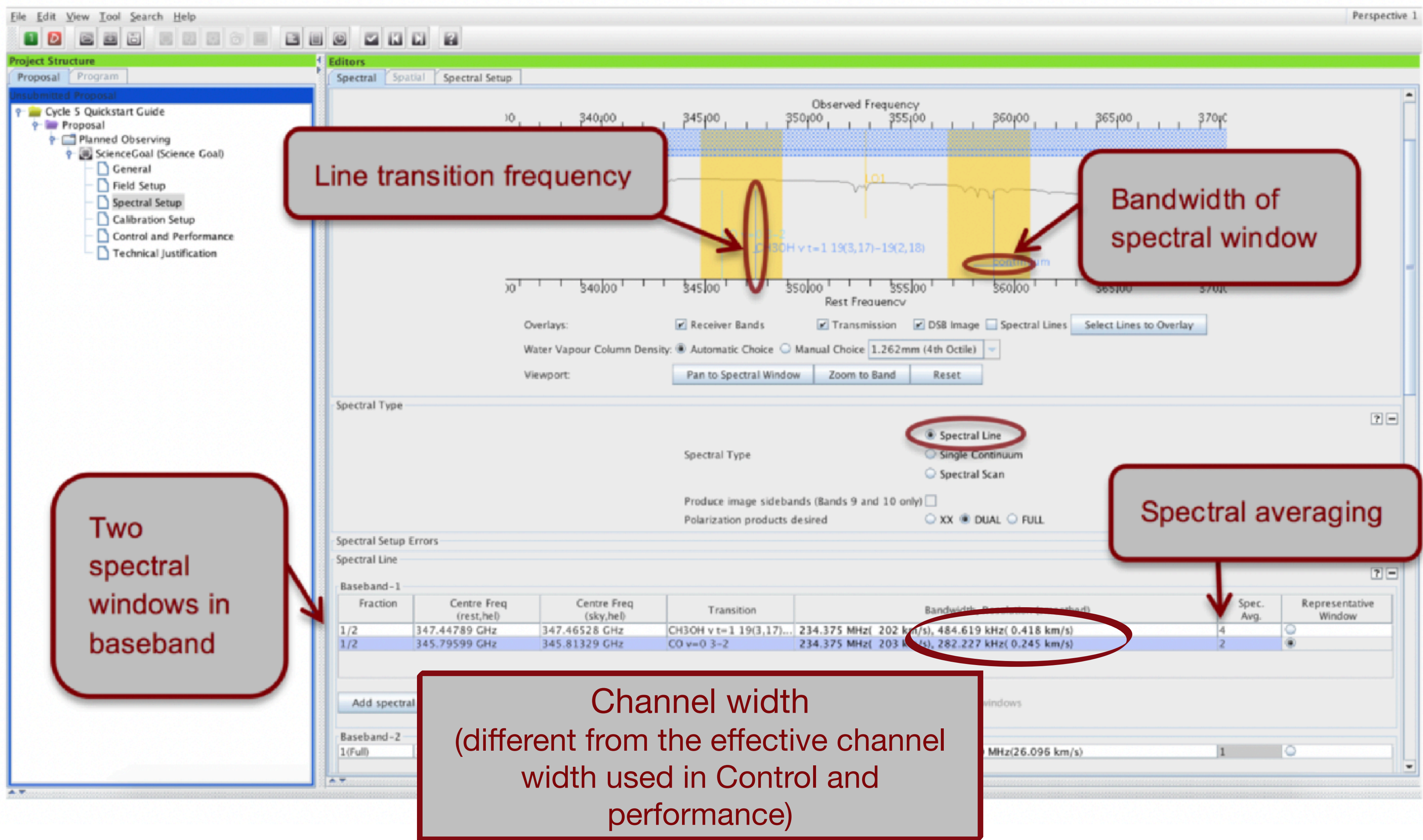
1 Spectral Line

2 Single continuum

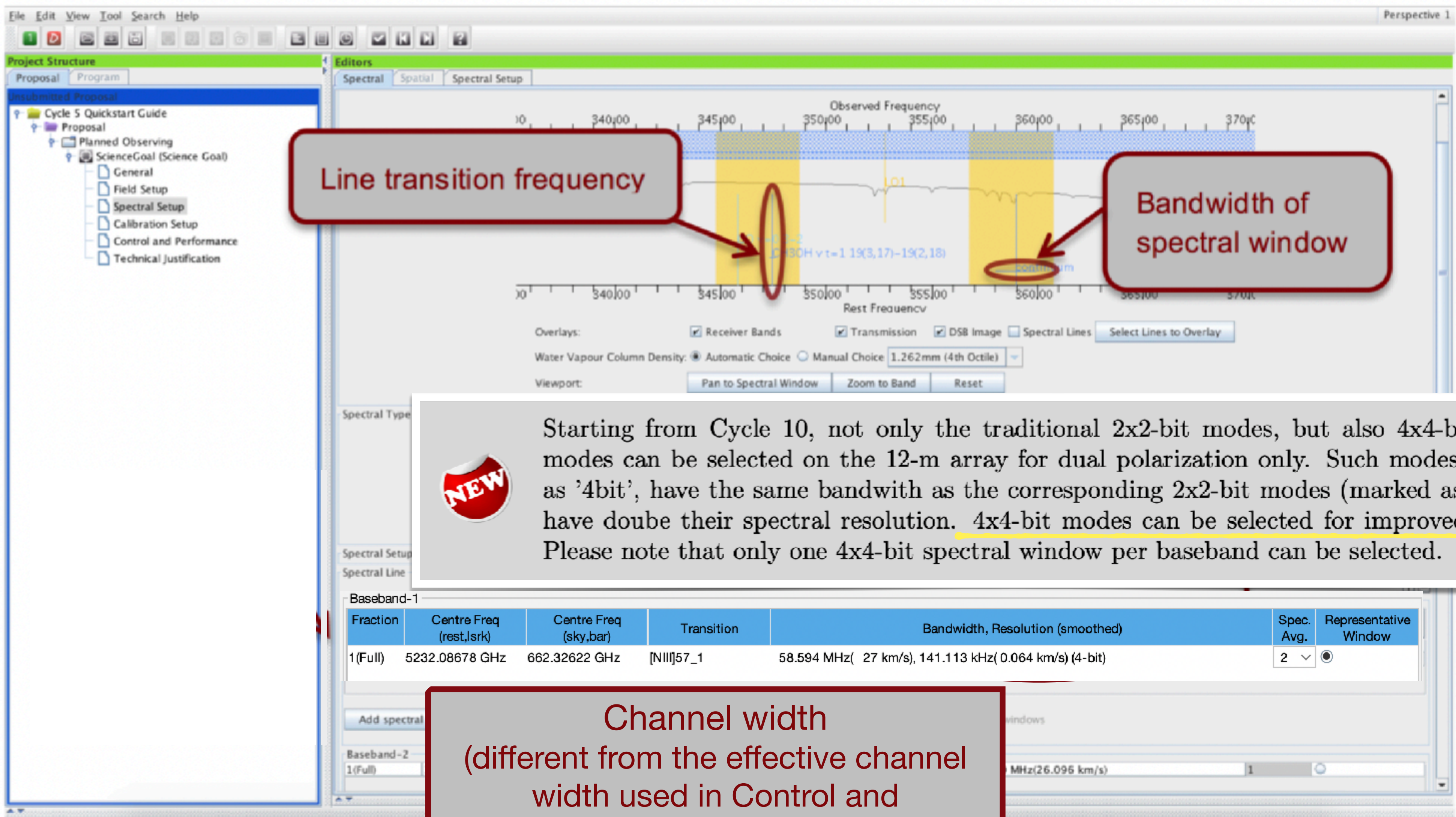
3 Spectral scan



Spectral setup...



Spectral setup...



Line transition frequency

Bandwidth of spectral window



Starting from Cycle 10, not only the traditional 2x2-bit modes, but also 4x4-bit correlator modes can be selected on the 12-m array for dual polarization only. Such modes are marked as '4bit', have the same bandwidth as the corresponding 2x2-bit modes (marked as '2bit'), but have double their spectral resolution. 4x4-bit modes can be selected for improved sensitivity. Please note that only one 4x4-bit spectral window per baseband can be selected.

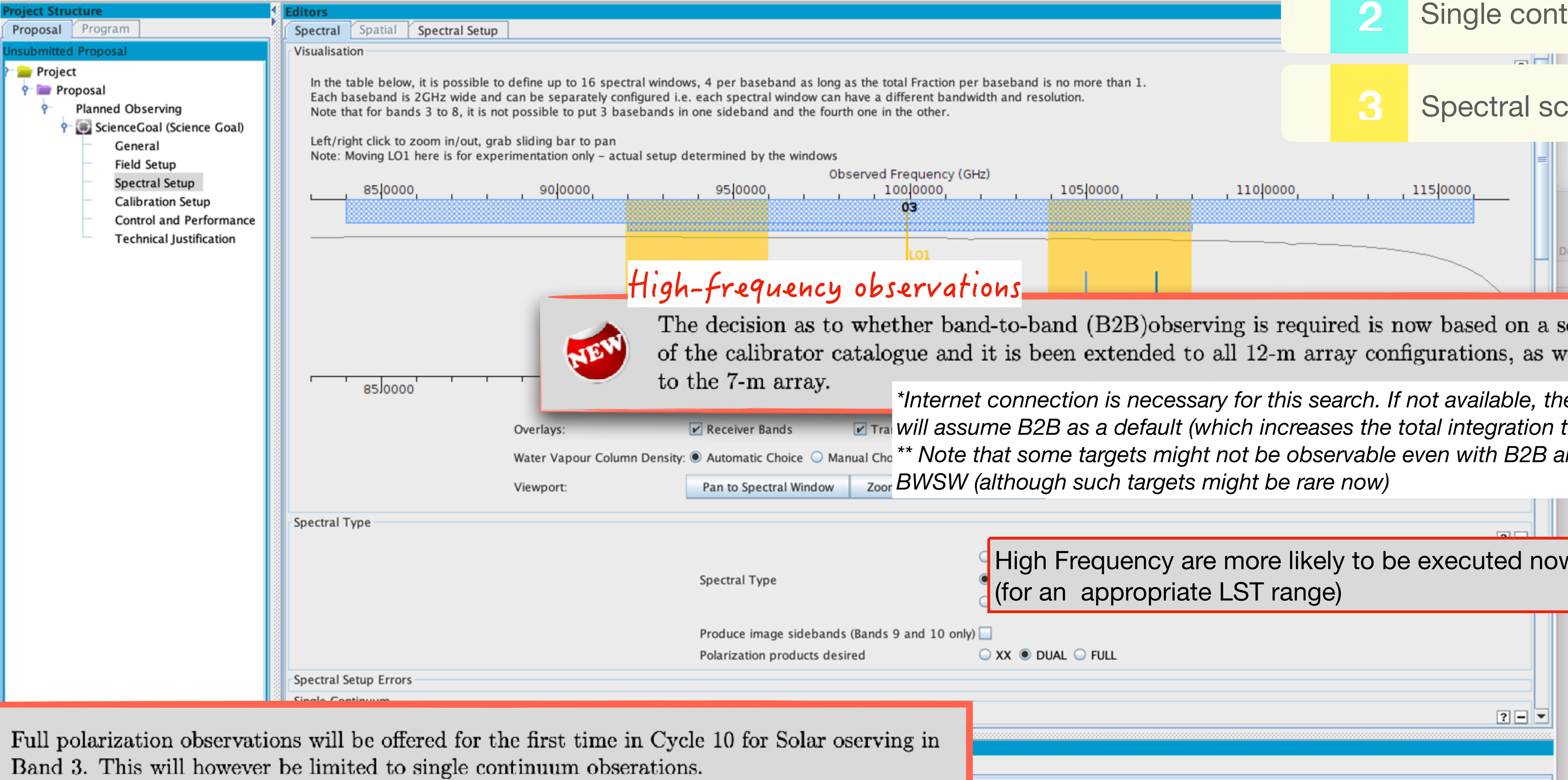
Channel width
(different from the effective channel width used in Control and performance)

Spectral setup...

1 Spectral Line

2 Single continuum

3 Spectral scan



Spectral setup...

File Edit View

Project Structure

Proposal

Unsubmitted

Cycle

Proc

Transition Filter

CO

Include description

Frequency Filters

ALMA Band

Sky Frequency (GHz)

Min 31.3 Max 950

Receiver/Backend Configuration

Hide unobservable lines

Maximum Upper-state Energy (K)

Molecule Filter / Environment

Find More...

Reset Filters

Transitions matching your filter settings:

Transition	Description	Rest Frequency	Sky Frequency	Upper-state Energy	Line Intensity	Sij μ^2	Catalog
CO v=2 1-0	Carbon Monoxide	113.172380 GHz	113.178043 GHz	6134.675 K		0.012 D ²	Offline
CO v=1 1-0	Carbon Monoxide	114.221757 GHz	114.227472 GHz	3089.154 K		0.012 D ²	Offline
CO v=0 1-0	Carbon Monoxide	115.271202 GHz	115.276970 GHz	5.532 K	60	0.012 D ²	Offline
CO v=2 2-1	Carbon Monoxide	226.340357 GHz	226.351682 GHz	6145.538 K		0.024 D ²	Offline
CO v=1 2-1	Carbon Monoxide	228.439110 GHz	228.450540 GHz	3100.118 K	0.62	0.024 D ²	Offline
CO v=0 2-1	Carbon Monoxide	230.538000 GHz	230.549535 GHz	16.596 K	70	0.024 D ²	Offline
CO+ J=2-1, F=3/2-1/2	Carbon Monoxide Ion	235.789605 GHz	235.801403 GHz		0.1	0.668 D ²	Offline
CO+ J=2-1, F=5/2-3/2	Carbon Monoxide Ion	236.062574 GHz	236.074386 GHz		0.1	1.2 D ²	Offline
CO v=2 3-2	Carbon Monoxide	339.499527 GHz	339.516514 GHz	6161.831 K		0.036 D ²	Offline
CO v=1 3-2	Carbon Monoxide	342.647656 GHz	342.664801 GHz	3116.561 K	0.71	0.036 D ²	Offline
CO v=0 3-2	Carbon Monoxide	345.795990 GHz	345.813292 GHz	33.192 K	70	0.036 D ²	Offline
CO+ J=3-2, F=5/2-3/2	Carbon Monoxide Ion	353.741285 GHz	353.758955 GHz		0.1	1.2 D ²	Offline
CO+ J=3-2, F=7/2-5/2	Carbon Monoxide Ion	354.014254 GHz	354.031957 GHz		0.18	1.713 D ²	Offline
CO v=2 4-3	Carbon Monoxide	452.645486 GHz	452.668135 GHz	6183.555 K		0.048 D ²	Offline
CO v=1 4-3	Carbon Monoxide	456.842991 GHz	456.865850 GHz	3138.486 K		0.048 D ²	Offline
CO v=0 4-3	Carbon Monoxide	461.040768 GHz	461.063837 GHz	55.317 K	60	0.048 D ²	Offline
CO v=2 6-5	Carbon Monoxide	678.880163 GHz	678.914131 GHz	6243.288 K		0.073 D ²	Offline
CO v=1 6-5	Carbon Monoxide	685.176415 GHz	685.210698 GHz	3198.774 K		0.073 D ²	Offline
CO v=0 6-5	Carbon Monoxide	691.473076 GHz	691.507674 GHz	116.159 K	100	0.073 D ²	Offline
CO v=2 7-6	Carbon Monoxide	791.960077 GHz	791.999703 GHz	6281.296 K		0.085 D ²	Offline
CO v=1 7-6	Carbon Monoxide	799.305700 GHz	799.345694 GHz	3237.134 K		0.085 D ²	Offline
CO v=0 7-6	Carbon Monoxide	806.651801 GHz	806.692153 GHz	154.872 K	110	0.085 D ²	Offline
CO v=2 8-7	Carbon Monoxide	905.009173 GHz	905.054456 GHz	6324.729 K		0.097 D ²	Offline
CO v=1 8-7	Carbon Monoxide	913.404166 GHz	913.449859 GHz	3280.971 K		0.097 D ²	Offline
CO v=0 8-7	Carbon Monoxide	921.799704 GHz	921.845827 GHz	199.111 K		0.097 D ²	Offline

Add to spectral window list

Spectral windows in this baseband (maximum of four)

Transition	Description	Rest Frequency	Sky Frequency
------------	-------------	----------------	---------------

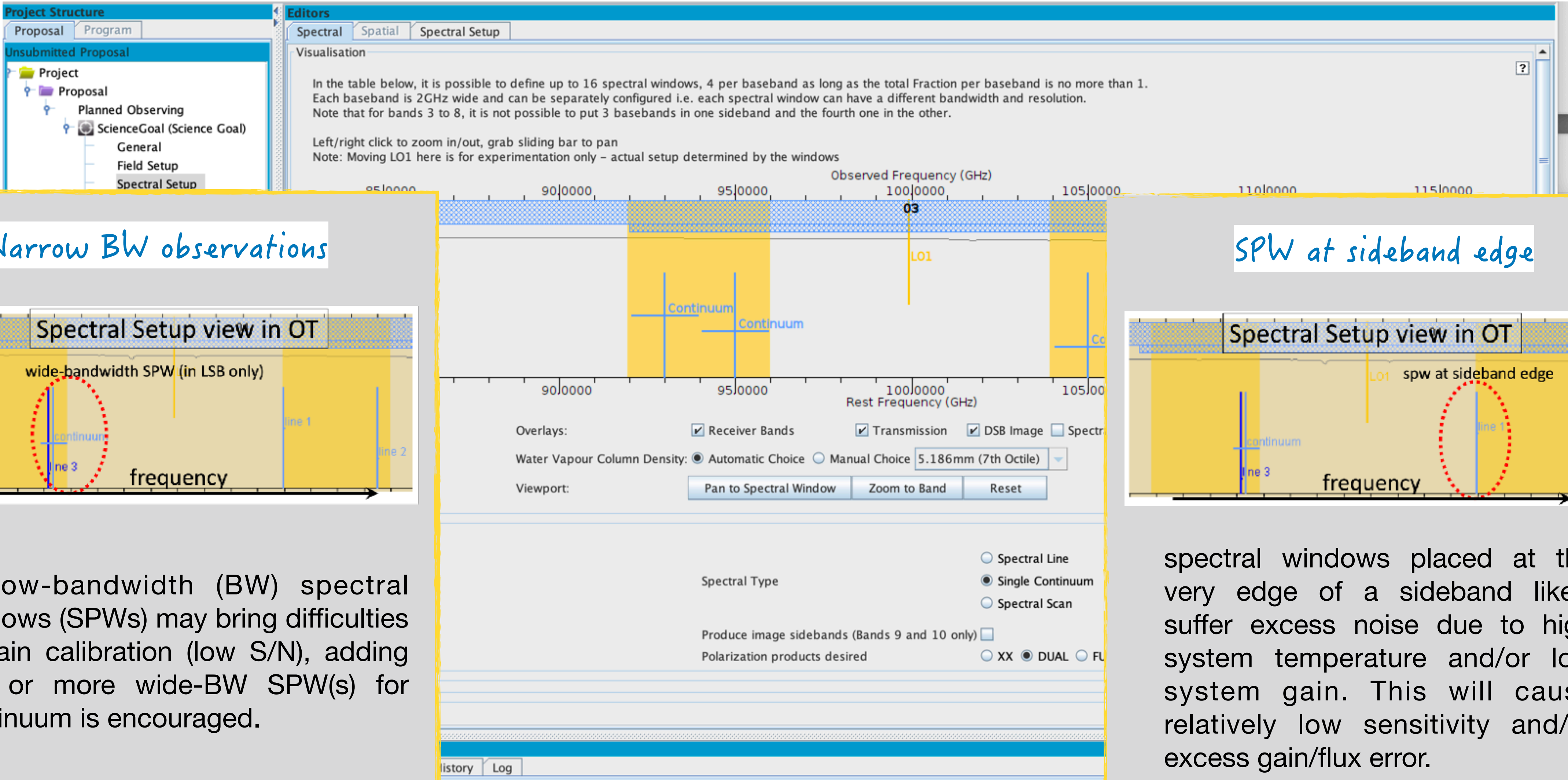
Remove spectral window(s)

Cancel Ok

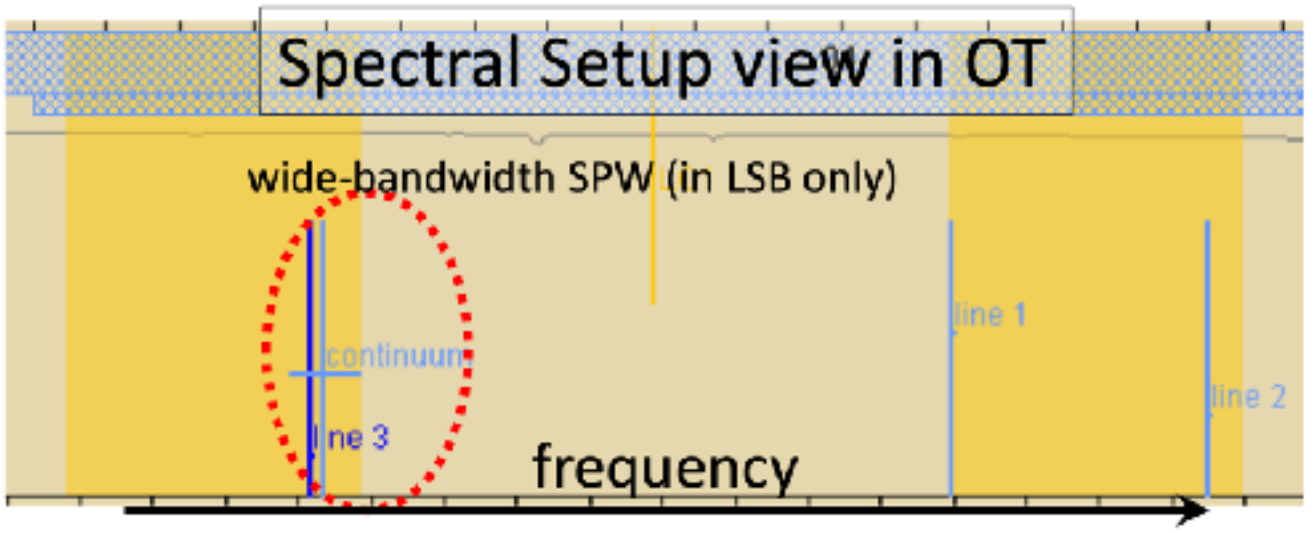
If you cannot find the transition you want in the Spectral Line Selector tool, try the *Search Online* button: you will then be able to search online from a more extensive database.

Figure 4: The Spectral Line Selector tool.

Spectral setup...

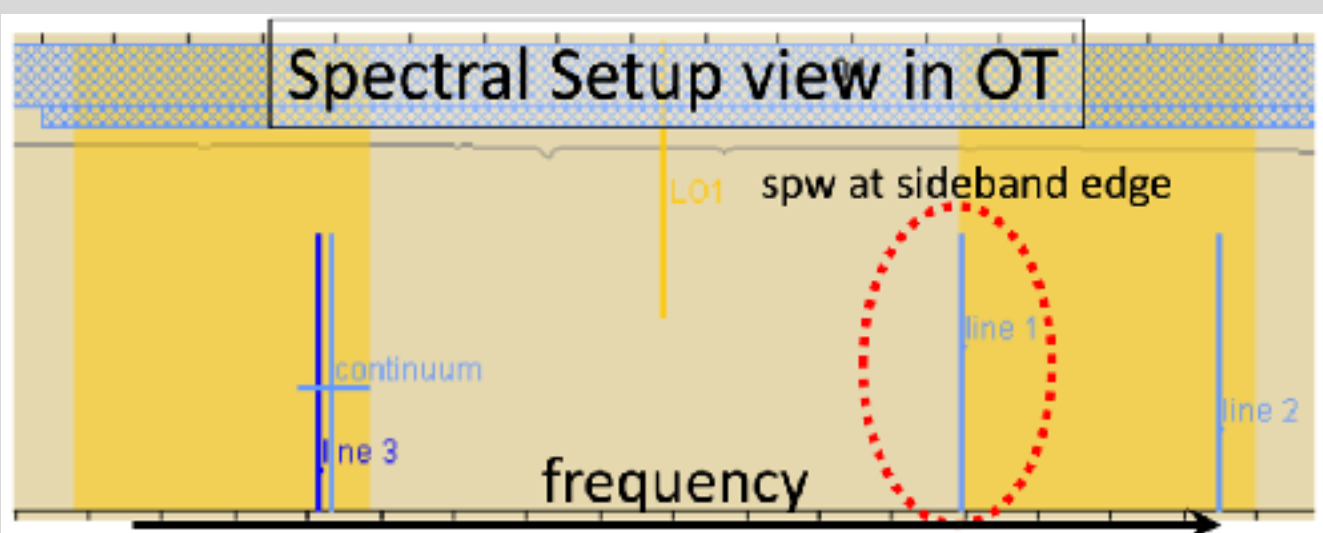


Narrow BW observations



Narrow-bandwidth (BW) spectral windows (SPWs) may bring difficulties at gain calibration (low S/N), adding one or more wide-BW SPW(s) for continuum is encouraged.

SPW at sideband edge

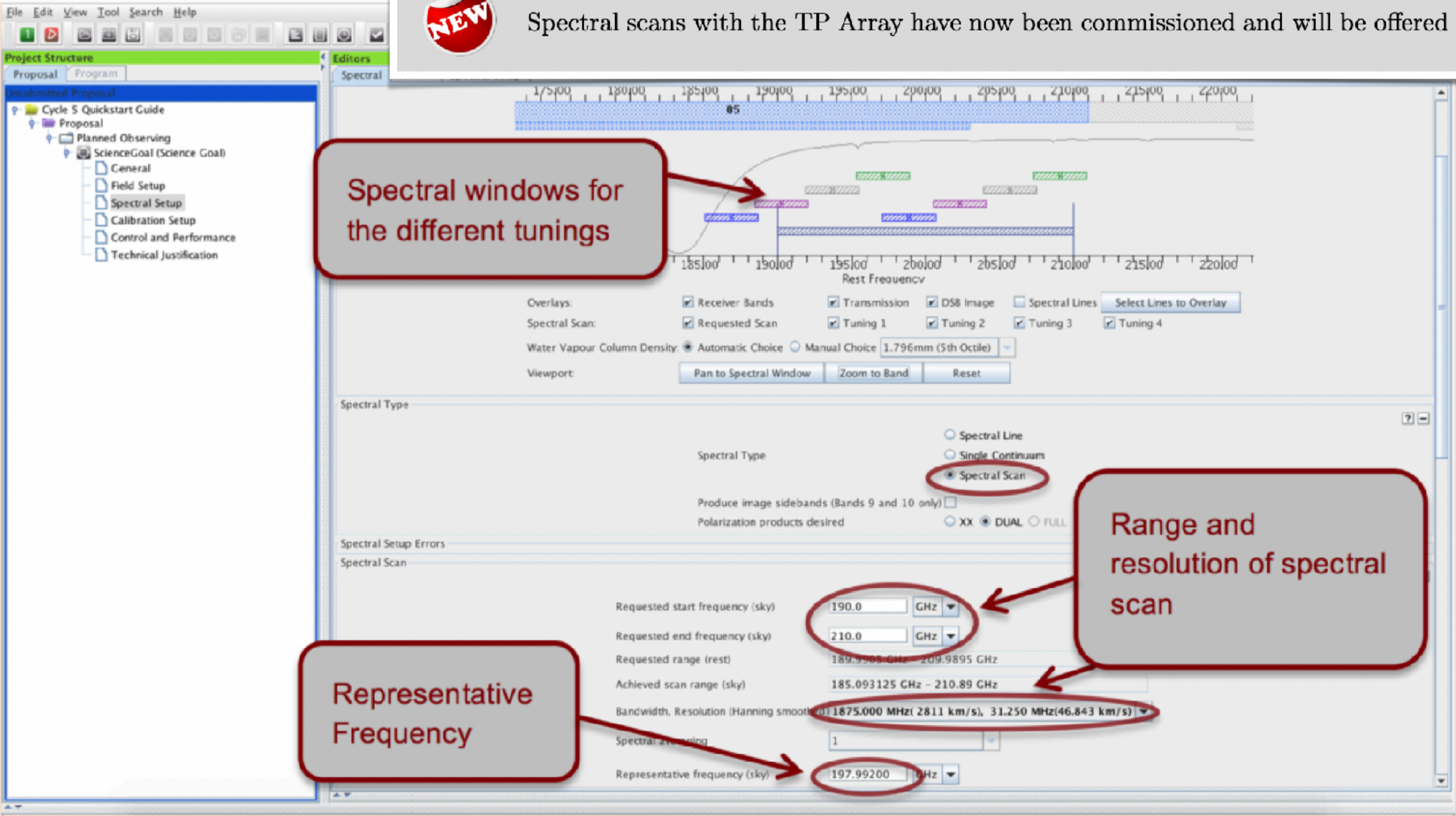


spectral windows placed at the very edge of a sideband likely suffer excess noise due to high system temperature and/or low system gain. This will cause relatively low sensitivity and/or excess gain/flux error.

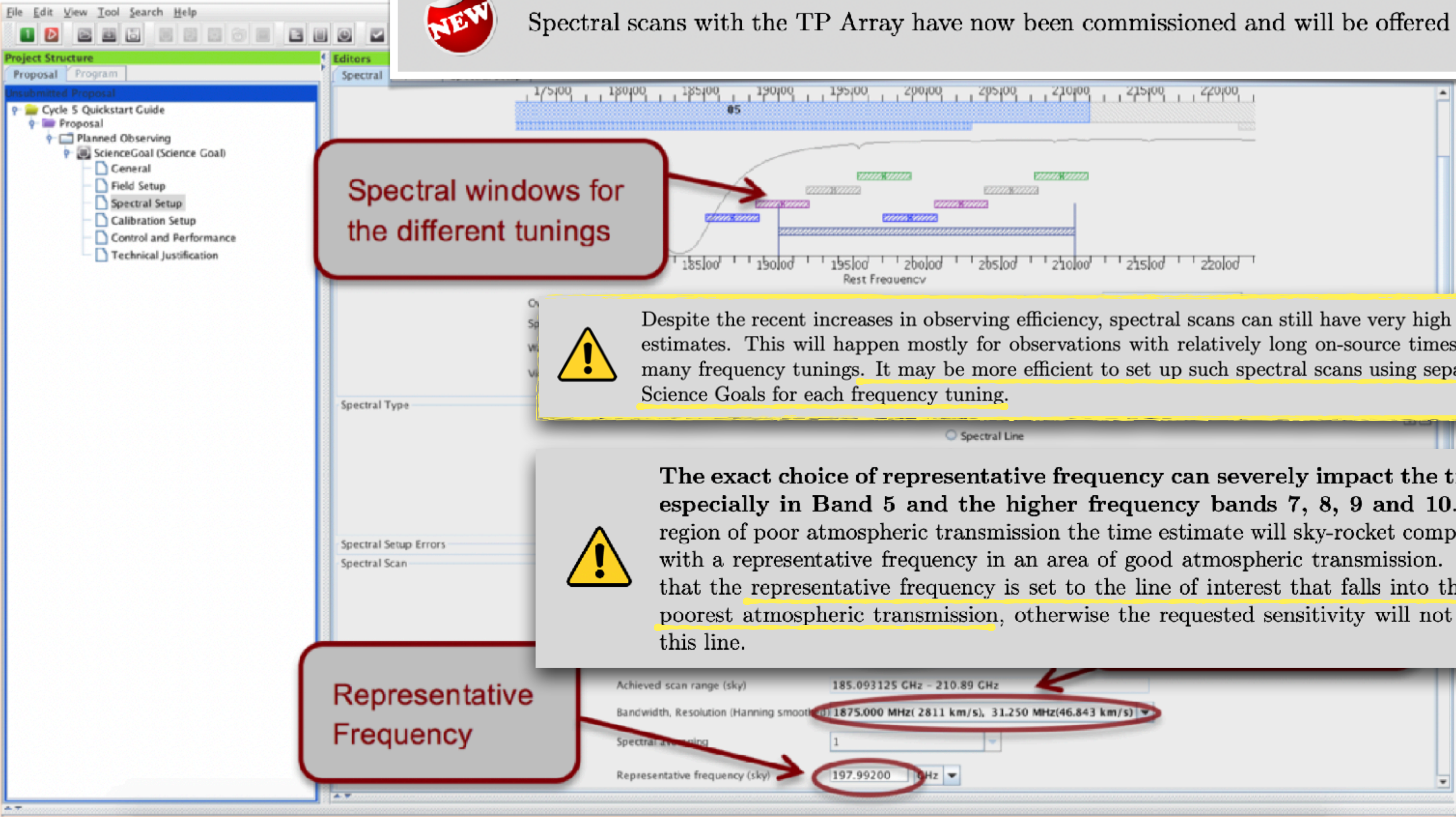
Spectral setup (spectral scans)...



Spectral scans with the TP Array have now been commissioned and will be offered in Cycle 10.



Spectral setup (spectral scans)...



Control and performance...



Users do not directly select whether ACA 7-m and/or Total Power observations should be added to their 12-m observations or not. Instead, the ACA is imposed by the OT if required to achieve the LAS requested. Whether or not ACA observations will be scheduled can be easily seen in the *Planning and Time Estimate* pop-up (see Fig. 11) or the Proposal Time Summary dialogue (“clock” icon on the menu bar).

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 - 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

Control and Performance

Configuration Information

Antenna Beamsize ($1.13 \cdot \lambda / D$)	12m	64.486 arcsec	7m	110.548 arcsec
Number of Antennas	12m	43		
ACA 7m configuration				
Longest baseline		0.049 km		
Synthesized beamsize		15.373 arcsec		
Shortest baseline		0.009 km		
Maximum recoverable scale		79.286 arcsec	33.422 arcsec	0.360 arcsec

Desired Performance

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

arcsec to arcsec

Largest Angular Structure in source arcsec

Desired mosaic sensitivity mJy equivalent to 1.4996 K @ 1.00 ° and 9.3723 K @ 0.400 °

Bandwidth used for Sensitivity Frequency Width MHz

Science goal integration time estimate

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

Are the observations time-constrained? ☐ Yes ☒ No

ACA (7-m + TP Array) needed?

Note: T
Operati
is longer

Input Parameters

Requested sensitivity	10.00 mJy
Bandwidth used for sensitivity	1.129 MHz
Representative frequency (sky, first source)	90.30 GHz

Estimated Total time for Science Goal 6.43 h

Cluster 1 Cluster 2

Source Name	RA	Dec	Velocity
M100	12:22:54.8990	15:49:20.570	1569.779 km/s

Possible Configuration Combinations

12-m (1)	12-m (2)	7-m	TP
C43-5	C43-2	Yes	No

Input Parameters

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

Time required for 12m (1) [C43-5]

Time on source per pointing (first source)	18.1 s [13.38 s]
Total number of pointings (all sources)	39
Number of tunings	1
Total time on source	11.79 min [1.70 min]
Total calibration time	13.83 min
Other overheads	5.98 min
Total time for 1 SB execution	31.60 min
Number of SB executions	1
Total time to complete SB	31.60 min

Calibration Breakdown per SB execution

2 x Pointing	4.00 min
1 x Amplitude/bandpass	5.00 min
2 x Phase	60.00 s
3 x Atmospheric	2.00 min
Calibration overheads	1.83 min

Additional Arrays

Time required for additional 12-m	15.80 min
-----------------------------------	-----------

Source(s) in the SB cluster

First (more extended) 12-m config assigned

Range of angular resolutions possible

Second (more compact) 12-m config assigned

Control and performance...



Users do not directly select whether ACA 7-m and/or Total Power observations should be added to their 12-m observations or not. Instead, the ACA is imposed by the OT if required to achieve the LAS requested. Whether or not ACA observations will be scheduled can be easily seen in the *Planning and Time Estimate* pop-up (see Fig. 11) or the Proposal Time Summary dialogue (“clock” icon on the menu bar).

File Edit View Tool Search Help

Project Structure

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Editors

Spectral Spatial Control and Performance

These parameters are used to control various aspects of the observations

Control and Performance

Configuration Information

Antenna Beamsize ($1.13 \cdot \lambda / D$) 12m 64.486 arcsec 7m 110.548 arcsec

Number of Antennas 12m 43

ACA 7m configuration

Longest baseline 0.049 km

Synthesized beamsize 15.373 arcsec

Shortest baseline 0.009 km

Maximum recoverable scale 79.286 arcsec

Desired Performance

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

arcsec to arcsec

Largest Angular Structure in source arcsec

Desired mosaic sensitivity mJy equivalent to 1.4996 K @ 1.00 " and 9.3723 K @ 0.400 "

ACA (7-m + TP Array) needed?

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 10.00 mJy

Bandwidth used for sensitivity 1.129 MHz

Representative frequency (sky, first source) 90.30 GHz

Estimated Total time for Science Goal 6.43 h

Cluster 1 Cluster 2

Source Name	RA	Dec	Velocity
M100	12:22:54.8990	15:49:20.570	1569.779 km/s

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 0.2000 mJy

Bandwidth used for sensitivity 117.188 MHz

Representative frequency (sky, first source) 271.801 GHz

Estimated Total time for Science Goal 3.01 h

Cluster 1

Source Name	RA	Dec	Velocity
test	09:55:52.4299	-69:40:46.930	218.769 km/s

Possible Configuration Combinations

12-m (1)	12-m (2)	7-m	TP	Nominal Beam(")	Max expected axial ratio
C-7	None	No	No	0.082 x 0.103	1.5

Source(s) in the SB cluster

First (more extended) 12-m config assigned

Control and performance (minimum Bandwidth Used for Sensitivity)...



Resolution \neq Effective channel width

Spectral Setup

Spectral Line						
Baseband-1						
Fraction	Centre Freq (rest,lsrk)	Centre Freq (sky,bar)	Transition	Bandwidth, Resolution (smoothed)		Spec. Avg. Representative Window
1(Full)	5232.08678 GHz	662.32622 GHz	[NIII]57_1	58.594 MHz(27 km/s)	141.113 kHz(0.064 km/s) (4-bit)	2 <input type="button" value="v"/> <input checked="" type="radio"/>

Control and performance

Bandwidth used for Sensitivity

RepWindowEffectiveChannelWidth

Frequency Width

0.195313 MHz

Technical justification

Line width / bandwidth used for sensitivity (

1000.00 km/s

/

88.41 m/s

) =

11311.53

**The effective channel width takes into account the effect of Hanning Smoothing!
(This is now the minimum frequency that can be used for BUfS)**

See the ALMA Technical Handbook and/or OT User Manual

Technical justification...

ALMA Observing Tool (Cycle 10 (Phase1)) - testo HF obs

File Edit View Tool Search Help

Perspective 1

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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

Project Structure

Unsubmitted Proposal

testo HF obs

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ScienceGoal (Copy of SPT0311-58)

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Calibration Setup

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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 1.000 km/s is 900.00 uJy

For a peak flux density of 4.50 mJy, the S/N is 5.0

Achieved RMS over the total 5.644 GHz bandwidth is 17.91 uJy

For a continuum flux density of 10.00 mJy, the achieved S/N is 558.3

For a peak line flux of 4.50 mJy, the achieved S/N over 1/3 of the source line width (1000.00 km/s / 3 = 333.33 km/s) is 90.8

The proposed observations exceed the nominal limits for the Line Imaging Dynamic Range

Line width / bandwidth used for sensitivity (1000.00 km/s / 1.00 km/s) = 1000.00

Spectral Dynamic Range (continuum flux / line rms): 100.05

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.

Choices to be justified

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

Technical justification...

Submit!

Validate

ALMA Observing Tool (Cycle 10 (Phase1)) - testo HF obs

File Edit View Tool Search Help

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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

Project Structure

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Unsubmitted Proposal

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Proposal

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ScienceGoal (Copy of SPT0311-58)

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Calibration Setup

Control and Performance

Technical Justification

Editors

Spectral Spatial Technical Justification

Technical Justification

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Spectral Dynamic Range (continuum flux / line rms): 11.05

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.

Choices to be justified

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

Documentation...

QUESTIONS? FEEDBACK?



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

AboutScienceProposingObservingDataProcessingToolsDocumentationHelp

Observing Tool

Observing Tool

Sensitivity Calculator

CASA Simulator

Observation Support Tool

Splatalogue

Science Ready Data Products

Toyama Microwave Atlas

Community-Developed

EU ARC network

Staff Tools

Japanese Virtual Obs.

Solar Ephemeris

Observing Tool

The ALMA Observing Tool (OT) is a Java desktop application used for the preparation and submission of Blocks). It is also used for preparing and submitting Director's Discretionary Time (DDT) proposals and Science Ready Data Products. The OT is configured for the present capabilities of ALMA as described in the [Cycle 9 Call For Proposals](#). Note that the OT is not available for Cycle 8 proposals.

Download & Installation

The OT should run on all common operating systems and depends on a version of Java being available. In previous versions of the OT, a version of Java was installed, but the Cycle 9 version of the OT will come with its own version of Java 11. Since Java 11 does not include Web Start, this version of the OT is no longer available. The Cycle 9 OT can be downloaded from the [ALMA Observing Tool Download Page](#).

It is recommended that the OT be installed using the ALMA **OT Installer**. This uses a modern graphical installer that allows you to change various settings from their defaults, including the amount of memory the OT may use. The installation will produce an executable file. If you have problems with the OT, particularly with installation and/or startup, please see the [troubleshooting page](#). A list of currently known bugs, their status and possible workarounds can be found on the regularly updated [known OT Issues](#) page. A further source of information is the [OT section of the ALMA Helpdesk Knowledgebase](#) - this contains a number of articles that deal with frequently asked questions. After exploring these resources, if confusion over some aspect of the OT remains, or if a previously unidentified bug has been uncovered, please file a [Helpdesk ticket](#).

The **tarball** version must be installed manually and the instructions for doing this have not changed.

Installer

Documentation

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


- If you are a novice OT user you should start with the [OT Quickstart Guide](#), which takes you through the basic steps of ALMA proposal preparation.
- Audio-visual illustrations of different aspects of the OT can be found in the [OT video tutorials](#). These are recommended for novices and advanced users alike.
- More in-depth information on the OT can be found in the [User Manual](#), while concise explanations of all fields and menu items in the OT are given in the [Reference Manual](#). These two documents are also available within the OT under the Help menu.

Troubleshooting

If you have problems with the OT, particularly with installation and/or startup, please see the [troubleshooting page](#). A list of currently known bugs, their status and possible workarounds can be found on the regularly updated [known OT Issues](#) page. A further source of information is the [OT section of the ALMA Helpdesk Knowledgebase](#) - this contains a number of articles that deal with frequently asked questions. After exploring these resources, if confusion over some aspect of the OT remains, or if a previously unidentified bug has been uncovered, please file a [Helpdesk ticket](#).

Doc. 9.10, Ver. 1.0 | March 2022

ALMA Observing Tool Quickstart Guide



Doc. 10.5, Ver. 1.0 | March 2023

ALMA Observing Tool User Manual

Anna Miotello, Andy Biggs, Rein H. Warmels

