



VLA Observation Preparation

Emmanuel Momjian

Observational Considerations

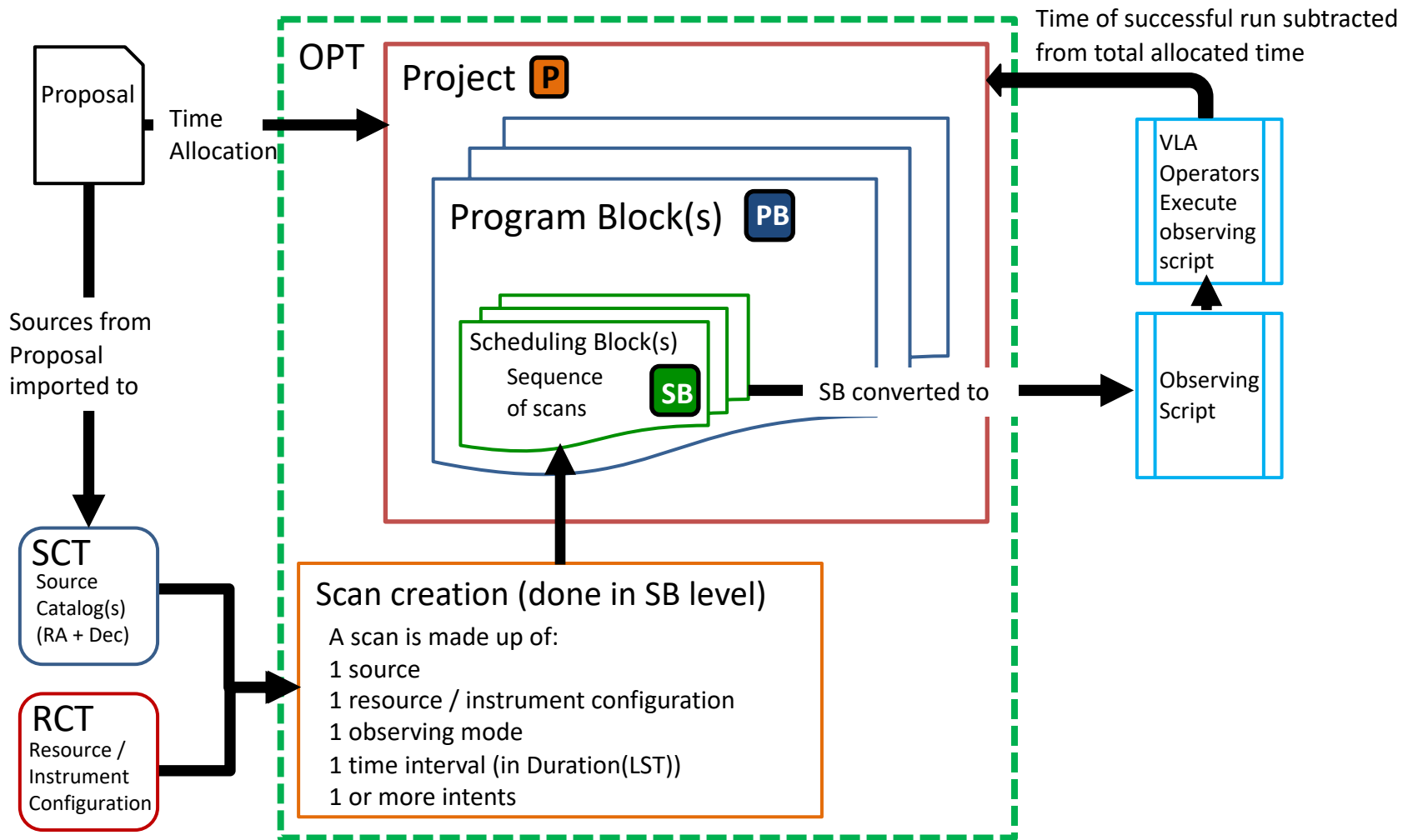
- The VLA primarily uses dynamic scheduling (i.e., hard to know at what exact time your project will be on the array).
 - Each scheduling block must include a range of scheduling constraints:
 - LST start range
 - Weather (atmospheric phase noise and wind limits)
 - Anticipate and protect against unknown startup slew time and cable wrap
 - Anticipate and protect against availability of calibrators/slew for different starting times

Observational Considerations

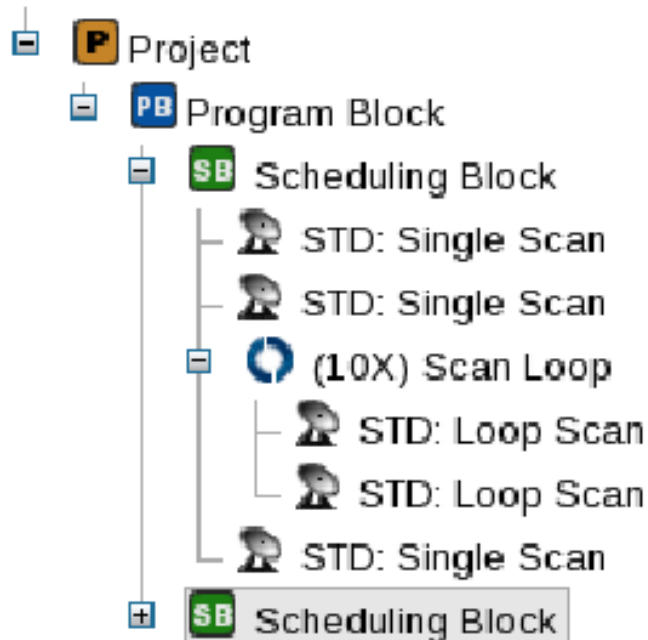
Where are my calibrators and target sources on the sky?

- Strong, point like calibrators are good for bandpass and delay calibration.
- Nearby calibrators are good for phase calibration.
- Pointing calibrators should be in the same general region of the sky.
- What are the choices for a flux density scale calibrator?
- Can certain calibrations be combined with fewer calibrator sources?

Flow diagram



Example project tree



- Project has Program Blocks (PB)
- PB has Scheduling Blocks (SB)
 - observing run script
 - Sequence of scans and/or (loops of) loops of scans, including setup scans.
 - Includes science target and various calibration sources.

Designing a schedule

- Designing a schedule: determine which/what
 - Sources to observe, and for how long (with each setup).
 - Setups (resources) to use
 - Receivers, samplers, correlator
 - Calibrations to perform
 - Extra sources/resources? (e.g. pointing)

How to start the OPT

- You were asked to register at

<https://my.nrao.edu>

- For this event, login to one of these two servers:

<https://opt-extra-1.aoc.nrao.edu/opt>

<https://opt-extra-2.aoc.nrao.edu/opt>

- These are special versions of the OPT for the CDE.
- Do not use these links to prepare & submit VLA observations.
- The screenshots do not reflect pulsar tabs which were recently added into the OPT/RCT/SCT.



Dashboard

Proposals

Data Processing

Obs Prep

Helpdesk

Profile

Hi, Galactico | [Sign Out](#)

Wednesday 12 April 2017

Options

- [Obs Prep Tools](#)
 - 📄 [Information](#)

Observation Preparation Tools

EVLA Observation Preparation Tool

- [Information about the Observation Preparation Tool](#)
- [Login to the Observation Preparation Tool](#)

GBT Dynamic Scheduling System

- [Information about the Dynamic Scheduling System](#)
- [Login to the Dynamic Scheduling System](#)



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- [New Project]
- [New Program Block]
- [New Scheduling Block], (
- [STD: [New Scan]]

Overview **Comments**

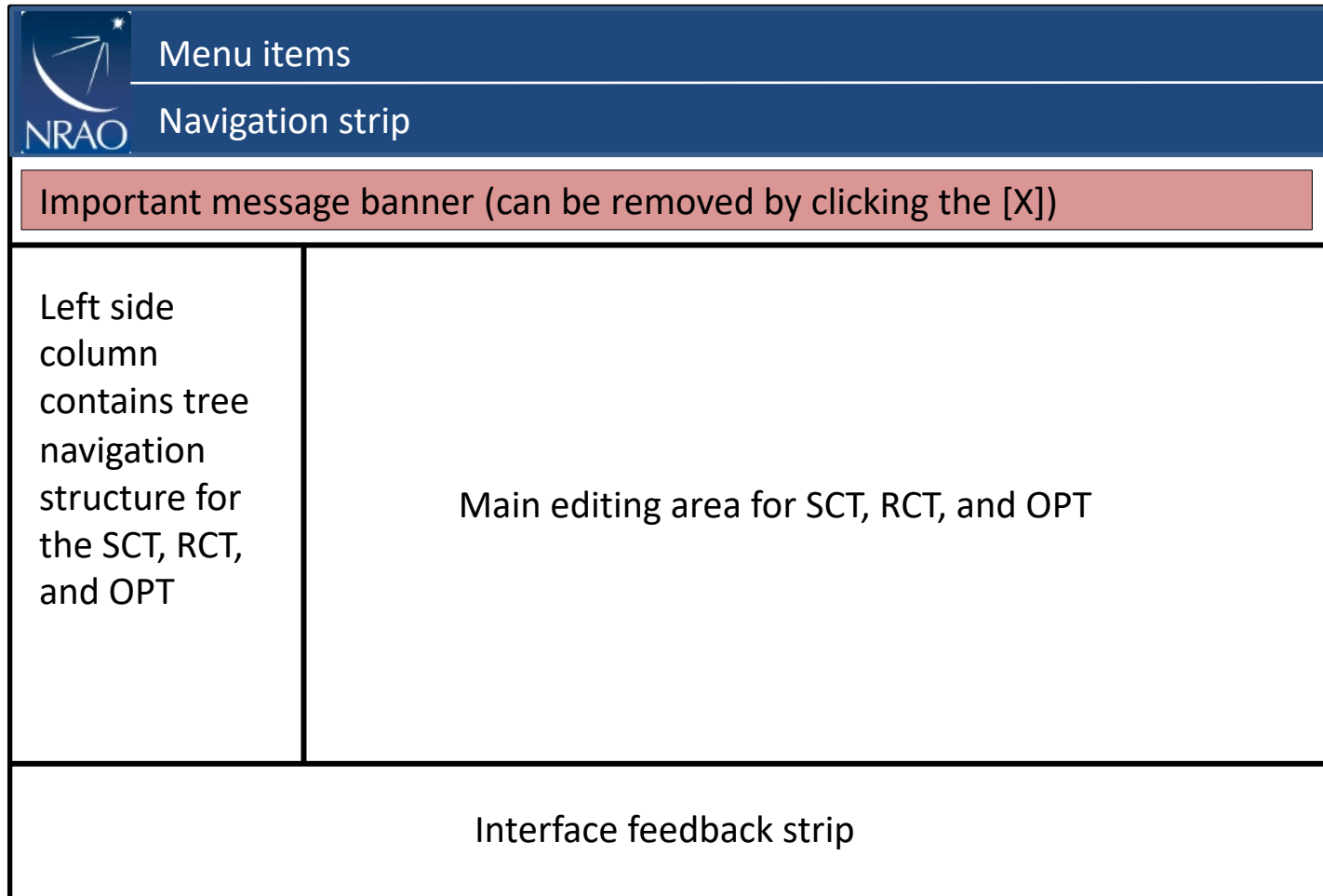
SCAN DETAILS

NAME	SCAN MODE	ANTENNA WRAP	REFERENCE POINTING	PHASE & DELAY CALIBRATION	OVER THE TOP
[New Scan]	Standard Observing ▾	No Preference ▾	<input type="checkbox"/> Apply Last?	<input type="checkbox"/> Apply Last?	<input type="checkbox"/> Allow?

TARGET SOURCE	HARDWARE SETUP	SCAN TIMING	INTENTS
No Source Assigned Change	No Instrument Config. Assigned <input type="checkbox"/> Keep Previous Conf. Change	Duration (LST) ▾ 00:05:00	<input checked="" type="checkbox"/> OBSERVE TARGET <input type="checkbox"/> CALIBRATE COMPLEX GAIN <input type="checkbox"/> CALIBRATE FLUX DENSITY SCALE <input type="checkbox"/> CALIBRATE BANDPASS More >>>



Layout of the OPT



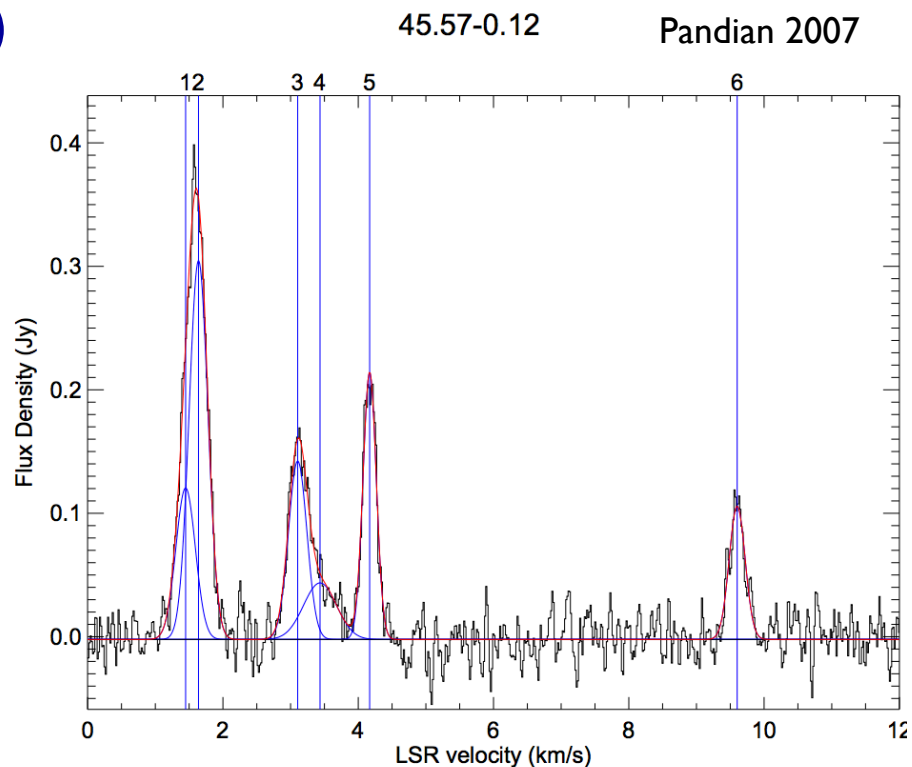
What are we observing?

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- Array Configuration: B
- Receiver: C-band (4 - 8 GHz)
 - Targeting the 6.7 GHz methanol maser ($\nu_0=6668.518$ MHz) + continuum including linear polarization.
- 3 hr long scheduling block

What are we observing?

- V (radio, LSR): centered near 6 km/s
- $\Delta V \sim 9$ km/s (range for the lines)
- $\delta V \sim 0.04$ km/s (~ 0.9 kHz)

Comp	V Km/s	FWHM Km/s
1	1.45	0.34
2	1.64	0.33
3	3.10	0.32
4	3.44	0.57
5	4.17	0.23
6	9.60	0.28



Source Catalog (SCT)

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25

The screenshot shows the NRAO Observation Preparation Tool (OPT) web interface. The browser address bar displays the URL `https://obs.vla.nrao.edu/opt/secure/index.xhtml`. The navigation bar includes the following links: [NRAO](#) > [User Portal](#) > [Observation Preparation](#) > [Sources](#) > [Instrument Configurations](#). The [Sources](#) link is highlighted with a red box, and a red arrow points to it from the instruction below. A red banner at the top of the main content area contains a maintenance notice: "The OPT will be offline at 08:00MDT/02:00UT for 5 minutes for maintenance. Please log out before that time and log in again a few minutes later to continue where you left off. We apologize for any inconvenience this may cause." Below the banner, a left sidebar shows a project tree with two items: "DEMO_old" and "DEMO". The main content area contains the text: "To start, please select an item in the tree on the left or create a New Project".

➤ In the OPT: click on Sources (in navigation bar)

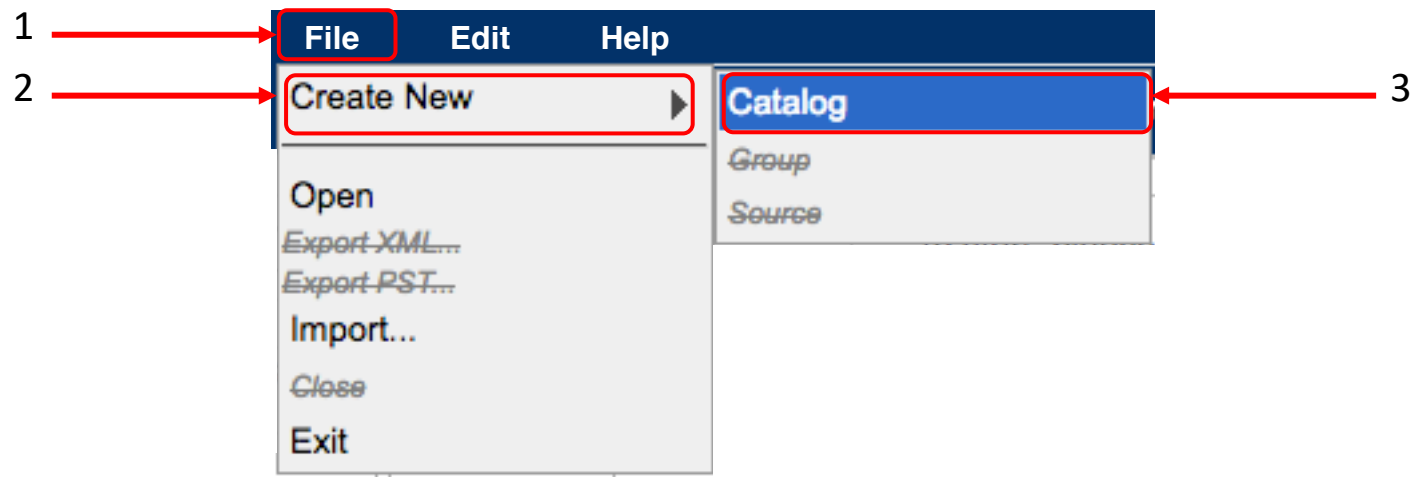
Source Catalog (SCT)

The screenshot shows a web browser window with the following elements:

- Browser Tab:** NRAO Source Catalog Manag... x +
- Address Bar:** <https://obs.vla.nrao.edu/sct/MyCatalogs.jsf;jsessionid=B942327375B822C961490AA910533870>
- Navigation Bar:** File Edit Help | NRAO > [User Portal](#) > [Observation Preparation](#) | **Sources** | [Instrument Configurations](#) | Hello, Dr. Galactico Armenian | [Exit](#)
- Left Panel (Tree View):**
 - Search Search
 - Search Aliases As Well
 - External Search
 - Advanced Search
 - [Advanced Search](#)
 - VLA
 - NRAO_CD_OPT
 - Personal Catalog
- Main Content Area:** To start, please select an item in the tree on the left or create a New Catalog

Source Catalog (SCT)

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
 - RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- **File** → **Create New** → **Catalog**



Source Catalog (SCT)

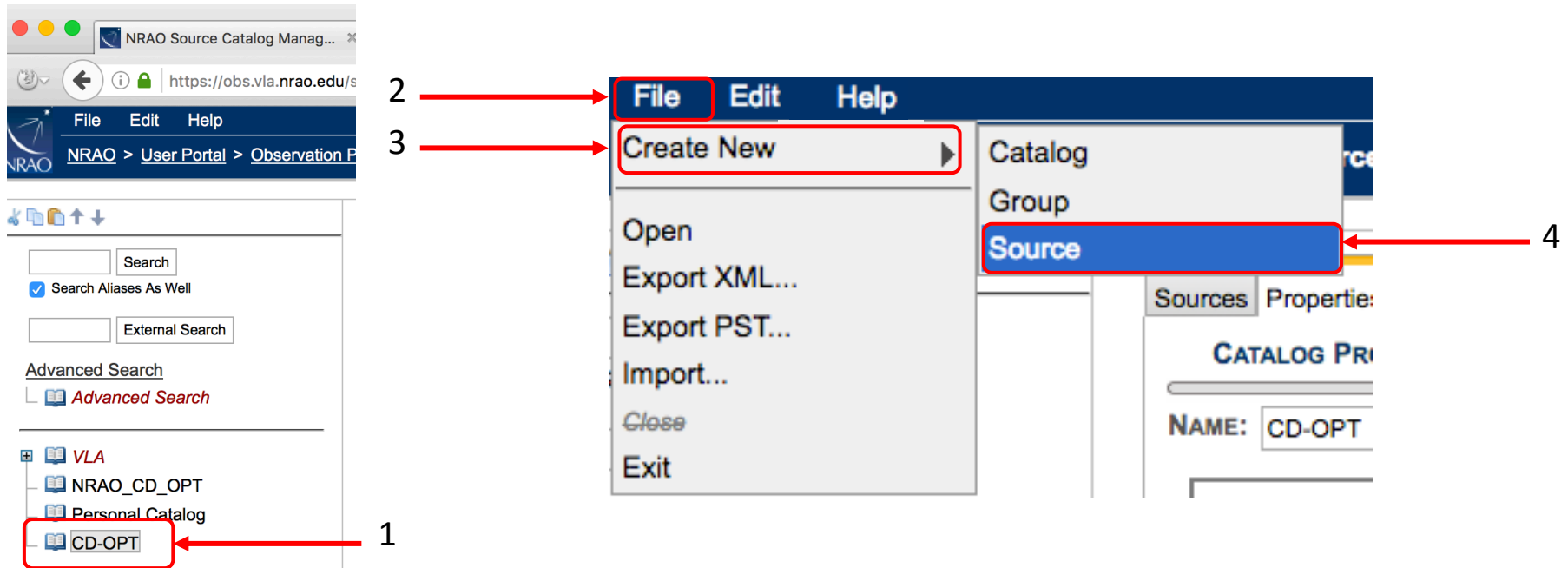
The screenshot shows a web browser window with the URL `https://obs.vla.nrao.edu/sct/MyCatalogs.jsf;jsessionid=B942327375B822C961490AA910533870?catalogo`. The page title is "NRAO Source Catalog Manag...". The browser's address bar shows the URL and a search icon. The page header includes "File Edit Help" and "NRAO > User Portal > Observation Preparation | Sources | Instrument Configurations". The user is logged in as "Hello, Dr. Galactico Armenian" with an "Exit" link.

The main content area is titled "Sources Properties" and contains a "CATALOG PROPERTIES" form. The form has a "NAME:" field with the value "CD-OPT". A red box highlights this field, and a red arrow points to it from the text "Enter name of catalog in the Name field". Below the name field is a text area for notes, with the text "To add a personal note, click 'New Note' below." and a "(New Note)" placeholder. A red arrow points to this text area from the text "Press Tab key or Return".

Below the notes field, the form displays "CATALOG OWNER" as "Dr Galactico Armenian", "CURRENT COAUTHORS" as "No CoAuthors Found", and "ADD COAUTHORS" with a "Last Name:" field and a table with "Name" and "E-mail" columns. An "Add Coauthors" button is at the bottom of this section.

On the left side of the page, there is a search bar with a "Search" button and a "Search Aliases As Well" checkbox. Below that is an "External Search" button. Further down is an "Advanced Search" section with a link to "Advanced Search". At the bottom left is a tree view showing a hierarchy: "VLA" (expanded), "NRAO_CD_OPT", "Personal Catalog", and "CD-OPT".

Source Catalog (SCT)



- Click on the catalog CD-OPT so that it is highlighted in gray (if it is not already), and go to File → Create New → Source

Source Catalog (SCT)

The screenshot shows the NRAO Source Catalog Management (SCT) web application. The browser address bar displays the URL: `https://obs.vla.nrao.edu/sct/MyCatalogs.jsf;jsessionid=B942327375B822C961490AA910533870?catao`. The page title is "NRAO Source Catalog Manag...". The navigation menu includes "File", "Edit", and "Help". The breadcrumb trail is "NRAO > User Portal > Observation Preparation | Sources | Instrument Configurations". The user is identified as "Hello, Dr. Galactico Armenian" with an "Exit" link.

The main content area is titled "Return to 'CD-OPT'" and features three tabs: "New Source", "Images", and "Notes". The "New Source" tab is active, showing the "SOURCE NAME(s)" section with a "NAME" field containing "New Source". Below this are fields for "ORIGIN OF INFORMATION", "ALIASES" (with a "Click to View" button), and "SOURCE MAP" (with an "Open in New Window" link).

The "SOURCE POSITIONS" section includes "POSITION TYPE:" set to "Simple Position" and "COORDINATE SYSTEM:" set to "Equatorial". Below these are input fields for "RIGHT ASCENSION", "DECLINATION", "DISTANCE", and "EQUINOX".

	VALUE	UNCERTAINTY
RIGHT ASCENSION	0h 0m 0.00s	0.00mas
DECLINATION	0d 0' 0.00"	0.00mas
DISTANCE	0.0 km	0.0km
EQUINOX	J2000	

The left sidebar contains search options: "Search", "Search Aliases As Well" (checked), and "External Search". It also lists "Advanced Search" and "Advanced Search" (with a book icon). A tree view shows the following items: "VLA", "NRAO_CD_OPT", "Personal Catalog", and "CD-OPT".

Source Catalog (SCT)

https://obs.vla.nrao.edu/sct/MyCatalogs.jsf?catalogId=2708899&sourceId=2708903

NRAO > User Portal > Observation Preparation | Sources | Instrument Configurations

Hello, Dr. Galactico Armenian

SOURCE NAME(S)

NAME: 45.57-0.12 (Target source: 45.57-0.12)

ORIGIN OF INFORMATION: [Empty]

ALIASES: [Click to View](#)

SOURCE MAP: [Open in New Window](#)

SOURCE POSITIONS

POSITION TYPE: Simple Position

COORDINATE SYSTEM: Equatorial

	VALUE	UNCERTAINTY
RIGHT ASCENSION	19h 15m 13.20s	0.00mas
DECLINATION	11d 10' 25.00"	0.00mas
DISTANCE	0.0 km	0.0km

➤ Populate Name, R.A., and Dec. fields

- Can have the numbers either colon or space separated. Will be reformatted by the tool.

Source Catalog (SCT)

Return to 'CD-OPT'

New Source **Images** Notes

SOURCE NAME(S)

NAME

ORIGIN OF INFORMATION

ALIASES [Click to View](#)

SOURCE MAP [Open in New Window](#)

SOURCE POSITIONS

➤ Target's LST range: Click on the Images tab.

Source Catalog (SCT)

https://obs.vla.nrao.edu/sct/MyCatalogs.jsf?catalogId=2708899&sourceId=2708903

File Edit Help

NRAO > User Portal > Observation Preparation | Sources | Instrument Configurations

Hello, Dr. Galactico Armenian Exit

45.57-0.12 Images Notes

Search

Search Aliases As Well

External Search

Advanced Search

Advanced Search

VLA

NRAO_CD_OPT

Personal Catalog

CD-OPT

VISIBILITY CHART

Elevation Curve for 45.57-0.12 at the VLA

Elevation	LST (Rising)	LST (Setting)
8	13:24	01:07
10	13:34	00:57
15	13:58	00:33
20	14:22	00:08
25	14:46	23:44
30	15:10	23:20
80		

Azimuth Curve for 45.57-0.12 at the VLA

LST target: 13:34 → 00:57 (10 degrees or higher in elevation)

Source Catalog (SCT)

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- LST target: 13:34 → 00:57 (10 degrees or higher in elevation)

➤ **What calibrators are needed?**

➤ **Complex Gain calibrator**

➤ **Flux Density Scale calibrator**

➤ **Bandpass calibrator**

➤ **Polarization Angle calibrator**

➤ **Polarization Leakage calibrator (D-terms)**

Note: A given calibrator may serve more than one purpose

Source Catalog (SCT)

https://obs.vla.nrao.edu/sct/MyCatalogs.jsf?catalogId=2708899


NRAO > User Portal > Observation Preparation | Sources | Instrument Configurations

Hello, Dr. Galactico Armenian

Sources Properties

SOURCES IN 'CD-OPT' (1)

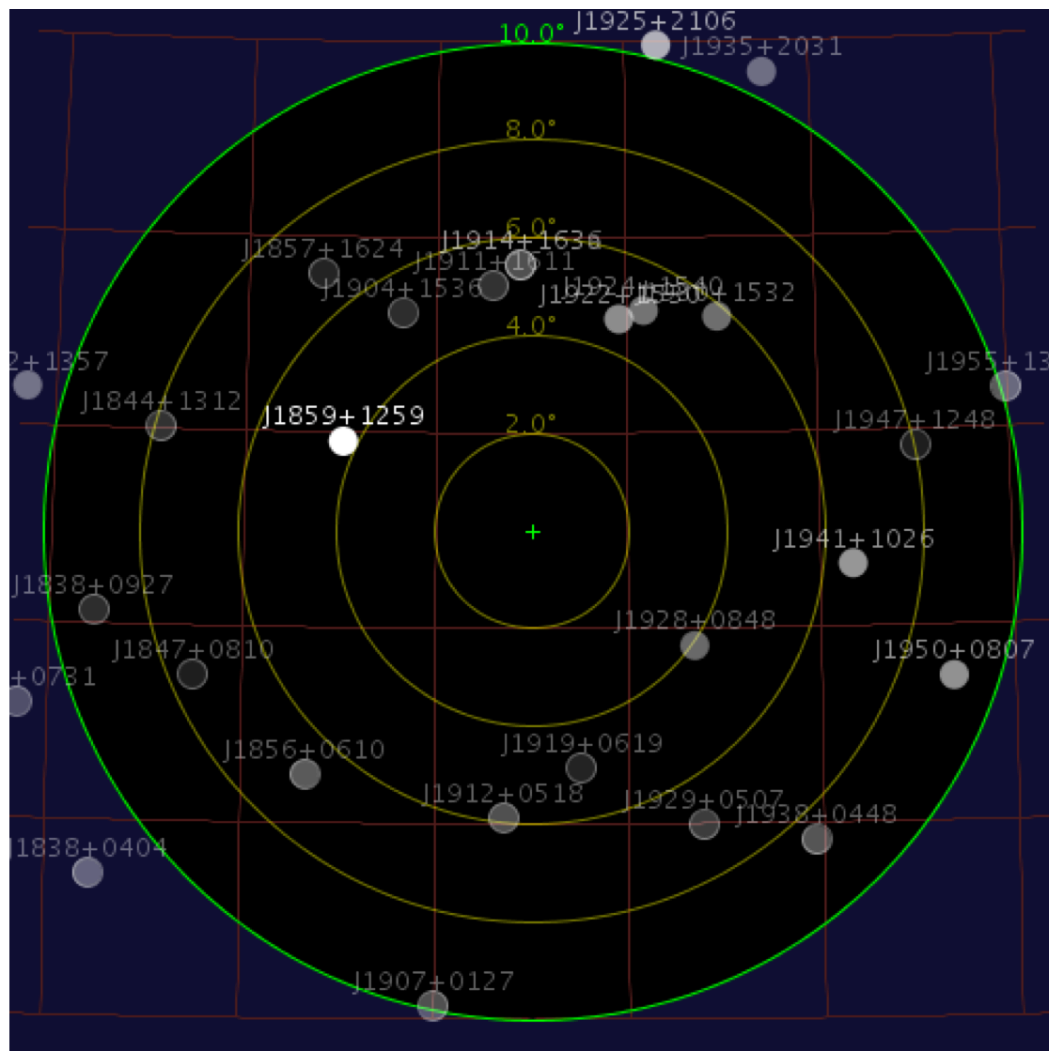
Select: All | None Show: 25 | 50 | 100 | 200 SELECT COORDINATE SYSTEM: Equatorial

	Name	Right Ascension	Declination	Velocity	Flux / Structure	Sky Map
<input type="checkbox"/>	45.57-0.12	19h 15m 13.20s	11d 10' 25.00"		DETAILS ALIASES	

1

2

- Finding a complex gain calibrator: Click the catalog name CD-OPT on the side menu, then click on the sky map icon



Objective: Finding a nearby complex gain calibrator.
 Hover over a source to see information

J1922+1530

Aliases: 1922+155 B1920+1524 1920+154

Positions:

RA: 19h 22m 34.699s

Dec: 15° 30' 10.032"

Uncertainties (mas):

RA: 10.0

Dec: 10.0

Flux / Structure

Band	Flux	A	B	C	D	UV _{min} (kλ)	UV _{max} (kλ)
L (20.0cm)	0.5Jy	X	X	X	X		
C (5.0cm)	0.8Jy	P	P	P	P	6.0	
X (3.0cm)	1Jy	P	P	P	P		
Ku (2.0cm)	0.7Jy	S	S	S	S	6.0	
Q (0.7cm)	0.28Jy	W	W	W	W		

Velocities:

No Information

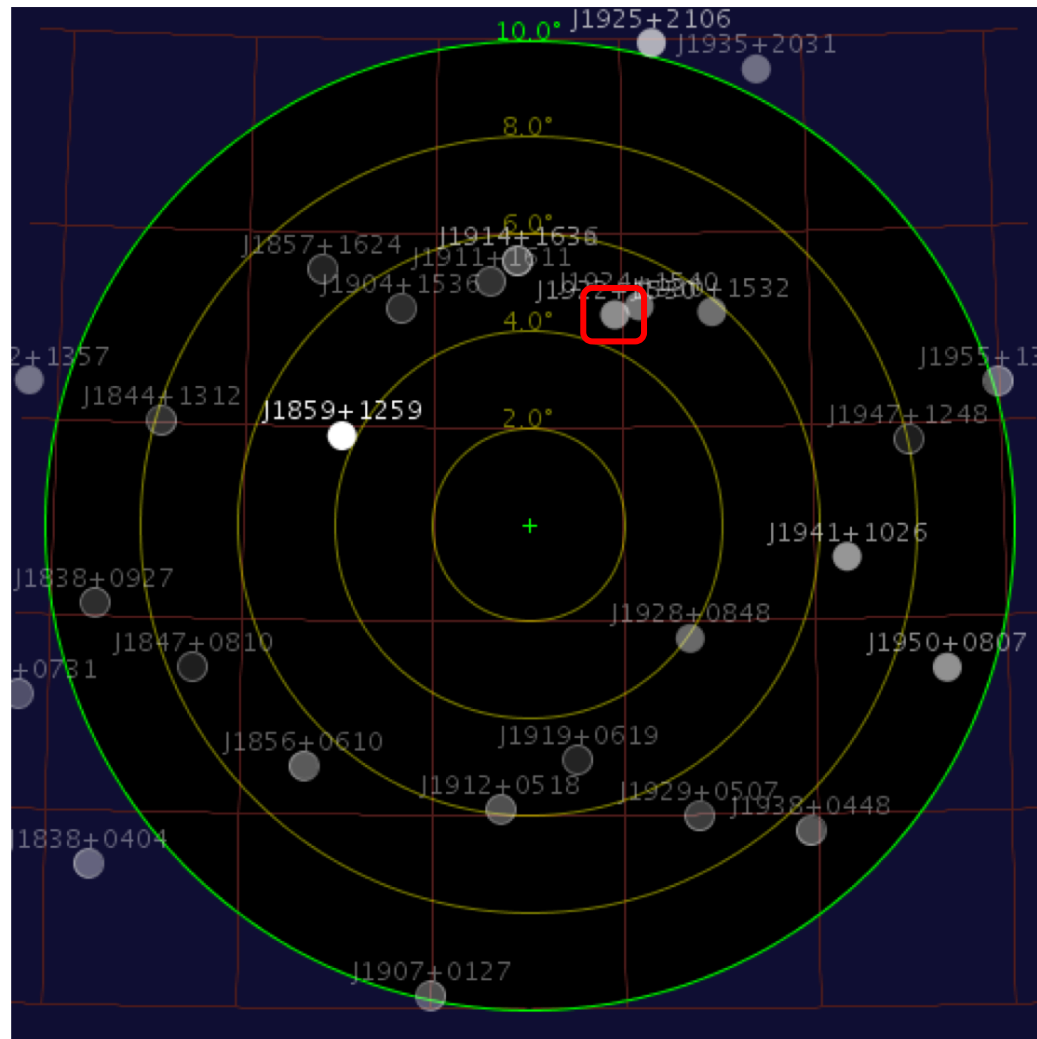
Images:

[1922+155.1.png](#)

[1922+155.uv.png](#)

[1922+155.1.png](#)

[1922+155.uv.png](#)



A good complex gain calibrator for this frequency band would be **J1922+1530**

Source Catalog (SCT)

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- LST target: 13:34 → 00:57
- CGC: J1922+1530

- Next, find a flux density scale calibrator

Source Catalog (SCT)

Select: All | None Show: 25 | 50 | 100 | 200 SELECT COORDINATE SYSTEM: Equatorial

	Name	Right Ascension	Declination	Velocity	Flux / Structure	Sky Map	
<input type="checkbox"/>	0137+331=3C48	1h 37m 41.299431s	33d 9' 35.13299"		DETAILS	ALIASES	
<input type="checkbox"/>	0542+498=3C147	5h 42m 36.137916s	49d 51' 7.23356"		DETAILS	ALIASES	
<input type="checkbox"/>	1331+305=3C286	13h 31m 8.287984s	30d 30' 32.95885"		DETAILS	ALIASES	
<input type="checkbox"/>	0521+166=3C138	5h 21m 9.886021s	16d 38' 22.05122"		DETAILS	ALIASES	
<input type="checkbox"/>	1411+522=3C295	14h 11m 20.6477s	52d 12' 9.141"		DETAILS	ALIASES	
<input type="checkbox"/>	3C48	1h 37m 41.299431s	33d 9' 35.13299"		DETAILS	ALIASES	
<input type="checkbox"/>	3C147	5h 42m 36.137916s	49d 51' 7.23356"		DETAILS	ALIASES	
<input type="checkbox"/>	3C286	13h 31m 8.287984s	30d 30' 32.95885"		DETAILS	ALIASES	
<input type="checkbox"/>	3C138	5h 21m 9.886021s	16d 38' 22.05122"		DETAILS	ALIASES	
<input type="checkbox"/>	3C295	14h 11m 20.6477s	52d 12' 9.141"		DETAILS	ALIASES	

➤ Finding a flux density scale calibrator: Click on the + of the VLA catalog on the left, then click on VLA Flux Cal

Source Catalog (SCT)

Select: All | None

Show: 25 | 50 | 100 | 200

SELECT COORDINATE SYSTEM:

Equatorial ▾

		Name	Right Ascension	Declination	Flux / Structure		Sky Map
<input type="checkbox"/>		0137+331=3C48	1h 37m 41.299431s	33d 9' 35.13299"	DETAILS	ALIASES	
<input type="checkbox"/>		0542+498=3C147	5h 42m 36.137916s	49d 51' 7.23356"	DETAILS	ALIASES	
<input type="checkbox"/>		0521+166=3C138	5h 21m 9.886021s	16d 38' 22.05122"	DETAILS	ALIASES	
<input type="checkbox"/>		1331+305=3C286	13h 31m 8.287984s	30d 30' 32.95885"	DETAILS	ALIASES	
<input type="checkbox"/>		1411+522=3C295	14h 11m 20.6477s	52d 12' 9.141"	DETAILS	ALIASES	
<input type="checkbox"/>		3C48	1h 37m 41.299431s	33d 9' 35.13299"	DETAILS	ALIASES	

Band	Flux	A	B	C	D
P (83.0cm)	26Jy	S	S	S	S
L (20.0cm)	15Jy	S	S	P	P
C (5.0cm)	7.47Jy	S	S	S	P
X (3.0cm)	5.23Jy	S	P	P	P
Ku (2.0cm)	3.4Jy	S	S	S	S
K (1.3cm)	2.59Jy	X	S	S	P
Q (0.7cm)	1.45Jy	X	S	P	P

In the list view of the 'VLA Flux Cal' table, hover on DETAILS to get information on the source. Flux density for 3C286 is ~6 Jy at 6.7 GHz.

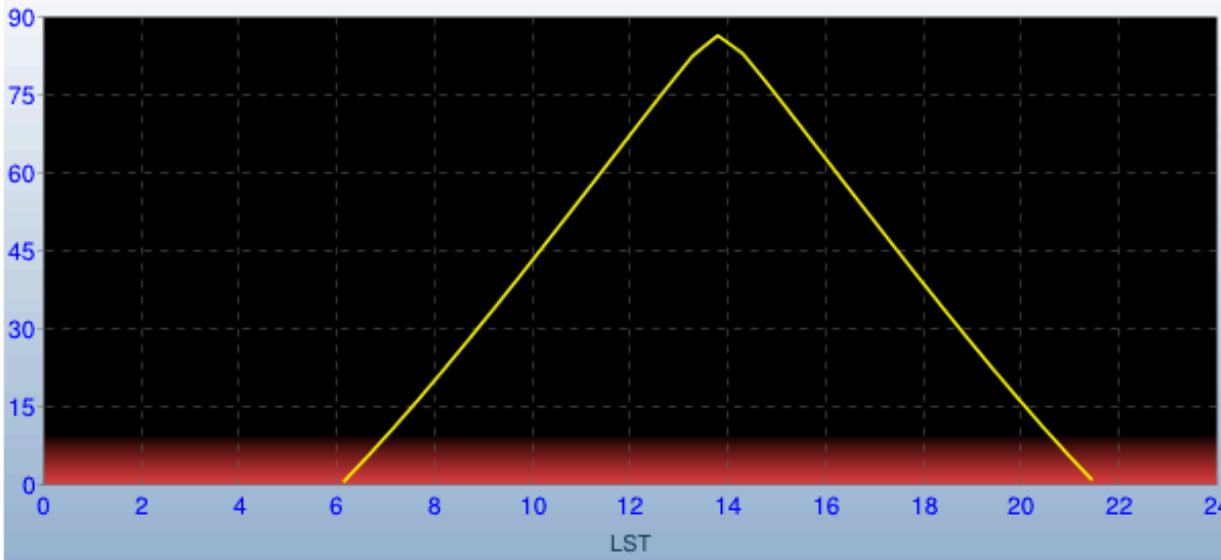
Source Catalog (SCT)

Personal Catalog
 NRAO_CD_OPT
 VLA
 RA Groups
 Dec Groups
VLA Flux Cal

SOURCES IN 'VLA FLUX CAL' (5)

Name	Right Ascension	Declination	Velocity	Flux / Structure	Sky Map
0137+331=3C48	1h 37m 41.299431s	33d 9' 35.13299"		DETAILS	ALIASES
0542+498=3C147	5h 42m 36.137916s	49d 51' 7.23356"		DETAILS	ALIASES
1331+305=3C286	13h 31m 8.287984s	30d 30' 32.95885"		DETAILS	ALIASES
0521+166=3C138	5h 21m 9.886021s	16d 38' 22.05122"		DETAILS	ALIASES
1411+522=3C295	14h 11m 20.6477s	52d 12' 9.141"		DETAILS	ALIASES

Elevation Curve for 1331+305=3C286 at the VLA



Elevation	LST (Rising)	LST (Setting)
8	06:44	20:18
10	06:55	20:07
15	07:23	19:39
20	07:50	19:13
25	08:16	18:46
30	08:41	18:21
80	12:47	14:15

3C286 > 10° 06:55 → 20:07

Source Catalog (SCT)

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- LST target: 13:34 → 00:57
- CGC: J1922+1530
- FDSC: 3C286 LST range 06:55 → 20:07

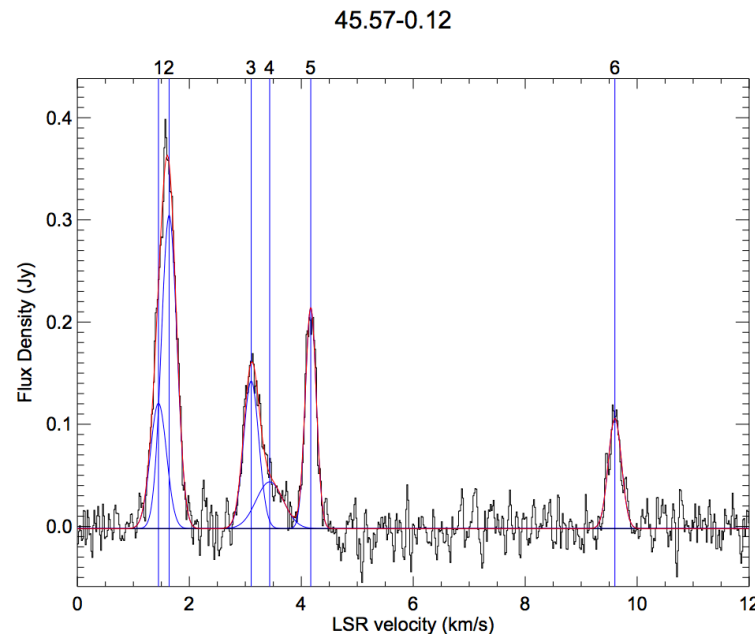
- Next, bandpass calibrator

Source Catalog (SCT)

➤ Finding a bandpass calibrator

Need a strong source. Can we use 3C286?

- Strongest line is ~ 0.4 Jy
- $S_{\text{cal}}\sqrt{t_{\text{cal}}} > S_{\text{obj}}\sqrt{t_{\text{obj}}}$
- Total session 3hr, assume on-target will be about 2hr
 - $S_{\text{obj}}\sqrt{t_{\text{obj}}} \sim 0.6$
 - If time on 3C286 is 5min \rightarrow
 $S_{\text{cal}}\sqrt{t_{\text{cal}}} \sim 1.7$



3C286 can also serve as the bandpass calibrator

Source Catalog (SCT)

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- LST target: 13:34 → 00:57
- CGC: J1922+1530
- FDSC: 3C286, LST range 06:55 → 20:07
- BPC: 3C286

➤ **Finding Polarization Angle Calibrator:**

<http://go.nrao.edu/vla-pol> (VLA OSS)

or

<http://go.nrao.edu/vla-obs> (VLA Obs. Guide)

And go to the Polarimetry subsection

Table 7.2.1: Category A - primary polarization standards

Source	Other name	Comments	Notes
J0137+3309	B0134+329 (3C48)	pol standard (>4GHz)	A1,A2, A3
J0521+1638	B0518+165 (3C138)	pol standard	A1
J1331+3030	B1328+307 (3C286)	pol standard	A1 A4

Table 7.2.1 Notes:

- A1. Polarized fraction and angle values for these sources is given in Table 7.2.6 below.
- A2. 3C48 is weak at high frequency and somewhat resolved in larger configurations. Depolarized below 4GHz.
- **A3. 3C48 has been undergoing a major event since 2016 affecting its polarization and flux density properties, especially above 5 GHz. For accurate polarization angle calibration, care should be taken that a current model of its polarization properties is available and applied during calibration.**
- A4. 3C286 is our foremost primary calibrator and should be used if available.

3C286 can also serve as the polarization angle calibrator

Source Catalog (SCT)

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- LST target: 13:34 → 00:57
- CGC: J1922+1530
- FDSC: 3C286, LST range 06:55 → 20:07
- BPC: 3C286
- PAG: 3C286
- **Finding Polarization Leakage Calibrator:**

<http://go.nrao.edu/vla-pol> (VLA OSS)

or

<http://go.nrao.edu/vla-obs> (VLA Obs. Guide)

And go to the Polarimetry subsection

Polarization Leakage Calibration

Two common approaches to determine the leakage terms:

- either observe one or more strong calibrators ($> 1 \text{ Jy}$) over a wide range (e.g., > 60 degrees) in parallactic angle and through multiple scans, or
- observe a strong unpolarized (typically $< 1\%$ polarized) calibrator source through at least one scan

Polarization Leakage Calibration

Source	Other name	Comments	Notes
J0319+4130	B0316+413 (3C84)	low pol, bright, flat spectrum, monitored upon request	C1
J0542+4349	B0538+498 (3C147)	low pol <10GHz, steep spectrum, resolved	C2
J0713+4349	B0710+439	low pol, CSO, monitored upon request	C3
J1407+2827	B1404+286 (OQ208)	low pol, steep spectrum	C4
J2355+4950	B2352+495	low pol, CSO, monitored upon request	C3

Table 7.2.3 Notes:

- C1. Very bright and low polarization (<1%), but variable flux density. Approaches 1% polarized at 43GHz.
- C2. Steep spectrum and resolved, low polarization below 10GHz (best <4.5GHz). Stable polarization above. See Table 7.5.1 below.
- C3. Weak at high frequency, but stable flux and very low polarization.
- C4. Weak at high frequency, bright and low polarization below 9GHz.

J1407+2827 can serve as the polarization leakage calibrator

Source Catalog (SCT)

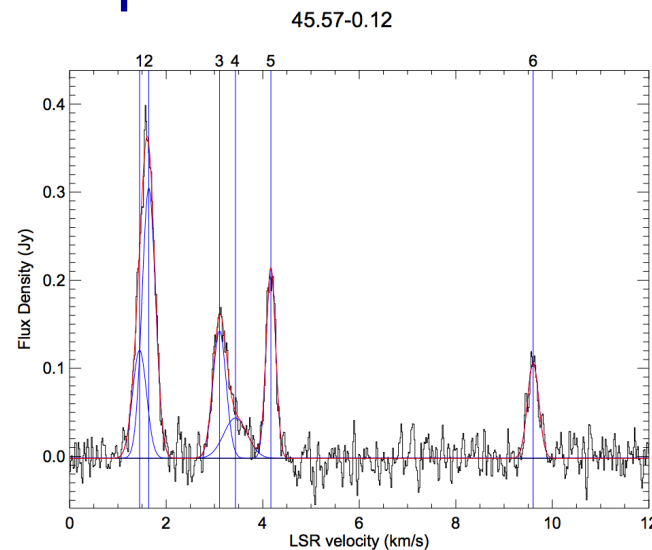
- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- LST target: 13:34 → 00:57
- CGC: J1922+1530
- FDSC: 3C286, LST range 06:55 → 20:07
- BPC: 3C286
- PAG: 3C286
- PLC: J1407+2827 (OQ208), LST range ????
- **Locate this calibrator in the VLA catalog and find its LST range**

Source Catalog (SCT)

- Target source: The 6.7 GHz methanol maser site 45.57-0.12
- RA (J2000): 19:15:13.2, DEC (J2000)= +11:10:25
- LST target: 13:34 → 00:57
- CGC: J1922+1530 (LST range same as target)
- FDSC: 3C286, LST range of 06:55 → 20:07
- BPC: 3C286
- PAG: 3C286
- PLC: J1407+2827 (OQ208), LST range of 07:38 → 20:36

Resource Catalog (RCT)

- C-band targeting 6.7 GHz methanol maser ($v_o=6668.518$ MHz) + full band continuum for total intensity and linear polarization.
 - Will use a mix 3-bit & 8-bit mode
 - 3-bit for the continuum and linear polarization
 - 8-bit for the spectral line
- V (radio, LSR): centered near 6 km/s
- $\Delta V \sim 9$ km/s (range for the lines)
- $\delta V \sim 0.04$ km/s (~ 0.9 kHz)



Resource Catalog (RCT)

NRAO Instrument Configurati... x +

https://obs.vla.nrao.edu/rct/secure/index.xhtml

File Edit Help

NRAO > User Portal > Observation Preparation | Sources | **Instrument Configurations**

Hello, Dr. Galactico Armenian Exit

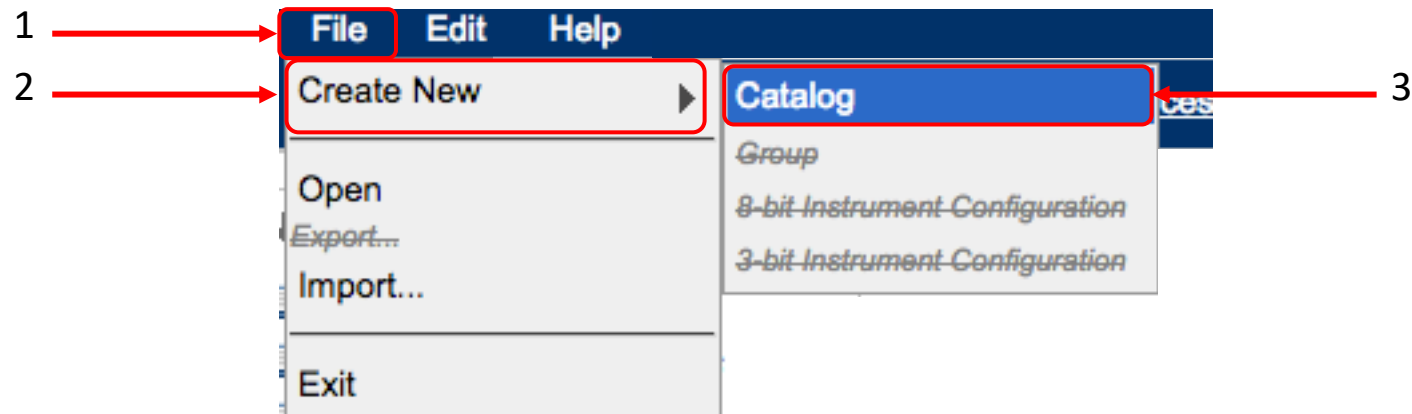
To start, please select an item in the tree on the left or create a New Catalog

- NRAO Defaults
- old OSRO NRAO Defaults
- test1
- test2
- Personal Catalog
- NRAO_CD

- **In the OPT: click on Instrument Configurations (in navigation bar)**

Resource Catalog (RCT)

➤ File → Create New → Catalog



Resource Catalog (RCT)

[New Catalog]

Resources

Properties

Name:

[New Catalog]

➤ Name catalog (e.g., CD-OPT)

CATALOG OWNER

Dr. Galactico Armenian

CURRENT COAUTHORS

No CoAuthors Found

ADD COAUTHORS

Last Name: Search

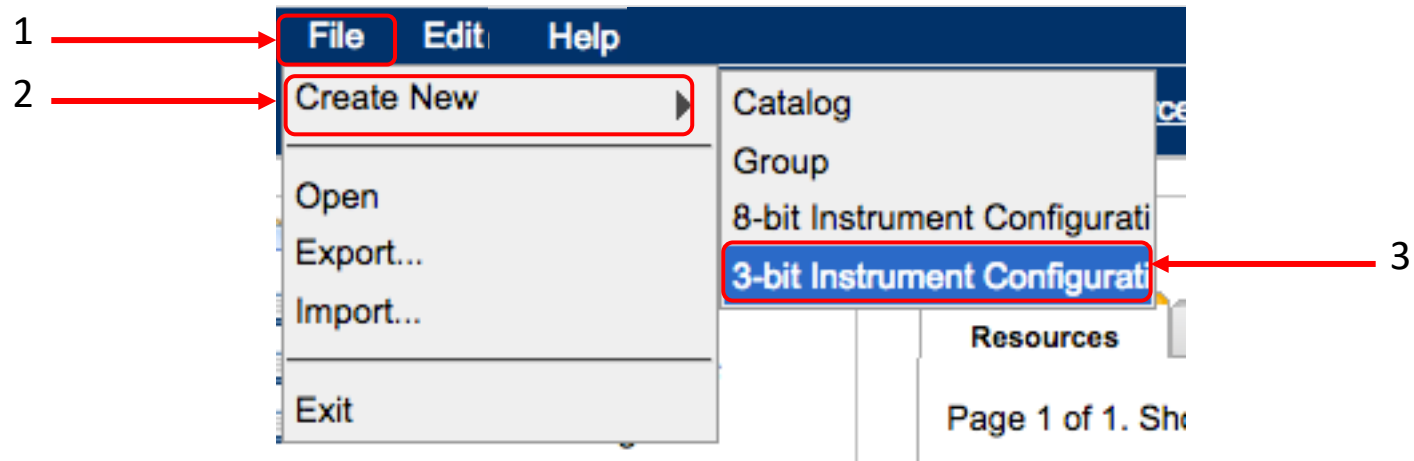
Name

E-mail

Add Coauthors

Resource Catalog (RCT)

➤ File → Create New → 3-bit Instrument Configuration



Resource Catalog (RCT)

➤ File → Create New → 3-bit Instrument Configuration

New Resource Wizard

Observing Band
C (4.0GHz - 8.0GHz)

Array Configuration
B / CnB

Integration Time
3.0s

Polarization Mode
Full

Generate Cancel

1. Select Observing Band: C

2. Select Array Configuration: B /CnB

3. Select Polarization: Full

4. Click on Generate to create resource

Resource Catalog (RCT)

➤ Under Basics tab

Basics | Lines | Basebands | Line Placement | Subbands | Validation

ID
2313529

Name
 1

Receiver Band
C (4.0GHz - 8.0GHz) ▾
3-dB range: 3.8GHz - 8.2GHz

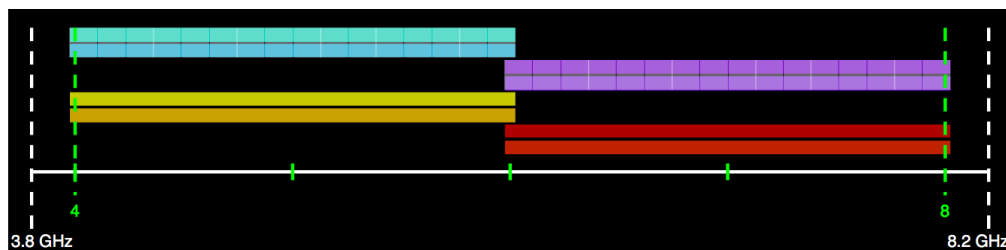
Correlator Integration Time (s)
 2

1. Change the name as desired; 2. confirm the Correlator Integration Time.

Resource Catalog (RCT)

➤ Under Basebands tab

- old OSRO NRAO Defaults
- test1
- test2
- Personal Catalog
- NRAO_CD
- CD-OPT



Total BI. BPs Used:	32 of 64
Total Data Rate:	7.90 MB/s or 28.43 GB/h
Total Spectral Points:	2048
Total Bandwidth:	4.096GHz
Capability Mode:	General observing

- Basics
- Lines
- Basebands
- Line Placement
- Subbands
- Validation

ID
2313529

Name

The setup by default is made for the 3-bit part (per our selection).
Next is to introduce the 8-bit baseband for the line.

Resource Catalog (RCT)

Total Data Rate: 7.90 MB/s or 28.43 GB/h
Total Spectral Points: 2048
Total Bandwidth: 4.096GHz
Capability Mode: General observing

Basics | Lines | **Basebands** | Line Placement | Subbands | Validation

Sampler Input Mode

- Four 2-GHz 3-bit samplers (A1/C1, A2/C2, B1/D1, and B2/D2)
- Two 1-GHz 8-bit samplers (A0/C0 and B0/D0)
- Two 2-GHz 3-bit samplers (A1/C1 and A2/C2) and a single 1-GHz 8-bit sampler (B0/D0)**
- Single 1-GHz 8-bit sampler (A0/C0) and two 2-GHz 3-bit samplers (B1/D1 and B2/D2)

Line	Bandwidth	Frequency	Range
A2/C2	2.048GHz	7.0GHz	5.976GHz - 8.024GHz
B1/D1	2.048GHz	5.0GHz	3.976GHz - 6.024GHz
B2/D2	2.048GHz	7.0GHz	5.976GHz - 8.024GHz

Warning: You must enter a source position before you can set a doppler line!

Name	Doppler Line	Offset From Center	Target Sky Frequency	Position	Velocity	Rest Frame	Convention
A1/C1	<input type="checkbox"/>	0GHz	5GHz				

From the Sampler Input Mode drop-down menu select:

Two 2-GHz 3-bit samplers and a single 1-GHz 8-bit sampler

Resource Catalog (RCT)

NRAO Instrument Configurati... x +

https://obs.vla.nrao.edu/rct/secure/catalogs/2313455/resources/2313529/basebands.shtml

File Edit Help

NRAO > User Portal > Observation Preparation | Sources | Instrument Configurations

Hello, Dr. Galactico Armenian Exit

- NRAO Defaults
- old OSRO NRAO Defaults
- test1
- test2
- Personal Catalog
- NRAO_CD
- CD-OPT

CD-OPT » NRAO-C32f3

3.8 GHz 8.2 GHz

Total BI. BPs Used:	32 of 64
Total Data Rate:	7.90 MB/s or 28.43 GB/h
Total Spectral Points:	2048
Total Bandwidth:	4.096GHz
Capability Mode:	General observing

Basics Lines **Basebands** Line Placement Subbands Validation

Sampler Input Mode


Two 2-GHz 3-bit samplers (A1/C1 and A2/C2) and a single 1-GHz 8-bit sampler (B0/D0)

Resource Catalog (RCT)

➤ Go to Lines tab

Basics **Lines** Basebands Line Placement Subbands Validation

Direction for Doppler calculations

Coordinate System	Right Ascension	Declination	Epoch
Equatorial 	0h 0m 0.00s	0d 0' 0.00"	J2000

Import Source Position

Spectral line frequencies and coverage

Line	Rest Frequency	Rest Frame	Convention	Velocity	Minimum Range	Channel Separation	Polarization	Use Recirculation?	Bl.BPs Required	Delete
------	----------------	------------	------------	----------	---------------	--------------------	--------------	--------------------	-----------------	--------

Add Line Copy Last Line Download Spectral Lines Import Spectral Lines...

Resource Catalog (RCT)

➤ Type in RA & Dec. **or** use Import Source Position

Basics **Lines** Basebands Line Placement Su

Direction for Doppler ca: Enter RA & Dec

Coordinate System	Right Ascension	Declination	Epoch
Equatorial	0h 0m 0.000000	0d 0' 0.000000"	J2000

Import Source Position

Click on button

Choose Source

SOURCE CATALOG:
CD-OPT

SOURCE GROUP:
All

SOURCES:
45.57-0.12

Select

Cancel

1. Select Source Catalog

2. Select source


3. Click on Select to fill field

Resource Catalog (RCT)

➤ Click on button Add Line

Basics **Lines** Basebands Line Placement Subbands Validation

Direction for Doppler calculations

Coordinate System	Right Ascension	Declination	Epoch
Equatorial 	19h 15m 13.20s	11d 10' 25.00"	J2000

Import Source Position

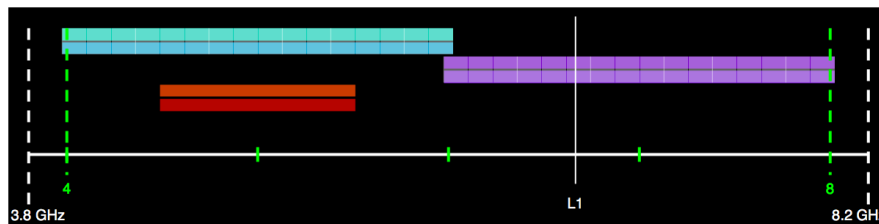
Spectral line frequencies and coverage

Line	Rest Frequency	Rest Frame	Convention	Velocity	Minimum Range	Channel Separation	Polarization	Use Recirculation?	BI.BPs Required	Delete
------	----------------	------------	------------	----------	---------------	--------------------	--------------	--------------------	-----------------	--------

Add Line Copy Last Line Download Spectral Lines Import Spectral Lines...

Resource Catalog (RCT)

- CH₃OH 6.7 GHz ($\nu_0=6668.518$ MHz).
- V (radio, LSR) = centered near 6 km/s
- DV ~ 9 km/s (range for the lines) → Minimum Range = 40 km/s
- $\delta V \sim 0.04$ km/s (~0.9 kHz) → Channel Separation = 0.04 km/s



Total BI. BPs Used:	32 of 64
Total Data Rate:	7.90 MB/s or 28.43 GB/h
Total Spectral Points:	2048
Total Bandwidth:	4.096GHz
Capability Mode:	General observing

Basics **Lines** Basebands Line Placement Subbands Validation

Direction for Doppler calculations

Coordinate System	Right Ascension	Declination	Epoch
Equatorial	19h 15m 13.20s	11d 10' 25.00"	J2000

Import Source Position

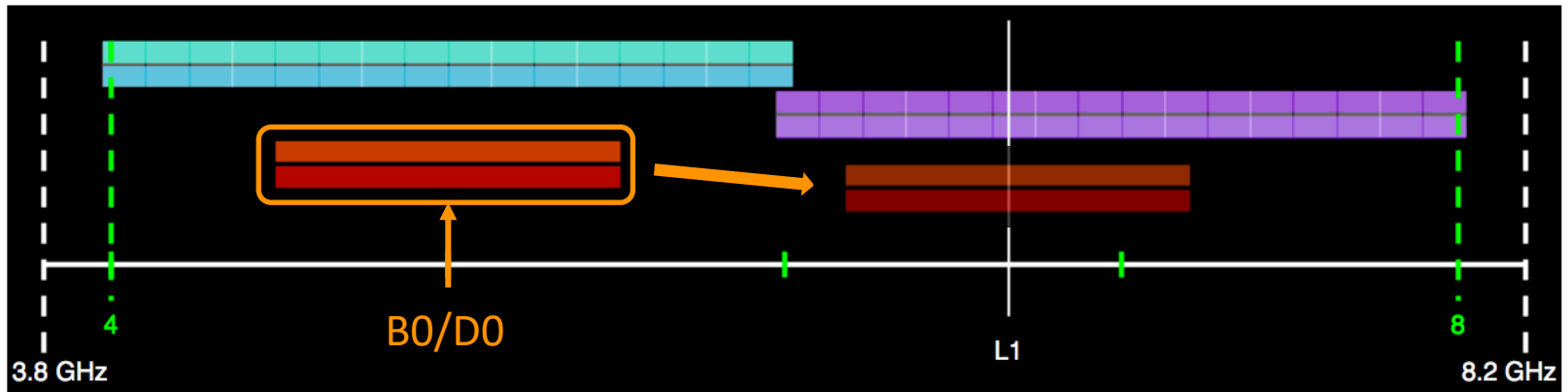
Spectral line frequencies and coverage

	Line	Rest Frequency	Rest Frame	Convention	Velocity	Minimum Range	Channel Separation	Polarization	Use Recirculation?	BI.BPs Required	De
L1	Methanol	6668.518 6.669GHz	LSR	Radio (km/s)	6.0 km/s	40.0 km/s 889.751kHz	0.04 km/s 889.751Hz	Full	<input checked="" type="checkbox"/>	1	

Name line →

Add Line Copy Last Line Download Spectral Lines Import Spectral Lines...

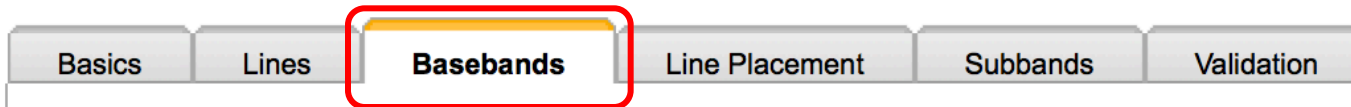
Resource Catalog (RCT)




We need to overlap the 1 GHz wide baseband (B0/D0) from the 8 bit samplers with the line L1.

Resource Catalog (RCT)

➤ Go to Basebands tab



Sampler Input Mode

Two 2-GHz 3-bit samplers (A1/C1 and A2/C2) and a single 1-GHz 8-bit sampler (B0/D0) 

Name	Bits	Center Frequency	Sky Range
A1/C1 2.048GHz	3	5.0GHz	3.976GHz - 6.024GHz
A2/C2 2.048GHz	3	7.0GHz	5.976GHz - 8.024GHz
B0/D0 1.024GHz	8	5.0GHz	4.488GHz - 5.512GHz

Resource Catalog (RCT)

➤ Still under Basebands tab:

- We will Doppler set the baseband B0/D0 on the line (1 & 2)
- Set the Center Frequency of B0/D0 to (6.669GHz + 0.064GHz) = 6.733GHz (3)

Basics | Lines | **Basebands** | Line Placement | Subbands | Validation

Sampler Input Mode
Two 2-GHz 3-bit samplers (A1/C1 and A2/C2) and a single 1-GHz 8-bit sampler (B0/D0)

Name	Bits	Center Frequency	Sky Range
A1/C1 2.048GHz	3	5.0GHz	3.976GHz - 6.024GHz
A2/C2 2.048GHz	3	7.0GHz	5.976GHz - 8.024GHz
B0/D0 1.024GHz	8	6.733GHz	6.224GHz - 7.245GHz 3

Name	Doppler Line	Offset From Center	Target Sky Frequency	Position	Velocity	Rest Frame	Convention
A1/C1	1 Methanol 2 6.669GHz	0GHz	5GHz				
A2/C2	Methanol 6.669GHz	0GHz	7GHz				
B0/D0	<input checked="" type="checkbox"/> Methanol - 6.669GHz	64.040MHz	6.669GHz	19h 15m 13.20s 11d 10' 25.00"	6.0km/s	Lsr Kinematic	Radio

Resource Catalog (RCT)

- Go to Line Placement tab, click on Generate button (1)

Basics	Lines	Basebands	Line Placement	Subbands	Validation					
Line	Rest Frequency	Rest Frame	Convention	Velocity	Minimum Range	Channel Separation	Polarization	Use Recirculation?	Bl.BPs Required	Generate
L1	Methanol 6668.518MHz 6.669GHz	Lsr Kinematic	Radio	6km/s	40.0 km/s 889.751kHz	0.04 km/s 889.751Hz	FULL	Yes	1	Generate

- Select **B0/D0**, click on Generate button in pop-up box (2 & 3)

Generate Subband from Science Specification

Using line **Methanol - 6668.518MHz**

Baseband
B0/D0

Comments
Generated from
Methanol -

Generate Cancel

Resource Catalog (RCT)

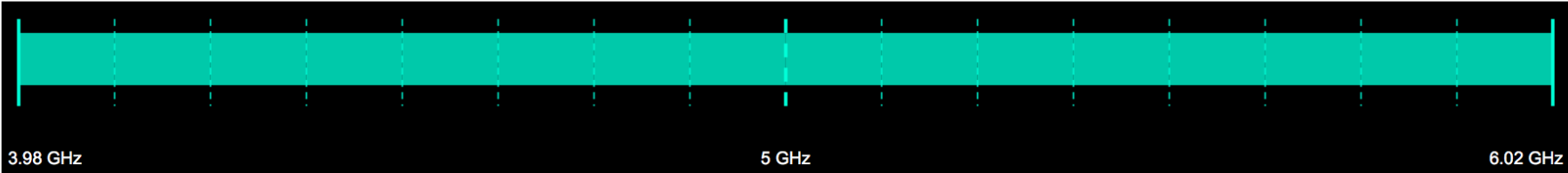
➤ Go to Subbands tab, defaults to first subband (A1/C1)

Basics | Lines | Basebands | Line Placement | **Subbands** | Validation

Clear All Subbands

A1/C1 | A2/C2 | B0/D0

Add Subband | Fill Subbands | Bulk Edit Selected Subbands | Delete Selected Subbands



SBP	BW	Snap To Grid	Central Frequency	Fix To Baseband	Polarization	Bl. BPs	Recirculation	Channels	MB/s	Priority
0	128MHz 6440km/s	<input checked="" type="checkbox"/>	BB _{center} + 960.0MHz 5.896GHz - 6.024GHz	<input checked="" type="checkbox"/>	Full	1	1×	64 × 2.00MHz (64 × 101km/s)	0.247	Essential
1	128MHz 6580km/s	<input checked="" type="checkbox"/>	BB _{center} + 832.0MHz 5.768GHz - 5.896GHz	<input checked="" type="checkbox"/>	Full	1	1×	64 × 2.00MHz (64 × 103km/s)	0.247	Essential
2	128MHz 6730km/s	<input checked="" type="checkbox"/>	BB _{center} + 704.0MHz 5.64GHz - 5.768GHz	<input checked="" type="checkbox"/>	Full	1	1×	64 × 2.00MHz (64 × 105km/s)	0.247	Essential

Resource Catalog (RCT)

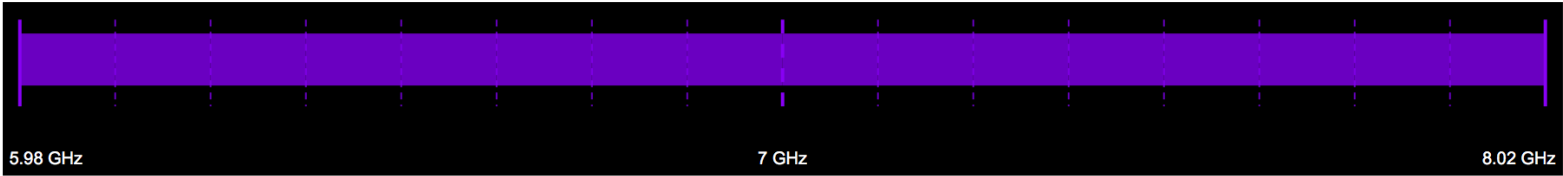
➤ In Subbands tab check A2/C2

Basics | Lines | Basebands | Line Placement | **Subbands** | Validation

Clear All Subbands

A1/C1 | **A2/C2** | B0/D0

Add Subband | Fill Subbands | Bulk Edit Selected Subbands | Delete Selected Subbands



SBP	BW	Snap To Grid	Central Frequency	Fix To Baseband	Polarization	Bl. BPs	Recirculation	Channels	MB/s	Priority
0	128MHz 4820km/s	<input checked="" type="checkbox"/>	BB _{center} + 960.0MHz 7.896GHz - 8.024GHz	<input checked="" type="checkbox"/>	Full	1	1x	64 × 2.00MHz (64 × 75.3km/s)	0.247	Essential
1	128MHz 4900km/s	<input checked="" type="checkbox"/>	BB _{center} + 832.0MHz 7.768GHz - 7.896GHz	<input checked="" type="checkbox"/>	Full	1	1x	64 × 2.00MHz (64 × 76.6km/s)	0.247	Essential
2	128MHz 4980km/s	<input checked="" type="checkbox"/>	BB _{center} + 704.0MHz 7.64GHz - 7.768GHz	<input checked="" type="checkbox"/>	Full	1	1x	64 × 2.00MHz (64 × 77.8km/s)	0.247	Essential
3	128MHz 5070km/s	<input checked="" type="checkbox"/>	BB _{center} + 576.0MHz 7.512GHz - 7.64GHz	<input checked="" type="checkbox"/>	Full	1	1x	64 × 2.00MHz (64 × 79.1km/s)	0.247	Essential

Resource Catalog (RCT)

➤ In Subbands tab find spectral line in B0/D0 (yellow box)

The screenshot shows the RCT interface with the 'Subbands' tab selected. The 'B0/D0' subband is highlighted in a yellow box. Below the spectral plot, a table lists the subband details.

SBP	BW	Snap To Grid	Central Frequency	Fix To Baseband	Polarization	Bl. BPs	Recirculation	Channels	MB/s	Priority
0	1MHz 45.0km/s	<input type="checkbox"/>	6.668960101GHz 6.66846GHz - 6.66946GHz	<input type="checkbox"/>	Full	1	32x	2048 × 488Hz (2048 × 0.0219km/s)	7.897	Essential

Resource Catalog (RCT)

- In Subbands tab make sure that Snap to Grid and Fix to Baseband are not checked for spectral line resource (and do not check them; it is an irreversible process)

Basics Lines Basebands Line Placement **Subbands** Validation

Clear All Subbands

A1/C1 A2/C2 **B0/D0**

Add Subband Fill Subbands Bulk Edit Selected Subbands Delete Selected Subbands

6.22 GHz 6.73 GHz 7.25 GHz

SBP	BW	Snap To Grid	Central Frequency	Fix To Baseband	Polarization	Bl. BPs	Recirculation	Channels	MB/s	Priority
0	1MHz 45.0km/s	<input type="checkbox"/>	6.668960101GHz 6.66846GHz - 6.66946GHz	<input type="checkbox"/>	Full	1	32x	2048 × 488Hz (2048 × 0.0219km/s)	7.897	Essential

- Hover over them for the explanations.

Resource Catalog (RCT)

- In Subbands tab select Add Subband to add subband(s) in order to make calibration easier (especially for delay calibration)

The screenshot shows the 'Subbands' tab in the RCT software. The 'Add Subband' button is highlighted with a red box. Below the button is a frequency spectrum plot showing a range from 6.22 GHz to 7.25 GHz. Below the plot is a table of subband parameters.

SBP	BW	Snap To Grid	Central Frequency	Fix To Baseband	Polarization	Bl. BPs	Recirculation	Channels	MB/s	Priority
0	1MHz 45.0km/s	<input type="checkbox"/>	6.668960101GHz 6.66846GHz - 6.66946GHz	<input type="checkbox"/>	Full	1	32x	2048 × 488Hz (2048 × 0.0219km/s)	7.897	Essential

Resource Catalog (RCT)

- In Subbands tab click on Add Subband to add a 128 MHz subband. Need to move in frequency to overlap with the line subband. This is done by adjusting the Center Frequency.

Basics | Lines | Basebands | Line Placement | **Subbands** | Validation

Clear All Subbands

A1/C1 | A2/C2 | **B0/D0**

Add Subband | Fill Subbands | Bulk Edit Selected Subbands | Delete Selected Subbands

SBP	BW	Snap To Grid	Central Frequency	Fix To Baseband	Polarization	Channels	MB/S	Priority	Ger
0	1MHz 45.0km/s	<input type="checkbox"/>	6.668960101GHz 6.66846GHz - 6.66946GHz	<input type="checkbox"/>	Full	2048 × 488Hz (2048 × 0.0219km/s)	7.910	Essential	Ger
1	128MHz 6110km/s	<input checked="" type="checkbox"/>	BB_center + -448.0MHz 6.221GHz - 6.349GHz	<input checked="" type="checkbox"/>	Full	64 × 2.00MHz (64 × 95.4km/s)	0.247	Essential	

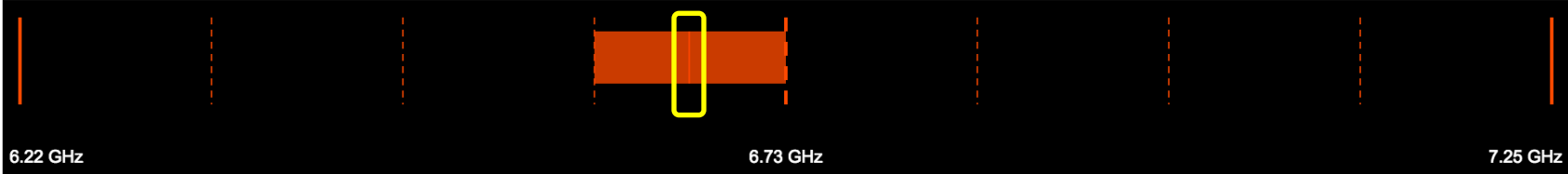
Resource Catalog (RCT)

Basics Lines Basebands Line Placement **Subbands** Validation

Clear All Subbands

A1/C1 A2/C2 **B0/D0**

Add Subband Fill Subbands Bulk Edit Selected Subbands Delete Selected Subbands

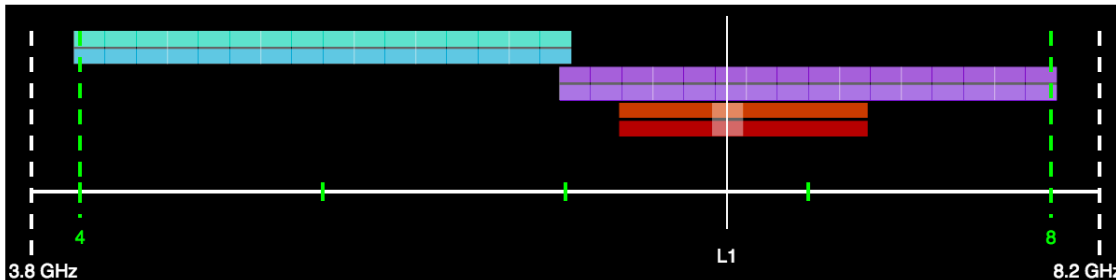


SBP	BW	Snap To Grid	Central Frequency	Fix To Baseband	Polarization	Array Phasing	Bl. BPs	Recirculation	Channels	MB/S	Priority	
0	1MHz 45.0km/s	<input type="checkbox"/>	6.668960101GHz 6.66846GHz - 6.66946GHz	<input type="checkbox"/>	Full	<input type="checkbox"/>	1	32x	2048 × 488Hz (2048 × 0.0219km/s)	7.910	Essential	Gene
1	128MHz 5750km/s	<input checked="" type="checkbox"/>	BB _{center} + -64.0MHz 6.605GHz - 6.733GHz	<input checked="" type="checkbox"/>	Full	<input type="checkbox"/>	1	1x	64 × 2.00MHz (64 × 89.9km/s)	0.247	Essential	

Resource Catalog (RCT)

- Go to Validation tab to view the summary and see if there are any warning messages.

CD-OPT » mysetup



Total BI. BPs Used:	34 of 64
Total Data Rate:	16.04 MB/s or 57.75 GB/h
Total Spectral Points:	4160
Total Bandwidth:	4.225GHz
Capability Mode:	Shared risk

Basics Lines Basebands Line Placement Subbands **Validation**

Name:	mysetup
Tint:	3.0
Receiver Band:	C (4.0GHz - 8.0GHz)

T _{int}	AC BB _{center} Freq	AC Summed BW	AC Coverage	Req. BIBPs	# Channels	AC Doppler Line	AC Doppler Vel.	AC Doppler Pos.	AC Do
Band	BD BB _{center} Freq	BD Summed BW	BD Coverage	Act. BIBPs	Min/Max Width	BD Doppler Line	BD Doppler Vel.	BD Doppler Pos.	BD Do
3s	5.0GHz / 7.0GHz	2.048GHz / 2.048GHz	100.0 / 100.0 %	34	4160	--- / ---	--- --- --- / --- --- ---	--- / ---	---
C	6.733GHz	128.0MHz	12.5 %	34	488Hz / 2.0MHz	6.668518GHz	6.0km/s LSR Radio	19h 15m 13.20s 11d 10' 25.00"	64.039

Resource Catalog (RCT)

In the Validation tab see all the subbands (a small section of the long table is shown below)

A2/C2	8	128MHz	6.872GHz - 7.0GHz	Yes	6.936GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	7	128MHz	7.0GHz - 7.128GHz	Yes	7.064GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	6	128MHz	7.128GHz - 7.256GHz	Yes	7.192GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	5	128MHz	7.256GHz - 7.384GHz	Yes	7.32GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	4	128MHz	7.384GHz - 7.512GHz	Yes	7.448GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	3	128MHz	7.512GHz - 7.64GHz	Yes	7.576GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	2	128MHz	7.64GHz - 7.768GHz	Yes	7.704GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	1	128MHz	7.768GHz - 7.896GHz	Yes	7.832GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	0	128MHz	7.896GHz - 8.024GHz	Yes	7.96GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
B0/D0	1	128MHz	6.605GHz - 6.733GHz	Yes	6.669GHz	Full	1	1×	64	2.0MHz	No	0.247 ME
	0	1MHz	6.66846010GHz - 6.66946010GHz	No	6.66896010GHz	Full	1	32×	2048	488Hz	No	7.897 ME

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Q1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Q2	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Q3	-	0	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Q4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WIDAR's baseline board pair usage

Observation Preparation

The OPT will be offline at 08:00MDT/02:00UT for 5 minutes for maintenance. Please log out before that time and log in again a few minutes later to continue where you left off. We apologize for any inconvenience this may cause.

To start, please select an item in the tree on the left or create a New Project

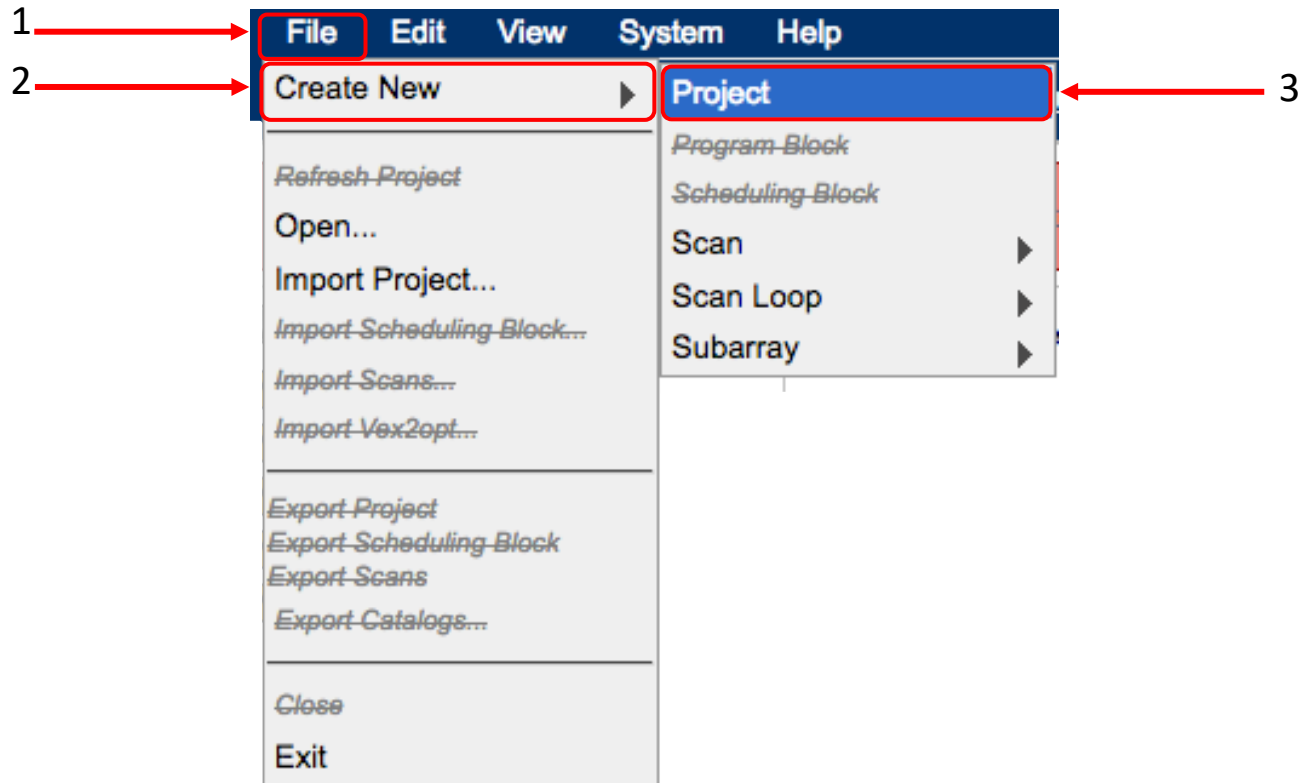
- DEMO_old
- DEMO

➤ In the OPT: click on Observation Preparation (in navigation bar)


Observation Preparation

If you don't have New Project one can be created from the menu:

➤ **File** → **Create New** → **Project**



Observation Preparation

- Alternatively, click on Program Block icon 
 - Insert CD-OPT into the Name field (1)
 - Acceptable configuration: drag the desired configuration of B (2)

This is only needed for test projects

PROGRAM BLOCK DETAILS

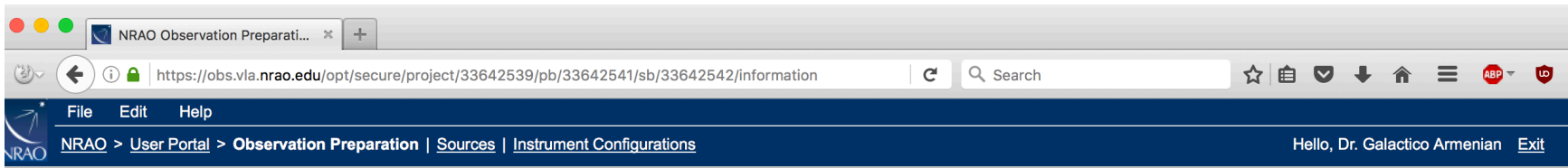
NAME	CD-OPT	SCHEDULING PRIORITY	1
ALLOCATED TIME (HRS)	0.00	USED TIME (HRS)	0.00
COMPLETED?	Yes		

ACCEPTABLE CONFIGURATIONS

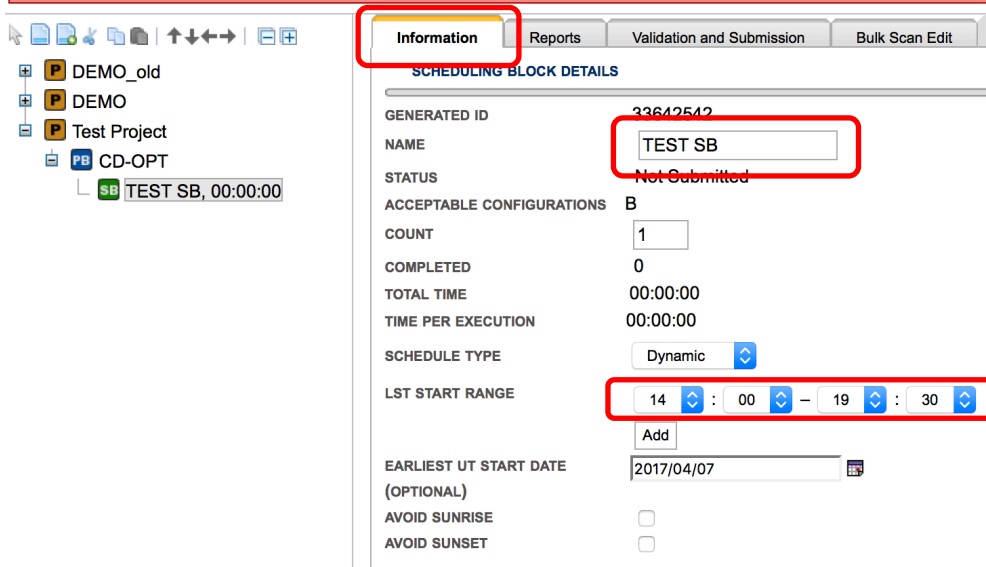
Drag configurations from the list on the right to the left to choose that configuration.
Drag configurations on the left up and down in order to adjust their priority.
Drag configurations from the list on the left to the right to remove that configuration.

ACCEPTABLE CONFIGURATIONS	AVAILABLE CONFIGURATIONS
B	A
	C
	D
	A=>D
	B=>A
	C=>B
	D=>C
	Any

Observation Preparation: SB



The OPT will be offline at 08:00MDT/02:00UT for 5 minutes for maintenance. Please log out before that time and log in again a few minutes later to continue where you left off. We apologize for any inconvenience this may cause.



- At Scheduling Block level click on the Information tab.
- Give the SB a name such as TEST SB
- Schedule Type: leave as Dynamic
- LST range:
 - LST target/CGC (J1922+1530): 13:34 → 00:57
 - LST FDSC/BPC/PAC (3C286): 06:55 → 20:07
 - LST PLC (J1407+2827): 07:38 → 20:36

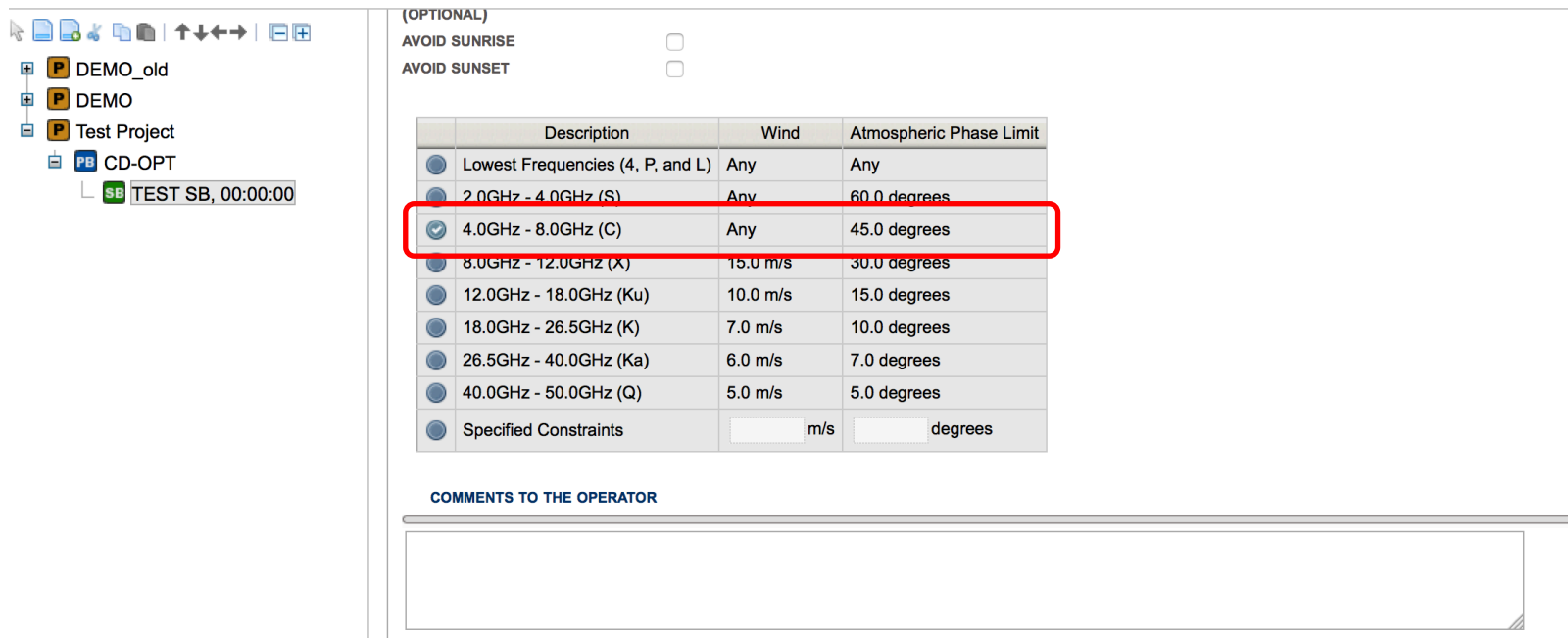
Assuming a 3 hr long SB:

Possible LST start range: 14:30 → 19:00

Observation Preparation: SB

Scroll down on the same page for the scheduling constraints

Select 4.0GHz – 8.0GHz (C) constraints



The screenshot shows a software interface for observation preparation. On the left is a file tree with folders: DEMO_old, DEMO, Test Project, CD-OPT, and a sub-folder SB containing a file TEST SB, 00:00:00. The main area is titled '(OPTIONAL)' and contains two unchecked checkboxes: 'AVOID SUNRISE' and 'AVOID SUNSET'. Below these is a table of scheduling constraints:

	Description	Wind	Atmospheric Phase Limit
<input type="radio"/>	Lowest Frequencies (4, P, and L)	Any	Any
<input type="radio"/>	2.0GHz - 4.0GHz (S)	Any	60.0 degrees
<input checked="" type="radio"/>	4.0GHz - 8.0GHz (C)	Any	45.0 degrees
<input type="radio"/>	8.0GHz - 12.0GHz (X)	15.0 m/s	30.0 degrees
<input type="radio"/>	12.0GHz - 18.0GHz (Ku)	10.0 m/s	15.0 degrees
<input type="radio"/>	18.0GHz - 26.5GHz (K)	7.0 m/s	10.0 degrees
<input type="radio"/>	26.5GHz - 40.0GHz (Ka)	6.0 m/s	7.0 degrees
<input type="radio"/>	40.0GHz - 50.0GHz (Q)	5.0 m/s	5.0 degrees
<input type="radio"/>	Specified Constraints	<input type="text"/> m/s	<input type="text"/> degrees

Below the table is a section titled 'COMMENTS TO THE OPERATOR' with a large empty text box.

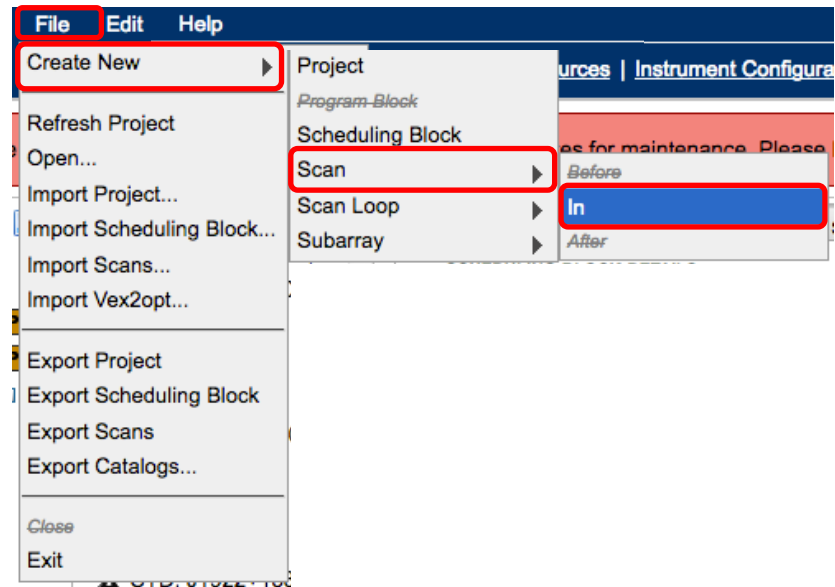
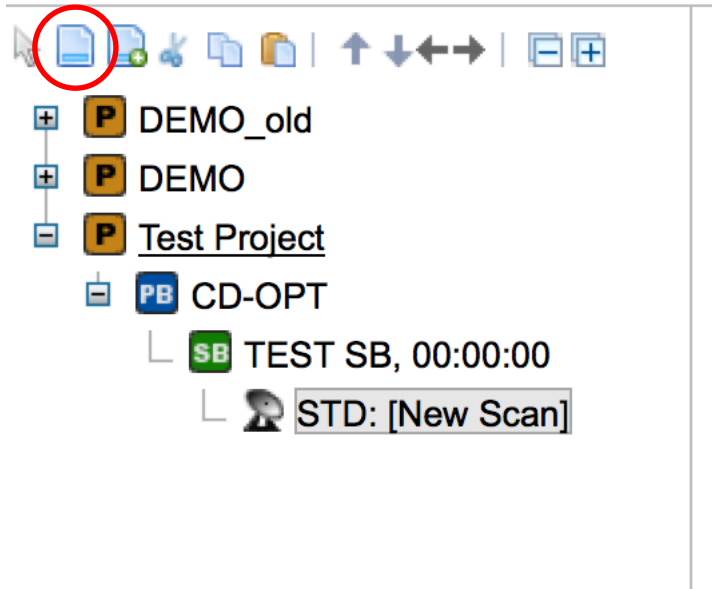
Observation Preparation: SB

- Scheduling Block: Scans
 - Need to account for ~10.5 min for initial slew (can include the setup scans)
 - A dummy scan using a different band (3min)
 - Attenuator setup scan (1min)
 - Requantizer gain setup scan (0.5min)
 - CGC (~6min) [to ensure at least 1min of on-source data]
 - Target-CGC loop
 - FDSC/BPC/PAC scan(s): 3x3min (including slew)
 - PLC scan: 2x3min (including slew)
 - CGC (~5min) [to ensure at least 1min of on-source data]
 - Target-CGC loop

Observation Preparation: Scans

How to set a regular scan using the target source and resource.

1st we need to add a new scan: either use the little icon at the top of the tree structure or from menu **File** → **Create New** → **Scan** → **In**



Observation Preparation: Target Source Scan

Using the target source 45.57-0.12 and the C-band resource we made, the following information will be adjusted

Overview **Comments**

SCAN DETAILS

NAME	SCAN MODE	ANTENNA WRAP	REFERENCE POINTING	PHASE & DELAY CAL	RECORD ON MARK V	OVER THE TOP
[New Scan]	Standard Observing	No Preference	<input type="checkbox"/> Apply Last?	<input type="checkbox"/> Apply Last?	<input type="checkbox"/> Allow?	<input type="checkbox"/> Allow?

TARGET SOURCE	HARDWARE SETUP	SCAN TIMING	INTENTS
No Source Assigned <input type="button" value="Import"/>	No Instrument Config. Assigned <input type="checkbox"/> Keep Previous Conf. <input type="button" value="Import"/>	Duration (LST) 00:05:00	<input checked="" type="checkbox"/> OBSERVE TARGET <input type="checkbox"/> CALIBRATE COMPLEX GAIN (A AND P) <input type="checkbox"/> CALIBRATE FLUX DENSITY SCALE <input type="checkbox"/> CALIBRATE BANDPASS <input type="checkbox"/> SETUP INTENT More >>>

Observation Preparation: Target Source Scan

Using the target source 45.57-0.12

The image shows a software interface for observation preparation. On the left, the 'SCAN DETAILS' section has a 'NAME' field with a '[New Scan]' button (1) and a 'Start' button. Below it, the 'TARGET SOURCE' section has an 'Import' button (2). On the right, a 'Choose Source' dialog box is open. It has a 'SOURCE CATALOG' dropdown set to 'CD-OPT' (3), a 'SOURCE GROUP' dropdown set to 'All', and a 'SOURCES' list with '45.57-0.12' selected (4). The dialog has a 'Change' button (5) and a 'Cancel' button.

Observation Preparation: Target Source Scan

Using the C-band resource we made

Overview Comments

SCAN DETAILS

NAME	SCAN MODE	ANTENNA
45.57-0.12	Standard Observing	No Preferen

TARGET SOURCE	HARDWARE SETUP
45.57-0.12 RA: 19h 15m 13.20s DEC: 11d 10' 25.00"	No Instrument Config. Assigned <input type="checkbox"/> Keep Previous Conf.

Import

Import

RESOURCE CATALOG: CD-OPT

RESOURCE GROUP: All

RESOURCES:
 mysetup

Change

Cancel

2

3

4

Observation Preparation: Scan Intents

- Setup intent needs to be marked explicitly
- Calibrator intents are important for pipeline processing
- Click on **More >>>** to reveal more intents, **Less <<<** to hide

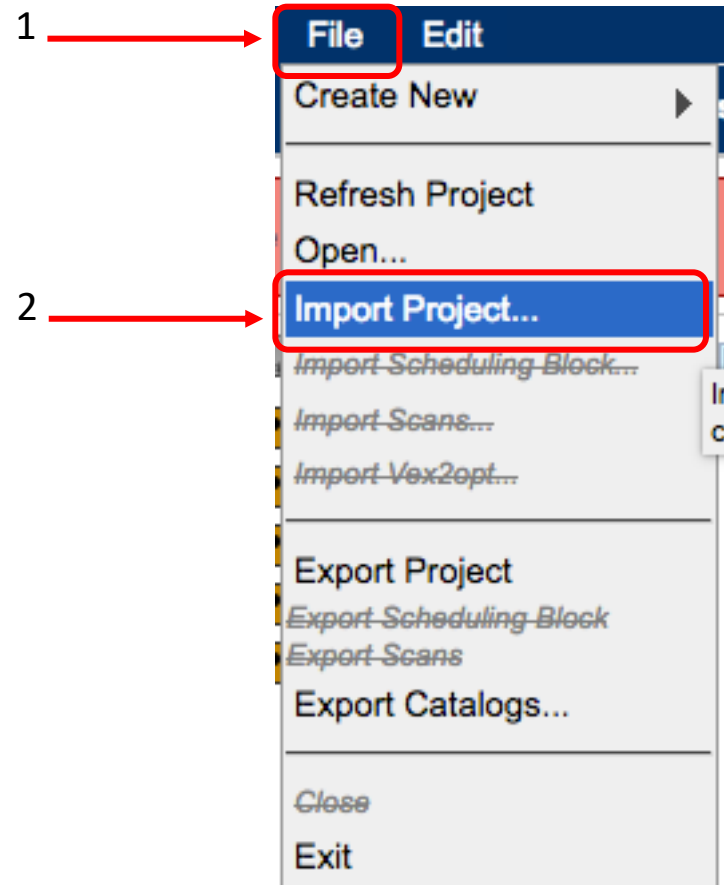
The diagram illustrates the 'INTENTS' panel in two states:

- Collapsed State (Left):** Shows a list of intents with checkboxes. The 'OBSERVE TARGET' checkbox is checked. Below the list is a red-bordered button labeled 'More >>>'.
- Expanded State (Right):** Shows the same list of intents, but with more items revealed. The 'OBSERVE TARGET' checkbox is checked. Below the list is a blue-bordered button labeled 'Less <<<'.

A red arrow points from the 'More >>>' button in the collapsed state to the expanded state. A blue arrow points from the 'Less <<<' button in the expanded state back to the collapsed state.

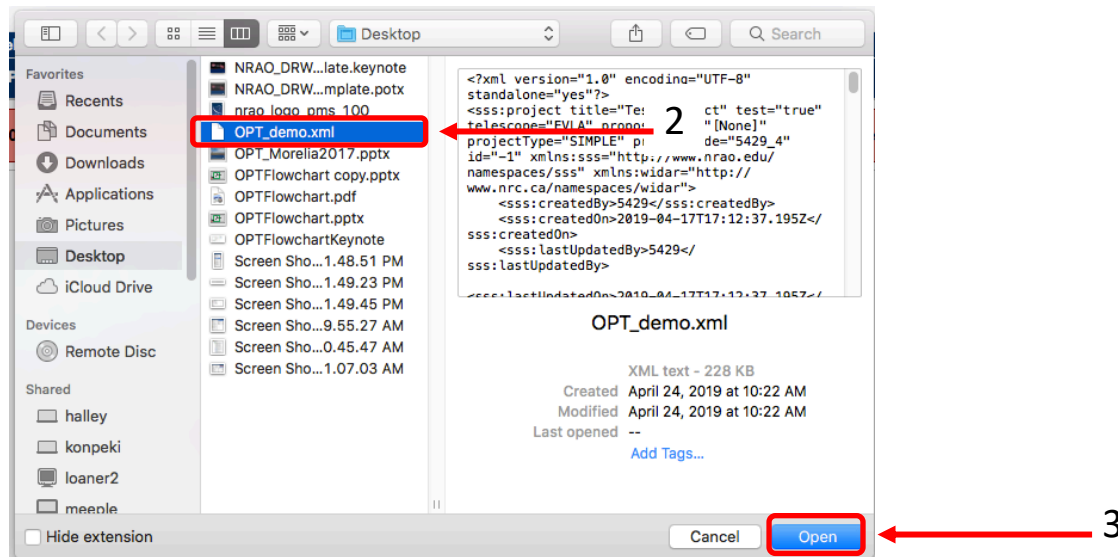
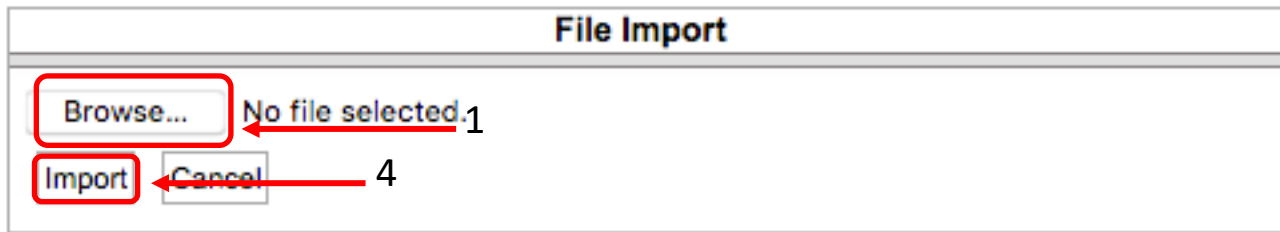
Observation Preparation

- You were provided with a file called OPT_demo.xml
- File → Import Project



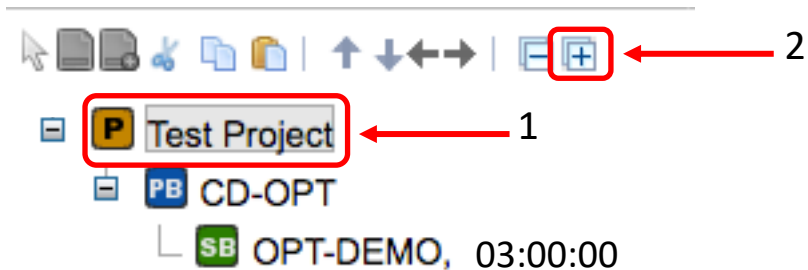
Observation Preparation

- Browse to locate the file and import (click once and wait for a few seconds).



Observation Preparation

- Select the Project and click on the  icon to open it up



Observation Preparation

NRAO Observation Preparati... x +

https://obs.vla.nrao.edu/opt/secure/project/33642539/pb/33642541/sb/33642542/information

File Edit View Help

NRAO > User Portal > Observation Preparation | Sources | Instrument Configurations

Hello, Dr. Galactico Armenian Exit

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Information **Reports** Validation and Submission Bulk Scan Edit Executions

SCHEDULING BLOCK DETAILS

GENERATED ID 33642542
NAME OPT-DEMO
STATUS Not Submitted
ACCEPTABLE CONFIGURATIONS B
COUNT 1
COMPLETED 0
TOTAL TIME 03:00:00
TIME PER EXECUTION 03:00:00
SCHEDULE TYPE Dynamic
LST START RANGE 14 : 30 - 19 : 00
EARLIEST UT START DATE (OPTIONAL) 2017/04/07
AVOID SUNRISE
AVOID SUNSET

Click on Reports tab to view all you have done

	Description	Wind	Atmospheric Phase Limit
<input type="radio"/>	Lowest Frequencies (4, P, and L)	Any	Any
<input type="radio"/>	2.0GHz - 4.0GHz (S)	Any	60.0 degrees
<input checked="" type="radio"/>	4.0GHz - 8.0GHz (C)	Any	45.0 degrees
<input type="radio"/>	8.0GHz - 12.0GHz (X)	15.0 m/s	30.0 degrees

Observation Preparation

- Check in the Reports tab the following:
 - Instrument configuration summary
 - Time on source summary
 - Schedule summary

Observation Preparation

- Change the assumed schedule start at the top to assess whether all the scans in the SB are OK at all possible start times in the assumed LST range. Click on Update to implement the LST change.

ASSUMED SCHEDULE START: 62633 LST

SCHEDULE STOP: 62633 12:30:00 LST

ASSUMED ANTENNA POSITION
AZIMUTH: 225.0d
ELEVATION: 35.0d



Observation Preparation

- Check if the narrow subband for the line is set up correctly. Click on **Show All Subbands** then check the frequency of your line source. Use Dopset (URL below) to check.

INSTRUMENT CONFIGURATION SUMMARY											
Name	T _{int}	AC BB _{center} Freq	AC Summed BW	AC Coverage	Req. BIBPs	# Channels	AC Doppler Line	AC Doppler Vel.	AC Doppler Pos.	AC Doppler Off.	Data Rate
	Band	BD BB _{center} Freq	BD Summed BW	BD Coverage	Act. BIBPs	Min/Max Width	BD Doppler Line	BD Doppler Vel.	BD Doppler Pos.	BD Doppler Off.	
1 L16f2A	2s	1.264GHz	512.0MHz	50.0 %	16	1024	---	---	---	---	5.923 MB/s
	L	1.776GHz	512.0MHz	50.0 %	16	1.0MHz / 1.0MHz	---	---	---	---	21.322 GB/h
Show All Subbands 											
2 mysetup	3s	5.0GHz / 7.0GHz	2.048GHz / 2.048GHz	100.0 / 100.0 %	34	4160	--- / ---	---	---	---	16.041 MB/s
	C	6.73337915GHz	128.0MHz	12.5 %	34	488Hz / 2.0MHz	6.668518GHz	6.0km/s LSR Radio	19h 15m 13.20s 11d 10' 25.00"	64.039899	57.747 GB/h
Show All Subbands 											

B0/D0	1	128MHz	6.60537942GHz - 6.73337942GHz	Yes	6.66937942GHz	Full	1	1*	64	2.0MHz	No	0.247 MB/s	0	Generated from Methanol - 6
	0	1MHz	6.66883952GHz - 6.66983952GHz	No	6.66933952GHz	Full	1	32*	2048	488Hz	No	7.897 MB/s	0	

NATIONAL RADIO ASTRONOMY OBSERVATORY VLA OBSERVING PROGRAM 5429_4 FOR DAY 64580 LST 18:52:30 (FRI APR 07 12:58:59 UTC 2017) SUMMARY REPORT.										
+ -	Source	Scan	AC Freq.	Start LST	Slew	Modifiers	Start HA	Start Az	Start El	Start PA
		Instrument Cfg.	BD Freq.	Stop LST	On Source		End HA	End Az	End El	End PA
		dummy	1.264GHz	18:52:30	00:01:53		-0.50	158.1d	70.2d	-18.7d

Observation Preparation

- **Validation and Submission.** Click on the Validation and Submission tab, click on Validate and if no errors reported, click on Submit

The screenshot shows a web interface with a navigation bar at the top containing tabs: Information, Reports, Validation and Submission (highlighted with a red box), Bulk Scan Creation, Bulk Scan Edit, and Executions. Below the navigation bar, there are three main sections:

- VALIDATE SCHEDULING BLOCK**: Contains the text "To submit your project, click Validate below. If there are no errors, you may then submit the project for scheduling." Below this text are two buttons: "Validate" (highlighted with a red box and a red arrow labeled "1") and "Approve". Below the buttons is the message "Success! Your project has no errors."
- REQUEST HELP**: Contains the text "To request help, you must file a ticket with the help desk. Clicking the button below will send you to the help desk." Below this text is the instruction "Be sure to include the following text:" followed by "OPT Help for Project Code: 5429_1" and "SB ID: 6613118". Below the text is a "Request Help" button.
- SUBMIT SCHEDULING BLOCK**: Contains a "Submit" button (highlighted with a red box and a red arrow labeled "2").

Observation Preparation

Before Submitting a Scheduling Block

Visit go.nrao.edu/vla-obs

Review the information found in the Presubmission Checklists

- Instrument Validation
- SB Validation

Observation Preparation

Logout of the OPT as soon as you are done!

Wait for an email from the VLA operator notifying that the observations have been carried out!



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