ALMA OT and Archive!

09:15 - 09:50 -- ALMA Overview talk, ALMA Cycle 5 proposals

09:50 - 10:40 -- Local ALMA Science Highlights:
Brendan Bowler, Yao-Lun Yang,
Jackie Champagne, Sam Factor

10:40 - 11:00 -- Break

11:00 - 11:20 -- ALMA Observing Tool and ALMA data archive
11:20 - 12:30 -- Small group work on ALMA OT and/or archive

12:30 - 13:40 -- Lunch (provided for registered participants)

13:40 - 14:10 -- Introduction to data imaging and ALMA simulations
14:10 - 16:30 -- Small group work on Data Imaging or Simulations

Goals:

- **If you are writing Cycle 5 proposals,**
  Have a draft of a "Science Goal" in your ALMA OT.
  Check for possible duplication in ALMA data archive.
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- **If you're not planning to write a proposal this time,**
  Check if your target of interest (or similar type of sources) have exiting ALMA data in the archive.
  Examine the data content, and the preliminary imaging results.

Downloading the ALMA OT

https://almascience.nrao.edu/proposing/proposing/observing-tool

About | Science | Proposing | Observing | Data | Processing | Tools | Documentation | Help | Search Site

Observing Tool

The ALMA Observing Tool (OT) is a Java application used for the preparation and submission of ALMA Phase 1 (observing proposal) and Phase 2 (telescope runfiles for accepted proposals) materials. It is also used for preparing and submitting Director's Discretionary Time (DDT) proposals. The current *Cycle 4* release of the OT is configured for the present capabilities of ALMA as described in the Cycle 4 Call For Proposals. Note that in order to submit proposals you will have to register with the ALMA Science Portal beforehand.

Note that preparation of Cycle 3 Phase 1 and DDT proposals needs to be done using the Cycle 3 version of the Observing Tool. This version of the OT can be found in the DDT page, or the Phase 2 menu.

Download & Installation

The OT will run on most common operating systems, as long as you have **Java 8** installed (see the troubleshooting page if you are experiencing Java problems). The ALMA OT is available in two flavours: Web Start and tarball.

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

The **tarball** version must be installed manually and will not automatically update itself, however there should be no installation issues. For Linux users, we also provide a download complete with a recommended version of the Java Runtime Environment. Please use this if you have any problems running the OT tarball install with your default Java.

Webstart Tarball

NRAO

OT Video Tutorials

OT Video Tutorials

The OT video tutorials provide an audio-visual demonstration of different aspects of proposal preparation in the OT. Novice users should start with the first video and work their way down, while more experienced users may want to jump straight to one of the specialised videos.

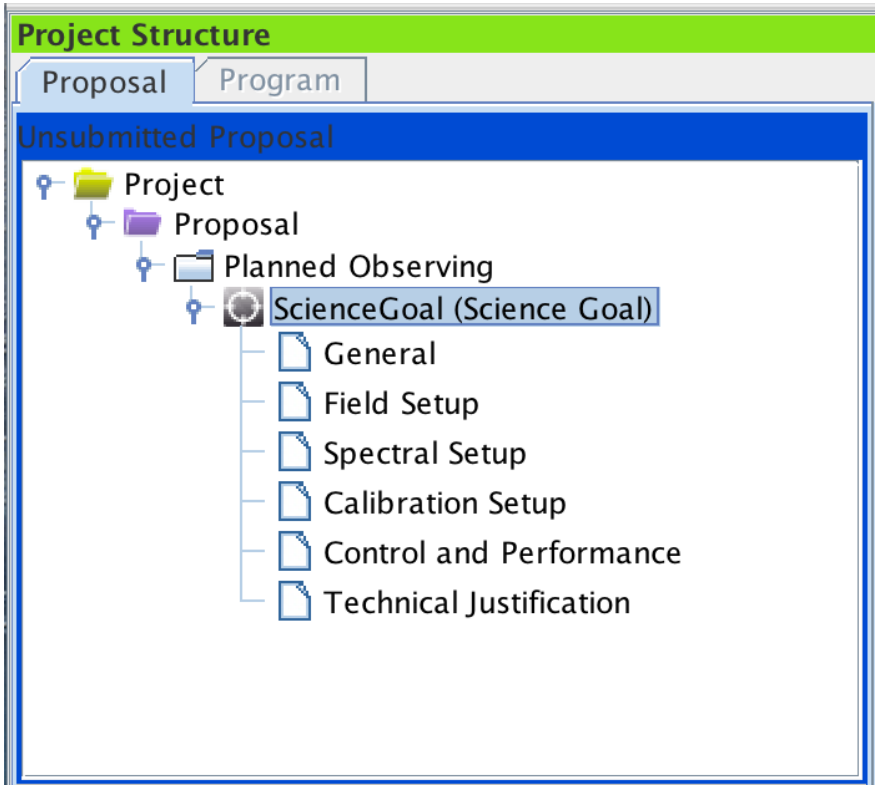
OT Video Tutorial 1: Useful to Know

This video will help you get started with the OT and introduce you to some handy tips and tricks. Topics covered include navigating the OT, using the help function, the template library, time estimation, validation, opening & submitting projects including re-submissions, and the concept of non-standard modes.

Demo:
"Proposal" + "Science case" in OT

What is a "Science Goal":

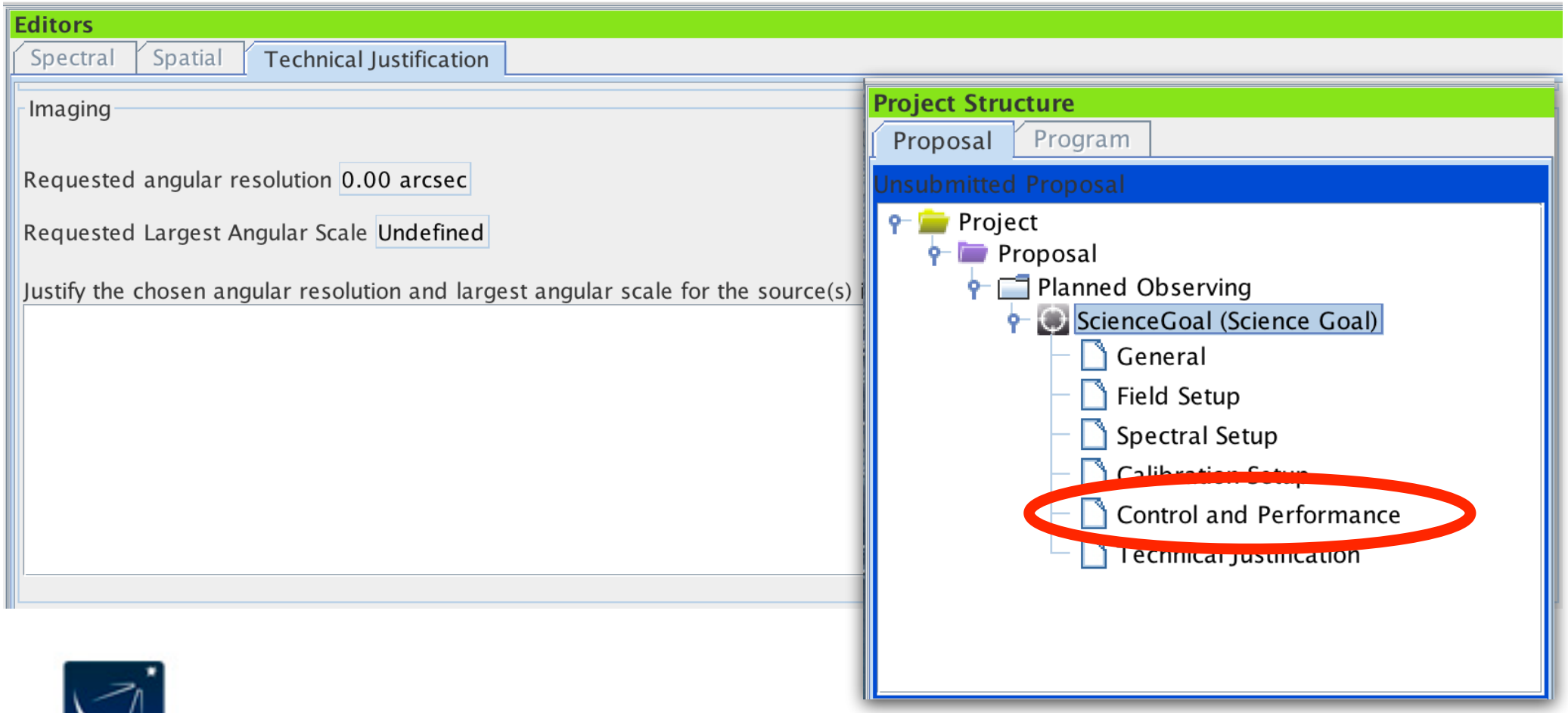
- Like the Technical Justification Section (Targets, Instrumentation Setup, and Justifications)
- In OT, a Science Goal includes



- Each SG contains one or more sources of the same target types (individual pointing(s) or 1 rectangular mosaic), and limited to one correlator setup with up to five frequency tunings, one calibration strategy, and one set of Control/Performance parameters.

Three key elements:

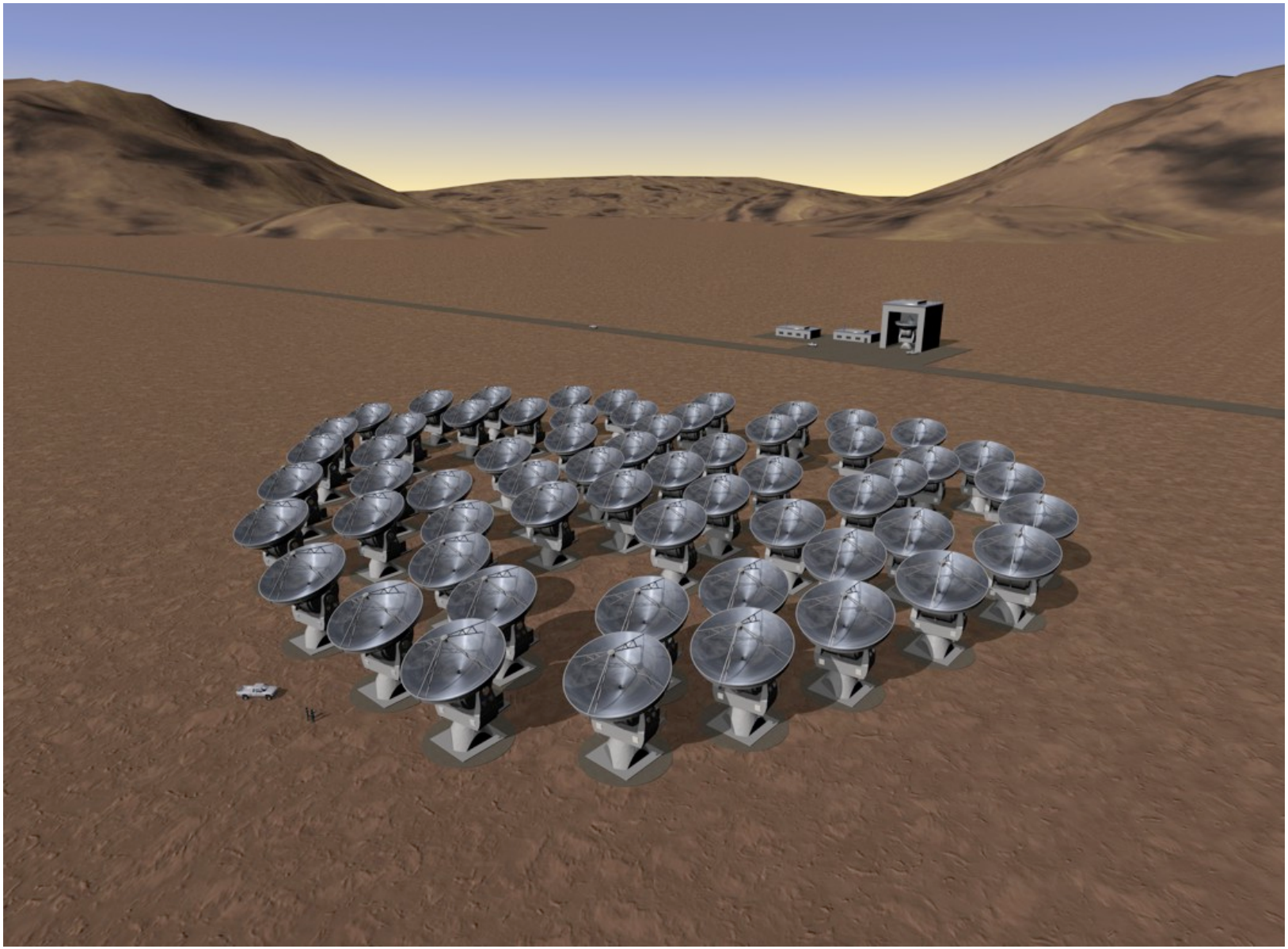
- Angular resolution (array configuration)
- Largest angular scale (do I need ACA? mosaic?)



Interferometry Basics

Single dish: diameter is responsible for sensitivity, field of view, resolution

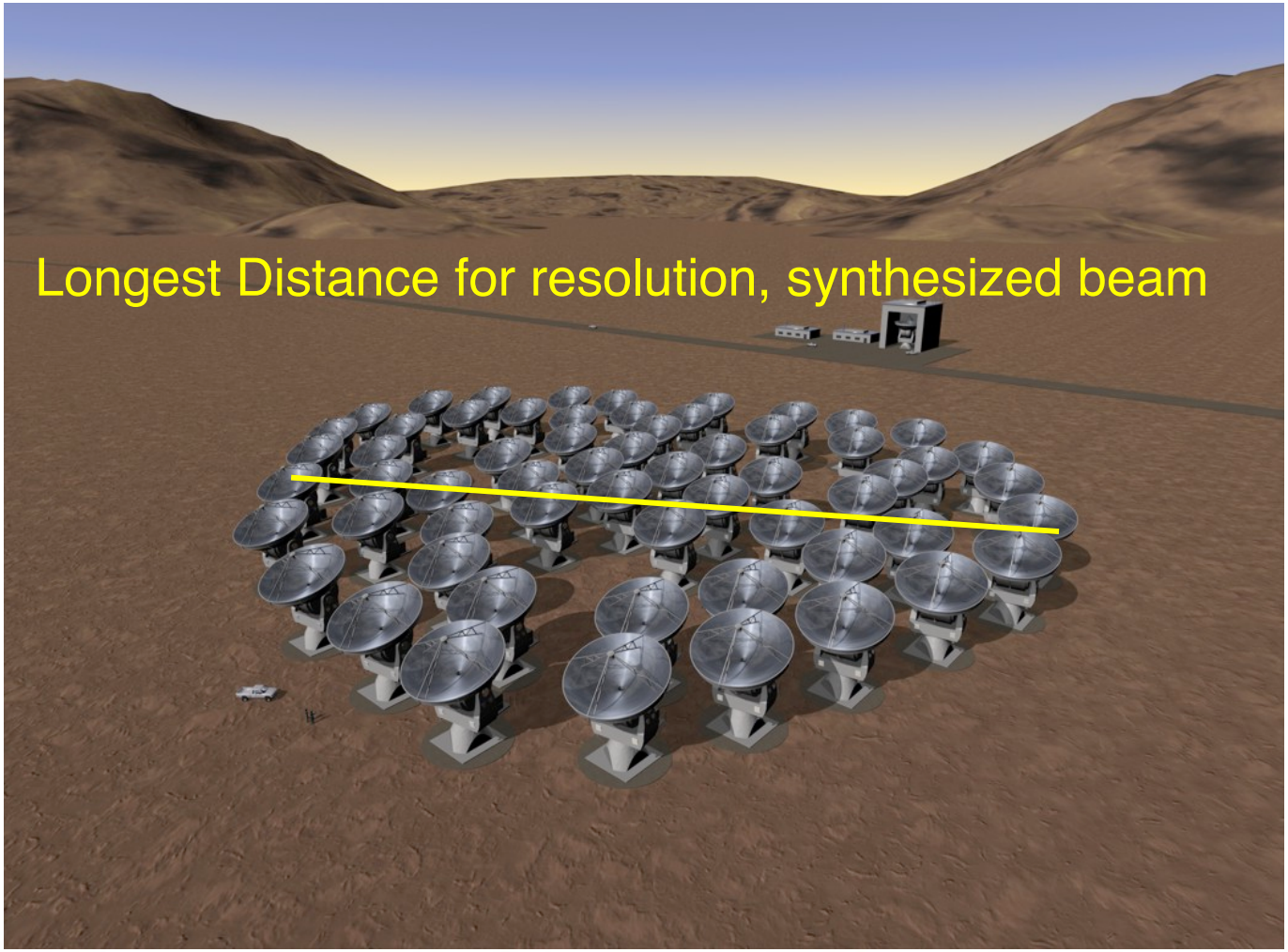
Interferometer: multiple contributing design parameters



Characteristic Angular Scales

Angular resolution of telescope array:

- $\sim \lambda/B_{max}$, where B_{max} is the longest baseline

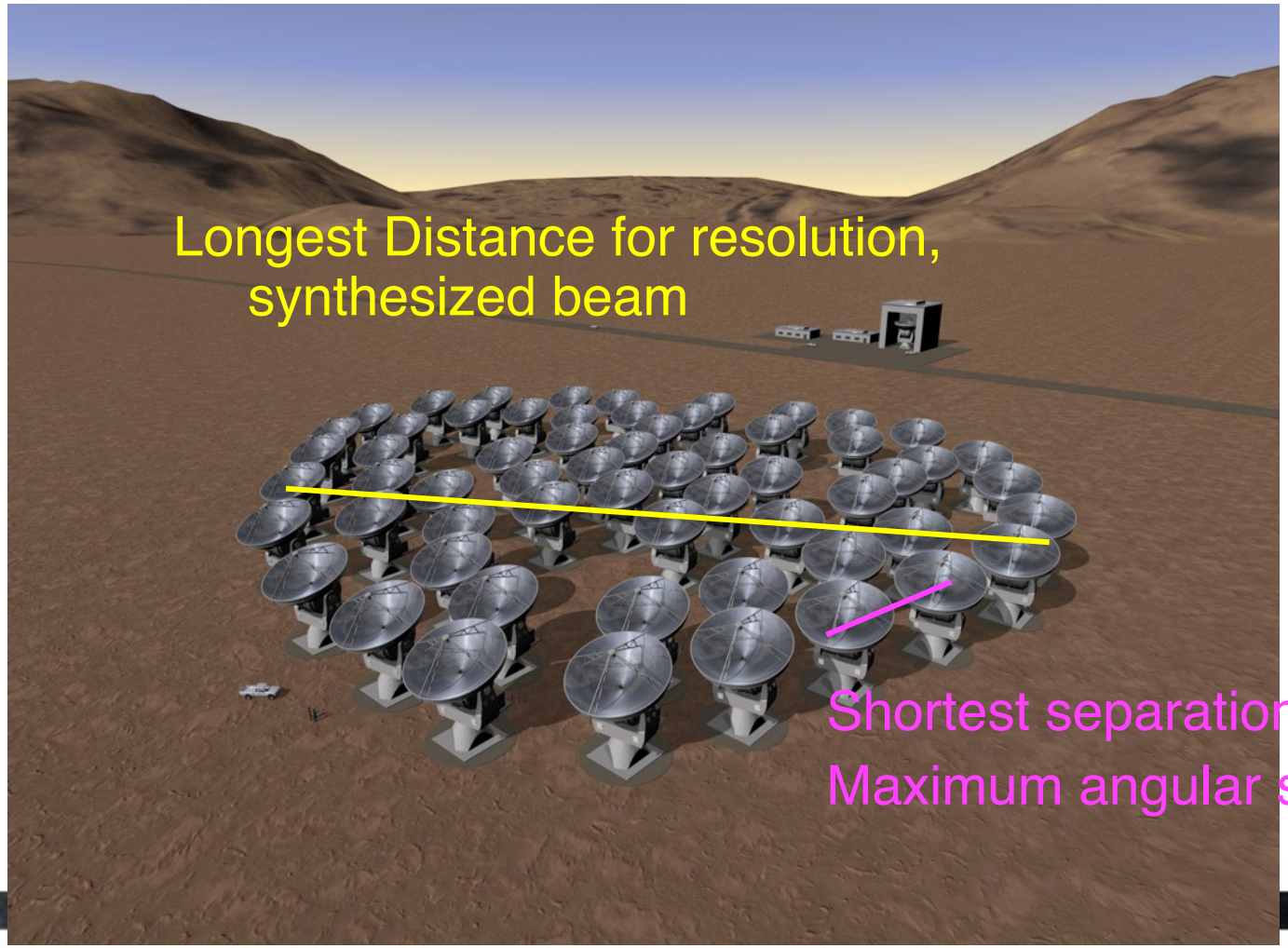


Characteristic Angular Scales

Maximum angular scale:

- a source is resolved if the angular size > λ/B_{min}

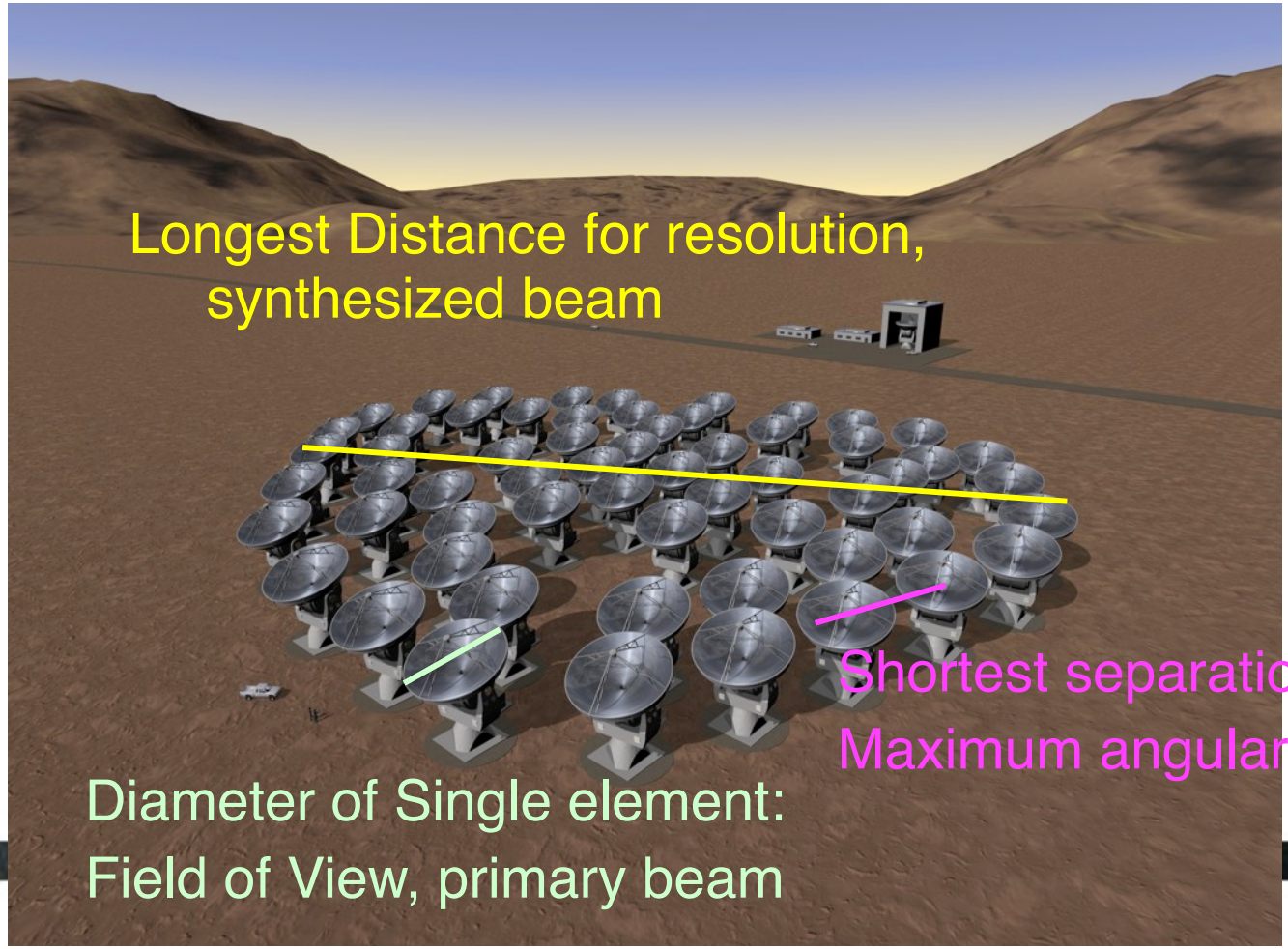
  (B_{min} is the minimum separation between apertures)



Characteristic Angular Scales

Field of view of a single aperture (single dish):

- ~ λ/D, where D is the diameter of the telescope.
- If sources are more extended than the FOV, it can be observed using multiple pointing centers in a mosaic.



Characteristic Angular Scales

Angular resolution of telescope array:

- ~ λ/B_{max} , where B_{max} is the longest baseline

Maximum angular scale:

- a source is resolved if the angular size > λ/B_{min}
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Field of view of a single aperture (single dish):

- ~ λ/D, where D is the diameter of the telescope.
- If sources are more extended than the FOV, it can be observed using multiple pointing centers in a mosaic.

An interferometer is sensitive to a range of angular sizes

$$\lambda/B_{max} < \theta < \lambda/B_{min}$$

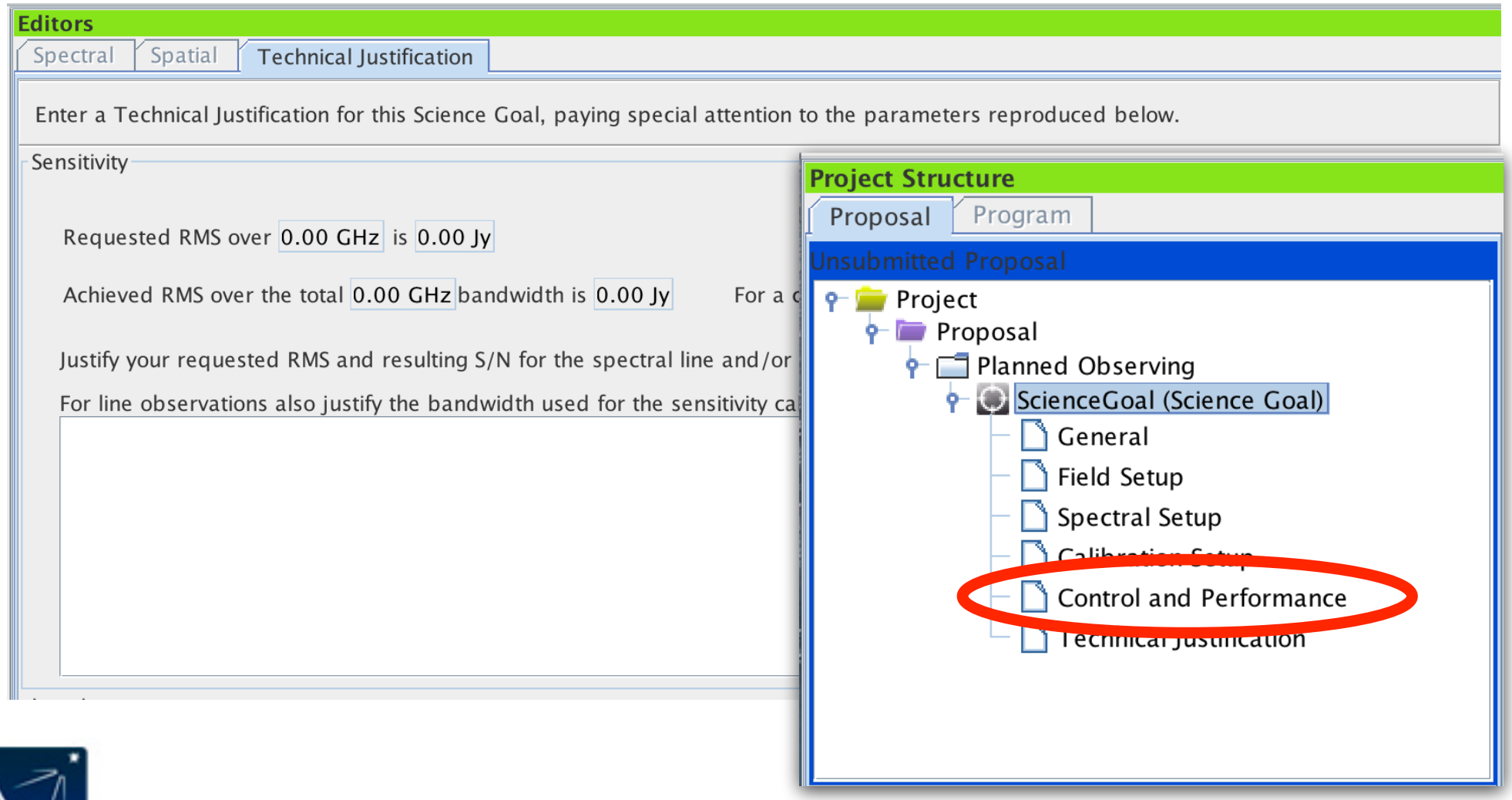
Since $B_{min} > D$, an interferometer is not sensitive to the large angular scales and cannot recover the total flux of resolved sources

Config	Lmax	Band	Band 3	Band 4	Band 5	Band 6	Band 7	Band 8	Band 9	Band 10
	Lmin	Freq	100 GHz	150 GHz	183 GHz	230 GHz	345 GHz	460 GHz	650 GHz	870 GHz
7-m Array	45 m	AR	12.5"	8.4"	6.8"	5.4"	3.6"	2.7"	1.9"	1.4"
	9 m	MRS	66.7"	44.5"	36.1"	29.0"	19.3"	14.5"	10.3"	7.7"
C43-1	161 m	AR	3.4"	2.3"	1.8"	1.5"	1.0"	0.74"	0.52"	0.39"
	15 m	MRS	29.0"	19.0"	15.4"	12.4"	8.3"	6.2"	4.4"	3.3"
C43-2	314 m	AR	2.3"	1.5"	1.2"	1.0"	0.67"	0.50"	0.35"	0.26"
	15 m	MRS	22.6"	15.0"	12.2"	9.8"	6.5"	4.9"	3.5"	2.6"
C43-3	500 m	AR	1.4"	0.94"	0.77"	0.62"	0.41"	0.31"	0.22"	0.16"
	15 m	MRS	16.2"	10.8"	8.7"	7.0"	4.7"	3.5"	2.5"	1.9"
C43-4	784 m	AR	0.92"	0.61"	0.50"	0.40"	0.27"	0.20"	0.14"	0.11"
	15 m	MRS	11.2"	7.5"	6.1"	4.9"	3.3"	2.4"	1.7"	1.3"
C43-5	1.4 km	AR	0.54"	0.36"	0.30"	0.24"	0.16"	0.12"	0.084"	0.063"
	15 m	MRS	6.7"	4.5"	3.6"	2.9"	1.9"	1.5"	1.0"	0.77"
C43-6	2.5 km	AR	0.31"	0.20"	N/A	0.13"	0.089"	0.067"	0.047"	0.035"
	15 m	MRS	4.1"	2.7"		1.8"	1.2"	0.89"	0.63"	0.47"
C43-7	3.6 km	AR	0.21"	0.14"	N/A	0.092"	0.061"	0.046"	0.033"	0.024"
	64 m	MRS	2.6"	1.7"		1.1"	0.75"	0.56"	0.40"	0.30"
C43-8	8.5 km	AR	0.096"	0.064"	N/A	0.042"	0.028"	N/A	N/A	N/A
	110 m	MRS	1.4"	0.95"		0.62"	0.41"			
C43-9	13.9	AR	0.057"	0.038"	N/A	0.025"	N/A	N/A	N/A	N/A
	368 m	MRS	0.81"	0.54"		0.35"				
C43-10	16.2	AR	0.042"	0.028"	N/A	0.018"	N/A	N/A	N/A	N/A
	244 m	MRS	0.50"	0.33"		0.22"				

Table A-1 in ALMA Proposer Guide

Three key elements:

- Sensitivity Requirement

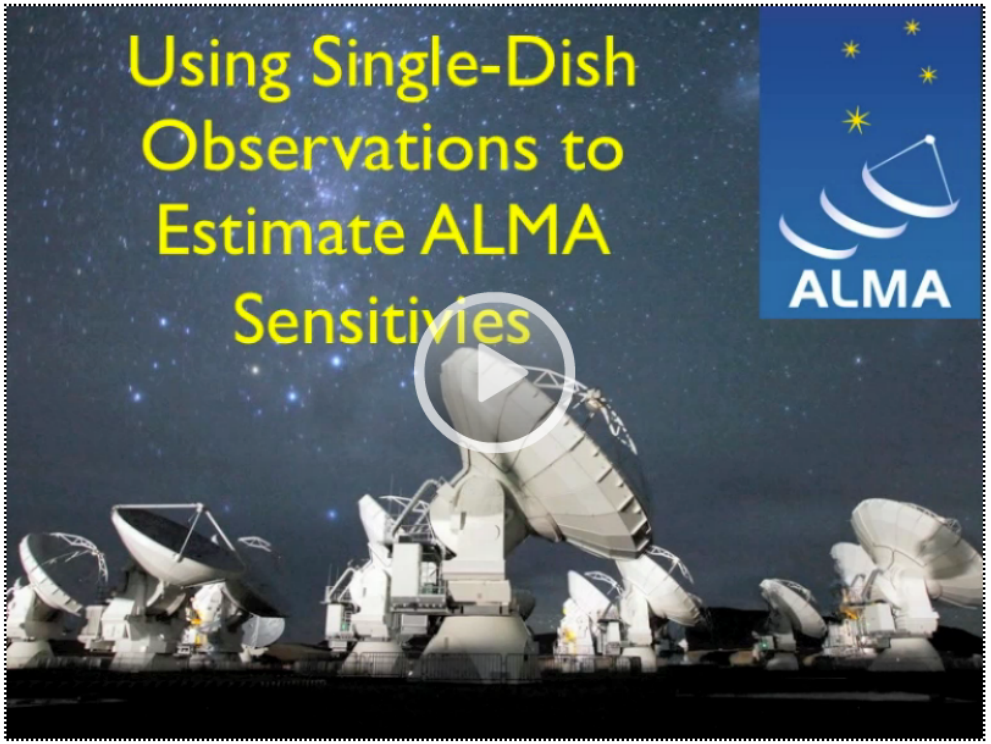


Three key elements:

- If you have single dish measurements:

Using Single-Dish Data to Estimate ALMA Sensitivities

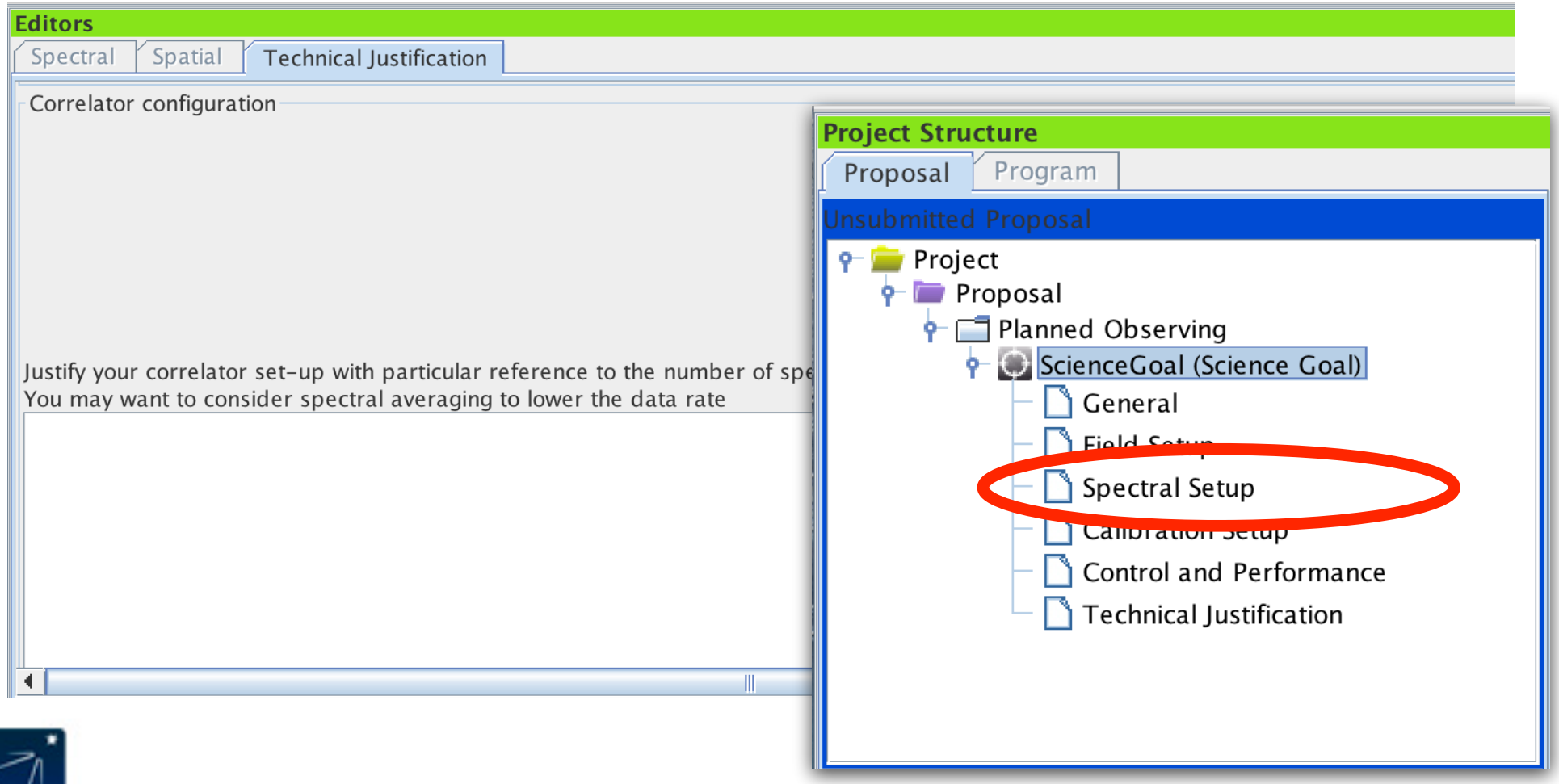
by Dong-Chan Kim — last modified Dec 18, 2015



Duration: 00:06:49

Three key elements:

- Spectral Setup (spectral, continuum, or spectral scan observations?)



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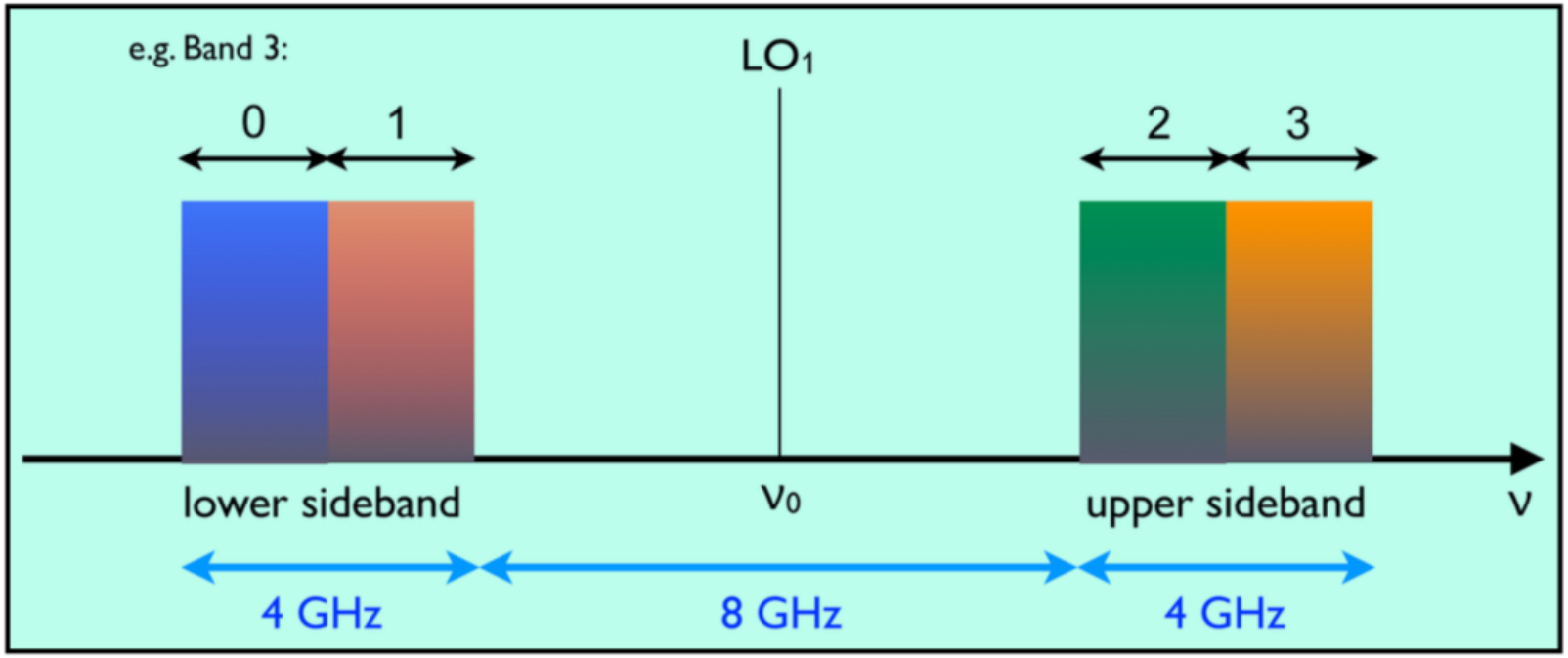
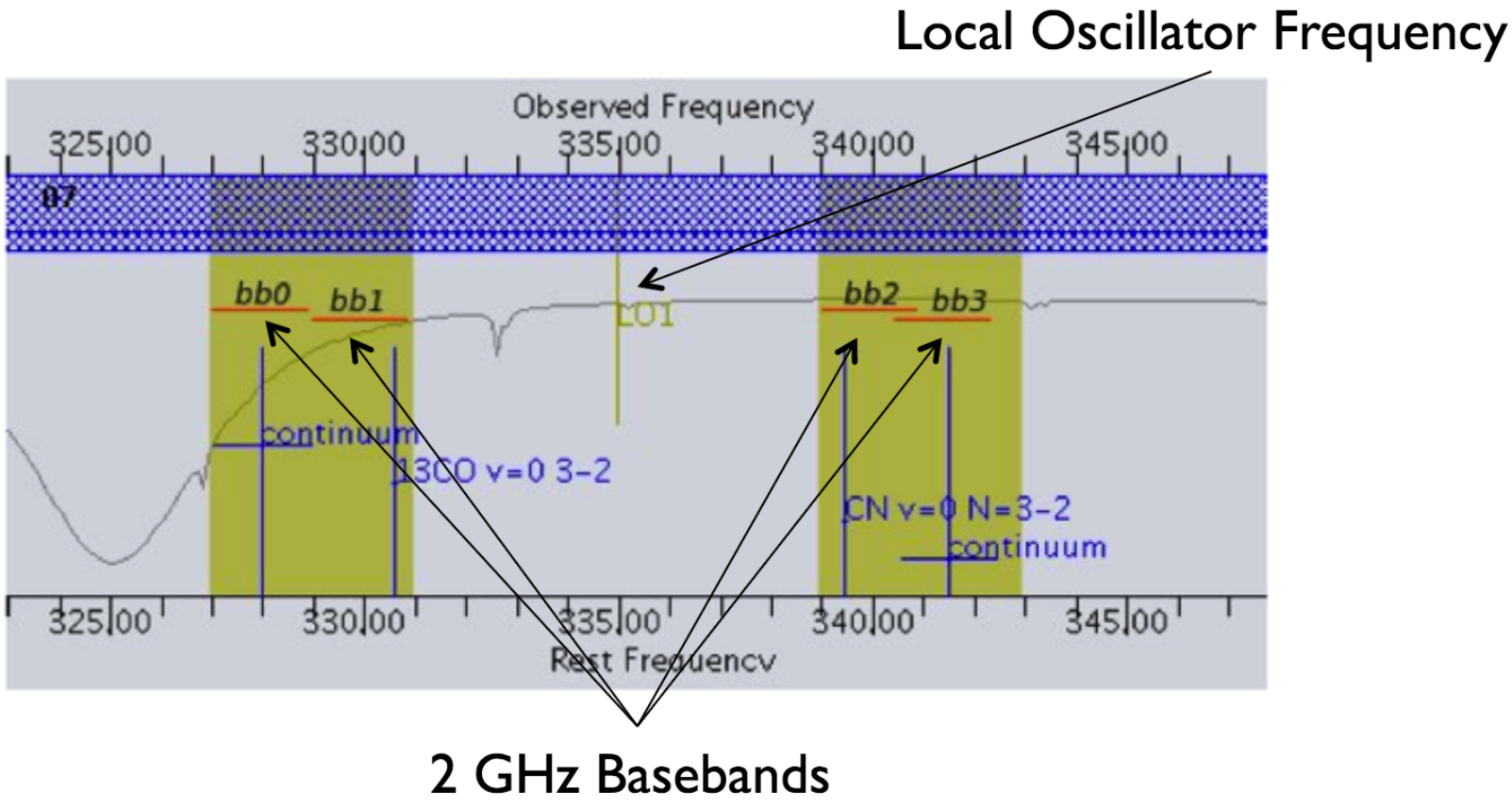


0,1,2,3: 2GHz Basebands

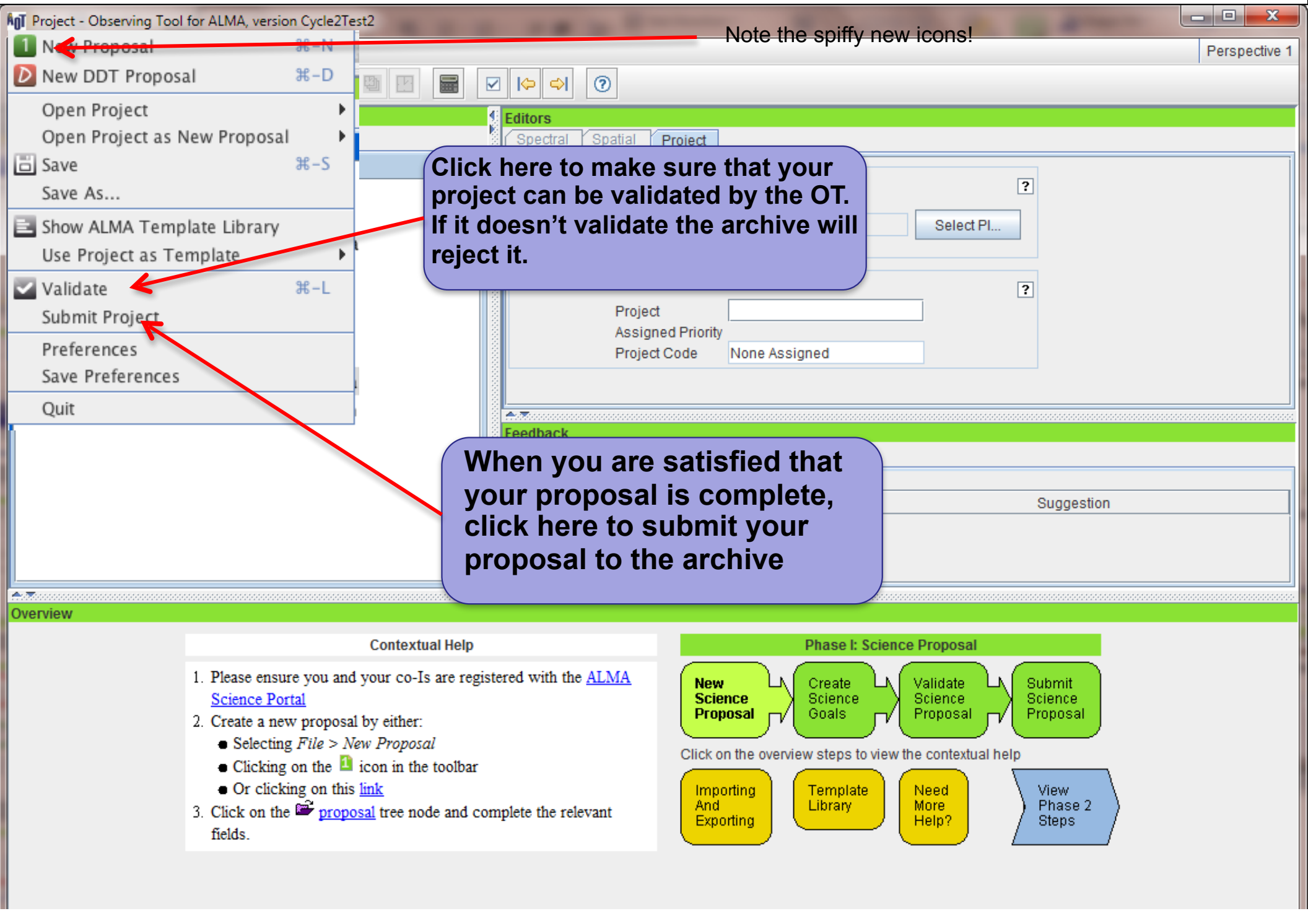
Three key elements:

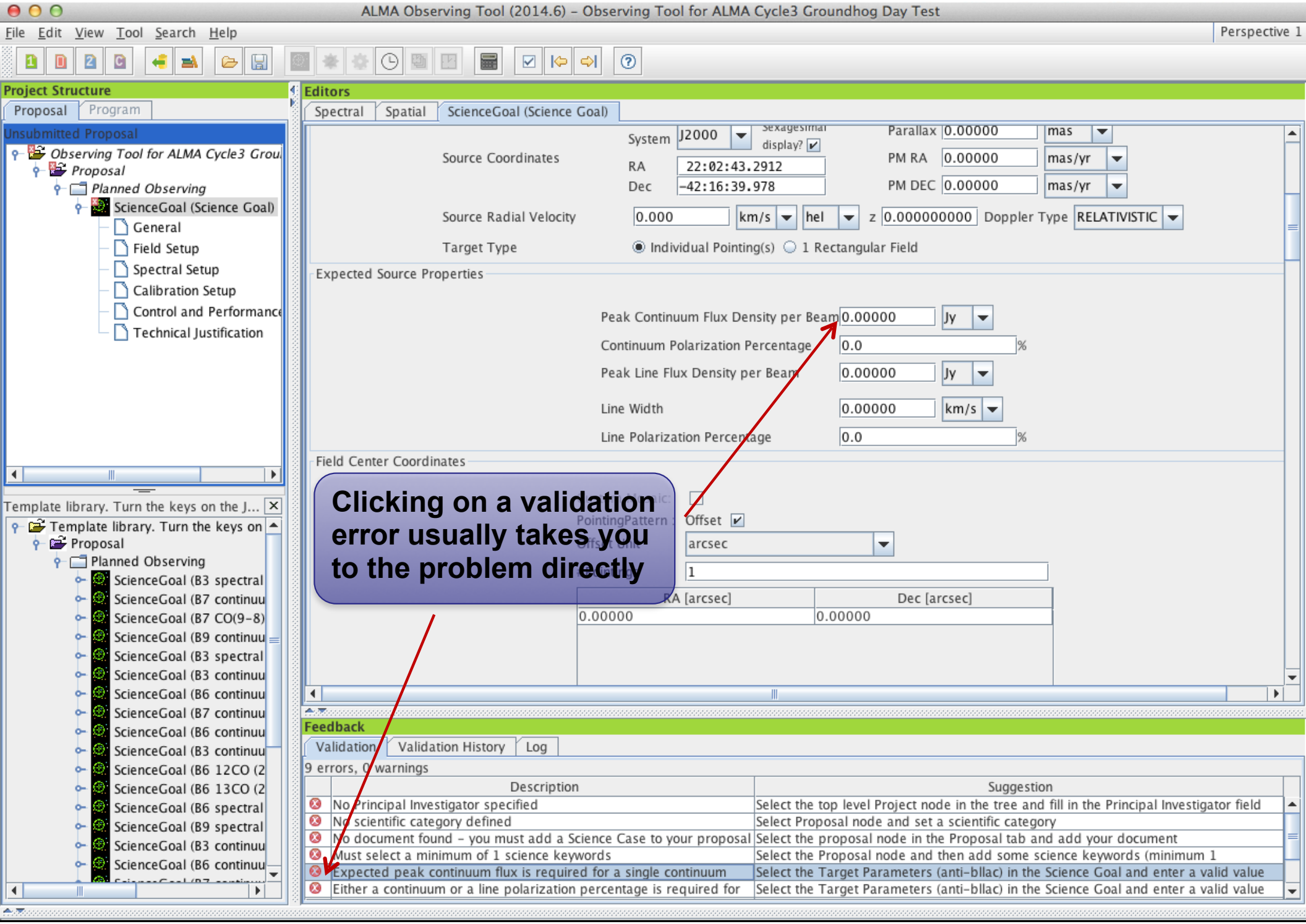
- Spectral Setup (spectral, continuum, or spectral scan observations?)



Demo:
"Science Goal" in OT

When the time is ripe … validate & submit




ALMA Observing Tool (2014.6) – Observing Tool for ALMA Cycle3 Groundhog Day Test
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Observing Tool for ALMA Cycle3 Grou
Proposal
Planned Observing
ScienceGoal (Science Goal)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Template library. Turn the keys on the J...
Template library. Turn the keys on
Proposal
Planned Observing
ScienceGoal (B3 spectral
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ScienceGoal (B7 CO(9-8)
ScienceGoal (B9 continuu
ScienceGoal (B3 spectral
ScienceGoal (B3 continuu
ScienceGoal (B6 continuu
ScienceGoal (B7 continuu
ScienceGoal (B6 continuu
ScienceGoal (B3 continuu
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ScienceGoal (B9 spectral
ScienceGoal (B3 continuu
ScienceGoal (B6 continuu
Editors
Spectral Spatial ScienceGoal (Science Goal)
Source Coordinates
System J2000
Sexagesimal display?
RA 22:02:43.2912
Dec -42:16:39.978
Parallax 0.00000 mas
PM RA 0.00000 mas/yr
PM DEC 0.00000 mas/yr
Source Radial Velocity 0.000 km/s hel
z 0.000000000
Doppler Type RELATIVISTIC
Target Type
Individual Pointing(s)
1 Rectangular Field
Expected Source Properties
Peak Continuum Flux Density per Beam 0.00000 Jy
Continuum Polarization Percentage 0.0 %
Peak Line Flux Density per Beam 0.00000 Jy
Line Width 0.00000 km/s
Line Polarization Percentage 0.0 %
Field Center Coordinates
PointingPattern
Offset
arcsec
1
RA [arcsec]
Dec [arcsec]
0.00000
0.00000
Clicking on a validation error usually takes you to the problem directly
Feedback
Validation Validation History Log
9 errors, 0 warnings
Description
Suggestion
No Principal Investigator specified
Select the top level Project node in the tree and fill in the Principal Investigator field
No scientific category defined
Select Proposal node and set a scientific category
No document found – you must add a Science Case to your proposal
Select the proposal node in the Proposal tab and add your document
Must select a minimum of 1 science keywords
Select the Proposal node and then add some science keywords (minimum 1
Expected peak continuum flux is required for a single continuum
Select the Target Parameters (anti-bllac) in the Science Goal and enter a valid value
Either a continuum or a line polarization percentage is required for
Select the Target Parameters (anti-bllac) in the Science Goal and enter a valid value

Find data in archive:
Archive Query

ALMA

ALMA Science Archive Query

Query Form | Results Table

Search | Reset

https://almascience.nrao.edu/aq/

Query Help

Position
Source name (Resolver)
Source name (ALMA)
RA Dec
Galactic
Target list
Angular resolution
Largest angular scale
Field of view

Energy
Frequency
Bandwidth
Spectral resolution
Band

Time
Observation date
Integration time

Polarisation
Polarisation type

Observation
Line sensitivity (10 km/s)
Continuum sensitivity
Water vapour

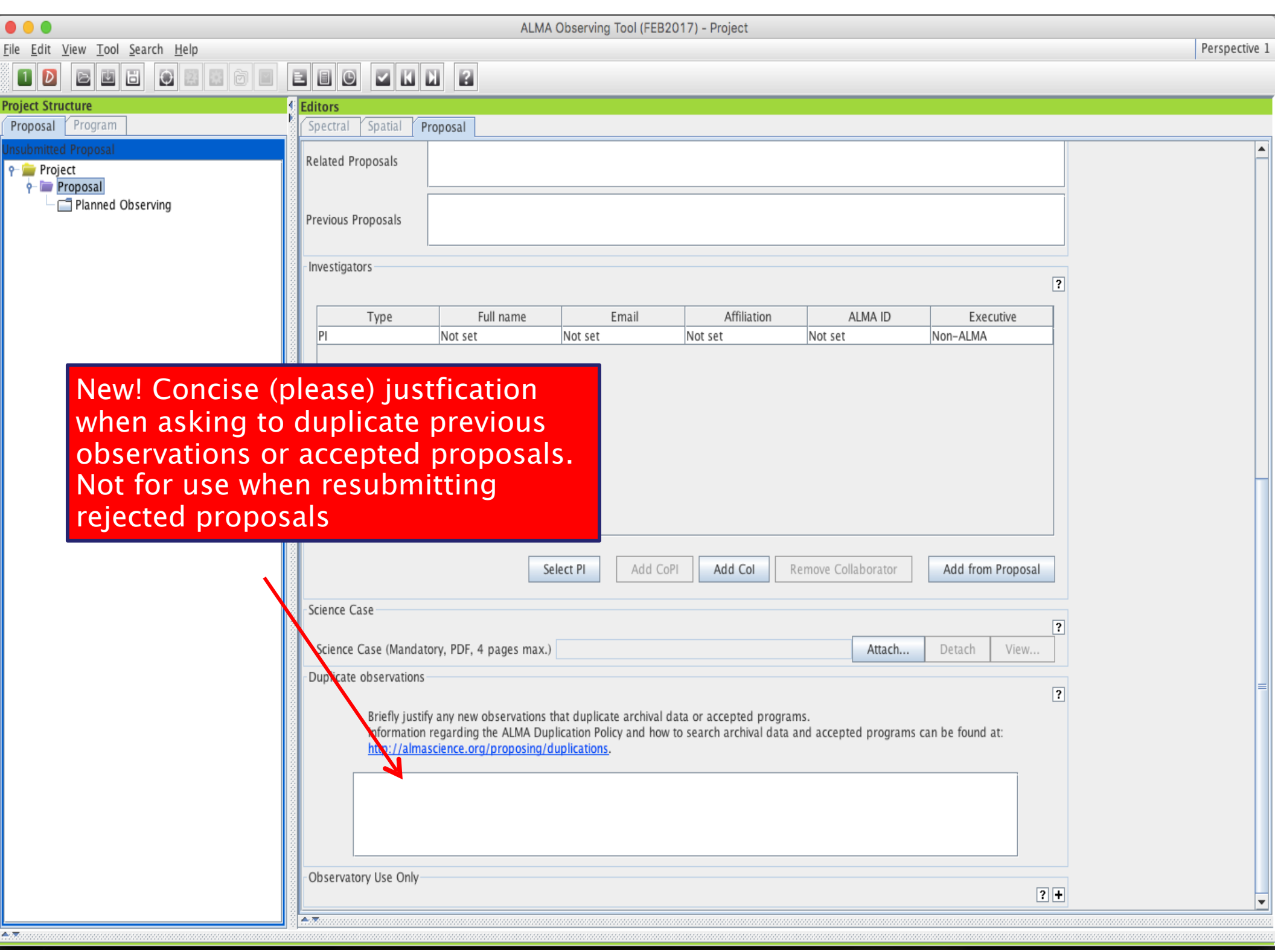
Project
Project code
Project title
PI name
Proposal authors
Project abstract
Publication count
Science keyword

Publication
Bibcode
Title
First author
Authors
Abstract
Year

Options
View:
- (•) observation
- ( ) project
- ( ) publication

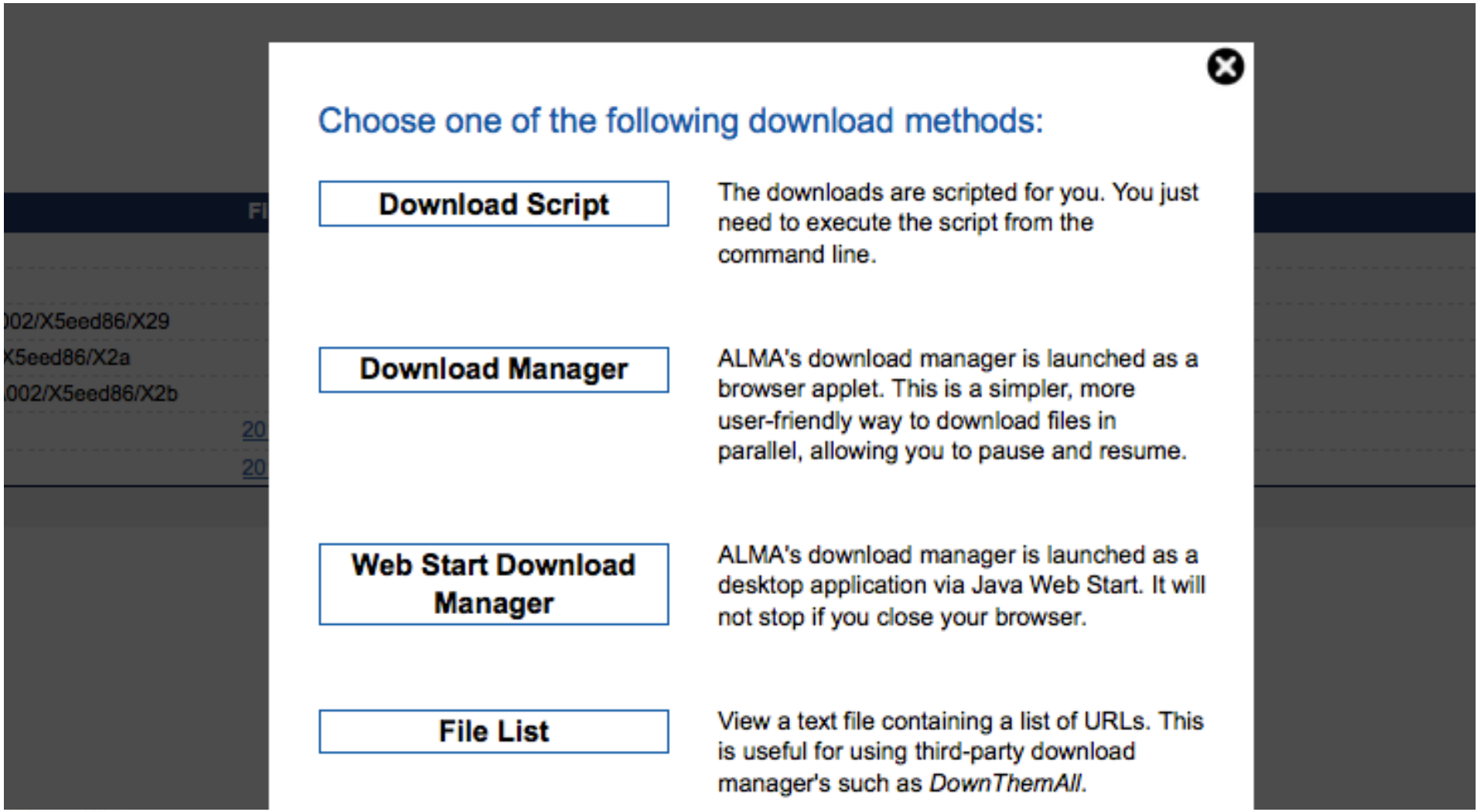
[ ] public data only
[x] science observations only

NRAO


ALMA Observing Tool (FEB2017) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
Editors
Spectral Spatial Proposal
Related Proposals
Previous Proposals
Investigators
Type Full name Email Affiliation ALMA ID Executive
PI Not set Not set Not set Not set Non-ALMA
Select PI
Add CoPI
Add CoI
Remove Collaborator
Add from Proposal
Science Case
Science Case (Mandatory, PDF, 4 pages max.)
Attach...
Detach
View...
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:
http://almascience.org/proposing/duplications.
Observatory Use Only
New! Concise (please) justfication when asking to duplicate previous observations or accepted proposals. Not for use when resubmitting rejected proposals

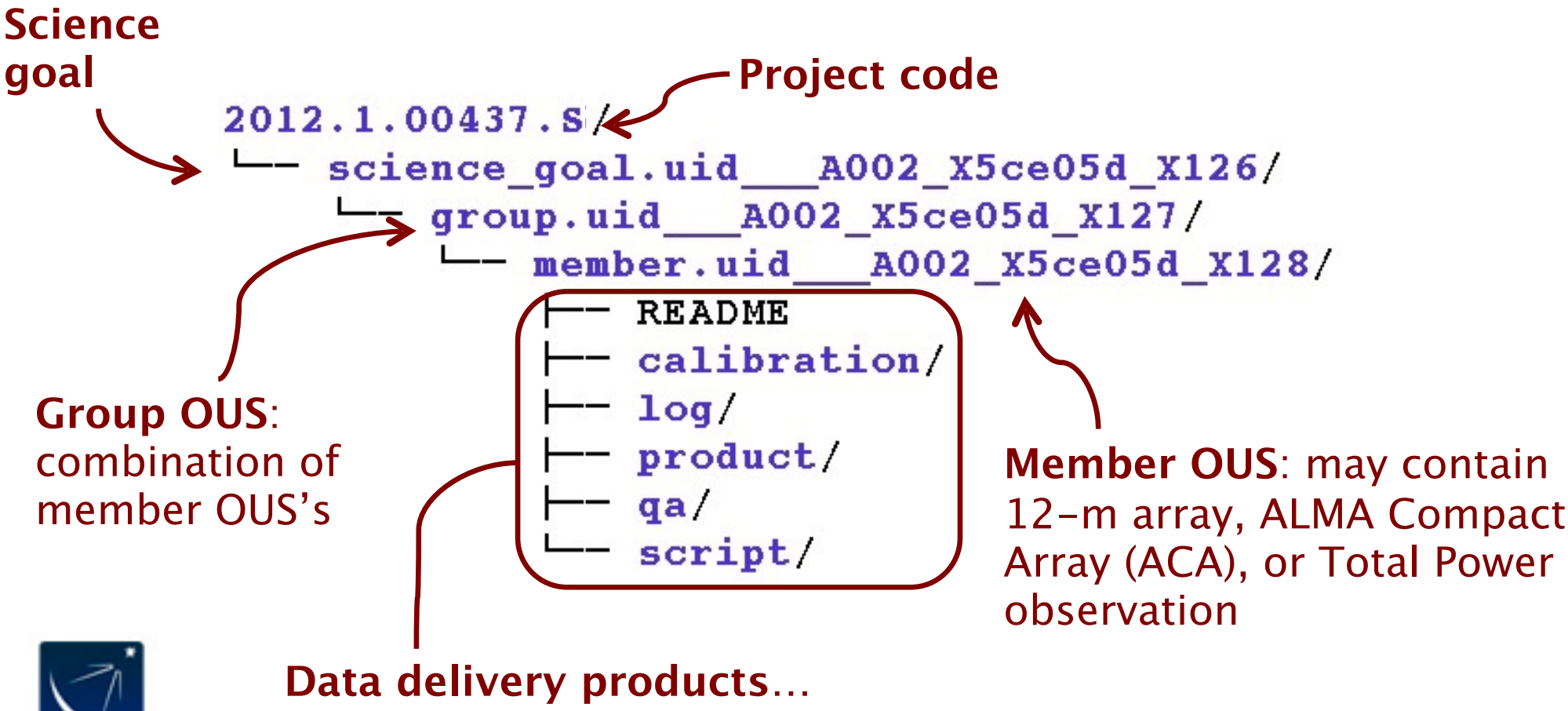
Request Handler

Request Handler: Download options



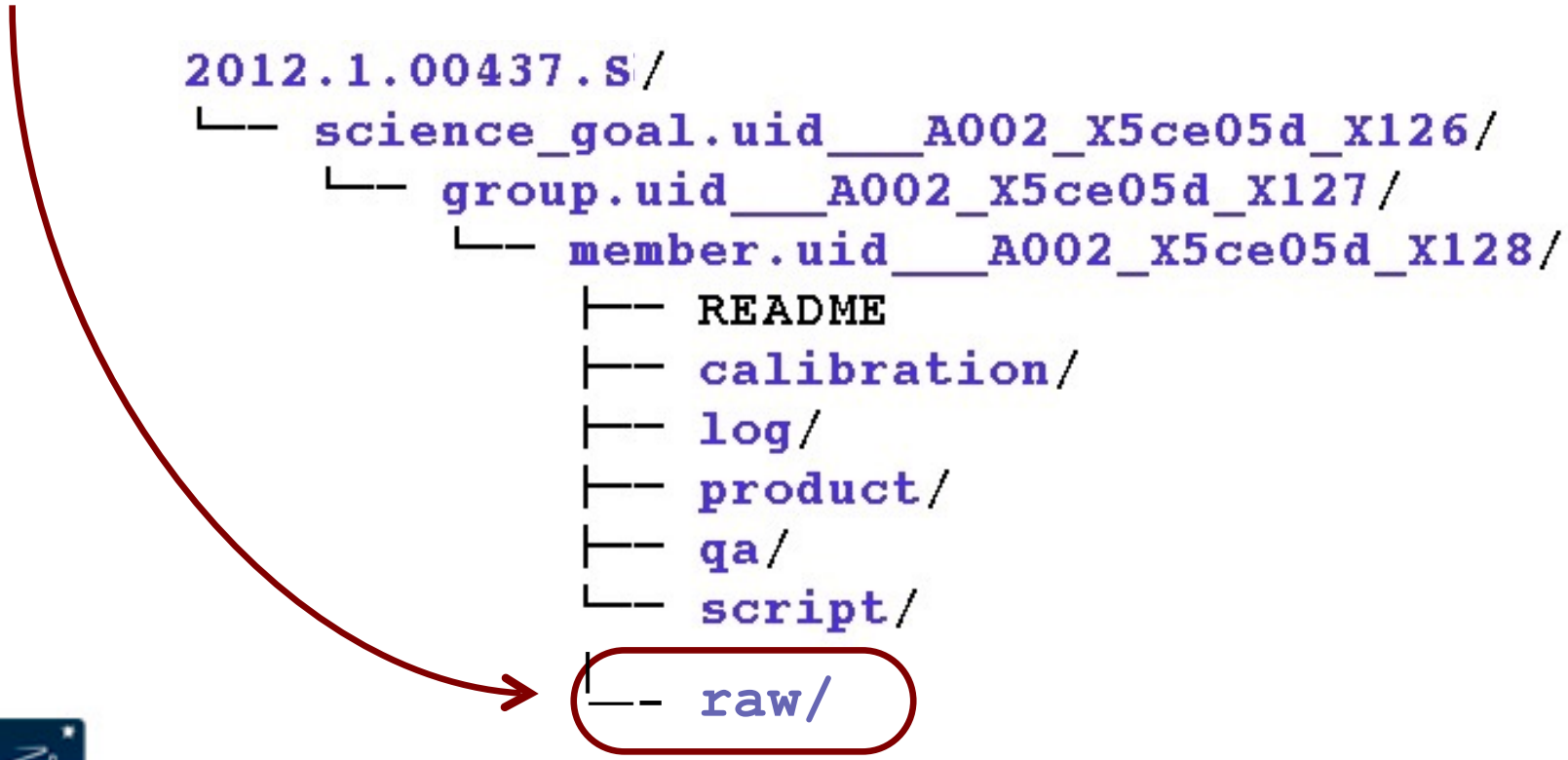
QA2 Data Products Package: the processed data

Documentation: https://almascience.nrao.edu/documents-and-tools/cycle3/ALMAQA2Products3.0.pdf



QA2 Data Products Package: the processed data

If you want to redo the imaging, then you also need to download the “raw” data and then apply the scriptForPI.py script



Small group work:

- **Suggested timeline:**
  (5 mins) Share your working goals with your teammates.
  (until 12:25pm) work individually, discuss with teammates.
  (5 mins) Wrap up, share your achievements with teammates.

Group 1:	Group 2:	Group 3:	Group 4:
Brendan	Andrew	Kristy	Caprice
Laurence	Jackie	Nathan	Peter
Patrick	Meghana	Rachael	Richard
Rebecca	Intae	Sam	Yao-Lun
	Taylor	Sydney	

ALMA

For more info:

https://almascience.nrao.edu/

The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA is funded in Europe by the European Organization for Astronomical Research in the Southern Hemisphere (ESO), in North America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC), and in East Asia by the National Institutes of Natural Sciences (NINS) of Japan in cooperation with the Academia Sinica (AS) in Taiwan. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI), and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction and operation of ALMA.

NRAO