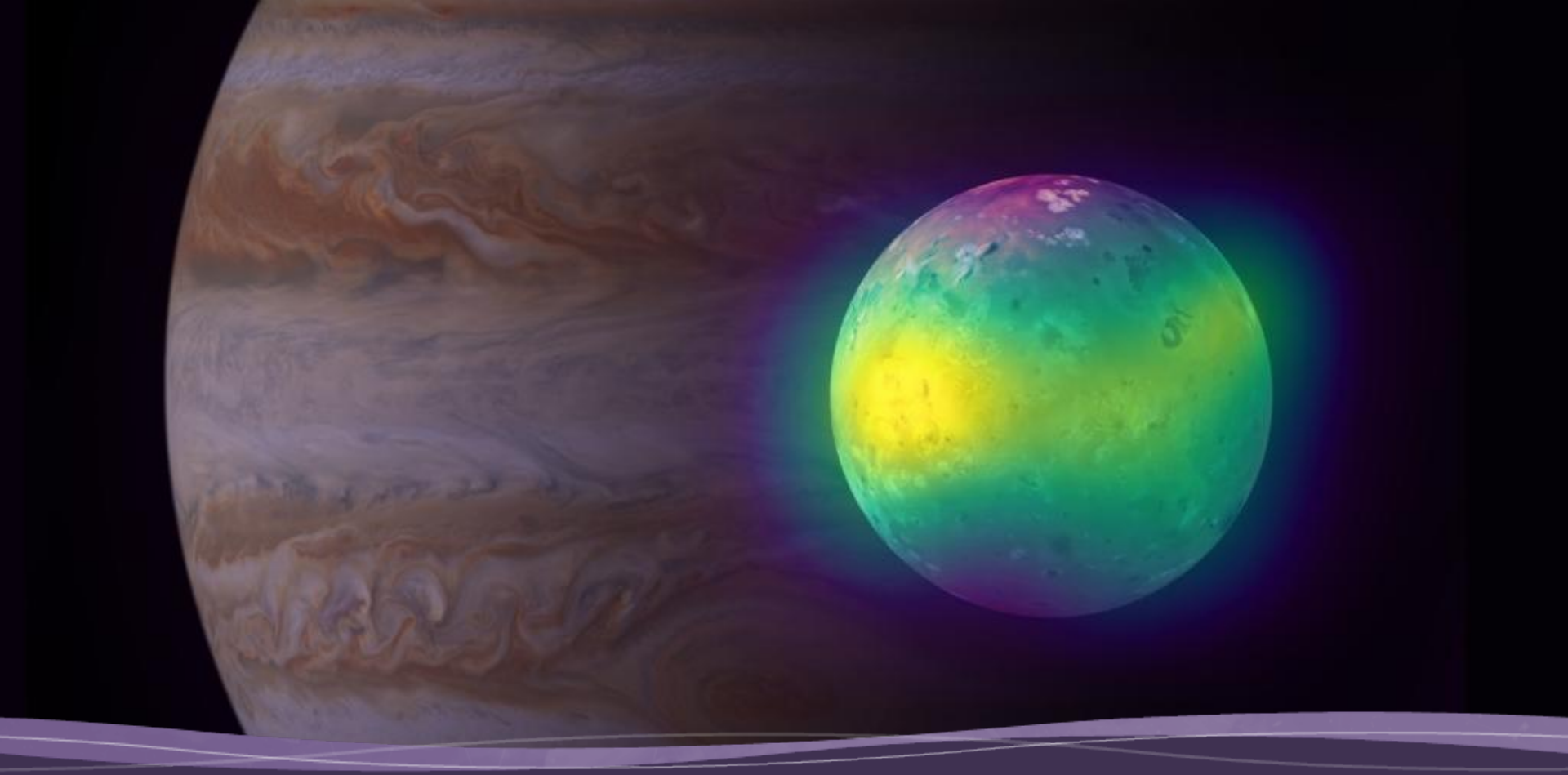


The Science Ready Data Products Initiative

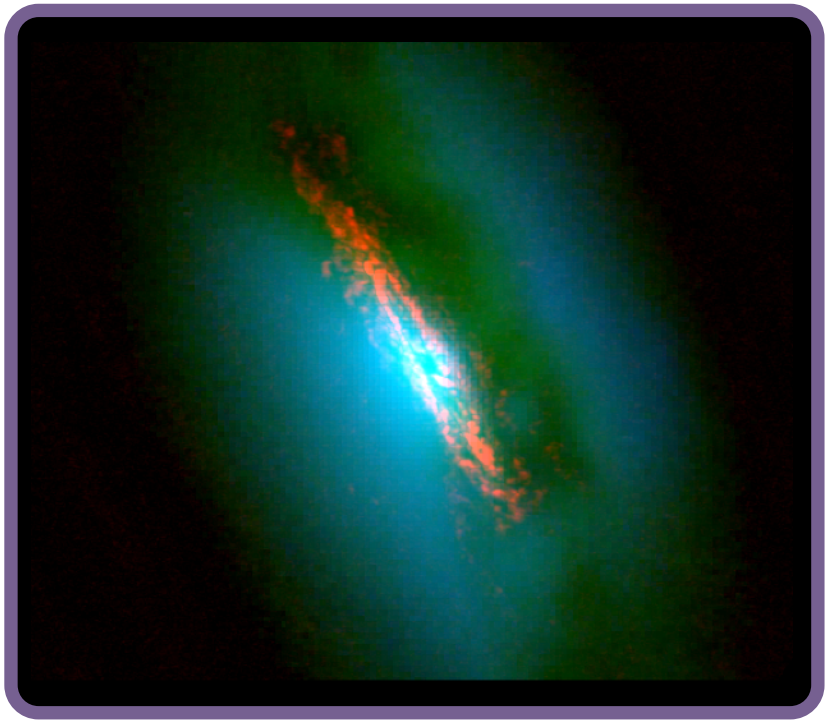
Slides by John Tobin - SRDP Project Scientist
https://science.nrao.edu/srdp/

NRAO's Science Ready Data Products Initiative

The SRDP program is an observatory wide program to increase the scientific impact of NRAO's telescopes by making radio interferometer data easier to use, especially for non-experts by:

- Providing the expertise required to perform data processing, so users may focus on their science
- Leverage the use of pipelines to enable users to perform reimaging of data (currently ALMA) without running CASA themselves
- Provide users calibrated data without having to restore themselves

https://science.nrao.edu/srdp/



- Curating a rich collection of images and cubes for archival study

SRDP is pioneering the tools and processes for ngVLA Science Operations.

Science Ready Data Products

The SRDP Program is currently managing three projects:

- Science Ready Archive and Operations: Defining, creating, and making available science ready products.
  - NRAO Archive
  - VLA Pipeline
  - ALMA Pipeline - limited to features to support user-defined reprocessing
- VLA Sky Survey: Synoptic all-sky survey at S-Band
  - Epoch 3 currently observing
- Telescope Time Allocation Tools - replacement for current proposal submission/review tools

Science Ready Archive and Operations - Services

- NRAO Archive (https://data.nrao.edu)
- VLA
  - Quality assured VLA visibility data
    - S/C-band and higher frequencies, continuum data
  - Calibrated Measurement Set Download
  - Continuum images from VLA data (since late 2022)
- ALMA
  - User-Defined Imaging (AUDI)
    - Re-imaging of data with user-specified parameters
    - self-calibration on science targets
  - Calibrated Measurement Set Download
- VLBA, GBT, GMVA, and Historical VLA
  - Data hosted by NRAO archive
- CARTA service
  - View images currently available in NRAO archive
  - VLASS data, VLA images, and ALMA images created by AUDI

Science Ready Archive and Operations (SRDP)

- Set pipeline development priorities for
  - VLA pipeline
  - Extensions to ALMA pipeline to support SRDP services
  - NRAO Archive (and supporting subsystems)
- VLA calibration pipeline has been integrating VLASS-derived improvements over the past few years
- A VLA continuum imaging pipeline has been developed (adapted from from ALMA pipeline)
  - Users are now getting images delivered along with calibrations
- User-specified angular resolution for ALMA User-Defined Imaging

Caveats

- Focus is on pipeline-able features
  - Some user-defined settings, non-interactive execution
- ALMA Features supported for Cycle 5+ only; pipeline-calibrated data only
  - limitation of how data were archived previously
- Sometimes less ALMA data available for restores than there should be
- Cycle 5 data sometimes need special settings
  - Will get re-run behind the scenes if necessary by staff
- VLA data might have a calibration, but possibly not science quality
  - Still useful but some additional flagging may be needed
    - Images may still be 'ok' thanks to statwt task
  - Science quality calibrations started ~June 2019 (for select bands)
- VLA data back to late 2016 supported for restoration

ALMA SRDP Capabilities

- Downloading of restored measurement sets[1]
  - Useful for archival data or users in other ALMA ARCs that do not get calibrated data
  - NA users get a calibrated MS(es) that are available for a limited time after QA2
- ALMA User-Defined Imaging[1]
  - Make new ALMA images from archival (or your own!) data

[1] For data successfully processed by calibration pipeline, manual calibration not supported

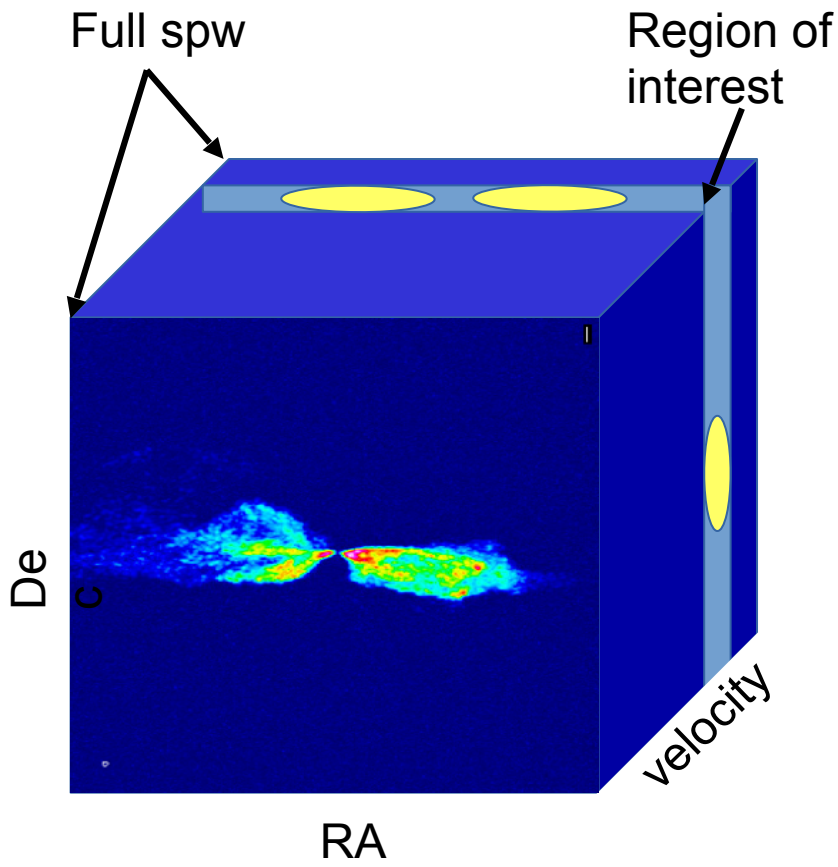
Accessing SRDP capabilities

- User-access to most SRDP services will be through NRAO archive (https://data.nrao.edu)
  - NRAO Archive hosts data from:
    - Jansky VLA
    - ALMA (Cycle 1+)
    - VLBA
    - Historical VLA
    - GBT (2014-2020)
    - GMVA

- This is *NOT* the ALMA archive (https://almascience.nrao.edu/aq/)
  - No NRAO SRDP services are available through the ALMA archive
  - ALMA archive does have some similar features like CARTA

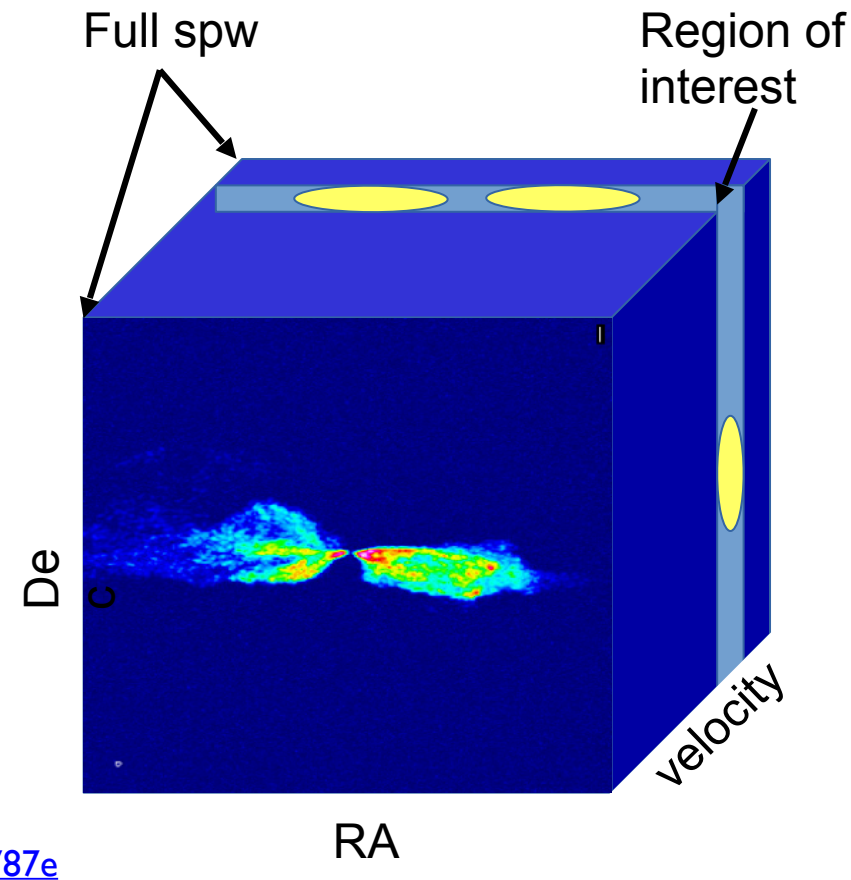
ALMA User Defined Imaging

- Make new ALMA images without downloading all the data or running CASA
- ALMA imaging pipeline with automasking is quite mature with science-quality output however...
  - Archived cubes are generated for full spw at native resolution
  - 10s of GB cubes possible/frequent
  - Size mitigation may prevent all sources/ spws from being imaged



ALMA User Defined Imaging

- User-triggered imaging enables creation of new images using archive interface
  - User specifies cube they want[1]
    - Frequency/velocity
    - Rest Frequency
    - Spectral averaging
    - Angular resolution*
  - Calibrated measurement set restored
  - Imaging pipeline runs
  - Image is QAed and ingested into NRAO archive
  - Video Demo: https://vimeo.com/513590322/81ee77787e



* The pipeline does the best it can within the limits of the data (i.e., no magic)

[1] Defaults will make a standard cube that spans the spw.

Run ALMA User-Defined Imaging (AUDI)

- Instructions on https://science.nrao.edu/srdp/
- Go to https://data.nrao.edu
- Search for some data (e.g., project code, target name, position/ radius)
- Click the '+' to see more detail about the project
- Click the blue 'Download Restored MS' button for the desired data
- Fill out the dialog box for a frequency-based or velocity-based cube
- A valid setting for the frequency-based cube is filled by default for the selected spectral window

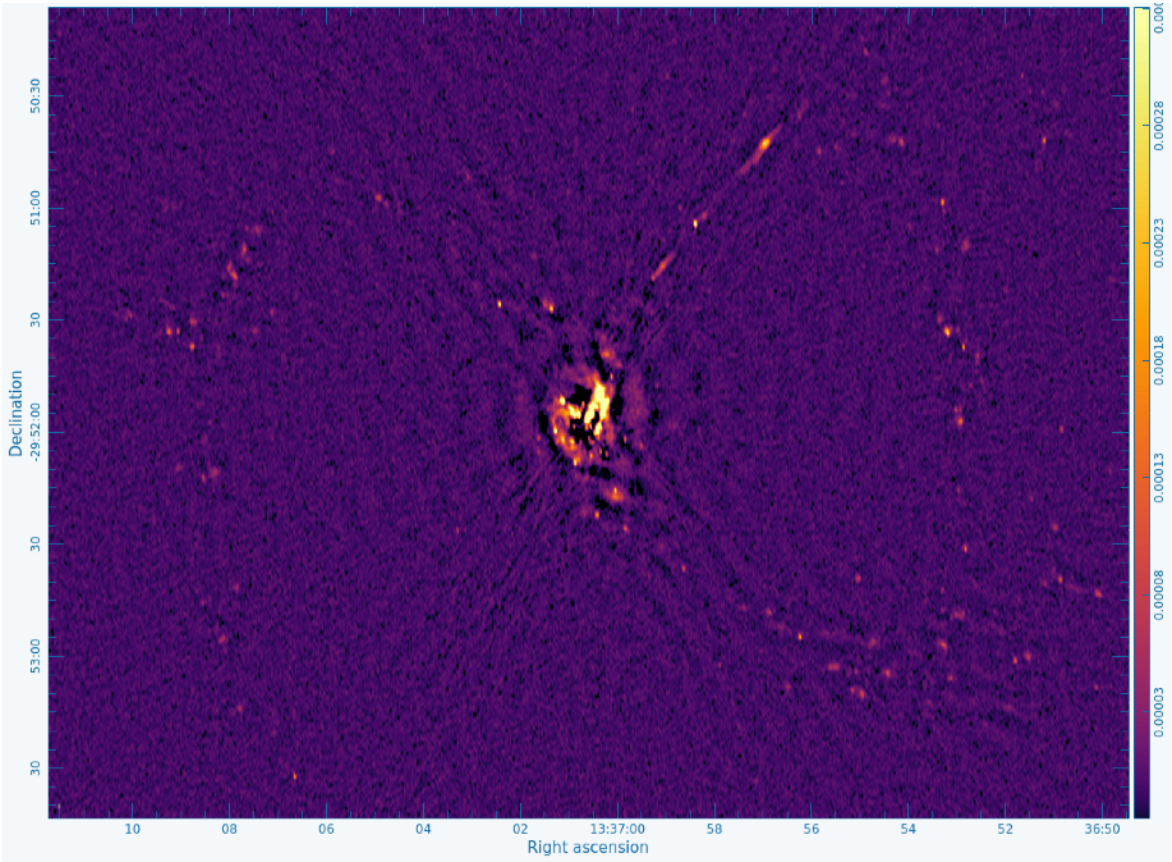
How to use ALMA User-Defined Imaging (AUDI)

https://vimeo.com/513590322/81ee77787e

What's New in SRDP?

- Fully automated target self-calibration in imaging pipelines
  - Uses continuum and applies results back to spectral line and continuum data
- Included in AUDI imaging since June 2023 (hif_selfcal)
- ALMA and VLA pipelines will include selfcal task by default this fall
  - Single-field selfcal (standard and spectral scan)
- Stand-alone selfcal tools available (runs within CASA 6.4+)
  - Developed by J. Tobin and P. Sheehan
  - https://github.com/jjtobin/auto_selfcal (single-field selfcal)
  - Development Fork: https://github.com/psheehan/auto_selfcal
    - Adds support for mosaics, low-S/N (typically longer baselines)
    - Will become the 'new' stable in the next month or so

Auto-selfcal In Action



- VLA S-Band A-config

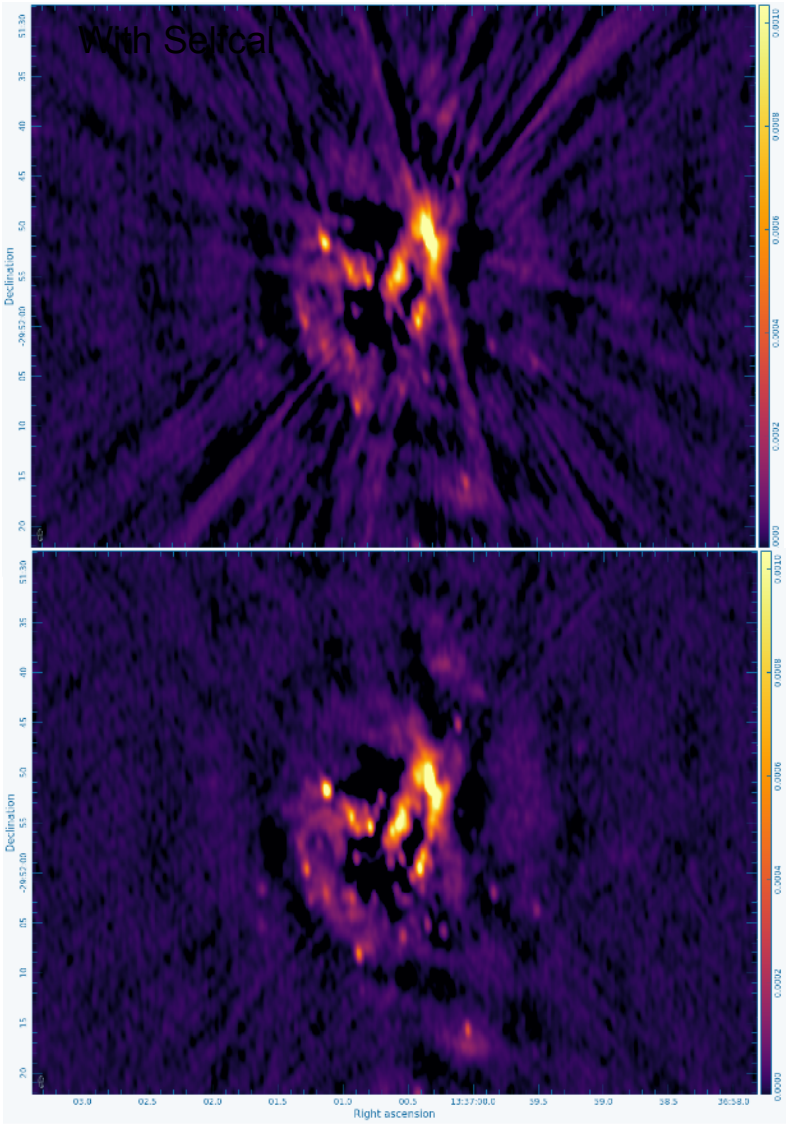
Without Selfcal With Selfcal

Auto-selfcal In Action

Zoom-in on central region

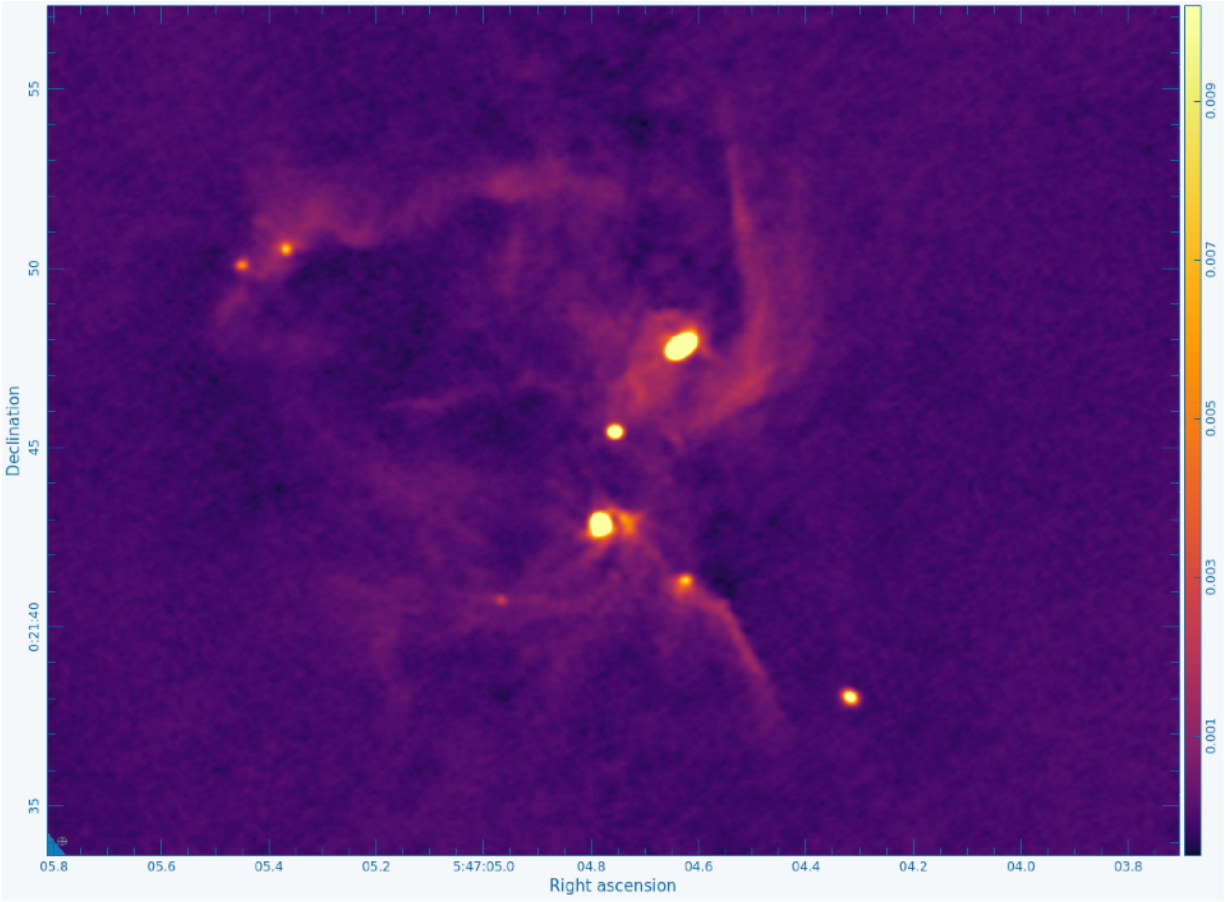
Without Selfcal

With Selfcal



- VLA S-Band A-config

Auto-selfcal In Action

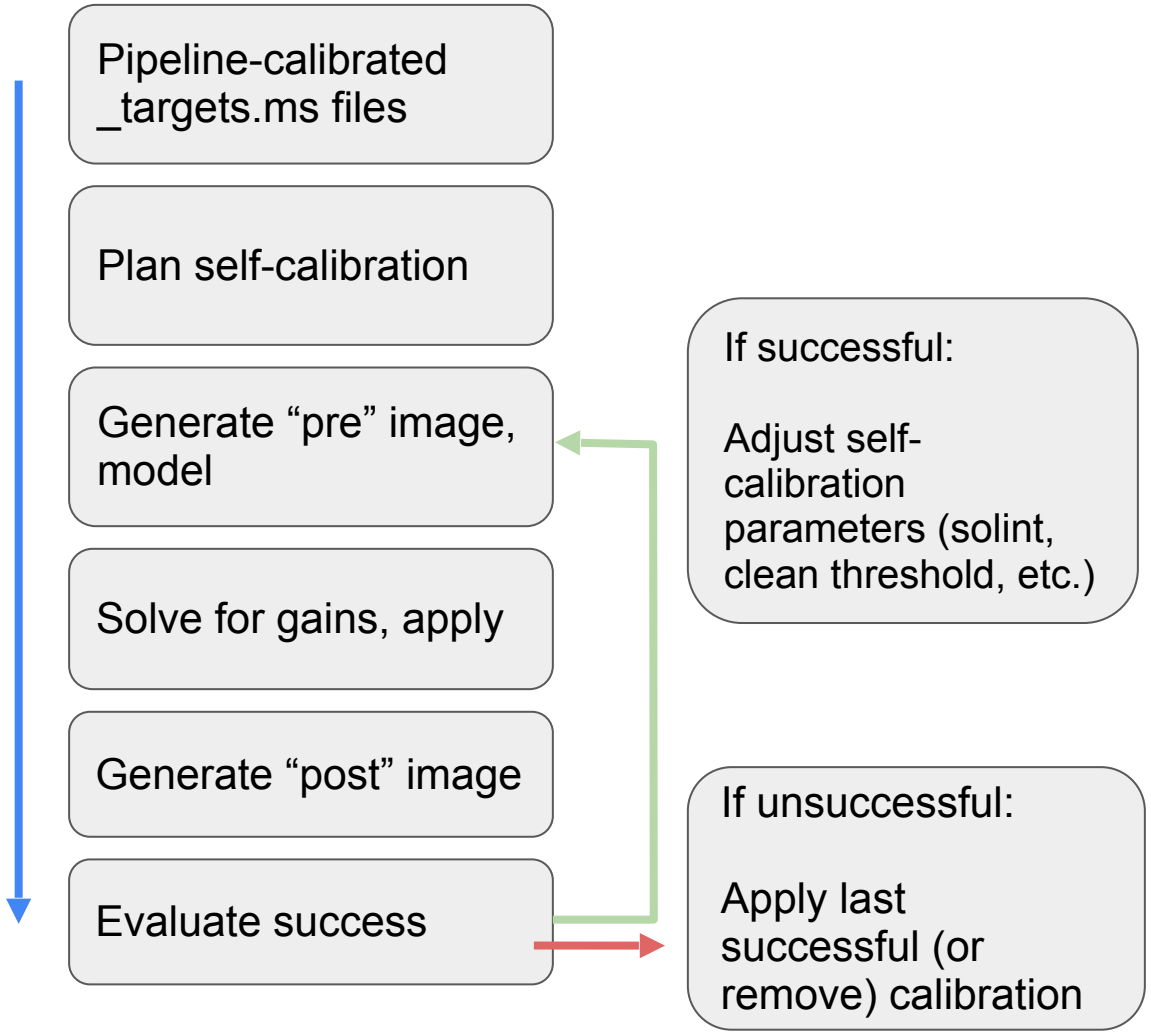


- NGC 2071IR (HOPS-361)
- ALMA Band 6 C43-6

Without Selfcal With Selfcal

Auto-selfcal: How does it work?

- Designed to mimic an interactive self-calibration workflow
- Heuristics added/ developed to automate the process
- Operates on single MOUS from ALMA or collection of VLA EBs with same targets/spectral setup



Auto-selfcal: Available versions

In the AUDI/upcoming Pipeline (CASA 6.5.3-28 + pipeline; CASA 6.5.4-9 +pipeline):

- Self-calibration of single-pointing ALMA and VLA datasets
  - Multi-source EBs work
  - No mosaics
- Possible additional AUDI release with improved selfcal within next 4-6 months
- Current features from standalone tools will be in Pipeline task in 2024

In the Standalone tools:

- Near-field heuristics with improved near-field mask generation
- Improved heuristics for “long baseline” datasets
- Mosaics work
- Available here soon (when stable): https://github.com/jjtobin/auto_selfcal.git
- Or here now (development): https://github.com/psheehan/auto_selfcal.git

Summary: Accessing SRDP capabilities

- User-access to most SRDP services will be through NRAO archive (https://data.nrao.edu)
  - NRAO Archive hosts data from:
    - Jansky VLA
    - ALMA (Cycle 1+)
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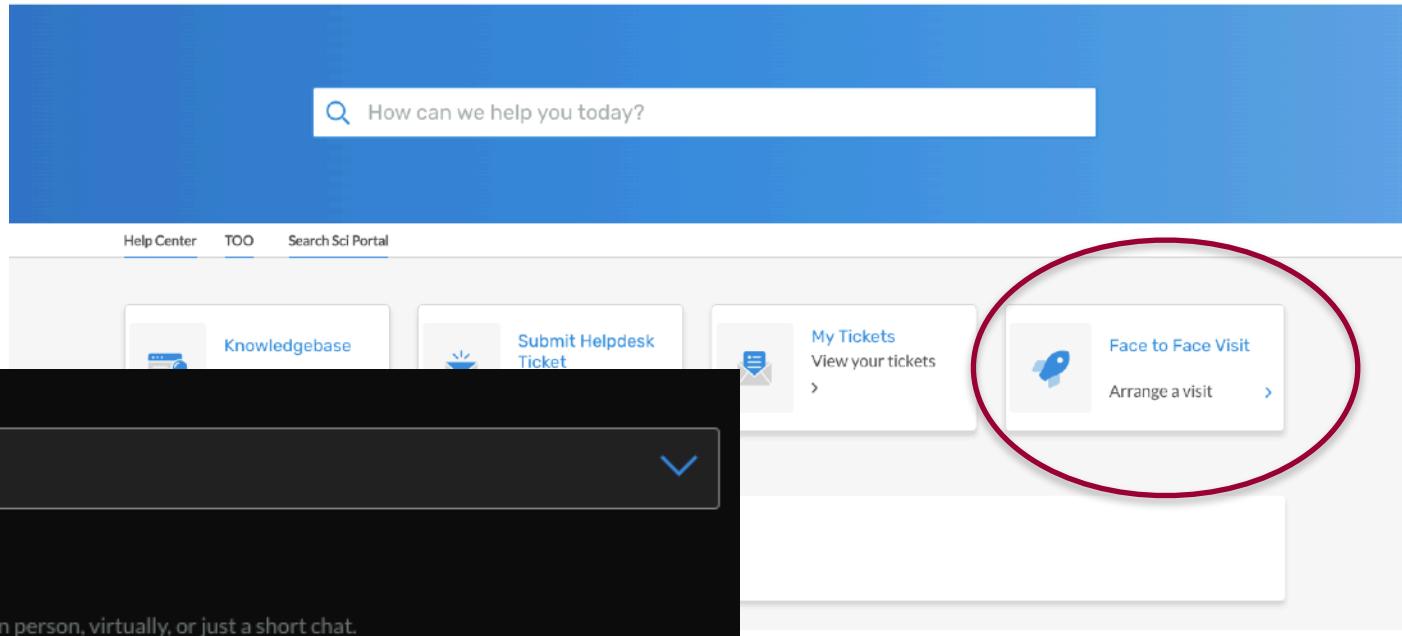
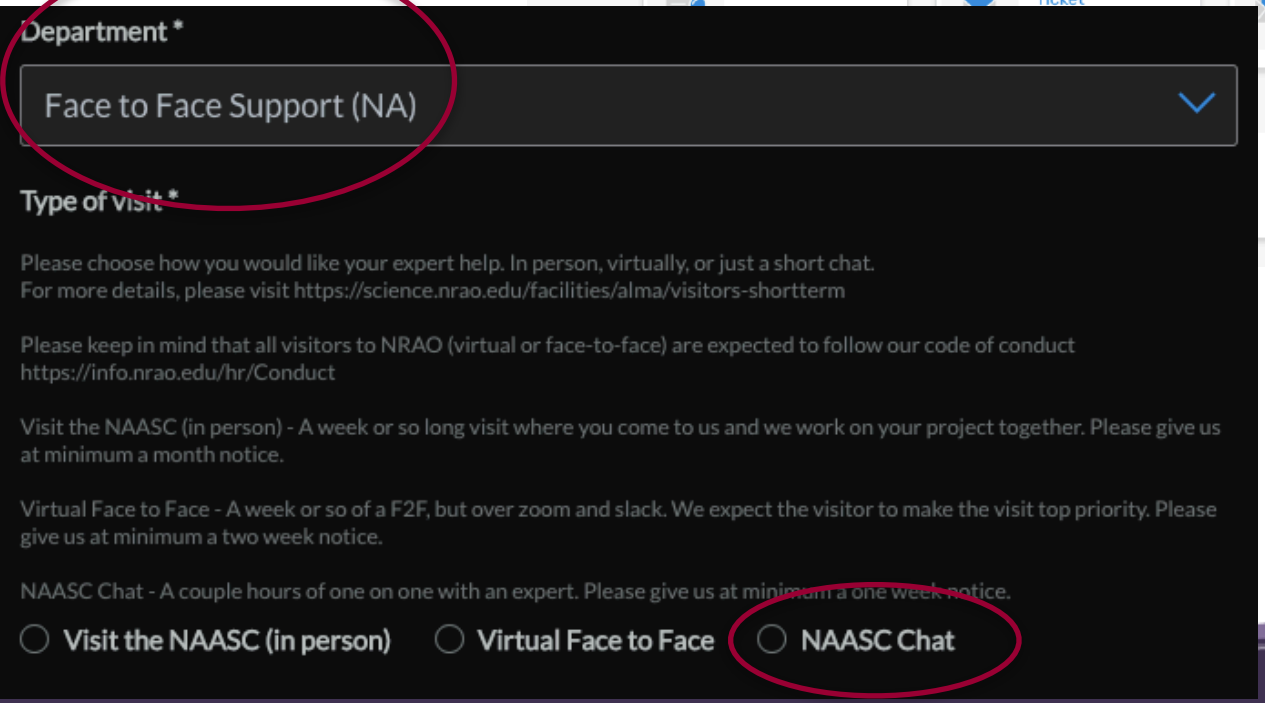
    - Historical VLA
    - GBT (2014-2020)
    - GMVA

- This is *NOT* the ALMA archive (https://almascience.nrao.edu/aq/)
  - No NRAO SRDP services are available through the ALMA archive
  - ALMA archive does have some similar features like CARTA

Other resources

- You can ask for a zoom help session for any part of your ALMA data process at https://help.almascience.org/





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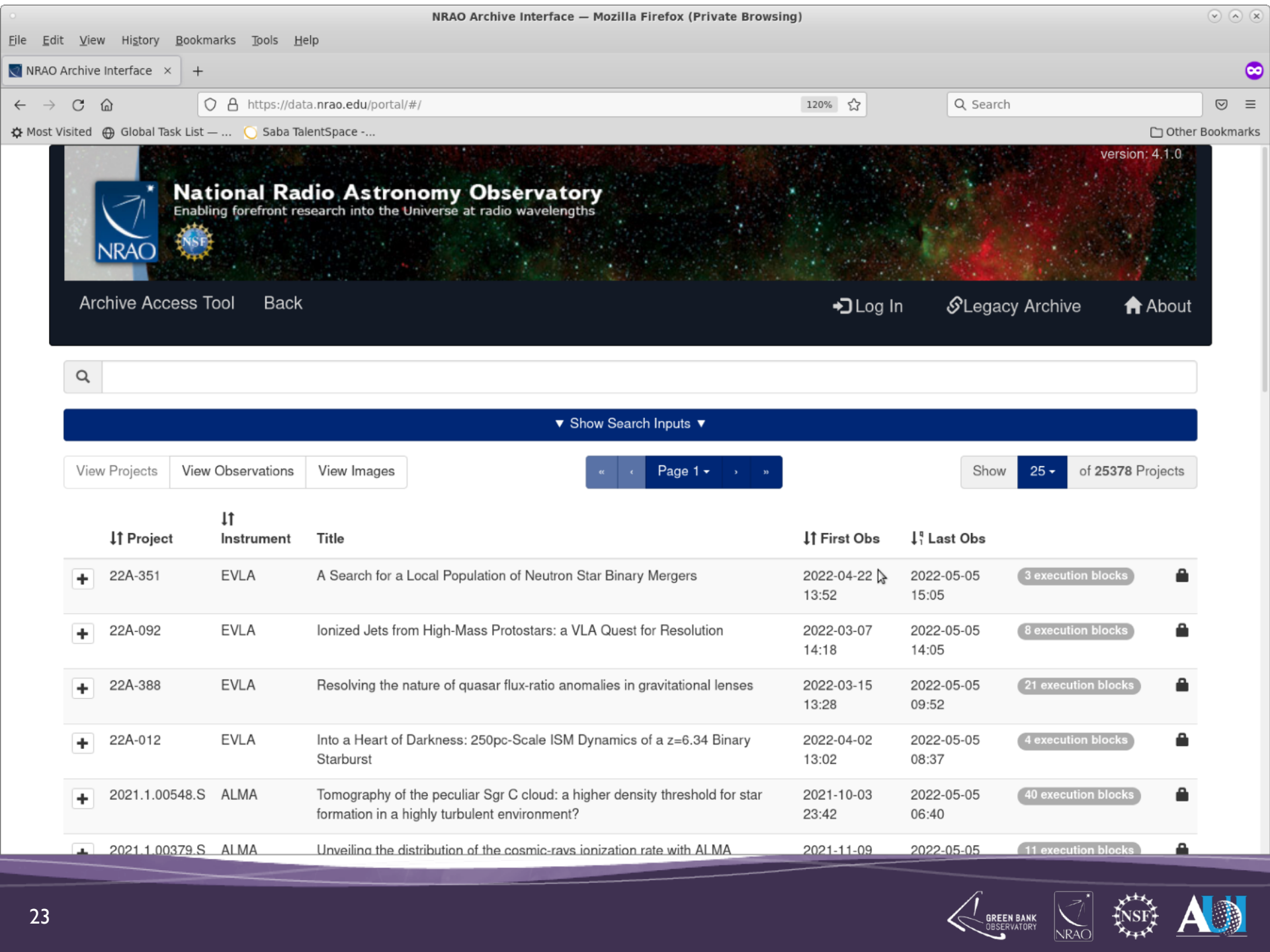
Demos

- CARTA - VLASS - NGC 1097 (UGC 595)
- CARTA - HOPS-370
- Restore HOPS-370 2017.1.00419.S
- Reimaging HOPS-370 2017.1.00419.S 12CO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22A-388 EVLA Resolving the nature of quasar flux-ratio anomalies in gravitational lenses 2022-03-15 13:28 2022-05-05 09:52 21 execution blocks
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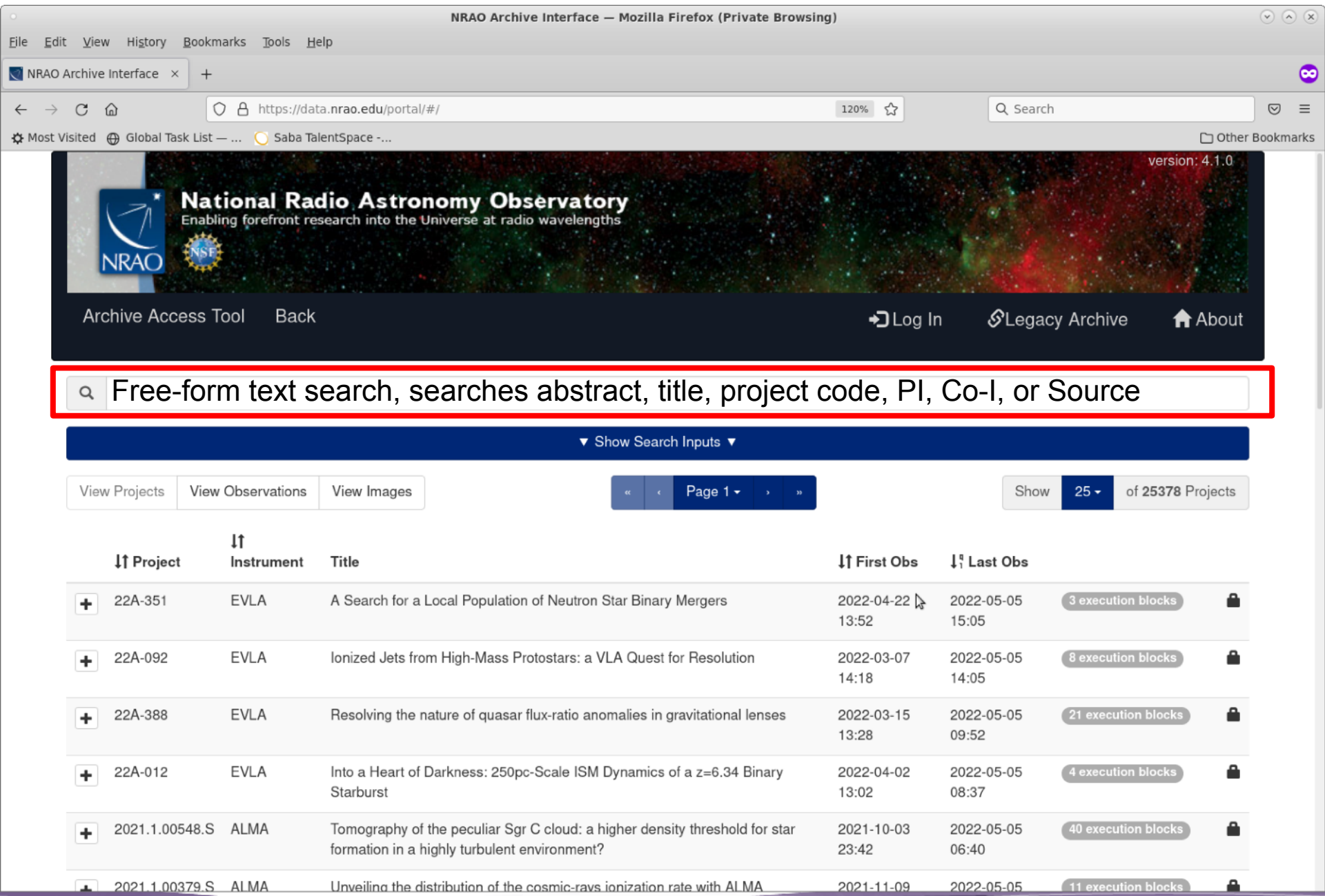
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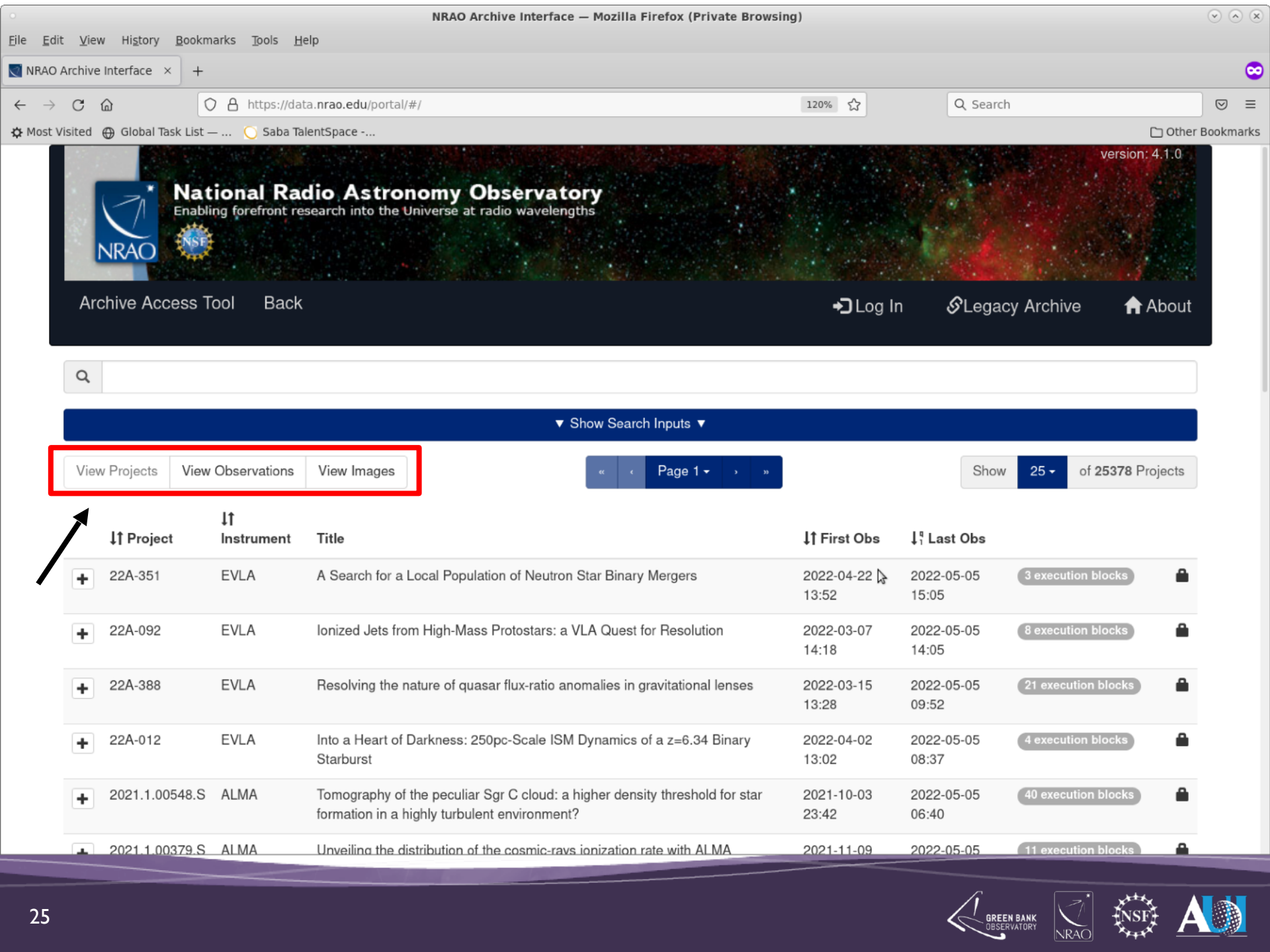
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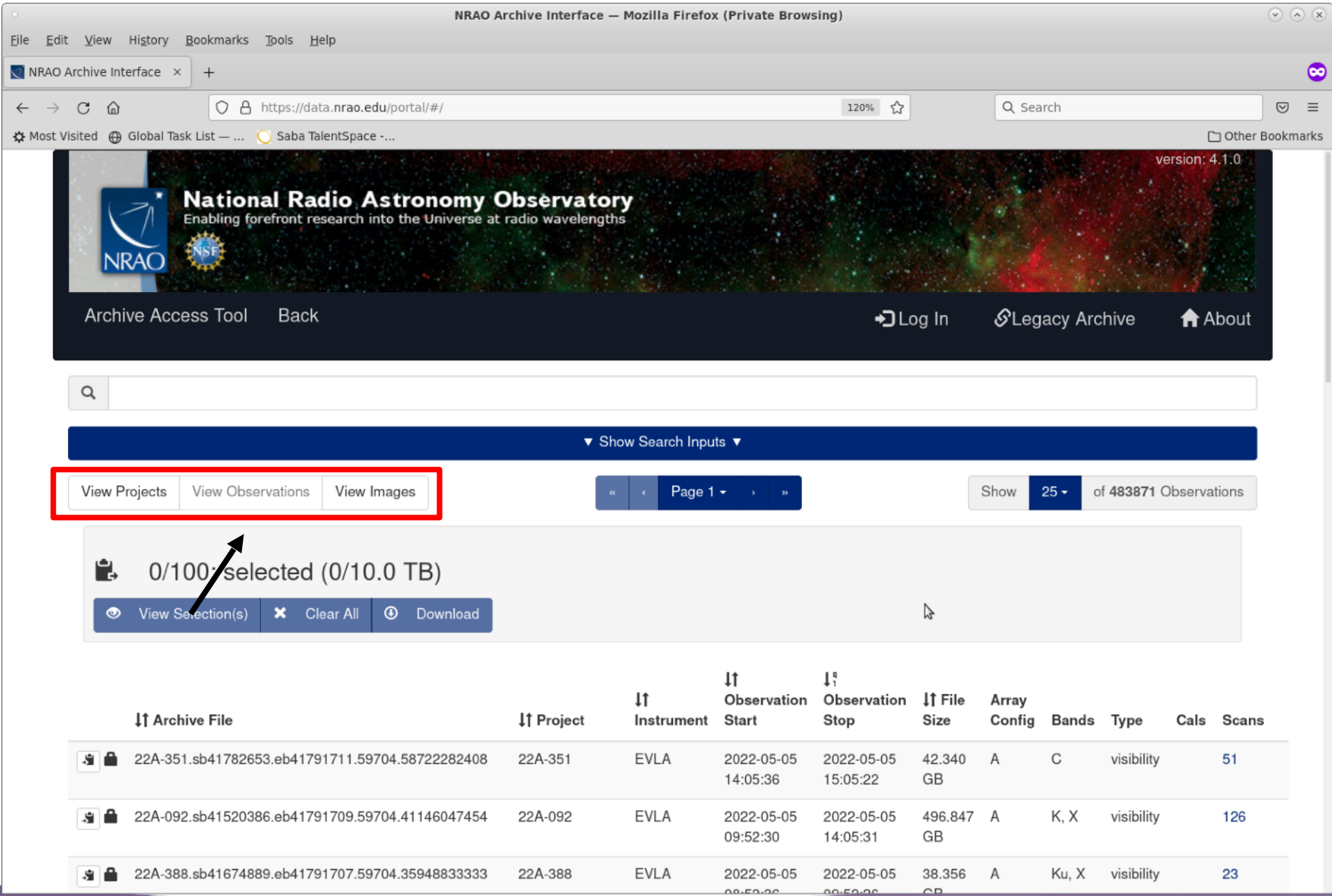
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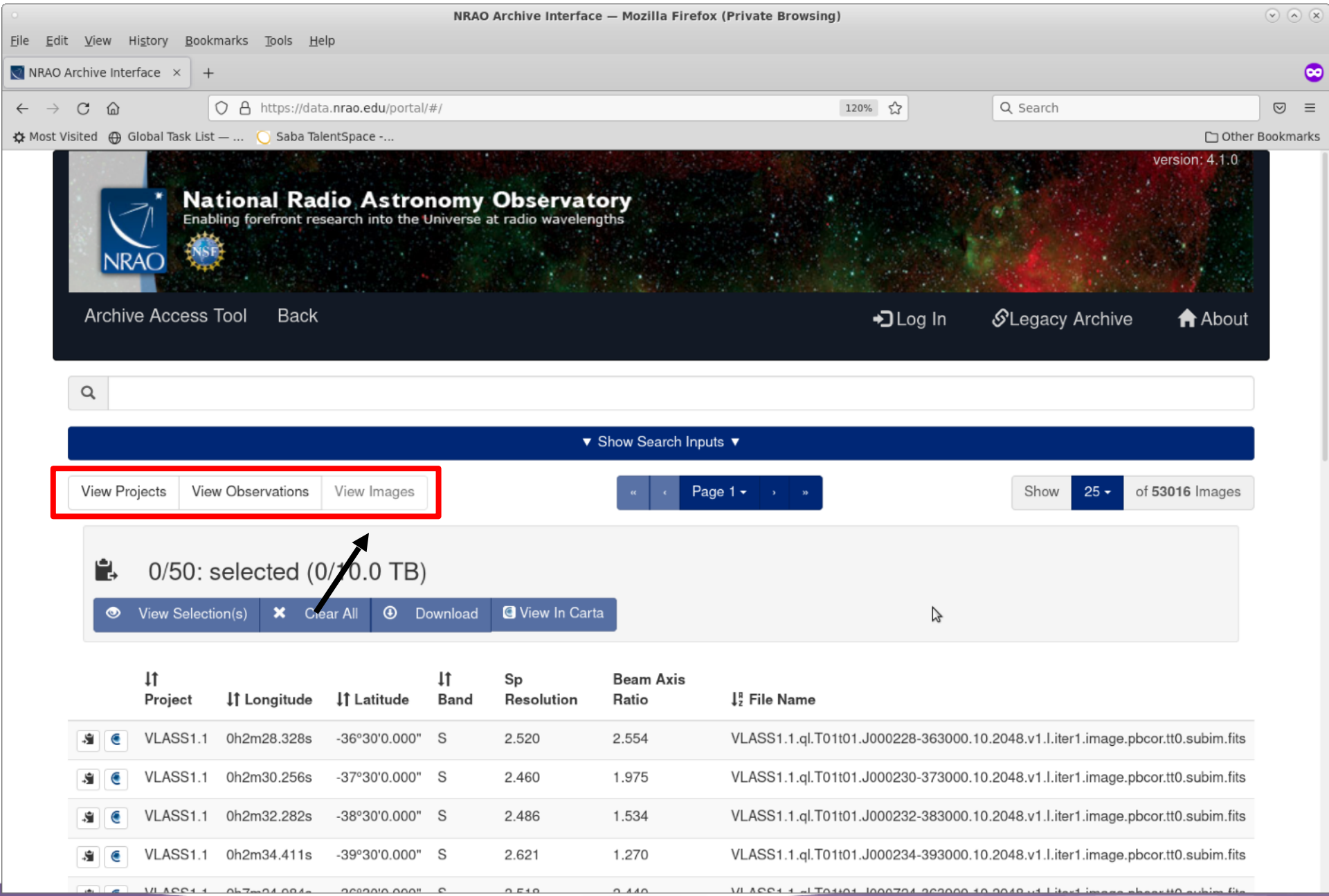
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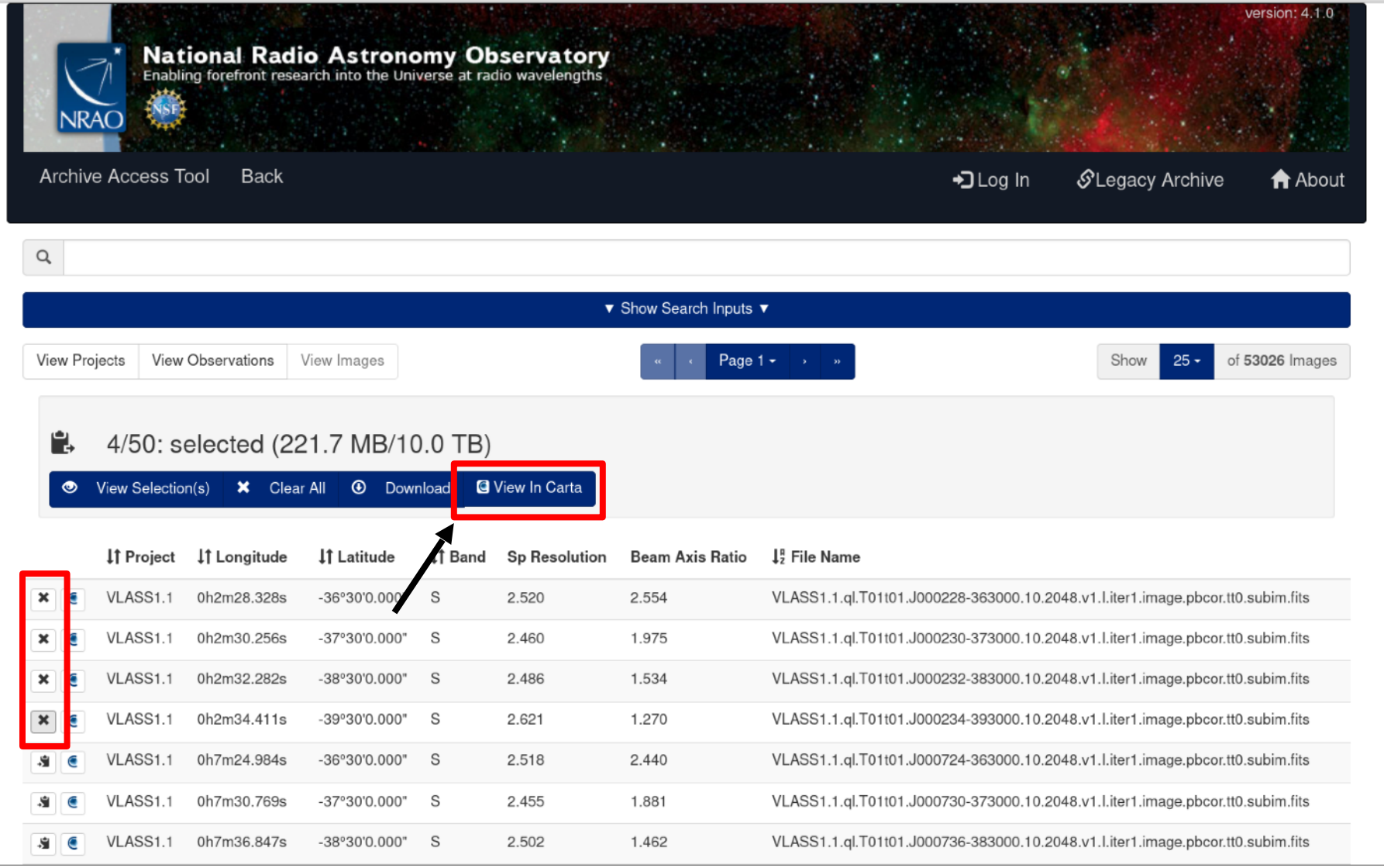
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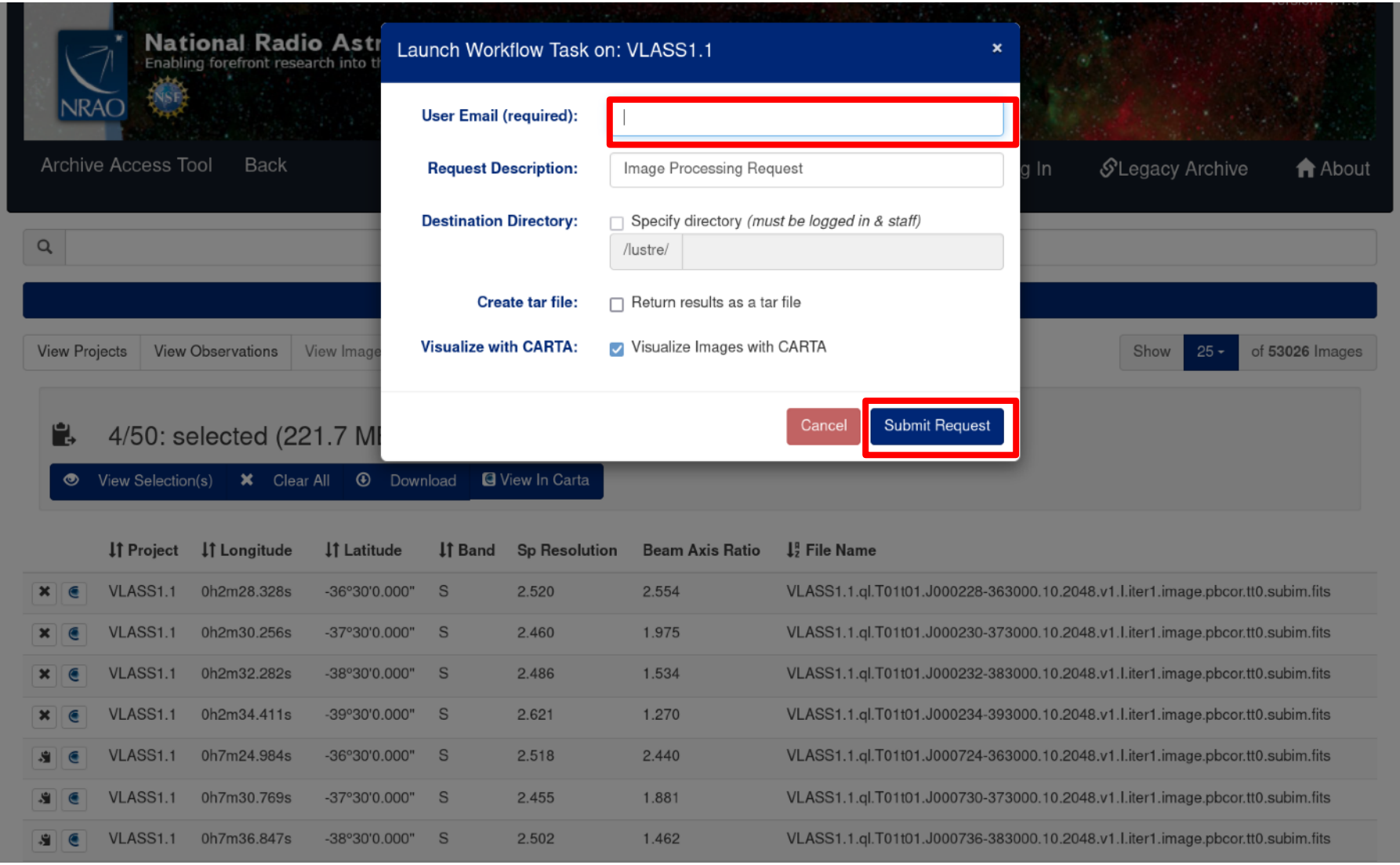
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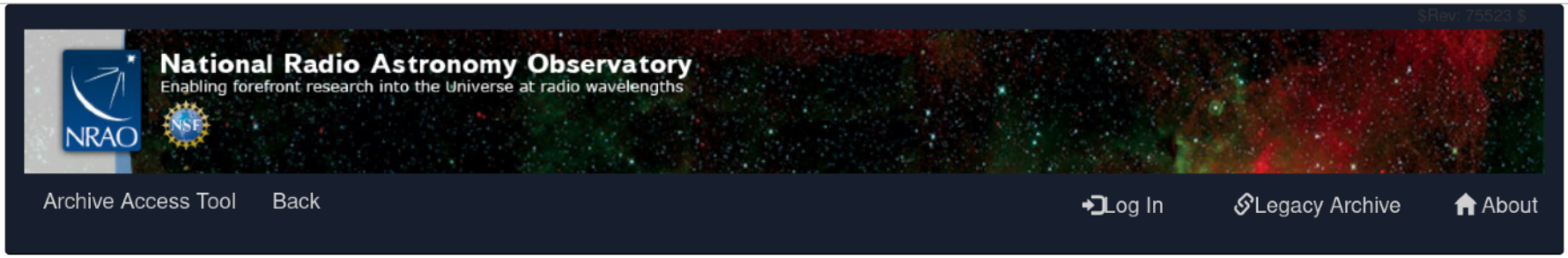
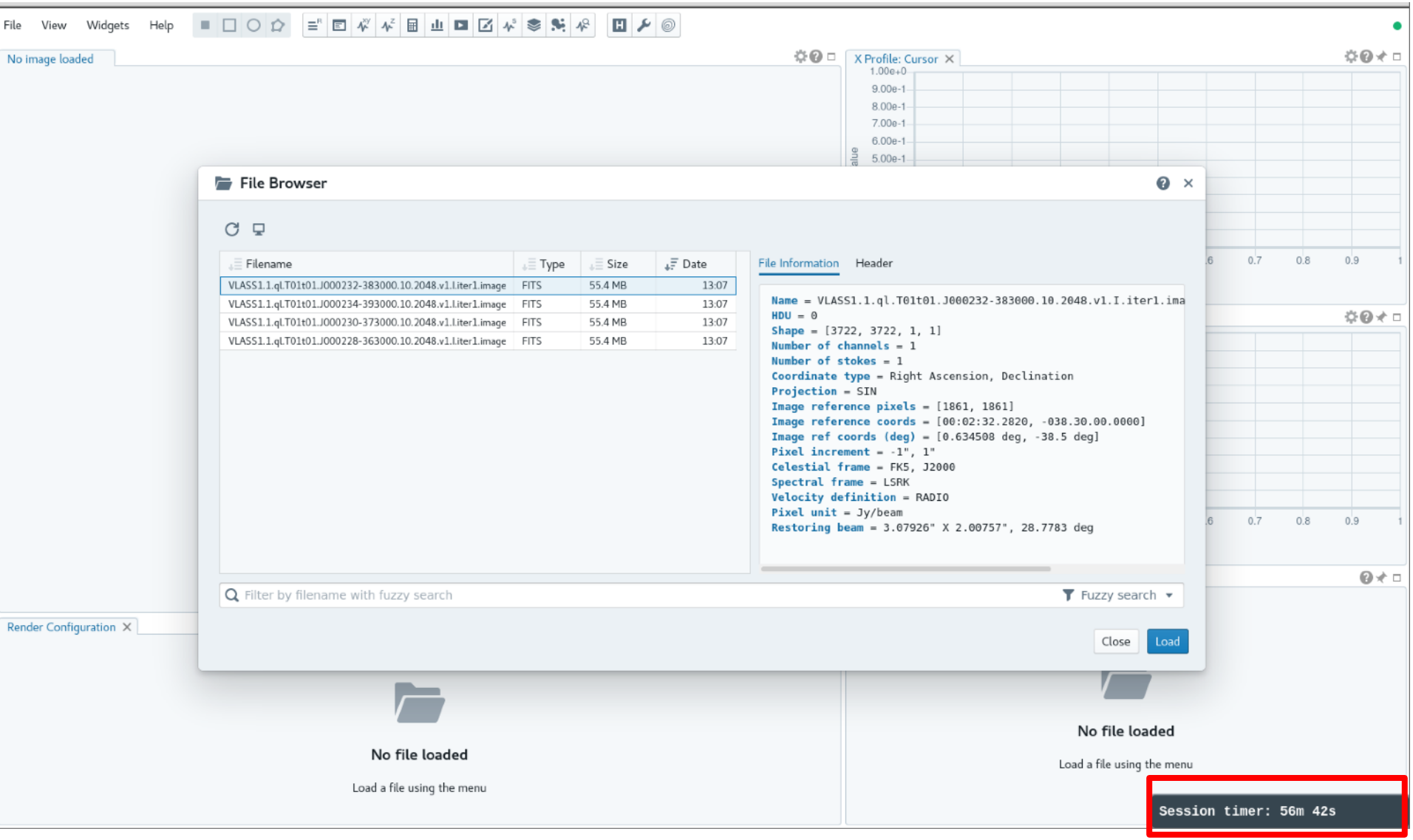
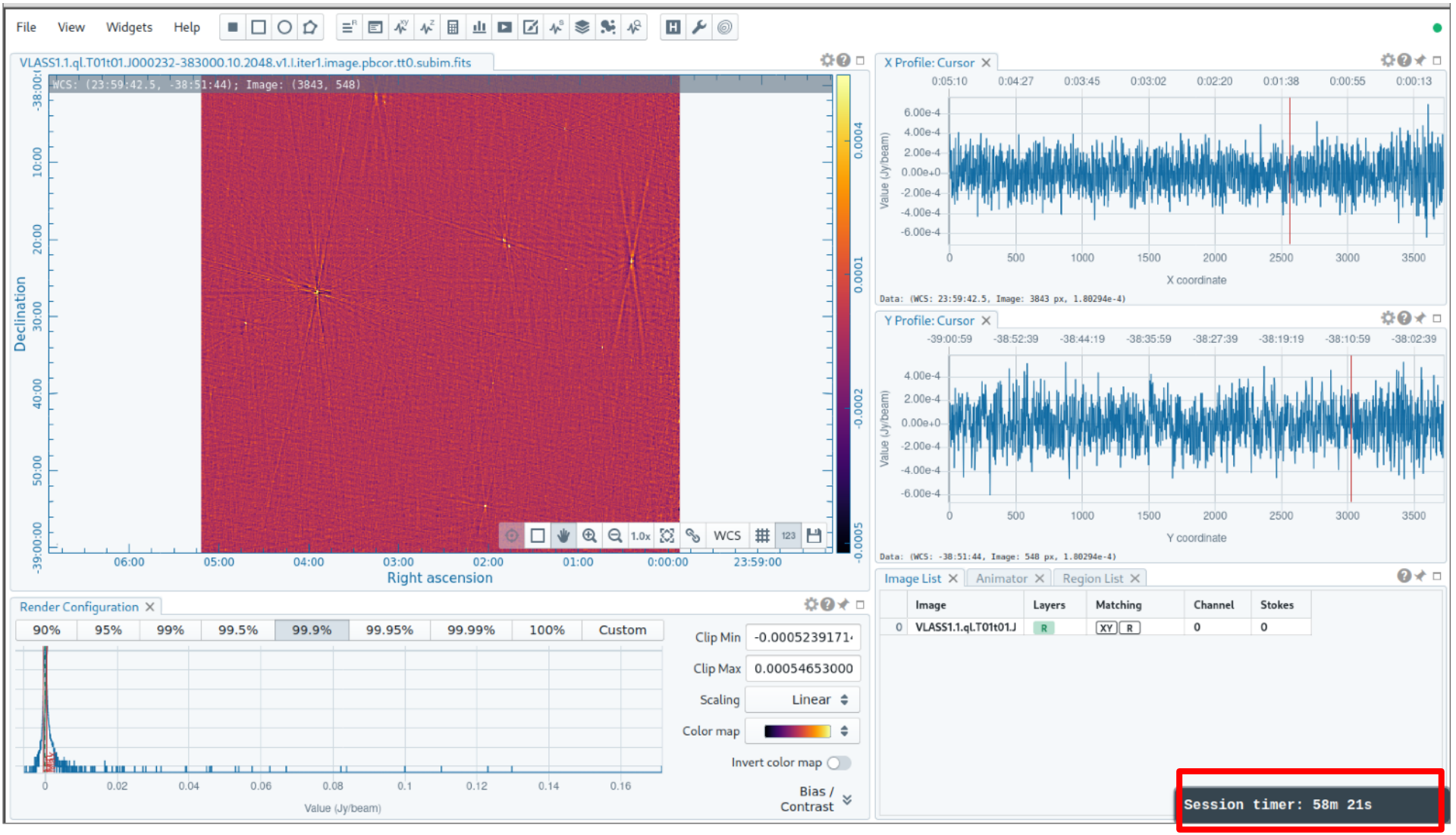


- Requests to view images in CARTA should take 30-60s

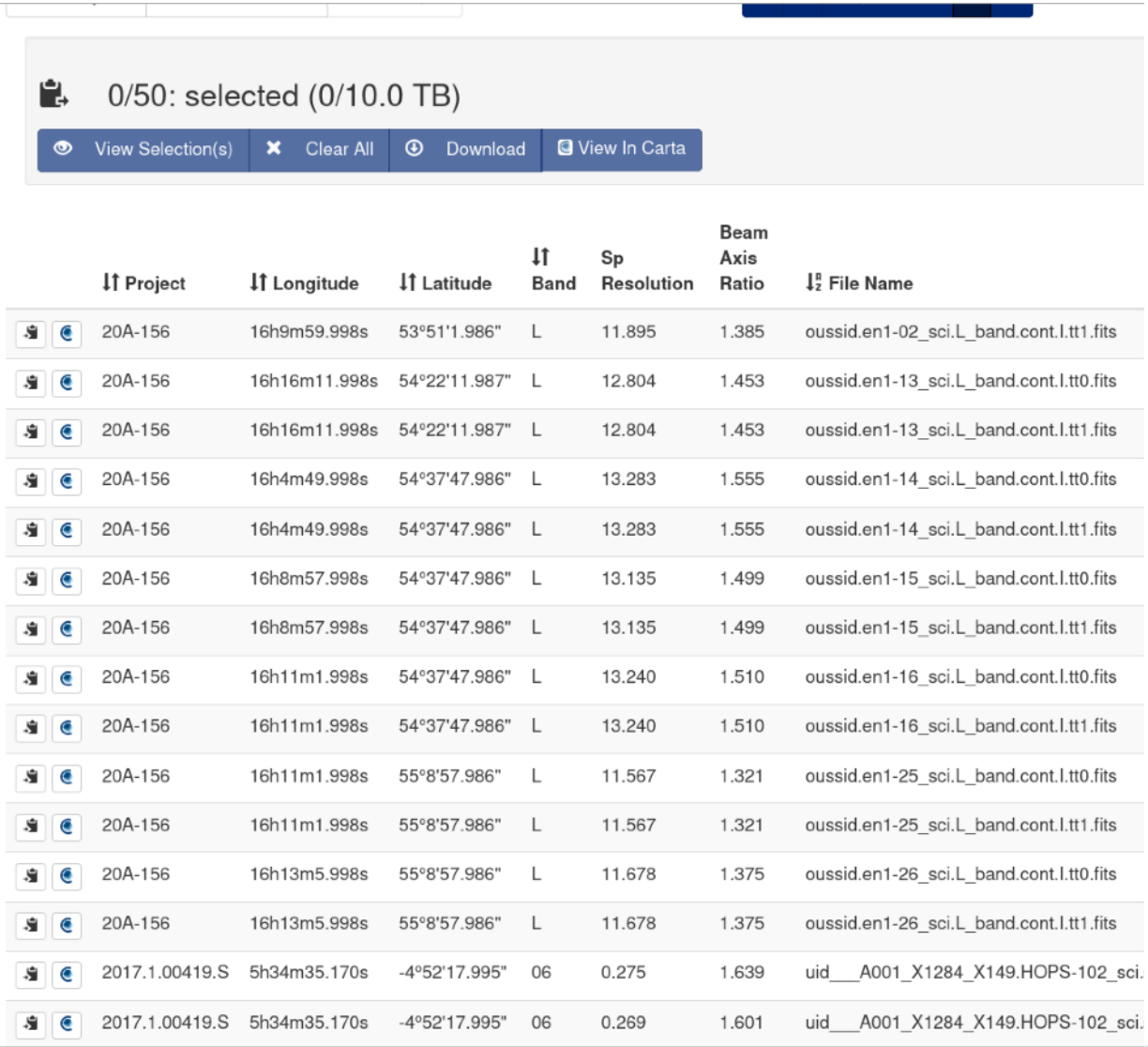


- Sessions expire after 1 hour regardless of activity



- Sessions expire after 1 hour regardless of activity

ALMA and VLA PI images also in Archive



0/50: selected (0/10.0 TB)

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	20A-156	16h4m49.998s	54°37'47.986"	L	13.283	1.555	oussid.en1-14_sci.L_band.cont.I.tt0.fits
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	20A-156	16h11m1.998s	54°37'47.986"	L	13.240	1.510	oussid.en1-16_sci.L_band.cont.I.tt0.fits
	20A-156	16h11m1.998s	54°37'47.986"	L	13.240	1.510	oussid.en1-16_sci.L_band.cont.I.tt1.fits
	20A-156	16h11m1.998s	55°8'57.986"	L	11.567	1.321	oussid.en1-25_sci.L_band.cont.I.tt0.fits
	20A-156	16h11m1.998s	55°8'57.986"	L	11.567	1.321	oussid.en1-25_sci.L_band.cont.I.tt1.fits
	20A-156	16h13m5.998s	55°8'57.986"	L	11.678	1.375	oussid.en1-26_sci.L_band.cont.I.tt0.fits
	20A-156	16h13m5.998s	55°8'57.986"	L	11.678	1.375	oussid.en1-26_sci.L_band.cont.I.tt1.fits
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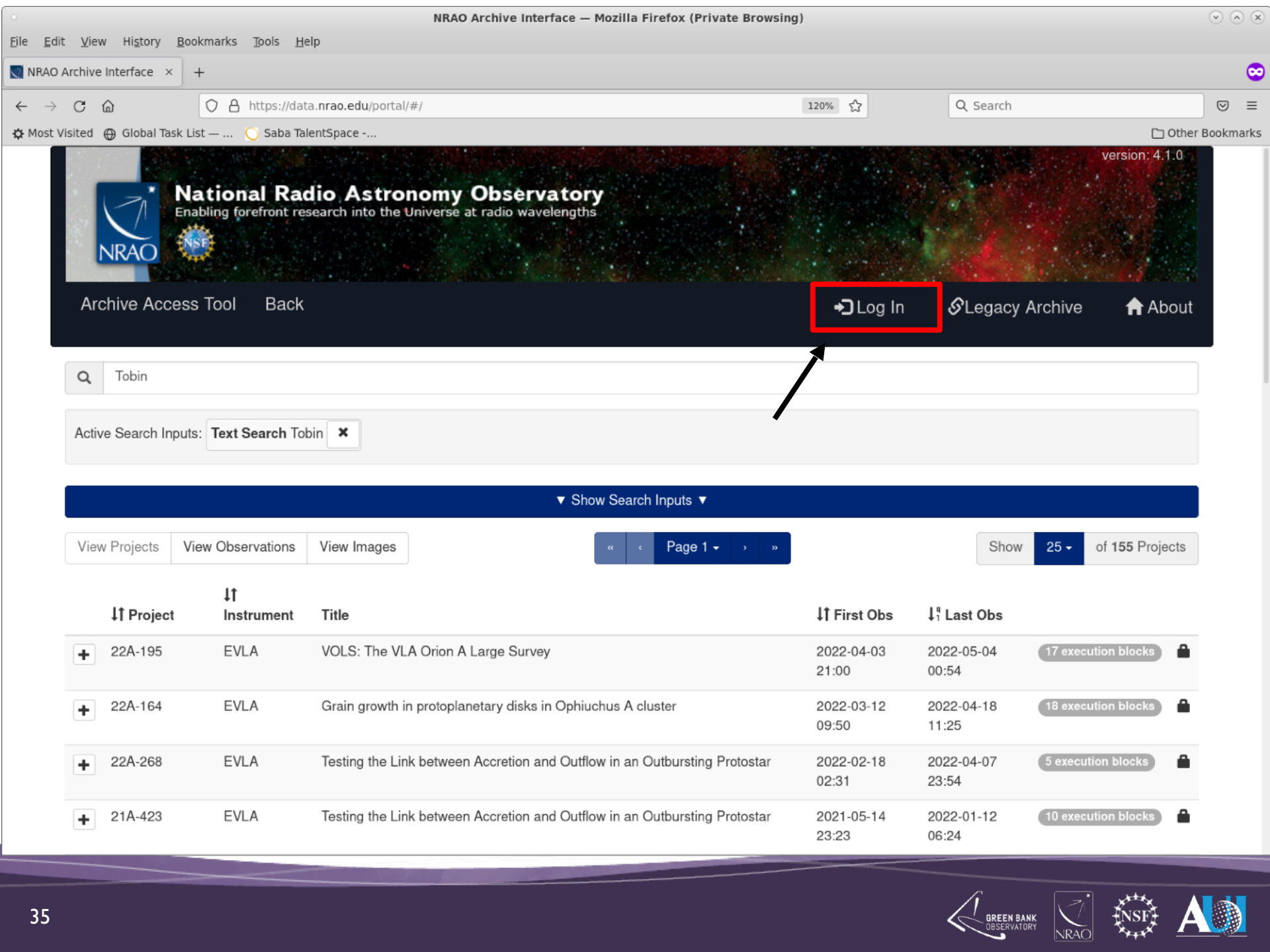
	2017.1.00419.S	5h34m35.170s	-4°52'17.995"	06	0.269	1.601	uid___A001_X1284_X149.HOPS-102_sci.

- ALMA images currently
- limited to those created
- with ‘AUDI’ tool (later
- in the talk)
  - Full set of ALMA
  - images will be
  - available in the future
- VLA PI data from
- imaging pipeline pilot
- operations available
  - Imaging of all PI data
  - will begin later in the
  - year

A Simple Search

- If looking for your own data, much can be accomplished with simple searches
- A view of just your data also available
  - Log-in required
  - PI and Co-I projects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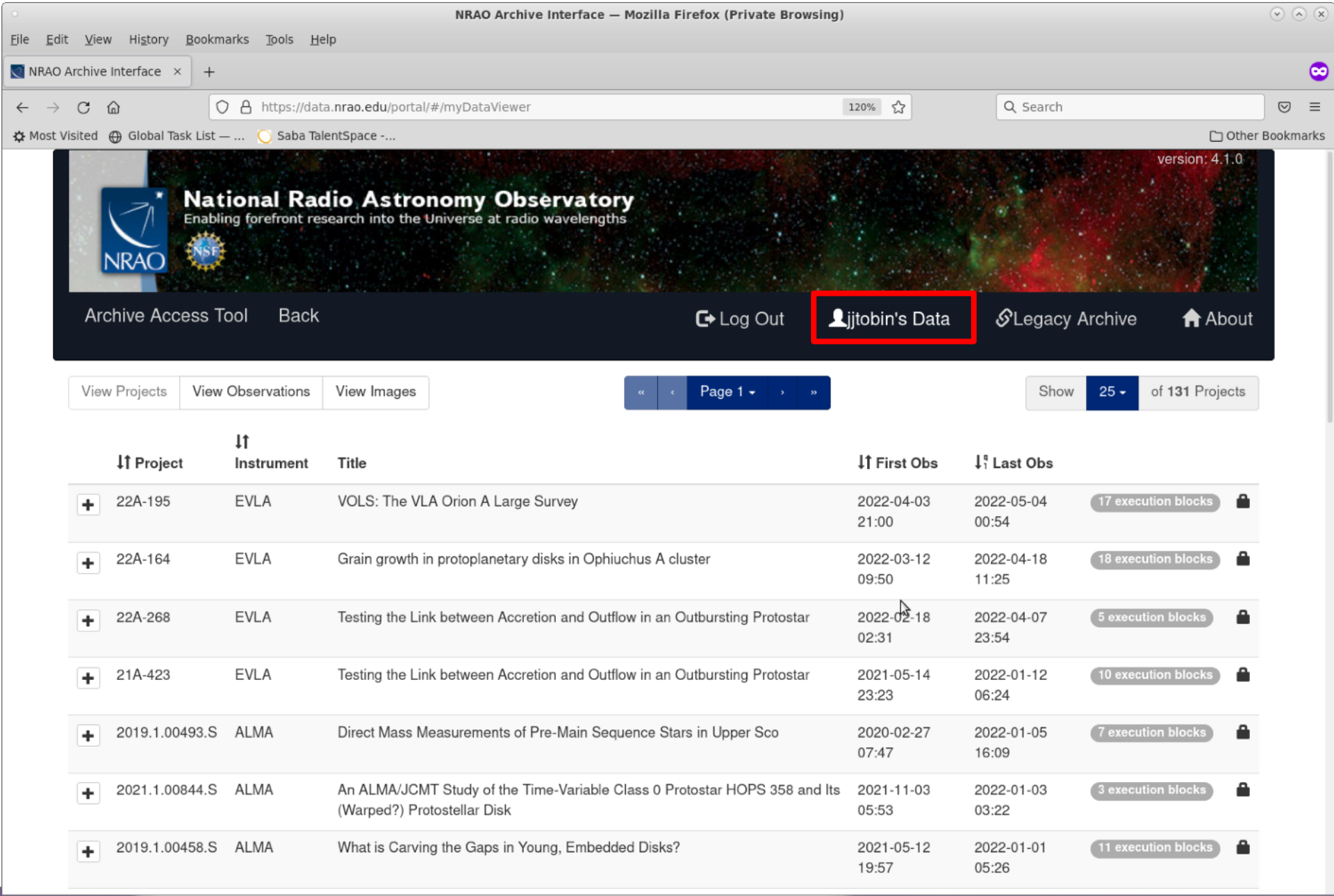
22A-195 EVLA VOLS: The VLA Orion A Large Survey 2022-04-03 21:00 2022-05-04 00:54 17 execution blocks
22A-164 EVLA Grain growth in protoplanetary disks in Ophiuchus A cluster 2022-03-12 09:50 2022-04-18 11:25 18 execution blocks
22A-268 EVLA Testing the Link between Accretion and Outflow in an Outbursting Protostar 2022-02-18 02:31 2022-04-07 23:54 5 execution blocks
21A-423 EVLA Testing the Link between Accretion and Outflow in an Outbursting Protostar 2021-05-14 23:23 2022-01-12 06:24 10 execution blocks



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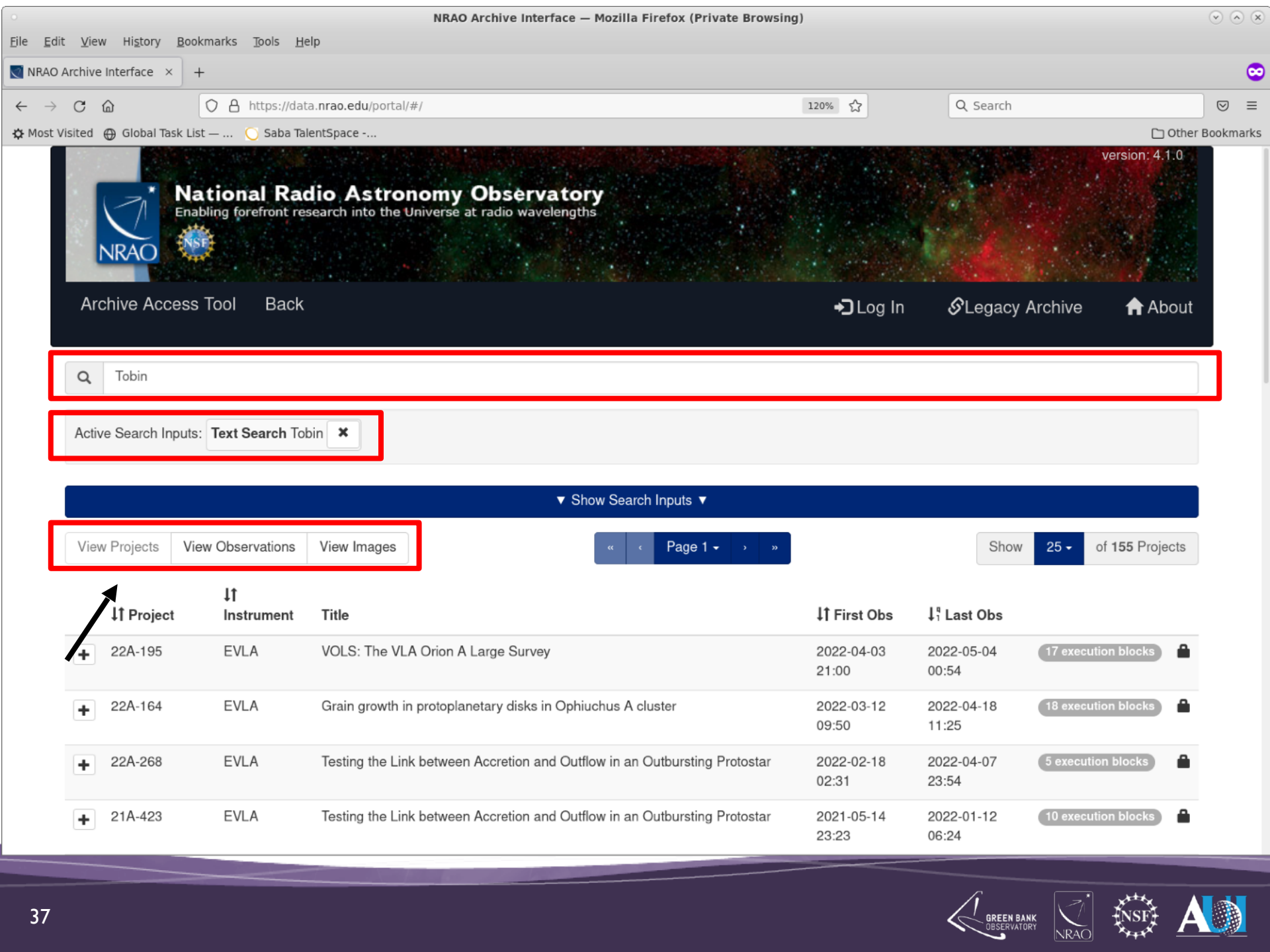
+	22A-164	EVLA	Grain growth in protoplanetary disks in Ophiuchus A cluster	2022-03-12 09:50	2022-04-18 11:25	18 execution blocks
+	22A-268	EVLA	Testing the Link between Accretion and Outflow in an Outbursting Protostar	2022-02-18 02:31	2022-04-07 23:54	5 execution blocks
+	21A-423	EVLA	Testing the Link between Accretion and Outflow in an Outbursting Protostar	2021-05-14 23:23	2022-01-12 06:24	10 execution blocks
+	2019.1.00493.S	ALMA	Direct Mass Measurements of Pre-Main Sequence Stars in Upper Sco	2020-02-27 07:47	2022-01-05 16:09	7 execution blocks
+	2021.1.00844.S	ALMA	An ALMA/JCMT Study of the Time-Variable Class 0 Protostar HOPS 358 and Its (Warped?) Protostellar Disk	2021-11-03 05:53	2022-01-03 03:22	3 execution blocks
+	2019.1.00458.S	ALMA	What is Carving the Gaps in Young, Embedded Disks?	2021-05-12 19:57	2022-01-01 05:26	11 execution blocks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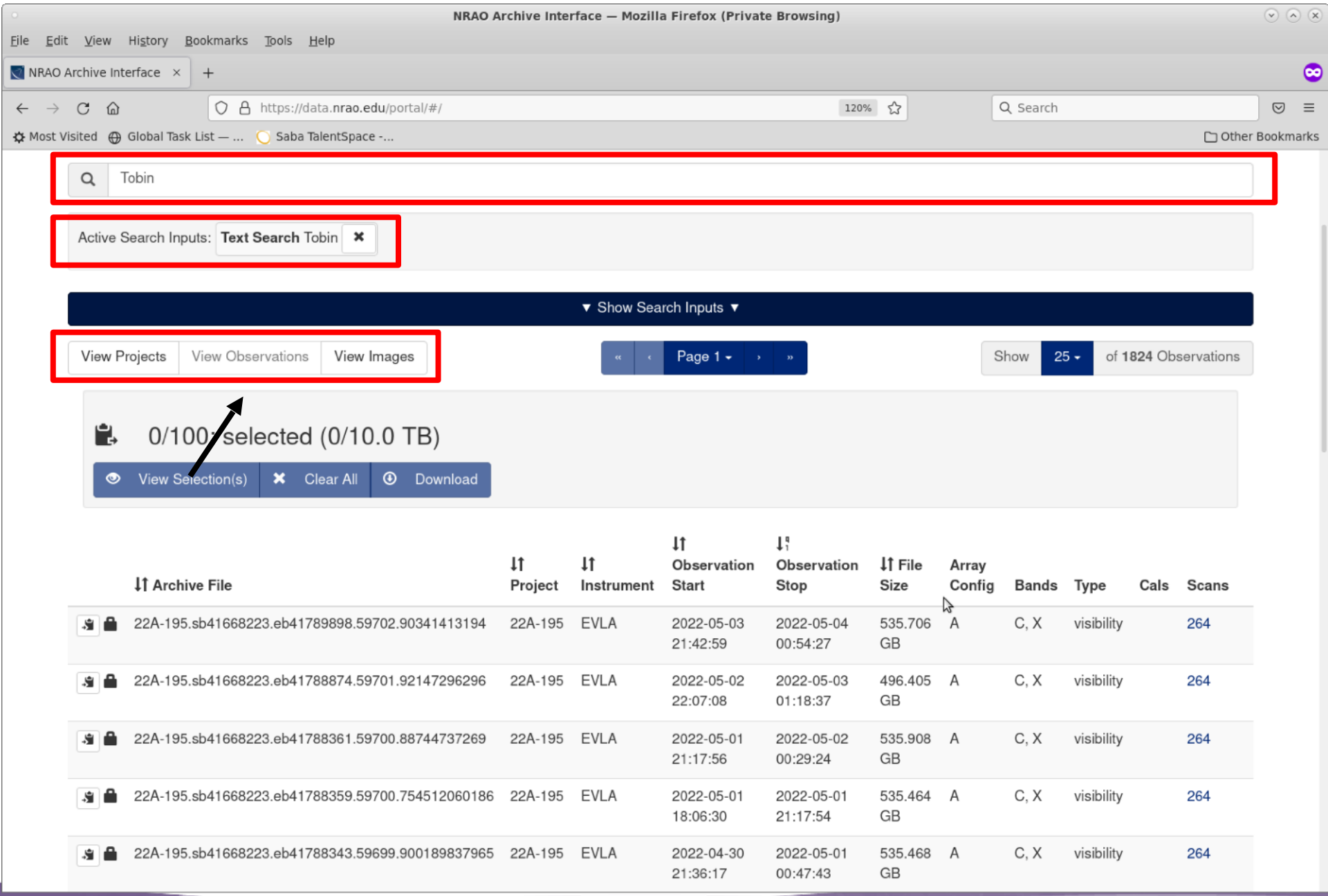
22A-195 EVLA VOLS: The VLA Orion A Large Survey 2022-04-03 21:00 2022-05-04 00:54 17 execution blocks
22A-164 EVLA Grain growth in protoplanetary disks in Ophiuchus A cluster 2022-03-12 09:50 2022-04-18 11:25 18 execution blocks
22A-268 EVLA Testing the Link between Accretion and Outflow in an Outbursting Protostar 2022-02-18 02:31 2022-04-07 23:54 5 execution blocks
21A-423 EVLA Testing the Link between Accretion and Outflow in an Outbursting Protostar 2021-05-14 23:23 2022-01-12 06:24 10 execution blocks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Observation Stop
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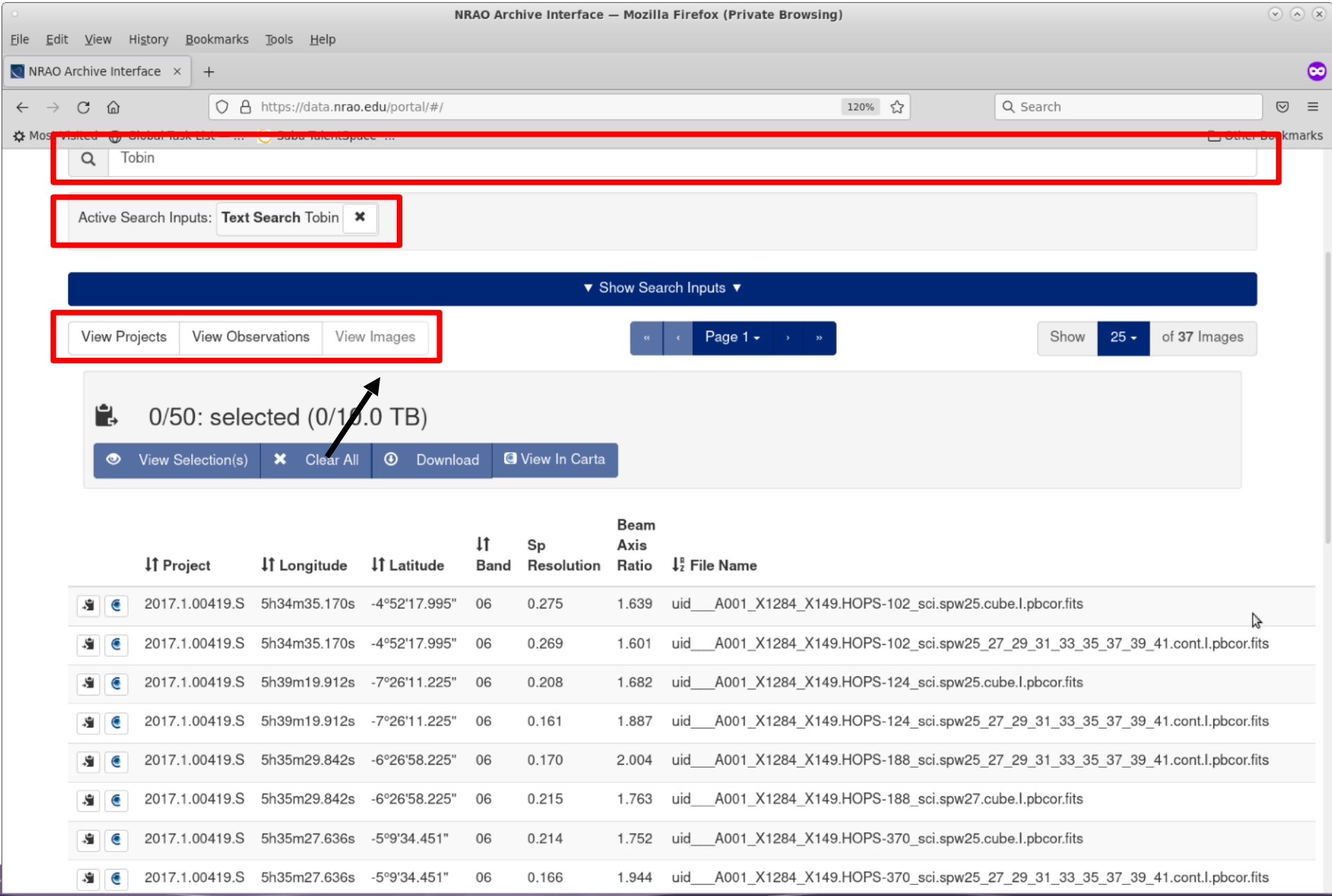
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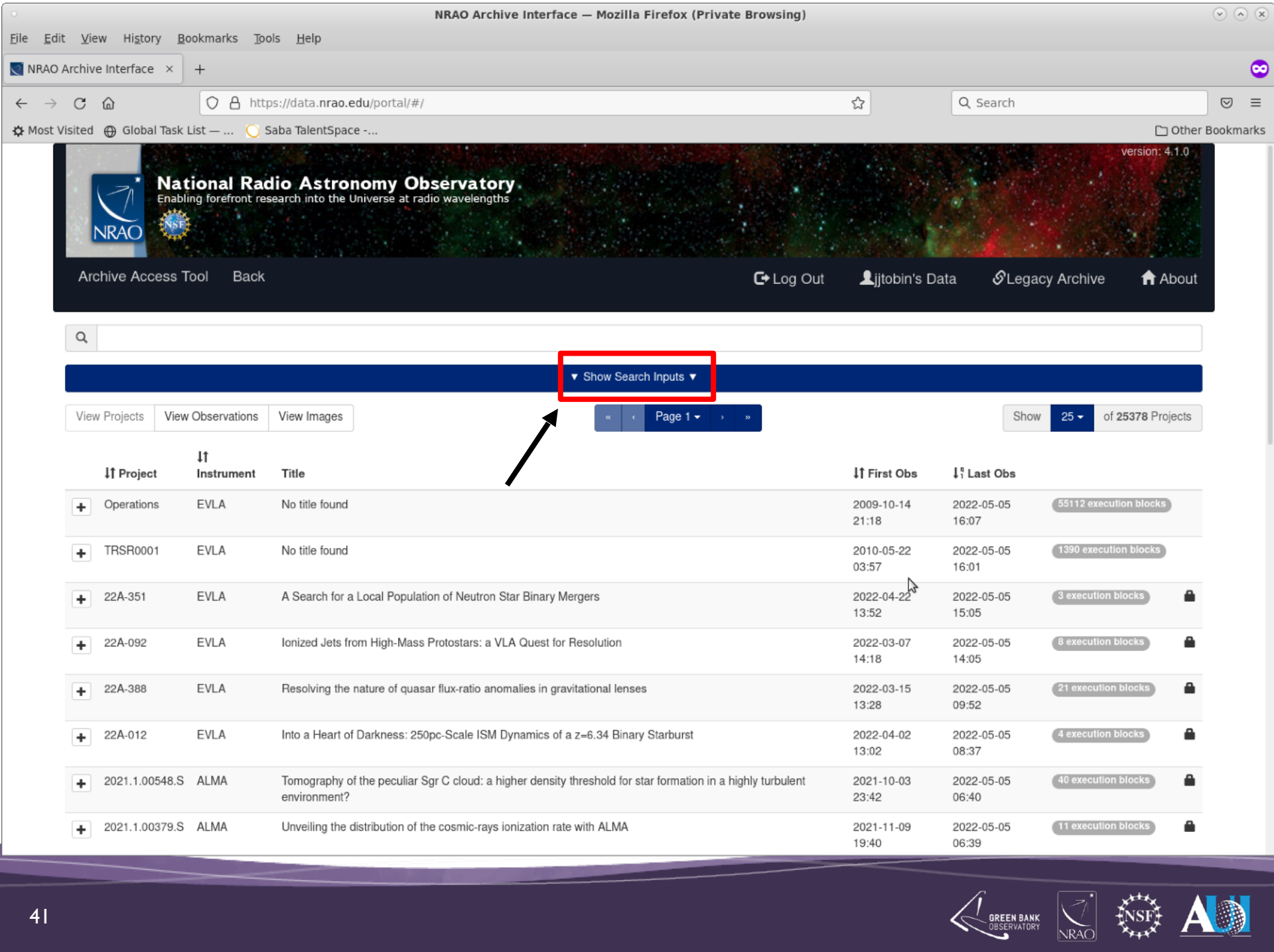
More Complex Searches

- More highly refined searches also possible
  - Combination of many parameters possible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Project
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Title
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Operations EVLA No title found 2009-10-14 21:18 2022-05-05 16:07 55112 execution blocks
TRSR0001 EVLA No title found 2010-05-22 03:57 2022-05-05 16:01 1390 execution blocks
22A-351 EVLA A Search for a Local Population of Neutron Star Binary Mergers 2022-04-22 13:52 2022-05-05 15:05 3 execution blocks
22A-092 EVLA Ionized Jets from High-Mass Protostars: a VLA Quest for Resolution 2022-03-07 14:18 2022-05-05 14:05 8 execution blocks
22A-388 EVLA Resolving the nature of quasar flux-ratio anomalies in gravitational lenses 2022-03-15 13:28 2022-05-05 09:52 21 execution blocks
22A-012 EVLA Into a Heart of Darkness: 250pc-Scale ISM Dynamics of a z=6.34 Binary Starburst 2022-04-02 13:02 2022-05-05 08:37 4 execution blocks
2021.1.00548.S ALMA Tomography of the peculiar Sgr C cloud: a higher density threshold for star formation in a highly turbulent environment? 2021-10-03 23:42 2022-05-05 06:40 40 execution blocks
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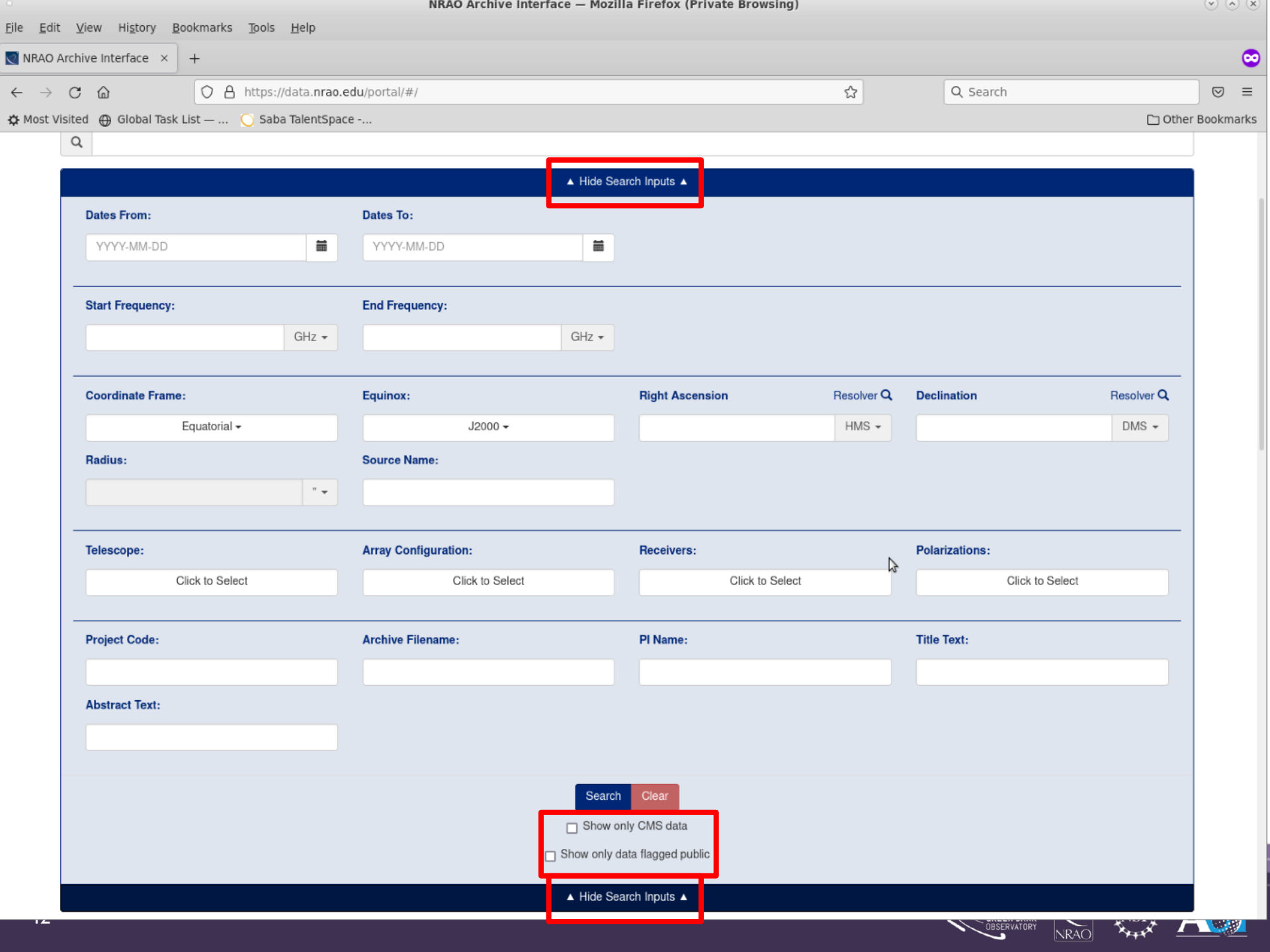
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End Frequency:
GHz
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Equatorial
Equinox:
J2000
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Resolver
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Array Configuration:
Click to Select
Receivers:
Click to Select
Polarizations:
Click to Select
Project Code:
Archive Filename:
PI Name:
Title Text:
Abstract Text:
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Show only CMS data
Show only data flagged public
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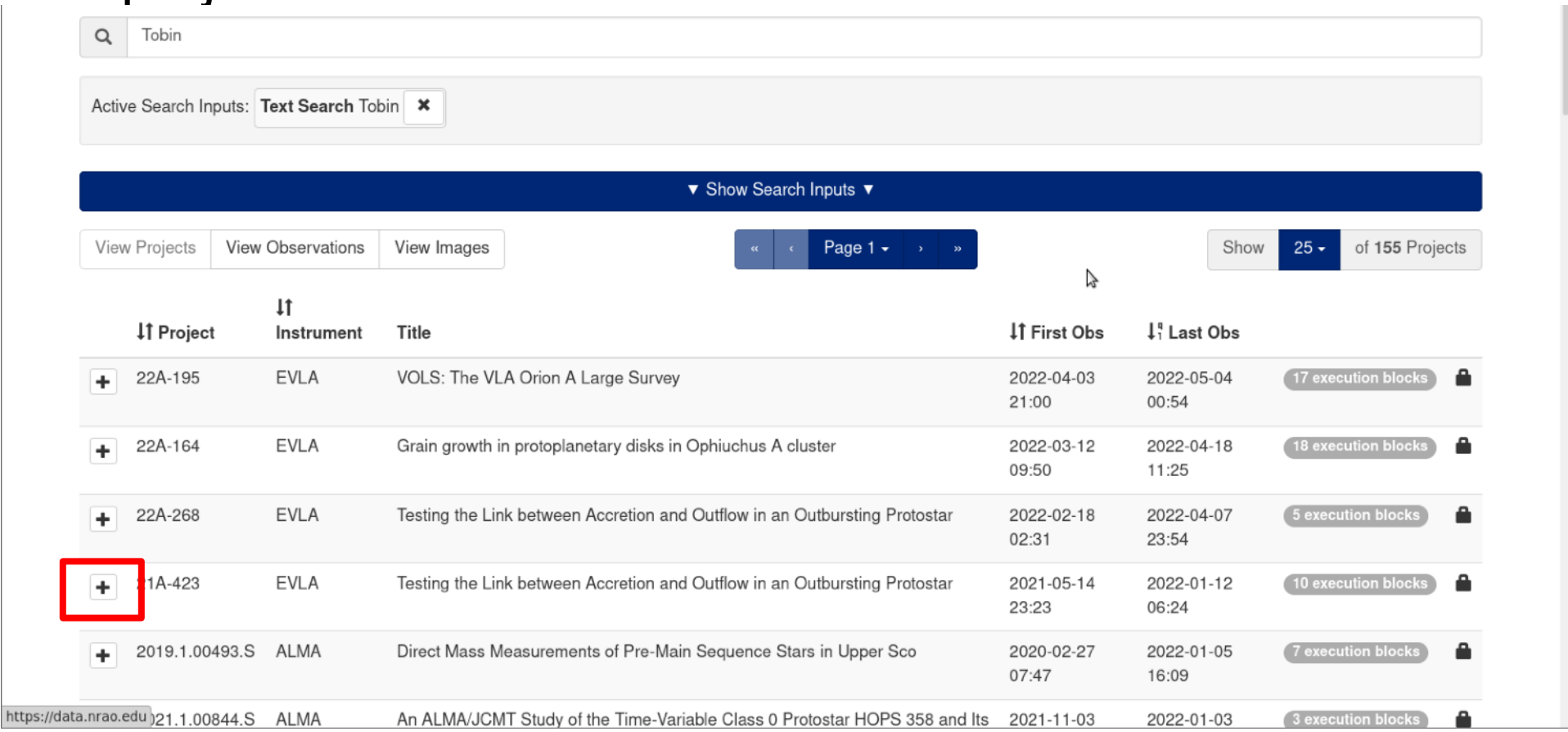
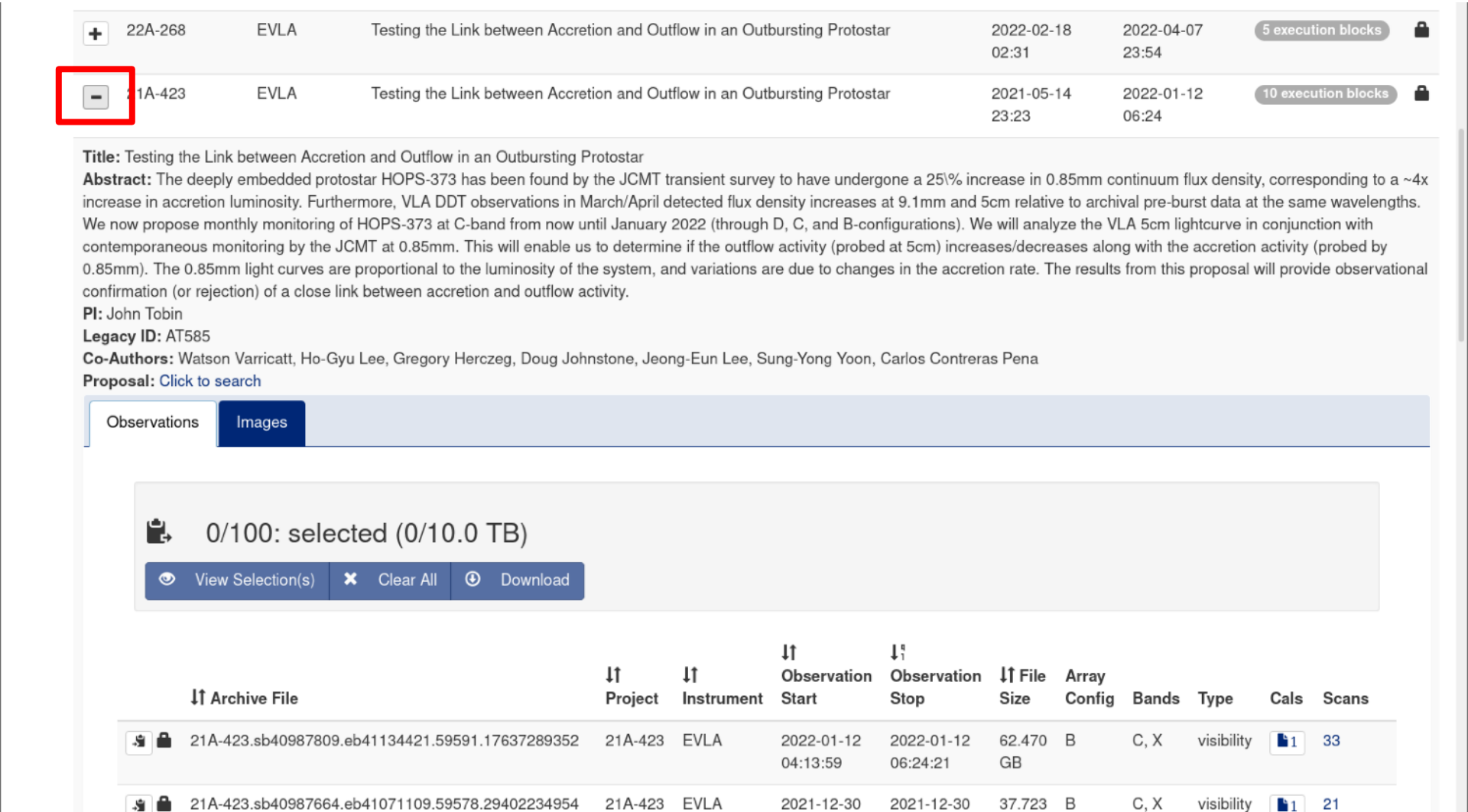
Project-based search results

- Results will show project and observations within project that meet search results



Project-based search results

- Details and Observations/Images within project shown



+	22A-268	EVLA	Testing the Link between Accretion and Outflow in an Outbursting Protostar	2022-02-18 02:31	2022-04-07 23:54	5 execution blocks	
−	21A-423	EVLA	Testing the Link between Accretion and Outflow in an Outbursting Protostar	2021-05-14 23:23	2022-01-12 06:24	10 execution blocks	

Title: Testing the Link between Accretion and Outflow in an Outbursting Protostar
Abstract: The deeply embedded protostar HOPS-373 has been found by the JCMT transient survey to have undergone a 25\% increase in 0.85mm continuum flux density, corresponding to a ~4x increase in accretion luminosity. Furthermore, VLA DDT observations in March/April detected flux density increases at 9.1mm and 5cm relative to archival pre-burst data at the same wavelengths. We now propose monthly monitoring of HOPS-373 at C-band from now until January 2022 (through D, C, and B-configurations). We will analyze the VLA 5cm lightcurve in conjunction with contemporaneous monitoring by the JCMT at 0.85mm. This will enable us to determine if the outflow activity (probed at 5cm) increases/decreases along with the accretion activity (probed by 0.85mm). The 0.85mm light curves are proportional to the luminosity of the system, and variations are due to changes in the accretion rate. The results from this proposal will provide observational confirmation (or rejection) of a close link between accretion and outflow activity.
PI: John Tobin
Legacy ID: AT585
Co-Authors: Watson Varricatt, Ho-Gyu Lee, Gregory Herczeg, Doug Johnstone, Jeong-Eun Lee, Sung-Yong Yoon, Carlos Contreras Pena
Proposal: Click to search

Observations | Images

0/100: selected (0/10.0 TB)

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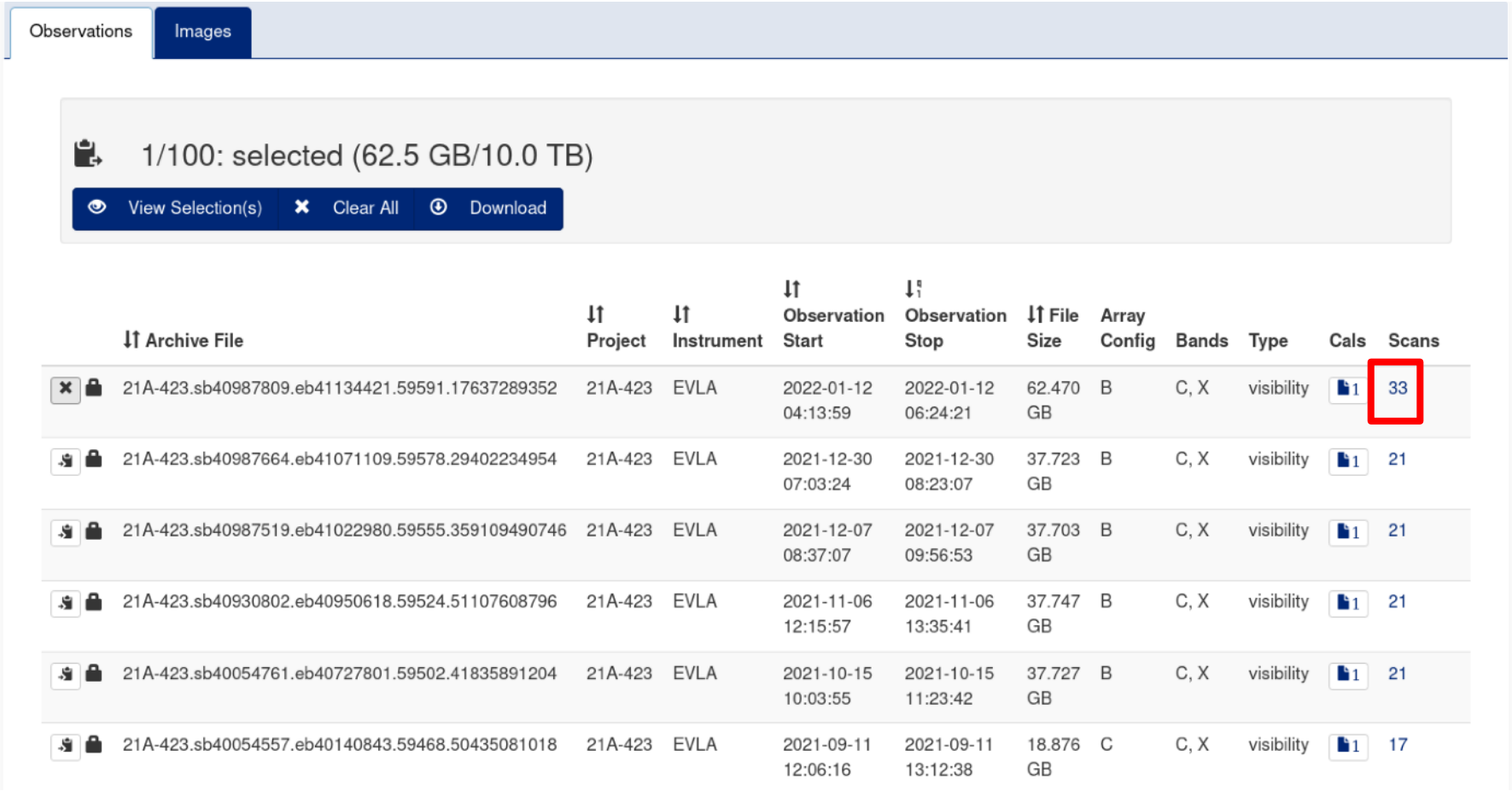
Archive File	Project	Instrument	Observation Start	Observation Stop	File Size	Array Config	Bands	Type	Cals	Scans
21A-423.sb40987809.eb41134421.59591.17637289352	21A-423	EVLA	2022-01-12 04:13:59	2022-01-12 06:24:21	62.470 GB	B	C, X	visibility	1	33
21A-423.sb40987664.eb41071109.59578.29402234954	21A-423	EVLA	2021-12-30	2021-12-30	37.723	B	C, X	visibility	1	21

Project-based search results

- Link to a list of scans



Archive File	Project	Instrument	Observation Start	Observation Stop	File Size	Array Config	Bands	Type	Cals	Scans
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21A-423.sb40987664.eb41071109.59578.29402234954	21A-423	EVLA	2021-12-30 07:03:24	2021-12-30 08:23:07	37.723 GB	B	C, X	visibility	1	21
21A-423.sb40987519.eb41022980.59555.359109490746	21A-423	EVLA	2021-12-07 08:37:07	2021-12-07 09:56:53	37.703 GB	B	C, X	visibility	1	21
21A-423.sb40930802.eb40950618.59524.51107608796	21A-423	EVLA	2021-11-06 12:15:57	2021-11-06 13:35:41	37.747 GB	B	C, X	visibility	1	21
21A-423.sb40054761.eb40727801.59502.41835891204	21A-423	EVLA	2021-10-15 10:03:55	2021-10-15 11:23:42	37.727 GB	B	C, X	visibility	1	21
21A-423.sb40054557.eb40140843.59468.50435081018	21A-423	EVLA	2021-09-11 12:06:16	2021-09-11 13:12:38	18.876 GB	C	C, X	visibility	1	17

List of Scans

Observation ID: 21A-423.sb40987809.eb41134421.59591.17637289352

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Legacy ID: AT585
Estimated Size: 62.470 GB
Obs Release Date: 2022-07-14T05:24:21.799Z
Data Product Type: visibility
Receiver Band: C, X
Array Configuration: B
Calibrations:
File: 21A-423_2022_01_12_T06_37_17.380.tar

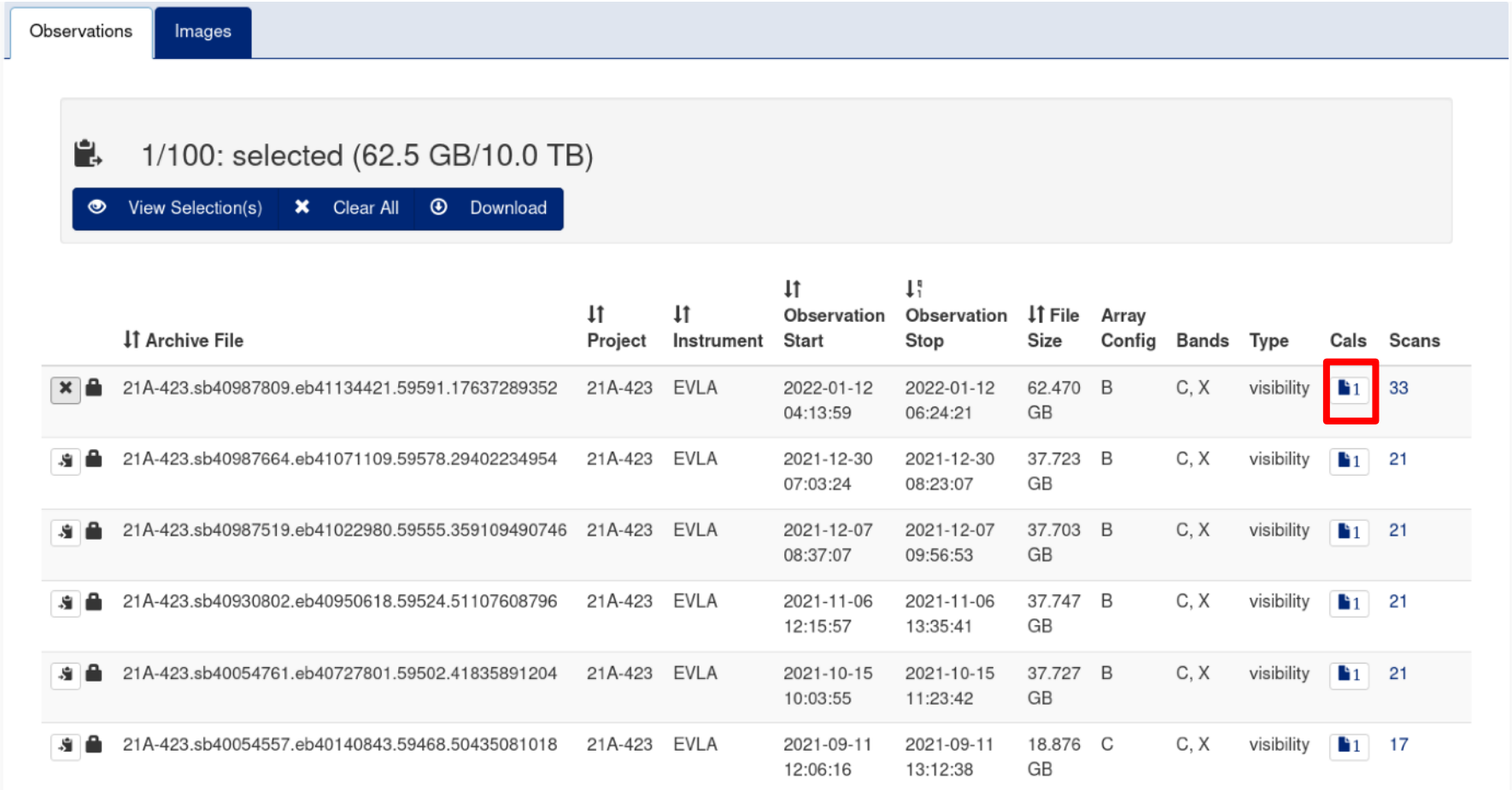
Request Data

- Not currently in a particular order
- We plan to revise this view to be more useful

Longitude	Latitude	Target Name	Min Frequency	Max Frequency	Scan Intent	Polarizations	Temporal Res	Scan Duration
5h46m30.990s	0°2'33.900"	HOPS-373	3.9760000 GHz	7.8960000 GHz	["OBSERVE_TARGET"]	["RR, RL, LR, LL"]	3.03	478.7 sec
5h46m30.990s	0°2'33.900"	HOPS-373	3.9760000 GHz	7.8960000 GHz	["OBSERVE_TARGET"]	["RR, RL, LR, LL"]	3.011	478.7 sec
5h52m50.101s	3°13'27.243"	J0552+0313	3.9760000 GHz	7.8960000 GHz	["SYSTEM_CONFIGURATION"]	["RR, RL, LR, LL"]	3.032	448.75 sec
5h52m50.101s	3°13'27.243"	J0552+0313	3.9760000 GHz	7.8960000 GHz	["CALIBRATE_PHASE","CALIBRATE_AMPLI"]	["RR, RL, LR, LL"]	3.219	41.85 sec
5h52m50.101s	3°13'27.243"	J0552+0313	3.9760000 GHz	7.8960000 GHz	["CALIBRATE_PHASE","CALIBRATE_AMPLI"]	["RR, RL, LR, LL"]	3.219	41.85 sec
5h52m50.101s	3°13'27.243"	J0552+0313	3.9760000 GHz	7.8960000 GHz	["CALIBRATE_PHASE","CALIBRATE_AMPLI"]	["RR, RL, LR, LL"]	3.223	41.9 sec
5h52m50.101s	3°13'27.243"	J0552+0313	3.9760000 GHz	7.8960000 GHz	["CALIBRATE_PHASE","CALIBRATE_AMPLI"]	["RR, RL, LR, LL"]	3.219	41.85 sec
5h46m30.990s	0°2'33.900"	HOPS-373	3.9760000 GHz	7.8960000 GHz	["OBSERVE_TARGET"]	["RR, RL, LR, LL"]	3.011	478.7 sec
5h52m50.101s	3°13'27.243"	J0552+0313	8.3320000 GHz	8.4600000 GHz	["SYSTEM_CONFIGURATION"]	["RR, RL, LR, LL"]	1.009	175.55 sec
5h52m50.101s	3°13'27.243"	J0552+0313	3.9760000 GHz	7.8960000 GHz	["CALIBRATE_PHASE","CALIBRATE_AMPLI"]	["RR, RL, LR, LL"]	3.223	41.9 sec
5h46m30.990s	0°2'33.900"	HOPS-373	3.9760000 GHz	7.8960000 GHz	["OBSERVE_TARGET"]	["RR, RL, LR, LL"]	3.03	478.7 sec
5h46m30.990s	0°2'33.900"	HOPS-373	3.9760000 GHz	7.8960000 GHz	["OBSERVE_TARGET"]	["RR, RL, LR, LL"]	3.011	478.7 sec

Project-based search results

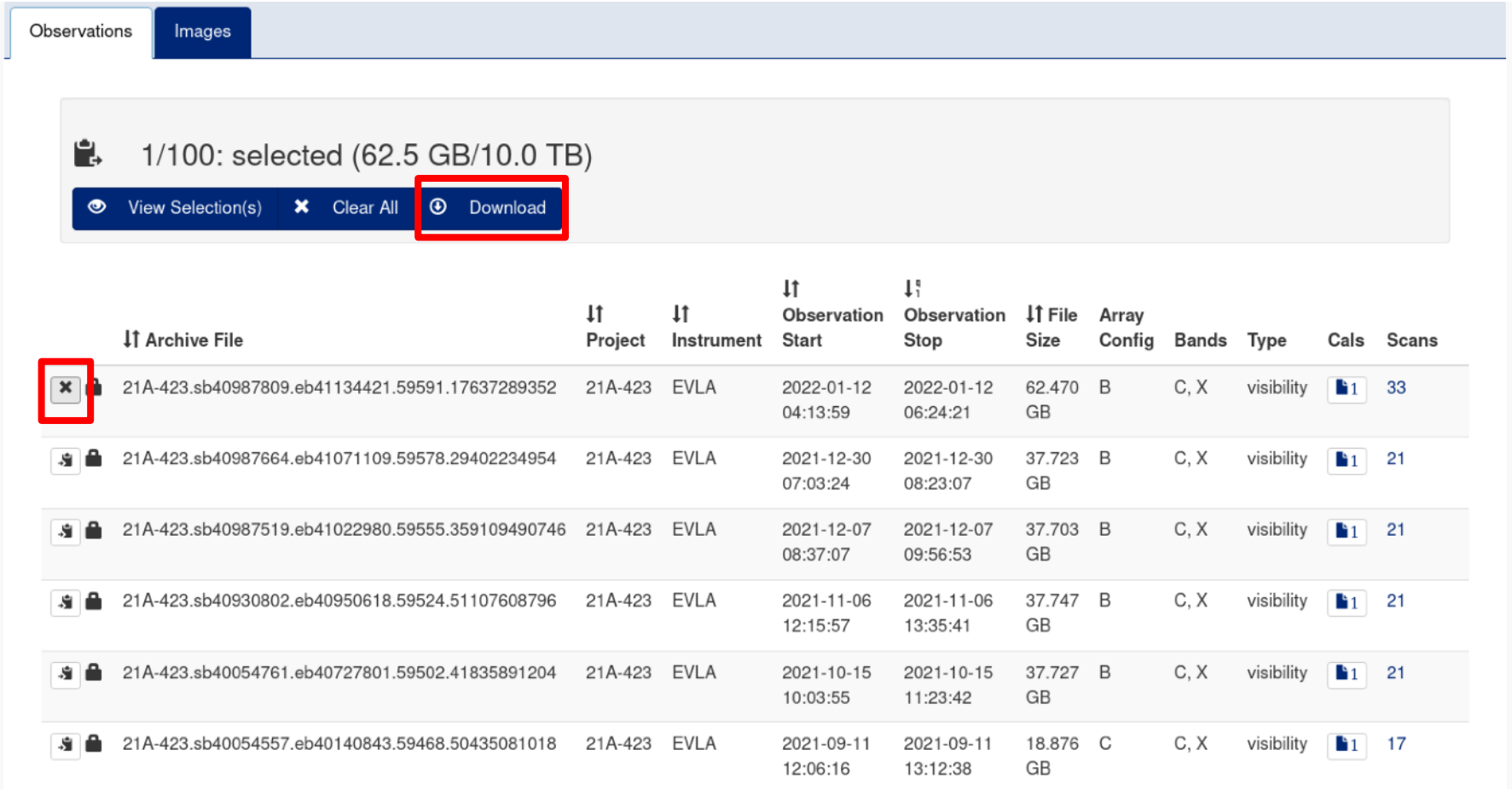
- Click on the icon to download just the calibration tarball



	Archive File	Project	Instrument	Observation Start	Observation Stop	File Size	Array Config	Bands	Type	Cals	Scans
	21A-423.sb40987809.eb41134421.59591.17637289352	21A-423	EVLA	2022-01-12 04:13:59	2022-01-12 06:24:21	62.470 GB	B	C, X	visibility	1	33
	21A-423.sb40987664.eb41071109.59578.29402234954	21A-423	EVLA	2021-12-30 07:03:24	2021-12-30 08:23:07	37.723 GB	B	C, X	visibility	1	21
	21A-423.sb40987519.eb41022980.59555.359109490746	21A-423	EVLA	2021-12-07 08:37:07	2021-12-07 09:56:53	37.703 GB	B	C, X	visibility	1	21
	21A-423.sb40930802.eb40950618.59524.51107608796	21A-423	EVLA	2021-11-06 12:15:57	2021-11-06 13:35:41	37.747 GB	B	C, X	visibility	1	21
	21A-423.sb40054761.eb40727801.59502.41835891204	21A-423	EVLA	2021-10-15 10:03:55	2021-10-15 11:23:42	37.727 GB	B	C, X	visibility	1	21
	21A-423.sb40054557.eb40140843.59468.50435081018	21A-423	EVLA	2021-09-11 12:06:16	2021-09-11 13:12:38	18.876 GB	C	C, X	visibility	1	17

Project-based search results

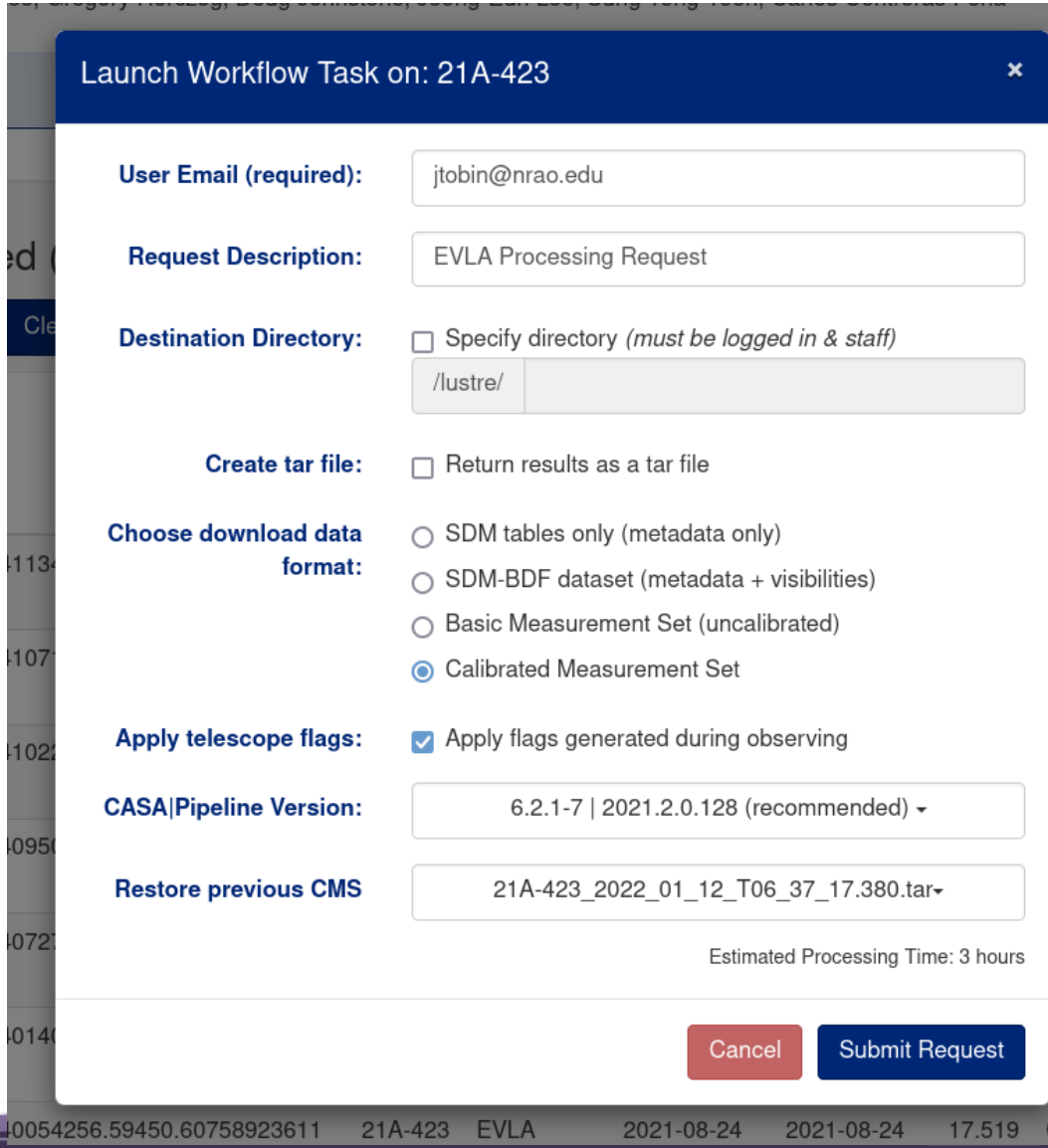
- Select an observation to see the download options



Archive File	Project	Instrument	Observation Start	Observation Stop	File Size	Array Config	Bands	Type	Cals	Scans
21A-423.sb40987809.eb41134421.59591.17637289352	21A-423	EVLA	2022-01-12 04:13:59	2022-01-12 06:24:21	62.470 GB	B	C, X	visibility	1	33
21A-423.sb40987664.eb41071109.59578.29402234954	21A-423	EVLA	2021-12-30 07:03:24	2021-12-30 08:23:07	37.723 GB	B	C, X	visibility	1	21
21A-423.sb40987519.eb41022980.59555.359109490746	21A-423	EVLA	2021-12-07 08:37:07	2021-12-07 09:56:53	37.703 GB	B	C, X	visibility	1	21
21A-423.sb40930802.eb40950618.59524.51107608796	21A-423	EVLA	2021-11-06 12:15:57	2021-11-06 13:35:41	37.747 GB	B	C, X	visibility	1	21
21A-423.sb40054761.eb40727801.59502.41835891204	21A-423	EVLA	2021-10-15 10:03:55	2021-10-15 11:23:42	37.727 GB	B	C, X	visibility	1	21
21A-423.sb40054557.eb40140843.59468.50435081018	21A-423	EVLA	2021-09-11 12:06:16	2021-09-11 13:12:38	18.876 GB	C	C, X	visibility	1	17

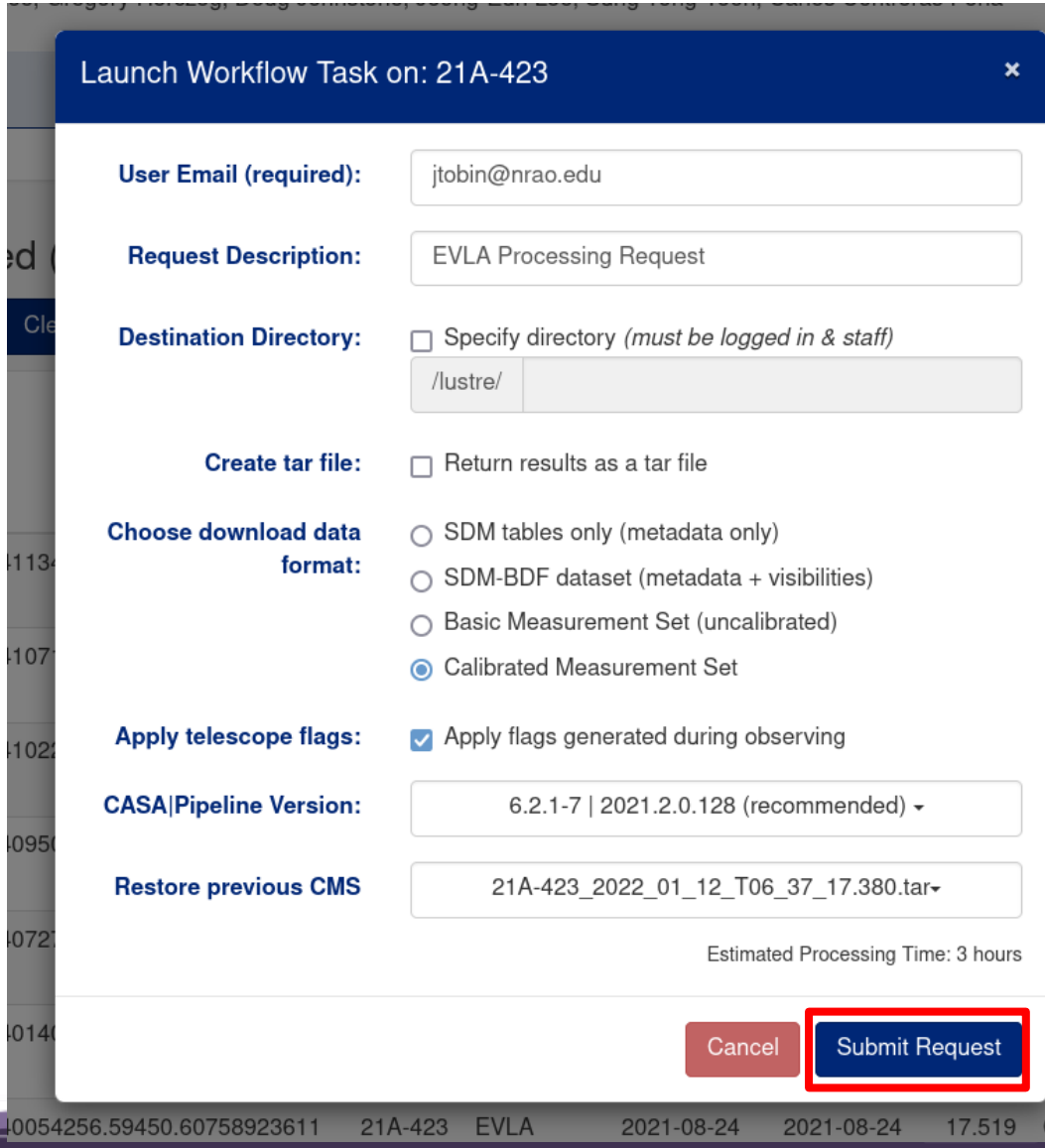
Download Options for VLA

- Login required for proprietary data download (no more keys)
- Local delivery will be possible for any logged-in user in the next ~month
- tar file option not recommended, use wget -r (see archive documentation, link on slide 3)



Download Options for VLA

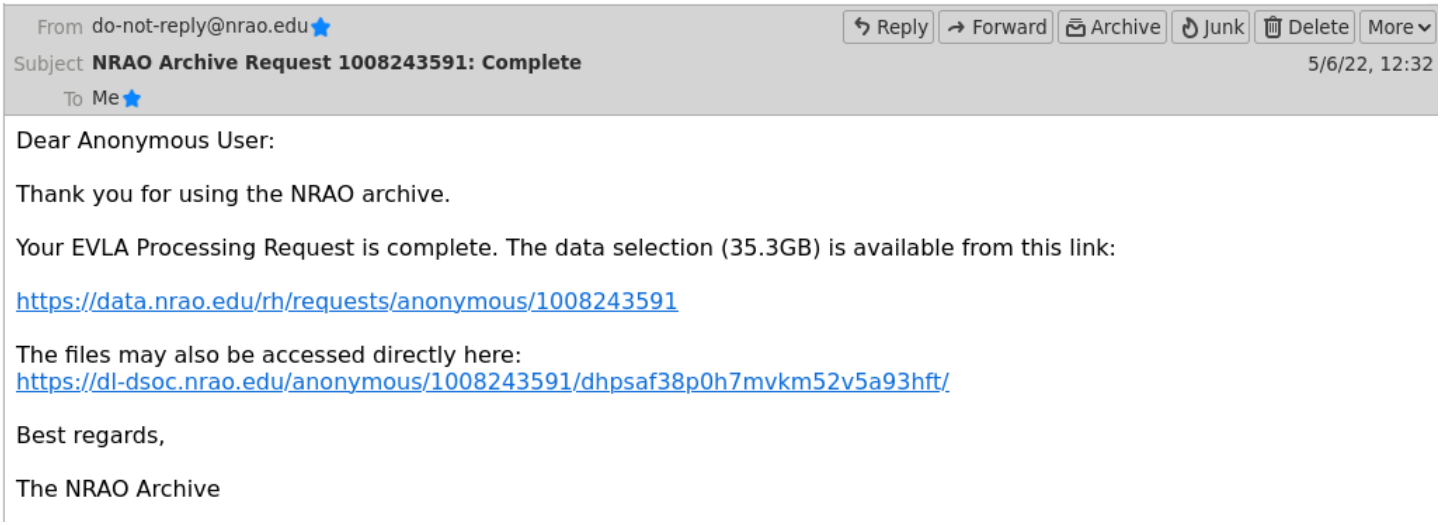
- SDM-BDF – raw data (recommended for manual processing and pipeline re-runs)
- Basic MS – raw data but converted to MS from SDM
- Calibrated MS – MS with VLA pipeline calibration applied (if available)
- Apply flags only really applicable to Basic MS
- Generally want to use latest CASA+pipeline



Submitted Request

- All submitted requests go to ‘Request Handler’
  - Checks authorization for data
  - Provides some status of where request is at
  - completely non-interactive
  - safe to close window (or go back to archive with back button)
  - E-mail notification when done will be sent
  - Cannot cancel jobs or get exact status updates

When your data are ready



From do-not-reply@nrao.edu
Subject **NRAO Archive Request 1008243591: Complete**
To Me

Reply | Forward | Archive | Junk | Delete | More

5/6/22, 12:32

Dear Anonymous User:

Thank you for using the NRAO archive.

Your EVLA Processing Request is complete. The data selection (35.3GB) is available from this link:

https://data.nrao.edu/rh/requests/anonymous/1008243591

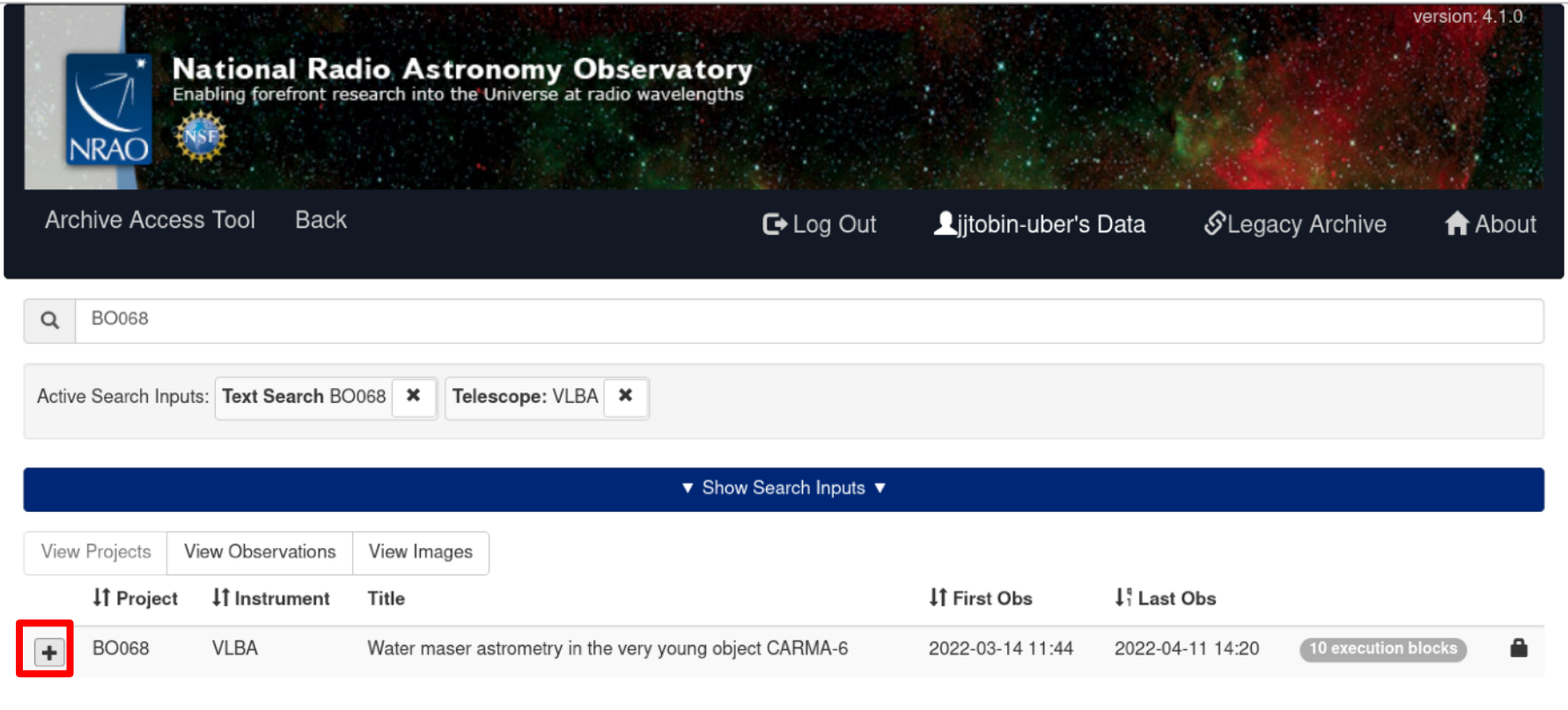
The files may also be accessed directly here:
https://dl-dsoc.nrao.edu/anonymous/1008243591/dhpsaf38p0h7mvkm52v5a93hft/

Best regards,

The NRAO Archive

- Look for an e-mail notification
  - Link to staged location at end of message
  - download via terminal command:
  - `wget -r --reject "index.html*" -np -nH -cut-dirs=3  https://dl-dsoc.nrao.edu/anonymous/1008243591/dhpsaf38p0h7mvkm52v5a93hft/`
  - Terminal command essential if not using tarred download
    - MSes and SDMs have a bunch of subdirectories within them

VLBA Data Through the NRAO Archive



VLBA Data

BO068	VLBA	Water maser astrometry in the very young object CARMA-6	2022-03-14 11:44	2022-04-11 14:20	10 execution blocks	

Title: Water maser astrometry in the very young object CARMA-6

Abstract: Protostellar jets play a fundamental role in the evolution and re-distribution of angular momentum during the formation of new stars. The milliarcsecond angular resolution and very high astrometric precision capability of the VLBA applied to the 22 GHz water maser line offer a unique opportunity to explore the kinematical structure of protostellar jets close to the central engine, on spatial scales of a few au. We propose follow-up VLBA observations of the recently detected 22 GHz water masers in the Class 0/I object CARMA-6 at the heart of the Serpens South cluster. With these new observations, combined with data from previous epochs, we will measure the proper motions of the maser spots, allowing us to i) study the jet kinematics near its launching point, ii) investigate the relationship between the observed velocity gradients of the masers and the outflow/jet/disk geometry, and iii) search for signatures of jet rotation, jet precession and/or episodic ejection. In addition and very importantly, we will obtain the parallax of the source, which will be the first direct measurement of the distance to the embedded protostar and thus to the Serpens South cluster.

PI: Gisela Ortiz

Legacy ID: BO068

Co-Authors: Adele Plunkett, Sergio Dzib, Thushara Pillai, Laurent Loinard, Carolina Rodríguez-Garza, Yan Gong

Segments | Images

Segment	Observation Start	Observation Stop	File Size	Bands	Correlation Files
BO068B	2022-04-11 09:54	2022-04-11 14:20	19.762 GB	K	5
BO068A	2022-03-14 11:44	2022-03-14 16:11	19.395 GB	K	5

VLBA Data

	Segment	Observation Start	Observation Stop	File Size	Bands	Correlation Files
▲ 🔒	BO068B	2022-04-11 09:54	2022-04-11 14:20	19.762 GB	K	5

5/100: selected (19.8 GB/10.0 TB)

View Selection(s) | Clear All | Download

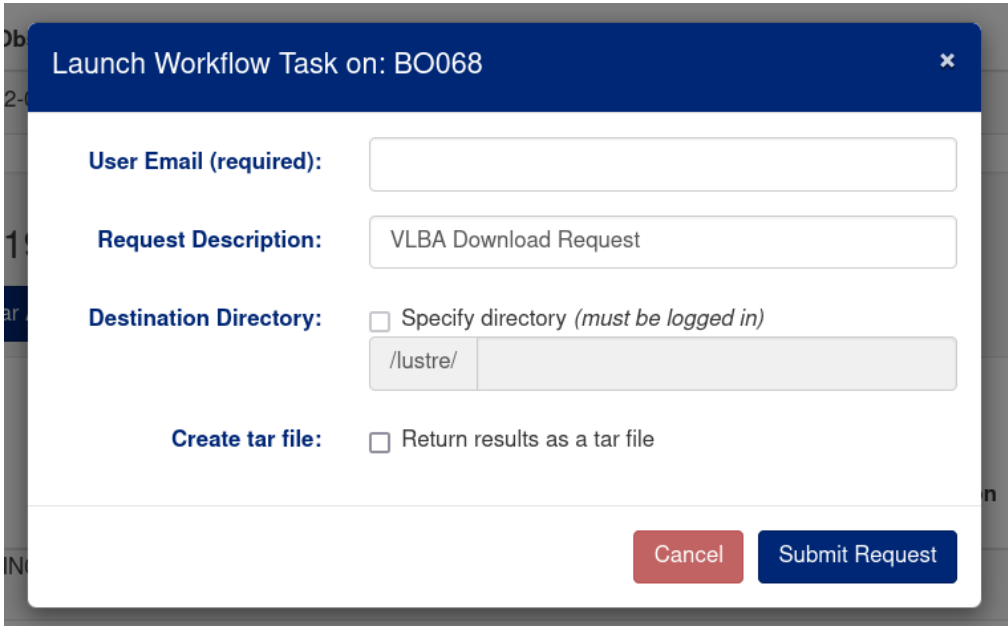
Select All

	Archive File	Project	Instrument	Observation Start	Observation Stop	File Size	Array Config	Bands	Type	Cals	Scans
✓ 🔒	VLBA_BO068B_bo068bgeo_BIN0_SRC0_0_220429T135730.idifits	BO068	VLBA	2022-04-11 09:54:04	2022-04-11 14:20:59	211.879 MB		K	correlation		40
✓ 🔒	VLBA_BO068B_bo068bcarma_BIN0_SRC0_0_220429T140554.idifits	BO068	VLBA	2022-04-11 10:26:17	2022-04-11 13:52:38	1.117 GB		K	correlation		292
✓ 🔒	VLBA_BO068B_bo068bcarmazoom_BIN0_SRC0_0_220429T140645.idifits	BO068	VLBA	2022-04-11 10:26:17	2022-04-11 13:52:38	8.658 GB		K	correlation		292
✓ 🔒	VLBA_BO068B_bo068bG028_BIN0_SRC0_0_220429T135752.idifits	BO068	VLBA	2022-04-11 10:26:17	2022-04-11 13:52:38	1.117 GB		K	correlation		292
✓ 🔒	VLBA_BO068B_bo068bG028zoom_BIN0_SRC0_0_220429T135818.idifits	BO068	VLBA	2022-04-11 10:26:17	2022-04-11 13:52:38	8.658 GB		K	correlation		292

▼ 🔒	BO068A	2022-03-14 11:44	2022-03-14 16:11	19.395 GB	K	5

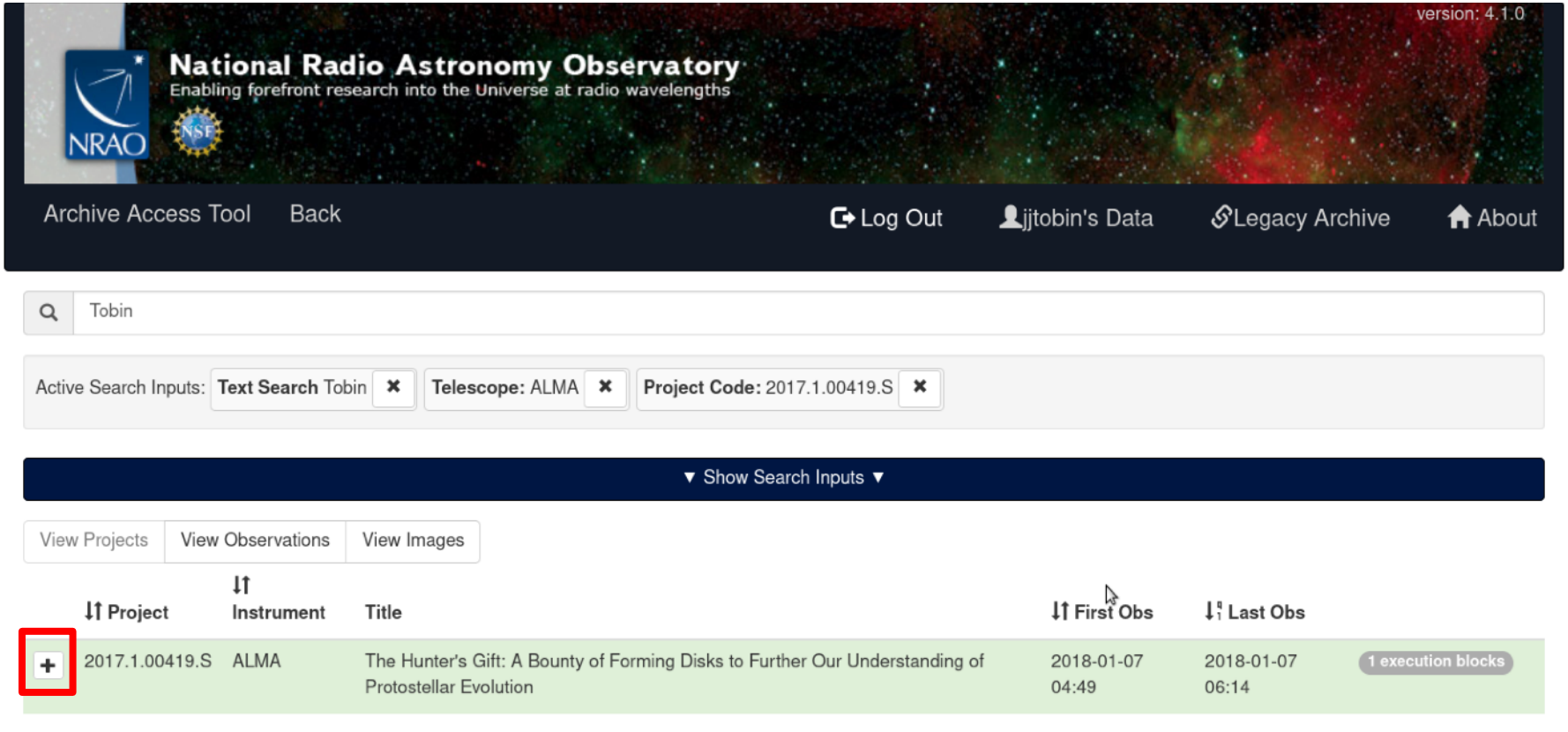
VLBA Download options (or lack)

- No processing options, just standard download
- Only FITS format is available for download



ALMA Data Through the NRAO Archive

- Does not replace ALMA Science Archive, but adds functionality



Active Search Inputs: **Text Search** Tobin ✖ **Telescope:** ALMA ✖ **Project Code:** 2017.1.00419.S ✖

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View Projects | View Observations | View Images

	Project	Instrument	Title	First Obs	Last Obs	
−	2017.1.00419.S	ALMA	The Hunter's Gift: A Bounty of Forming Disks to Further Our Understanding of Protostellar Evolution	2018-01-07 04:49	2018-01-07 06:14	1 execution blocks

Title: The Hunter's Gift: A Bounty of Forming Disks to Further Our Understanding of Protostellar Evolution

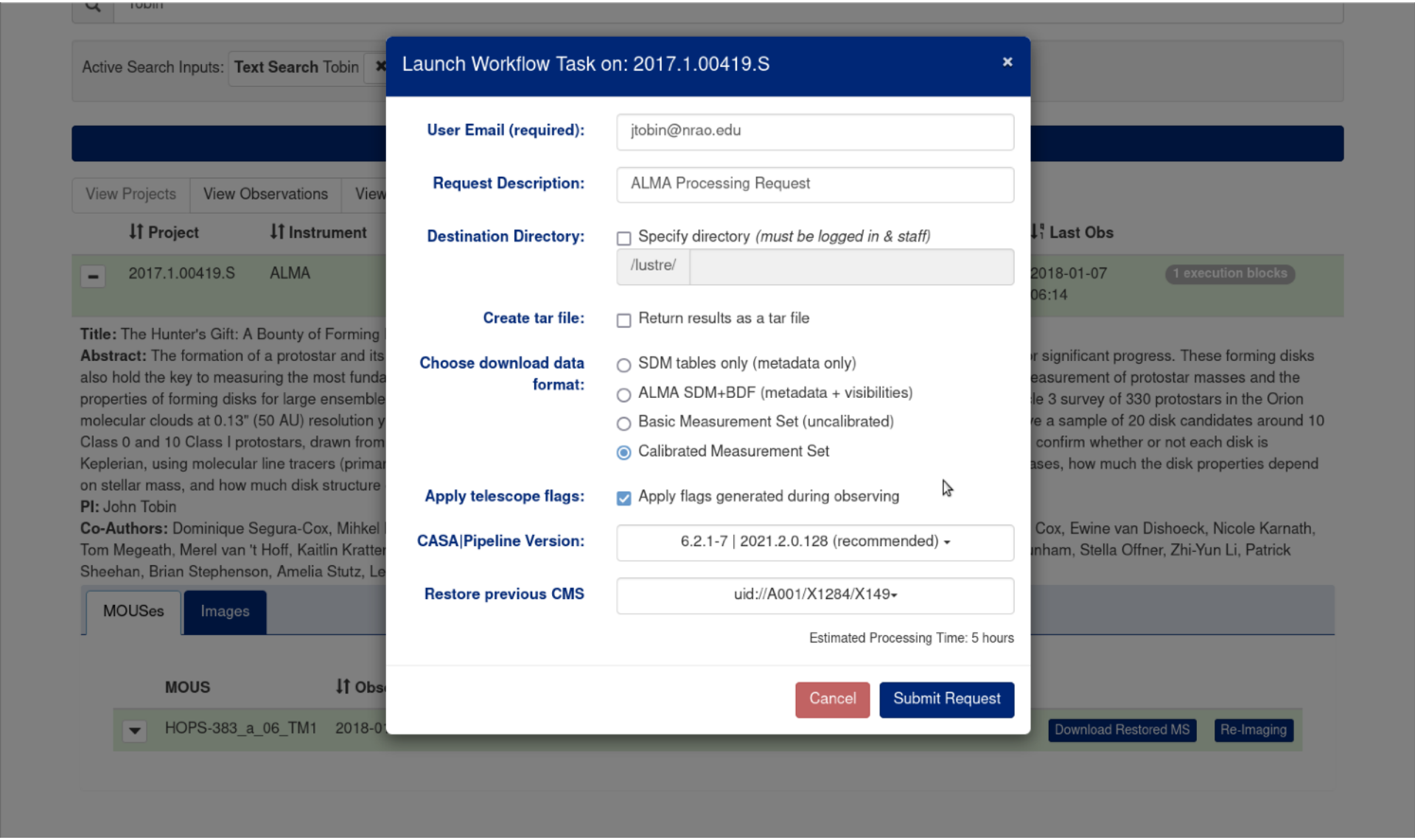
Abstract: The formation of a protostar and its Keplerian disk remains a poorly characterized process, but ALMA now provides an opportunity for significant progress. These forming disks also hold the key to measuring the most fundamental parameter of newborn stars, their masses derived from the Keplerian disk rotation. The measurement of protostar masses and the properties of forming disks for large ensembles of systems is essential to solidifying our knowledge of star and planet formation. Our ALMA Cycle 3 survey of 330 protostars in the Orion molecular clouds at 0.13" (50 AU) resolution yielded >100 well-resolved continuum images of apparent protostellar disks. We propose to observe a sample of 20 disk candidates around 10 Class 0 and 10 Class I protostars, drawn from a representative range of luminosities (0.4 L_sun to 480 L_sun). With these observations, we will confirm whether or not each disk is Keplerian, using molecular line tracers (primarily C18O J=2-1), measure the change in mass and mass accretion between the Class 0 and I phases, how much the disk properties depend on stellar mass, and how much disk structure evolves from Class 0 to Class I and later stages.

PI: John Tobin

Co-Authors: Dominique Segura-Cox, Mihkel Kama, Friedrich Wyrowski, Magnus Persson, William Fischer, Sarah Sadavoy, Mayra Osorio, Erin Cox, Ewine van Dishoeck, Nicole Karnath, Tom Megeath, Merel van 't Hoff, Kaitlin Kratter, Ana Karla Diaz Rodriguez, Guillem Anglada, Hector Arce, Laura Perez, Elise Furlan, Michael Dunham, Stella Offner, Zhi-Yun Li, Patrick Sheehan, Brian Stephenson, Amelia Stutz, Leslie Looney, Nickalas Reynolds

MOUSes | Images

	MOUS	Observation Start	Observation Stop	File Size	Array Config	Ang Res	Bands	EBs	
▼	HOPS-383_a_06_TM1	2018-01-07 04:49	2018-01-07 06:14	89.366 GB		0.220"	06	1	Download Restored MS Re-Imaging


Launch Workflow Task on: 2017.1.00419.S
User Email (required):
jtobin@nrao.edu
Request Description:
ALMA Processing Request
Destination Directory:
Specify directory (must be logged in & staff)
/lustre/
Create tar file:
Return results as a tar file
Choose download data format:
SDM tables only (metadata only)
ALMA SDM+BDF (metadata + visibilities)
Basic Measurement Set (uncalibrated)
Calibrated Measurement Set
Apply telescope flags:
Apply flags generated during observing
CASA|Pipeline Version:
6.2.1-7 | 2021.2.0.128 (recommended)
Restore previous CMS
uid://A001/X1284/X149
Estimated Processing Time: 5 hours
Cancel
Submit Request
Active Search Inputs:
Text Search Tobin
View Projects
View Observations
Project
Instrument
Last Obs
2017.1.00419.S
ALMA
2018-01-07 06:14
1 execution blocks
Title: The Hunter's Gift: A Bounty of Forming
Abstract: The formation of a protostar and its
also hold the key to measuring the most funda
properties of forming disks for large ensemble
molecular clouds at 0.13" (50 AU) resolution y
Class 0 and 10 Class I protostars, drawn from
Keplerian, using molecular line tracers (primar
on stellar mass, and how much disk structure
PI: John Tobin
Co-Authors: Dominique Segura-Cox, Mihkel
Tom Megeath, Merel van 't Hoff, Kaitlin Kratter
Sheehan, Brian Stephenson, Amelia Stutz, Le
r significant progress. These forming disks
easurement of protostar masses and the
le 3 survey of 330 protostars in the Orion
e a sample of 20 disk candidates around 10
confirm whether or not each disk is
ases, how much the disk properties depend
Cox, Ewine van Dishoeck, Nicole Karnath,
nham, Stella Offner, Zhi-Yun Li, Patrick
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Active Search Inputs: **Text Search** Tobin ✖ **Telescope:** ALMA ✖ **Project Code:** 2017.1.00419.S ✖

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	Project	Instrument	Title	First Obs	Last Obs	
−	2017.1.00419.S	ALMA	The Hunter's Gift: A Bounty of Forming Disks to Further Our Understanding of Protostellar Evolution	2018-01-07 04:49	2018-01-07 06:14	1 execution blocks

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Abstract: The formation of a protostar and its Keplerian disk remains a poorly characterized process, but ALMA now provides an opportunity for significant progress. These forming disks also hold the key to measuring the most fundamental parameter of newborn stars, their masses derived from the Keplerian disk rotation. The measurement of protostar masses and the properties of forming disks for large ensembles of systems is essential to solidifying our knowledge of star and planet formation. Our ALMA Cycle 3 survey of 330 protostars in the Orion molecular clouds at 0.13" (50 AU) resolution yielded >100 well-resolved continuum images of apparent protostellar disks. We propose to observe a sample of 20 disk candidates around 10 Class 0 and 10 Class I protostars, drawn from a representative range of luminosities (0.4 L_sun to 480 L_sun). With these observations, we will confirm whether or not each disk is Keplerian, using molecular line tracers (primarily C18O J=2-1), measure the change in mass and mass accretion between the Class 0 and I phases, how much the disk properties depend on stellar mass, and how much disk structure evolves from Class 0 to Class I and later stages.

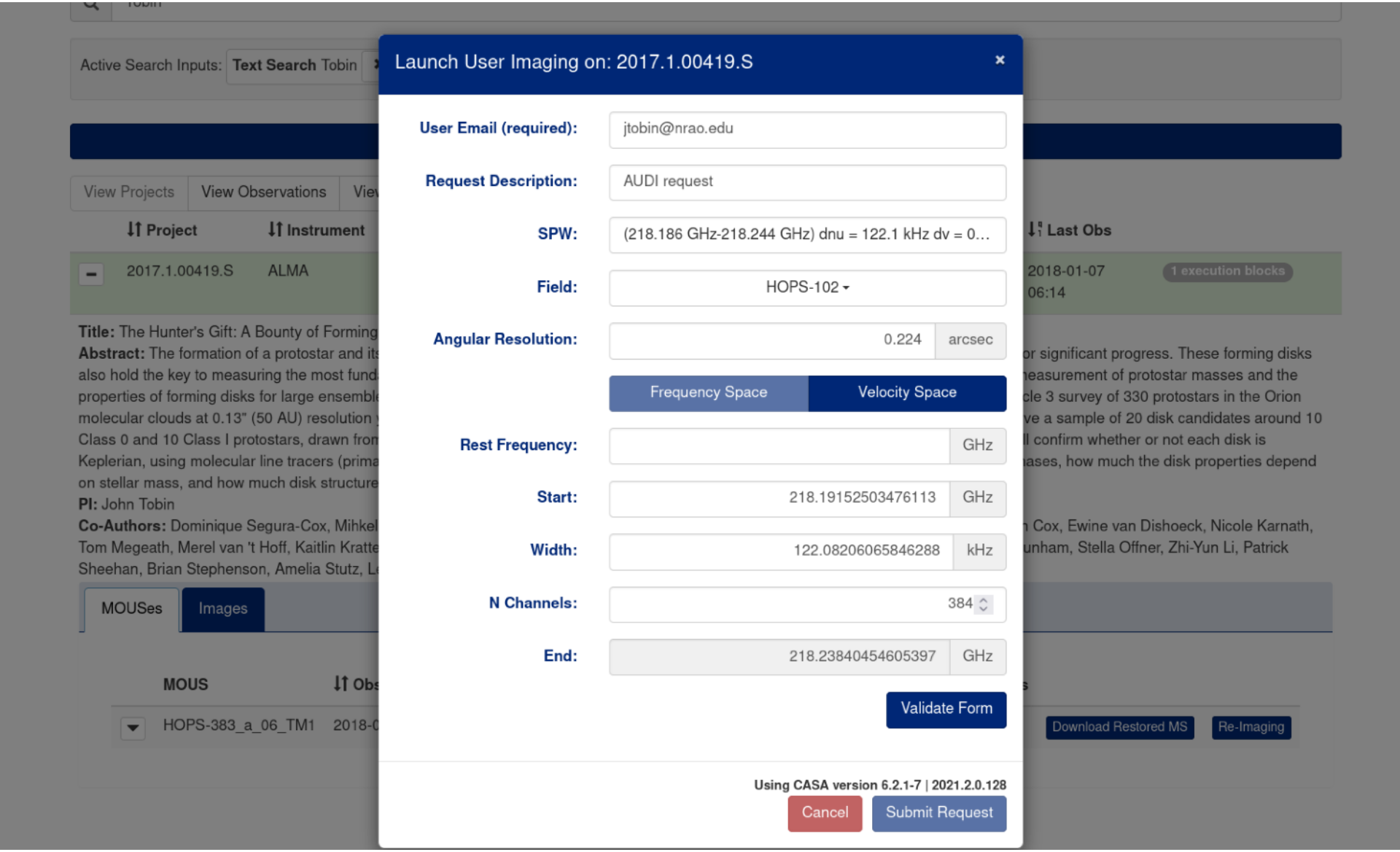
PI: John Tobin

Co-Authors: Dominique Segura-Cox, Mihkel Kama, Friedrich Wyrowski, Magnus Persson, William Fischer, Sarah Sadavoy, Mayra Osorio, Erin Cox, Ewine van Dishoeck, Nicole Karnath, Tom Megeath, Merel van 't Hoff, Kaitlin Kratter, Ana Karla Diaz Rodriguez, Guillem Anglada, Hector Arce, Laura Perez, Elise Furlan, Michael Dunham, Stella Offner, Zhi-Yun Li, Patrick Sheehan, Brian Stephenson, Amelia Stutz, Leslie Looney, Nickalas Reynolds

MOUSes | Images

	MOUS	Observation Start	Observation Stop	File Size	Array Config	Ang Res	Bands	EBs		
▼	HOPS-383_a_06_TM1	2018-01-07 04:49	2018-01-07 06:14	89.366 GB		0.220"	06	1	Download Restored MS	Re-Imaging

Frequency-based Cube



Velocity-based Cube