

Observing Tool for ALMA Cycle 4

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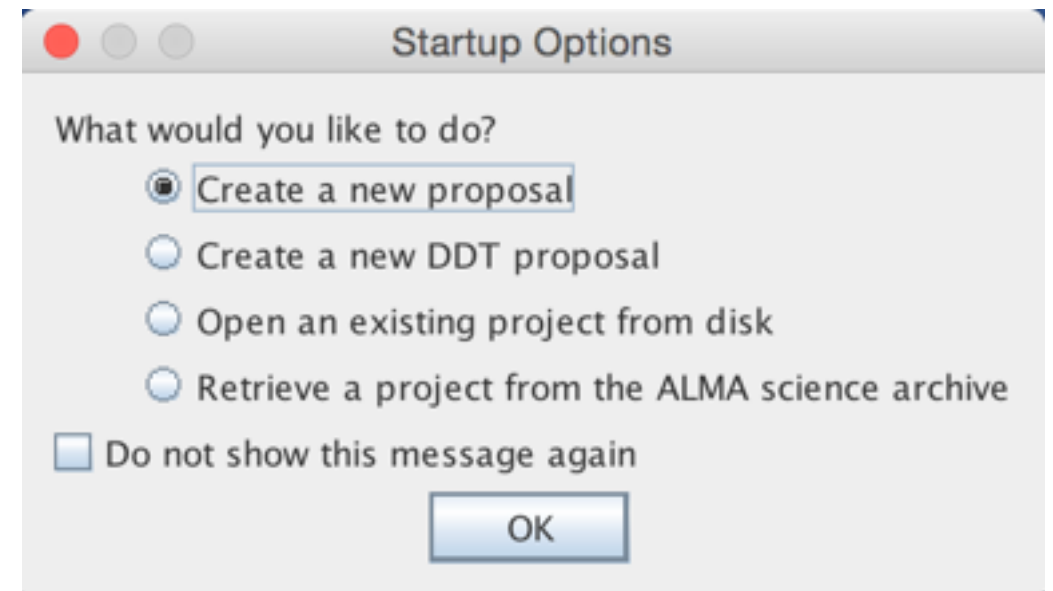
Observing Tool (OT) for ALMA Cycle 4

- java-based tool retrievable from [almascience](http://almascience.org) website
 - ✓ webstart version (always updated)
 - ✓ tarball version (offline working, might be outdated)
- the *only* way to submit your ALMA proposal
- the OT offers a visualization of spatial setting (e.g., pointings in a mosaic), spectral settings (correlator tuning), time estimator, sensitivity calculator, and messages when settings incompatible

Starting up the OT

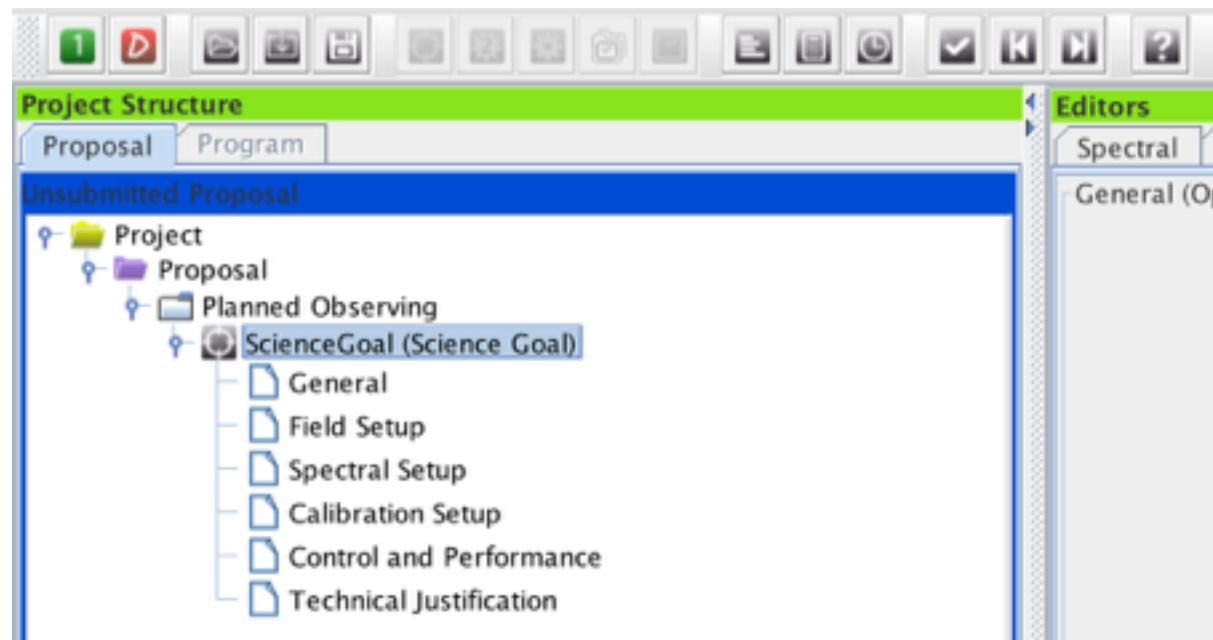


Click logo to start.



- PI/Col have to registered on almascience website
- select proposal type (regular, VLBI, ToO, large program)
- select scientific category
- if resubmission of previous Cycle, enter the project ID
- if resubmitting an already submitted Cycle 4 project, make sure that you it contains the project ID on the Project Tab to avoid duplication

Science Goals



NEW

- Science Goals have *no more restrictions* based on source separation.
- Max 150 sources per SG, allowing small frequency adjustments for different LSR velocities of the sources
- Max 5 tunings per source within one ALMA band (spectral scan)
- Spectral settings: within one ALMA band
- Field settings: rectangular field OR individual pointing, not a mix

Field setup

- Resolve by Source Name (NED, Simbad)
- SSO incl. Sun (tick box, select object, *Sun, Ephemeris: upload ephemeris file*)
- upload Sources from file (see help for file format)
- **important: expected source properties**

The screenshot shows a 'Source' configuration window with the following fields and options:

- Source Name:** A text input field.
- Choose a Solar System Object?:** A checkbox.
- Name of object:** A dropdown menu currently set to 'Unspecified'.
- System:** A dropdown menu set to 'FK5 J2000'.
- Sexagesimal display?:** A checked checkbox.
- Source Coordinates:**
 - RA:** A text input field with '00:00:00.0000'.
 - Dec:** A text input field with '00:00:00.000'.
- Parallax:** A text input field with '0.00000' and a unit dropdown set to 'mas'.
- PM RA:** A text input field with '0.00000' and a unit dropdown set to 'mas/yr'.
- PM DEC:** A text input field with '0.00000' and a unit dropdown set to 'mas/yr'.
- Source Radial Velocity:** A text input field with '0.000', a unit dropdown set to 'km/s', and a 'lsrk' checkbox.
- z:** A text input field with '0.000000000'.
- Doppler Type:** A dropdown menu set to 'RADIO'.
- Target Type:** Two radio buttons: 'Individual Pointing(s)' (selected) and '1 Rectangular Field'.

A 'Resolve' button is located at the top right of the window.

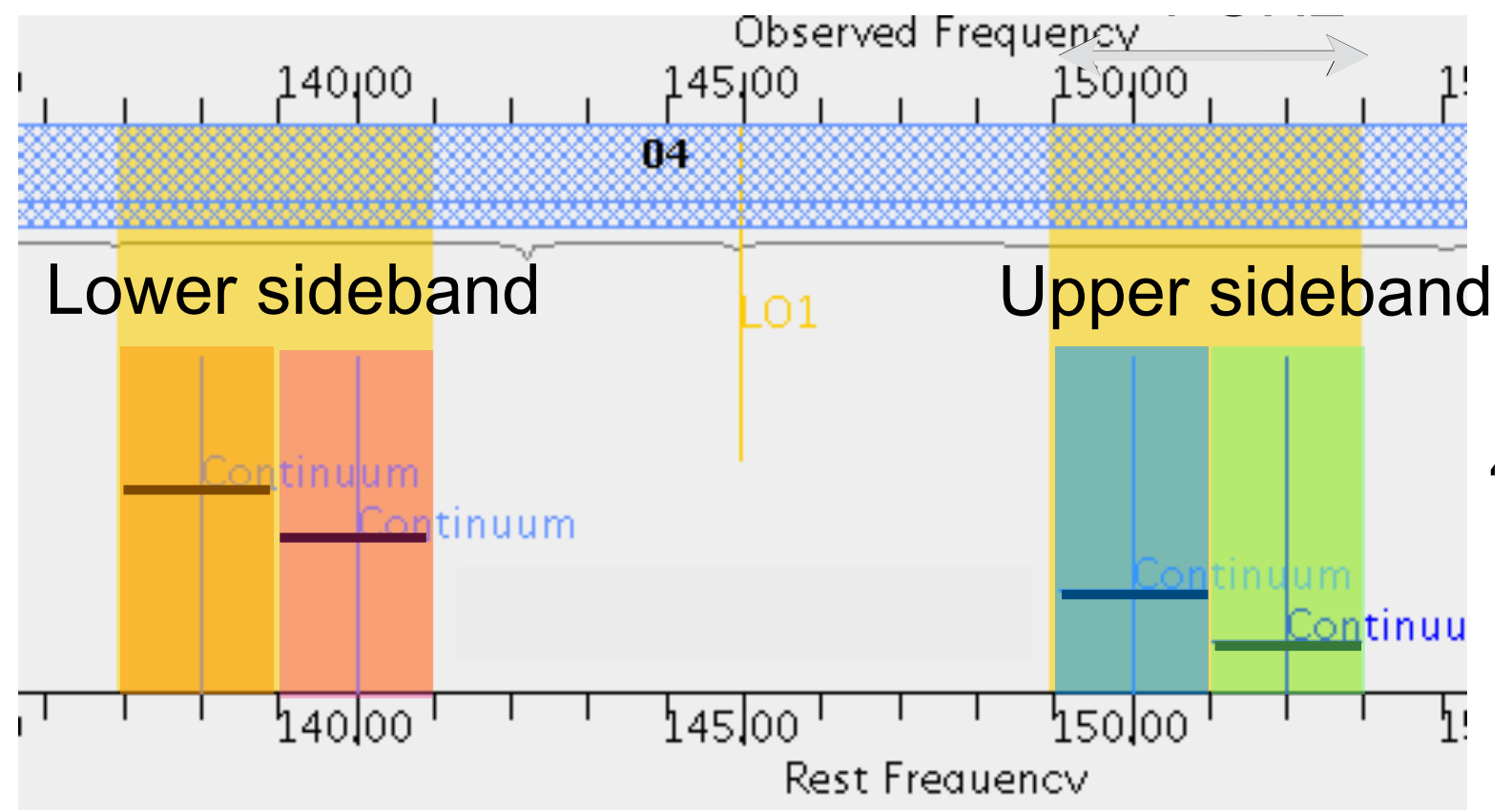
- Individual pointings (can have more than one offset)
- Rectangular fields (mosaics)
- *to use the spatial tab we need first to define the FOV, which depends on the frequency setting in the spectral setup*

Spectral setup

Continuum (single, dual, full pol)

Spectral scan (single, dual pol)

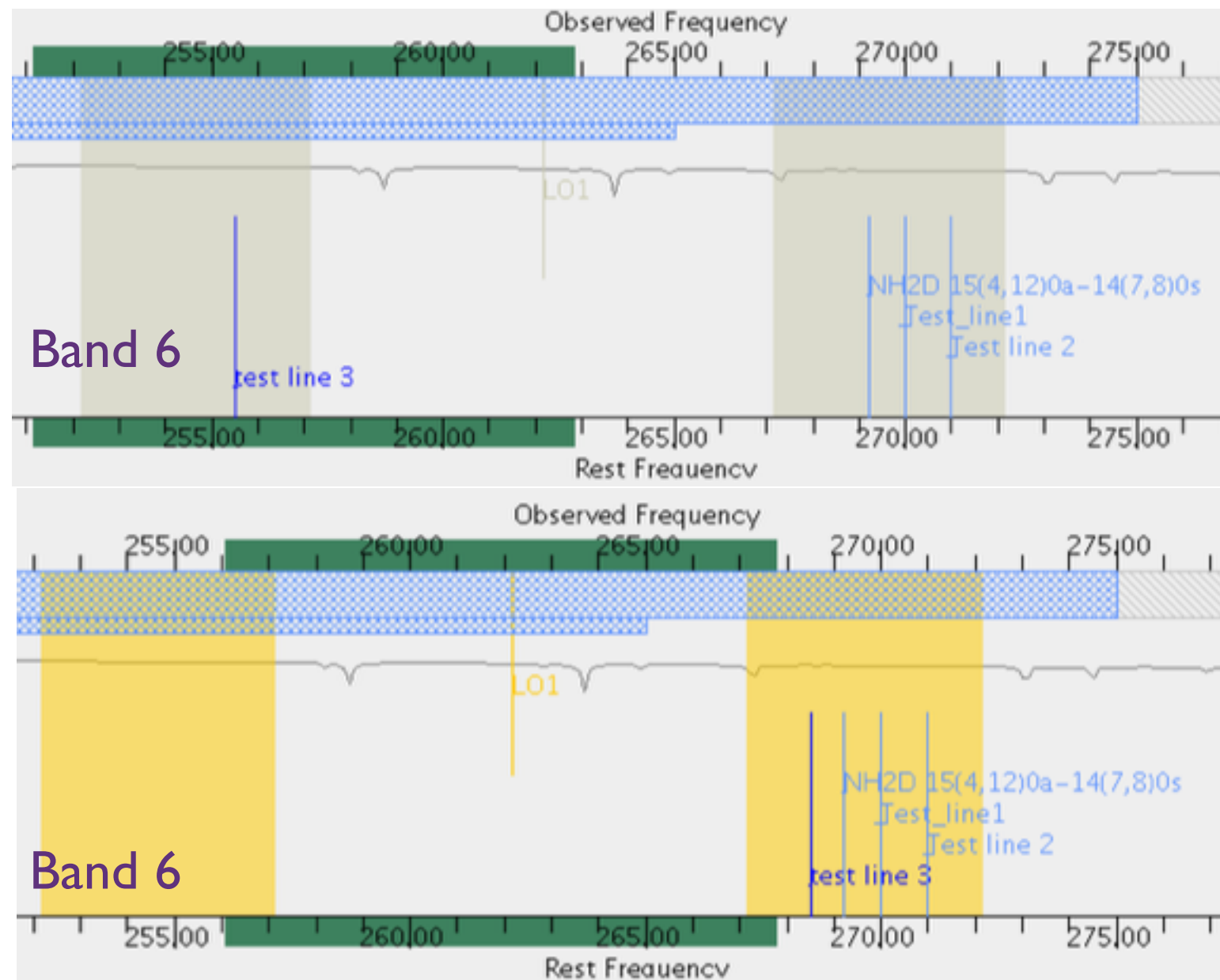
Spectral line (single, dual, full pol)



- 4 basebands (BBs), each max 2GHz, to be placed in two sidebands
- widths sideband different per band (band 3,4,7,8: 4GHz; band 6: 5GHz; band 9,10: 8 GHz)
- *carefully select the representative spw: will be used for all frequency/spectral resolution dependent calculations, such as FOV, MRS, angular resolution, atmospheric opacity*

Baseband limitations

- 2SB receivers (bands 3,4,6,7,8) cannot have 3 BBs in one sideband and 1 BB in the other
- DSB receivers (bands 9,10) have no BB/sideband restrictions



Bad spectral configuration

BBs stay gray in *spectral viewer*

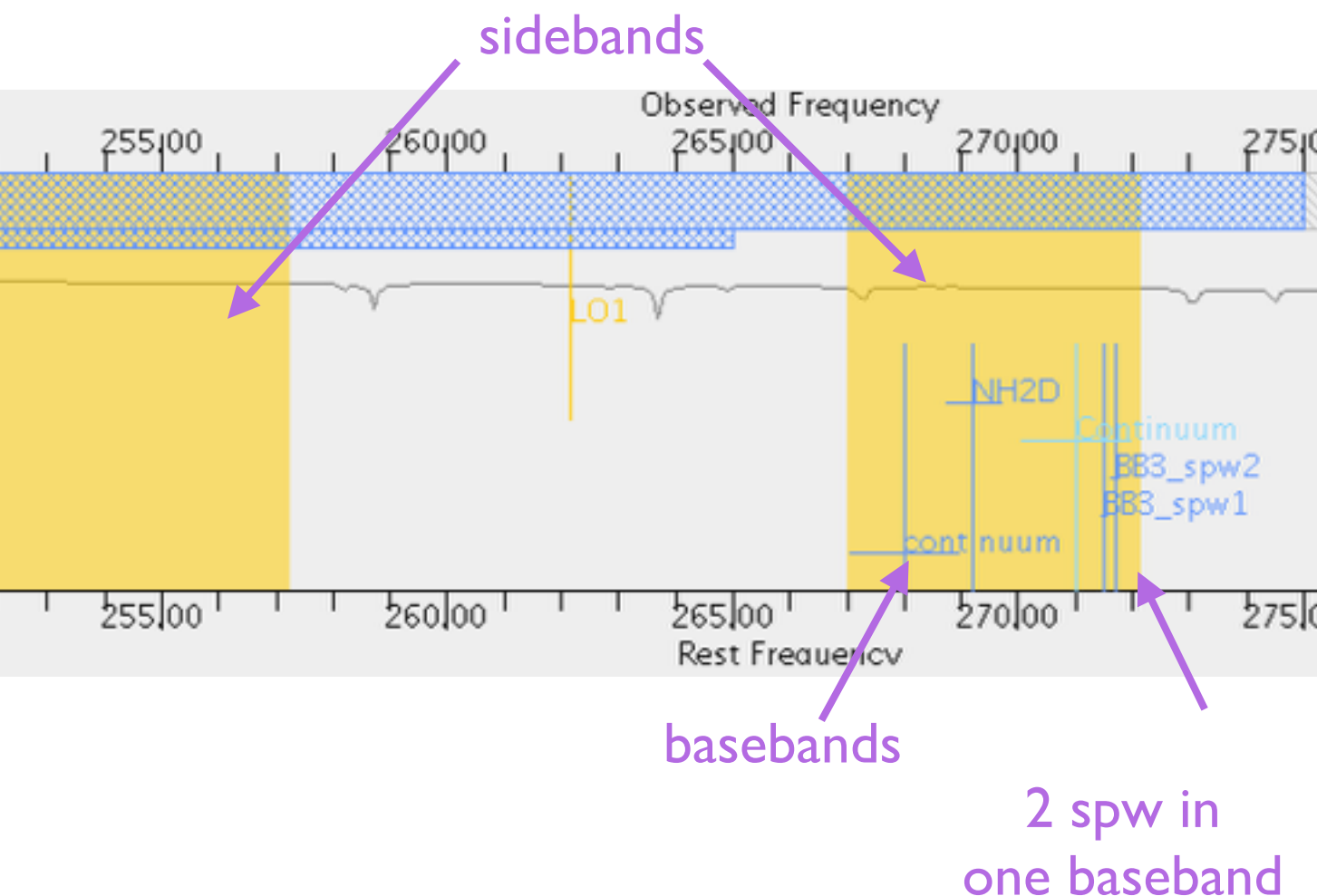
Bad spectral configuration gives
error messages in red

Spectral configuration OK

BBs become yellow

Spectral line setups

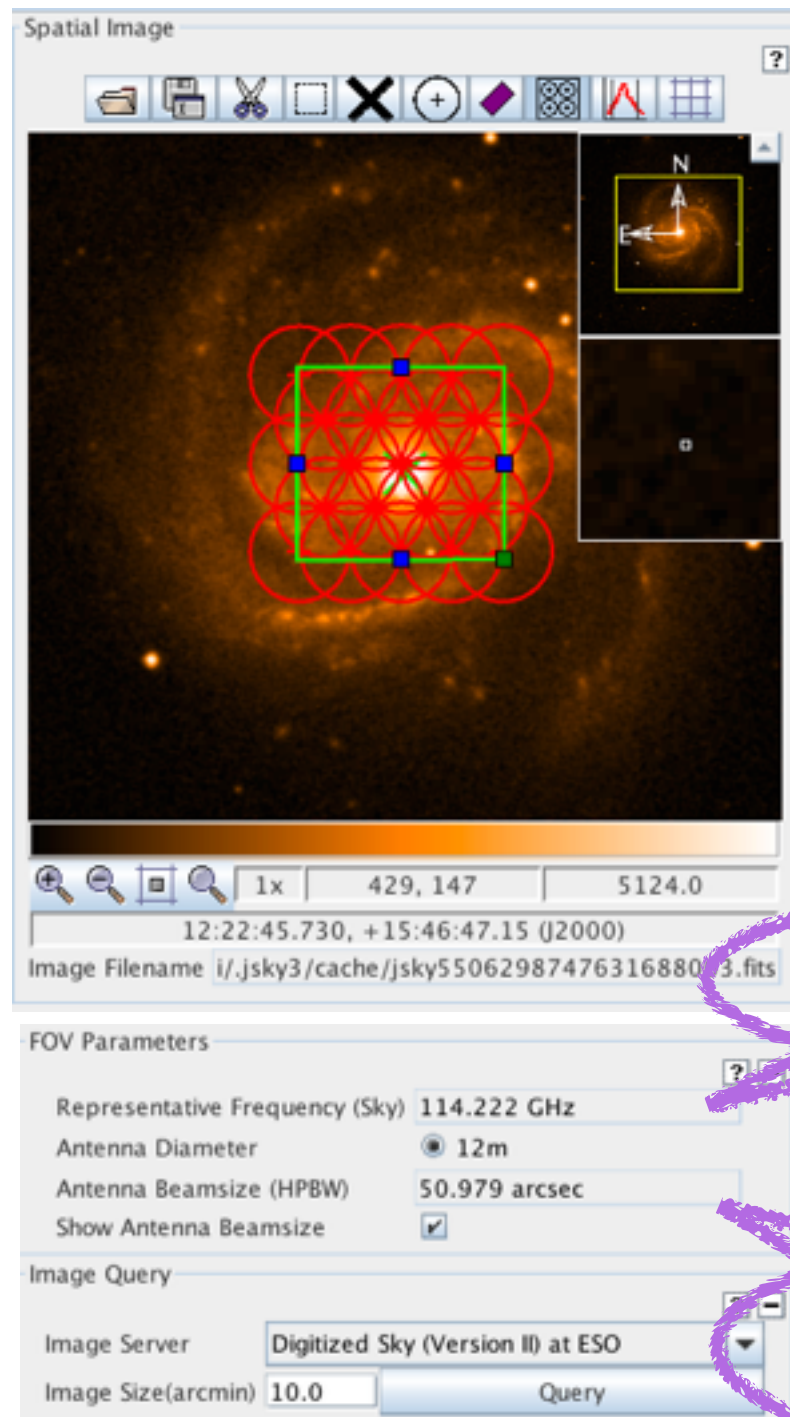
- Use the ALMA spectral line database
- Continuum BB and spectral line can be mixed (Spectral line mode)
- Set unused spws to continuum to help with calibration and continuum removal, in particular if you have narrowband spw



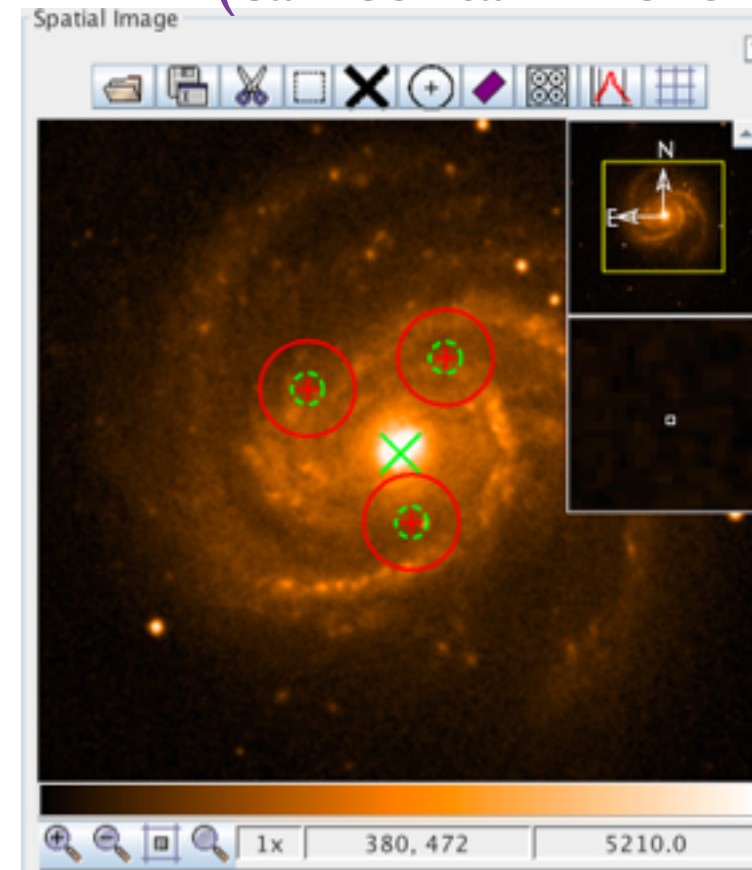
- in each BB can contain up to 4 spectral windows (spw)
- all spws in one BB should have the *same resolution*
- better higher spectral resolution, but *keep data rate < 40MB/s*

Spatial setup, once the spectral setup is done

Rectangular field (mosaic)



Individual pointing
(can contain more offset pointings)



pointing positions table

Field Center Coordinates

Custom Mosaic:	<input type="checkbox"/>
PointingPattern:	Offset <input checked="" type="checkbox"/>
Offset Unit:	arcsec
#Pointings	3
RA [arcsec]	Dec [arcsec]
49.41789	34.26666
-24.24002	50.83892
-6.03416	-36.75872

Add Delete Import Export

Control and performance

OT calculates the angular resolution/maximum recoverable scale (MRS) for the most extended and most compact 12m Array, and the ACA 7m array based on the frequency and the source declination

Enter the desired performance,
angular resolution, MRS,
sensitivity and the bandwidth
for sensitivity

Based on the user selected resolution and MRS the OT will choose the most suitable array (incl. ACA stand alone)

OT Time estimation uses the sensitivity calculator to derive the total time for the SG incl. calibration. It will divide sources with large separations in clusters that have their own calibrators, and show the number of tunings per cluster.

Technical Justification

Justify your chosen sensitivity and bandwidth for sensitivity 

Justify your angular resolution and MRS 

Justify your spectral resolution and data rate 

Numbers to be double checked
trigger a message in blue

Only spectral dynamic
range < 1000 (B3,4,6) /500
(B7,8,9,10) allowed

Figures/Tables required for
Technical Justification have to be
present in Scientific Justification

OT C4: work in progress

Only spectral dynamic
range < 1000 (B3,4,6) /500
(B7,8,9,10) allowed

Check the knowledgebase
if you encounter problems
or contact us!

Knowledgebase

Why does the Cycle 4 OT report an achieved RMS of 0.00 Jy?

25 March 2016 02:58 PM



The Cycle 4 Observing Tool (version 201603-CYCLE4-OFF-B) contains a bug in the Technical Justification section of a Science Goal that reports an achieved RMS of 0.00 Jy (S/N of infinity). This error does not affect proposal validation or time estimates. We recommend that users ignore these incorrect values in the Technical Justification and proceed with the normal proposal submission process.

ALMA Observing Tool (Cycle4) - Project

File Edit View Tool Search Help

Project Structure

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

Editors

Spectral Spatial Technical Justification

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

Sensitivity

Requested RMS over 7,500 MHz is 500.00 mJy. For a peak flux density of 2.00 Jy, the S/N is 4.0.

Achieved RMS over the total 7,500 MHz bandwidth is 0.00 Jy. For a continuum flux density of 2.00 Jy, the achieved S/N is infinity.

For a peak line flux of 1.00 Jy, the achieved S/N over 1/3 of the source line width (25.00 km/s / 3 = 8.33 km/s) is infinity.

Line width / bandwidth used for sensitivity (25.00 km/s / 9291.09 km/s) = 0.003.

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. 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.

Overview

Contextual Help

1. Please ensure you and your co-Is are registered with the [ALMA Science Portal](#).
2. Create a new proposal by either:
 - Selecting **File > New Proposal**
 - Clicking on the 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

Technical Justification

Justify your chosen sensitivity and bandwidth for sensitivity 

Justify your angular resolution and MRS 

Justify your spectral resolution and data rate 

Numbers to be double checked
trigger a message in blue

Only spectral dynamic
range < 1000 (B3,4,6) /500
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Limitations for Solar and VLBI proposals

Solar observations: continuum mode (single or dual pol) in a predefined spectral range of band 3 and 6.



VLBI observations: continuum mode (full pol) in a predefined spectral range of band 3 and 6, and *require a separate proposal to the GMVA or EHT*

PI does not ask for a sensitivity, but directly for observing time in limited time slots:

(1) Planned Start Date	(2) Configuration (planned campaigns)	(3) Longest baseline	(4) LST with best observing conditions	(5) LST with unstable observing conditions	(6) PI Observing Time (days)
23 December 2016	C40-3 (Solar)	0.46 km	~3h - 15h	~15h-3h	11
19 January 2017	C40-2 (Solar)	0.27 km	~4h - 17h	~17h-4h	9
1 February 2017	February maintenance period				
16 March 2017	C40-1 (Solar/VLBI)	0.15 km	~8h - 22h	22h-8h	17
6 April 2017	C40-3 (Solar/VLBI)	0.46 km	~9h - 23h	~23h-9h	11

Completing the proposal

1. Validate your proposal

This brings up any problem, such missing Scientific Justification, or badly set spectral settings.

Only validated proposal can be submitted!



Validation errors are given in the
Feedback window

2. Display project time summary

*Gives an overview of observing time of all proposal and
the data rate plus expected data size*

3. Make a pdf overview and save the .aot file on your disk

OT documentation and Help

OT contains the ALMA
template library of aot
files for Cycle 4

OT Help includes the User manual and
reference guide

ALMA website contains the OT
quickstart guide, manual and
reference guide, Cycle 4 proposers
guide, and OT video tutorials

Submit questions to the ALMA
Helpdesk or your ARC!