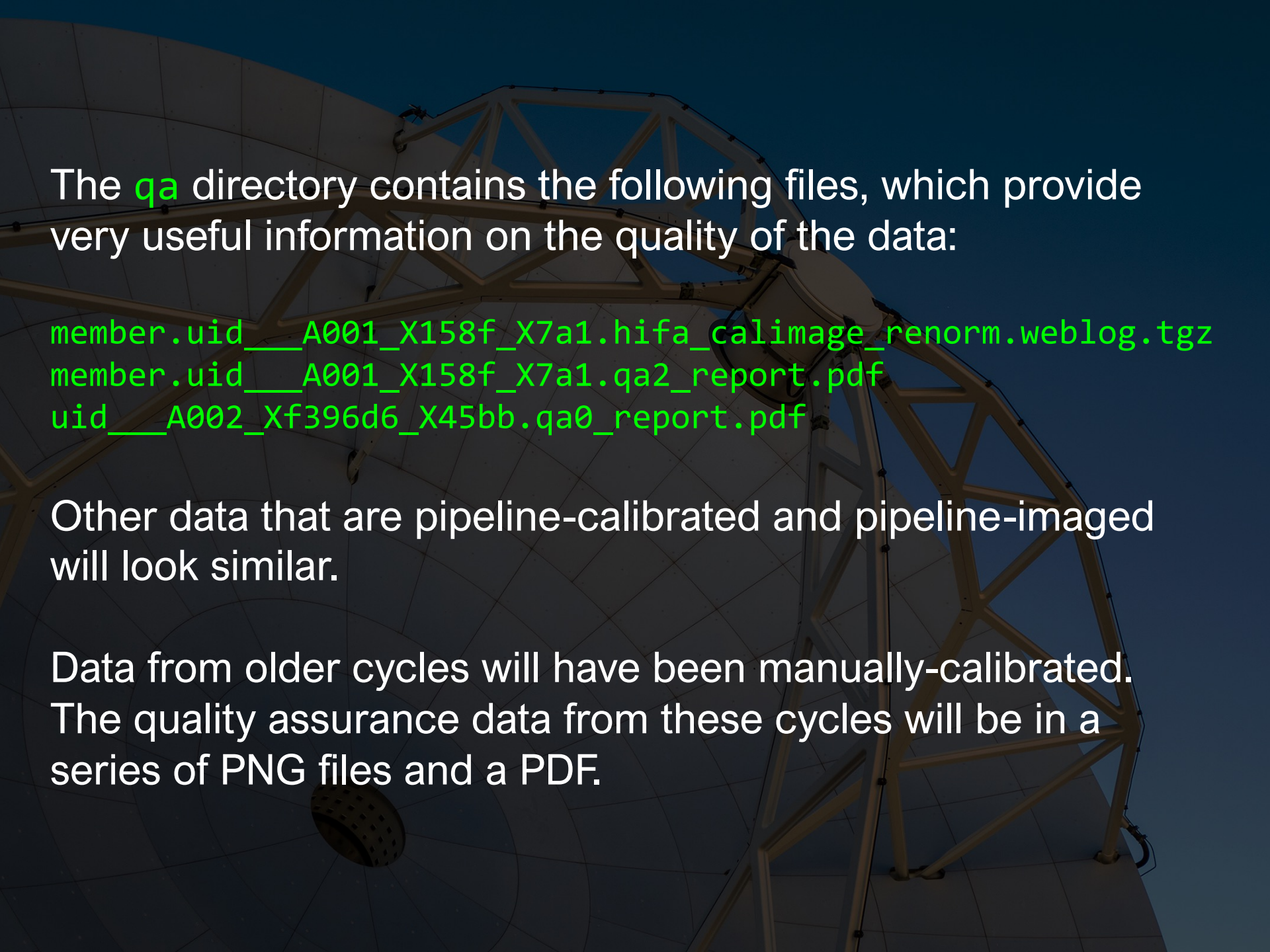


Reviewing the WebLog and Other QA Documents

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The **qa** directory contains the following files, which provide very useful information on the quality of the data:

```
member.uid___A001_X158f_X7a1.hifa_calimage_renorm.weblog.tgz  
member.uid___A001_X158f_X7a1.qa2_report.pdf  
uid___A002_Xf396d6_X45bb.qa0_report.pdf
```

Other data that are pipeline-calibrated and pipeline-imaged will look similar.

Data from older cycles will have been manually-calibrated. The quality assurance data from these cycles will be in a series of PNG files and a PDF.



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

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.

QA0 Report 

Execution Block Summary

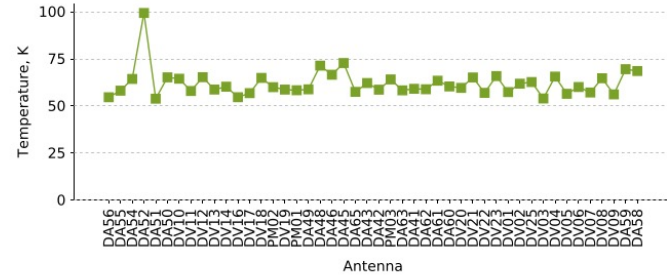
Project Code	2021.1.00499.S	SchedBlock	Pj113921_a_03_TM2
ExecBlock	uid://A002/Xf396d6/X45bb	ExecBlock Status	SUCCESS
QA0 Status	✔ Pass	Exec. Fraction	1.50
Repr. frequency	89.631 GHz (Sky)	Band	ALMA_RB_03
Array	12 [m]	Baselines	15m -- 2617m
Antennas	Antennas: 46 effective, 46 usable, 46 unflagged, 46 total. Expected for Cycle 9 : 43, minimum acceptable: 41 Band observed: 3. Highest recommended: 4-4		
Weather	PWV 4.15 mm; Wind 3.50 m/s; Humidity 21.51 %; Pressure 493.55 hPa; Phase rms: 193.366 microns		
QA0 comment	No issues found in the data, except high Trx/Tsys on DA52.		
AOS Check comment	2021-12-04T12:21:47 uid://A002/Xf396d6/X45bb Band 3 Freq 89.6314199553 GHz standard observation Mean Zenith PWV: 4.15 +/- 0.08 mm - Representative Tsys: 65.4 K 46/46 antennas are working in band 3 on the BLC PHASECAL: Antenna-based phase rms on phaseCal: 20.8 degrees (193.4 microns) No antennas exceed rms limit BANDPASS: WVR-corrected baseline-based phase rms on bandpass: 11.8 degrees (109.4 microns) on 1000m baselines Mean improvement in phase rms using WVRs: 2.94 Baseline limit with good phase (80%): 1319m. L60 resolution: 0.523 arcsec Bandpass calibrator: J1058+0133 Flux: 4.110 +/- 0.112 Jy Possible channels with SNR>30: 3659 Phase calibrator: J1148+1840 Flux: 0.125 +/- 0.004 Jy Sky separation: 2.80 degrees Resolution slope : 0.00 SNR in calibrated phaseCal flux: Between antennas: 148.0 Between scans: 269.8 9 completed cycles of science/phaseCal. 1 bandpass scan Percentage of all cal data to be flagged: 50.00% Binary size: 4.77GB Band observed: 3 HIGHEST RECOMMENDED OBSERVING BAND: 4 - 4 QA0 PASS		
QA0 warnings	Percentage of calibration data flagged: 0.500 % Achieved angular resolution is outside the expected range. Observed: 0.38, requested: 0.57 - 0.85		

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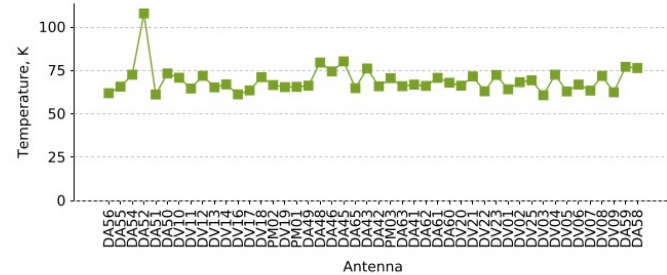
The plots of T_{sys} or system temperature (under “atmospheric calibrations”) should be checked for any antennas that are outliers.

Atmosphere calibrations for representative frequency

Source: J10580133

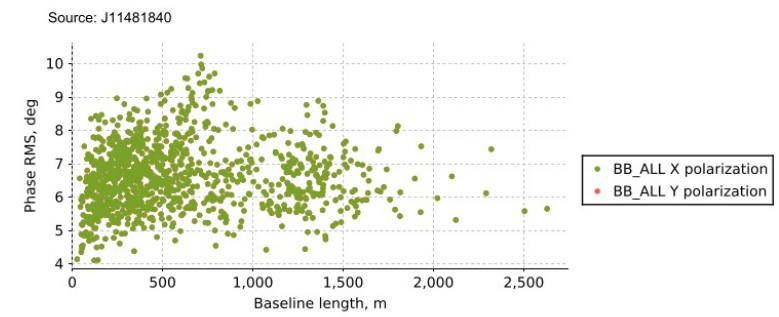
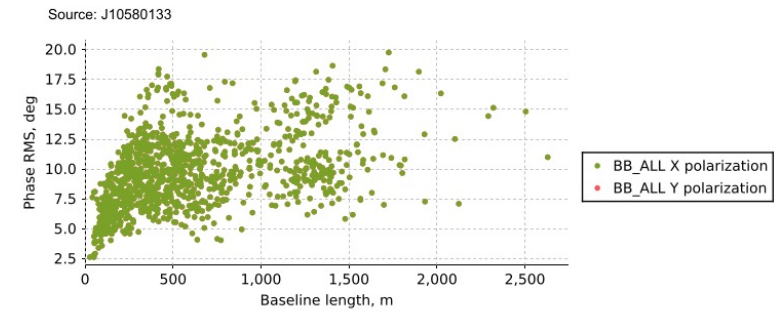


Source: PJ1139217



Any outliers in the plots of phase RMS versus baseline length could be indicative of antennas or baselines that were not producing usable data. These data will need to be checked later.

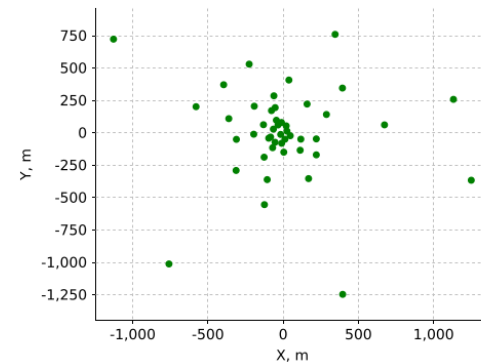
Phase RMS (baseline-based)



Corrected phase rms per baseline in-scan, in summed BB

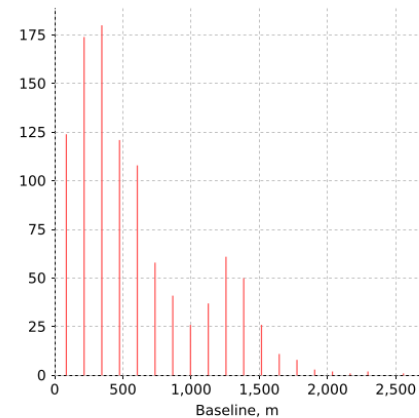
The baseline distribution is useful to understand what the angular resolution and maximum recoverable scale will be like when the final images are made.

Antenna positions



- Completely flagged antennas
- Antennas with minor flagging
- Antennas with high phase
- Antenna positions

Baseline distribution



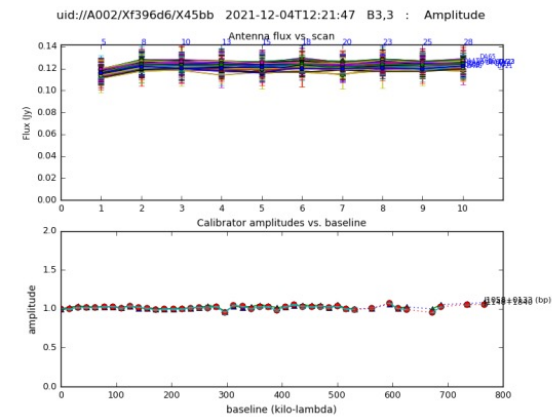
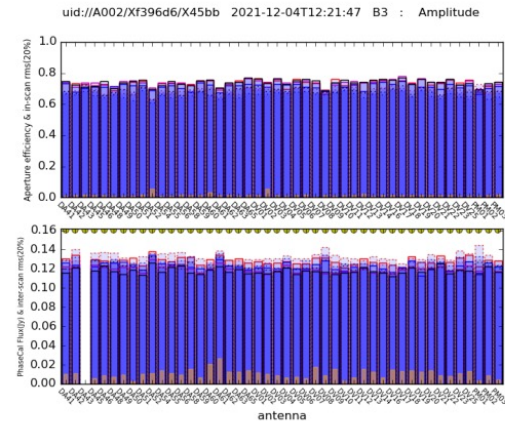
The antenna list midway through the QA0 report has useful information on antennas that may be producing problematic or unusable data.

Antennas

```
DA41      DA41 FE:03 . . .  
          QA0_WVR_high_tau_contin  Continuum brightness: 33.5 K tau 0.130 PWV discrepancy: before 6.0  
          after 3.1 %  
DA42      DA42 FE:62 . . .  
          QA0_WVR_high_tau_contin  Continuum brightness: 35.9 K tau 0.140 PWV discrepancy: before 6.6  
          after 3.0 %  
DA43      DA43 FE:67 . . .  
          QA0_Shadowed_scan : 4 : by antenna DA57(not in array) Separations: uv 10.3m w 11.6 m . . .  
          QA0_Shadowed_scan : 5 : by antenna DA57(not in array) Separations: uv 11.1m w 10.8 m . . .  
          QA0_Shadowed_scan : 6 : by antenna DA57(not in array) Separations: uv 10.6m w 11.4 m . . .  
          QA0_Shadowed_scan : 7 : by antenna DA57(not in array) Separations: uv 10.6m w 11.4 m . . .  
          QA0_Shadowed_scan : 8 : by antenna DA57(not in array) Separations: uv 11.0m w 11.0 m . . .  
          QA0_Shadowed_scan : 9 : by antenna DA57(not in array) Separations: uv 10.4m w 11.5 m . . .  
          QA0_Shadowed_scan : 10 : by antenna DA57(not in array) Separations: uv 10.8m w 11.1 m . . .  
          QA0_Shadowed_scan : 11 : by antenna DA57(not in array) Separations: uv 10.3m w 11.6 m . . .  
          QA0_Shadowed_scan : 12 : by antenna DA57(not in array) Separations: uv 10.3m w 11.7 m . . .  
          QA0_Shadowed_scan : 13 : by antenna DA57(not in array) Separations: uv 10.7m w 11.3 m . . .  
          QA0_Shadowed_scan : 14 : by antenna DA57(not in array) Separations: uv 10.1m w 11.8 m . . .  
          QA0_Shadowed_scan : 15 : by antenna DA57(not in array) Separations: uv 10.5m w 11.4 m . . .  
          QA0_Shadowed_scan : 16 : by antenna DA57(not in array) Separations: uv 10.0m w 11.9 m . . .  
          QA0_Shadowed_scan : 17 : by antenna DA57(not in array) Separations: uv 10.0m w 11.9 m . . .  
          QA0_Shadowed_scan : 18 : by antenna DA57(not in array) Separations: uv 10.4m w 11.6 m . . .  
          QA0_Shadowed_scan : 19 : by antenna DA57(not in array) Separations: uv 9.8m w 12.0 m . . .  
          QA0_Shadowed_scan : 20 : by antenna DA57(not in array) Separations: uv 10.3m w 11.7 m . . .  
          QA0_Shadowed_scan : 21 : by antenna DA57(not in array) Separations: uv 9.7m w 12.1 m . . .  
          QA0_Shadowed_scan : 22 : by antenna DA57(not in array) Separations: uv 9.7m w 12.1 m . . .  
          QA0_Shadowed_scan : 23 : by antenna DA57(not in array) Separations: uv 10.1m w 11.8 m . . .  
          QA0_Shadowed_scan : 24 : by antenna DA57(not in array) Separations: uv 9.6m w 12.2 m . . .  
          QA0_Shadowed_scan : 25 : by antenna DA57(not in array) Separations: uv 10.0m w 11.9 m . . .  
          QA0_Shadowed_scan : 26 : by antenna DA57(not in array) Separations: uv 9.4m w 12.3 m . . .  
          QA0_Shadowed_scan : 27 : by antenna DA57(not in array) Separations: uv 9.4m w 12.4 m . . .  
          QA0_Shadowed_scan : 28 : by antenna DA57(not in array) Separations: uv 9.9m w 11.9 m . . .  
          QA0_WVR_high_tau_contin  Continuum brightness: 40.7 K tau 0.160 PWV discrepancy: before 7.3  
          after 3.1 %  
  
DA46      DA46 FE:18 . . .  
          QA0_WVR_high_tau_contin  Continuum brightness: 38.3 K tau 0.150 PWV discrepancy:
```

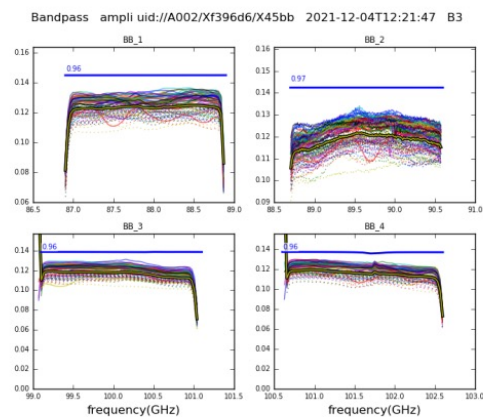

These plots of the antenna median amplitude and RMS noise can also be used to identify any antennas that could be producing noisy or problematic data.

Histogram of antenna median amplitude and RMS

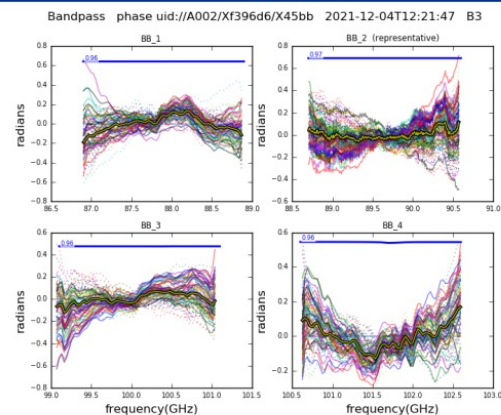


The bandpass amplitude and phase plots can be used to check for any irregularities in the data as a function of frequency.

Bandpass amplitude



Bandpass Phase



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

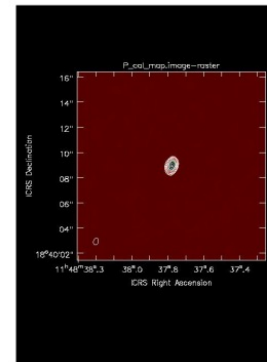
QA0+ results are only to be used as a guide to assess the data quality, and are not for scientific use. QA0+ image and fluxes are obtained from an online reduction of the combined wideband continuum spectral windows (using mfs TCLEAN in CASA), with no bandpass or Tsys calibration, nor removal of potential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

Science target	PJ113921.7			
Peak	0.055	Integrated	0.05	RMS 0.003
Xoff	0.569	Yoff	0.218	(arcsec from phase centre)
Beam X	0.603"	Beam Y	0.382"	Beam PA -17.66°
Selfcal	true			
Peak	0.107 mJy	Integrated	0.192 mJy	RMS 0.004 mJy
Xoff	0.007	Yoff	0.004	(arcsec from phase centre)
Phase Cal	J1148+1840		Separation	2.80°
Peak	28.255 mJy	Integrated	29.343 mJy	RMS 0.217 mJy
Beam X R=0.5	0.563"		Beam Y R=0.5	0.376"
Beam PA R=0.5	-17.28°		RMS R=0.5	0.217 mJy
Beam X R=2.0	0.805"		Beam Y R=2.0	0.56"
Beam PA R=2.0	-27.01°		RMS R=2.0	0.316 mJy
Beam X R=-0.5	0.428"		Beam Y R=-0.5	0.287"
Beam PA R=-0.5	-13.38°		RMS R=-0.5	0.166 mJy
WVR	Try remcloud	false	PhaseCal RMS	18.208
Bandpass			Bandpass RMS Top	10.598
Bandpass RMS	[5.53, 7.57, 10.8, 10.73]°		Bandpass Timescales	[20.0, 40.0, 80.0, 120.0] seconds

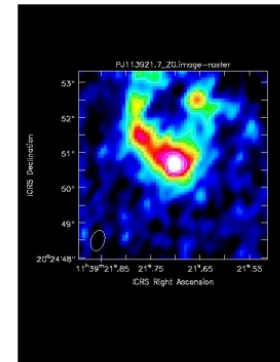
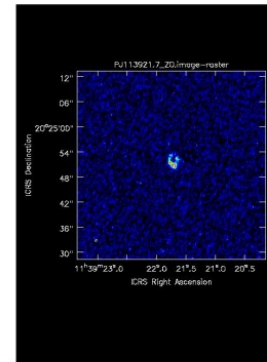
The QA0+ section shows some very quick (but very rough) images produced from the data soon after the observations were performed as well as some measurements from those images.

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

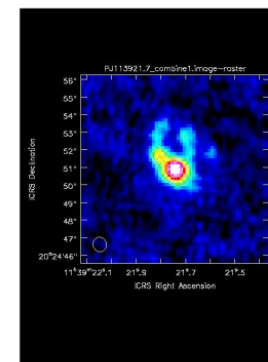
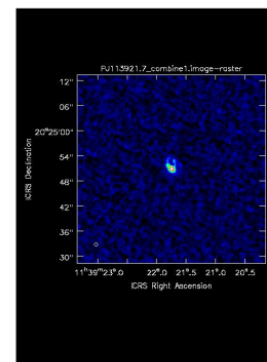


The QA0+ EB section contains the images created using just one Execution Block (EB).

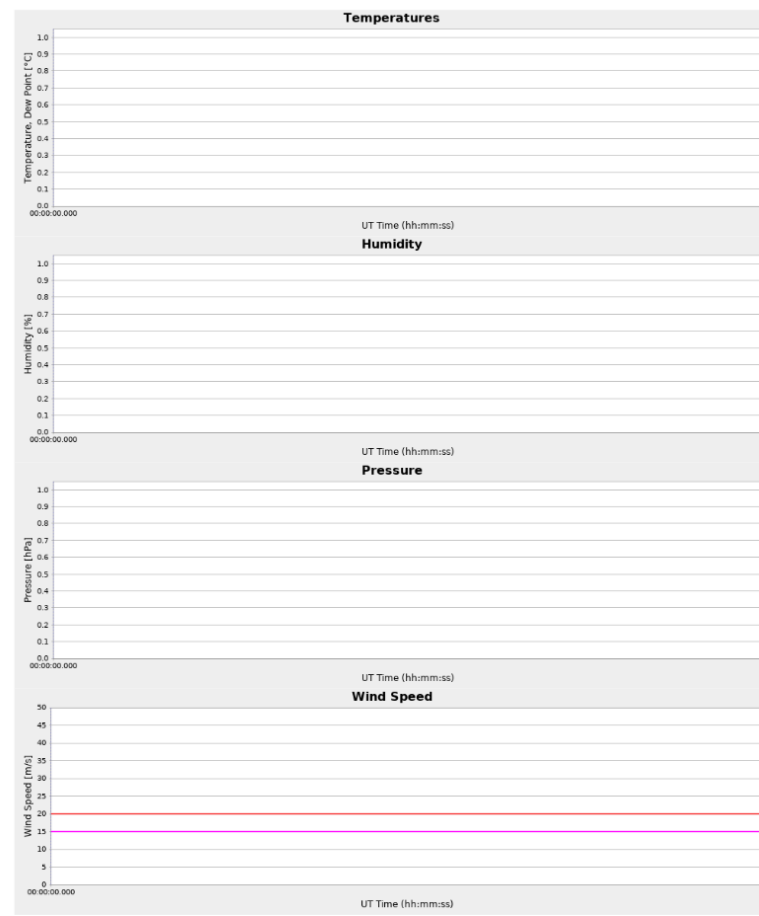
The QA0+ concat section contains images based on combining the data from this EB with previously-executed EBs (if they exist).

QA0+ concat					
N EBs	1	ExecBlock UIDs	[]		
Beam X R=0.5	0.829"		Beam Y R=0.5	0.76"	
Beam PA R=0.5	16.24°		RMS R=0.5	0.003 mJy	
Beam X R=2.0	1.254"		Beam Y R=2.0	1.131"	
Beam PA R=2.0	-26.32°		RMS R=2.0	0.003 mJy	
Beam X R=-0.5	0.593"		Beam Y R=-0.5	0.407"	
Beam PA R=-0.5	4.93°		RMS R=-0.5	0.005 mJy	
Science target	PJ113921.7	RA	11:39:21.745	Dec	+020:24:50.9136
Xoff	-0.044	Yoff	-0.014	Offset (fraction of beam)	0.058
Peak	0.117 mJy	Integrated	0.253 mJy	RMS	0.003 mJy

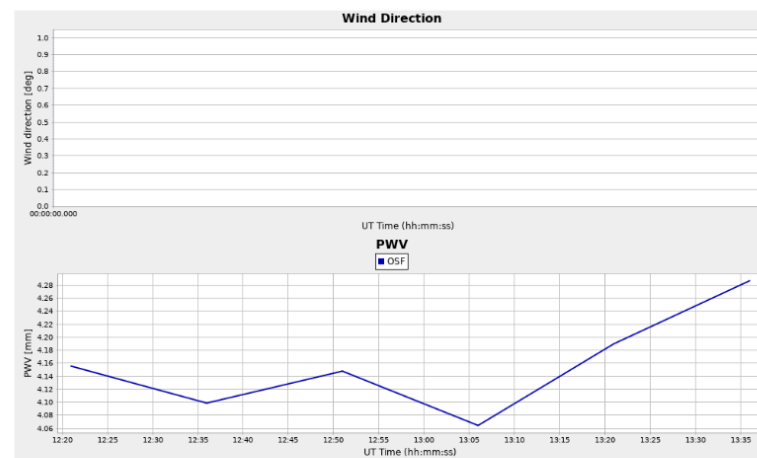
Concatenated target images



The final two pages show the weather conditions at the site, although this information is also available in the WebLogs.



The final two pages show the weather conditions at the site, although this information is also available in the WebLogs.



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.

QA2 Report



Project Information

Name Probing Gas, Dust, Stars, and Star Formation Activity down to 100-pc Scales using Strong Gravitational Lensing
Code 2021.1.00499.5
PI Patrick Kamieneski
Organization Department of Astronomy, Massachusetts at Amherst, University of
Co-Is O. Cooper, B. Frye, K. Harrington, J. Lowenthal, A. Vishwas, Q. Wang, M. Yun

ObsUnitSet Information

Name Member OUS (PJ113921.7)
QA2 Status ✓Pass
Member OUS Status ID uid://A001/X158f/X7a1
SchedBlock name PJ113921_a_03_TM2
SchedBlock UID uid://A001/X158f/X782
Array TM2
Mode Standard
Band ALMA_RB_03
Repr.Freq. (sky) 89.63 [GHz]
Spectral setup Mixed
Sources PJ113921.7
Other SBs in this Group
OUS (Member OUS PJ113921_a_03_TM1 (uid://A001/X158f/X79f)
Status ID in brackets):
Execution count 1.50 of 1 expected

Final QA2 comment

Comments from Reducer

CASA version: 6.2.1.7, Pipeline version 2021.2.0.128

Reduction mode: PL calibration and imaging

Calibration issues: None

Imaging issues: None

General info:

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-almas-normalization-strategy>

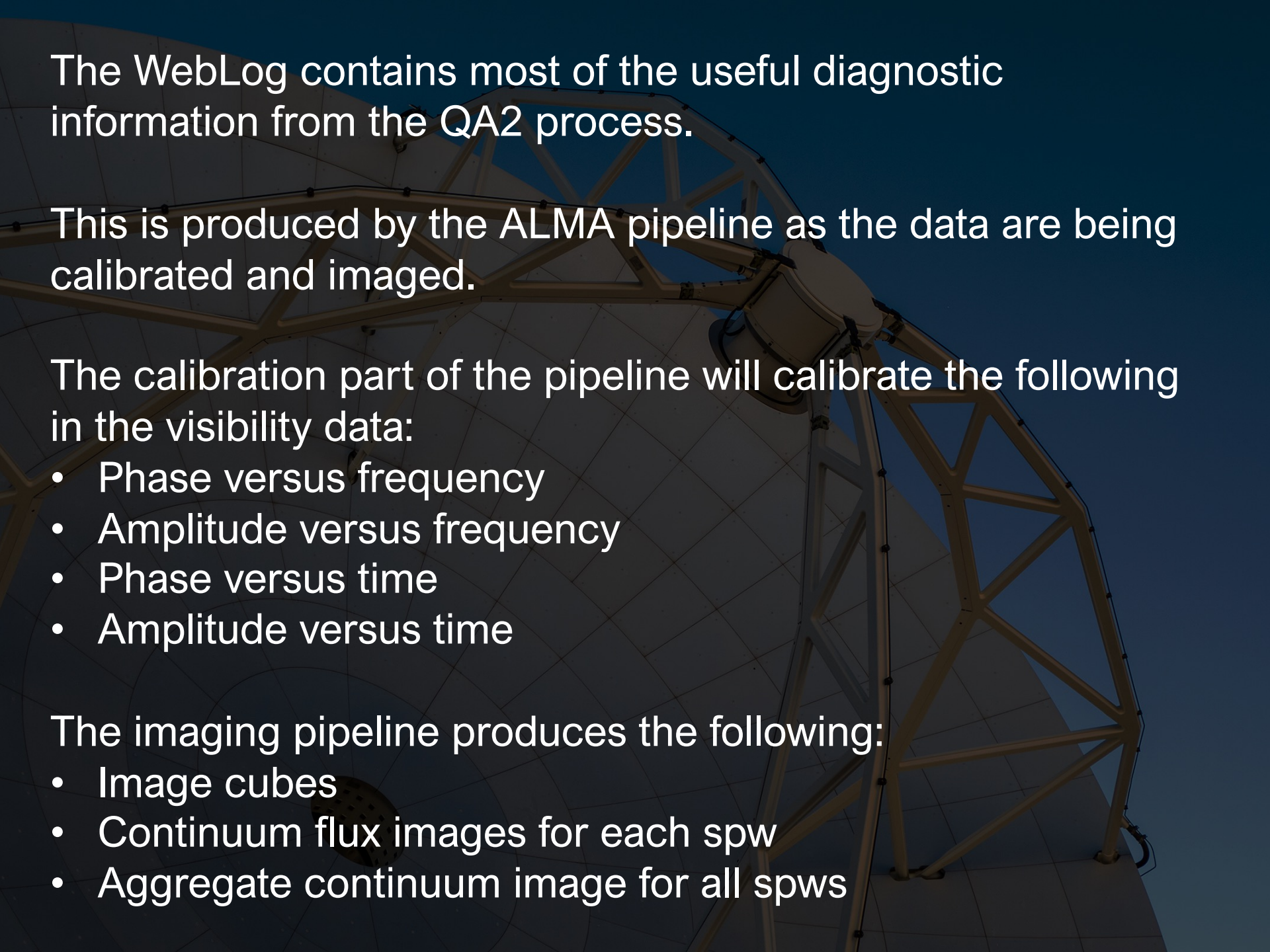
The requirement of rescaling due to any astronomical lines detected in this dataset has been evaluated and the largest peak rescaling value has been estimated to be 1.002, as displayed in the table in the hifa_renorm task of the delivered weblog. The effect of rescaling is a channel-dependent increase 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 below this threshold, this dataset has not been corrected for the above issue.

It is recommended that the PI carefully assess the results on the hif_findcont weblog page, and in the "line-free moment 0" images on the cube imaging weblog page. Self-calibration was not performed.

This is a line project, thus QA2 was performed on the Aggregate Continuum and the PI specified representative spectral window.

The RMS and beam size meet the PI requested performance parameters, therefore, this scheduling block has been deemed a QA2 PASS.

Aggregate Continuum -
Image name: uid___A001_X158f_X7a1.s36_0_PJ113921.7_sci.spw17_21_23_25.cont.l.iter1.image.tt0



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

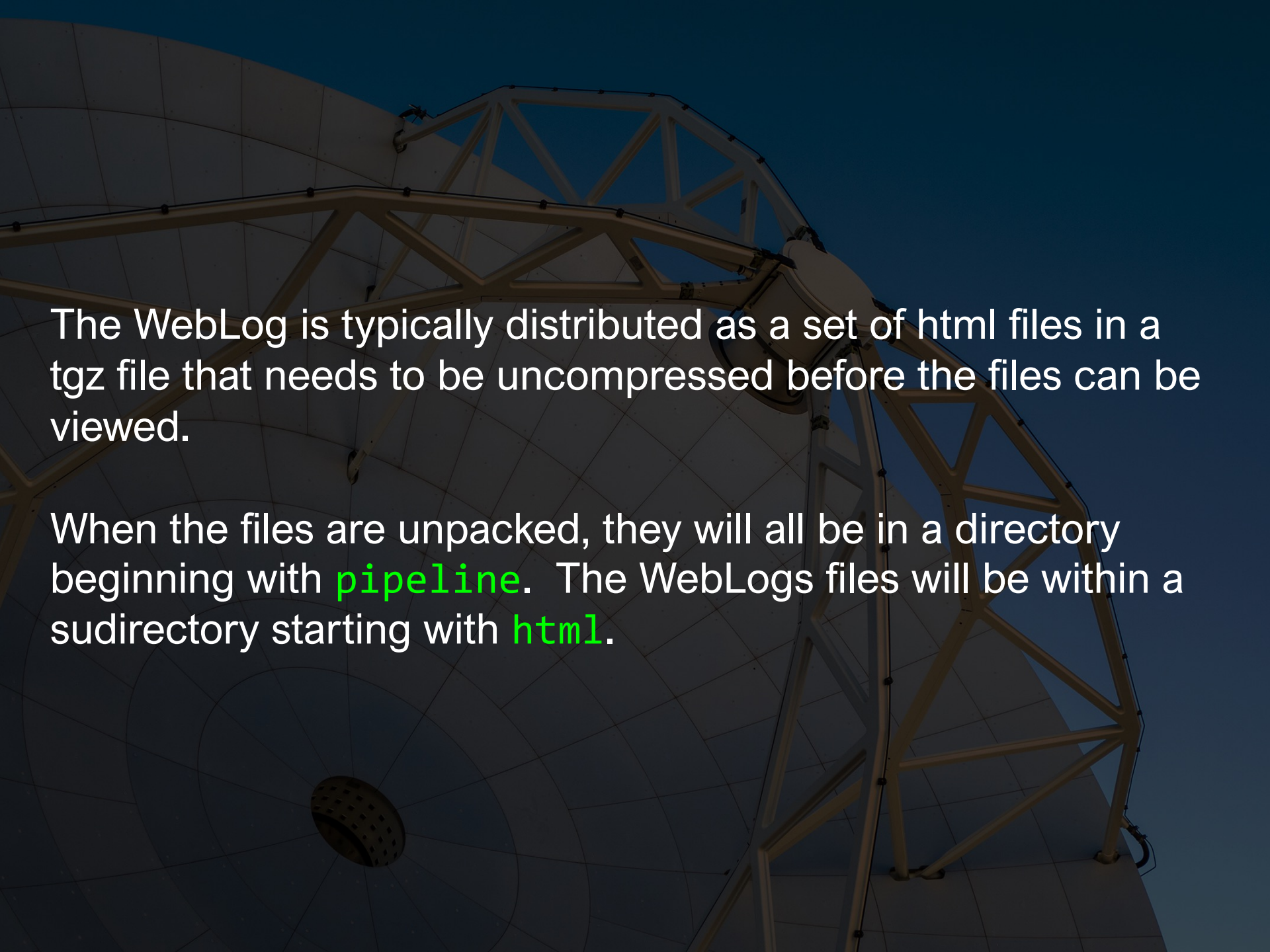
This is produced by the ALMA pipeline as the data are being calibrated and imaged.

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

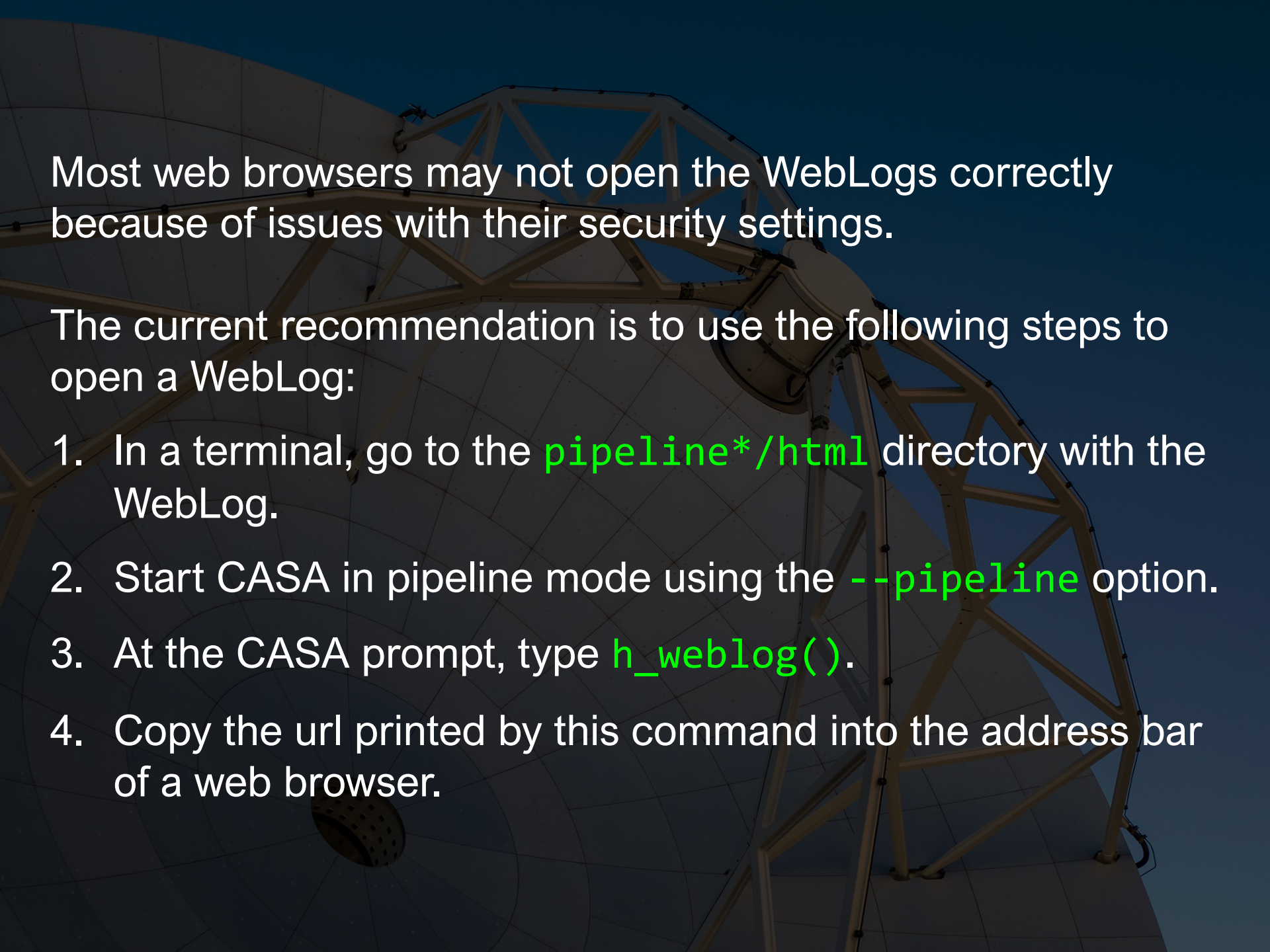
The imaging pipeline produces the following:

- 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, with a large, curved, perforated metal surface. The structure is illuminated from the side, creating strong highlights and deep shadows. The background is a clear, dark blue sky.

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.

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

Browser Tab: 2021.1.00499.S - Home

Address Bar: file:///D:/pipeline/html/t1-1.html

Navigation: Home (selected), By Topic, By Task

Page Header: 2021.1.00499.S

Observation Overview

Project	uid://A001/X1525/X705
Principal Investigator	pkamieneski
OUS Status Entity id	uid://A001/X158f/X7a1
Observation Start	2021-12-04 12:23:08 UTC
Observation End	2021-12-04 13:23:12 UTC

Pipeline Summary

Pipeline Version	2021.2.0.128 (documentation)
CASA Version	6.2.1.7 (environment)
IERSeop2000 Version	0001.0153 (last date: 2021-10-10 00:00:00)
IERSpredict Version	0623.0662 (last date: 2022-03-04 00:00:00)
Pipeline Start	2021-12-06 15:32:10 UTC
Execution Duration	5:54:43

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/X158f/X7a1 Scheduling Block ID: uid://A001/X158f/X782 Scheduling Block Name: PJ113921_a_03_TM2									
Session: session_1									
uid__A002_Xf396d6_X45bb.ms	ALMA Band 3	46	2021-12-04 12:23:08	2021-12-04 13:23:12 MS dates not fully covered by IERSeop2000. CASA will use IERSpredict.	0:41:25	15.3 m	2.6 km	749.4 m	13.2 GB
uid__A002_Xf396d6_X45bb_target.ms	ALMA Band 3	46	2021-12-04 12:32:20	2021-12-04 13:22:31 MS dates not fully covered by IERSeop2000. CASA will use IERSpredict.	0:41:20	15.3 m	2.6 km	749.4 m	6.5 GB

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

2021.1.00499.S - Session Data Details X +

file:///D:/pipeline/html/t2-1.html?sidebar=sidebar_uid___A002_Xf396d6_X45bb_ms&subpage=t2-1_details.html

ALMA Home By Topic By Task 2021.1.00499.S

Session: session_1

uid___A002_Xf396d6_X45bb.ms

uid___A002_Xf396d6_X45bb_target.ms

Overview of 'uid___A002_Xf396d6_X45bb.ms'

Observation Execution Time

Start Time	2021-12-04 12:23:08
End Time	2021-12-04 13:23:12
Total Time on Source	0:55:15
Total Time on Science Target	0:41:25

[LISTOBS OUTPUT](#)

Spatial Setup

Science Targets	'PJ113921.7'
Calibrators	'J1058+0133', 'J1148+1840' and 'J1150+2417'

Antenna Setup

Min Baseline	15.3 m
Max Baseline	2.6 km
Number of Baselines	1035
Number of Antennas	46
Antenna Diameters	46 of 12 m

Weather

uid___A002_Xf396d6_X45bb.ms

Spectral Setup

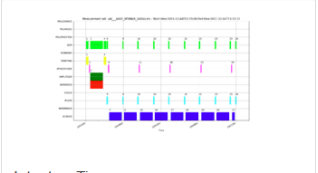
All Bands	'ALMA Band 3' and 'WVR'
Science Bands	'ALMA Band 3'

Sky Setup

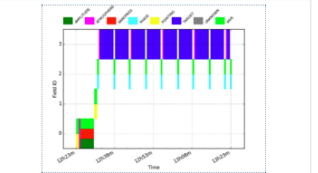
Min Elevation	36.99 degrees
Max Elevation	54.03 degrees

PWV

uid___A002_Xf396d6_X45bb.ms



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.

2018.1.01131.S - Session Data Details - Mozilla Firefox

2018.1.01131.S - Session Data X

file:///home/gbendo/pipeline/html/t2-1.html?sidebar=sidebar_uid__A002_Xd98580_X354_ms&subpage=listobs.txt

Session: session_1

uid__A002_Xd98580_X354.ms

uid__A002_Xd98580_X354_target.ms

listobs.txt

BACK

```

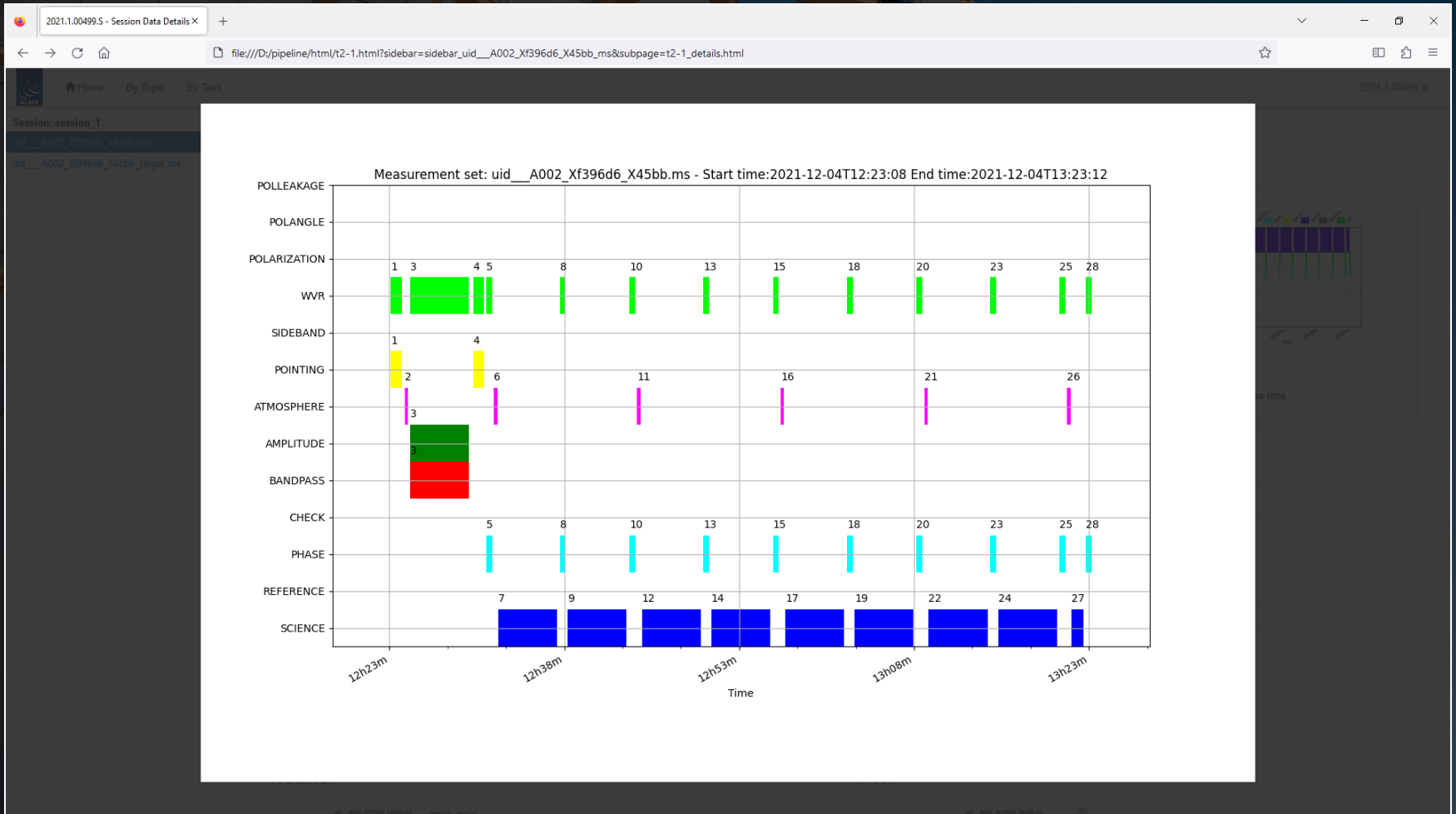
=====
MeasurementSet Name: /home/dared/opt/dared.20180CT/mnt/dataproc/2018.1.01131.S_2019_04_02T19_32_25.386/SOUS_uid__A001_X135b_X60/GOUS_uid__A001_X135b_X68/MOUS_uid__A001_X135b_X6b/working/uid__A002_Xd98580_X354.ms  MS Version 2
=====
observer: daryalexia  Project: uid://A001/X12ee/X3
Observation: ALMA
Data records: 22840320  Total elapsed time = 1092.77 seconds
Observed from 14-Mar-2019/01:01:10.3  to 14-Mar-2019/01:19:23.0 (UTC)

observationID = 0  ArrayID = 0
Date Timerange (UTC) Scan FldId FieldName nRows SpwIds Average Interval(s) ScanIntent
14-Mar-2019/01:01:10.3 - 01:03:13.0 1 0 J0538-4405 1919472 [0,1,2,3,4,5,6,7,8,9,10,11,12] [0.016, 0.016, 0.016, 0.016, 1.15, 2.02, 1.01, 2.02, 1.01, 2.02, 1.01, 2.02, 1.01] [CALIBRATE_POINTING#ON_SOURCE,CALIBRATE_WVR#ON_SOURCE]
01:03:33.1 - 01:03:50.6 2 0 J0538-4405 343248 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.016, 0.016, 0.016, 0.016, 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]
01:04:04.2 - 01:09:07.0 3 0 J0538-4405 8168976 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.016, 0.016, 0.016, 0.016, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 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]
01:09:42.9 - 01:11:45.7 4 1 J0730-1141 1919328 [0,1,2,3,4,5,6,7,8,9,10,11,12] [0.016, 0.016, 0.016, 0.016, 1.15, 2.02, 1.01, 2.02, 1.01, 2.02, 1.01, 2.02, 1.01] [CALIBRATE_POINTING#ON_SOURCE,CALIBRATE_WVR#ON_SOURCE]
01:12:00.0 - 01:12:17.6 5 1 J0730-1141 343248 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.016, 0.016, 0.016, 0.016, 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]
01:12:23.0 - 01:12:54.3 6 1 J0730-1141 816936 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.016, 0.016, 0.016, 0.016, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 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]
01:13:08.0 - 01:13:25.2 7 2 Z_CMA 343248 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.016, 0.016, 0.016, 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]
01:13:31.0 - 01:18:33.8 8 2 Z_CMA 8168976 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.016, 0.016, 0.016, 0.016, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01] [OBSERVE_TARGET#ON_SOURCE]
01:18:52.4 - 01:19:23.0 9 1 J0730-1141 816888 [4,13,14,15,16,17,18,19,20,21,22,23,24] [1.15, 0.016, 0.016, 0.016, 0.016, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 6.05, 1.01, 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]
(nRows = Total number of rows per scan)

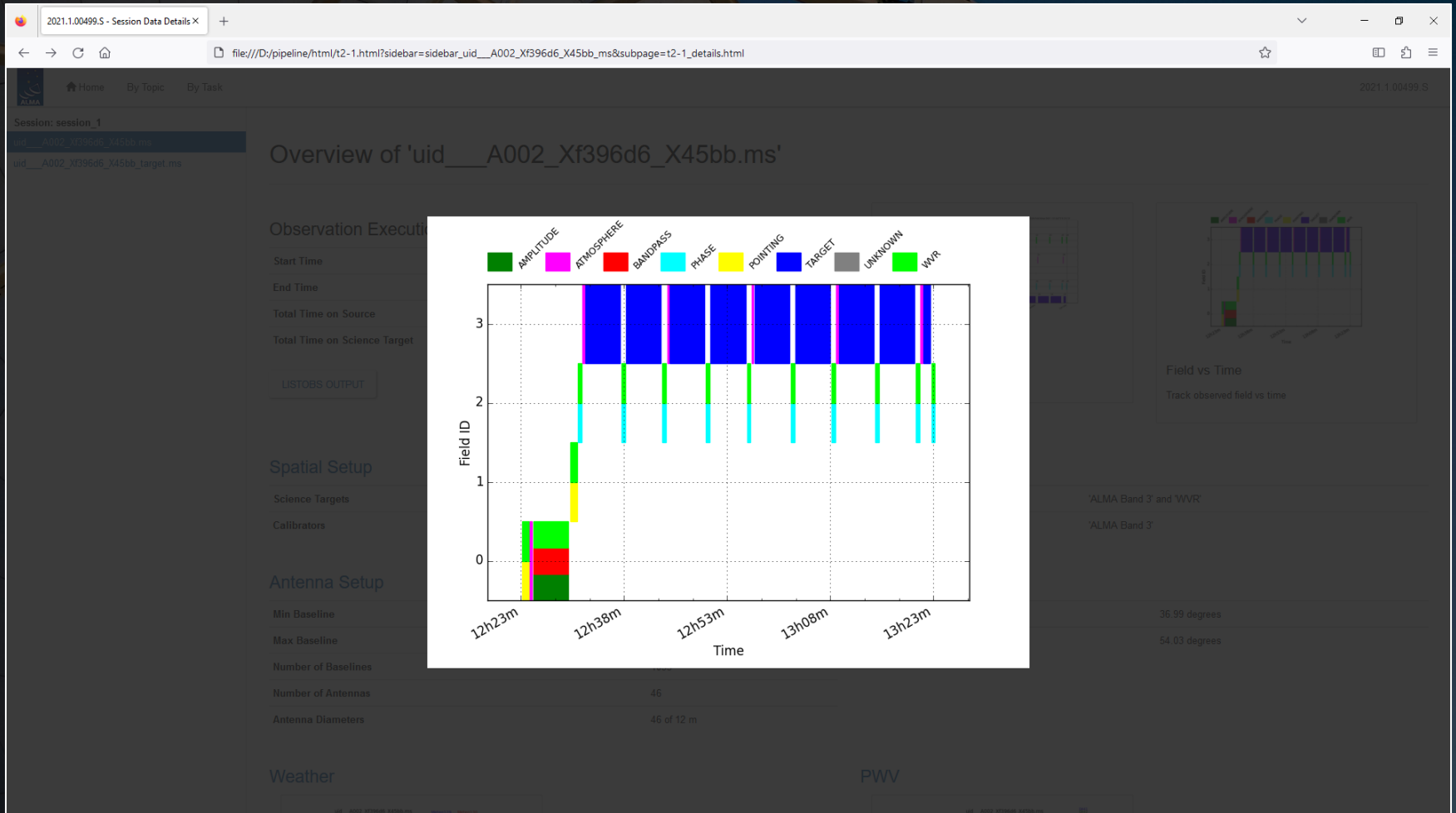
Fields: 3
ID Code Name RA Decl Epoch SrcId nRows
0 none J0538-4405 05:38:50.361558 -44.05:08.93891 ICRS 0 10431696
1 none J0730-1141 07:30:19.112473 -11.41:12.60058 ICRS 1 3896400
2 none Z_CMA 07:03:43.158465 -11.33:06.18271 ICRS 2 8512224

```

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).

2021.1.00499.S - Session Data Details X +

file:///D:/pipeline/html/t2-1.html?sidebar=sidebar_uid___A002_Xf396d6_X45bb_ms&subpage=t2-2-3.html

ALMA Home By Topic By Task 2021.1.00499.S

Session: session_1

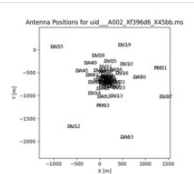
uid___A002_Xf396d6_X45bb_ms

uid___A002_Xf396d6_X45bb_target.ms

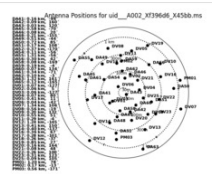
Antenna Setup Details

Antennas Baselines

Antenna Positions

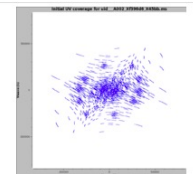


Antenna Position
Plot antenna latitude vs antenna longitude



Antenna Position
Polar-logarithmic plot of antenna positions.

UV coverage

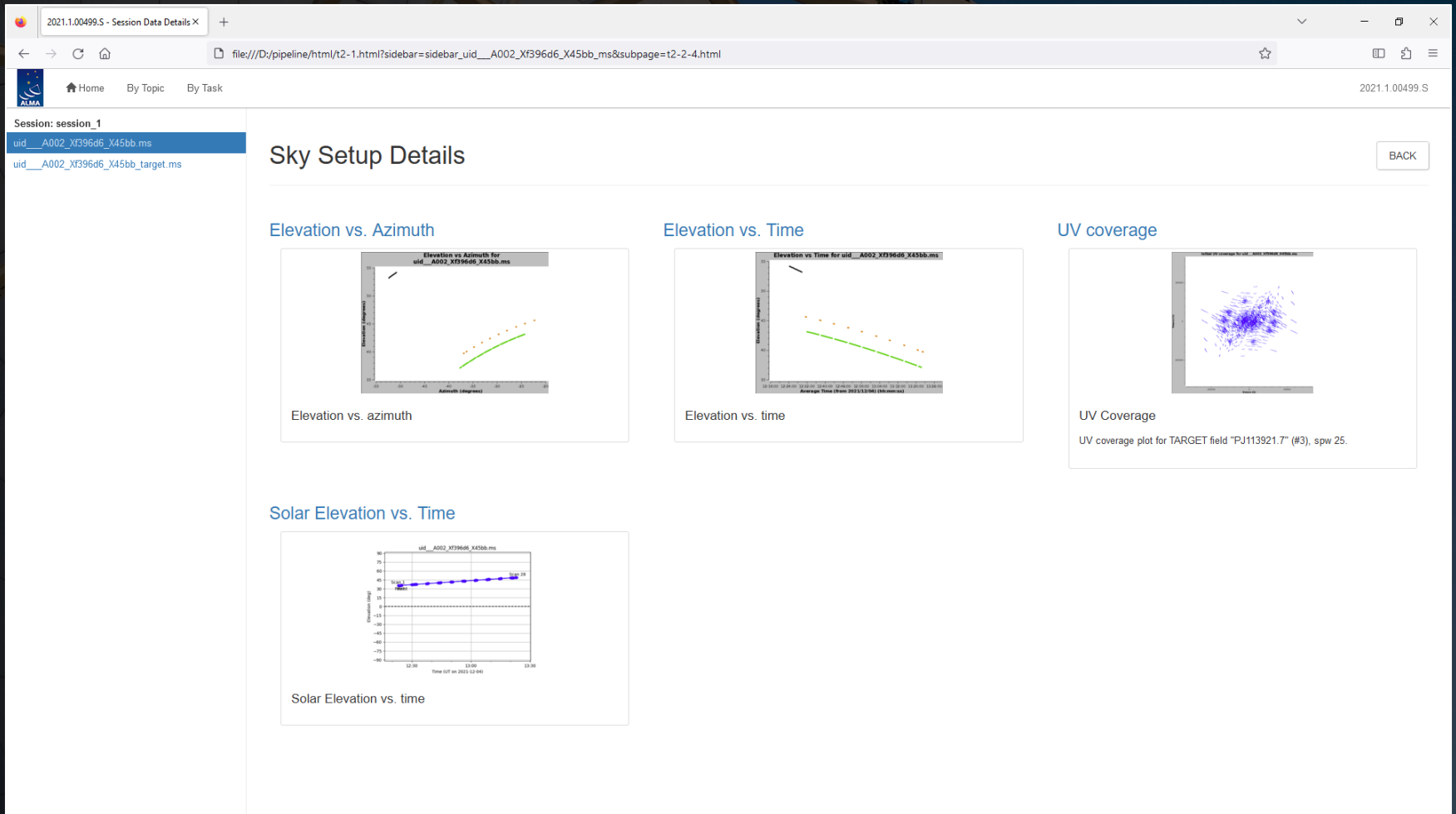


UV Coverage
UV coverage plot for TARGET field "FUJ113921.7" (#3), spw 25.

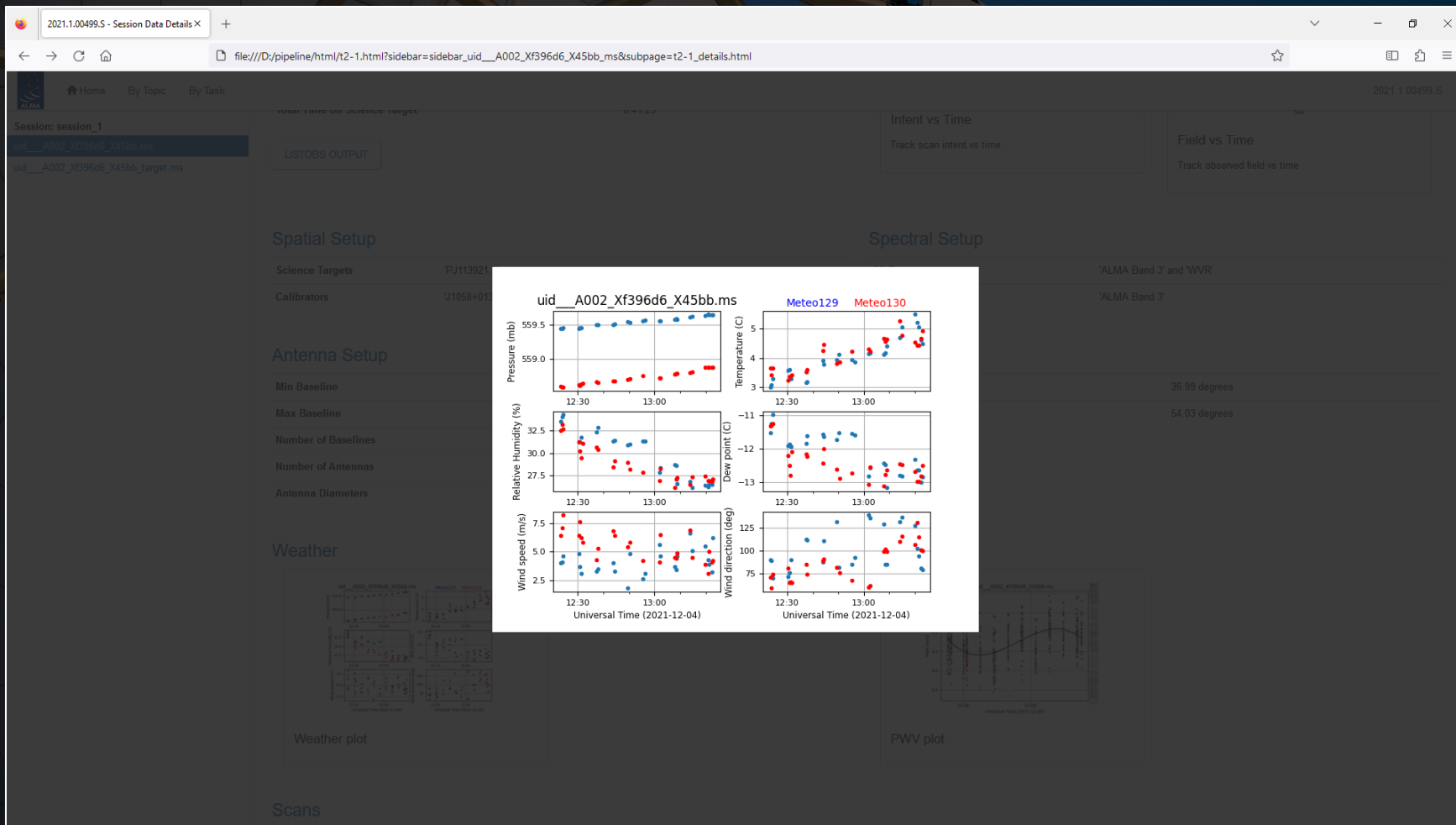
Antenna Details

ID	Name	Pad	Diameter	Offset from Array Centre	
				Longitude	Latitude
0	DA41	A073	12.0	-147.1 m	-705.3 m
1	DA42	A047	12.0	38.5 m	-775.2 m
2	DA43	A035	12.0	32.0 m	-706.8 m
3	DA45	A104	12.0	-530.9 m	-492.5 m
4	DA46	A016	12.0	37.5 m	-614.6 m
5	DA48	A076	12.0	-78.0 m	-882.7 m
6	DA49	A096	12.0	-347.1 m	-322.8 m
7	DA50	A100	12.0	725.0 m	622.0 m

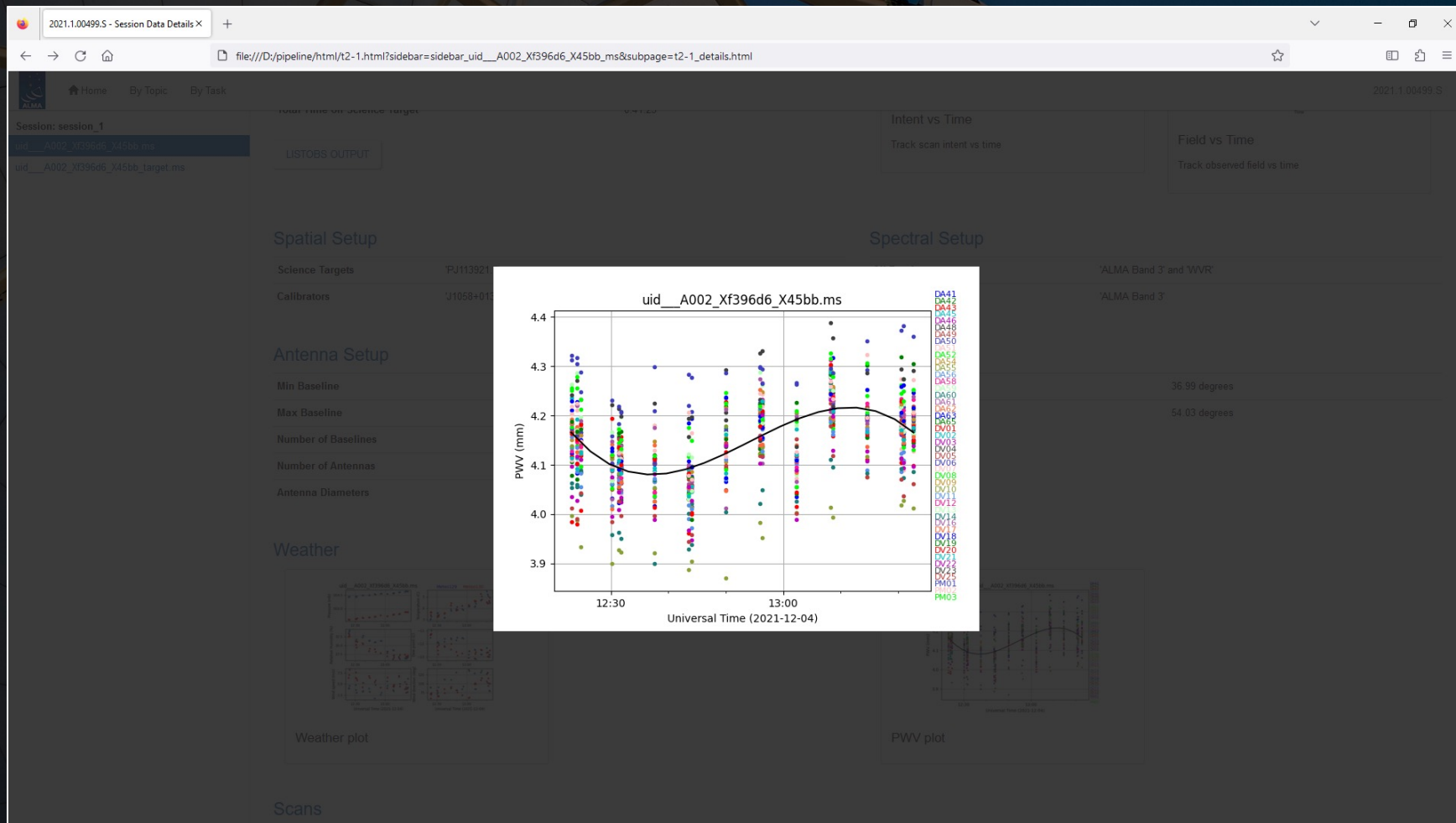
The sky setup shows the elevation and azimuth of the fields during the observations. The beam for sources observed at low elevations ($<45^\circ$) could appear elongated. Calibration problems may occur if the phase calibrator and science target are too far apart ($>10^\circ$).



The weather and PWV plots are useful for understanding the observing conditions. High humidity or PWV values could affect the S/N of the data. Sudden changes in the weather conditions could cause sudden changes in the phases and amplitudes.



The weather and PWV plots are useful for understanding the observing conditions. High humidity or PWV values could affect the S/N of the data. Sudden changes in the weather conditions could cause sudden changes in the phases and amplitudes.



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, but the ones listed on the following pages have the most useful information.

Task	QA Score	Duration
1. hifa_importdata : Register measurement sets with the pipeline	1.00	0:13:08
2. hifa_flagdata : ALMA deterministic flagging	1.00	0:42:48
3. hifa_fluxcallflag : Flag spectral features in solar system flux calibrators	1.00	0:00:03
4. hif_rawflagchans : Flag channels in raw data	1.00	0:04:18
5. hif_refant : Select reference antennas	1.00	0:00:12
6. h_tsyscal : Calculate Tsys calibration	1.00	0:07:38
7. hifa_tsysflag : Flag Tsys calibration	0.96	0:09:05
8. hifa_antpos : Correct for antenna position offsets	1.00	0:00:03
9. hifa_wvrflag : Calculate and flag WVR calibration	1.00	0:17:32
10. hif_lowgainflag : Flag antennas with low gain	1.00	0:05:35
11. hif_setmodels : Set calibrator model visibilities	1.00	0:05:50
12. hifa_bandpassflag : Phase-up bandpass calibration and flagging	0.96	0:20:04
13. hifa_bandpass : Phase-up bandpass calibration	0.95	0:15:21
14. hifa_spwphaseup : Spw phase offsets calibration	1.00	0:00:28
15. hifa_gfluxscaleflag : Phased-up flux scale calibration + flagging	1.00	0:08:55
16. hifa_gfluxscale : Transfer fluxscale from amplitude calibrator	1.00	0:10:11
17. hifa_timegaincal : Gain calibration	1.00	0:22:26
18. hifa_targetflag : Target outlier flagging	1.00	0:11:21
19. hif_applycal : Apply calibrations from context	1.00	0:35:17

hifa_importdata: This module imports data for the pipeline. The most notable information on this page is the list of model flux densities for the calibration sources.

The screenshot shows a web browser window with the URL `file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage1&ms=all&subpage=t2-4m_details.html`. The page title is "1. ALMA Import Data". A sidebar on the left lists tasks in execution order, with "1. hifa_importdata" selected. The main content area shows a summary of imported measurement sets and a table of imported flux densities.

1. ALMA Import Data

Data from 1 measurement set was registered with the pipeline. The imported data is summarised below.

Measurement Set	SchedBlock ID	Src Type	Dst Type	Number Imported			Size	flux.csv
				Scans	Fields	Science Target		
uid__A002_Xf396d6_X45bb.ms	uid://A001/X158f/X782	MS	MS	28	4	1	13.2 GB	View or download

Summary of Imported Measurement Sets

Imported Flux Densities

The following flux densities were imported into the pipeline context:

Measurement Set	Field	Intents	SpW	Flux Density				Spix	Age Of Nearest Monitor Point (days)
				I	Q	U	V		
uid__A002_Xf396d6_X45bb.ms	J1058+0133 (#0)	AMPLITUDE, BANDPASS	17	4.272 Jy	0.000 Jy	0.000 Jy	0.000 Jy	-0.503	5.0
			21	4.002 Jy					
			23	3.971 Jy					
			25	4.230 Jy					
J1150+2417 (#1)			17	1.119 Jy				-0.389	16.0
			21	1.064 Jy					
			23	1.058 Jy					
			25	1.110 Jy					
J1148+1840 (#2)		PHASE	17	133.504 mJy				-0.595	44.0
			21	123.578 mJy					
			23	122.448 mJy					
			25	131.938 mJy					

Flux densities imported from the ASDM. Online flux catalog values are used when available for ALMA.

The “age of nearest monitor point” information (when actually listed) will be needed later when comparing these catalogue flux densities to the ones measured in the dataset.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage1&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

2021.1.00499.S

1. ALMA Import Data

BACK

Data from 1 measurement set was registered with the pipeline. The imported data is summarised below.

Measurement Set	SchedBlock ID	Src Type	Dst Type	Number Imported			Size	flux.csv
				Scans	Fields	Science Target		
uid__A002_Xf396d6_X45bb.ms	uid://A001/X158f/X782	MS	MS	28	4	1	13.2 GB	View or download

Summary of Imported Measurement Sets

Imported Flux Densities

The following flux densities were imported into the pipeline context:

Measurement Set	Field	Intents	SpW	Flux Density				Spix	Age Of Nearest Monitor Point (days)
				I	Q	U	V		
uid__A002_Xf396d6_X45bb.ms	J1058+0133 (#0)	AMPLITUDE, BANDPASS	17	4.272 Jy	0.000 Jy	0.000 Jy	0.000 Jy	-0.503	5.0
			21	4.002 Jy					
			23	3.971 Jy					
			25	4.230 Jy					
	J1150+2417 (#1)		17	1.119 Jy				-0.389	16.0
			21	1.064 Jy					
			23	1.058 Jy					
			25	1.110 Jy					
	J1148+1840 (#2)	PHASE	17	133.504 mJy				-0.595	44.0
			21	123.578 mJy					
			23	122.448 mJy					
			25	131.938 mJy					

Flux densities imported from the ASDM. Online flux catalog values are used when available for ALMA.

In case of flux calibration problems, these numbers should be compared to data from the ALMA Calibrator Source Catalogue (<https://almascience.eso.org/sc/>). If the numbers differ, contact the local ARC for assistance with the dataset.

The screenshot shows a web browser window displaying the ALMA pipeline task details for '1. ALMA Import Data'. The page includes a sidebar with a list of tasks in execution order, a main content area with a 'BACK' button, and several data tables. The first table summarizes the imported data from a measurement set. The second table provides a summary of imported measurement sets. The third table lists imported flux densities with columns for measurement set, field, intents, spectral width, flux density components (I, Q, U, V), Spix, and age of nearest monitor point.

1. ALMA Import Data

Data from 1 measurement set was registered with the pipeline. The imported data is summarised below.

Measurement Set	SchedBlock ID	Src Type	Dst Type	Number Imported			Size	flux.csv
				Scans	Fields	Science Target		
uid__A002_Xf396d6_X45bb.ms	uid://A001/X158f/X782	MS	MS	28	4	1	13.2 GB	View or download

Summary of Imported Measurement Sets

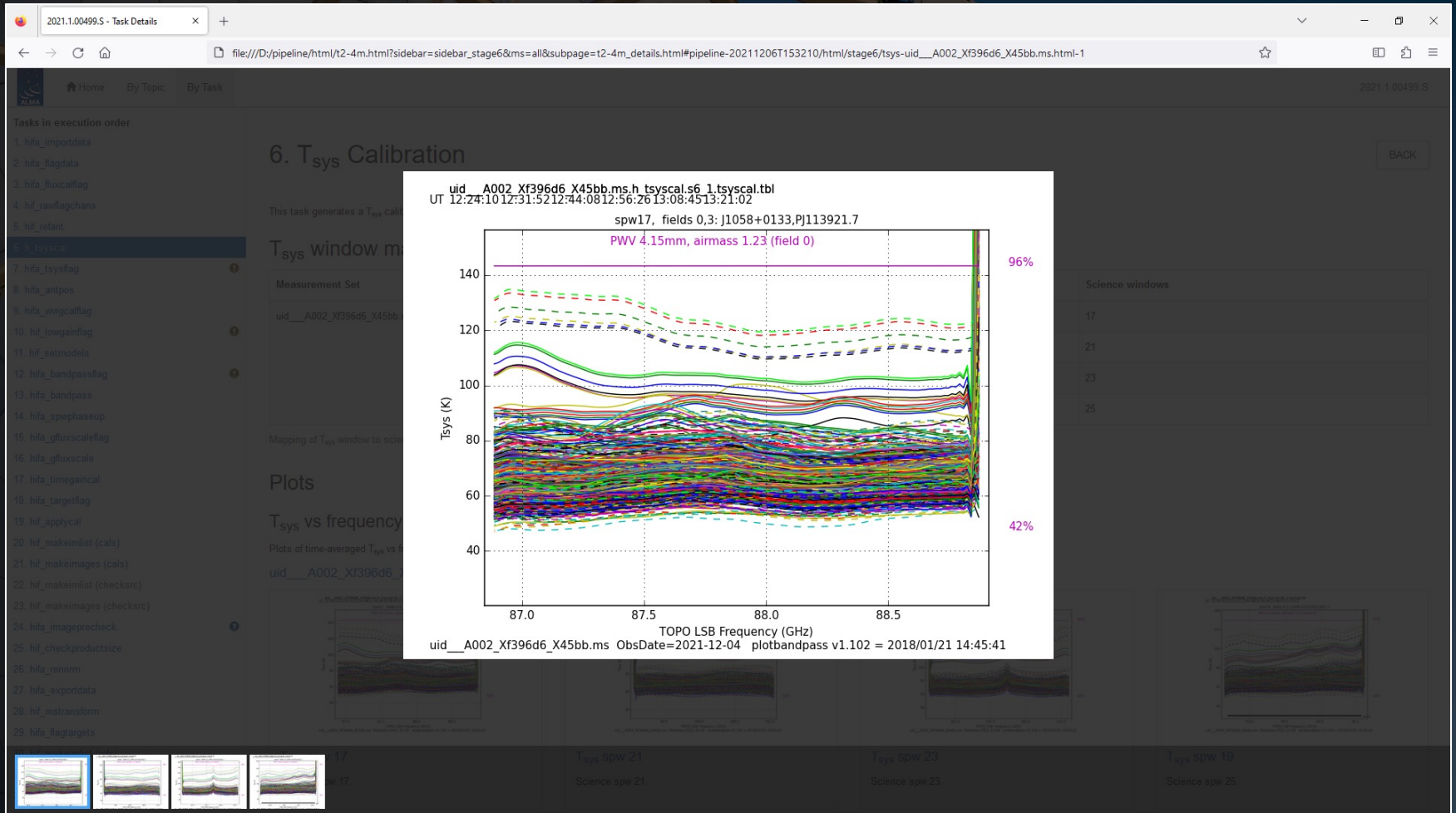
Imported Flux Densities

The following flux densities were imported into the pipeline context:

Measurement Set	Field	Intents	SpW	Flux Density				Spix	Age Of Nearest Monitor Point (days)
				I	Q	U	V		
uid__A002_Xf396d6_X45bb.ms	J1058+0133 (#0)	AMPLITUDE, BANDPASS	17	4.272 Jy	0.000 Jy	0.000 Jy	0.000 Jy	-0.503	5.0
			21	4.002 Jy					
			23	3.971 Jy					
			25	4.230 Jy					
J1150+2417 (#1)			17	1.119 Jy				-0.389	16.0
			21	1.064 Jy					
			23	1.058 Jy					
			25	1.110 Jy					
J1148+1840 (#2)		PHASE	17	133.504 mJy				-0.595	44.0
			21	123.578 mJy					
			23	122.448 mJy					
			25	131.938 mJy					

Flux densities imported from the ASDM. Online flux catalog values are used when available for ALMA.

The plots should be devoid of spectral features except in the locations of atmospheric lines, and the amplitudes of all lines in the plots should be similar.



hifa_tsysflag: This step applies flagging to bad T_{sys} data. It is useful to check the plots of T_{sys} versus frequency again to make sure bad data were flagged but good data were not. (Data covering atmospheric features should not necessarily be flagged here.)

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage7&ms=all&subpage=t2-4m_details.html

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2021.1.00499.S

7. Flag T_{sys} calibration

BACK

Task notifications

Warning! uid__A002_Xf396d6_X45bb.ms - for intent AMPLITUDE (field 0: J1058+0133) and spw 23, the following antennas are fully flagged: DA52

Warning! uid__A002_Xf396d6_X45bb.ms - for intent BANDPASS (field 0: J1058+0133) and spw 23, the following antennas are fully flagged: DA52

Warning! uid__A002_Xf396d6_X45bb.ms - the following antennas are moved to the end of the refant list because they are fully flagged for one or more Tsys spws, in one or more fields with intent "BANDPASS", "PHASE", and/or "AMPLITUDE": DA52

Contents

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

Reference Antenna update

For the measurement set(s) listed below, the reference antenna list was updated due to significant flagging (antennas moved to end and/or removed). See warnings in task notifications for details. Shown below are the updated reference antenna lists, only for those measurement sets where it was modified.

Measurement Set	Reference Antennas (Highest to Lowest)
uid__A002_Xf396d6_X45bb.ms	DA43, DV06, DV03, DV02, DV04, DV01, DA60, DA58, DV21, DA46, DA42, DV25, DA62, DA54, DA65, DV20, DA41, DA51, PM02, DA59, DV09, DA48, DV18, DV22, DV17, DV11, DA56, DV23, DA61, DV16, DV14, DV13, DV05, DA49, DV10, DV08, PM03, DA45, DA50, DV19, PM01, DV12, DA55, DA63, DV07, DA52

Updated reference antenna selection per measurement set. Antennas are listed in order of highest to lowest priority.

T_{sys} vs frequency after flagging

hifa_tsysflag: This step applies flagging to bad T_{sys} data. It is useful to check the plots of T_{sys} versus frequency again to make sure bad data were flagged but good data were not. (Data covering atmospheric features should not necessarily be flagged here.)

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage7&ms=all&subpage=t2-4m_details.html

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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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvconftit

For the measurement set(s) listed below, the reference antenna list was updated due to significant flagging (antennas moved to end and/or removed). See warnings in task notifications for details. Shown below are the updated reference antenna lists, only for those measurement sets where it was modified.

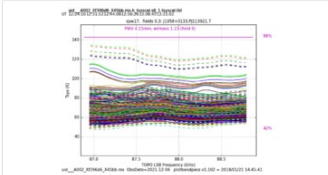
Measurement Set	Reference Antennas (Highest to Lowest)
uid__A002_Xf396d6_X45bb.ms	DA43, DV06, DV03, DV02, DV04, DV01, DA60, DA58, DV21, DA46, DA42, DV25, DA62, DA54, DA65, DV20, DA41, DA51, PM02, DA59, DV09, DA48, DV18, DV22, DV17, DV11, DA56, DV23, DA61, DV16, DV14, DV13, DV05, DA49, DV10, DV08, PM03, DA45, DA50, DV19, PM01, DV12, DA55, DA63, DV07, DA52

Updated reference antenna selection per measurement set. Antennas are listed in order of highest to lowest priority.

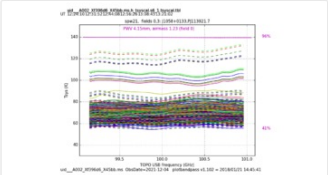
T_{sys} vs frequency after flagging

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

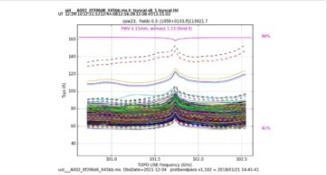
uid__A002_Xf396d6_X45bb.ms



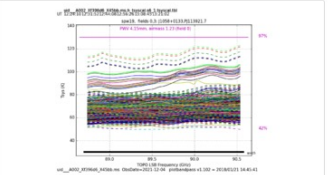
T_{sys} SPW 17
Science spw 17.



T_{sys} SPW 21
Science spw 21.



T_{sys} SPW 23
Science spw 23.



T_{sys} spw 19
Science spw 25.

Flagging steps

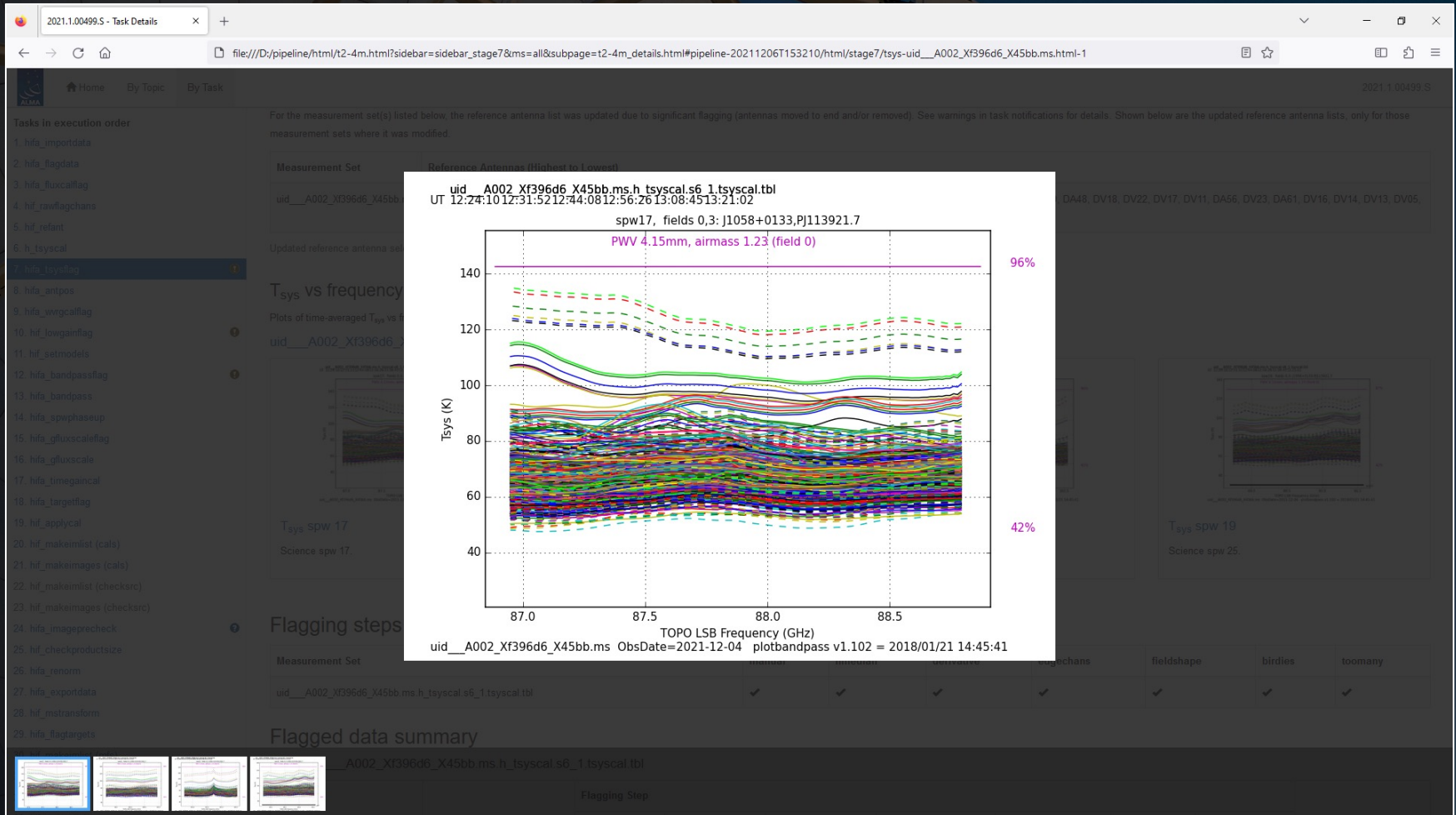
Measurement Set	manual	nmedian	derivative	edgechans	fieldshape	birdies	toomany
uid__A002_Xf396d6_X45bb.ms.h_tsyscal.s6_1.tsyscal.tbl	✓	✓	✓	✓	✓	✓	✓

Flagged data summary

Table: uid__A002_Xf396d6_X45bb.ms.h_tsyscal.s6_1.tsyscal.tbl

Flagging Step	Count

hifa_tsysflag: This step applies flagging to bad T_{sys} data. It is useful to check the plots of T_{sys} versus frequency again to make sure bad data were flagged but good data were not. (Data covering atmospheric features should not necessarily be flagged here.)



hifa_wvrgcalflag: In this step, an a priori phase correction based on measurements from water vapour radiometers is derived. The plots of the data before and after the application of the corrections should be checked to ensure that the corrections improve the data.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage9&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcalflag
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_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

9. WVR Calibration and Flagging

BACK

This task checks whether the WVR radiometers are working as intended, interpolating for antennas that are not. The WVR caltable is only added to subsequent pre-applies if it gives a tangible improvement.

Results

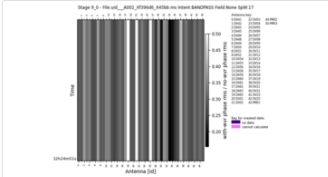
Plots

The pipeline tests whether application of WVR correction improves the data by performing a gaincal for a chosen field, usually the bandpass calibrator, and comparing the resulting phase corrections evaluated both with and without application of WVR correction. Plots based on these data in these evaluation caltables are presented below.

Flagging metric view(s)

The following plots show the flagging metric used by the pipeline to determine which antennas' WVR corrections to flag. The RMS phase during observation of the bandpass calibrator is calculated without WVR corrections applied, and with WVR corrections applied, and the metric is the ratio of those two RMS values. If the WVR measurements are corrupted, or the wvrgcal task itself flags the WVR data on a given antenna, then the pipeline will not calculate a metric here.

[uid__A002_Xf396d6_X45bb.ms](#)



Spectral window 17

Phase correction with/without WVR

The following set of plots show the improvement in the rms phase after applying the WVR corrections. These plots are calculated for various data intents after both the pipeline and wvrgcal task have selected antennas whose WVR correction needs flagging. The correction applied to those antennas in these plots is the correction interpolated from neighboring antennas. Sometimes antennas can have sufficiently corrupted data that the metric can still not be calculated, but those antennas will in most cases be flagged for the rest of the calibration process. Click on a link below to show all flagging metric views for that measurement set.

- [uid__A002_Xf396d6_X45bb.ms](#)

The next set of plots show the deviation about the scan median phase before and after WVR application. Points are plotted per integration and per correlation.

hifa_wvrgcalflag: In this step, an a priori phase correction based on measurements from water vapour radiometers is derived. The plots of the data before and after the application of the corrections should be checked to ensure that the corrections improve the data.

The screenshot shows a web browser window with the address bar displaying a file path: `file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage9&ms=all&subpage=t2-4m_details.html#pipeline-20211206T153210/html/stage9/phase-offsets-uid__A002_Xf396d6_X45bb.ms.html`. The page title is "Phase correction with/without WVR".

The page content includes a list of tasks in execution order on the left, with "hifa_wvrgcalflag" selected. The main content area contains the following text:

The following set of plots show the improvement in the rms phase after applying the WVR corrections. These plots are calculated for various data intents after both the pipeline and wvrgcal task have selected antennas whose WVR correction needs flagging. The correction applied to those antennas in these plots is the correction interpolated from neighboring antennas. Sometimes antennas can have sufficiently corrupted data that the metric can still not be calculated, but those antennas will in most cases be flagged for the rest of the calibration process. Click on a link below to show all flagging metric views for that measurement set.

uid__A002_Xf396d6_X45bb.ms

The next set of plots show the deviation about the scan median phase before and after WVR application. Points are plotted per integration and per correlation.

Click the summary plots to enlarge, or click the summary title for a gallery of more detailed plots for individual geteense.

uid__A002_Xf396d6_X45bb.ms

Spectral window 17

Phase correction vs distance

Plots show the phase offset (lower panel) and rms deviation (upper panel) for each antenna. The lower panel of these plots show the median phase offset with and without WVR correction. One plot is generated per antenna.

Click the summary plots to enlarge them, or the summary plot title to show a gallery of phase offset plots for individual antenna.

uid__A002_Xf396d6_X45bb.ms

The central plot is titled "J1148+1840,J1058+0133 (PHASE,BANDPASS,AMPLITUDE)" and "SPW 17 Correlations X and Y All Antennas Scans 3,5,8,10,13,15,18...28". The y-axis is "Deviation from Scan Median Phase (degrees)" ranging from -200 to 200. The x-axis is "Scan" with markers at 3, 5, 8, 10, 13, 15, 18, 20, 23, 25, 28. The plot shows four data series: "X before" (grey dashed line), "Y before" (blue dashed line), "X after" (green solid line), and "Y after" (red solid line). The "after" series show significantly reduced deviation compared to the "before" series.

hifa_wvrgcalflag: In this step, an a priori phase correction based on measurements from water vapour radiometers is derived. The plots of the data before and after the application of the corrections should be checked to ensure that the corrections improve the data.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage9&ms=all&subpage=t2-4m_details.html#pipeline-20211206T153210/html/stage9/phase_offsets_vs_baseline-uid__A002_Xf396d6_X45bb.ms.html

Home By Topic By Task 2021.1.00499.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcalflag
4. hif_rawflagchans
5. hif_rfdant
6. h_bayscal
7. hifa_tvsysflag
8. hifa_antos
9. **hifa_wvrgcalflag**
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spsphassup
15. hifa_gfluxscaleflag
16. hifa_gfluxscale
17. hifa_tmegancal
18. hifa_targetflag
19. hif_applycal
20. hif_makeimlist (cata)
21. hif_makeimages (cata)
22. hif_makeimlist (checkerc)
23. hif_makeimages (checkerc)
24. hifa_imagepscheck
25. hif_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtarget
30. hif_makeimlist (mts)
31. hif_fitdcom
32. hif_uvcontfit

Phase correction with/without WVR

The following set of plots show the improvement in the rms phase after applying the WVR corrections. These plots are calculated for various data intents after both the pipeline and wvrgcal task have selected antennas whose WVR correction needs flagging. The correction applied to those antennas in these plots is the correction interpolated from neighboring antennas. Sometimes antennas can have sufficiently corrupted data that the metric can still not be calculated, but those antennas will in most cases be flagged for the rest of the calibration process. Click on a link below to show all flagging metric views for that measurement set.

- uid__A002_Xf396d6_X45bb.ms

The next set of plots show the deviation about the scan median phase before and after WVR application. Points are plotted per integration and per correlation.

Click the summary plots to enlarge, or click the summary title for a gallery of more detailed plots for individual antenna.

uid__A002_Xf396d6_X45bb.ms

Spectral window 17

Phase correction vs distance

Plots show the phase offset (lower panel) and rms phase deviation (upper panel) versus distance to the reference antenna DA43. The lower panel of these plots show the median phase offset with and without WVR correction. One plot is generated per antenna.

Click the summary plots to enlarge them, or the summary plot title to show a gallery of phase offset plots for individual antenna.

uid__A002_Xf396d6_X45bb.ms

J1058+0133 (AMPLITUDE,BANDPASS)

SPW 17 Correlations X and Y All Antennas Scan 3

Phase RMS without WVR / Phase RMS with WVR

ratio

No Improvement

Median Absolute Deviation from Median Phase

degrees

Distance to Reference Antenna DA43 (m)

▲ X before ▲ X after ● Y before ● Y after

hifa_bandpassflag: This is a step to identify data with aberrant amplitudes before deriving corrections for the phase and amplitude versus frequency. It is useful to check the output from this step to ensure that statistical outliers are removed in the “after flagging” images.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage12&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

2021.1.00499.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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mstansform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

12. Bandpass Calibration Flagging

BACK

Task notifications

- Warning! uid___A002_Xf396d6_X45bb.ms - for intent BANDPASS (field J1058+0133) and spw 17, the following antennas are fully flagged: PM01
- Warning! uid___A002_Xf396d6_X45bb.ms - for intent BANDPASS (field J1058+0133) and spw 21, the following antennas are fully flagged: DV08
- Warning! uid___A002_Xf396d6_X45bb.ms - for intent BANDPASS (field J1058+0133) and spw 25, the following antennas are fully flagged: PM01
- Warning! uid___A002_Xf396d6_X45bb.ms - the following antennas are moved to the end of the refant list because they are fully flagged for one or more spws, in one or more fields with intents among BANDPASS: PM01 and DV08

This task performs a preliminary phased-up bandpass solution and temporarily applies it, then computes the flagging heuristics by calling `hif_correctedampflag` which looks for outlier visibility points by statistically examining the scalar difference of the corrected amplitude minus model amplitudes, and then flags those outliers. The philosophy is that only outlier data points that have remained outliers after calibration will be flagged. Note that the phase of the data is not assessed.

Plots are generated at two points in this workflow: after bandpass calibration but before flagging heuristics are run, and after flagging heuristics have been run and applied. If no points were flagged, the “after” plots are not generated or displayed.

Contents

- [Reference Antenna update table](#)
- [Flagging commands](#)
- [Flagged data summary table](#)
- [Amplitude vs time plots for flagging](#)
- [Amplitude vs UV distance plots for flagging](#)

Reference Antenna update

For the measurement set(s) listed below, the reference antenna list was updated due to significant flagging (antennas moved to end and/or removed). See warnings in task notifications for details. Shown below are the updated reference antenna lists, only for those measurement sets where it was modified.

Measurement Set	Reference Antennas (Highest to Lowest)
uid___A002_Xf396d6_X45bb.ms	DA43, DV06, DV03, DV02, DV04, DV01, DA60, DA58, DV21, DA46, DA42, DV25, DA62, DA54, DA65, DV20, DA41, DA51, PM02, DA59, DV09, DA48, DV18, DV22, DV17, DV11, DA56, DV23, DA61, DV16, DV14, DV13, DV05, DA49, DV10, PM03, DA45, DA50, DV19, DV12, DA55, DA63, DV07, DA52, DV08, PM01

Updated reference antenna selection per measurement set. Antennas are listed in order of highest to lowest priority.

Flagging

hifa_bandpassflag: This is a step to identify data with aberrant amplitudes before deriving corrections for the phase and amplitude versus frequency. It is useful to check the output from this step to ensure that statistical outliers are removed in the “after flagging” images.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage12&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.S

Tasks in execution order

1. hifa_impordata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_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_checkproductsizes
26. hifa_renom
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

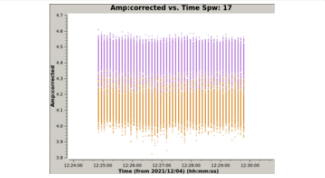
Amplitude vs time

These plots show amplitude vs time for two cases: 1, the calibrated data before application of any flags; and 2, where flagging was applied, the calibrated data after application of flags.

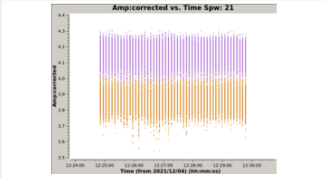
Data are plotted for all antennas and correlations, with different correlations shown in different colours.

uid__A002_Xf396d6_X45bb.ms

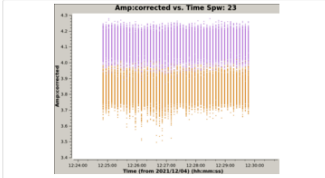
Spectral Window 17
Intents: BANDPASS
Calibrated data before flagging.



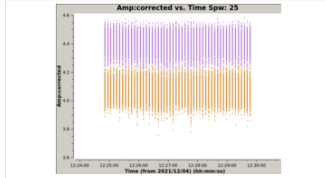
Spectral Window 21
Intents: BANDPASS
Calibrated data before flagging.



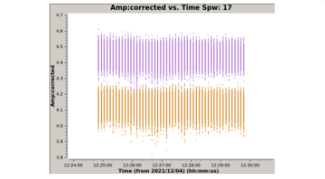
Spectral Window 23
Intents: BANDPASS
Calibrated data before flagging.



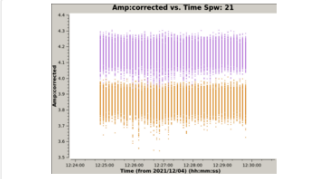
Spectral Window 25
Intents: BANDPASS
Calibrated data before flagging.



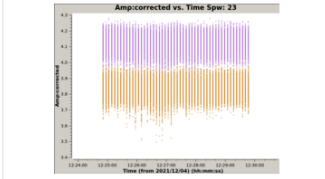
Spectral Window 17
Intents: BANDPASS
Calibrated data after flagging.



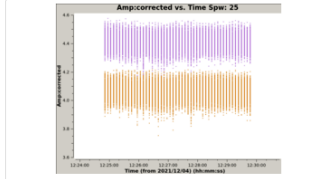
Spectral Window 21
Intents: BANDPASS
Calibrated data after flagging.



Spectral Window 23
Intents: BANDPASS
Calibrated data after flagging.



Spectral Window 25
Intents: BANDPASS
Calibrated data after flagging.



Amplitude vs UV distance

These plots show amplitude vs UV distance for two cases: 1, the calibrated data before application of any flags; and 2, where flagging was applied, the calibrated data after application of flags.

Data are plotted for all antennas and correlations, with different correlations shown in different colours.

hifa_bandpassflag: This is a step to identify data with aberrant amplitudes before deriving corrections for the phase and amplitude versus frequency. It is useful to check the output from this step to ensure that statistical outliers are removed in the “after flagging” images.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage12&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

2021.1.00499.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_wvrqcallflag
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_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

Amplitude vs UV distance

These plots show amplitude vs UV distance for two cases: 1, the calibrated data before application of any flags; and 2, where flagging was applied, the calibrated data after application of flags.

Data are plotted for all antennas and correlations, with different correlations shown in different colours.

uid__A002_Xf396d6_X45bb.ms

Spectral Window	Intents	Calibrated data before flagging	Calibrated data after flagging
Spectral Window 17	BANDPASS		
Spectral Window 21	BANDPASS		
Spectral Window 23	BANDPASS		
Spectral Window 25	BANDPASS		

Pipeline QA

Input Parameters

Tasks Execution Statistics

hifa_bandpass: Corrections for the phase and amplitude versus frequency are derived in this step. The plots of these quantities versus frequency should be smooth. Otherwise, it may be necessary to re-calibrate the data.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage13&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.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_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_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

13. Bandpass Calibration

BACK

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_Xf396d6_X45bb.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_Xf396d6_X45bb.ms	Channel	inf,15.625000MHz(1.0ch)	ALL	17	uid__A002_Xf396d6_X45bb.ms.hifa_bandpass.s13_3.spw17_21_23_25.channel.solintinf.bcal.tbl
				21	
	23				
	25				
		inf,3.906250MHz(1.0ch)			

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 typical antenna.

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

uid__A002_Xf396d6_X45bb.ms

hifa_bandpass: Corrections for the phase and amplitude versus frequency are derived in this step. The plots of these quantities versus frequency should be smooth. Otherwise, it may be necessary to re-calibrate the data.

2021.1.00499.5 - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage13&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.5

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_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_checkproductsizes
26. hifa_renom
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontcheck

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 detailed plots per spectral window and antenna.

uid___A002_Xf396d6_X45bb.ms

Amplitude vs frequency (show uid___A002_Xf396d6_X45bb.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 detailed plots for all antennas, or on the links below to show plots with specific antennas preselected.

Reference antenna (DA43) (show DA43)

Amplitude vs frequency for the reference antenna (DA43). Click the link above to show detailed plots for DA43.

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_Xf396d6_X45bb.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 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.

Pipeline QA

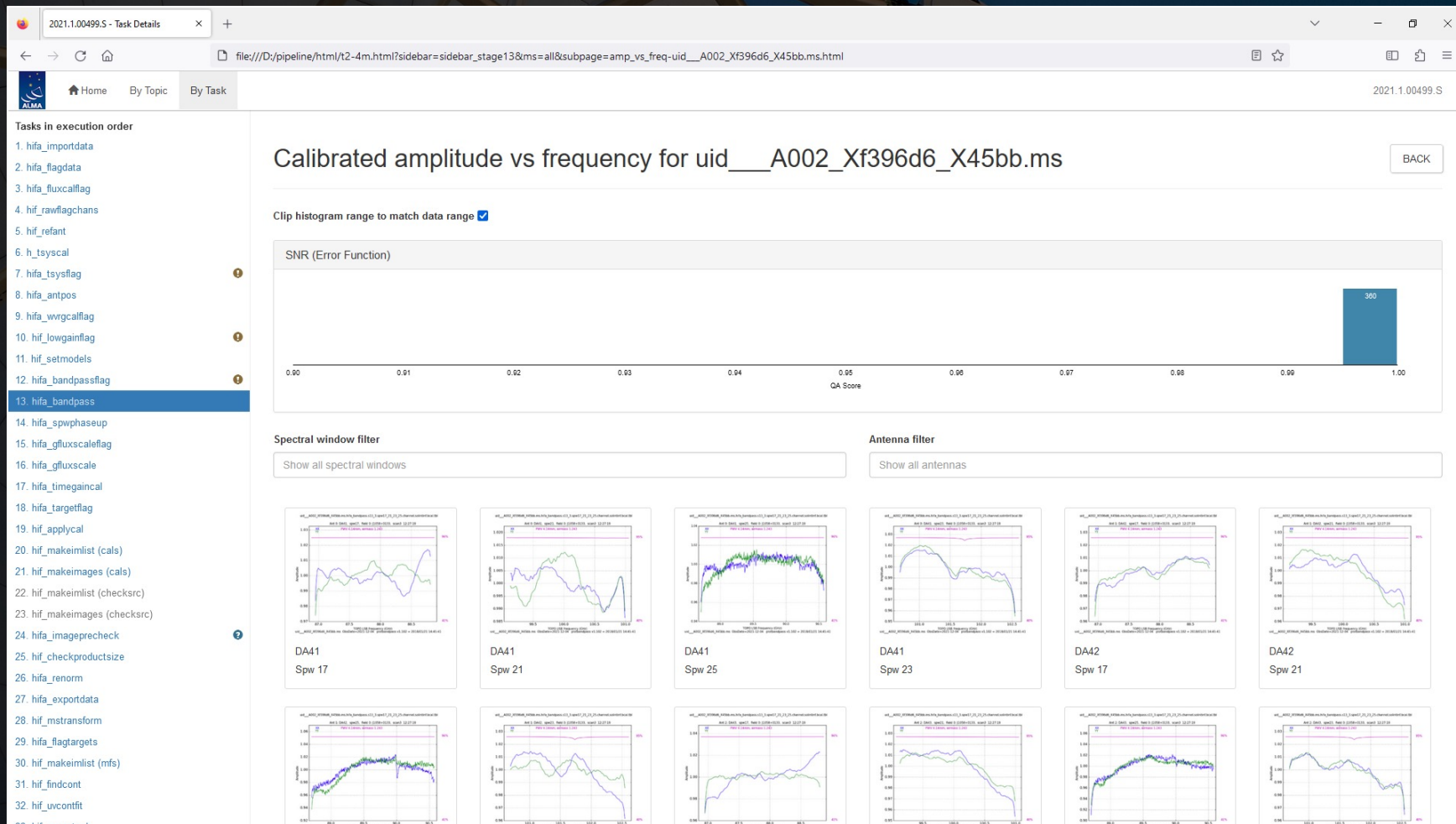
Input Parameters

Tasks Execution Statistics

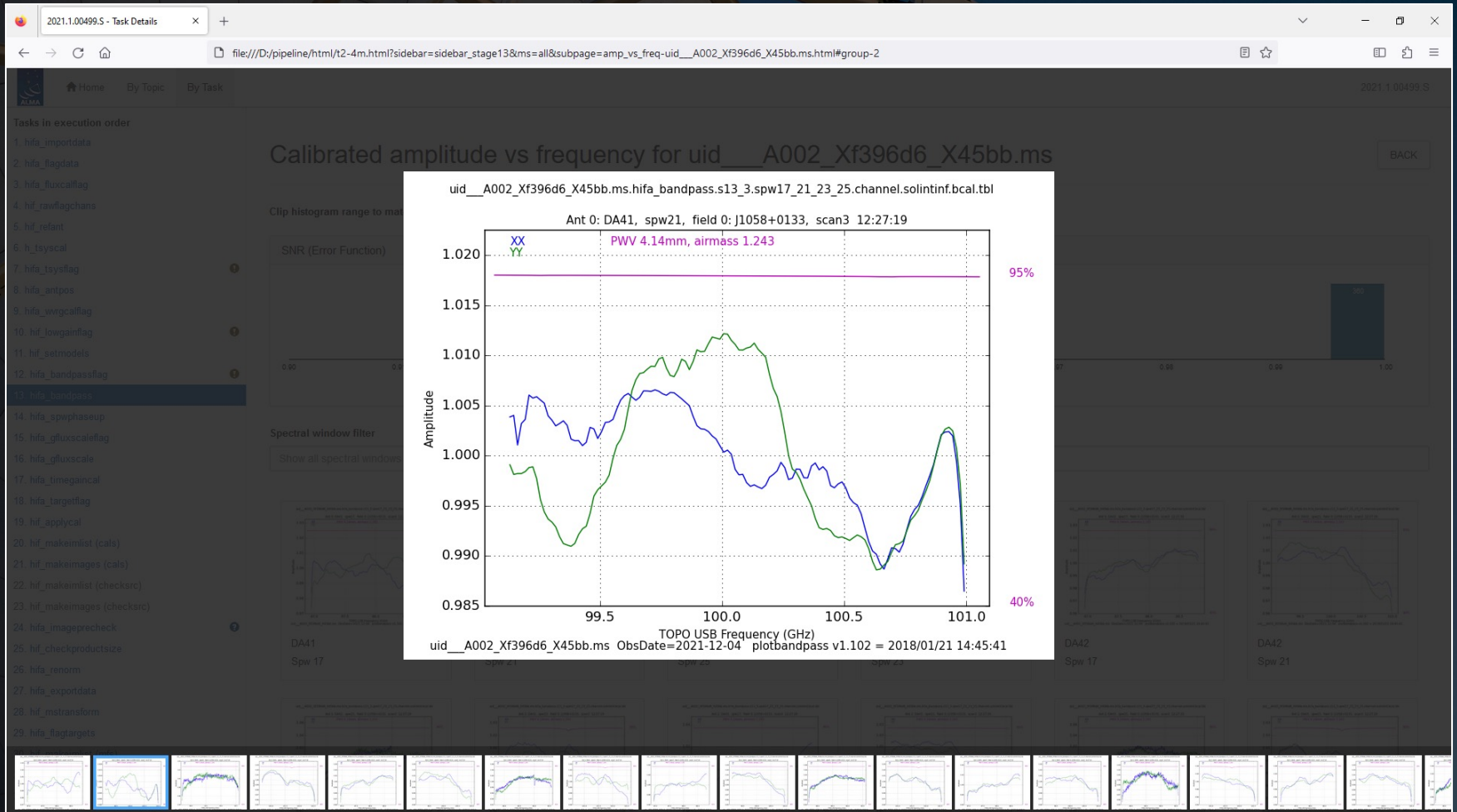
CASA logs for stage 13

- View or download stage13/casapy.log (152.1 KB)

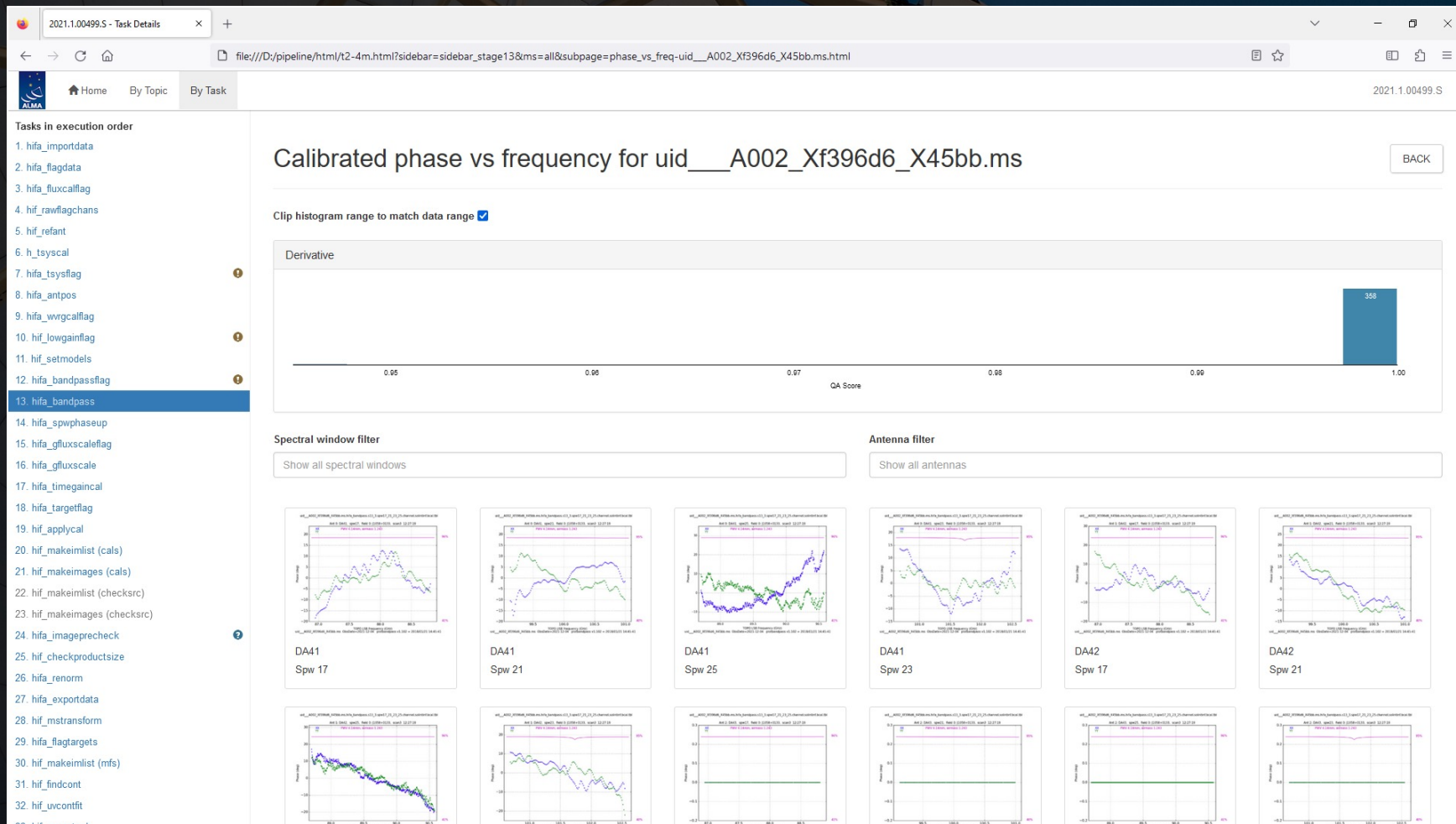
hifa_bandpass: Corrections for the phase and amplitude versus frequency are derived in this step. The plots of these quantities versus frequency should be smooth. Otherwise, it may be necessary to re-calibrate the data.



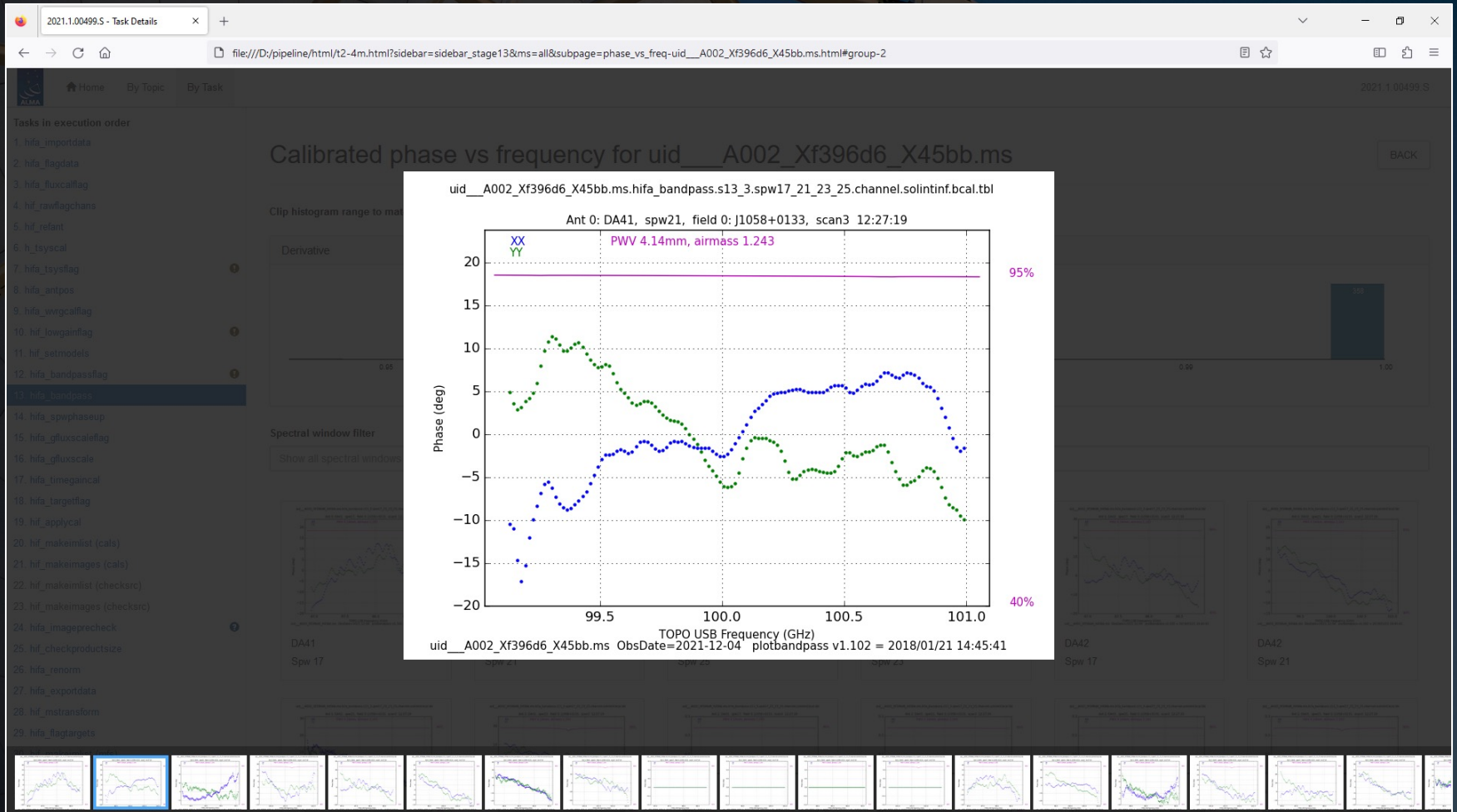
hifa_bandpass: Corrections for the phase and amplitude versus frequency are derived in this step. The plots of these quantities versus frequency should be smooth. Otherwise, it may be necessary to re-calibrate the data.



hifa_bandpass: Corrections for the phase and amplitude versus frequency are derived in this step. The plots of these quantities versus frequency should be smooth. Otherwise, it may be necessary to re-calibrate the data.



hifa_bandpass: Corrections for the phase and amplitude versus frequency are derived in this step. The plots of these quantities versus frequency should be smooth. Otherwise, it may be necessary to re-calibrate the data.



hifa_spwphaseup: From Cycle 9 onwards (but not in the example used here), this step produces diagnostic plots showing the rms noise in the phases as a function of uv distance. They look similar to another set of plots from the QA0 reports.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage14&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

14. Compute Spw Phaseup Map and Offsets

BACK

This task computes the spectral window map that will be used to apply the time gaincal phase solutions and the caltable containing per spw phase offsets.

Results

Measurement Set	Spectral Window Map
uid__A002_Xf396d6_X45bb.ms	

Phase solution spw map per measurement set.

Measurement Set	Phase SNR threshold	Spectral Window	Estimated SNR
uid__A002_Xf396d6_X45bb.ms	32.0	17	113.9
		21	102.3
		23	96.7
		25	114.1

Estimated phase calibrator signal to noise ratios per measurement set. For spectral windows where the estimated SNR is below the specified threshold (phasesnr parameter), the SNR value is indicated in **bold**.

Measurement Set	Solution Parameters		Applied To		Calibration Table
	Type	Interval	Scan Intent	Spectral Windows	
uid__A002_Xf396d6_X45bb.ms	Phase only	Infinite	ALL	17, 21, 23, 25	uid__A002_Xf396d6_X45bb.ms.hifa_spwphaseup.s14_3.spw17_21_23_25.solintinf.gpcal.tbl

Applied calibrations and parameters used for caltable generation

Pipeline QA

Input Parameters

Tasks Execution Statistics

hifa_spwphaseup: From Cycle 9 onwards (but not in the example used here), this step produces diagnostic plots showing the RMS noise in the phases as a function of uv distance. They look similar to another set of plots from the QA0 reports.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage14&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit

14. Compute Spw Phaseup Map and Offsets

This task computes the spectral window map that will be used to apply the time gaincal phase solutions and the ca

Results

Measurement Set

uid__A002_XF396d6_X45bb.ms

Phase solution spw map per measurement set.

Measurement Set	Phase SNR threshold
uid__A002_XF396d6_X45bb.ms	32.0

Estimated phase calibrator signal to noise ratios per measurement set. For spectral windows where the estimated S

Measurement Set	Solution Parameters		Applied To	
	Type	Interval	Scan Intent	Spectral
uid__A002_XF396d6_X45bb.ms	Phase only	Infinite	ALL	17, 21, 23

Applied calibrations and parameters used for callable generation

Pipeline QA

Input Parameters

Tasks Execution Statistics

2021.1.00499.S

BACK

Phase RMS (baseline-based)

Source: J10580133

Source: J11481840

Corrected phase rms per baseline in-scan, in summed BB

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The phase RMS values in these plots should be below 70° , or else the data cannot be calibrated properly. Ideally, the phase RMS values should vary linearly with uv distance, but this is not absolutely necessary.

2021.1.00499.5 - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage14&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

14. Compute Spw Phaseup Map and Offsets

This task computes the spectral window map that will be used to apply the time gaincal phase solutions and the ca

Results

Measurement Set

uid__A002_Xf396d6_X45bb.ms

Phase solution spw map per measurement set.

Measurement Set	Phase SNR threshold
uid__A002_Xf396d6_X45bb.ms	32.0

Estimated phase calibrator signal to noise ratios per measurement set. For spectral windows where the estimated S

Measurement Set	Solution Parameters		Applied To	
	Type	Interval	Scan Intent	Spectral
uid__A002_Xf396d6_X45bb.ms	Phase only	Infinite	ALL	17, 21, 23

Applied calibrations and parameters used for callable generation

Pipeline QA

Input Parameters

Tasks Execution Statistics

Phase RMS (baseline-based)

Source: J10580133

Phase RMS, deg

Baseline length, m

• BB_ALL X polarization
• BB_ALL Y polarization

Source: J11481840

Phase RMS, deg

Baseline length, m

• BB_ALL X polarization
• BB_ALL Y polarization

Corrected phase rms per baseline in-scan, in summed BB

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Any noisy or problematic baselines can be identified in the logs accessible from the bottom of the page.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage14&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

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_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_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

14. Compute Spw Phaseup Map and Offsets

This task computes the spectral window map that will be used to apply the time gaincal phase solutions and the ca

Results

Measurement Set

uid__A002_XF396d6_X45bb.ms

Phase solution spw map per measurement set.

Measurement Set	Phase SNR threshold
uid__A002_XF396d6_X45bb.ms	32.0

Estimated phase calibrator signal to noise ratios per measurement set. For spectral windows where the estimated S

Measurement Set	Solution Parameters		Applied To	
	Type	Interval	Scan Intent	Spectral
uid__A002_XF396d6_X45bb.ms	Phase only	Infinite	ALL	17, 21, 23

Applied calibrations and parameters used for callable generation

Pipeline QA

Input Parameters

Tasks Execution Statistics

Phase RMS (baseline-based)

Source: J10580133

Phase RMS, deg

Baseline length, m

BB_ALL X polarization
BB_ALL Y polarization

Source: J11481840

Phase RMS, deg

Baseline length, m

BB_ALL X polarization
BB_ALL Y polarization

Corrected phase rms per baseline in-scan, in summed BB

Page 6 of 16

hifa_gfluxscaleflag: Outliers from the hifa_bandpassflag step should be flagged before this step. It is worth checking the plots of amplitude versus time and versus uv distance, which are now shown for the phase calibrator (and other calibrators when they are present).

The screenshot shows a web browser window with the URL `file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage15&ms=all&subpage=t2-4m_details.html`. The page title is "2021.1.00499.S - Task Details". The browser's address bar shows the file path. The page content includes a navigation menu on the left with tasks listed in execution order, a main content area with a "BACK" button, a description of the task, a "Contents" section with links to "Flagging commands", "Flagged data summary table", "Amplitude vs time plots for flagging", and "Amplitude vs UV distance plots for flagging", a "Flagging" section with a table, and a "Flagged data summary" section with a table.

15. Phased-up Fluxscale Calibration and Flagging

This task computes the flagging heuristics on the phase calibrator and flux calibrator by calling `hif_correctedampflag` which looks for outlier visibility points by statistically examining the scalar difference of corrected amplitudes minus model amplitudes, and flags those outliers. The philosophy is that only outlier data points that have remained outliers after calibration will be flagged. The heuristic works equally well on resolved calibrators and point sources because it is not performing a vector difference, and thus is not sensitive to nulls in the flux density vs. `uvdistance` domain. Note that the phase of the data is not assessed.

In further detail, the workflow is as follows: an a priori calibration is applied using pre-existing caltables in the calibration state, a preliminary phase and amplitude gaincal solution is solved and applied, the flagging heuristics are run, and any outliers are flagged. Plots are generated at two points in this workflow: after preliminary phase and amplitude calibration but before flagging heuristics are run, and after flagging heuristics have been run and applied. If no points were flagged, the "after" plots are not generated or displayed. The score for this stage is the standard data flagging score, which depends on the fraction of data flagged.

Contents

- Flagging commands
- Flagged data summary table
- Amplitude vs time plots for flagging
- Amplitude vs UV distance plots for flagging

Flagging

Measurement Set	Flagging Commands	Number of Statements
<code>uid__A002_Xf396d6_X45bb.ms</code>	<code>uid__A002_Xf396d6_X45bb.ms-flag_commands.txt</code>	0

Report Files

Flagged data summary

Measurement Set: `uid__A002_Xf396d6_X45bb.ms`

Data Selection	flagged before	flagged after
TOTAL	21.352%	21.352%
BANDPASS	9.914%	9.914%
AMPLITUDE	9.914%	9.914%
PHASE	10.223%	10.223%

hifa_gfluxscaleflag: Outliers from the hifa_bandpassflag step should be flagged before this step. It is worth checking the plots of amplitude versus time and versus uv distance, which are now shown for the phase calibrator (and other calibrators when they are present).

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage15&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.S

Tasks in execution order

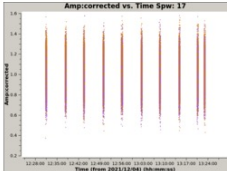
1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallflag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrqcallflag
10. hif_lowgainflag
11. hif_setmodels
12. hifa_bandpassflag
13. hifa_bandpass
14. hifa_spwphaseup
15. **hifa_gfluxscaleflag**
16. hifa_gfluxscale
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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontcheck

Amplitude vs time

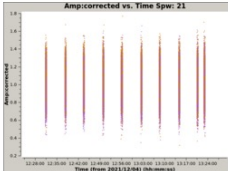
These plots show amplitude vs time for two cases: 1, the calibrated data before application of any flags; and 2, where flagging was applied, the calibrated data after application of flags.

Data are plotted for all antennas and correlations, with different correlations shown in different colours.

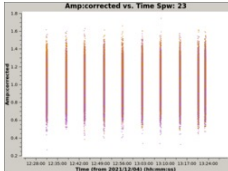
uid__A002_Xf396d6_X45bb.ms



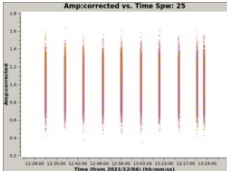
Spectral Window 17
Intents: PHASE
Fields: J1148+1840
Calibrated data before flagging.



Spectral Window 21
Intents: PHASE
Fields: J1148+1840
Calibrated data before flagging.



Spectral Window 23
Intents: PHASE
Fields: J1148+1840
Calibrated data before flagging.



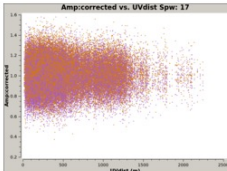
Spectral Window 25
Intents: PHASE
Fields: J1148+1840
Calibrated data before flagging.

Amplitude vs UV distance

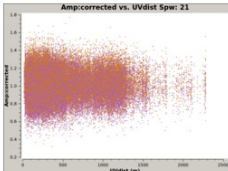
These plots show amplitude vs UV distance for two cases: 1, the calibrated data before application of any flags; and 2, where flagging was applied, the calibrated data after application of flags.

Data are plotted for all antennas and correlations, with different correlations shown in different colours.

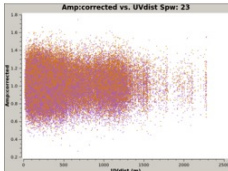
uid__A002_Xf396d6_X45bb.ms



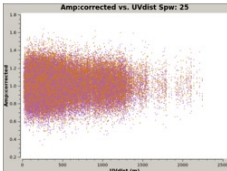
Spectral Window 17
Intents: PHASE
Field: J1148+1840



Spectral Window 21
Intents: PHASE
Field: J1148+1840



Spectral Window 23
Intents: PHASE
Field: J1148+1840



Spectral Window 25
Intents: PHASE
Field: J1148+1840

hifa_gfluxscale: The fluxes for the calibration sources (except the flux calibrator source itself) are compared to the values from the calibrator archive here.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage16&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

2021.1.00499.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_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_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_uvcontcheck

16. Phased-up fluxscale

BACK

Contents

- Tables:
 - Antennas used for flux scaling
 - Computed flux densities
- Plots:
 - Calibrated flux density vs derived flux density vs catalogue flux density
 - Flux calibrator model comparison

Results

Antennas Used for Flux Scaling

The following antennas were used for flux scaling, entries for unresolved flux calibrators are blank

Measurement Set	UV Range	Antennas
uid__A002_Xf396d6_X45bb.ms		

Antennas for Flux Calibration

Computed Flux Densities

The following flux densities were set in the measurement set model column and recorded in the pipeline context:

Measurement Set	Field	Spw	Frequency Bandwidth (TOPO)	Derived Scaling Factor				Flux Ratio (Calibrated / Catalog)	Spix
				Calibrated Visibility Flux Density					
				Catalog Flux Density					
				I	Q	U	V		
uid__A002_Xf396d6_X45bb.ms	J1148+1840 (#2) PHASE	17	87.878 GHz 2.000 GHz	132.519 ± 0.657 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.990	0.0
				132.209 ± 0.109 mJy (0.08%)					

These numbers should be close, but only if the two sets of numbers are from similar dates (within 30 days of each other). The phase calibrators vary in brightness over time, so the catalog values often do not measure the derived values.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage16&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrqcallag
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_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontcheck

Computed Flux Densities

The following flux densities were set in the measurement set model column and recorded in the pipeline context:

Measurement Set	Field	Spw	Frequency Bandwidth (TOPO)	Derived Scaling Factor				Flux Ratio (Calibrated / Catalog)	Spix	
				Calibrated Visibility Flux Density						
				Catalog Flux Density						
I	Q	U	V							
uid__A002_Xf396d6_X45bb.ms	J1148+1840 (#2) PHASE	17	87.878 GHz 2.000 GHz	132.519 ± 0.657 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.990	0.0	
				132.209 ± 0.109 mJy (0.08%)						
				133.504 mJy						
		21	100.062 GHz 2.000 GHz	121.772 ± 0.599 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy			0.983
				121.473 ± 0.112 mJy (0.09%)						
				123.578 mJy						
		23	101.619 GHz 2.000 GHz	120.503 ± 0.546 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy			0.982
				120.196 ± 0.116 mJy (0.1%)						
				122.448 mJy						
25	89.639 GHz 1.875 GHz	130.626 ± 0.710 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.988				
		130.313 ± 0.113 mJy (0.09%)								
		131.938 mJy								

Phased-up Fluxscale Results

Calibrated visibility flux density vs catalogue flux density

These plots show amplitude vs frequency for the non-AMPLITUDE calibrators in each measurement set, comparing the calibrated visibility flux density $S_{\text{calibrated}}$ to the catalogue flux density $S_{\text{catalogue}}$ reported by analysisUtils, online source catalogues, and/or recorded in the ASDM. In these plots, $S_{\text{catalogue}}$ is extrapolated using the spectral index to cover the frequency range of the spectral windows.

QA metrics are calculated by comparing the flux density ratio $K_{\text{spw}} = S_{\text{calibrated}} / S_{\text{catalogue}}$ for each spectral window to the ratio for the highest SNR spectral window. This metric evaluates how consistent the relative flux calibration is from spectral window to spectral window for each calibrator; it does not evaluate whether the absolute flux calibration is reasonable as compared to the catalogue measurements. All QA scores based on this metric are included in the Pipeline QA section at the bottom of this page.

hifa_timegaincal: This module derives phase and amplitude corrections versus time. The various plots should be inspected for outliers, which may need to be flagged before imaging.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage17&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

2021.1.00499.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcalflag
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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

17. Gain Calibration

BACK

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	Spectral Windows	Gainfield	
uid__A002_Xf396d6_X45bb.ms	Phase only	Infinite	PHASE	17, 21, 23, 25	nearest	uid__A002_Xf396d6_X45bb.ms.hifa_timegaincal.s17_2.spw17_21_23_25.solintf.gpcal.tbl
uid__A002_Xf396d6_X45bb.ms	Phase only	Infinite	TARGET, CHECK	17, 21, 23, 25		uid__A002_Xf396d6_X45bb.ms.hifa_timegaincal.s17_2.spw17_21_23_25.solintf.gpcal.tbl
uid__A002_Xf396d6_X45bb.ms	Phase only	Per integration (6.05s)	AMPLITUDE, BANDPASS, POLARIZATION, POLANGLE, POLLEAKAGE	17, 21, 23, 25	nearest	uid__A002_Xf396d6_X45bb.ms.hifa_timegaincal.s17_3.spw17_21_23_25.solintf.gpcal.tbl
uid__A002_Xf396d6_X45bb.ms	Amplitude only	Infinite	AMPLITUDE, BANDPASS, PHASE, POLARIZATION, POLANGLE, POLLEAKAGE	17, 21, 23, 25	nearest	uid__A002_Xf396d6_X45bb.ms.hifa_timegaincal.s17_7.spw17_21_23_25.solintf.gacal.tbl
uid__A002_Xf396d6_X45bb.ms	Amplitude only	Infinite	TARGET, CHECK	17, 21, 23, 25		uid__A002_Xf396d6_X45bb.ms.hifa_timegaincal.s17_7.spw17_21_23_25.solintf.gacal.tbl

Applied calibrations and parameters used for caltable generation

Plots

Phase vs time

hifa_timegaincal: This module derives phase and amplitude corrections versus time. The various plots should be inspected for outliers, which may need to be flagged before imaging.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage17&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrqcallag
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_renom
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontcheck

Plots

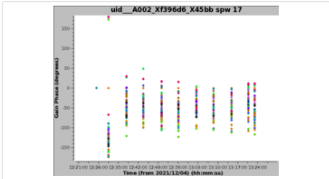
Phase vs time

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.

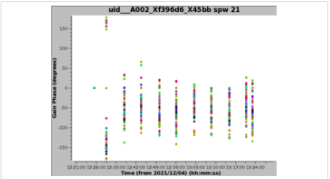
[uid__A002_Xf396d6_X45bb.ms](#)

Spectral window 17



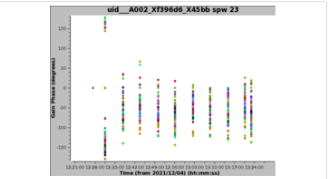
Phase vs time for spectral window 17, all antennas and correlations.

Spectral window 21



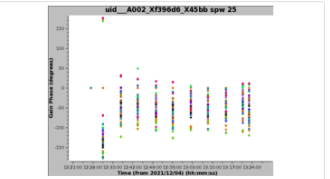
Phase vs time for spectral window 21, all antennas and correlations.

Spectral window 23



Phase vs time for spectral window 23, all antennas and correlations.

Spectral window 25



Phase vs time for spectral window 25, all antennas and correlations.

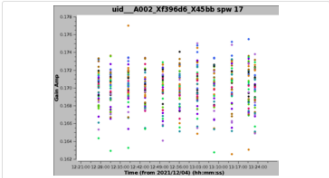
Amplitude vs time

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.

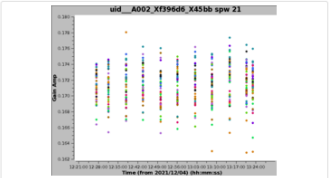
[uid__A002_Xf396d6_X45bb.ms](#)

Spectral window 17



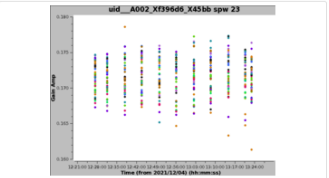
Amplitude vs time for spectral window 17, all antennas and correlations.

Spectral window 21



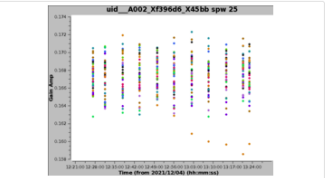
Amplitude vs time for spectral window 21, all antennas and correlations.

Spectral window 23



Amplitude vs time for spectral window 23, all antennas and correlations.

Spectral window 25



Amplitude vs time for spectral window 25, all antennas and correlations.

hifa_timegaincal: This module derives phase and amplitude corrections versus time. The various plots should be inspected for outliers, which may need to be flagged before imaging.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage17&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrqcallag
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_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

Diagnostic plots

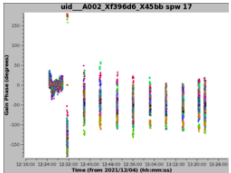
Phase vs time

These diagnostic plots show the phase solution for a calibration generated using a short solution interval. In case of very low SNR, solutions averaged in time for the phase calibrator are used with a solint = 1/4 the phasecal scan time. 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.

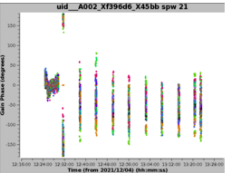
[uid__A002_Xf396d6_X45bb.ms](#)

Plots show the diagnostic phase calibration for uid__A002_Xf396d6_X45bb.ms.



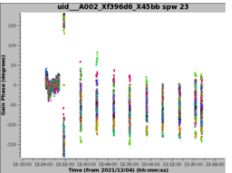
Spectral window 17

Phase vs time for spectral window 17, all antennas and correlations.



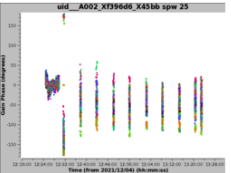
Spectral window 21

Phase vs time for spectral window 21, all antennas and correlations.



Spectral window 23

Phase vs time for spectral window 23, all antennas and correlations.



Spectral window 25

Phase vs time for spectral window 25, 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 the previous phase only solutions to the data and computing a new phase solution. The new phase solutions should scatter around 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_Xf396d6_X45bb.ms](#)

Plots show the diagnostic phase offsets for uid__A002_Xf396d6_X45bb.ms calculated using solint=inf.


Note that no spectral windows have been combined or remapped




Spectral window 17



Spectral window 21



Spectral window 23



Spectral window 25

hifa_applycal: This step applies the calibration tables and created plots of the phases and amplitudes afterwards. Any unexpected outliers in these plots will need to be identified and flagged.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage19&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.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_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_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_uvcontplot

19. Apply calibration tables

BACK

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_Xf396d6_X45bb.ms (callibrary: view / download)	32.8 GB	TARGET	"PJ113921.7"	17, 21, 23, 25	0~45	T _{sys}	17, 1, 2, 3, 4, 17, 17, 7, 19, 9, 10, 11, 12, 17, 19, 21, 23, 17, 17, 19, 19, 21, 21, 23, 23, 19, 19	"PJ113921.7"	linear, linear	True	Filename
						WVR		nearest	False	Filename	
						Bandpass		linearperobs, linearflag	True	Filename	
						Gain (phase only)		nearest	linear, linear	False	Filename

The amplitudes versus frequency, versus uv distance, and versus time should be mostly flat for the calibration sources (but not necessarily for science targets or planetary objects). However, the scatter in the amplitudes may increase where atmospheric transmission decreases.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage19&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

2021.1.00499.S

Tasks in execution order

1. hifa_importdata
2. hifa_flagdata
3. hifa_fluxcallag
4. hif_rawflagchans
5. hif_refant
6. h_tsyscal
7. hifa_tsysflag
8. hifa_antpos
9. hifa_wvrqcallag
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_renom
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

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_Xf396d6_X455b.ms

Spectral Window	ALMA Band	Intents	Fields
Spw 17	ALMA Band 3	AMPLITUDE,BANDPASS	J1058+0133
Spw 21	ALMA Band 3	AMPLITUDE,BANDPASS	J1058+0133
Spw 23	ALMA Band 3	AMPLITUDE,BANDPASS	J1058+0133
Spw 25	ALMA Band 3	AMPLITUDE,BANDPASS	J1058+0133
Spw 17	ALMA Band 3	PHASE	J1148+1840
Spw 21	ALMA Band 3	PHASE	J1148+1840
Spw 23	ALMA Band 3	PHASE	J1148+1840
Spw 25	ALMA Band 3	PHASE	J1148+1840

Calibrated phase vs frequency

The phases for the calibration sources should be equivalent to 0.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage19&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontcheck

Calibrated phase vs frequency

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

uid__A002_Xf396d6_X45bb.ms

Spectral Window	ALMA Band	Intents	Fields
Spectral Window 17	ALMA Band 3	BANDPASS	J1058+0133
Spectral Window 21	ALMA Band 3	BANDPASS	J1058+0133
Spectral Window 23	ALMA Band 3	BANDPASS	J1058+0133
Spectral Window 25	ALMA Band 3	BANDPASS	J1058+0133
Spectral Window 17	ALMA Band 3	PHASE	J1148+1840
Spectral Window 21	ALMA Band 3	PHASE	J1148+1840
Spectral Window 23	ALMA Band 3	PHASE	J1148+1840
Spectral Window 25	ALMA Band 3	PHASE	J1148+1840

Calibrated amplitude vs UV distance

Plots of calibrated amplitude vs UV distance for the calibrators in each measurement set. Data are plotted for all antennas, coloured by correlation.

uid__A002_Xf396d6_X45bb.ms

This module also produces plots of the amplitude/model flux ratios versus antenna and uv distance. These should be close to 1 (or the average of the data from the XX and YY receivers should be 1).

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage19&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

2021.1.00499.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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontplot

(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_Xf396d6_X45bb.ms

Plots for AMPLITUDE calibration intent were created with UV range set to capture the inner half of the data (UV max < 449.2 m). Plots for other intents have no UV range restriction.

Spectral Window 17
ALMA Band 3
Intents: AMPLITUDE, BANDPASS
Fields: J1058+0133

Spectral Window 21
ALMA Band 3
Intents: AMPLITUDE, BANDPASS
Fields: J1058+0133

Spectral Window 23
ALMA Band 3
Intents: AMPLITUDE, BANDPASS
Fields: J1058+0133

Spectral Window 25
ALMA Band 3
Intents: AMPLITUDE, BANDPASS
Fields: J1058+0133

Spectral Window 17
ALMA Band 3
Intents: PHASE
Fields: J1148+1840

Spectral Window 21
ALMA Band 3
Intents: PHASE
Fields: J1148+1840

Spectral Window 23
ALMA Band 3
Intents: PHASE
Fields: J1148+1840

Spectral Window 25
ALMA Band 3
Intents: PHASE
Fields: J1148+1840

(Corrected amplitude / model) vs UV distance

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

uid__A002_Xf396d6_X45bb.ms

hif_makeimages (cals): When this is first called, it makes continuum images of each calibrator in each spw for quality assessment. If the images do not look like point sources or if artefacts are present, the calibration may need to be repeated with additional flagging.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage21&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.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_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_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

21. Tclean/MakeImages

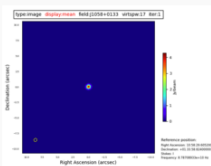
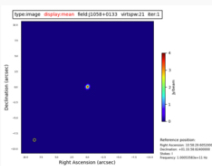
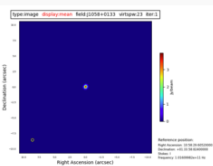
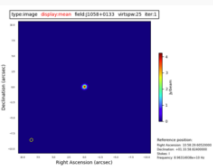
Make calibrator images

BACK

Image Details

Fields

- J1058+0133 (BANDPASS)
- J1148+1840 (PHASE)

Field	Spw			
J1058+0133 (BANDPASS)	17 / X1620027342#ALMA_RB_03#BB_1#SW-01	21 / X1620027342#ALMA_RB_03#BB_3#SW-01	23 / X1620027342#ALMA_RB_03#BB_4#SW-01	25 / X1620027342#ALMA_RB_03#BB_2#SW-01
				
	View other QA images...	View other QA images...	View other QA images...	View other QA images...
centre frequency of image	87.8709GHz (LSRK)	100.0536GHz (LSRK)	101.6100GHz (LSRK)	89.6315GHz (LSRK)
beam	0.533 x 0.504 arcsec	0.480 x 0.402 arcsec	0.462 x 0.404 arcsec	0.542 x 0.490 arcsec
beam p.a.	-85.7deg	-23.5deg	-20.4deg	-63.7deg
final theoretical sensitivity	50 uJy/beam	50 uJy/beam	53 uJy/beam	52 uJy/beam
cleaning threshold	3.1 mJy/beam Dirty DR: 8.5e+04 DR correction: 31	2.9 mJy/beam Dirty DR: 7.9e+04 DR correction: 28	2.9 mJy/beam Dirty DR: 7.5e+04 DR correction: 27	3 mJy/beam Dirty DR: 8.2e+04 DR correction: 29
clean residual peak / scaled	10.62	14.39	13.49	11.71

hif_makeimages (cals): When this is first called, it makes continuum images of each calibrator in each spw for quality assessment. If the images do not look like point sources or if artefacts are present, the calibration may need to be repeated with additional flagging.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage21&ms=all&subpage=uid___A001_X158f_X7a1-field/1058_0133_BANDPASS_spw17-poll-cleanplots.html

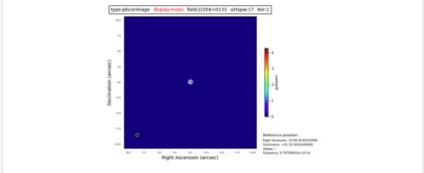
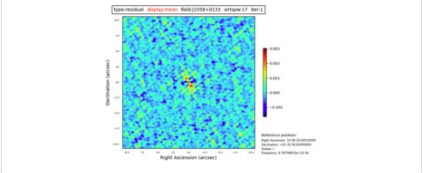
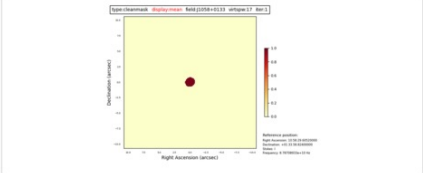
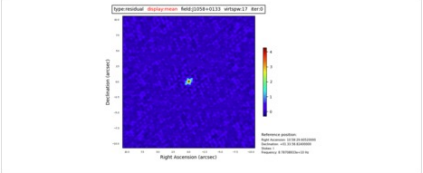
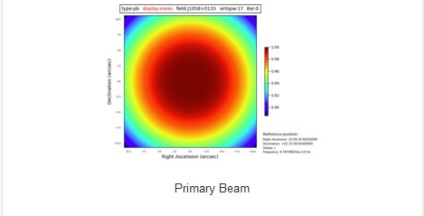
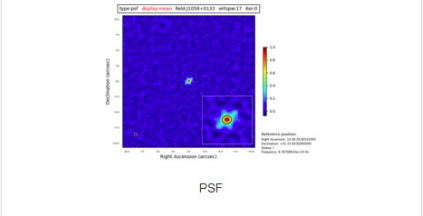
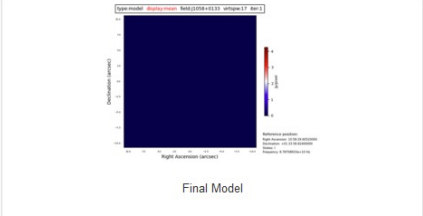
Home By Topic By Task 2021.1.00499.S

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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

Clean results for J1058+0133 (BANDPASS) SpW 17

Navigation: [Home] [Previous] [Next] [BACK]

Iteration	Image	Residual	Clean Mask
1			
0			
	 <p>Primary Beam</p>	 <p>PSF</p>	 <p>Final Model</p>

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.

2021.1.00499.5 - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage24&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2021.1.00499.5

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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvconttab

24. Image Pre-Check

BACK

Goals From OT:

Representative Target: PJ113921.7
 Representative Frequency: 89 6314 GHz (SPW 25)
 Bandwidth for Sensitivity: 11.96 MHz (rounded to nearest integer #channels (3), repBW = 11.72 MHz)
 Min / Max Acceptable Resolution: 0.566 arcsec / 0.850 arcsec
 Maximum expected beam axial ratio (from OT): 2.5
 Goal PI sensitivity: 0.405 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	[]	0.489 x 0.380 arcsec @ -14.2 deg	0.076 x 0.076 arcsec	1.29	11.72 MHz	repBW	0.00033 Jy/beam
0.0	[]	0.457 x 0.306 arcsec @ -18.5 deg	0.061 x 0.061 arcsec	1.29	7255 MHz	aggBW	1.24e-05 Jy/beam
0.5	[]	0.616 x 0.463 arcsec @ -19.2 deg	0.093 x 0.093 arcsec	1.33	11.72 MHz	repBW	0.00025 Jy/beam
0.5	[]	0.581 x 0.387 arcsec @ -20.2 deg	0.077 x 0.077 arcsec	1.33	7255 MHz	aggBW	9.38e-06 Jy/beam
1.0	[]	0.889 x 0.590 arcsec @ -33.7 deg	0.12 x 0.12 arcsec	1.51	11.72 MHz	repBW	0.000222 Jy/beam
1.0	[]	0.809 x 0.508 arcsec @ -29.5 deg	0.1 x 0.1 arcsec	1.51	7255 MHz	aggBW	8.35e-06 Jy/beam
2.0	[]	1.03 x 0.665 arcsec @ -36.8 deg	0.13 x 0.13 arcsec	1.55	11.72 MHz	repBW	0.000219 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.

2021.1.00499.5 - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage24&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.5

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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit

Estimates are given for four possible values of the `tlean` 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	[]	0.489 x 0.380 arcsec @ -14.2 deg	0.076 x 0.076 arcsec	1.29	11.72 MHz	repBW	0.00033 Jy/beam
0.0	[]	0.457 x 0.306 arcsec @ -18.5 deg	0.061 x 0.061 arcsec	1.29	7255 MHz	aggBW	1.24e-05 Jy/beam
0.5	[]	0.616 x 0.463 arcsec @ -19.2 deg	0.093 x 0.093 arcsec	1.33	11.72 MHz	repBW	0.00025 Jy/beam
0.5	[]	0.581 x 0.387 arcsec @ -20.2 deg	0.077 x 0.077 arcsec	1.33	7255 MHz	aggBW	9.38e-06 Jy/beam
1.0	[]	0.889 x 0.590 arcsec @ -33.7 deg	0.12 x 0.12 arcsec	1.51	11.72 MHz	repBW	0.000222 Jy/beam
1.0	[]	0.809 x 0.508 arcsec @ -29.5 deg	0.1 x 0.1 arcsec	1.51	7255 MHz	aggBW	8.35e-06 Jy/beam
2.0	[]	1.03 x 0.665 arcsec @ -36.8 deg	0.13 x 0.13 arcsec	1.55	11.72 MHz	repBW	0.000219 Jy/beam
2.0	[]	0.968 x 0.591 arcsec @ -33.9 deg	0.12 x 0.12 arcsec	1.55	7255 MHz	aggBW	8.21e-06 Jy/beam

Pipeline QA

Input Parameters

Tasks Execution Statistics

CASA logs for stage 24

- View or download stage24/casapy.log (463.2 KB)

hifa_renorm: This module determines whether a correction needs to be applied to the data scaling if bright spectral lines are present in the data. The correction is applied if the renorm scale factors in the tables are greater than 1.02.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage26&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2021.1.00499.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_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_checkproductsizes
- 26. hifa_renorm**
27. hifa_exportdata
28. hif_mtransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvcontfit
33. hif_uvcontsub

26. Renormalization

ALMA cross-correlations are divided by the auto-correlation as a function of frequency, in the correlator. This has a variety of advantages for operations and calibration, but if there is strong line emission detected in the autocorrelation (i.e. as would be detected in a single dish spectrum), that emission can anomalously decrease the cross-correlation amplitude at those frequencies.

This effect can be mitigated by comparing the autocorrelation spectrum (AC) of the target with the AC of the bandpass, which is generally located away from any such bright contaminating line emission. The ratio of the bandpass AC to the target AC provides a scaling factor as a function of frequency that can be used as a first order correction spectrum. However, atmospheric and instrumental variation (e.g. baseline ripple) need to be fitted and removed, so the spectrum is divided into several segments (marked on the plots as thin dotted vertical lines) for that fitting. The fitted AC ratio is presented here as the 'renorm scale factor' or 'renorm amplitude'.

All targets, spws, and measurement sets with maximum scaling above the observatory determined threshold will have the scaling applied.

Informative plots are collected in a pdf for each spw and source, linked from the table below.

The first plot in the pdf is a ReNormSpectra summary plot showing the average scaling spectrum over all scans, and for mosaics, all fields in the mosaic with peak scaling above the threshold. All antennas are plotted as dashed red and blue for XX and YY, and the mean is plotted solid.

The pdf next contains RenormDiagnosticCheck plots corresponding to each field and scan. The scaling spectrum is plotted as solid lines for each antenna (again red and blue for XX and YY), and the median as a dashed line (green and black for XX and YY).

Heuristics in the renormalization script have been applied to detect and correct spikes, dips, and jumps near the segment boundaries (marked with thin vertical dotted lines). Less significant (below the threshold for applying the correction) features may remain.

Features in the scaling spectrum associated with atmospheric features require additional care - ALMA data reduction staff will have evaluated these and minimized them insofar as possible with current heuristics, but PIs should take note of the shape and magnitude of any applied correction when performing line science at frequencies overlapping atmospheric lines.

MS/Source/SPW that trigger the need for renormalization above a threshold of 1.02 highlighted in red.

Please refer to the Pipeline User's Guide (linked to this weblog's Home page) for more details on renormalization and interpretation of the plots.

MS Name	Source Name	SPW	Max Renorm Scale Factor (field id)	PDF Link to Diagnostic Plots
uid__A002_Xf396d6_X45bb.ms	PJ113921.7	25	1.0015076 (3)	PDF

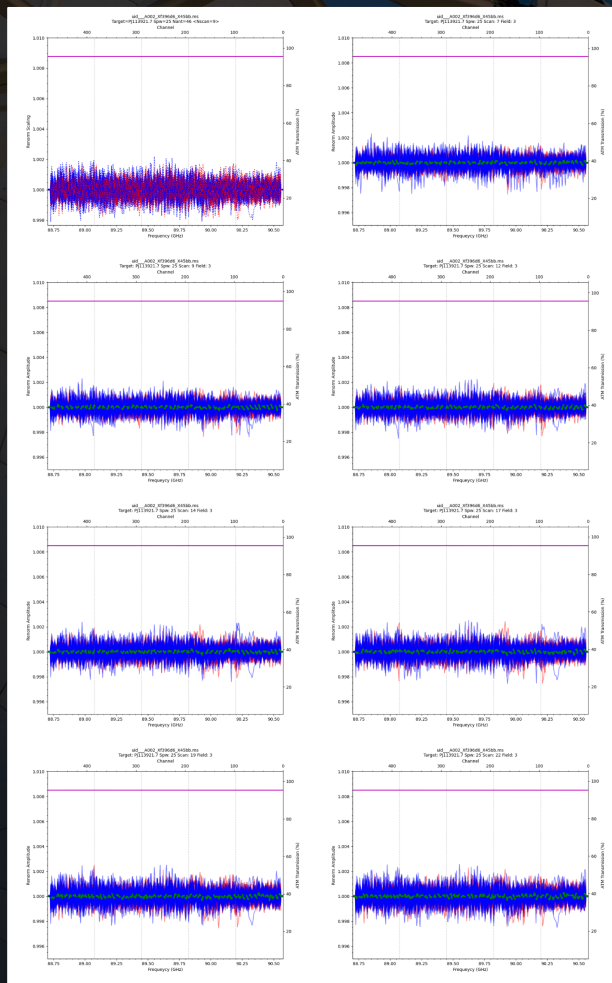
Renormalization results

Pipeline QA

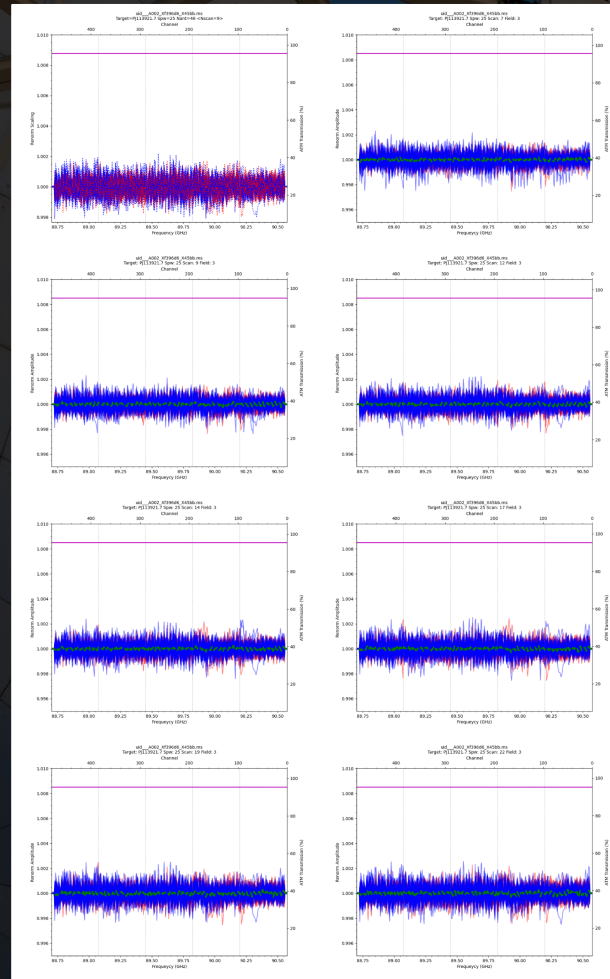
Input Parameters

Tasks Execution Statistics

The PDF linked in this page contains the diagnostic plots. If renormalization is triggered, it is useful to check that it is because of spectral lines from the source and not atmospheric spectral features (which will correspond to dips in the atmospheric transmission curves).



If the module was triggered by atmospheric spectral features, the pipeline may need to be re-run with this module disabled.



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.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage31&ms=all&subpage=t2-4m_details.html

ALMA Home By Topic By Task 2021.1.00499.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_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_checkproductsizes
26. hifa_renorm
27. hifa_exportdata
28. hif_mstransform
29. hifa_flagtargets
30. hif_makeimlist (mfs)
31. hif_findcont
32. hif_uvconftit
33. hif_uvconftit

31. Find Continuum

BACK

Field	Spw	Continuum Frequency Range		Frame	Status	Average spectrum	Joint mask
		Start	End				
PJ113921.7	17	86.99446 GHz	87.65065 GHz	LSRK	NEW		
		87.97874 GHz	88.02562 GHz				
		88.41621 GHz	88.66618 GHz				
	21	99.17694 GHz	100.91116 GHz		NEW , All cont.		
		100.73331 GHz	102.46753 GHz				
	23	100.73331 GHz	102.46753 GHz				
	25	88.71987 GHz	89.45028 GHz		NEW		

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.

2021.1.00499.5 - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage34&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.5

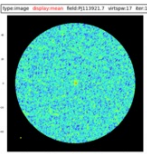
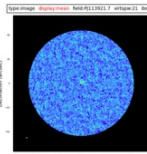
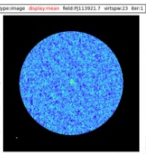
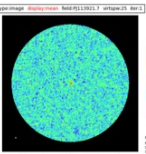
8. hifa_antpos
 9. hifa_wvrgcallflag
 10. hif_lowgainflag
 11. hif_setmodels
 12. hifa_bandpassflag
 13. hifa_bandpass
 14. hifa_spwphaseup
 15. hifa_gfluxscaleflag
 16. hifa_gfluxscale
 17. hifa_timegaincal
 18. hifa_targetflag
 19. hif_applycal
 20. hif_makeimlist (cals)
 21. hif_makeimages (cals)
 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
 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

Image Details

Field	Spw			
PJ113921.7 (TARGET)	17 / X1620027342#ALMA_RB_03#BB_1#SW-01	21 / X1620027342#ALMA_RB_03#BB_3#SW-01	23 / X1620027342#ALMA_RB_03#BB_4#SW-01	25 / X1620027342#ALMA_RB_03#BB_2#SW-01
				
	View other QA images...	View other QA images...	View other QA images...	View other QA images...
centre frequency of image	87.8303GHz (LSRK)	100.0440GHz (LSRK)	101.6004GHz (LSRK)	89.6221GHz (LSRK)
beam	0.894 x 0.607 arcsec	0.781 x 0.456 arcsec	0.725 x 0.451 arcsec	0.897 x 0.588 arcsec
beam p.a.	-32.7deg	-26.7deg	-22.3deg	-34.7deg
final theoretical sensitivity	23 uJy/beam	18 uJy/beam	19 uJy/beam	21 uJy/beam
cleaning threshold	46 uJy/beam Dirty DR: 8.5 DR correction: 1	37 uJy/beam Dirty DR: 15 DR correction: 1	38 uJy/beam Dirty DR: 16 DR correction: 1	41 uJy/beam Dirty DR: 9.4 DR correction: 1
clean residual peak / scaled MAD	5.81	5.82	5.10	4.46
non-pbcor image RMS	26 uJy/beam	21 uJy/beam	21 uJy/beam	24 uJy/beam
pbcor image max / min	479 / -299 uJy/beam	297 / -265 uJy/beam	265 / -324 uJy/beam	319 / -294 uJy/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.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage36&ms=all&subpage=t2-4m_details.html

Home By Topic By Task

2021.1.00499.S

- 8. hifa_antpos
- 9. hifa_vwgcalfag
- 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)

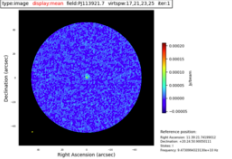
36. Tclean/MakeImages

Make target aggregate continuum images

BACK

Image Details

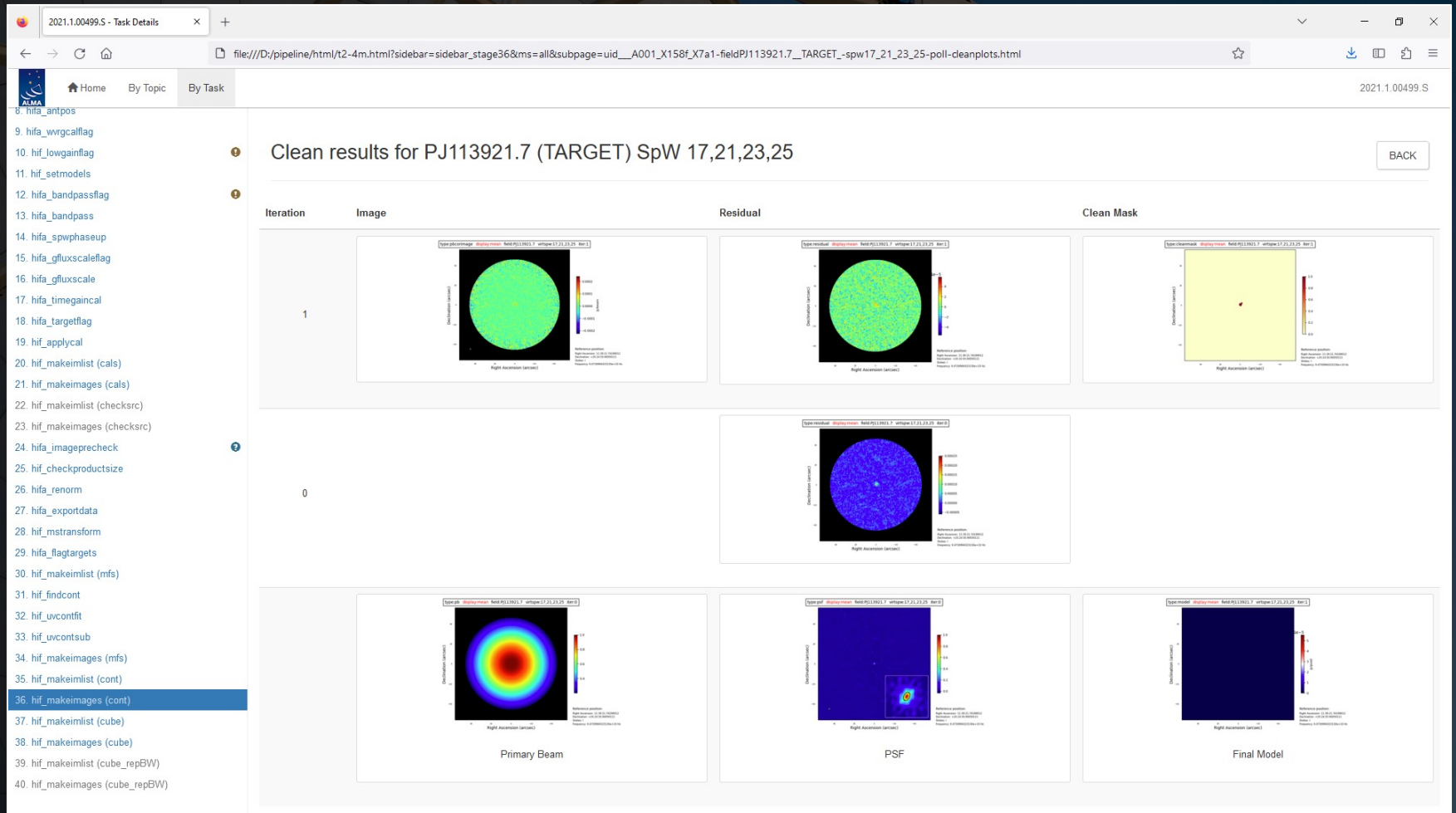
Field	Spw
PJ113921.7 (TARGET)	17, 21, 23, 25 / X1620027342#ALMA_RB_03#BB_1#SW-01,



View other QA images...

centre frequency of image	94.7310GHz (LSRK)
beam	0.793 x 0.496 arcsec
beam p.a.	-28.5deg
final theoretical sensitivity	10 uJy/beam
cleaning threshold	30 uJy/beam Dirty DR: 25 DR correction: 1.5
clean residual peak / scaled MAD	4.86
non-pbcor image RMS	12 uJy/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.



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2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage38&ms=all&subpage=t2-4m_details.html

Home By Topic By Task 2021.1.00499.S

8. hifa_antpos
 9. hifa_wvrgcalfag
 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)

38. Tclean/MakeImages

Make target cubes BACK

Image Details

Field	Spw		Spw	
PJ113921.7 (TARGET)	17 / X1620027342#ALMA_RB_03#BB_1#SW-01	21 / X1620027342#ALMA_RB_03#BB_3#SW-01	23 / X1620027342#ALMA_RB_03#BB_4#SW-01	25 / X1620027342#ALMA_RB_03#BB_2#SW-01
centre / rest frequency of cube	87.8616GHz / 339.0000GHz (LSRK)		100.0440GHz / 396.0000GHz (LSRK)	
beam	0.915 x 0.617 arcsec		0.819 x 0.465 arcsec	
beam p.a.	-33.9deg		-29.0deg	
final theoretical sensitivity	0.12 mJy/beam		0.12 mJy/beam	
cleaning threshold	0.23 mJy/beam Dirty DR: 6.3 DR correction: 1		findCont=AilCont, no cleaning 0 Jy/beam Dirty DR: 6.2 DR correction: 1	
clean residual peak / scaled MAD	5.58		-5.69	
non-pbcor image RMS / RMS_{min} / RMS_{max}	0.13 / 0.12 / 0.13 mJy/beam		0.13 / 0.12 / 0.14 mJy/beam	
			0.14 / 0.13 / 0.16 mJy/beam	
			0.42 / 0.4 / 0.45 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.

2021.1.00499.S - Task Details

file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage38&ms=all&subpage=uid__A001_X158f_X7a1-fieldPJ113921.7__TARGET_spw17-poll-cleanplots.html

ALMA Home By Topic By Task 2021.1.00499.S

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_apprycal
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
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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)

Clean results for PJ113921.7 (TARGET) SpW 17

Navigation: [Previous] [Next] [BACK]

Iteration	Image	Residual	Clean Mask	Line-free Moment 0	Line-free Moment 8	Spectra
1						
0						

Primary Beam

PSF

Final Model

The inset in the PSF image (when present) corresponds to the central 41 pixels of the PSF. When the beam shape is significantly non-Gaussian, the dotted contour of the 50% level of the PSF image will become distinctly visible apart from the fitted synthesized beam, which is shown as the solid contour.