

ALMA WebLog Review

George Bendo

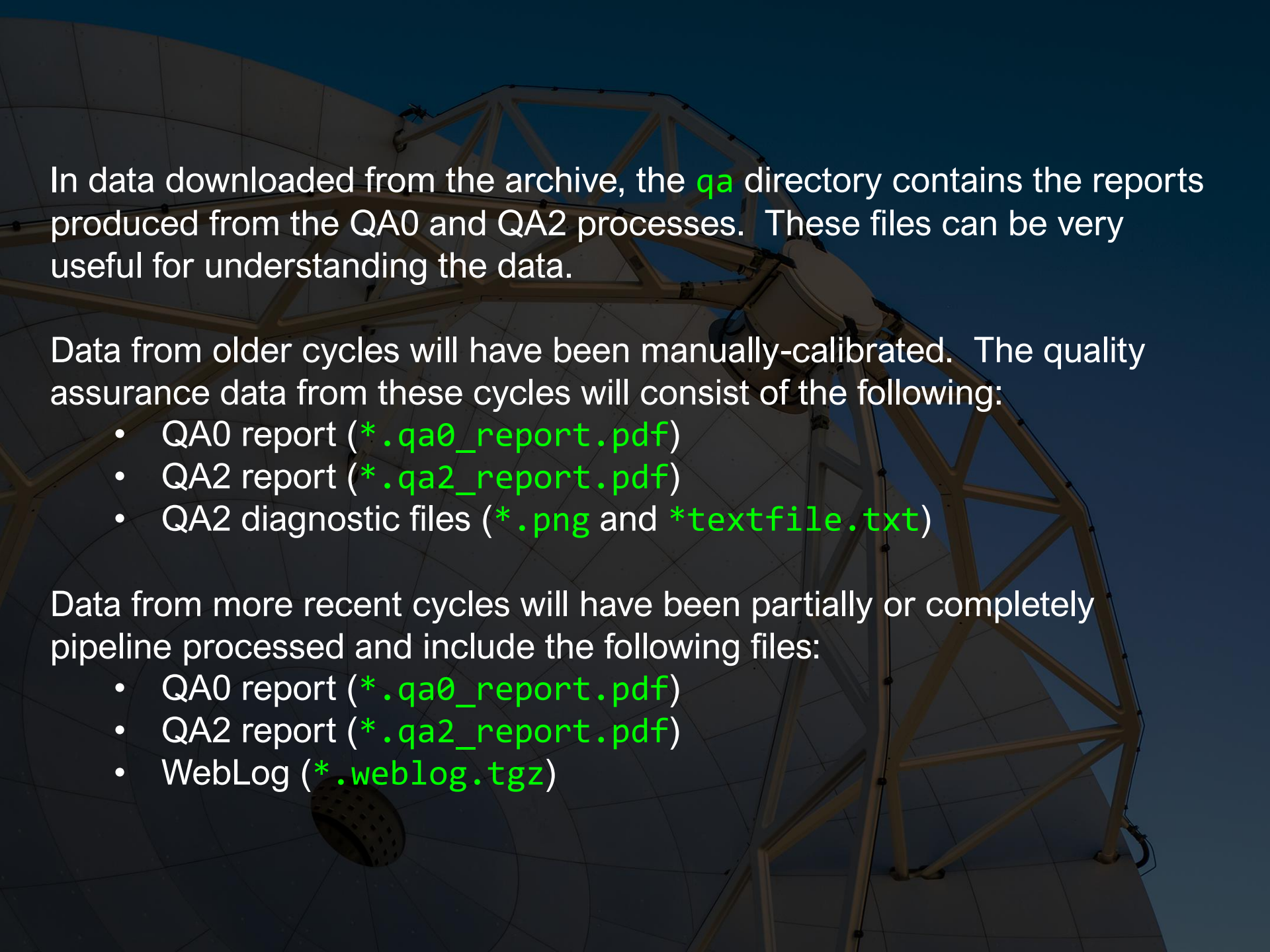
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Jodrell Bank Centre for Astrophysics
The University of Manchester





In the context of ALMA, QA stands for quality assurance. ALMA has four phases of quality assurance:

- QA0 Simple quality checks performed at the observatory as soon as the data are acquired
- QA1 Long-term monitoring of the performance of the observatory (not specific to any project)
- QA2 A complete quality assessment performed on the data after completely calibrating and imaging the data
- QA3 Re-assessment of data after they are delivered to users triggered when someone discovers a previously-unidentified problem



In data downloaded from the archive, the `qa` directory contains the reports produced from the QA0 and QA2 processes. These files can be very useful for understanding the data.

Data from older cycles will have been manually-calibrated. The quality assurance data from these cycles will consist of the following:

- QA0 report (`*.qa0_report.pdf`)
- QA2 report (`*.qa2_report.pdf`)
- QA2 diagnostic files (`*.png` and `*textfile.txt`)

Data from more recent cycles will have been partially or completely pipeline processed and include the following files:


- QA0 report (`*.qa0_report.pdf`)
- QA2 report (`*.qa2_report.pdf`)
- WebLog (`*.weblog.tgz`)

The QA0 PDF provides a summary of comments from the astronomer who acquired the data. Each Execution Block (EB) will have its own report.

Versions of this document from earlier cycles contain just some simple diagnostic plots.

Versions from recent cycles contain several new sets of diagnostic plots as well as preview images.

These documents are most useful for understanding whether any problems were encountered during the observations.

QA0 Report 

Execution Block Summary

Project Code	2022.1.00401.S	SchedBlock	PN_Hb_5_a_06_TM2
ExecBlock	uid://A002/X1003af4/Xa540	ExecBlock Status	SUCCESS
QA0 Status	✔ Pass	Exec. Fraction	1.47
Repr. frequency	230.560 GHz (Sky)	Band	ALMA_RB_06
Array	12 [m]	Baselines	14m -- 312m
Antennas	Antennas: 43 effective, 43 usable, 43 unflagged, 43 total. Expected for Cycle 9 : 43, minimum acceptable: N/A Band observed: 6. Highest recommended: 7-7		
Weather	PWV 1.23 mm; Wind 9.80 m/s; Humidity 13.53 %; Pressure 445.58 hPa; Phase rms: 72.605 microns		
QA0 comment	No major issues. Pass.		
AOS Check comment	2022-10-25T22:19:31 uid://A002/X1003af4/Xa540 Band 6 Freq 230.55953278143184 GHz standard observation Mean Zenith PWV: 1.22 +/- 0.06 mm Representative Tsys: 82.8 K 43/43 antennas are working in band 6 on the BLC PHASECAL: Antenna-based phase rms on phaseCal: 20.1 degrees (72.6 microns) No antennas exceed rms limit BANDPASS: WVR-corrected baseline-based phase rms on bandpass: 19.0 degrees (68.8 microns) on 100m baselines Mean improvement in phase rms using WVRs: 2.16 Baseline limit with good phase (80%): 170m. L80 resolution: 1.571 arcsec Bandpass calibrator: J1924-2914 Flux: 6.925 +/- 0.230 Jy Possible channels with SNR>30: 3694 Phase calibrator: J1820-2528 Flux: 0.297 +/- 0.014 Jy Sky separation: 9.00 degrees Resolution slope : 0.00 SNR in calibrated phaseCal flux: Between antennas: 37.2 Between scans: 136.2 1 completed cycles of science/phaseCal. 1 bandpass scan Percentage of antenna/bb data flagged: 0.00% Binary size: 5.93GB Band observed: 6 HIGHEST RECOMMENDED OBSERVING BAND: 7 - 7 *** QA0 PASS		
QA0 warnings	Achieved angular resolution is outside the expected range. Observed: 1.12, requested: 1.17 - 1.76		

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The QA0+ section shows some very quick (but very rough) images produced from the data soon after the observations were performed as well as some measurements from those images.

While these images and data are useful for providing a preliminary view of the results, they may be inaccurate compared to what is in the WebLogs.

QA0+ EB

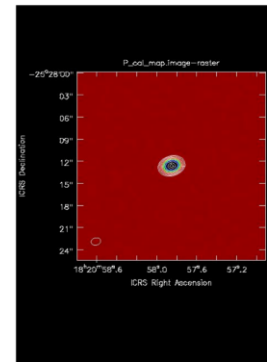
QA0+ results are only to be used as a guide to assess the data quality, and are not for scientific use. QA0+ image and fluxes are obtained from an online reduction of the combined wideband continuum spectral windows (using mfs TCLEAN in CASA), with no bandpass or Tsys calibration, nor removal of potential line contamination. Fluxes are only approximate. 'QA0+ EB' is the result from concatenating all EBs up to the current one.

Science target	NGC_6445				
Peak	6.112	Integrated	40.478	RMS	0.351
Xoff	12.032	Yoff	15.365	(arcsec from phase centre)	
Beam X	1.568"	Beam Y	1.04"	Beam PA	-72.53°
Selfcal	false				
Peak	NaN mJy	Integrated	NaN mJy	RMS	NaN mJy
Xoff	NaN	Yoff	NaN	(arcsec from phase centre)	
Phase Cal	J1820-2528	Separation	9.00°		
Peak	313.65 mJy	Integrated	312.094 mJy	RMS	8.228 mJy
Beam X R=0.5	1.324"		Beam Y R=0.5	0.99"	
Beam PA R=0.5	-76.64°		RMS R=0.5	8.228 mJy	
Beam X R=2.0	1.564"		Beam Y R=2.0	1.166"	
Beam PA R=2.0	-75.65°		RMS R=2.0	9.695 mJy	
Beam X R=-0.5	1.138"		Beam Y R=-0.5	0.869"	
Beam PA R=-0.5	-81.45°		RMS R=-0.5	7.16 mJy	
WVR	Try remcloud	false	PhaseCal RMS	11.794	
Bandpass			Bandpass RMS Top	11.543	
Bandpass RMS	[9.97, 13.86, 16.5, 16.79]°		Bandpass Timescales	[20.0, 40.0, 80.0, 120.0] seconds	

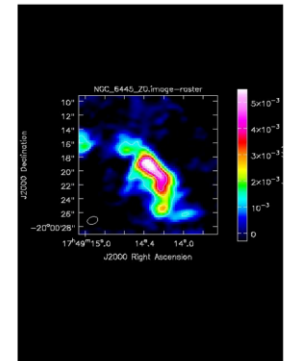
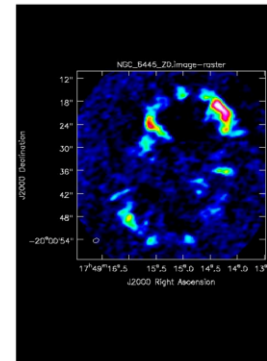
The QA0+ section shows some very quick (but very rough) images produced from the data soon after the observations were performed as well as some measurements from those images.

While these images and data are useful for providing a preliminary view of the results, they may be inaccurate compared to what is in the WebLogs.

Phase Cal (left).



Target images



The QA2 PDF includes some comments on the data processing and summary information about the observations.

The last few pages of the document include standard instructions sent to all users.

The first part of the section under "Final QA2 comment" may be useful to read in case something went wrong with the observations.

QA2 Report



Project Information

Name Mapping Molecular Irradiation Tracers in Extreme Bipolar Planetary Nebulae
Code 2022.1.00401.5
PI Joel Kastner
Organization Chester F. Carlson Center for Imaging, Rochester Institute of Te
Co-Is J. Alcolea, J. Bublitz, T. Forveille, P. Hily-Blant, P. Moraga Baez, M. Santander-García

ObsUnitSet information

Name Member OUS (PN_Hb_5)
QA2 Status ✓Pass
Member OUS Status ID uid://A001/X2d20/X2bb8
SchedBlock name PN_Hb_5_a_06_TM2
SchedBlock UID uid://A001/X2d20/X2b46
Array TM2
Mode Pipelineable
Band ALMA_RB_06
Repr.Freq. (sky) 230.56 [GHz]
Spectral setup FDM
Sources NGC_6445, PN_Hb_5
Other SBs in this Group
OUS (Member OUS Status ID in brackets): PN_Hb_5_d_06_TM1 (uid://A001/X2d20/X2bb6)
Execution count 1.47 of 1 expected

Final QA2 comment

Calibration issues: None.

Imaging issues: None.

It is recommended that the PI carefully assess the results on the hif_findcont weblog page, and the "line-free moment 8" images on the cube imaging weblog page.

Self-calibration was not performed.

This dataset has been checked for the so-called "renormalization issue". A detailed description about this issue, and how the renormalization process is carried out, can be found at the following link: <https://help.almascience.org/kb/articles/what-are-the-amplitude-calibration-issues-caused-by-alma-s-normalization-strategy>

The requirement of rescaling due to any astronomical lines detected in this dataset has been evaluated and the largest peak rescaling value has been estimated to be 5.4 %, as displayed in the table in the hifa_renorm task of the delivered weblog. The effect of rescaling is a channel-dependent increase of the line flux, which is largest in the brightest channels.

This is not an increase in flux-scale uncertainty, but a flux offset correction. When comparing such an offset to the nominal absolute flux accuracy, which is 5% in Bands 3, 4 & 5 and increasing to 20% in Bands 9 & 10, it is concluded that offsets up to 2% are considered negligible.

Since the rescaling factor is above this threshold, this dataset has been corrected for the above issue.

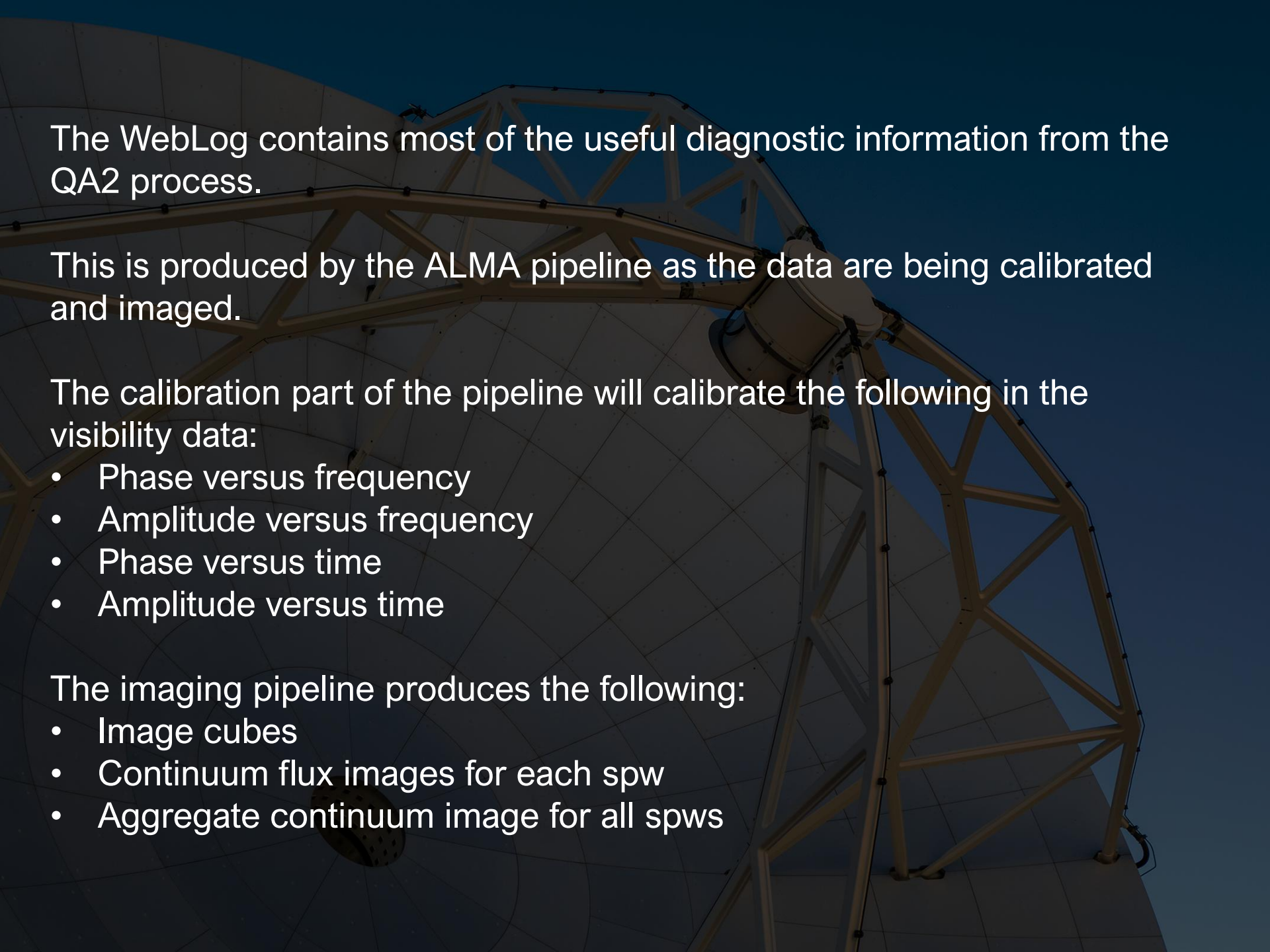
QA2 was performed on the image whose channel width is the one closest to the representative bandwidth selected by the PI in ALMA OT, in the spectral window closest in frequency to the representative frequency. Both the beam size and the RMS meet the PI requested performance parameters. Therefore, this scheduling block has been deemed a QA2 PASS.

Representative Window - spw 27

Image name: uid__A001_X2d20_X2bb8.s40_0.PN_Hb_5_sci.spw27.repBW.l.iter1.image
Robust = 0.5
Beam size = 1.60 x 1.15 arcsec
RMS = 5.65 mJy/beam over an effective bandwidth 2.71 MHz

Aggregate Continuum -

Image name: uid__A001_X2d20_X2bb8.s36_0.PN_Hb_5_sci.spw25_27_29_31.cont.l.iter1.image
Robust = 0.5
Beam size = 1.49 x 1.04 arcsec
RMS = 0.33 mJy/beam over 2.51 GHz



The WebLog contains most of the useful diagnostic information from the QA2 process.

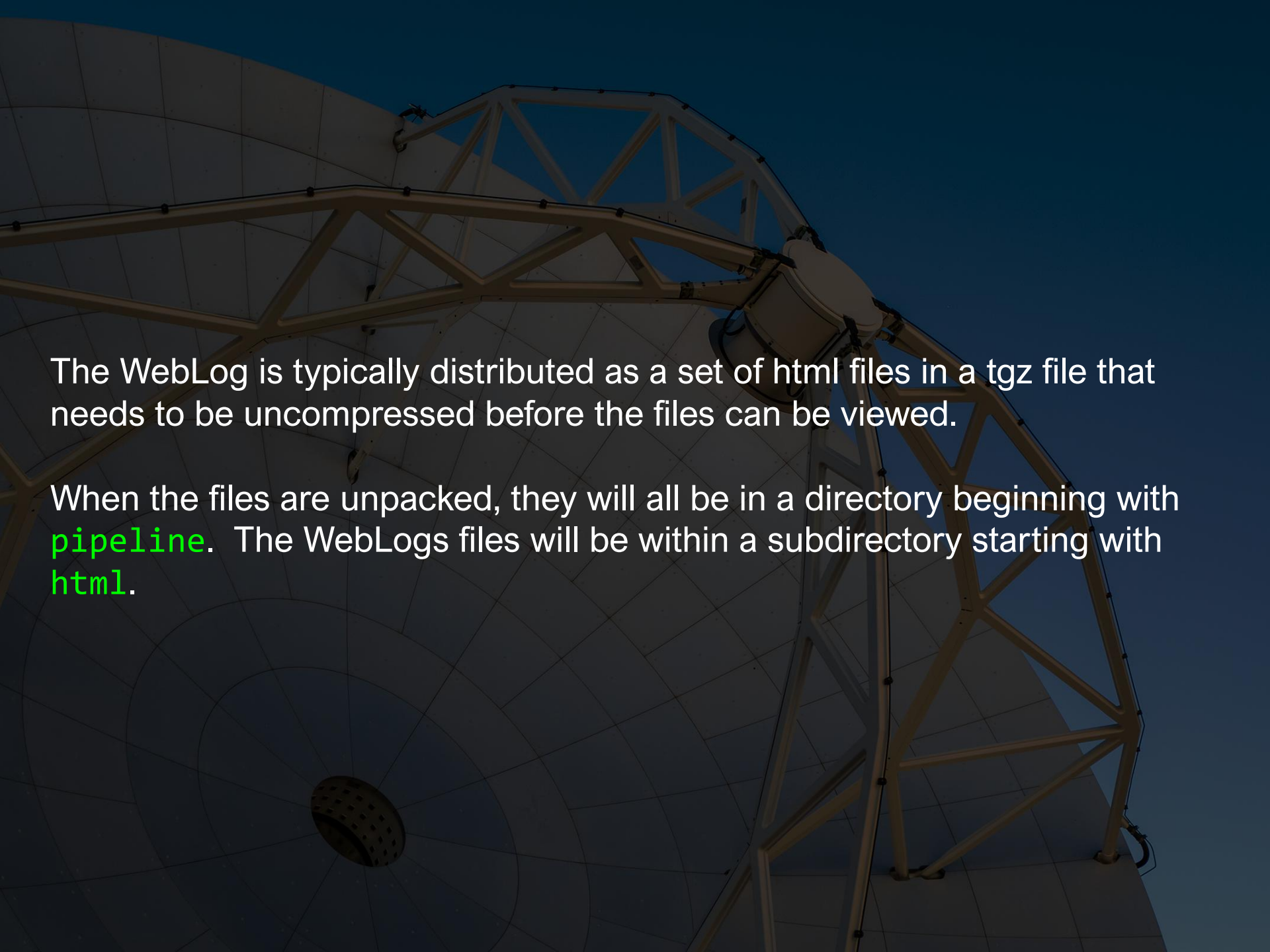
This is produced by the ALMA pipeline as the data are being calibrated and imaged.

The calibration part of the pipeline will calibrate the following in the visibility data:

- Phase versus frequency
- Amplitude versus frequency
- Phase versus time
- Amplitude versus time


The imaging pipeline produces the following:

- Image cubes
- Continuum flux images for each spw
- Aggregate continuum image for all spws

A large satellite dish antenna structure is shown against a dark blue sky. The dish is composed of a complex metal lattice of beams and supports. The surface of the dish is a grid of square panels. A circular antenna feed horn is visible at the bottom center of the dish. The overall scene is dimly lit, suggesting dusk or dawn.

The WebLog is typically distributed as a set of html files in a tgz file that needs to be uncompressed before the files can be viewed.

When the files are unpacked, they will all be in a directory beginning with `pipeline`. The WebLogs files will be within a subdirectory starting with `html`.



Most web browsers may not open the WebLogs correctly because of issues with their security settings.

The current recommendation is to use the following steps to open a WebLog:

1. In a terminal, go to the `pipeline*/html` directory with the WebLog.
2. Start CASA in pipeline mode using the `--pipeline` option.
3. At the CASA prompt, type `h_weblog()`.
4. Copy the url printed by this command into the address bar of a web browser.

The main index (or Home) page provides an overview of the observations. The page has three tabs at the top. The Home tab is currently displayed. Clicking on a measurement set in the bottom table leads to a page with more detailed information about those data.

2022.1.00401.S - Home - Google Chrome

2022.1.00401.S - Home x +

127.0.0.1:30000/t1-1.html

Home By Topic By Task 2022.1.00401.S

Observation Overview

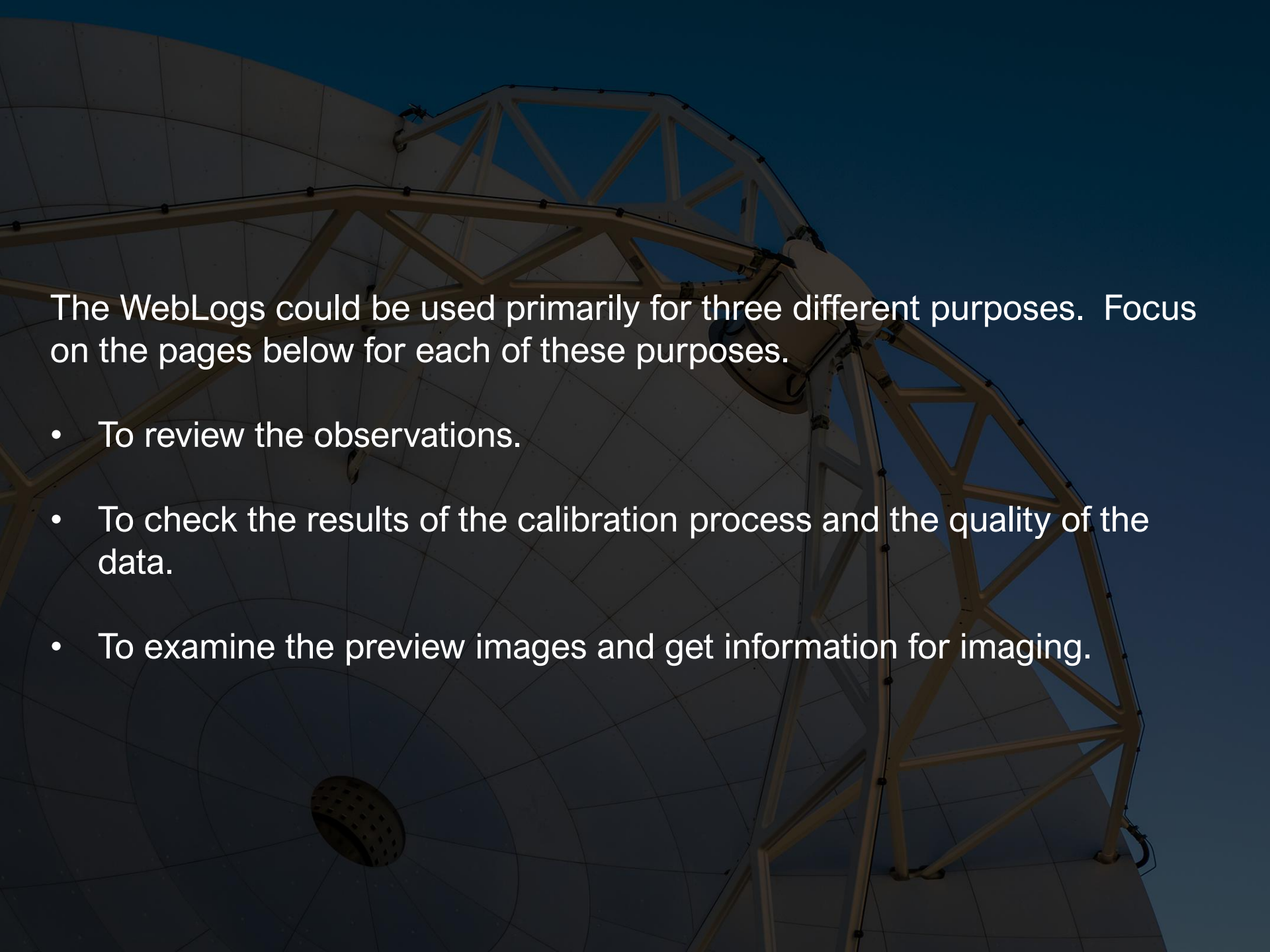
Project	uid://A001/X15ba/X677
Principal Investigator	jkastner
OUS Status Entity Id	uid://A001/X2d20/X2bb8
Observation Start	2022-10-25 22:20:37 UTC
Observation End	2022-10-25 22:34:40 UTC

Pipeline Summary

Pipeline Version	2022.2.0.64 (documentation)
CASA Version	6.4.1.12 (environment)
IERSeop2000 Version	0001.0163 (last date: 2022-09-06 00:00:00)
IERSpredict Version	0623.0983 (last date: 2023-01-22 00:00:00)
Pipeline Start	2022-10-26 14:15:18 UTC
Execution Duration	6:10:41

Observation Summary

Measurement Set	Receivers	Num Antennas	Time (UTC)		On Target	Baseline Length			Size
			Start	End		Min	Max	RMS	
Observing Unit Set Status: uid://A001/X2d20/X2bb8 Scheduling Block ID: uid://A001/X2d20/X2b46 Scheduling Block Name: PN_Hb_5_a_06_TM2									
Session: session_1 ACS Version: 38083c1, Build Version: ONLINE-CYCLE9-B-13-2022-10-21-28-00-00									
uid__A002_X1003af4_Xa540.ms	ALMA Band 6	43	2022-10-25 22:20:37	2022-10-25 22:34:40 MS dates not fully covered by IERSeop2000. CASA will use IERSpredict.	0:04:41	15.1 m	312.7 m	112.1 m	12.8 GiB
uid__A002_X1003af4_Xa540_targets.ms	ALMA Band 6	43	2022-10-25 22:29:12	2022-10-25 22:33:58 MS dates not fully covered by IERSeop2000. CASA will use IERSpredict.	0:04:39	15.1 m	312.7 m	112.1 m	4.8 GiB
uid__A002_X1003af4_Xa540_targets_line.ms	ALMA Band 6	43	2022-10-25 22:29:12	2022-10-25 22:33:58 MS dates not fully covered by IERSeop2000. CASA will use IERSpredict.	0:04:39	15.1 m	312.7 m	112.1 m	4.8 GiB



The WebLogs could be used primarily for three different purposes. Focus on the pages below for each of these purposes.

- To review the observations.
- To check the results of the calibration process and the quality of the data.
- To examine the preview images and get information for imaging.

The overview page lists a lot of basic information about the observations themselves.

2022.1.00401.S - Session Data Details - Google Chrome

2022.1.00401.S - Session

127.0.0.1:30000/t2-1.html?sidebar=sidebar_uid__A002_X1003af4_Xa540_ms&subpage=t2-1_details.html

ALMA Home By Topic By Task 2022.1.00401.S

Session: session_1

- uid__A002_X1003af4_Xa540.ms
- uid__A002_X1003af4_Xa540_targets.ms
- uid__A002_X1003af4_Xa540_targets_line.ms

Overview of 'uid__A002_X1003af4_Xa540.ms'

Observation Execution Time

Start Time	2022-10-25 22:20:37
End Time	2022-10-25 22:34:40
Total Time on Source	0:12:34
Total Time on Science Target	0:04:41

[LISTOBS OUTPUT](#)

Spatial Setup

Science Targets	'NGC_6445' and 'PN_Hb_5'
Callibrators	'J1820-2528' and 'J1924-2914'

Antenna Setup

Min Baseline	15.1 m
Max Baseline	312.7 m
Number of Baselines	903
Number of Antennas	43
Antenna Diameters	43 of 12 m

Weather

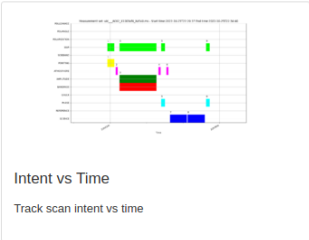
PWV

Spectral Setup

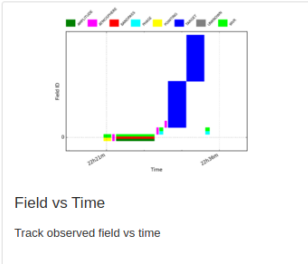
All Bands	'ALMA Band 6' and 'WVR'
Science Bands	'ALMA Band 6'

Sky Setup

Min Elevation	55.18 degrees
Max Elevation	78.71 degrees



Intent vs Time
Track scan intent vs time



Field vs Time
Track observed field vs time

The listobs output button displays a text file with summary information about the sequence of observations, the fields, the spectral windows, and the antennas. Versions of this file can also be created using the **listobs** command in CASA.

2022.1.00401.S - Session Data Details - Google Chrome

2022.1.00401.S - Session

127.0.0.1:30000/t2-1.html?sidebar=sidebar_uid__A002_X1003af4_Xa540_ms&subpage=listobs.txt

ALMA

Home By Topic By Task

2022.1.00401.S

Session: session_1

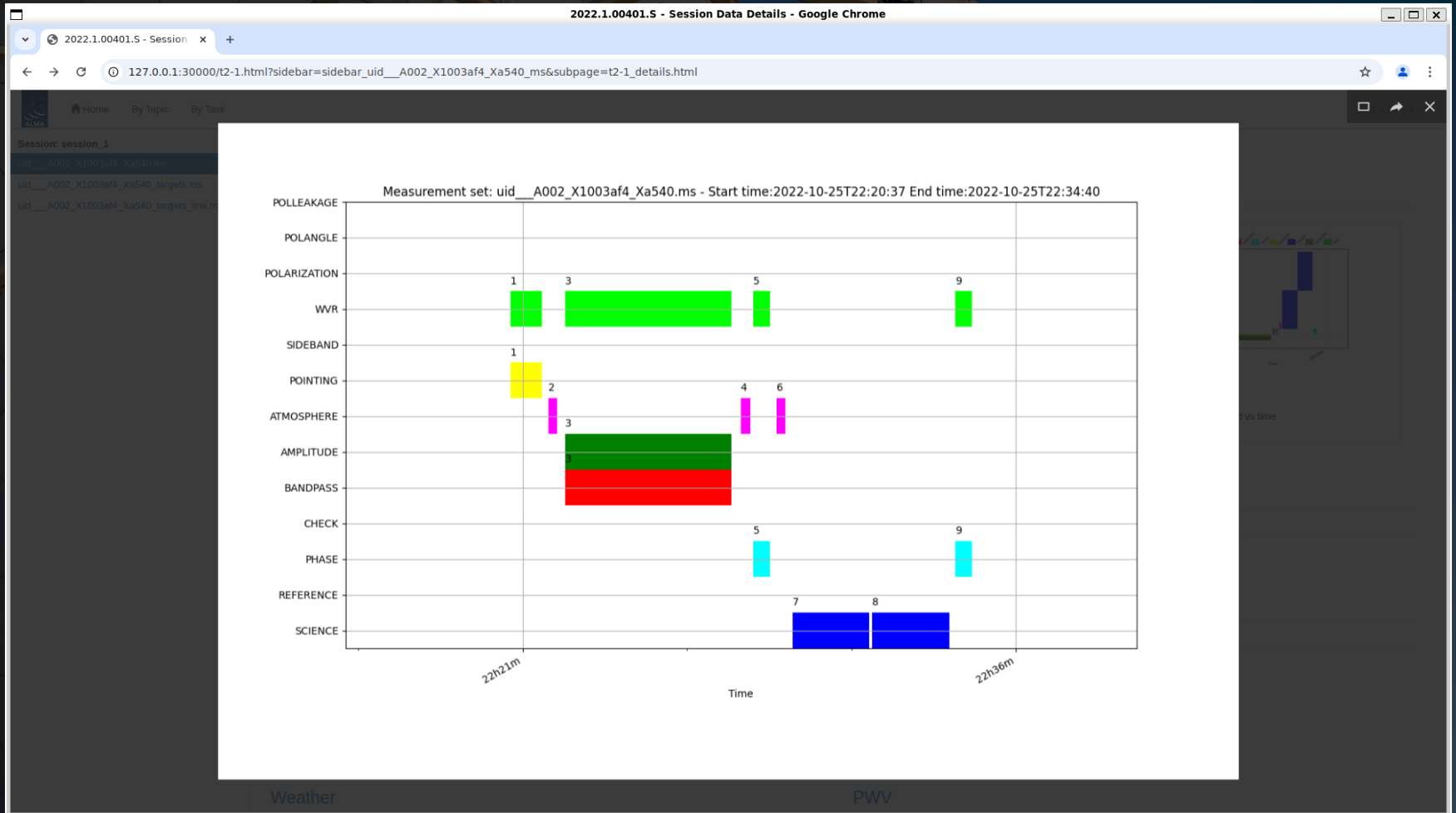
- uid__A002_X1003af4_Xa540.ms
- uid__A002_X1003af4_Xa540_targets.ms
- uid__A002_X1003af4_Xa540_targets_line.ms

listobs.txt

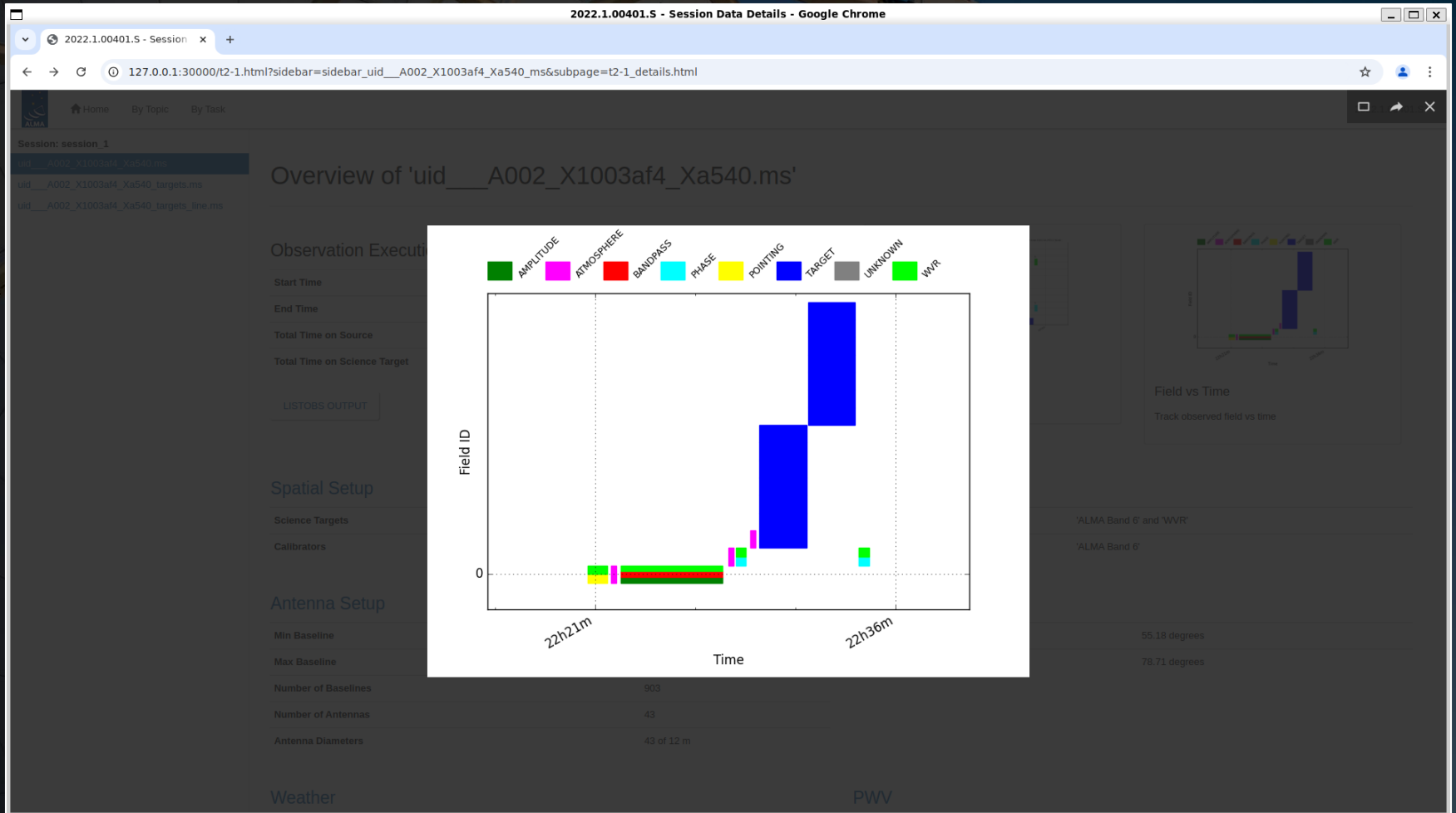
BACK

```
=====  
MeasurementSet Name: /mnt/jaosco/data/pipeproc/dataproc/2022.1.00401.S_2022_10_26T14_07_37.756/SOUs_uid__A001_X2d20_X2bb4/GOUS_uid__A001_X2d20_X2bb5/MOUS_uid__A001_X2d20_X2bb8/working/uid__A002_X1003af4_Xa540.ms  
MS Version 2  
=====  
Observer: jkastner Project: uid://A001/X15ba/X077  
Observation: ALMA  
Data records: 10880568 Total elapsed time = 843.072 seconds  
Observed from 25-Oct-2022/22:29:37.2 to 25-Oct-2022/22:34:40.3 (UTC)  
  
ObservationID = 0 ArrayID = 0  
Date Timerange (UTC) Scan FldId FieldName nRows SpwIds Average Interval(s) ScanIntent  
25-Oct-2022/22:29:37.2 - 22:21:34.7 1 0 J1924-2914 661942 [0,1,2,3,4,5,6,7,8,9,10,11,12] [0.010, 0.010, 0.010, 0.010, 1.15, 2.02, 1.01, 2.02, 1.01, 2.02, 1.01, 2.02, 1.01, 2.02, 1.01] [CALIBRATE_POINTING#ON_SOURCE,  
E,CALIBRATE_WVR#ON_SOURCE]  
22:21:40.4 - 22:22:03.5 2 0 J1924-2914 289390 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.010, 0.010, 0.010, 0.010, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576] [CALIBRATE_  
ATMOSPHERE#AMBIENT,CALIBRATE_ATMOSPHERE#HOT,CALIBRATE_ATMOSPHERE#OFF_SOURCE,CALIBRATE_WVR#AMBIENT,CALIBRATE_WVR#HOT,CALIBRATE_WVR#OFF_SOURCE]  
22:22:17.5 - 22:27:20.5 3 0 J1924-2914 4586599 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [CALIBRATE_BANDPASS  
#ON_SOURCE,CALIBRATE_FLUX#ON_SOURCE,CALIBRATE_WVR#ON_SOURCE]  
22:27:37.7 - 22:27:55.0 4 1 J1820-2528 289390 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.010, 0.010, 0.010, 0.010, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576] [CALIBRATE_  
ATMOSPHERE#AMBIENT,CALIBRATE_ATMOSPHERE#HOT,CALIBRATE_ATMOSPHERE#OFF_SOURCE,CALIBRATE_WVR#AMBIENT,CALIBRATE_WVR#HOT,CALIBRATE_WVR#OFF_SOURCE]  
22:28:00.8 - 22:28:31.2 5 1 J1820-2528 458638 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [CALIBRATE_PHASE#ON_  
_SOURCE,CALIBRATE_WVR#ON_SOURCE]  
22:28:43.4 - 22:28:59.7 6 2 PN_Hb_5 289390 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.010, 0.010, 0.010, 0.010, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576] [CALIBRATE_  
ATMOSPHERE#AMBIENT,CALIBRATE_ATMOSPHERE#HOT,CALIBRATE_ATMOSPHERE#OFF_SOURCE,CALIBRATE_WVR#AMBIENT,CALIBRATE_WVR#HOT,CALIBRATE_WVR#OFF_SOURCE]  
22:29:12.2 - 22:31:32.4 7 2 PN_Hb_5 275157 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_  
SOURCE]  
22:29:12.2 - 22:31:32.4 7 3 PN_Hb_5 275200 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_  
SOURCE]  
22:29:12.2 - 22:31:32.4 7 4 PN_Hb_5 275157 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_  
SOURCE]  
22:29:12.2 - 22:31:32.4 7 5 PN_Hb_5 275200 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_  
SOURCE]  
22:29:12.2 - 22:31:32.4 7 6 PN_Hb_5 275200 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_  
SOURCE]  
22:29:12.2 - 22:31:32.4 7 7 PN_Hb_5 275200 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_  
SOURCE]  
22:29:12.2 - 22:31:32.4 7 8 PN_Hb_5 275200 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_  
SOURCE]  
22:31:37.3 - 22:33:58.1 8 9 NGC_6445 275200 [4,13,14,15,16,25,26,27,28,29,30,31,32] [1.15, 0.010, 0.010, 0.010, 0.010, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_  
SOURCE]
```


The intent versus time plot shows the sequence of the observations as well as the purpose of those observations. Some observations have multiple purposes.



The field versus time plot is similar except that the y-axis indicates the field ID. In this case, 0 is field for the bandpass calibrator, 1 is the field for the phase calibrator, and 2 is the field for the science target (Z CMa).



The antenna setup page shows the location of the antennas and the resulting uv coverage (which is related to the final angular resolution and maximum recoverable scale of the data).

2022.1.00401.S - Session Data Details - Google Chrome

2022.1.00401.S - Session

127.0.0.1:30000/t2-1.html?sidebar=sidebar_uid__A002_X1003af4_Xa540_ms&subpage=t2-2-3.html

ALMA Home By Topic By Task 2022.1.00401.S

Session: session_1

- uid__A002_X1003af4_Xa540.ms
- uid__A002_X1003af4_Xa540_targets.ms
- uid__A002_X1003af4_Xa540_targets_line.ms

Antenna Setup Details

Antennas Baselines

Antenna Positions

Antenna Position
Plot antenna latitude vs antenna longitude

Antenna Position
Polar-logarithmic plot of antenna positions.

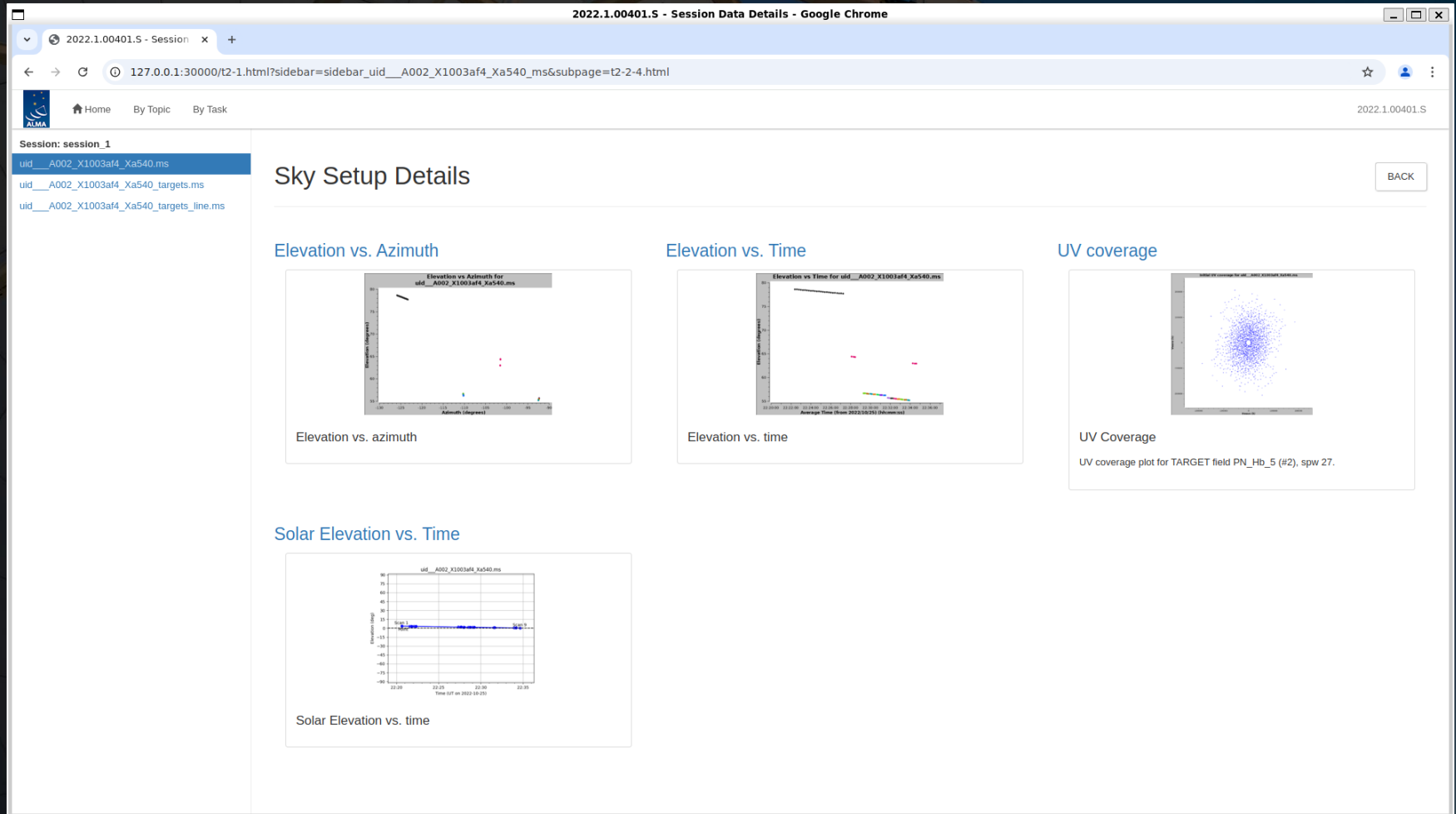
UV coverage

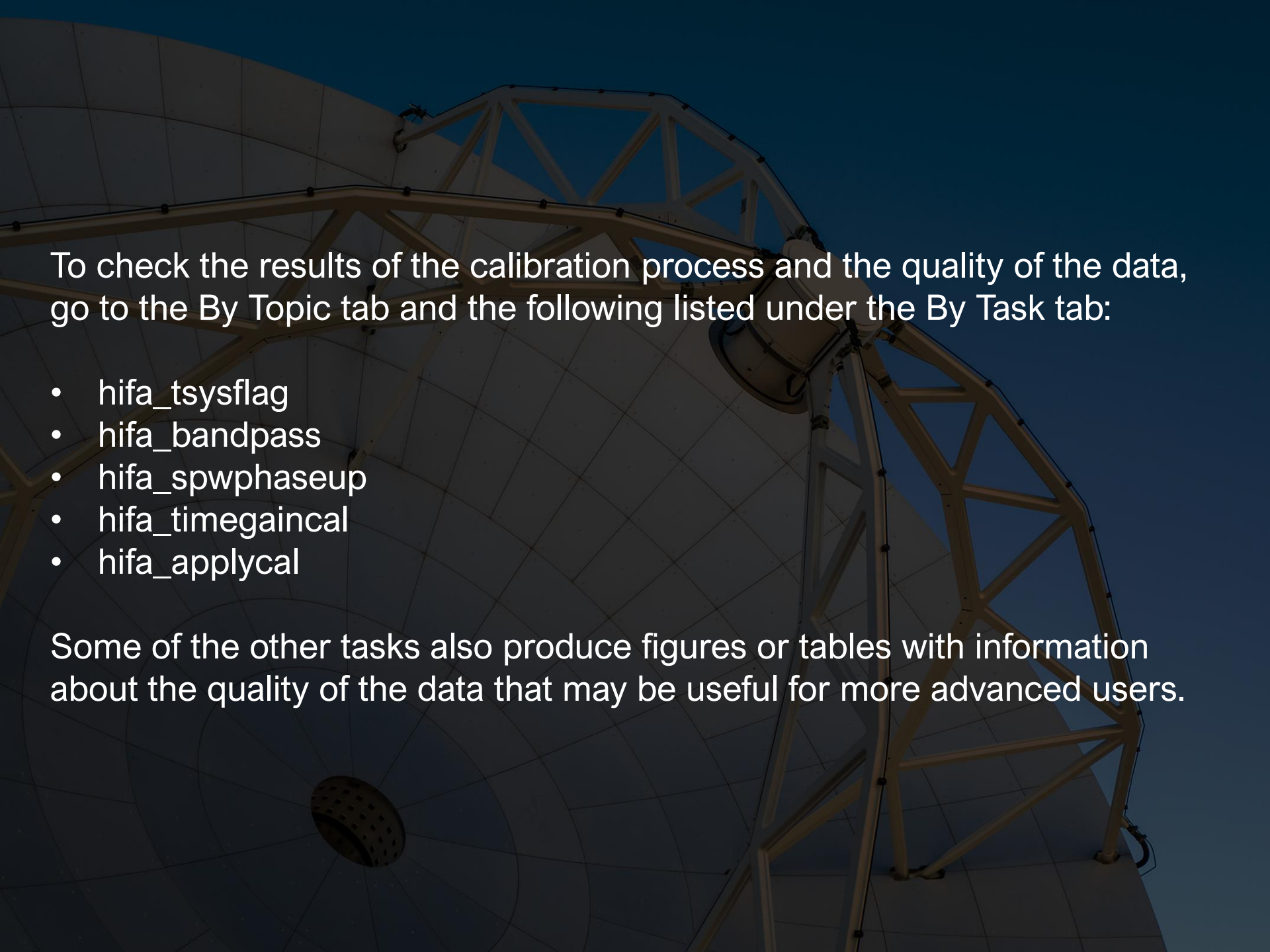
UV Coverage
UV coverage plot for TARGET field PN_Hb_5 (#2), spw 27.

Antenna Details

ID	Name	Pad	Diameter	Offset from Array Centre	
				Longitude	Latitude
0	DA41	A004	12.0	52.7 m	-704.4 m
1	DA42	A047	12.0	38.5 m	-775.2 m
2	DA43	A006	12.0	79.0 m	-702.1 m
3	DA44	A044	12.0	-22.0 m	-761.0 m
4	DA45	A040	12.0	15.7 m	-758.5 m
5	DA46	A001	12.0	24.2 m	-693.4 m
6	DA47	A040	12.0	99.4 m	-754.5 m

The sky setup shows the elevation and azimuth of the fields during the observations. The beam for sources observed at low elevations ($<45^\circ$) could appear elongated. Calibration problems may occur if the phase calibrator and science target are too far apart ($>10^\circ$).

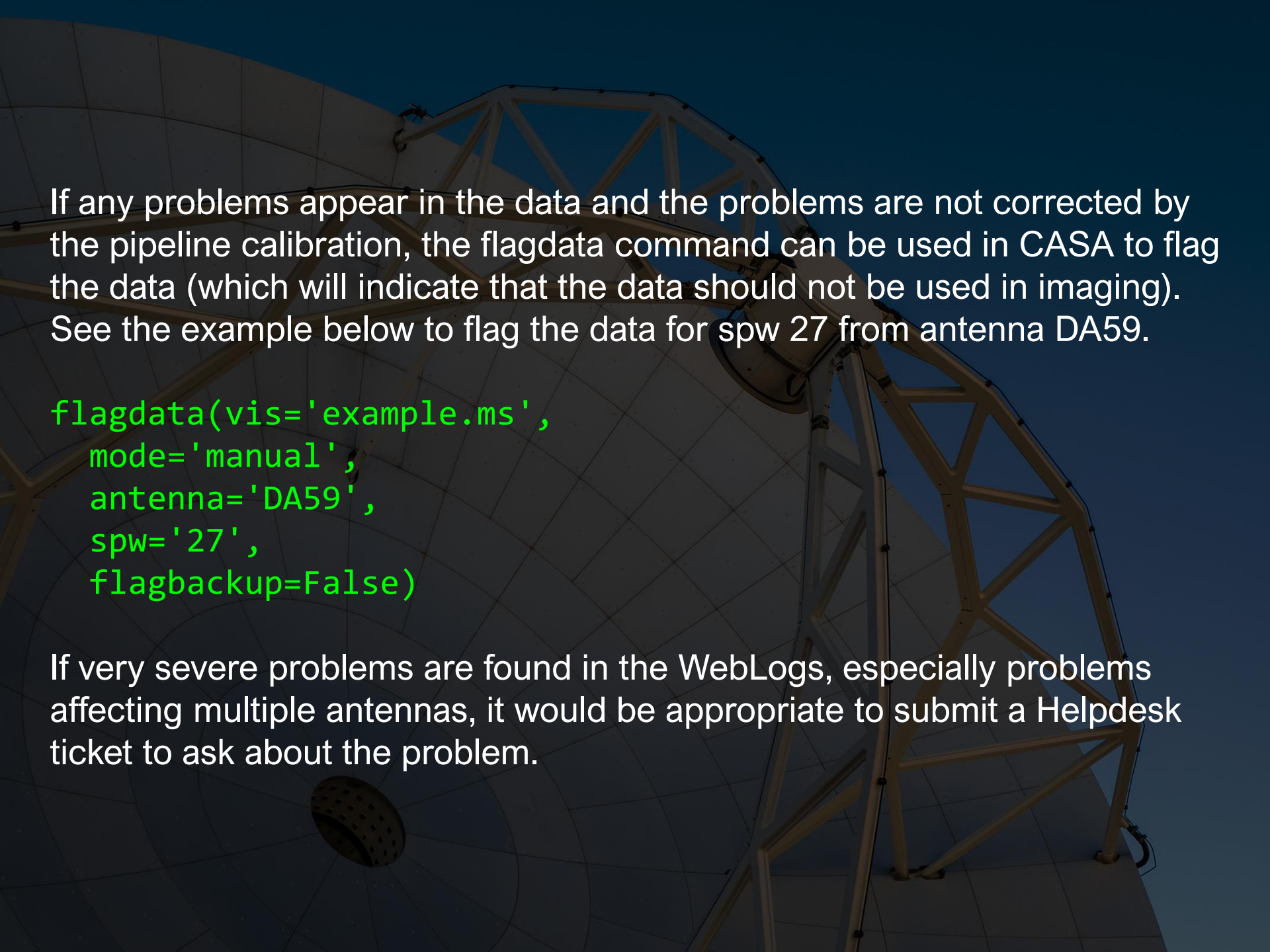




To check the results of the calibration process and the quality of the data, go to the By Topic tab and the following listed under the By Task tab:

- hifa_tsysflag
- hifa_bandpass
- hifa_spwphaseup
- hifa_timegaincal
- hifa_applycal

Some of the other tasks also produce figures or tables with information about the quality of the data that may be useful for more advanced users.



If any problems appear in the data and the problems are not corrected by the pipeline calibration, the `flagdata` command can be used in CASA to flag the data (which will indicate that the data should not be used in imaging). See the example below to flag the data for spw 27 from antenna DA59.

```
flagdata(vis='example.ms',  
         mode='manual',  
         antenna='DA59',  
         spw='27',  
         flagbackup=False)
```

If very severe problems are found in the WebLogs, especially problems affecting multiple antennas, it would be appropriate to submit a Helpdesk ticket to ask about the problem.

The By Topic page lists warnings that were produced by the pipeline along with grades for those warnings and tables showing the amount of data flagged for each antenna in each field. This page is more important for reviewing the quality of the data.






2022.1.00401.S - Topic Summary - Google Chrome

2022.1.00401.S - Topic Su x +

127.0.0.1:30000/t1-3.html

ALMA Home By Topic By Task 2022.1.00401.S

QA Scores: Lowest by Topic

Topic	Lowest Scoring Task	Min Score
Data Sets	26. hifa_renorm : Renorm	Renormalization applied  0.90
Calibration	17. hifa_tmegaincal : Gain calibration	Phase offsets: insufficient data  0.85
Flagging	7. hifa_tsysflag : Flag Tsys calibration	 1.00
Imaging	38. hif_makeimages : Make target cubes	 0.99
Miscellaneous	5. hif_refant : Select reference antennas	 1.00

Task Notifications: Warnings and Errors

No warnings or errors.

Flagging Summaries

uid__A002_X1003af4_Xa540.ms

Flagging percentages for Source name: J1820-2528, Intents: ATMOSPHERE,PHASE,WVR

spw	DA41	DA42	DA43	DA44	DA45	DA46	DA47	DA48	DA50	DA51	DA52	DA55	DA56	DA59	DA60	DA61	DA62	DA63	DA64	DA65	DV01	DV02	DV03	DV04	DV05	DV06	DV07	DV10	DV11	DV12	DV13	DV14	DV15	DV16	DV17	DV18	DV19	DV20	DV21	D
25	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4	
27	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2
29	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2.326	2
31	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4.651	4

Flagging percentages for Source name: J1924-2914, Intents: AMPLITUDE,ATMOSPHERE,BANDPASS,POINTING,WVR



















spw	DA41	DA42	DA43	DA44	DA45	DA46	DA47	DA48	DA50	DA51	DA52	DA55	DA56	DA59	DA60	DA61	DA62	DA63	DA64	DA65	DV01	DV02	DV03	DV04	DV05	DV06	DV07	DV10	DV11	DV12	DV13	DV14	DV15	DV16	DV17	DV18	DV19	DV20	DV21
-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

The By Task page lists each of the calibration and imaging steps that were applied in the pipeline. Not all of these steps need to be checked. Many of these have diagnostic information primarily used for quality assessment.

2022.1.00401.S - Task Summaries - Google Chrome

2022.1.00401.S

Task Summaries

Task	QA Score	Duration
1. hifa_importdata : Register measurement sets with the pipeline	 1.00	0:02:16
2. hifa_flagdata : ALMA deterministic flagging	 1.00	0:10:37
3. hifa_fluxcallflag : Flag spectral features in solar system flux calibrators	 1.00	0:00:02
4. hif_rawflagchans : Flag channels in raw data	 1.00	0:02:49
5. hif_refant : Select reference antennas	 1.00	0:00:13
6. h_tsyscal : Calculate Tsys calibration	 1.00	0:03:43
7. hifa_tsysflag : Flag Tsys calibration	 1.00	0:05:06
8. hifa_antpos : Correct for antenna position offsets	 1.00	0:00:02
9. hifa_wvrgcalfag : Calculate and flag WVR calibration	2.07x improvement  0.87	0:04:42
10. hif_lowgainflag : Flag antennas with low gain	 1.00	0:06:48
11. hif_setmodels : Set calibrator model visibilities	 1.00	0:03:14
12. hifa_bandpassflag : Phase-up bandpass calibration and flagging	 0.96	0:15:34
13. hifa_bandpass : Phase-up bandpass calibration	 1.00	0:16:46
14. hifa_spwphaseup : Spw phase offsets calibration	 1.00	0:02:09
15. hifa_gfluxscaleflag : Phased-up flux scale calibration + flagging	 1.00	0:03:03
16. hifa_gfluxscale : Transfer fluxscale from amplitude calibrator	 1.00	0:07:38
17. hifa_timegaincal : Gain calibration	Phase offsets: insufficient data  0.85	0:23:15
18. hifa_targetflag : Target outlier flagging	 1.00	0:03:41

hifa_tsysflag: This step includes plots of the T_{sys} data (used to correct amplitudes) as a function of frequency. It is useful to check these plots to understand the atmospheric transmission. Spectral features in these data could potentially reappear in the final spectra of the science targets.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage7&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
- 7. hifa_tsysflag**
8. hifa_antpos
9. hifa_wvrflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

7. Flag T_{sys} calibration

QA Score: 1.00 5.42% of data in uid__A002_X1003af4_Xa540.ms.h_tsyscal.s6_1.tsyscal.tbl was newly flagged

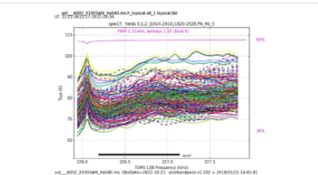
Contents

- T_{sys} after flagging
- Flagged data summary
- Flag step details
 - manual
 - nmedian
 - derivative
 - edgechans
 - fieldshape
 - birdies
 - toomany

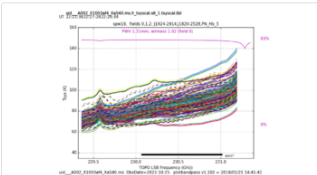
T_{sys} vs frequency after flagging

Plots of time-averaged T_{sys} vs frequency, colored by antenna.

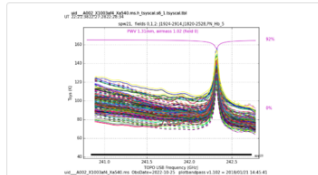
uid__A002_X1003af4_Xa540.ms



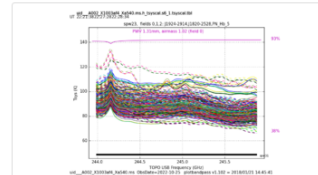
T_{sys} spw 17
Science spw 25.



T_{sys} spw 19
Science spw 27.

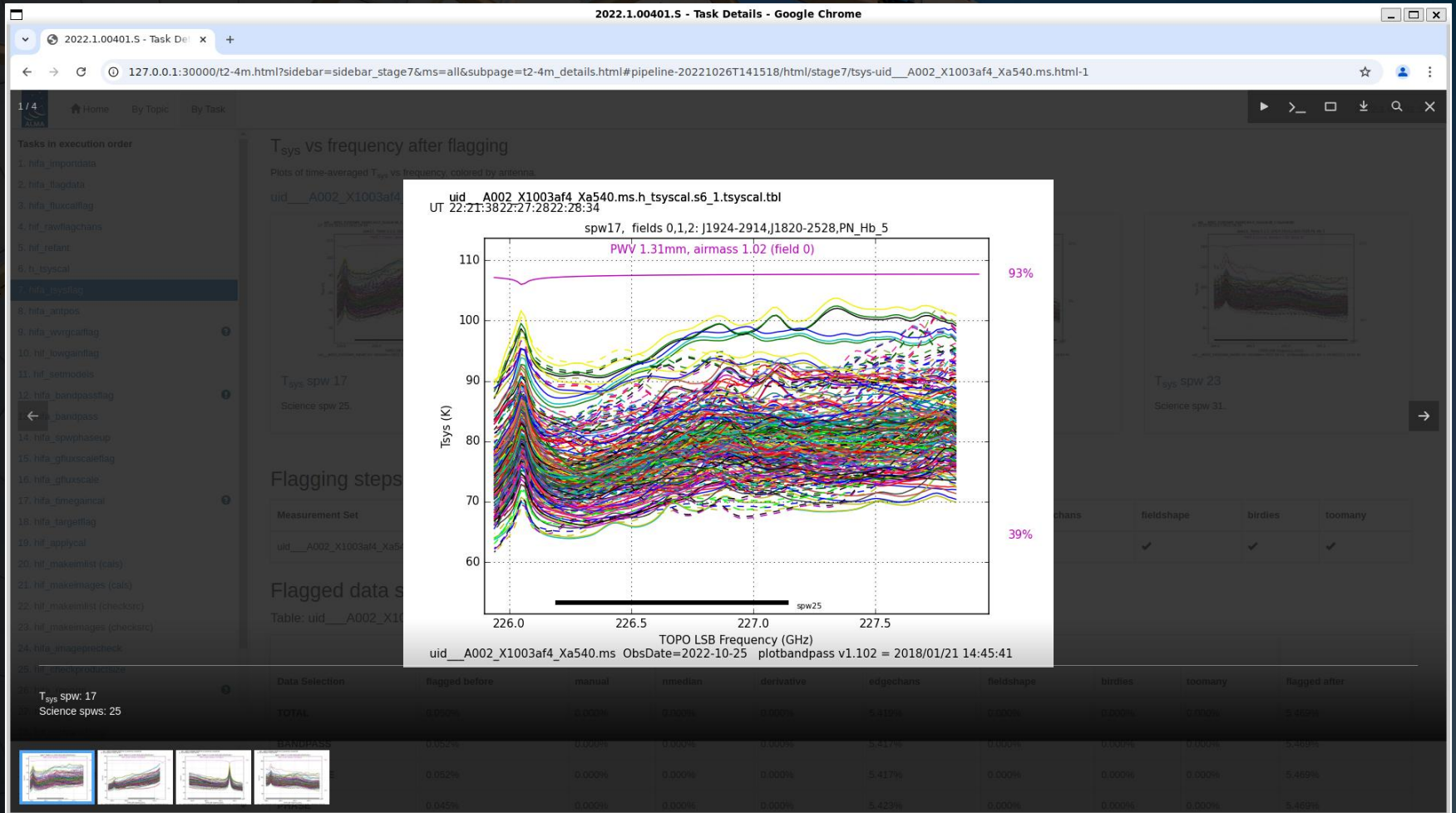


T_{sys} spw 21
Science spw 29.



T_{sys} spw 23
Science spw 31.

hifa_tsysflag: This step includes plots of the T_{sys} data (used to correct amplitudes) as a function of frequency. It is useful to check these plots to understand the atmospheric transmission. Spectral features in these data could potentially reappear in the final spectra of the science targets.



hifa_bandpass: Corrections for the phase and amplitude versus frequency are derived in this step.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage13&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrgcallflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
- 13. hifa_bandpass**
14. hifa_sppwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

13. Bandpass Calibration

QA Score: 1.00 Lowest score for amplitude SNR is 1.00 (uid___A002_X1003af4_Xa540.ms unknown origin) [All QA Scores \(2 green\)](#)

This task creates bandpass solutions for each measurement set.

Results

Phase-up on bandpass calibrator

Measurement Set	Phase-up Solution Parameters				
	Type	Interval	Min Baselines per Antenna	Min SNR	Phase-up Bandwidth
uid___A002_X1003af4_Xa540.ms	Phase only	Per integration (6.05s)	4	3.0	

Applied calibrations and parameters used for phase-up calibration

Bandpass calibration

Measurement Set	Solution Parameters		Applied To		Calibration Table
	Type	Interval	Scan Intent	Spectral Windows	
uid___A002_X1003af4_Xa540.ms	Channel	inf,0.488281MHz(1.0ch)	ALL	25	uid___A002_X1003af4_Xa540.ms.hifa_bandpass.s13_3.spw25_27_29_31.channel.solintinf.bcal.tbl
				27	
		inf,0.976562MHz(1.0ch)		29	
		31			

Parameters used for bandpass calibration

Plots

Plots show the bandpass correction applied to the target source. The first two plots show amplitude vs frequency; one for the reference antenna and one for a typical antenna, identified the antenna with mode score. The third plot shows phase vs frequency for the

The plots of these quantities versus frequency should be smooth. Any strong spikes or dips in the data could create false spectral lines in the final image cubes.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage13&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
- 13. hifa_bandpass**
14. hifa_spphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

Plots

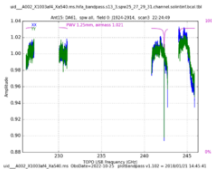
Plots show the bandpass correction applied to the target source. The first two plots show amplitude vs frequency; one for the reference antenna and one for a typical antenna, identified the antenna with mode score. The third plot shows phase vs frequency for the typical antenna.

Click the summary plots to enlarge them, or the plot title to see see detailed plots per spectral window and antenna.

uid__A002_X1003af4_Xa540.ms

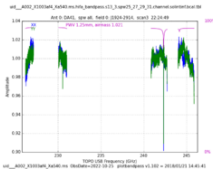
Amplitude vs frequency (show uid__A002_X1003af4_Xa540.ms)

The plots below show amplitude vs frequency for the bandpass correction, overlaid for all spectral windows and correlations. Click on the link above to show show detailed plots for all antennas, or on the links below to show plots with specific antennas preselected.



Reference antenna (DA61) (show DA61)

Amplitude vs frequency for the reference antenna (DA61). Click the link above to show detailed plots for DA61.



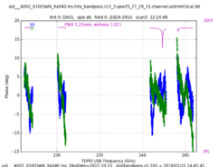
Typical antenna (DA41) (show DA41)

Amplitude vs frequency for a typical antenna (DA41). Click the link above to show detailed plots for DA41.

NB. random antenna until scores are working

Phase vs frequency (show uid__A002_X1003af4_Xa540.ms)

The plot below shows phase vs frequency for the bandpass correction, overlaid for all spectral windows and correlations. Click on the link above to show show phase vs frequency plots for all antennas, or on the link for just the typical antenna.



Typical antenna (DA41) (show DA41)

Phase vs frequency for a typical antenna (DA41). Click the link above to show detailed plots for DA41.

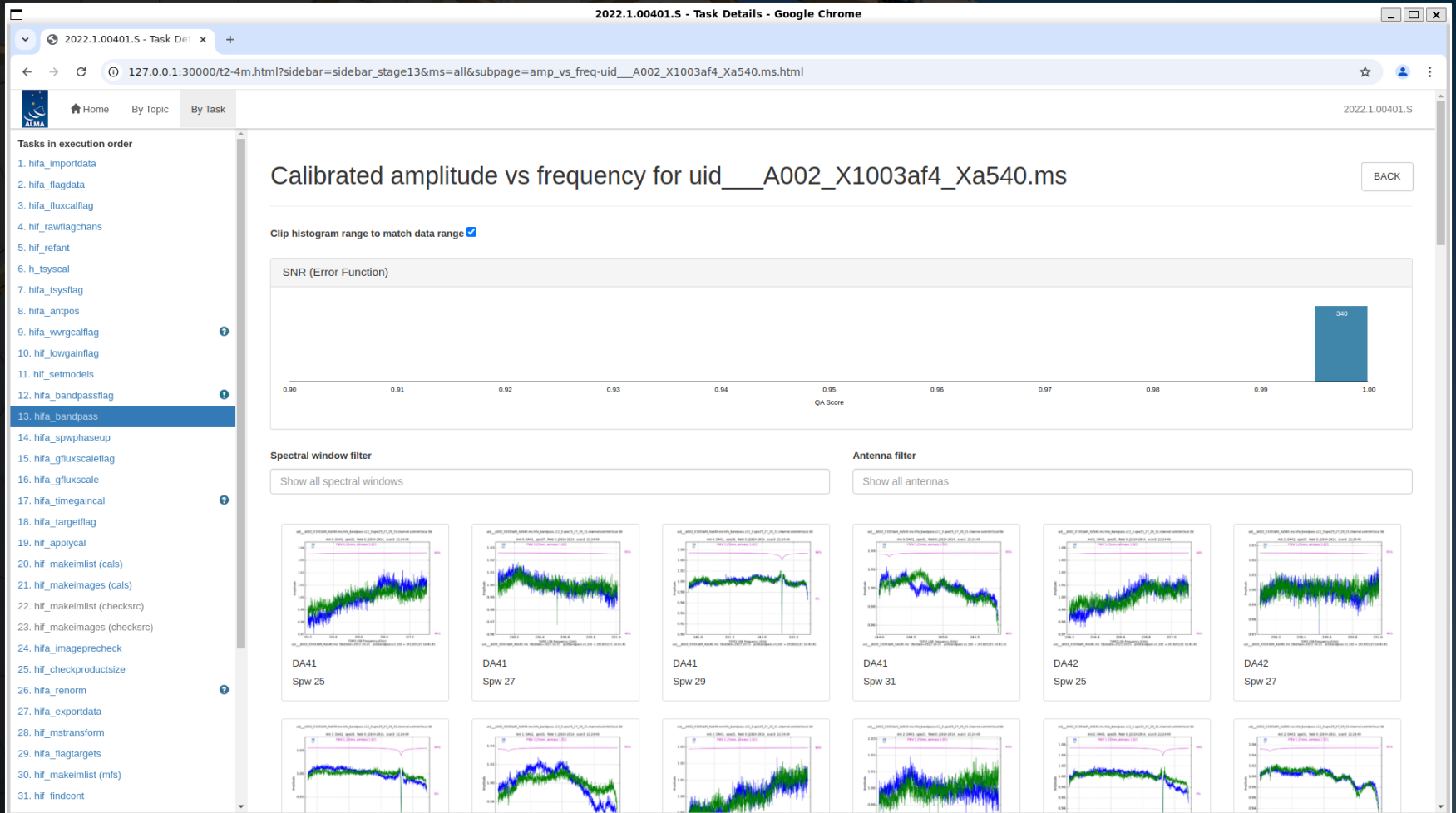
Input Parameters

Tasks Execution Statistics

CASA logs for stage 13

- View or download stage13/casapy.log (150.2 KiB)

The plots of these quantities versus frequency should be smooth. Any strong spikes or dips in the data could create false spectral lines in the final image cubes.



hifa_spwphaseup: This module creates diagnostic plots of the .

2022.1.00401.S - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage17&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2022.1.00401.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

17. Gain Calibration

BACK

QA Score: 0.85 Phase offsets: insufficient data to evaluate stability for uid ___A002_X1003af4_Xa540.ms SPW 25,31 Antennas DA41, DA42, DA43, DA44, DA45, DA46, DA47, DA48, DA50, DA51, DA52, DA55, DA56, DA59, DA60, DA62, DA63, DA64, DA65, DV01, DV02, DV03, DV04, DV05, DV06, DV07, DV10, DV11, DV12, DV13, DV14, DV15, DV16, DV17, DV18, DV19, DV20, DV21, DV22, DV24, DV25 [All QA Scores \(2 blue\)](#)

This task creates gain solutions for each measurement set.

- Plots
 - Phase vs time
 - Amplitude vs time
- Diagnostic plots
 - Phase vs time
 - Phase offsets vs time
 - Amplitude vs time

Results

Measurement Set	Solution Parameters		Applied To				Calibration Table
	Type	Interval	Scan Intent	Field	Spectral Windows	Gainfield	
uid___A002_X1003af4_Xa540.ms	Phase only	Infinite	PHASE	J1820-2528	25, 27, 29, 31	J1820-2528	uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_2.spw25_27_29_31.solintinf.gpcal.tbl
uid___A002_X1003af4_Xa540.ms	Phase only	Infinite	CHECK, TARGET	NGC_6445, PN_Hb_5	25, 27, 29, 31	J1820-2528	uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_2.spw25_27_29_31.solintinf.gpcal.tbl
uid___A002_X1003af4_Xa540.ms	Phase only	Per integration (6.05s)	AMPLITUDE, BANDPASS, POLANGLE, POLARIZATION, POLLEAKAGE		25, 27, 29, 31	nearest	uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_3.spw25_27_29_31.solintinf.gpcal.tbl
uid___A002_X1003af4_Xa540.ms	Amplitude only	Infinite	AMPLITUDE, BANDPASS, PHASE, POLANGLE, POLARIZATION, POLLEAKAGE		25, 27, 29, 31	nearest	uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_5.spw25_27_29_31.solintinf.gacal.tbl
uid___A002_X1003af4_Xa540.ms	Amplitude only	Infinite	CHECK, TARGET		25, 27, 29, 31		uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_5.spw25_27_29_31.solintinf.gacal.tbl

hifa_timegaincal: This module derives phase and amplitude corrections versus time. The output from this module only needs to be reviewed when problems arise with the data.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage17&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

17. Gain Calibration

QA Score: 0.85 Phase offsets: insufficient data to evaluate stability for uid ___A002_X1003af4_Xa540.ms SPW 25,31 Antennas DA41, DA42, DA43, DA44, DA45, DA46, DA47, DA48, DA50, DA51, DA52, DA55, DA56, DA59, DA60, DA62, DA63, DA64, DA65, DV01, DV02, DV03, DV04, DV05, DV06, DV07, DV10, DV11, DV12, DV13, DV14, DV15, DV16, DV17, DV18, DV19, DV20, DV21, DV22, DV24, DV25 [All QA Scores \(2 blue\)](#)

This task creates gain solutions for each measurement set.

- Plots
 - Phase vs time
 - Amplitude vs time
- Diagnostic plots
 - Phase vs time
 - Phase offsets vs time
 - Amplitude vs time

Results

Measurement Set	Solution Parameters		Applied To				Calibration Table
	Type	Interval	Scan Intent	Field	Spectral Windows	Gainfield	
uid___A002_X1003af4_Xa540.ms	Phase only	Infinite	PHASE	J1820-2528	25, 27, 29, 31	J1820-2528	uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_2.spw25_27_29_31.solintinf.gpcal.tbl
uid___A002_X1003af4_Xa540.ms	Phase only	Infinite	CHECK, TARGET	NGC_6445, PN_Hb_5	25, 27, 29, 31	J1820-2528	uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_2.spw25_27_29_31.solintinf.gpcal.tbl
uid___A002_X1003af4_Xa540.ms	Phase only	Per integration (6.05s)	AMPLITUDE, BANDPASS, POLANGLE, POLARIZATION, POLLEAKAGE		25, 27, 29, 31	nearest	uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_3.spw25_27_29_31.solintinf.gpcal.tbl
uid___A002_X1003af4_Xa540.ms	Amplitude only	Infinite	AMPLITUDE, BANDPASS, PHASE, POLANGLE, POLARIZATION, POLLEAKAGE		25, 27, 29, 31	nearest	uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_5.spw25_27_29_31.solintinf.gpcal.tbl
uid___A002_X1003af4_Xa540.ms	Amplitude only	Infinite	CHECK, TARGET		25, 27, 29, 31		uid___A002_X1003af4_Xa540.ms.hifa_timegaincal.s17_5.spw25_27_29_31.solintinf.gpcal.tbl

hifa_timegaincal: This module derives phase and amplitude corrections versus time. The output from this module only needs to be reviewed when problems arise with the data.

2022.1.00401.S - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage17&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2022.1.00401.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrqcalflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

Plots

Phase vs time

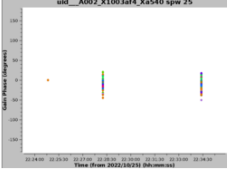
Plots show the phase correction to be applied to the target source. A plot is shown for each spectral window, with phase correction data points plotted per antenna and correlation as a function of time.

Click the summary plots to enlarge them, or the spectral window heading to see detailed plots per spectral window and antenna.

[uid__A002_X1003af4_Xa540.ms](#)

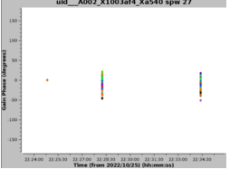
Spectral windows default mapped for J1820-2528 (PHASE).

Spectral window 25



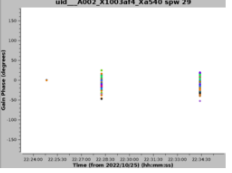
Phase vs time, all antennas and correlations.

Spectral window 27



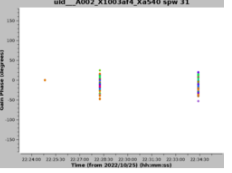
Phase vs time, all antennas and correlations.

Spectral window 29



Phase vs time, all antennas and correlations.

Spectral window 31



Phase vs time, all antennas and correlations.


Amplitude vs time

Plots show the amplitude calibration to be applied to the target source. A plot is shown for each spectral window and each set of antennas with the same antenna diameter, with amplitude correction data points per antenna and correlation as a function of time.

Click the summary plots to enlarge them, or the spectral window heading to see detailed plots per spectral window and antenna.


[uid__A002_X1003af4_Xa540.ms](#)

Spectral window 25




Amplitude vs time, all antennas and correlations.

Spectral window 27




Amplitude vs time, all antennas and correlations.

Spectral window 29



Amplitude vs time, all antennas and correlations.

Spectral window 31



Amplitude vs time, all antennas and correlations.

hifa_timegaincal: This module derives phase and amplitude corrections versus time. The output from this module only needs to be reviewed when problems arise with the data.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage17&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrgcallflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. **hifa_timegaincal**
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

Diagnostic plots

Phase vs time

These diagnostic plots show the phase solution for a calibration generated using a short solution interval (in the case of the checksource(s), they are taken from the tables generated by hifa_gfluxscale). In case of very low SNR on a particular phase calibrator or check source (if present), solutions averaged in time with a solint = 1/4 the scan time are shown for that field. This calibration is not applied to the target. One plot is shown for each non-combined spectral window, with phase correction plotted per antenna and correlation as a function of time.

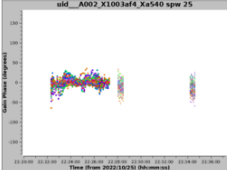
Click the summary plots to enlarge them, or the spectral window heading to see detailed plots per spectral window and antenna.

[uid__A002_X1003af4_Xa540.ms](#)

Spectral windows default mapped for J1820-2528 (PHASE).

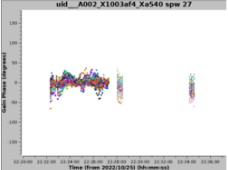
Plots show the diagnostic phase calibration for uid__A002_X1003af4_Xa540.ms.

Spectral window 25



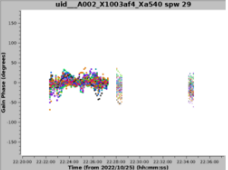
Phase vs time, all antennas and correlations.

Spectral window 27



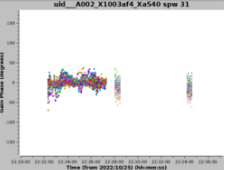
Phase vs time, all antennas and correlations.

Spectral window 29



Phase vs time, all antennas and correlations.

Spectral window 31



Phase vs time, all antennas and correlations.

Phase offsets vs time

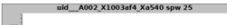
These diagnostic plots show the phase offsets as a function of time. The phase offsets are computed by preapplying an spw-combined phase-only solution to the phase calibrator data and computing a new phase solution for each spw. The new phase solutions should scatter about zero with no drift. The points shown for the other calibrators will be zero. The new solutions are not applied to the target. One plot is shown for each spectral window, with phase offset plotted per antenna and correlation as a function of time.

Click the summary plots to enlarge them, or the spectral window heading to see detailed plots per spectral window and antenna.

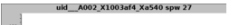
[uid__A002_X1003af4_Xa540.ms](#)

Plots show the diagnostic phase offsets for uid__A002_X1003af4_Xa540.ms calculated using solint="inf".


Spectral window 25



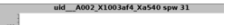
Spectral window 27



Spectral window 29



Spectral window 31



hifa_applycal: This step applies the calibration tables and created plots of the phases and amplitudes afterwards. Most of the output from this module only needs to be reviewed when problems arise with the data.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage19&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrgcallflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
- 19. hif_applycal**
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

19. Apply calibration tables

QA Score: 1.00 For uid__A002_X1003af4_Xa540.ms, intent(s): TARGET, 2.19% of the data was newly flagged by applycal flagging agents, for a total of 6.96% flagged. [All QA Scores \(3 green\)](#)

This task applies all calibrations registered with the pipeline to their target measurement sets.

Contents

- Applied calibrations
- Flagged data after calibration application
- Plots
 - Calibrated amplitude vs frequency
 - Calibrated phase vs frequency
 - Calibrated amplitude vs UV distance
 - Calibrated amplitude vs time
 - Calibrated phase vs time
 - (Corrected amplitude / model) vs antenna
 - (Corrected amplitude / model) vs UV distance
 - Science target: calibrated amplitude vs frequency
 - Science target: calibrated amplitude vs UV distance
 - UV coverage

Applied calibrations

The *Fields* column lists fields within the measurement set containing any of the intents listed in the *Intents* column. If a field name is ambiguous and does not uniquely identify a field, e.g., when a field is observed with multiple intents, then the unambiguous field ID is listed instead of the field name. The order of entries in the *Fields* and *Intents* columns has no significance.

Measurement Set		Target				Calibration					
Name	Final Size	Intent	Fields	Spw	Antenna	Type	spwmap	gainfield	Interp	calwt	table
uid__A002_X1003af4_Xa540.ms (callibrary: view / download)	36.7 GIB	TARGET	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	25, 27, 29, 31	0-42	T _{sys}	0, 1, 2, 3, 4, 5, 17, 7, 8, 9, 10, 11, 23, 17, 19, 21, 23, 17, 17, 19, 19, 21, 21, 23, 23, 17, 17, 19, 19, 21, 21, 23, 23	2	linear, linear	True	Filename
						WVR		nearest	False	Filename	

hifa_applycal: This step applies the calibration tables and created plots of the phases and amplitudes afterwards. Most of the output from this module only needs to be reviewed when problems arise with the data.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage19&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrflagflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

Plots

Calibrated amplitude vs frequency

Plots of calibrated amplitude vs frequency for all antennas and correlations, coloured by antenna. The atmospheric transmission for each spectral window is overlaid on each plot in pink.

uid__A002_X1003af4_Xa540.ms

Spectral Window	ALMA Band	Intents	Fields
Spw 25	ALMA Band 6	AMPLITUDE,BANDPASS	J1924-2914
Spw 27	ALMA Band 6	AMPLITUDE,BANDPASS	J1924-2914
Spw 29	ALMA Band 6	AMPLITUDE,BANDPASS	J1924-2914
Spw 31	ALMA Band 6	AMPLITUDE,BANDPASS	J1924-2914
Spw 25	ALMA Band 6	PHASE	J1820-2528
Spw 27	ALMA Band 6	PHASE	J1820-2528
Spw 29	ALMA Band 6	PHASE	J1820-2528
Spw 31	ALMA Band 6	PHASE	J1820-2528

Calibrated phase vs frequency

hifa_applycal: This step applies the calibration tables and created plots of the phases and amplitudes afterwards. Most of the output from this module only needs to be reviewed when problems arise with the data.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage19&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrgcalflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

Calibrated phase vs frequency

Plots of calibrated phase vs frequency for all antennas and correlations, coloured by antenna.

uid__A002_X1003af4_Xa540.ms

Spectral Window	ALMA Band	Intents	Fields
Spectral Window 25	ALMA Band 6	BANDPASS	J1924-2914
Spectral Window 27	ALMA Band 6	BANDPASS	J1924-2914
Spectral Window 29	ALMA Band 6	BANDPASS	J1924-2914
Spectral Window 31	ALMA Band 6	BANDPASS	J1924-2914
Spectral Window 25	ALMA Band 6	PHASE	J1820-2528
Spectral Window 27	ALMA Band 6	PHASE	J1820-2528
Spectral Window 29	ALMA Band 6	PHASE	J1820-2528
Spectral Window 31	ALMA Band 6	PHASE	J1820-2528

Calibrated amplitude vs UV distance

hifa_applycal: This step applies the calibration tables and created plots of the phases and amplitudes afterwards. Most of the output from this module only needs to be reviewed when problems arise with the data.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage19&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrgcallflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

(Corrected amplitude / model) vs antenna

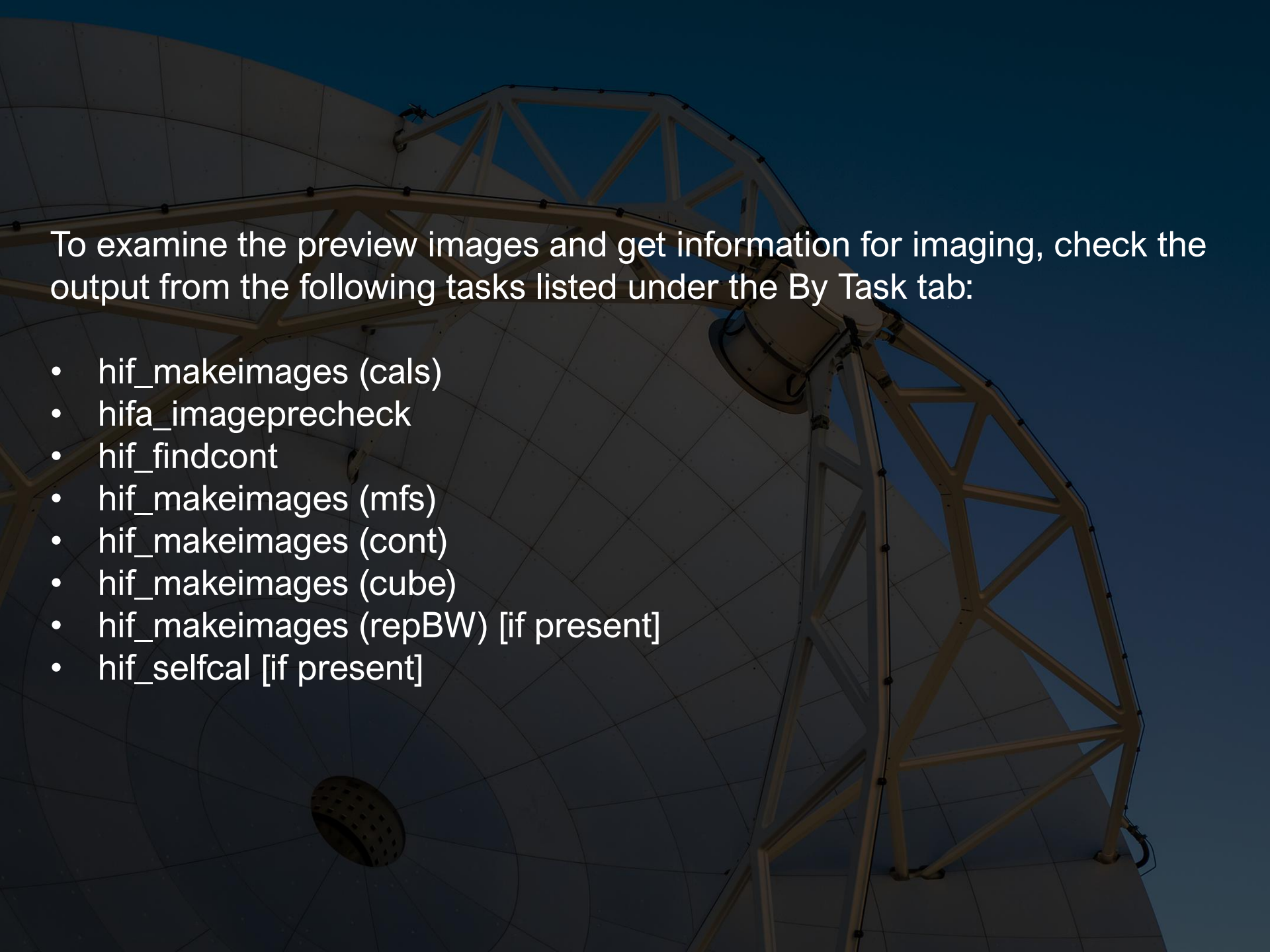
Plots of the ratio of the corrected amplitude to the model column value versus antenna ID. Data are coloured by antenna and are shown for all antennas and correlations.

uid__A002_X1003af4_Xa540.ms

Plots for AMPLITUDE calibration intent were created with UV range set to capture the inner half of the data (UV max < 90.5 m). Plots for other intents have no UV range restriction.

Spectral Window	ALMA Band	Intents	Fields
Spectral Window 25	ALMA Band 6	AMPLITUDE,BANDPASS	J1924-2914
Spectral Window 27	ALMA Band 6	AMPLITUDE,BANDPASS	J1924-2914
Spectral Window 29	ALMA Band 6	AMPLITUDE,BANDPASS	J1924-2914
Spectral Window 31	ALMA Band 6	AMPLITUDE,BANDPASS	J1924-2914
Spectral Window 25	ALMA Band 6	PHASE	J1820-2528
Spectral Window 27	ALMA Band 6	PHASE	J1820-2528
Spectral Window 29	ALMA Band 6	PHASE	J1820-2528
Spectral Window 31	ALMA Band 6	PHASE	J1820-2528

(Corrected amplitude / model) vs UV distance



To examine the preview images and get information for imaging, check the output from the following tasks listed under the By Task tab:

- hif_makeimages (cals)
- hifa_imageprecheck
- hif_findcont
- hif_makeimages (mfs)
- hif_makeimages (cont)
- hif_makeimages (cube)
- hif_makeimages (repBW) [if present]
- hif_selfcal [if present]

hif_makeimages (cals): When this is first called, it makes continuum images of each calibrator in each spw for quality assessment. The images of the phase calibrator (which is near the science targets) are useful to look at to understand the beam size and shape.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage21&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hifa_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrqcallflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renom
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

21. Tclean/MakeImages

Make calibrator images

QA Score: 1.00 RMS vs. DR corrected sensitivity, Field: J1820-2528 Intent: PHASE SPW: 27 [All QA Scores \(8 green\)](#)

Image Details

Fields

- J1924-2914 (BANDPASS)
- J1820-2528 (PHASE)

Field	Spw	Spw	Spw	Spw
J1924-2914 (BANDPASS)	25 / X638243208#ALMA_RB_06#BB_1#SW-01	27 / X638243208#ALMA_RB_06#BB_2#SW-01	29 / X638243208#ALMA_RB_06#BB_3#SW-01	31 / X638243208#ALMA_RB_06#BB_4#SW-01
centre frequency of image	226.6812GHz (LSRK)	230.5559GHz (LSRK)	241.8016GHz (LSRK)	244.9473GHz (LSRK)
beam	1.42 x 1.15 arcsec	1.33 x 1.09 arcsec	1.27 x 1.05 arcsec	1.31 x 1.05 arcsec
beam p.a.	84.1deg	-84.7deg	-84.5deg	83.5deg
final theoretical sensitivity	98 uJy/beam	0.11 mJy/beam	80 uJy/beam	81 uJy/beam
cleaning threshold	5.4 mJy/beam	5.4 mJy/beam	5.2 mJy/beam	5.1 mJy/beam

hif_makeimages (cals): When this is first called, it makes continuum images of each calibrator in each spw for quality assessment. The images of the phase calibrator (which is near the science targets) are useful to look at to understand the beam size and shape.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage21&ms=all&subpage=uid___A001_X2d20_X2bb8-fieldj1924-2914__BANDPASS_-spw25-poll-cleanplots.html

Home By Topic By Task 2022.1.00401.5

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrgcallflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
- 21. hif_makeimages (cals)**
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsize
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont

Clean results for J1924-2914 (BANDPASS) SpW 25

Iterations: 1, 0

Pb-corrected Images Residuals Clean Masks

Primary Beam PSF Final Model

hifa_imageprecheck: This module estimates beam sizes using different robust factors for imaging, which is useful to refer to when re-imaging the data. The row in green is selected for subsequent imaging steps.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage24&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

Tasks in execution order

- hifa_importdata
- hifa_flagdata
- hifa_fluxcallflag
- hifa_rawflagchans
- hif_refant
- h_tsyscal
- hifa_tsysflag
- hifa_antpos
- hifa_wvrgcallflag
- hif_lowgainflag
- hif_setmodels
- hifa_bandpassflag
- hifa_bandpass
- hifa_sppwphaseup
- hifa_gfluxscaleflag
- hifa_gfluxscale
- hifa_timegaincal
- hifa_targetflag
- hif_applycal
- hif_makeimlist (cals)
- hif_makeimages (cals)
- hif_makeimlist (checksrc)
- hif_makeimages (checksrc)
- hifa_imageprecheck**
- hif_checkproductsize
- hifa_renorm
- hifa_exportdata
- hif_mstransform
- hifa_flagtargets
- hif_makeimlist (mfs)
- hif_findcont

24. Image Pre-Check

BACK

QA Score: 1.00 Predicted robust=0.5 beam is within the PI requested range

Goals From OT:

Representative Target: PN_Hb_5
 Representative Frequency: 230.5595 GHz (SPW 27)
 Bandwidth for Sensitivity: 2.307 MHz (rounded to nearest integer #channels (5), repBW = 2.441 MHz)
 Min / Max Acceptable Resolution: 1.17 arcsec / 1.76 arcsec
 Maximum expected beam axial ratio (from OT): 1.5
 Goal PI sensitivity: 8.57 mJy
 Single Continuum: False

Estimated Synthesized Beam and Sensitivities for the Representative Target/Frequency

Estimates are given for four possible values of the tclean robust weighting parameter: robust = 0.0, +0.5 (default), +1.0, and +2.0. If the "Min / Max Acceptable Resolution" is available (>=Cycle 5 12-m Array data), the robust value closest to the default (+0.5) that predicts a beam area (defined as simply major x minor) that is in the range of the PI requested beam areas according to the table row for repBW (Bandwidth for Sensitivity) is chosen. If none of these robust values predict a beam area that is in range, robust=+2.0 is chosen if the predicted beam area is too small, and robust=0.0 is chosen if the predicted beam area is too large. The chosen robust value is highlighted in green and used for all science target imaging. In addition to an estimate for the repBW, an estimate for the aggregate continuum bandwidth (aggBW) is also given assuming NO line contamination but accounting for spw frequency overlap. If the Bandwidth for Sensitivity (repBW) is > the bandwidth of the spw containing the representative frequency (repSPW), then the beam is predicted using all spws, otherwise the beam is predicted for the repSPW alone. A message appears on the "By Task" view if a non-default value of robust (i.e., not +0.5) is chosen. Additionally, if the predicted beam is not within the PI requested range using one of the four robust values, Warning messages appear on this page.

These estimates should always be considered as the BEST CASE SCENARIO. These estimates account for Tsys, the observed uv-coverage, and prior flagging. The estimates DO NOT account for (1) subsequent science target flagging; (2) loss of continuum bandwidth due to the hif_findcont process (i.e. removal of lines and other spectral features from the data used to image the continuum); (3) issues that affect the image quality like (a) poor match of uv-coverage to image complexity; (b) dynamic range effects; (c) calibration deficiencies (poor phase transfer, residual baseline based effects, residual antenna position errors, etc.). It is also important to note that both the repBW and aggBW beam calculations are intrinsically multi-frequency synthesis continuum calculations, using the relevant spws as described above. The synthesized beam for a single channel in a cube will typically be larger and can be significantly larger depending on the details of uv-coverage and channel width.

robust	uvtaper	Synthesized Beam	Cell	Beam Ratio	Bandwidth	BW Mode	Effective Sensitivity
0.0	[]	1.55 x 1.10 arcsec @ -77.8 deg	0.22 x 0.22 arcsec	1.41	2.441 MHz	repBW	0.00559 Jy/beam
0.0	[]	1.38 x 0.972 arcsec @ -82.6 deg	0.19 x 0.19 arcsec	1.41	5625 MHz	aggBW	9.57e-05 Jy/beam
0.5	[]	1.59 x 1.13 arcsec @ -78.1 deg	0.23 x 0.23 arcsec	1.41	2.441 MHz	repBW	0.00511 Jy/beam
0.5	[]	1.49 x 1.04 arcsec @ -82.5 deg	0.21 x 0.21 arcsec	1.41	5625 MHz	aggBW	8.42e-05 Jy/beam

hifa_imageprecheck: This module estimates beam sizes using different robust factors for imaging, which is useful to refer to when re-imaging the data. The row in green is selected for subsequent imaging steps.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage24&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2022.1.00401.5

Tasks in execution order

- hifa_importdata
- hifa_flagdata
- hifa_fluxcallflag
- hif_rawflagchans
- hif_refant
- h_tsyscal
- hifa_tsysflag
- hifa_antpos
- hifa_wvrflag
- hifa_lowgainflag
- hif_setmodels
- hifa_bandpassflag
- hifa_bandpass
- hifa_spwphaseup
- hifa_gfluxscaleflag
- hifa_gfluxscale
- hifa_timegaincal
- hifa_targetflag
- hif_applycal
- hif_makeimlist (cals)
- hif_makeimages (cals)
- hif_makeimlist (checksrc)
- hif_makeimages (checksrc)
- hifa_imageprecheck**
- hif_checkproductsize
- hifa_renom
- hifa_exportdata
- hif_mstransform
- hifa_flagtargets
- hif_makeimlist (mfs)
- hif_findcont

Estimated Synthesized Beam and Sensitivity for the representative target frequency

Estimates are given for four possible values of the CLEAN robust weighting parameter: robust = 0.0, +0.5 (default), +1.0, and +2.0. If the "Min / Max Acceptable Resolution" is available (\geq Cycle 5 12-m Array data), the robust value closest to the default (+0.5) that predicts a beam area (defined as simply major x minor) that is in the range of the PI requested beam areas according to the table row for repBW (Bandwidth for Sensitivity) is chosen. If none of these robust values predict a beam area that is in range, robust=+2.0 is chosen if the predicted beam area is too small, and robust=0.0 is chosen if the predicted beam area is too large. The chosen robust value is highlighted in green and used for all science target imaging. In addition to an estimate for the repBW, an estimate for the aggregate continuum bandwidth (aggBW) is also given assuming NO line contamination but accounting for spw frequency overlap. If the Bandwidth for Sensitivity (repBW) is $>$ the bandwidth of the spw containing the representative frequency (repSPW), then the beam is predicted using all spws, otherwise the beam is predicted for the repSPW alone. A message appears on the "By Task" view if a non-default value of robust (i.e., not +0.5) is chosen. Additionally, if the predicted beam is not within the PI requested range using one of the four robust values, Warning messages appear on this page.

These estimates should always be considered as the BEST CASE SCENARIO. These estimates account for Tsys, the observed uv-coverage, and prior flagging. The estimates DO NOT account for (1) subsequent science target flagging; (2) loss of continuum bandwidth due to the hif_findcont process (i.e. removal of lines and other spectral features from the data used to image the continuum); (3) issues that affect the image quality like (a) poor match of uv-coverage to image complexity; (b) dynamic range effects; (c) calibration deficiencies (poor phase transfer, residual baseline based effects, residual antenna position errors, etc.). It is also important to note that both the repBW and aggBW beam calculations are intrinsically multi-frequency synthesis continuum calculations, using the relevant spws as described above. The synthesized beam for a single channel in a cube will typically be larger and can be significantly larger depending on the details of uv-coverage and channel width.

robust	uvtaper	Synthesized Beam	Cell	Beam Ratio	Bandwidth	BW Mode	Effective Sensitivity
0.0	[]	1.55 x 1.10 arcsec @ -77.8 deg	0.22 x 0.22 arcsec	1.41	2.441 MHz	repBW	0.00559 Jy/beam
0.0	[]	1.38 x 0.972 arcsec @ -82.6 deg	0.19 x 0.19 arcsec	1.41	5625 MHz	aggBW	9.57e-05 Jy/beam
0.5	[]	1.59 x 1.13 arcsec @ -78.1 deg	0.23 x 0.23 arcsec	1.41	2.441 MHz	repBW	0.00511 Jy/beam
0.5	[]	1.49 x 1.04 arcsec @ -82.5 deg	0.21 x 0.21 arcsec	1.41	5625 MHz	aggBW	8.42e-05 Jy/beam
1.0	[]	1.67 x 1.18 arcsec @ -78.3 deg	0.24 x 0.24 arcsec	1.42	2.441 MHz	repBW	0.00489 Jy/beam
1.0	[]	1.64 x 1.14 arcsec @ -82.1 deg	0.23 x 0.23 arcsec	1.42	5625 MHz	aggBW	8.04e-05 Jy/beam
2.0	[]	1.70 x 1.21 arcsec @ -78.8 deg	0.24 x 0.24 arcsec	1.40	2.441 MHz	repBW	0.00487 Jy/beam
2.0	[]	1.70 x 1.19 arcsec @ -82.1 deg	0.24 x 0.24 arcsec	1.40	5625 MHz	aggBW	8.01e-05 Jy/beam

Input Parameters

Tasks Execution Statistics

CASA logs for stage 24

- View or download stage24/casapy.log (484.2 KiB)

hif_findcont: This is where the pipeline creates initial image cubes and identifies continuum channels (although the identification is not always optimal). This is useful as a first look at the spectra, although re-imaging the data may be much more effective for identifying spectral lines.

2022.1.00401.S - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage31&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.S

4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvgcalfag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cats)
21. hif_makeimages (cats)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub
34. hif_makeimages (mfs)
35. hif_makeimlist (cont)
36. hif_makeimages (cont)

31. Find Continuum

QA Score: 1.00 Found continuum ranges [All QA Scores \(9 green\)](#)

Fields

- NGC_6445
- PN_Hb_5

Field	Spw	Start	End	Frame	Status	Average spectrum	Joint mask
NGC_6445	25	226.21141 GHz	226.25536 GHz	LSRK	NEW		
		226.39306 GHz	226.57471 GHz				
		226.70313 GHz	226.81837 GHz				
		226.92580 GHz	227.13772 GHz				
27	27	230.08400 GHz	230.42630 GHz	LSRK	NEW		
		230.60013 GHz	230.94780 GHz				
		230.99761 GHz	231.01324 GHz				
		242.86458 GHz	242.18006 GHz				
29	29	242.37734 GHz	242.72696 GHz	LSRK	NEW		

BACK

hif_makeimages: Several steps near the end of the pipeline (for multiple different types of output images) have this name. These pages are useful for seeing an overview of the imaging results, particularly with regards to information like beam sizes and noise levels.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage34&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_limegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsizes
26. hifa_renorm
27. hifa_expordata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub
34. hif_makeimages (mfs)
35. hif_makeimlist (cont)
36. hif_makeimages (cont)
37. hif_makeimlist (cube)
38. hif_makeimages (cube)
39. hif_makeimlist (cube_repBW)
40. hif_makeimages (cube_repBW)

34. Tclean/MakeImages

Make target per-spw continuum images

BACK

QA Score: 1.00 RMS vs. DR corrected sensitivity, Field: NGC_6445 Intent: TARGET SPW: 27 [All QA Scores \(8 green\)](#)

Image Details

Fields

- PN_Hb_5 (TARGET)
- NGC_6445 (TARGET)

Field	Spw
PN_Hb_5 (TARGET)	25 / X638243208#ALMA_RB_06#BB_1#SW-01
	27 / X638243208#ALMA_RB_06#BB_2#SW-01
	29 / X638243208#ALMA_RB_06#BB_3#SW-01
	31 / X638243208#ALMA_RB_06#BB_4#SW-01

View other QA images...

View other QA images...

View other QA images...

View other QA images...

centre frequency of image	226.6771GHz (LSRK)	230.5517GHz (LSRK)	241.8419GHz (LSRK)	244.9416GHz (LSRK)
beam	1.74 x 1.19 arcsec	1.59 x 1.15 arcsec	1.50 x 1.09 arcsec	1.60 x 1.09 arcsec
beam p.a.	-85.6deg	-78.9deg	-77.8deg	-85.0deg
final theoretical sensitivity	0.39 mJy/beam	0.34 mJy/beam	0.36 mJy/beam	0.33 mJy/beam
cleaning threshold	1.9 mJv/beam	1.7 mJv/beam	1.8 mJv/beam	1.6 mJv/beam

hif_makeimages: Several steps near the end of the pipeline (for multiple different types of output images) have this name. These pages are useful for seeing an overview of the imaging results, particularly with regards to information like beam sizes and noise levels.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage36&ms=all&subpage=t2-4m_details.html

2022.1.00401.5

Home By Topic By Task

10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub
34. hif_makeimages (mfs)
35. hif_makeimlist (cont)
36. hif_makeimages (cont)
37. hif_makeimlist (cube)
38. hif_makeimages (cube)
39. hif_makeimlist (cube_repBW)
40. hif_makeimages (cube_repBW)

36. Tclean/MakeImages

Make target aggregate continuum images

BACK

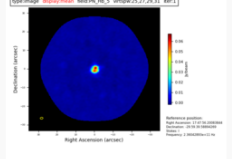
QA Score: 1.00 RMS vs. DR corrected sensitivity, Field: NGC_6445 Intent: TARGET SPW: 25,27,29,31 [All QA Scores \(2 green\)](#)

Image Details

Fields

- PN_Hb_5 (TARGET)
- NGC_6445 (TARGET)

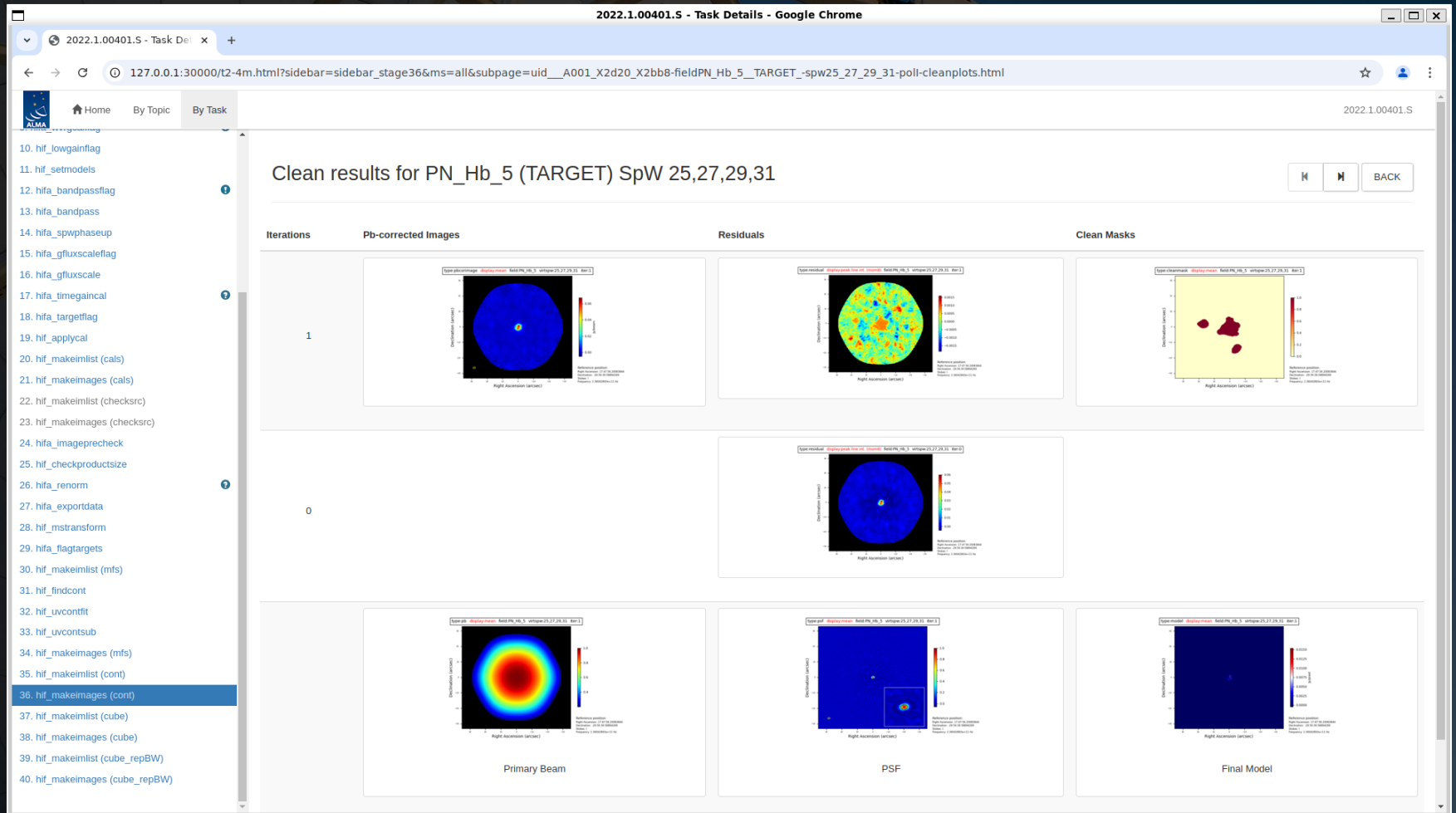
Field	Spw
PN_Hb_5 (TARGET)	25, 27, 29, 31 / X638243208#ALMA_RB_06#BB_1#SW-01



View other QA Images...

centre frequency of image	236.0429GHz (LSRK)
beam	1.49 x 1.04 arcsec
beam p.a.	-82.0deg
final theoretical	0.18 mJy/beam

hif_makeimages: Several steps near the end of the pipeline (for multiple different types of output images) have this name. These pages are useful for seeing an overview of the imaging results, particularly with regards to information like beam sizes and noise levels.



hif_makeimages: Several steps near the end of the pipeline (for multiple different types of output images) have this name. These pages are useful for seeing an overview of the imaging results, particularly with regards to information like beam sizes and noise levels.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage38&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_swpphaseup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_timegaincal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cals)
21. hif_makeimages (cals)
22. hif_makeimlist (checksrc)
23. hif_makeimages (checksrc)
24. hifa_imageprecheck
25. hif_checkproductsizes
26. hifa_renorm
27. hifa_exporthdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub
34. hif_makeimages (mfs)
35. hif_makeimlist (cont)
36. hif_makeimages (cont)
37. hif_makeimlist (cube)
38. hif_makeimages (cube)
39. hif_makeimlist (cube_repBW)
40. hif_makeimages (cube_repBW)

38. Tclean/MakeImages

Make target cubes

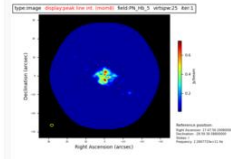
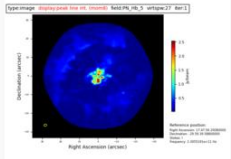
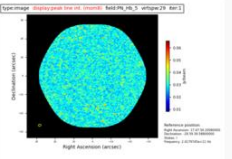
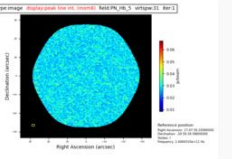
BACK

QA Score: 0.99 MOM8 FC image for field PN_Hb_5 virtspw 25 has a peak SNR of 3.0092 and no significant flux histogram asymmetry. [All QA Scores \(16 green\)](#)

Image Details

Fields

- PN_Hb_5 (TARGET)
- NGC_6445 (TARGET)

Field	Spw				
PN_Hb_5 (TARGET)	25 / X638243208#ALMA_RB_06#BB_1#SW-01	27 / X638243208#ALMA_RB_06#BB_2#SW-01	29 / X638243208#ALMA_RB_06#BB_3#SW-01	31 / X638243208#ALMA_RB_06#BB_4#SW-01	
					
centre / rest frequency of cube	226.6773GHz / 226.6637GHz (LSRK)	230.5519GHz / 230.5380GHz (LSRK)	241.7974GHz / 241.7740GHz (LSRK)	244.9431GHz / 244.9356GHz (LSRK)	
beam	1.74 x 1.20 arcsec	1.60 x 1.16 arcsec	1.54 x 1.10 arcsec	1.62 x 1.12 arcsec	
beam p.a.	-86.3deg	-77.5deg	-78.2deg	-85.8deg	
final theoretical sensitivity	8.7 mJy/beam	9.5 mJy/beam	7.4 mJy/beam	7.7 mJy/beam	

hif_makeimages: Several steps near the end of the pipeline (for multiple different types of output images) have this name. These pages are useful for seeing an overview of the imaging results, particularly with regards to information like beam sizes and noise levels.

2022.1.00401.5 - Task Details - Google Chrome

127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage40&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2022.1.00401.5

- 10. hif_lowgainflag
- 11. hif_setmodels
- 12. hifa_bandpassflag
- 13. hifa_bandpass
- 14. hifa_spwphaseup
- 15. hifa_gfluxscaleflag
- 16. hifa_gfluxscale
- 17. hifa_timegaincal
- 18. hifa_targetflag
- 19. hif_applycal
- 20. hif_makeimlist (cals)
- 21. hif_makeimages (cals)
- 22. hif_makeimlist (checksrc)
- 23. hif_makeimages (checksrc)
- 24. hifa_imageprecheck
- 25. hif_checkproductsize
- 26. hifa_renorm
- 27. hifa_exportdata
- 28. hif_mstransform
- 29. hifa_flagtargets
- 30. hif_makeimlist (mfs)
- 31. hif_findcont
- 32. hif_uvcontfit
- 33. hif_uvcontsub
- 34. hif_makeimages (mfs)
- 35. hif_makeimlist (cont)
- 36. hif_makeimages (cont)
- 37. hif_makeimlist (cube)
- 38. hif_makeimages (cube)
- 39. hif_makeimlist (cube_repBW)
- 40. hif_makeimages (cube_repBW)

40. Tclean/MakeImages

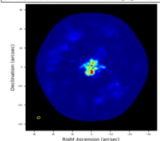
Make representative bandwidth target cube

BACK

QA Score: 1.00 MOM8 FC image for field PN_Hb_5 virtspw 27 has a peak SNR of 2.8452 and no significant flux histogram asymmetry. [All QA Scores \(2 green\)](#)

Image Details

Field	Spw
PN_Hb_5 (TARGET)	27 / X638243208#ALMA_RB_06#BB_2#SW-01



View other QA images...

centre / rest frequency of cube	230.5495GHz / 230.5380GHz (LSRK)
beam	1.60 x 1.15 arcsec
beam p.a.	-77.4deg
final theoretical sensitivity	5.1 mJy/beam
cleaning threshold	30 mJy/beam Dirty DR: 4.5e+02 DR correction: 3

hif_makeimages: Several steps near the end of the pipeline (for multiple different types of output images) have this name. These pages are useful for seeing an overview of the imaging results, particularly with regards to information like beam sizes and noise levels.

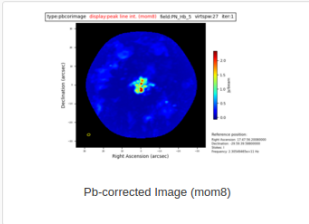
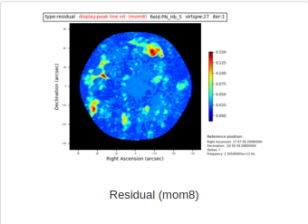
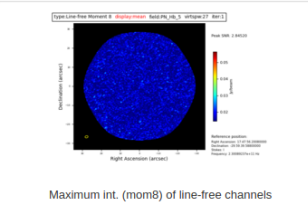
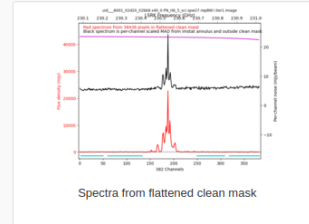
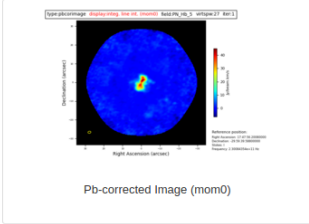
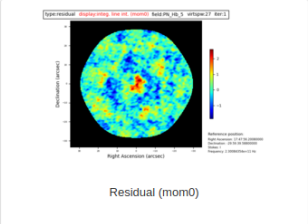
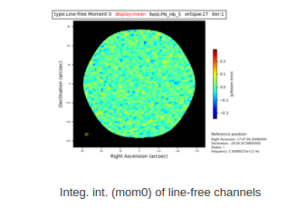
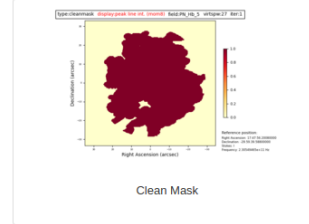
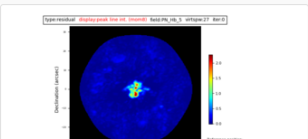
2022.1.00401.5 - Task Details - Google Chrome

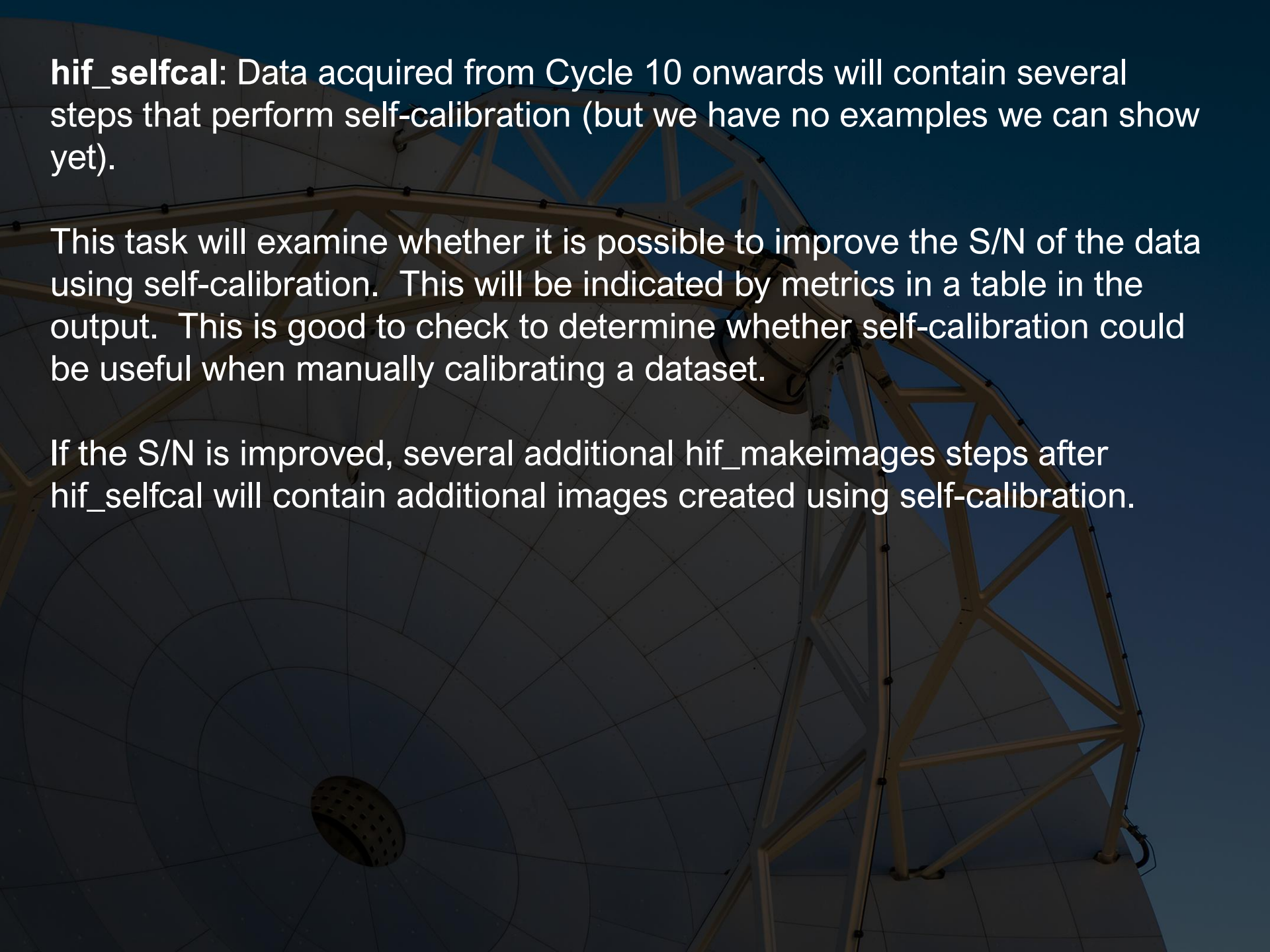
127.0.0.1:30000/t2-4m.html?sidebar=sidebar_stage40&ms=all&subpage=uid___A001_X2d20_X2bb8-fieldPN_Hb_5_TARGET_-spw27-poll-cleanplots.html

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Clean results for PN_Hb_5 (TARGET) SpW 27

BACK

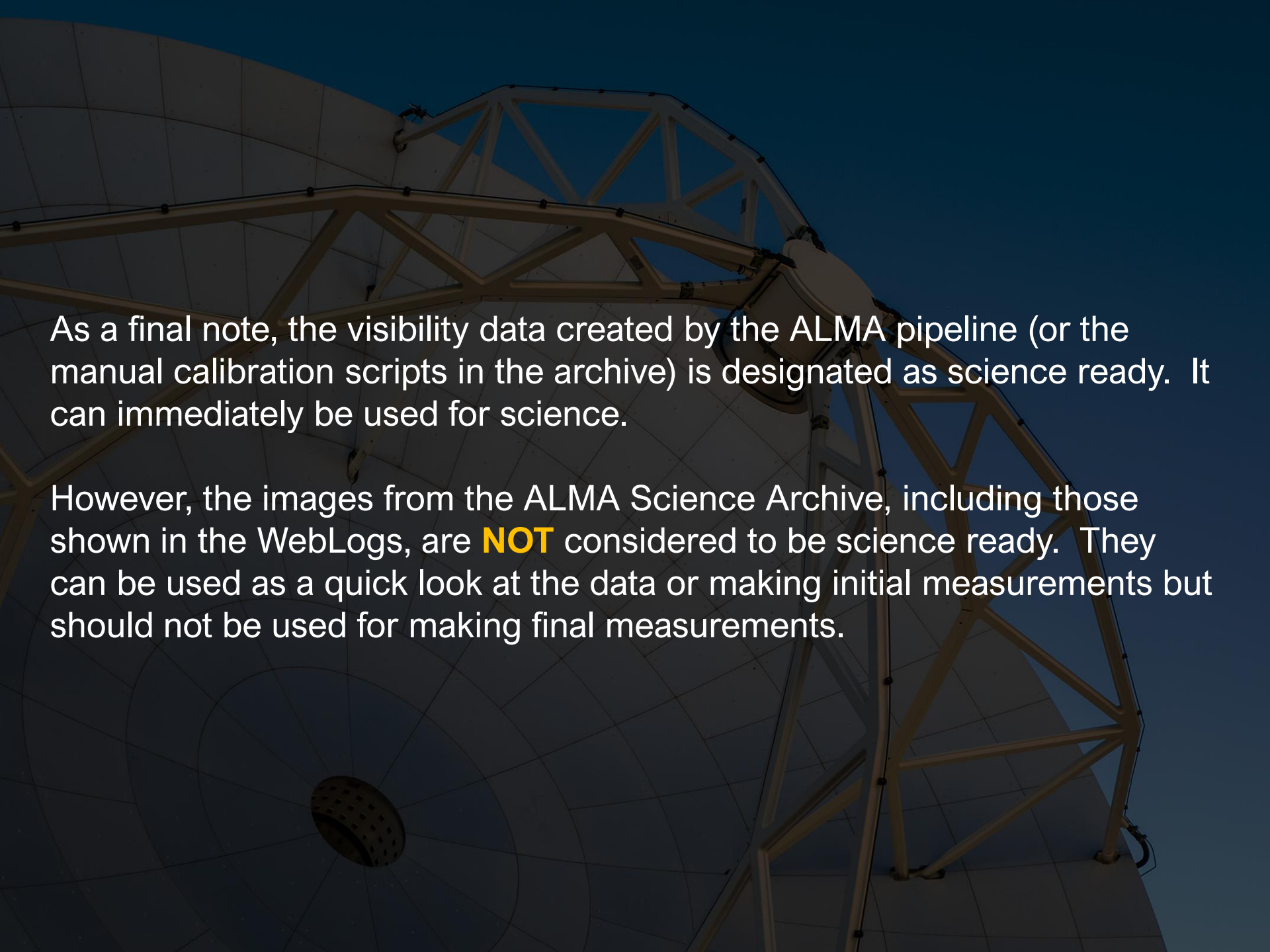
Iterations	Pb-corrected Images	Residuals	Line-free Moments	Spectra / Masks
1	 <p>Pb-corrected Image (mom8)</p>	 <p>Residual (mom8)</p>	 <p>Maximum int. (mom8) of line-free channels</p>	 <p>Spectra from flattened clean mask</p>
1	 <p>Pb-corrected Image (mom0)</p>	 <p>Residual (mom0)</p>	 <p>Integ. int. (mom0) of line-free channels</p>	 <p>Clean Mask</p>
0	 <p>Pb-corrected Image (mom8)</p>			



hif_selfcal: Data acquired from Cycle 10 onwards will contain several steps that perform self-calibration (but we have no examples we can show yet).

This task will examine whether it is possible to improve the S/N of the data using self-calibration. This will be indicated by metrics in a table in the output. This is good to check to determine whether self-calibration could be useful when manually calibrating a dataset.

If the S/N is improved, several additional `hif_makeimages` steps after `hif_selfcal` will contain additional images created using self-calibration.



As a final note, the visibility data created by the ALMA pipeline (or the manual calibration scripts in the archive) is designated as science ready. It can immediately be used for science.

However, the images from the ALMA Science Archive, including those shown in the WebLogs, are **NOT** considered to be science ready. They can be used as a quick look at the data or making initial measurements but should not be used for making final measurements.