Web-based Observing Tool (OT)

Gianni Cataldi (EA ARC)

What is the OT?

- The ALMA Observing Tool (OT) is used to create and submit an ALMA proposal
- From cycle 13, we will use the web-based OT instead of the Desktop-based OT
- Access the OT at https://cycle-13.sps.alma.cl/

OT Documentation

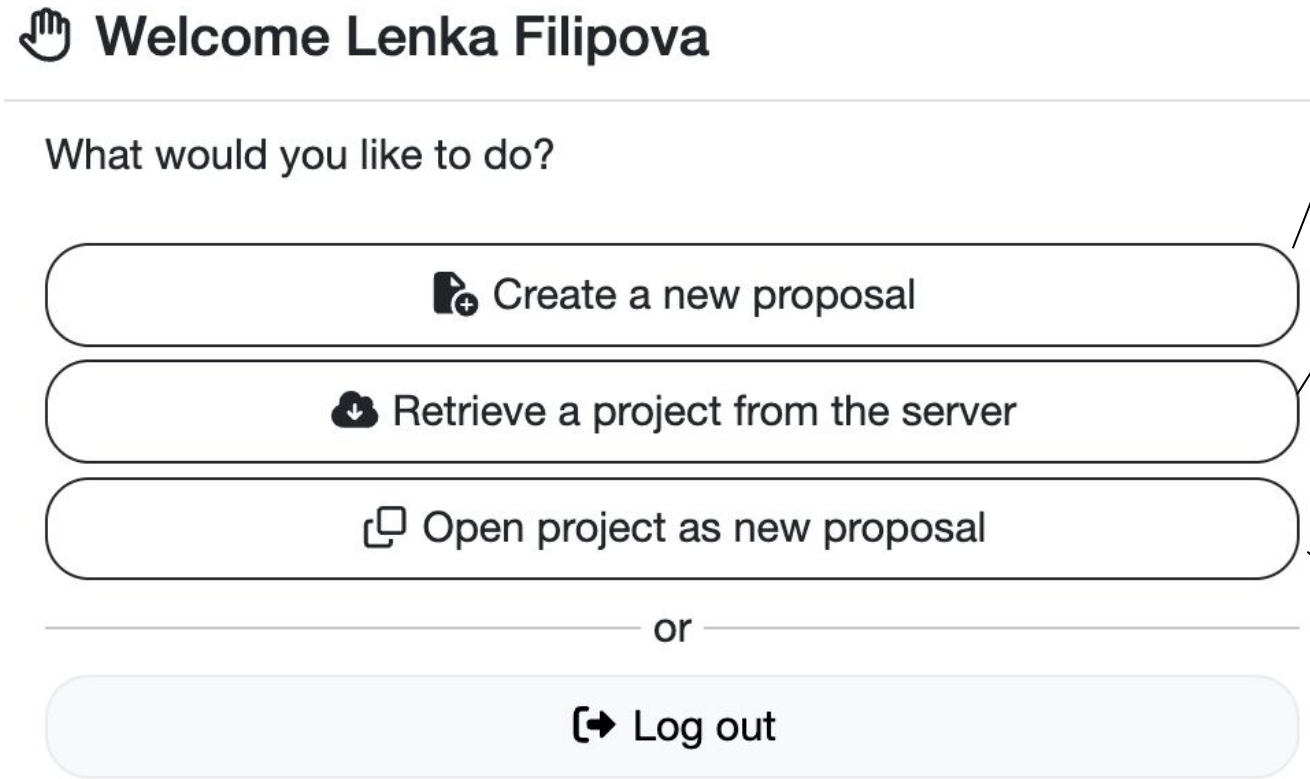
On the Science Portal, go to Documentation -> Cycle 13 -> Phase 1 & 2

- User manual (Describes how to use the OT for preparing ALMA proposals)
- Reference manual (An in-depth description of the OT)
- Video Tutorials
  - even if you are familiar with the desktop-based OT, it is recommended to at least watch the following video tutorials:
    - “What’s new: main differences from the desktop-based OT”
    - “Introduction and the staging area”
- FAQ and Known issues

Main differences to Desktop-based OT

- You need to be online :-)
  - Supported browsers: Chrome, Firefox and Safari
- No local saving or loading of proposals (no .aot files). Your proposals now live in the staging area.
- Autosaving without history or Undo!
- Spatial Visualizer now based on Aladin Sky Atlas

Welcome screen



Create a new proposal (draft)

Open a draft or a submitted proposal from the **staging area**

Make a copy of a proposal in the **staging area** (can be used to copy proposals from previous cycles!)

Header bar


Create a new draft proposal
Open project as new proposal (make a copy)
Sensitivity calculator
OT documentation
Validate
Proposal title
ALMA Observing Tool
My awesome proposal
Submit project
Ifilipova
Proposal
Science Plan
Open a draft or submitted proposal
Revert a project with unsubmitted changes to the submitted archive version
Open configuration tables
Generate PDF

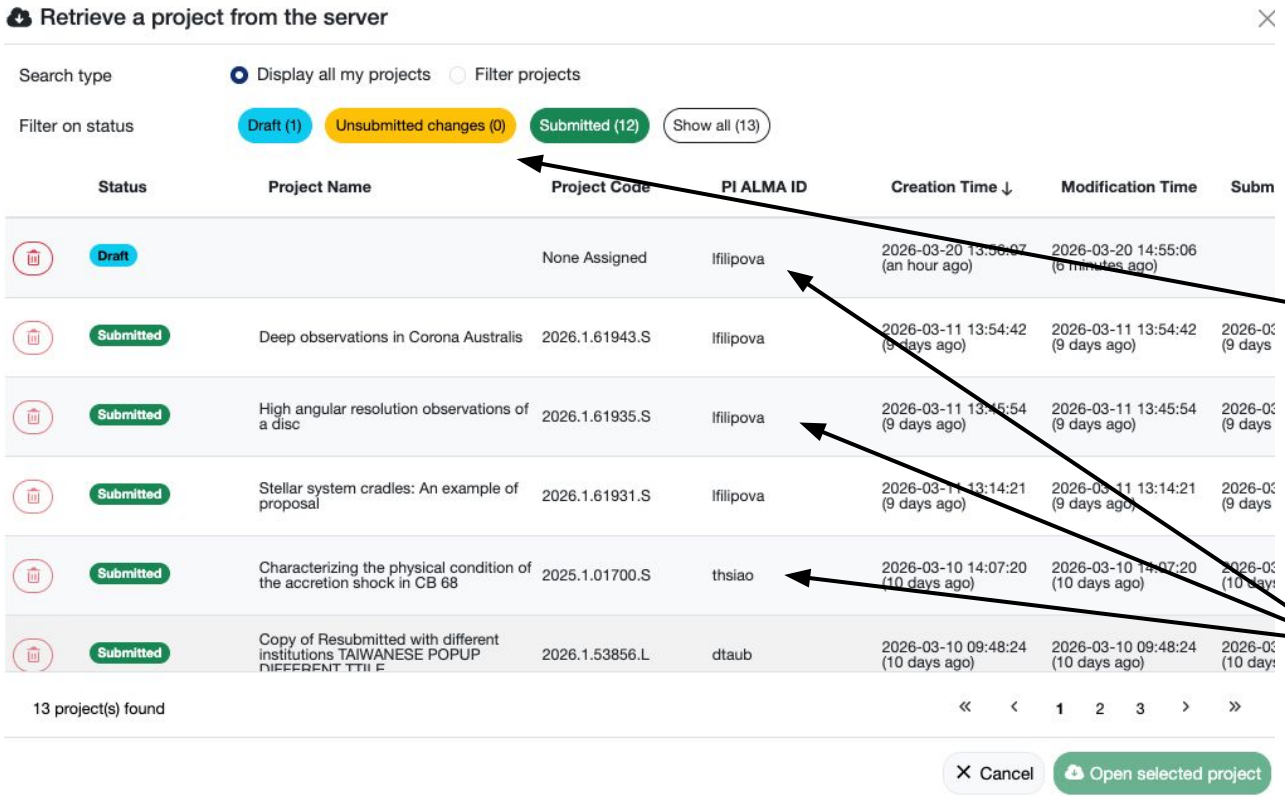
Staging area - Proposal Statuses

Each proposal is in one of the following statuses:

- Draft (proposal that has not yet been submitted; can be deleted)
- Submitted (proposal was submitted)
- Unsubmitted changes (proposal was submitted and later modified)

Staging area

"Retrieve a project from the server" or "Open project as new proposal" opens the staging area



Filter by Proposal Status

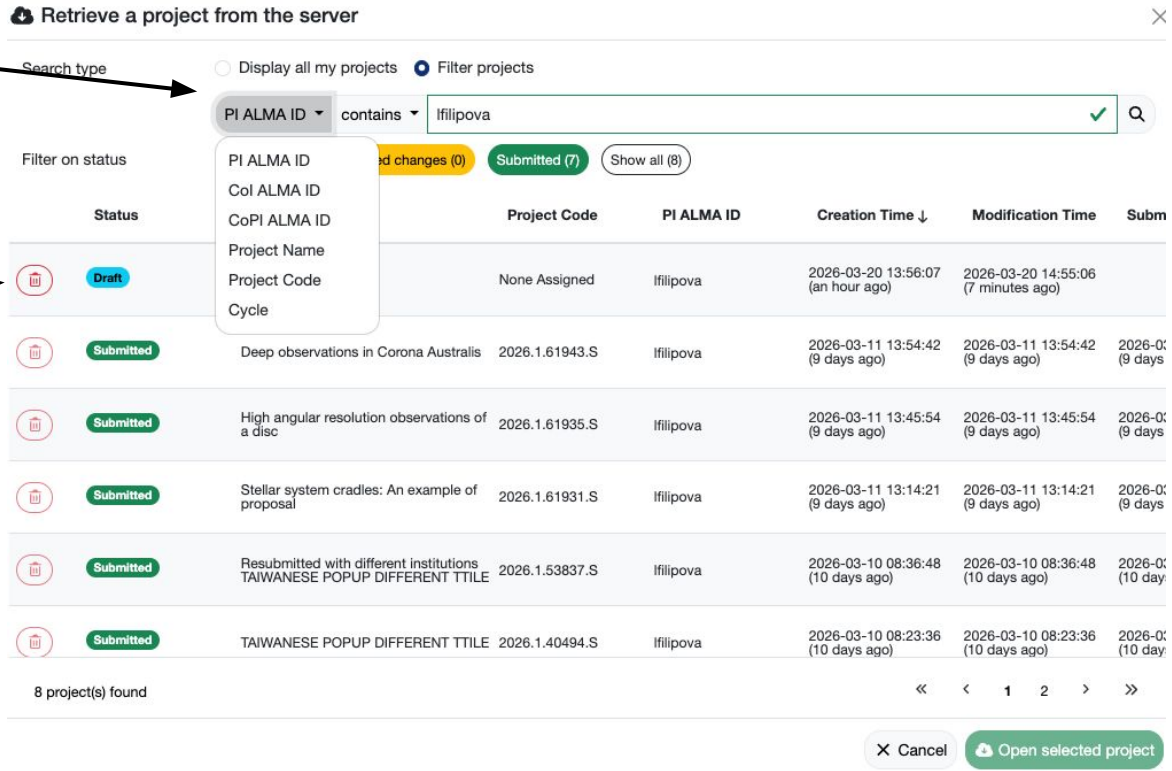
Users have access to all proposals ("draft", "submitted" and "unsubmitted changes") on which they are PI, CoPI or CoI

Staging area

Various filter options

Draft proposals can be deleted from the staging area. We recommend to clean up proposal drafts that are not needed anymore.

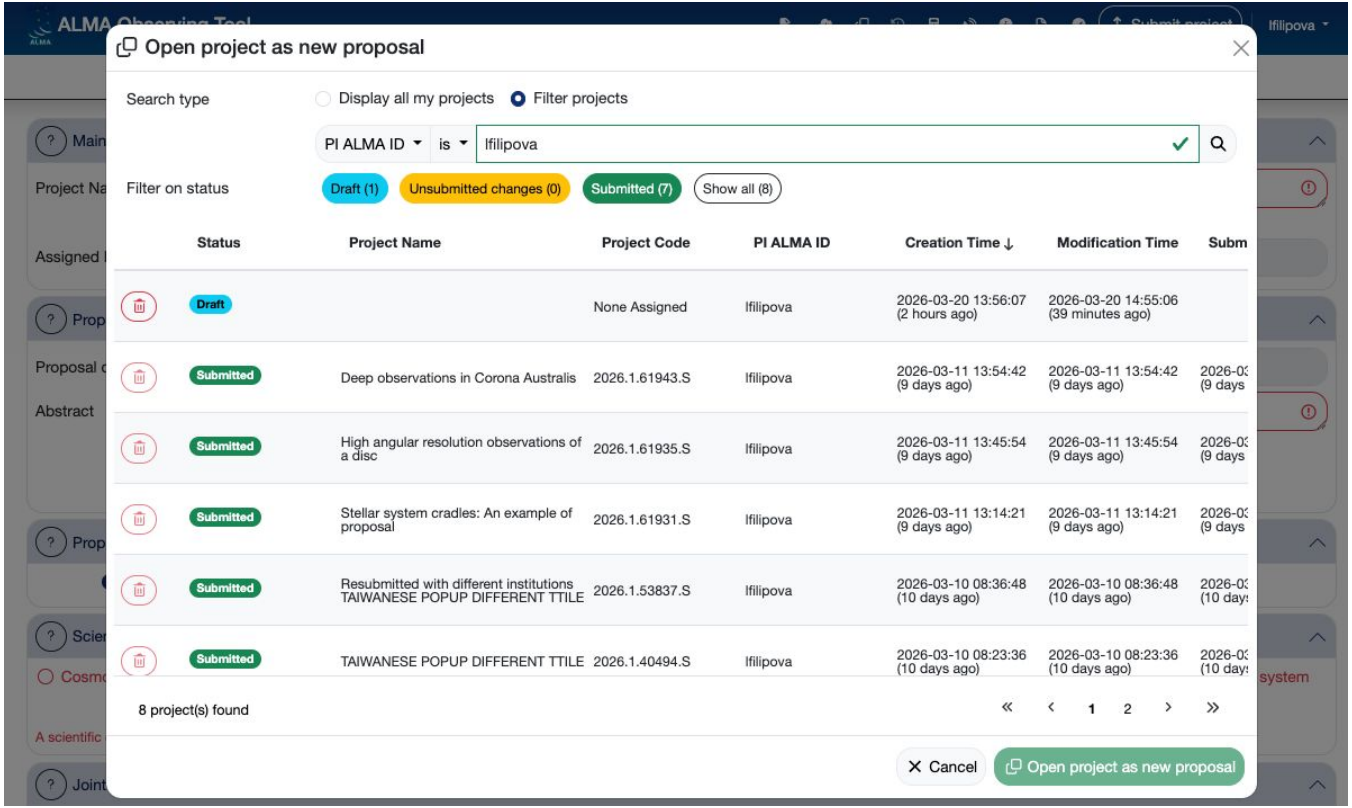
Submitted proposals can only be retracted via a helpdesk ticket.



Autosaving - BE CAREFUL!

- Every edit of the proposal is immediately saved, **overwriting** the previous version of the proposal
  - For most fields, the save is triggered when the user leaves the field (exceptions: Project Name, Abstract, and Duplicated Observation fields are saved once user stops typing for 0.5 s)
- There is **no history!**
- There is **no Undo**!
- What if you want to try something out?
  - **Make a copy of the proposal** (use “Open project as new proposal”)
    Note that the title of the copied proposals will be “Copy of…”
  - **Make a copy of the Science Goal**
- Proposals with unsubmitted changes can be reverted to the last submitted version

Making a copy



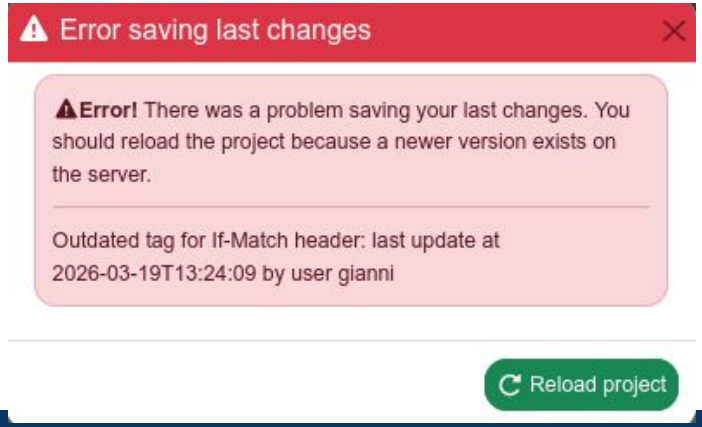
"Open project as new proposal" allows to make a copy of a proposal.

The copy will be in draft status.

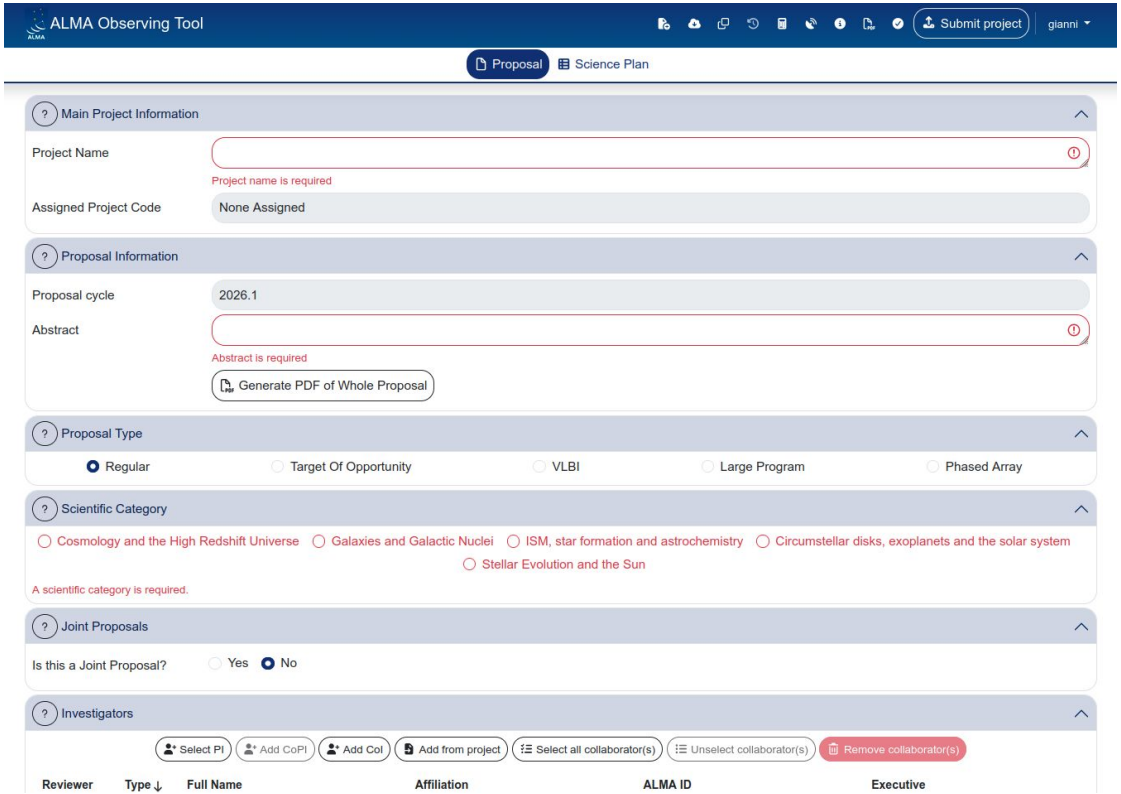
A copy allows to test something without overwriting the original proposal. Alternatively, one can also copy a Science Goal.

Autosaving - BE CAREFUL!

- co-Is have full editing rights! Clear communication between PI and co-Is is essential to ensure that there are no unwanted overwrites of the proposal
  - Only the PI can submit the proposal
  - co-Is cannot delete draft proposals
- Simultaneous editing is strongly discouraged
  - An error message is shown if editing is attempted on a proposal that has already been edited by another user:



“Proposal” page



- here you enter general information about your proposal:
  - Project Name
  - Abstract
  - Proposal type
  - Science category
  - Joint Proposal
  - PI / co-Is
  - Reviewer information
  - Science Justification
  - Justification for duplicate observations

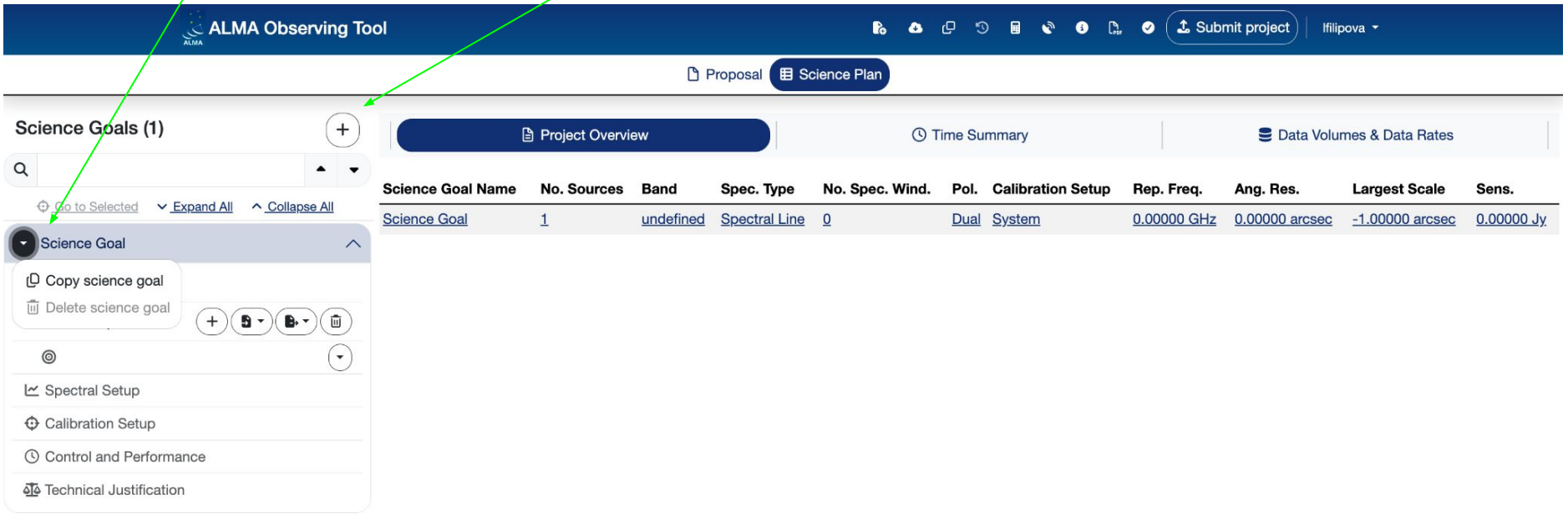
Science plan

- your proposal consists of one or several Science Goals (SGs)
- a SG can have several targets, but only one spectral setup, sensitivity and resolution
  - Example: observe 10 sources with the same spectral setup, sensitivity and resolution: one SG
  - Example: observe the same source in Band 3 and Band 6: two SGs
- SGs can be copied!

Science Plan and Science Goals

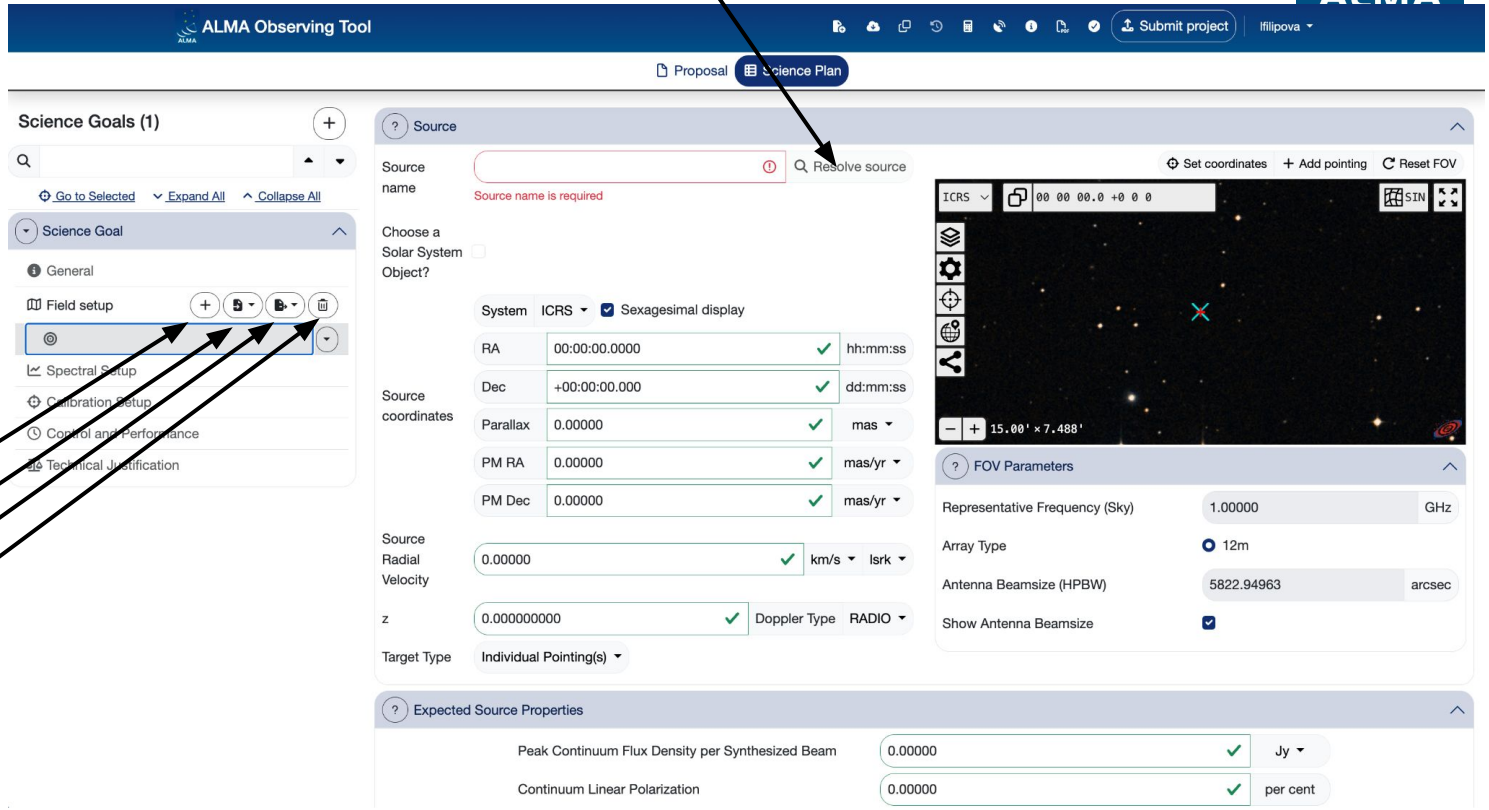
Copy or delete Science Goal here.

By default, an empty Science Goal is defined. Science Goals can be added with the plus button.



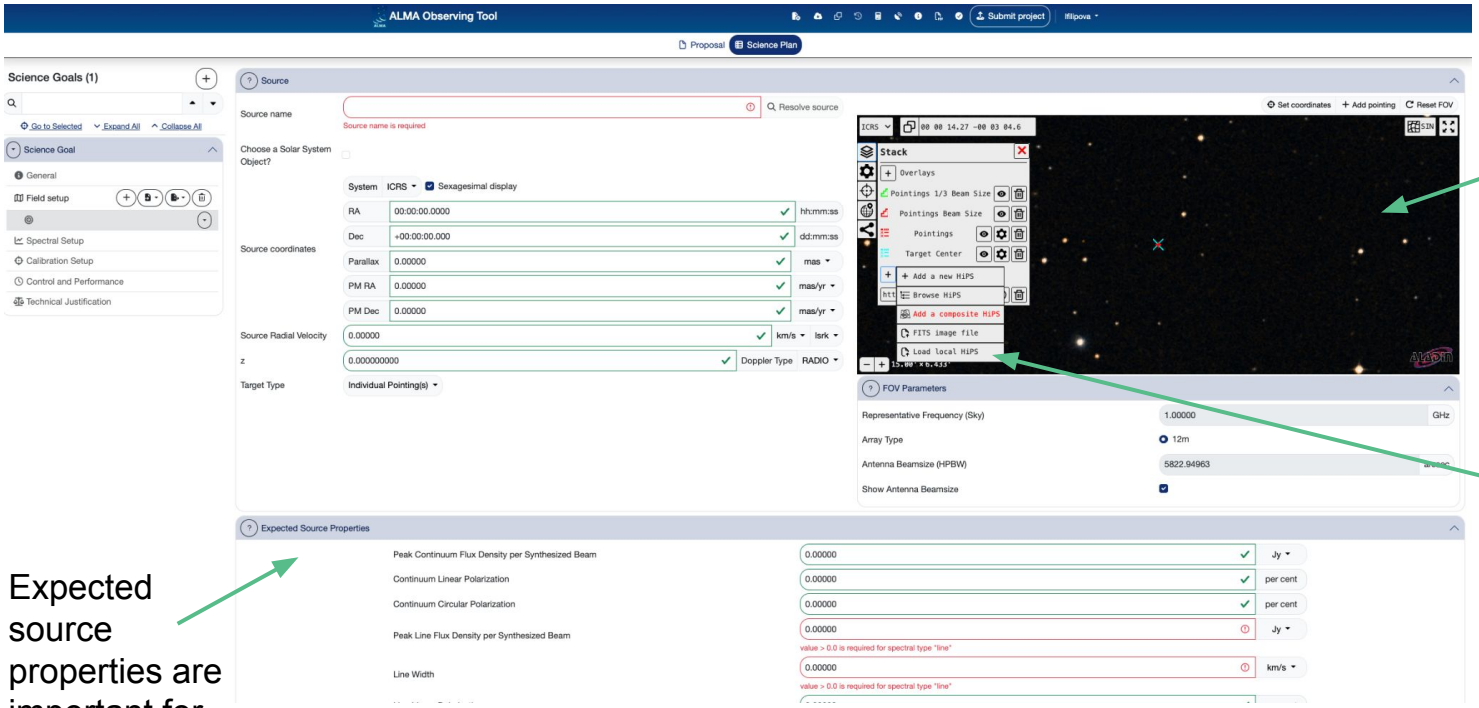
Field setup

Automatically import Source properties from the Simbad database



Sources can be added, imported, exported or deleted.

Field setup - Spatial visualizer



Spatial visualizer displays the browser version of the Aladin interactive Sky Atlas

Load FITS files by accessing the Overlays Menu and clicking on the plus sign next to “Surveys”

Expected source properties are important for the technical justification

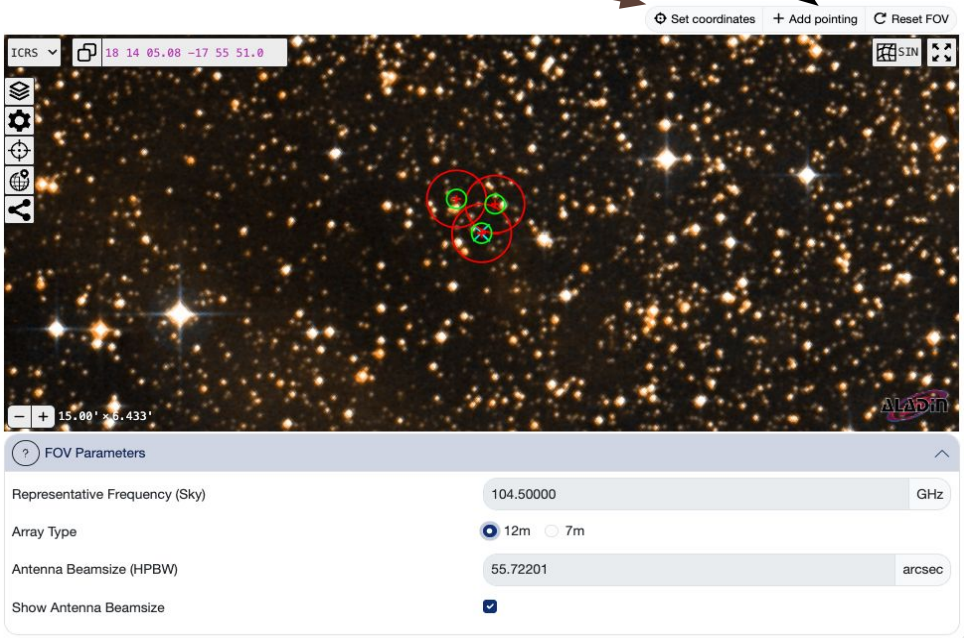
Field setup - Target Type

All sources in an SG must use the same Target Type (“Individual Pointings(s)” or “Rectangular Field”)

Individual Pointing(s)

change the coordinates of the source.

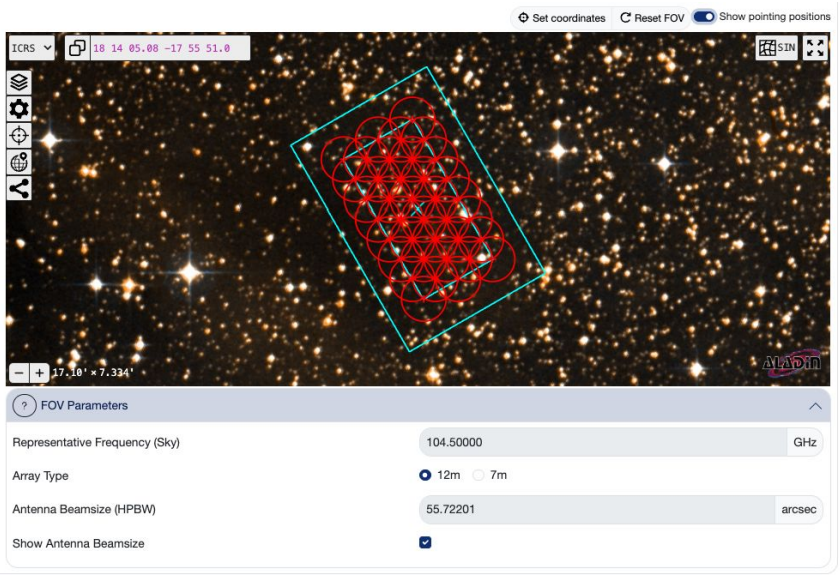
Individual pointings can be added in the visualizer **but not moved or removed**. Alternative: define pointings in CARTA and then import



Rectangular Field

No interactivity implemented for rectangles yet (you cannot draw, resize or rotate the rectangle)

Toggle activates pointing positions.



Field setup - Target Type

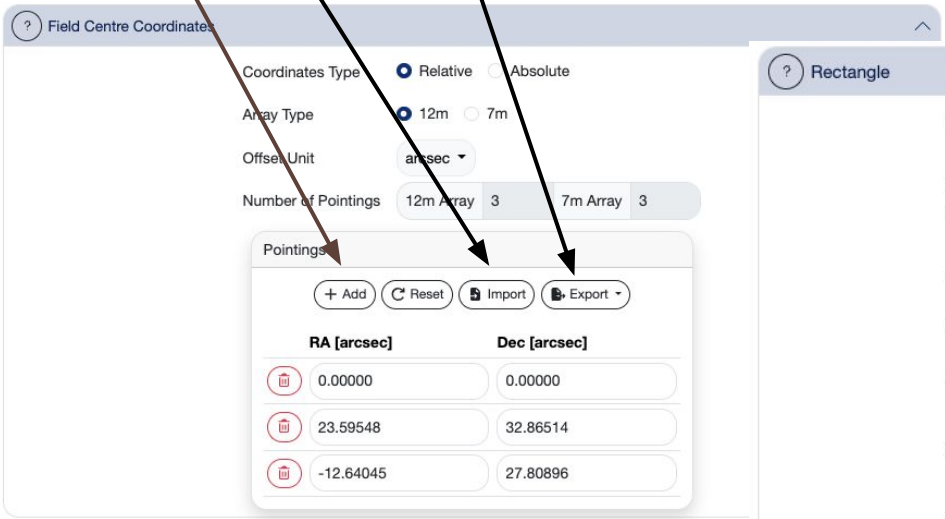
Individual Pointing(s)

Add pointing

import pointing

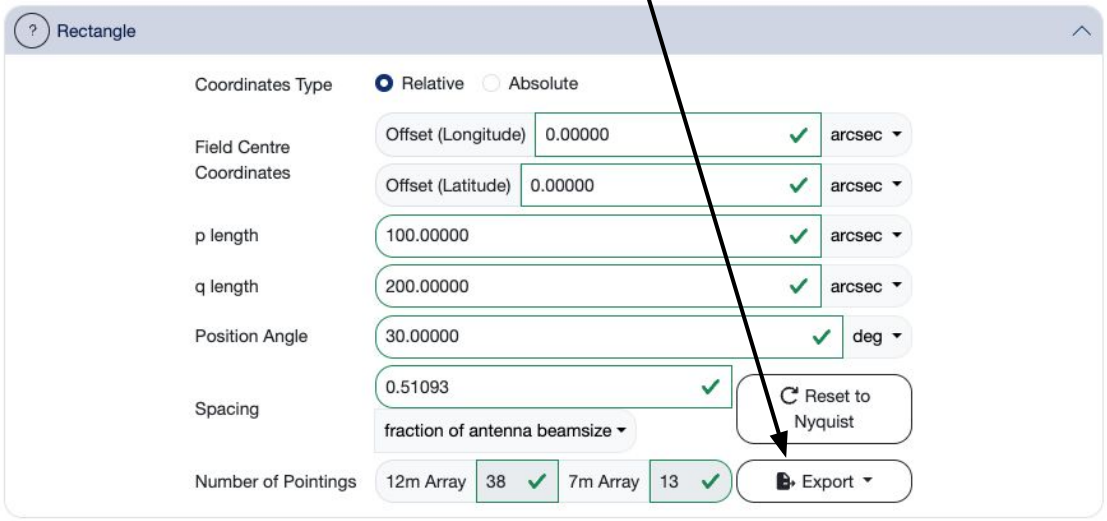
export pointing

beam size depends on frequency -> define pointings or rectangular field after spectral setup



Rectangular Field

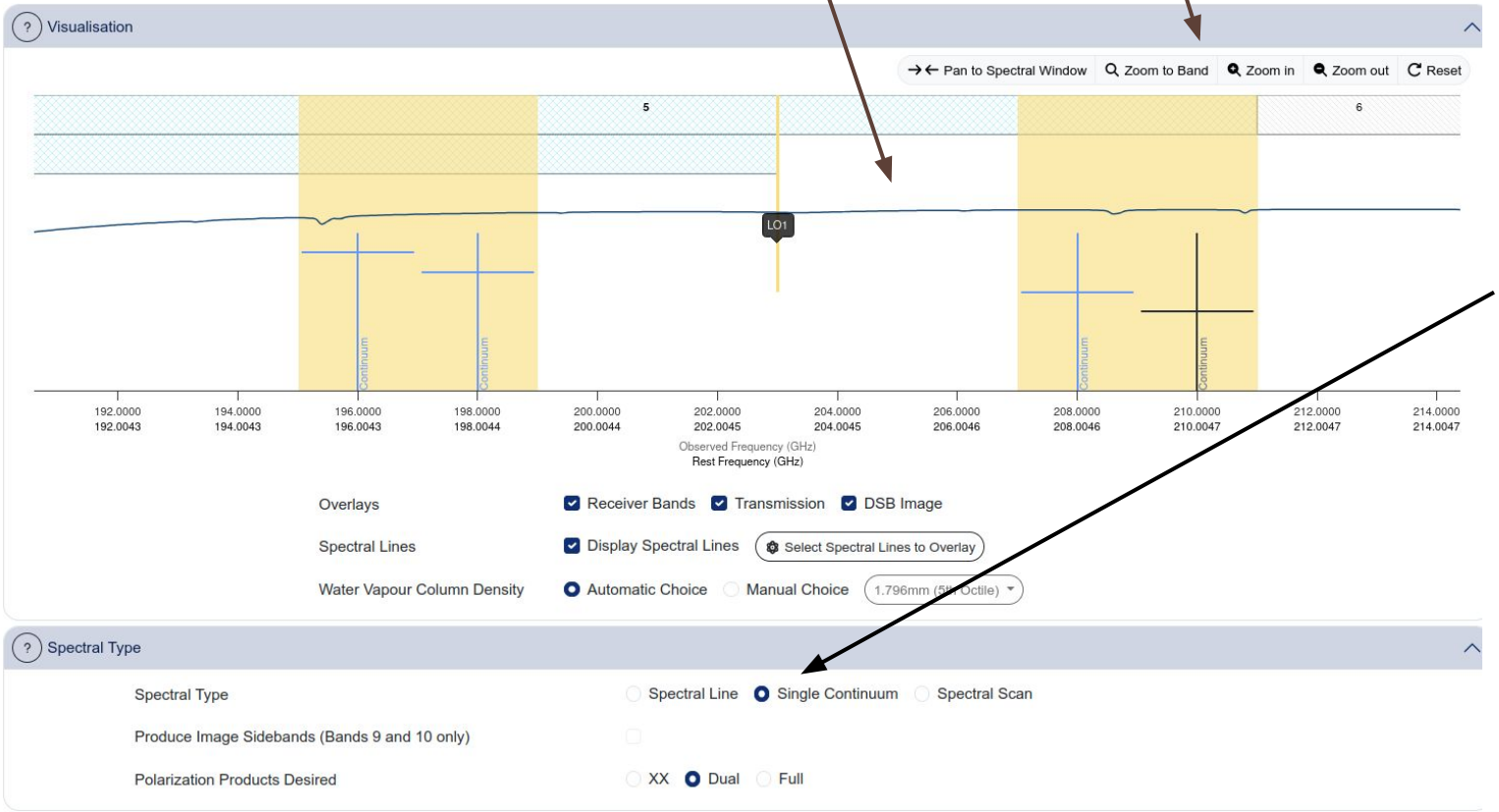
Export all pointings of the rectangle



Spectral Setup

You can also use your mouse to zoom

Zoom options

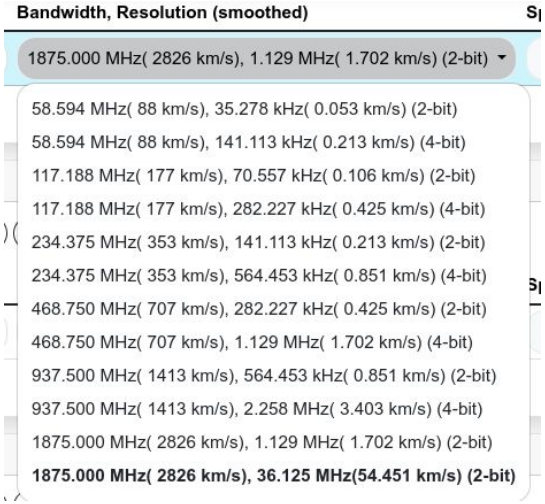


Spectral types:

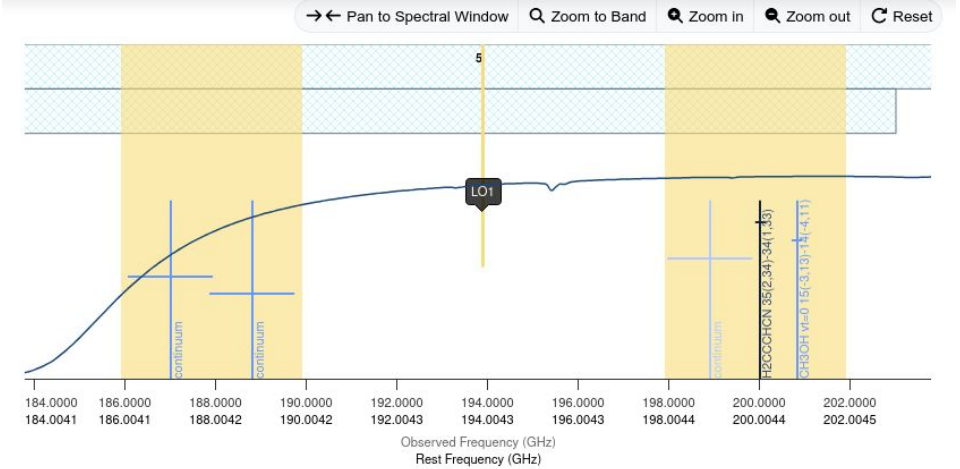
- *Spectral Line*
- *Single Continuum* (shortcut to define four continuum spectral windows)
- *Spectral Scan* (to cover a wide, uninterrupted frequency range)

Spectral Line

- 4 basebands of ~2 GHz each
- each baseband can contain up to 4 spectral windows (i.e. up to 16 spectral windows in total)
- the higher the spectral resolution, the lower the bandwidth of the spectral window
- basebands not needed for spectral line observations should be used for continuum to maximise total bandwidth (helps calibration)!

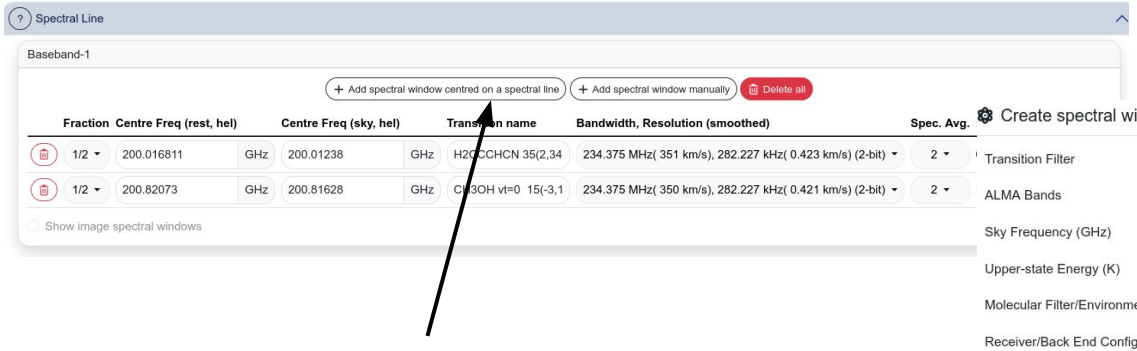


The higher the spectral resolution, the lower the bandwidth of the spectral window

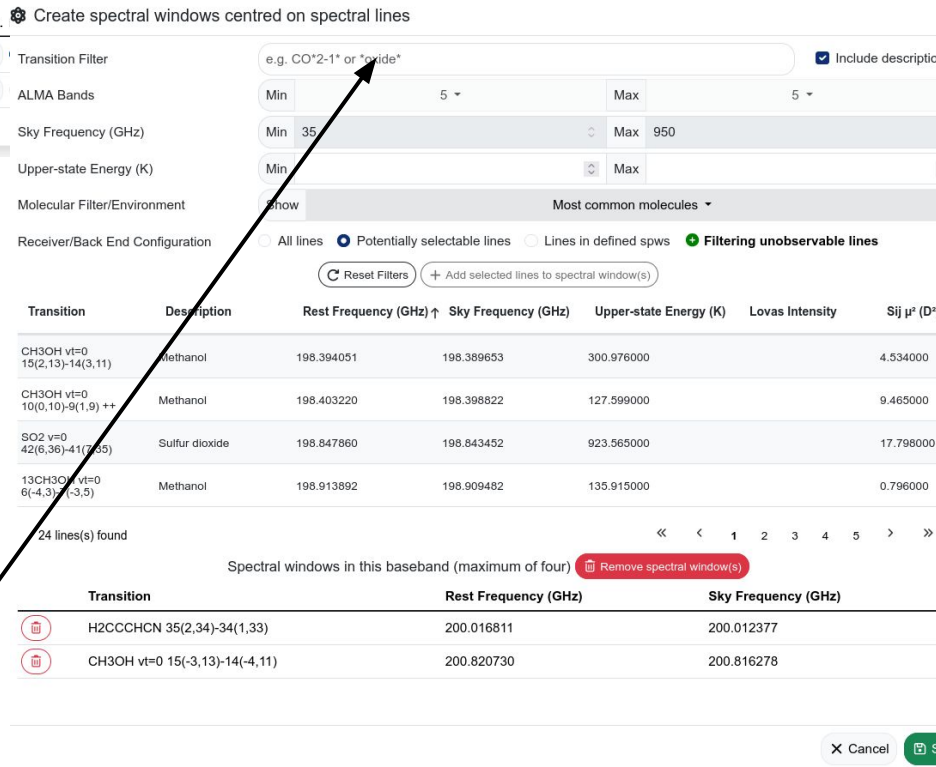


Example of a setup using continuum spectral windows to maximise the total bandwidth

Spectral Setup - Spectral Line Picker



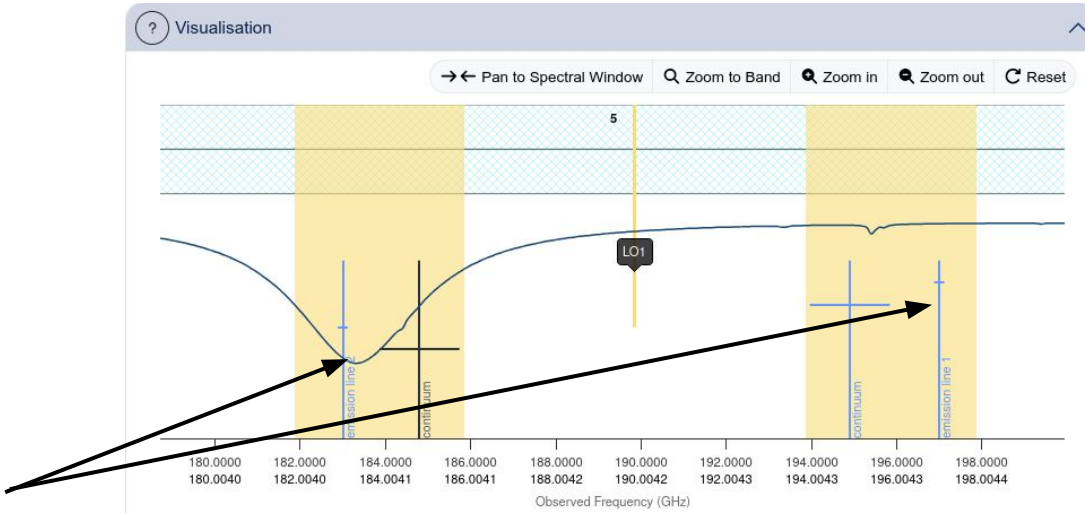
Open Spectral Line Picker



If one uses the transition filter, one needs to click outside of the field for the search to start.

Representative window

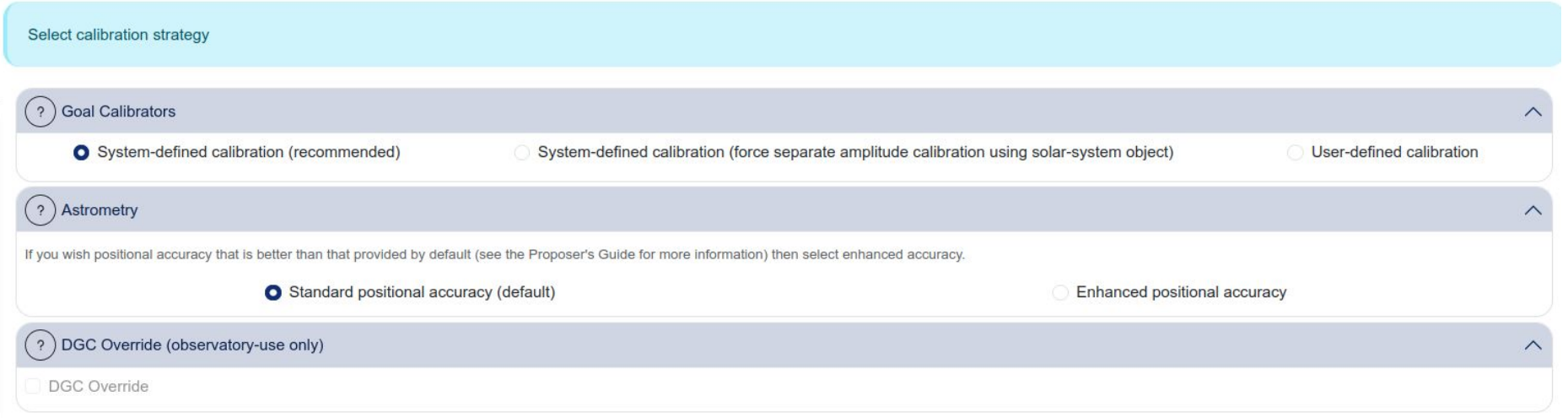
- pay attention to the representative window, because it affects the time estimate! (e.g. if the atmospheric transmission is very different for different windows)
- choose the window most important for your science



Very different atmospheric transmission. Choice of representative window will strongly affect time estimate!

Calibration Setup

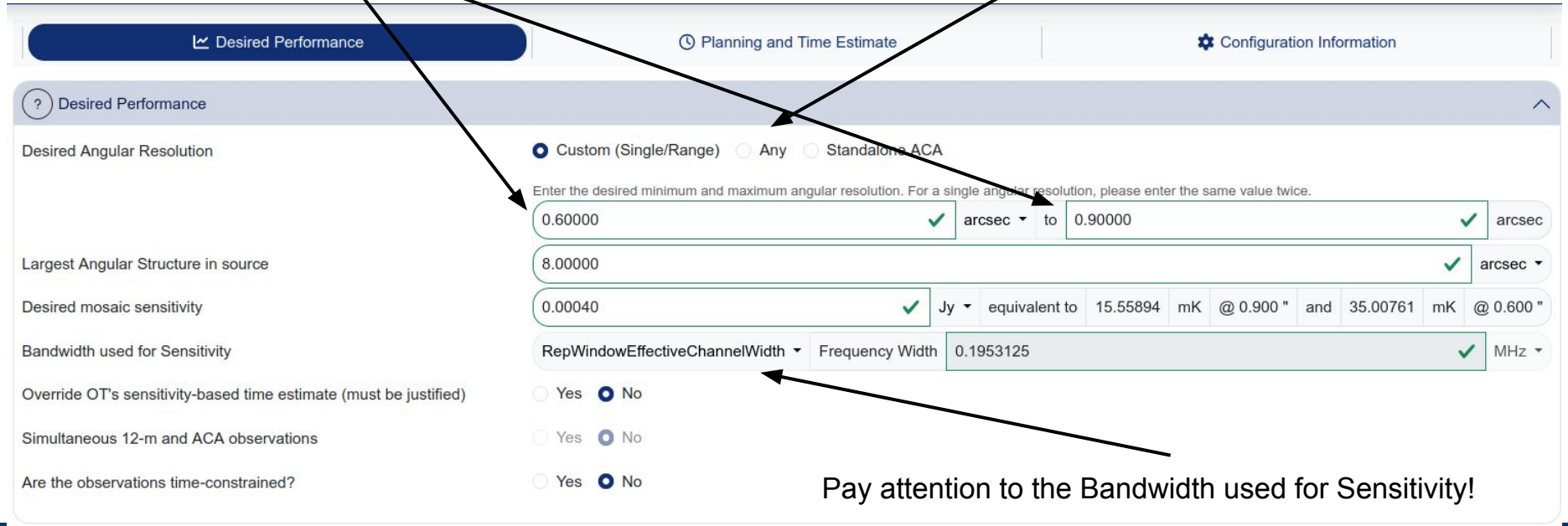
- leave it at default values, unless you know what you are doing



Control and Performance - Desired Performance

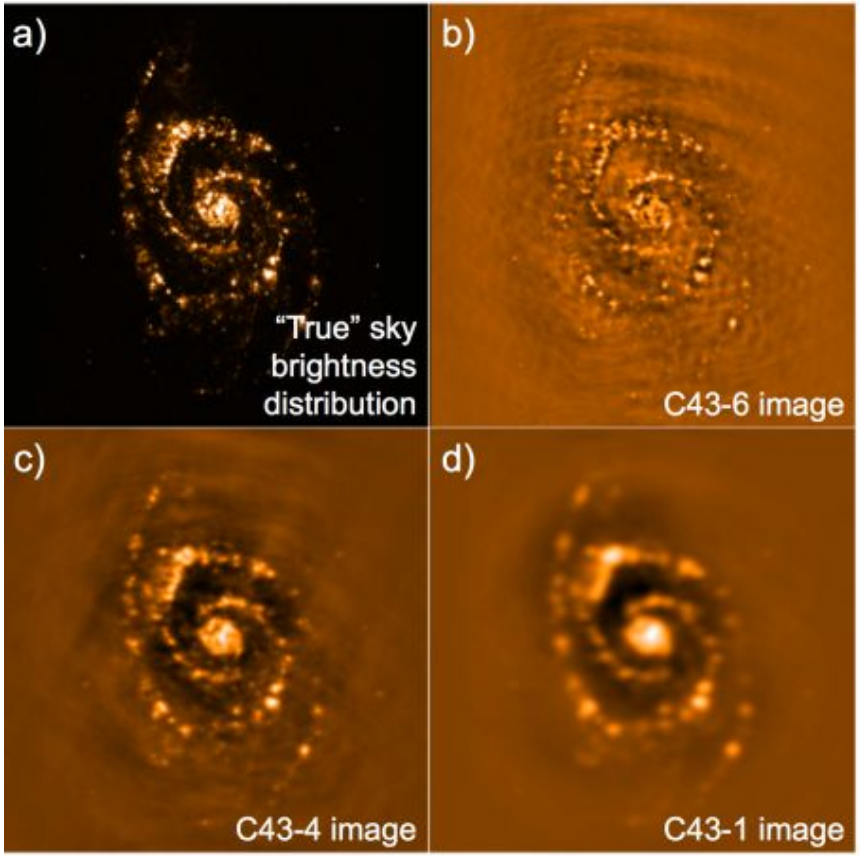
If desired, you can put the same value twice, but the OT will extend it to a ±20% range behind the scenes

Angular resolution options
- Custom
- Any (science can be done with any configuration)
- Standalone ACA (use only 7M array)



Pay attention to the Bandwidth used for Sensitivity!

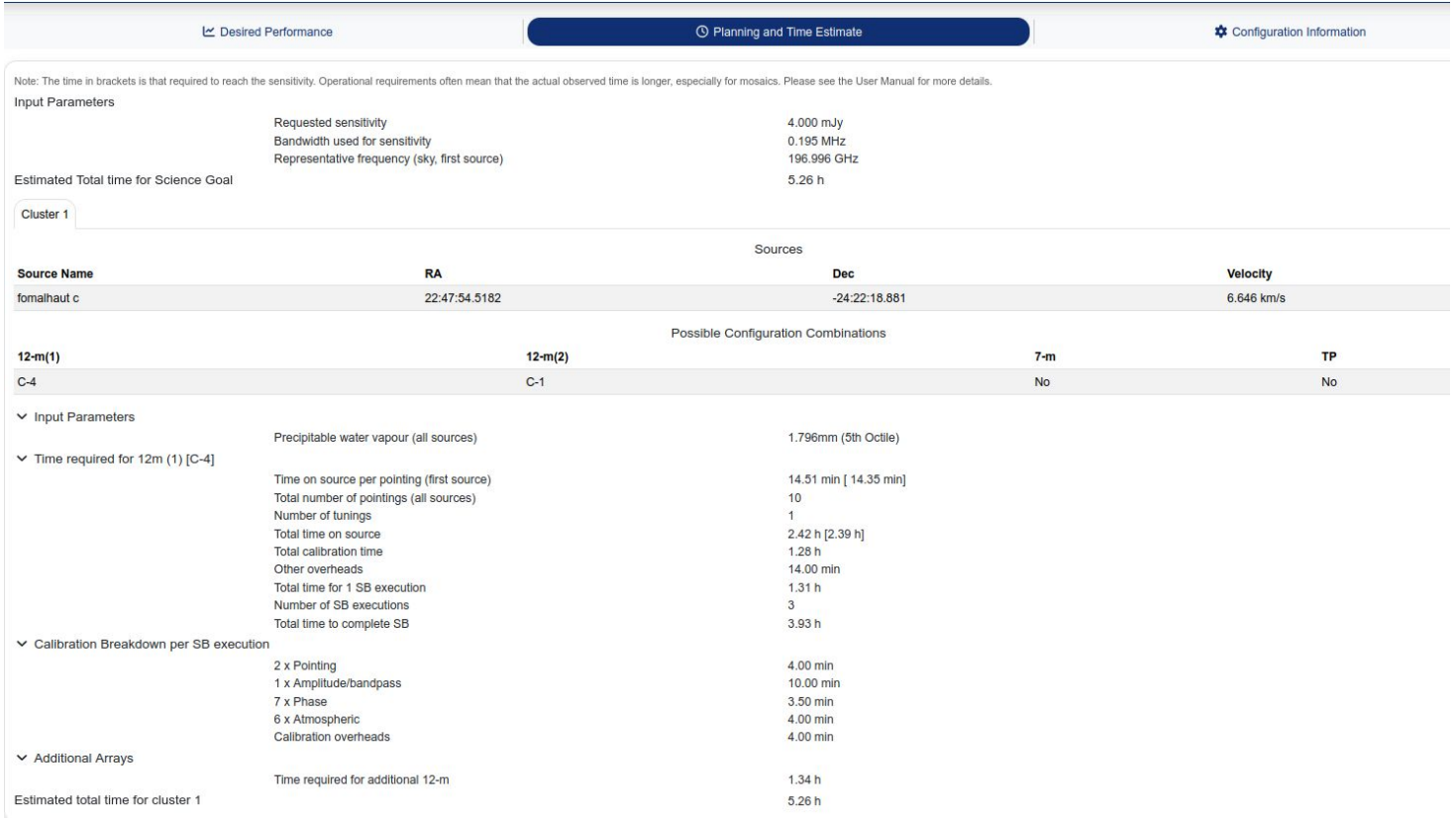
Largest angular structure



- interferometers filter out large scale emission (maximum recoverable scale is approximately $0.6\lambda/L_{min}$, where L_{min} is the shortest baseline)
- you need to enter the largest angular structure you would like to recover
- the OT will automatically add compact configurations if necessary
- see https://www.youtube.com/watch?v=9iDNq82t7gs

Simulated observations illustrating spatial filtering (Fig. 3.6 in Technical Handbook cycle 11)

Control and Performance - Planning and Time Estimate



Desired Performance | Planning and Time Estimate | Configuration Information

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	4.000 mJy
Bandwidth used for sensitivity	0.195 MHz
Representative frequency (sky, first source)	196.996 GHz
Estimated Total time for Science Goal	5.26 h

Cluster 1

Sources

Source Name	RA	Dec	Velocity
fomalhaut c	22:47:54.5182	-24:22:18.881	6.646 km/s

Possible Configuration Combinations

12-m(1)	12-m(2)	7-m	TP
C-4	C-1	No	No

Input Parameters

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

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

Time on source per pointing (first source)	14.51 min [14.35 min]
Total number of pointings (all sources)	10
Number of tunings	1
Total time on source	2.42 h [2.39 h]
Total calibration time	1.28 h
Other overheads	14.00 min
Total time for 1 SB execution	1.31 h
Number of SB executions	3
Total time to complete SB	3.93 h

Calibration Breakdown per SB execution

2 x Pointing	4.00 min
1 x Amplitude/bandpass	10.00 min
7 x Phase	3.50 min
6 x Atmospheric	4.00 min
Calibration overheads	4.00 min

Additional Arrays

Time required for additional 12-m	1.34 h
Estimated total time for cluster 1	5.26 h

Control and Performance - Configuration Information

Desired Performance | Planning and Time Estimate | Configuration Information

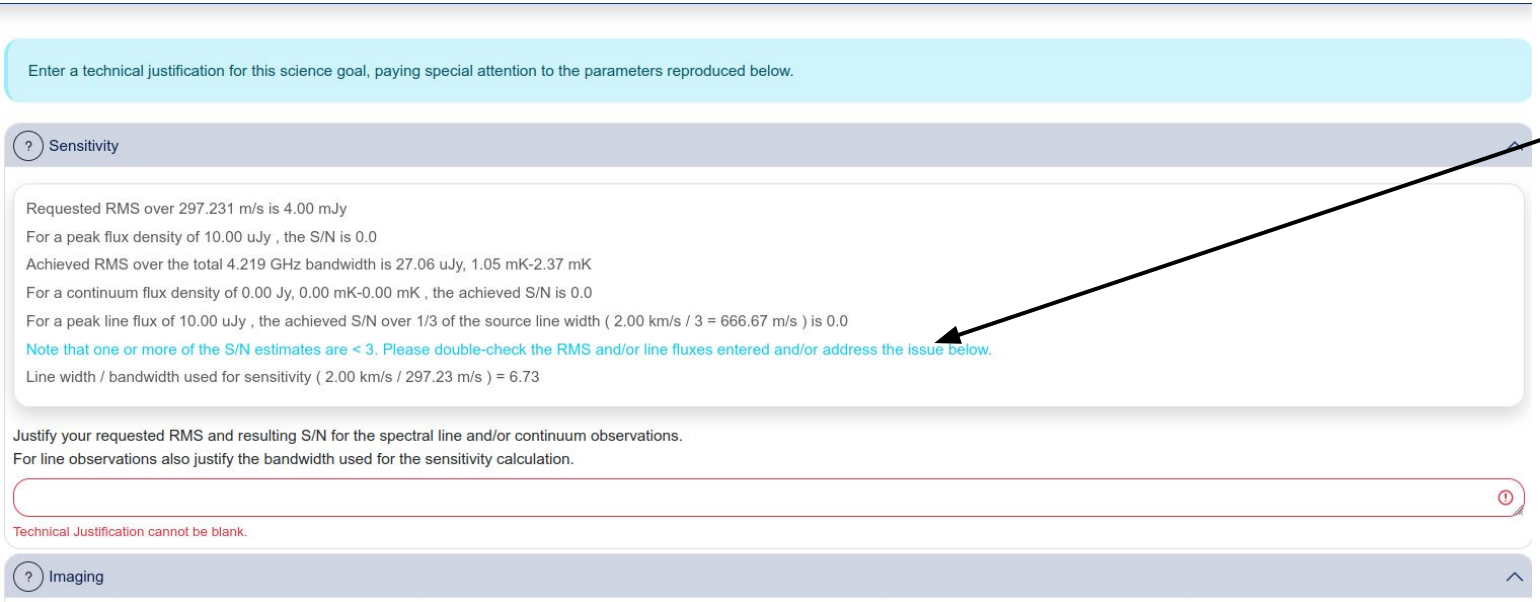
Antenna Beamsize (1.13 * λ/D)	12m	29.55878 arcsec	7m	50.67219 arcsec	
Number of Antennas	12m	43	7m	10	TP 3

	ACA 7m Configuration	Most compact 12m configuration	Most extended 12m configuration
Longest baseline	49 m	160.7 m	16196.6 m
Synthesized beamsize	6.35553 arcsec	1.68218 arcsec	0.02589 arcsec
Shortest baseline	9 m	15.1 m	256.1 m
Maximum recoverable scale	33.84756 arcsec	14.46626 arcsec	0.25178 arcsec

Technical Justification (TJ)

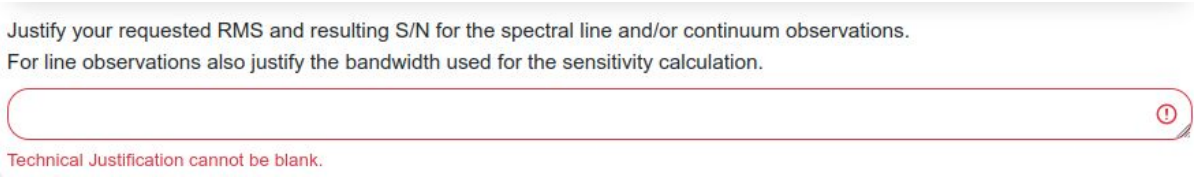
- **quantitatively** justify your technical setup (usually three text boxes):
  - Sensitivity
  - Imaging (angular resolution, largest angular scale)
  - Correlator Setup (=Spectral Setup)
- you need to convince the reviewers that your setup
  - can achieve your scientific goals
  - uses ALMA time efficiently
- the Technical Justification is important!
  - If you have a weak science case, a good TJ will not save you
  - ...but if you write a bad TJ, your proposal might be rejected even though you have a great science case（もったいない！）
- look at examples from your colleagues!

Technical Justification



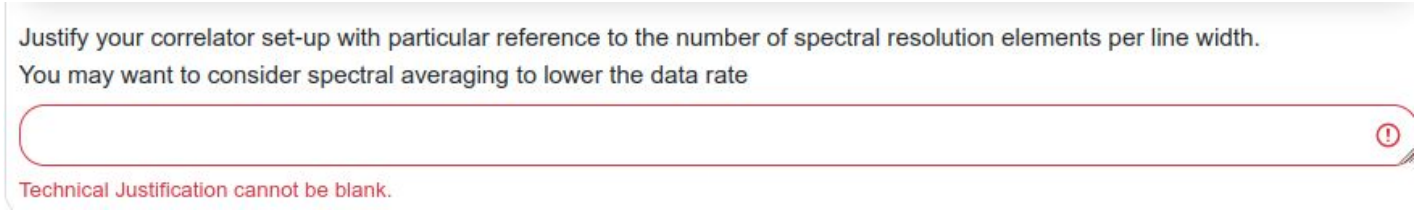
pay particular attention to any blue text and be sure to include the corresponding justification

Technical Justification: Sensitivity



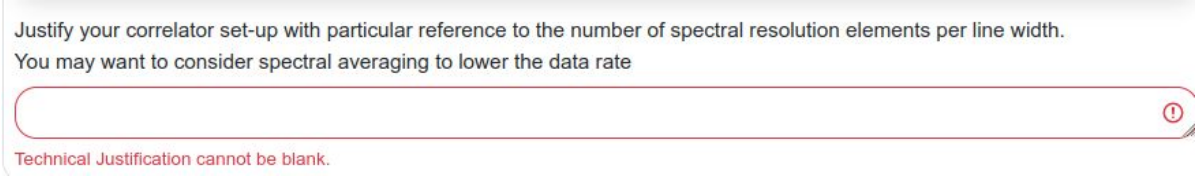
- What is the justification for the requested sensitivity?
  - What is the expected source brightness?
  - What S/N ratio do you need, and why?
  - Example: “To measure the disk size with an error of ~20%, our simulated observations indicate that we need a peak S/N of at least 10 in a single beam. Considering the total flux of the source measured by Camelot (1999), we expect a flux of 1 mJy/beam. Thus, we request a sensitivity of 0.1 mJy/beam…”
- For line observations, justify also the bandwidth used for the sensitivity calculation
  - Example: “As described in the Scientific Justification, to distinguish between our two hypotheses, we need to measure the CO 2-1 spectrum with a peak S/N of at least 5. Our models predict a CO 2-1 peak flux larger than 20 mJy. Thus, we request a sensitivity of 4 mJy over the bandwidth of a single channel.”
- If you do both line and continuum observations, be sure to discuss both

Technical Justification: Imaging



- Why do you need to achieve the requested angular resolution for your science?
  - What do you want to resolve?
  - Example: “To accurately characterise the ring morphology, we need to resolve it with at least 5 beams. Given the ring width of 0.5” measured by Lancelot (1988), we thus request an angular resolution of 0.1”…”
- What is the maximum angular scale you need to recover for your science, and why?
  - Example: “For our science, we need to recover the large scale emission of our source. Therefore, we set the largest angular scale equal to the galaxy diameter…”

Technical Justification: Correlator configuration



- What is the idea behind your spectral setup?
  - Example: “We place one spectral window onto the CO 2-1 line, while the remaining three spectral windows will observe the continuum to aid calibration. The continuum spectral windows will observe in FDM mode to allow serendipitous line detection…”
- What spectral resolution do you need, and why?
  - Example: “We want to resolve the line shape with at least 10 resolution elements to characterise the kinematics of the source in detail. Given the known line width of 10 km/s (Robin et al. 2000), we thus need a spectral resolution of 1 km/s.”
- Why did you choose Band X?
  - Example: “Observations in Band X give best tradeoff between the achieved S/N and the required observing time…”

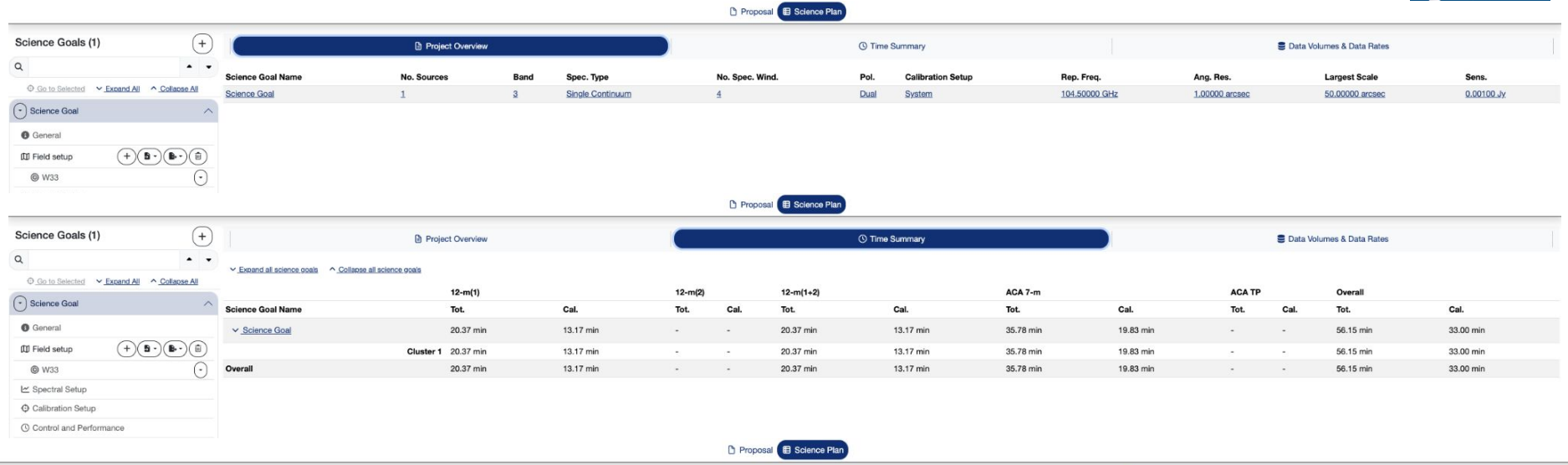
Validation

- Your proposal needs to validate without errors to be submitted
- It is recommended to validate your proposal often!

Click here to be taken directly to the error location

Project Overview / Time Summary / Data Volumes & Data Rates

Click on Science Plan



Science Goal Name	No. Sources	Band	Spec. Type	No. Spec. Wind.	Pol.	Calibration Setup	Rep. Freq.	Ang. Res.	Largest Scale	Sens.
Science Goal	1	3	Single Continuum	4	Dual	System	104.50000 GHz	1.00000 arcsec	50.00000 arcsec	0.00100 Jy

	12-m(1)		12-m(2)		12-m(1+2)		ACA 7-m		ACA TP		Overall	
Science Goal Name	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.	Tot.	Cal.
Science Goal	20.37 min	13.17 min	-	-	20.37 min	13.17 min	35.78 min	19.83 min	-	-	56.15 min	33.00 min
Cluster 1	20.37 min	13.17 min	-	-	20.37 min	13.17 min	35.78 min	19.83 min	-	-	56.15 min	33.00 min
Overall	20.37 min	13.17 min	-	-	20.37 min	13.17 min	35.78 min	19.83 min	-	-	56.15 min	33.00 min

	Data Volume			Avg. Data Rate		
Science Goal Name	12-m (1+2)	ACA 7-m	ACA TP	12-m (1+2)	ACA 7-m	ACA TP
Science Goal	1.88 GB	393.61 MB	-	-	-	-
Cluster 1	1.88 GB	393.61 MB	-	1.93 MB	0.21 MB	-
Overall	1.88 GB	393.61 MB	-			

Known issues

- For the full list of known issues, please check https://almascience.nao.ac.jp/proposing/observing-tool/faq-and-known-issues
- Enter button does not work in all fields. It is recommended to use the tab button to move away from a field.
- Spectral Line Picker: Click away from transition filter field to start the search

help function

Use the help function by clicking on the question mark!

Final tips

- log out after your work is done
- delete drafts from time to time to keep staging area clean
- write your proposals early, submit early!

Image credit: B. Tafreshi (ESO)

Good Luck!