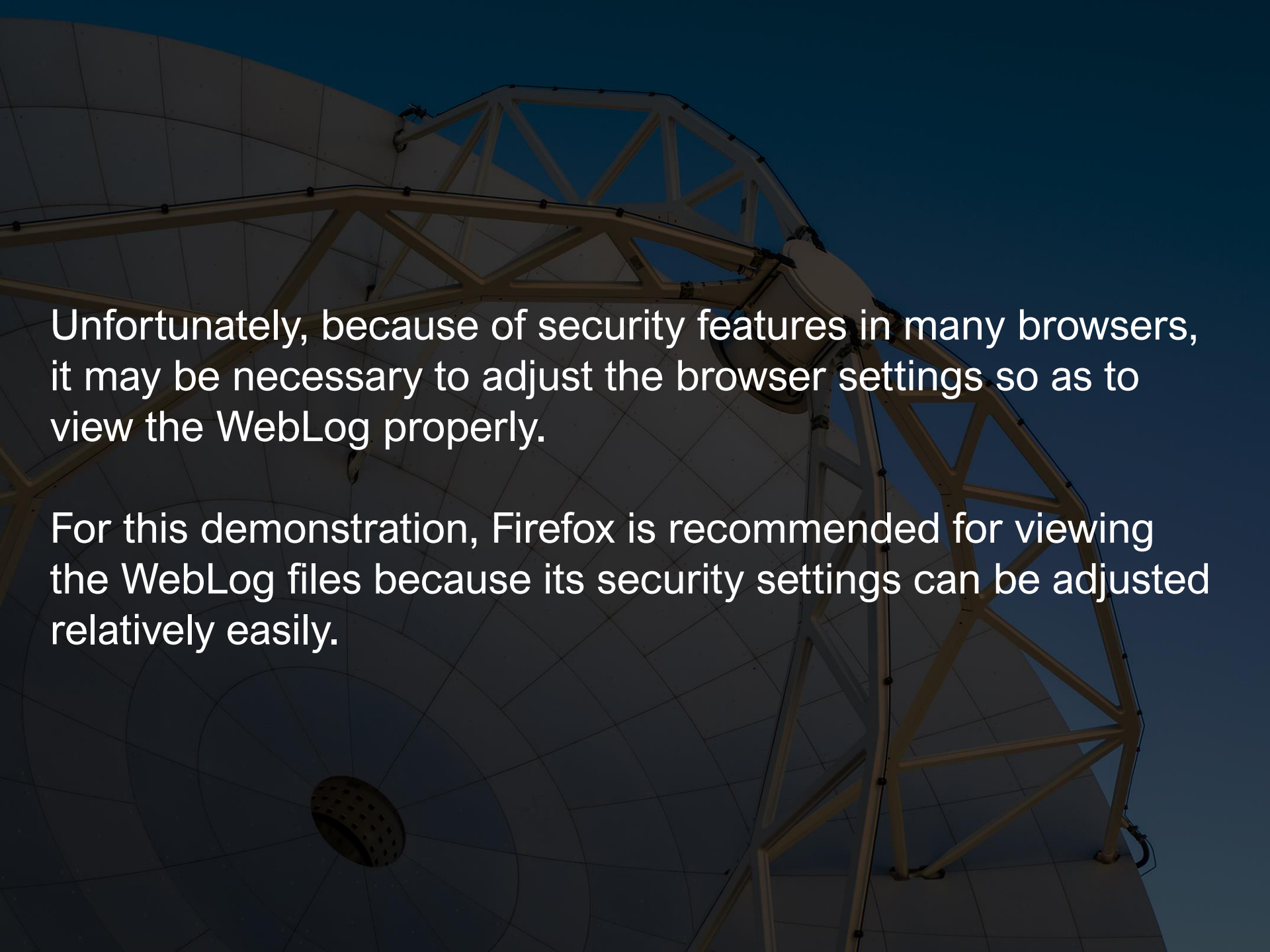


# Reviewing the WebLog

**George Bendo**

UK ALMA Regional Centre Node  
Jodrell Bank Centre for Astrophysics  
The University of Manchester

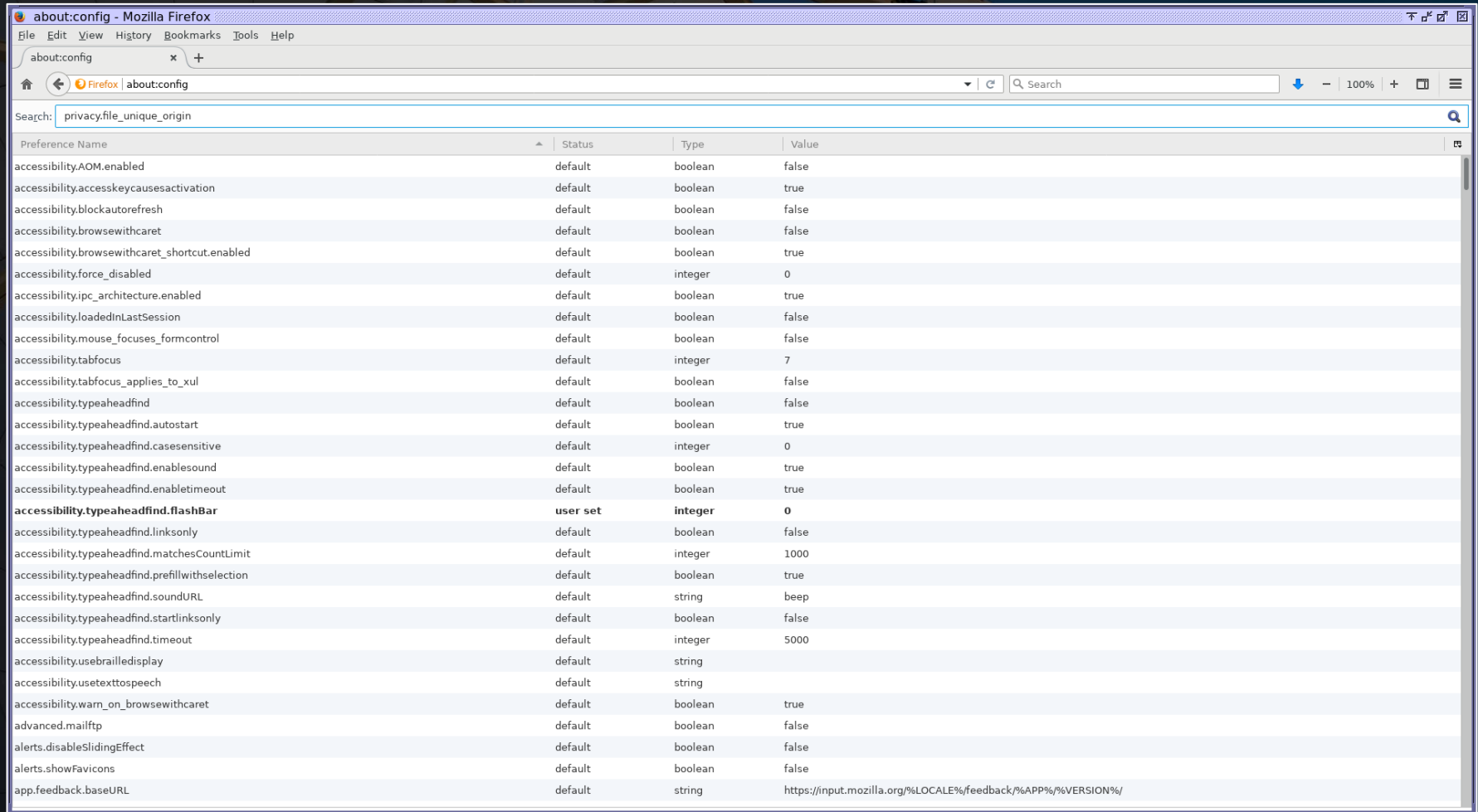


A large satellite dish antenna structure is shown against a dark blue sky. The dish is composed of many small, square panels arranged in a grid pattern. A complex metal framework of beams and supports is visible, particularly on the right side of the dish. The lighting is dim, suggesting dusk or dawn.

Unfortunately, because of security features in many browsers, it may be necessary to adjust the browser settings so as to view the WebLog properly.

For this demonstration, Firefox is recommended for viewing the WebLog files because its security settings can be adjusted relatively easily.

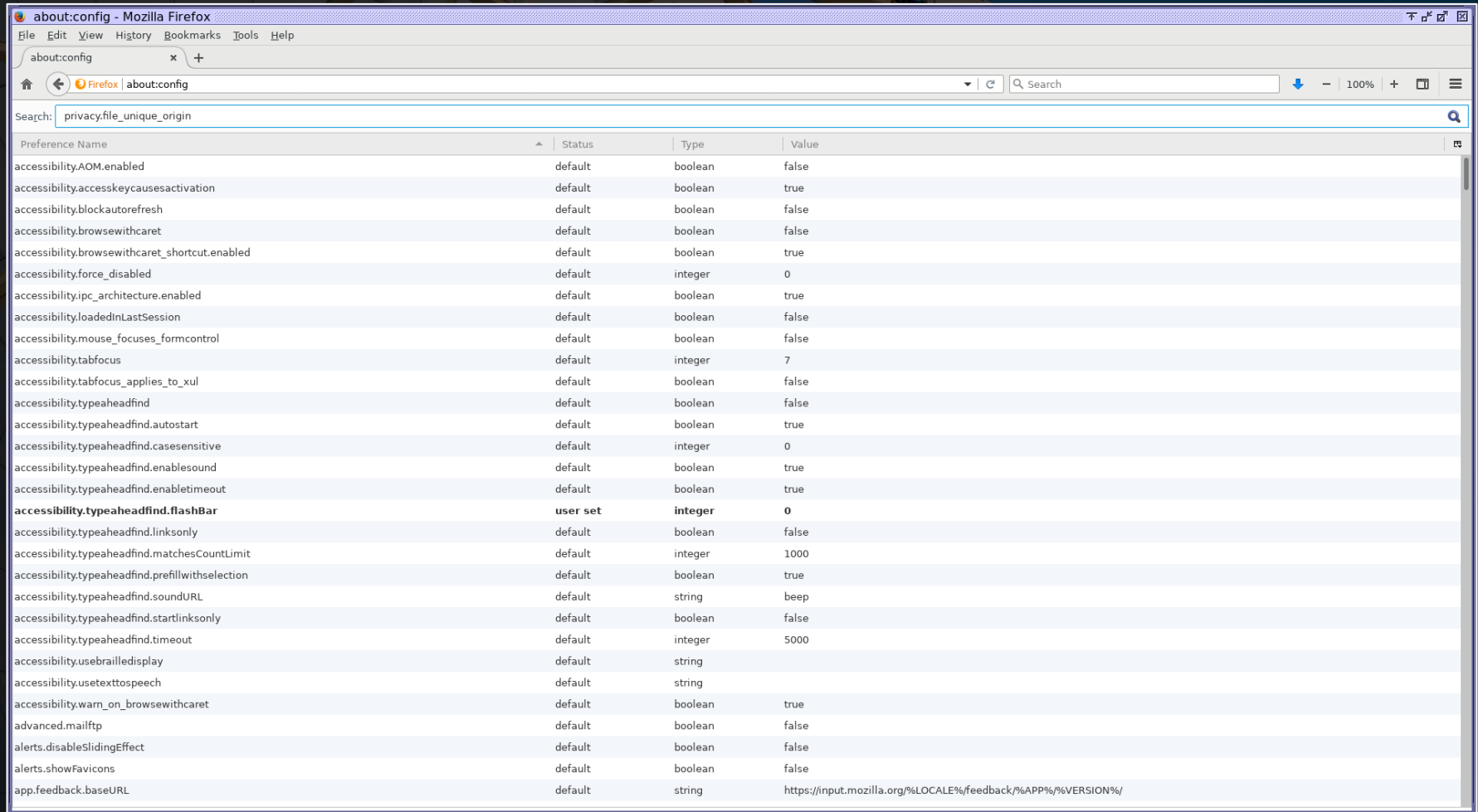
In Firefox, type “about:config” in the address bar. (This may display a warning page, but click continue to exit the page.)



The screenshot shows the Firefox browser window with the address bar set to "about:config". The search bar contains "privacy.file\_unique\_origin". The main content area displays a table of preferences. The table has four columns: Preference Name, Status, Type, and Value. The preferences listed include accessibility settings, advanced mail features, and app feedback settings. The preference "accessibility.typeaheadfind.flashBar" is highlighted in blue.

Preference Name	Status	Type	Value
accessibility.AOM.enabled	default	boolean	false
accessibility.accesskeycausesactivation	default	boolean	true
accessibility.blockautorefresh	default	boolean	false
accessibility.browsewithcaret	default	boolean	false
accessibility.browsewithcaret_shortcut.enabled	default	boolean	true
accessibility.force_disabled	default	integer	0
accessibility.ipc_architecture.enabled	default	boolean	true
accessibility.loadedInLastSession	default	boolean	false
accessibility.mouse_focuses_formcontrol	default	boolean	false
accessibility.tabfocus	default	integer	7
accessibility.tabfocus_applies_to_xul	default	boolean	false
accessibility.typeaheadfind	default	boolean	false
accessibility.typeaheadfind.autostart	default	boolean	true
accessibility.typeaheadfind.casesensitive	default	integer	0
accessibility.typeaheadfind.enablesound	default	boolean	true
accessibility.typeaheadfind.enabletimeout	default	boolean	true
<b>accessibility.typeaheadfind.flashBar</b>	<b>user set</b>	<b>integer</b>	<b>0</b>
accessibility.typeaheadfind.linkonly	default	boolean	false
accessibility.typeaheadfind.matchesCountLimit	default	integer	1000
accessibility.typeaheadfind.prefillwithselection	default	boolean	true
accessibility.typeaheadfind.soundURL	default	string	beep
accessibility.typeaheadfind.startlinksonly	default	boolean	false
accessibility.typeaheadfind.timeout	default	integer	5000
accessibility.usebrailledisplay	default	string	
accessibility.usetexttospeech	default	string	
accessibility.warn_on_browsewithcaret	default	boolean	true
advanced.mailftp	default	boolean	false
alerts.disableSlidingEffect	default	boolean	false
alerts.showFavicons	default	boolean	false
app.feedback.baseURL	default	string	https://input.mozilla.org/%LOCALE%/feedback/%APP%/%VERSION%/

On this page, search for the “privacy.file\_unique\_origin” preference and set it to False. After this, restart Firefox for the fix to take effect.







The qa directory contains the following files:

```
member.uid___A001_X135b_X6b.hifa_calimage.weblog.tgz  
member.uid___A001_X135b_X6b.qa2_report.html  
member.uid___A001_X135b_X6b.qa2_report.pdf  
uid___A002_Xd98580_X354.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 and some simple diagnostic plots.

## QA0 Report



**Project Code** 2018.1.01131.5  
**Session** uid://A001/X135b/X6b  
**SchedBlock** uid://A001/X135b/X5d (Z\_CMa\_a\_06\_TM2)  
**ExecBlock** uid://A002/Xd98580/X354 ✓ Pass

**Sources** J05384405, J07301141, Z\_CMa  
**# Antennas** 43 (111.6 % for Cycle 6)  
**Array** 12 [m]  
**Baselines** 15m -- 360m  
**Band** ALMA\_RB\_06  
**Weather** PWV 1.97 mm; Wind 7.49 m/s; Humidity 73.54 %; Pressure 463.25 hPa  
**Atmosphere** Tsys (Min/Avg/Max) : 77.6/89.7/108.1  
Trec (Min/Avg/Max) : 26.5/46.0/88.0

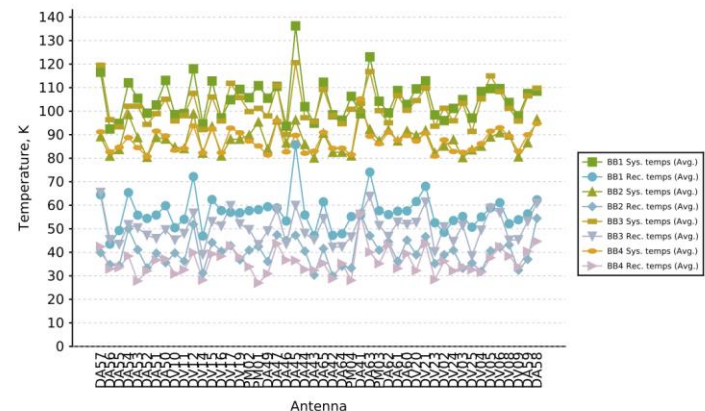
**Final QA0 comment** Pending flux cal observations. Pointing errors of PM antennas a bit higher than the other antenna types

### Times on sources

OBSERVE_TARGET (Z_CMa)	5.03min (5.03min expected)
CALIBRATE_ATMOSPHERE (Z_CMa, J0538-4405, J0730-1141)	1.32min
CALIBRATE_BANDPASS (J0538-4405)	5.05min
CALIBRATE_FLUX (J0538-4405)	5.05min
CALIBRATE_PHASE (J0730-1141)	1.02min
CALIBRATE_POINTING (J0538-4405, J0730-1141)	4.07min
CALIBRATE_WVR (Z_CMa, J0538-4405, J0730-1141)	11.45min

### Atmosphere calibrations

Source: J07301141





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

## QA0 Report



**Project Code** 2018.1.01131.5  
**Session** uid://A001/X135b/X6b  
**SchedBlock** uid://A001/X135b/X5d (Z\_CMa\_a\_06\_TM2)  
**ExecBlock** uid://A002/Xd98580/X354 ✓ Pass

**Sources** J05384405, J07301141, Z\_CMa  
**# Antennas** 43 (111.6 % for Cycle 6)  
**Array** 12 [m]  
**Baselines** 15m -- 360m  
**Band** ALMA\_RB\_06  
**Weather** PWV 1.97 mm; Wind 7.49 m/s; Humidity 73.54 %; Pressure 463.25 hPa  
**Atmosphere** Tsys (Min/Avg/Max) : 77.6/89.7/108.1  
Trec (Min/Avg/Max) : 26.5/46.0/88.0

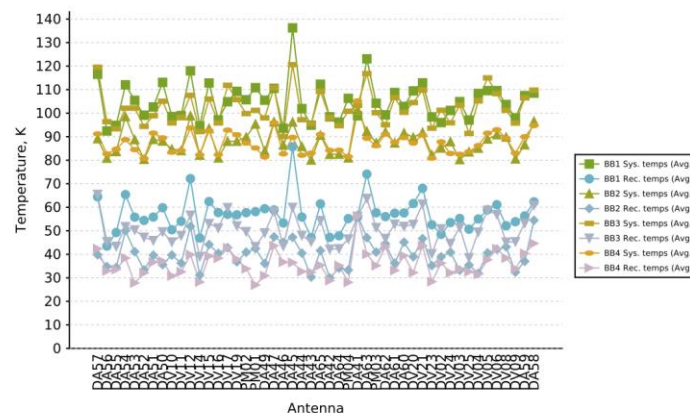
**Final QA0 comment** Pending flux cal observations. Pointing errors of PM antennas a bit higher than the other antenna types

### Times on sources

OBSERVE_TARGET (Z_CMa)	5.03min (5.03min expected)
CALIBRATE_ATMOSPHERE (Z_CMa, J0538-4405, J0730-1141)	1.32min
CALIBRATE_BANDPASS (J0538-4405)	5.05min
CALIBRATE_FLUX (J0538-4405)	5.05min
CALIBRATE_PHASE (J0730-1141)	1.02min
CALIBRATE_POINTING (J0538-4405, J0730-1141)	4.07min
CALIBRATE_WVR (Z_CMa, J0538-4405, J0730-1141)	11.45min

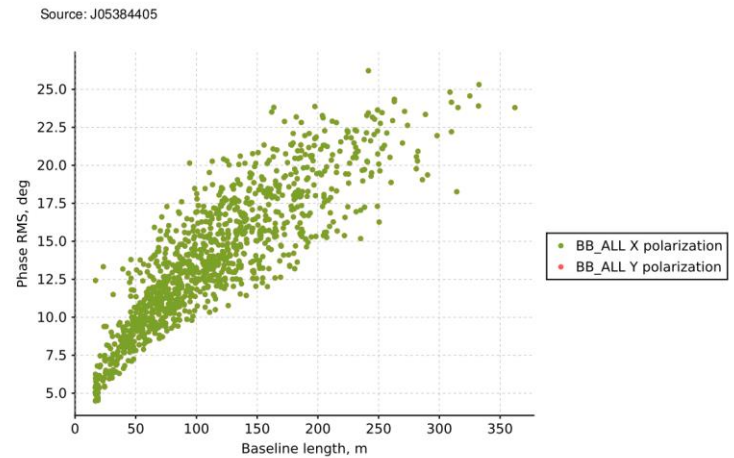
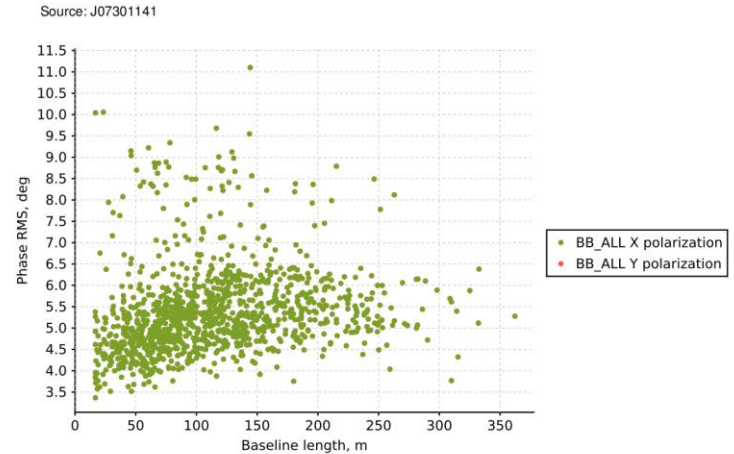
### Atmosphere calibrations

Source: J07301141



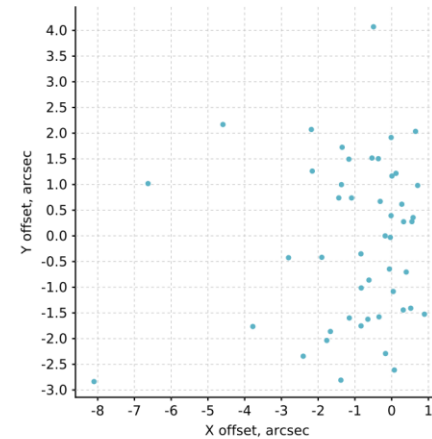


Any outliers in the plots of phase RMS versus baseline length could be indicative of antennas or baselines that were not producing usable data. These data will need to be checked later.

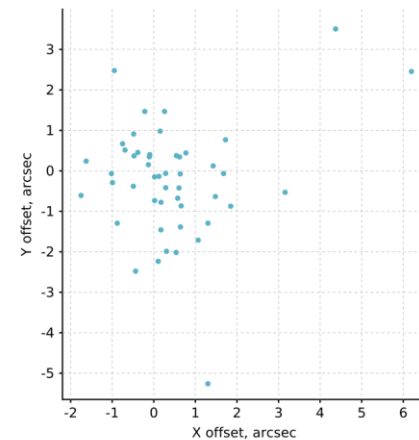


Pointing offsets are usually not a severe problem, but it is useful to be aware of any significant outliers.

Source: J07301141

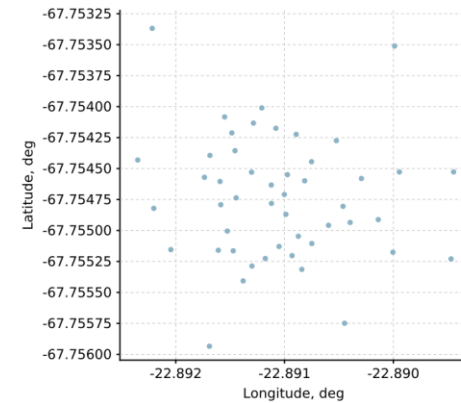


Source: J05384405

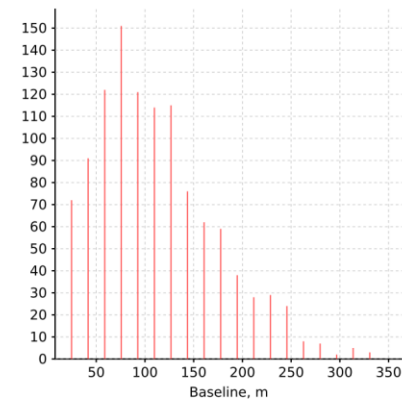


Antenna positions

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



Baseline distribution



Comments and Attachments

ExecBlock: uid://A002/Xd98580/X354

✓ Pass

Attachments: [aoscheck\\_phase\\_solution.png](#), [aoscheck\\_amplitude.png](#), [aoscheck\\_phase\\_solution.png](#), [aoscheck\\_amplitude.png](#)

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** A molecular line survey of FU Ori Outflows  
**Code** 2018.1.01131.5  
**PI** Dary Ruiz-Rodríguez  
**Organization** Chester F. Carlson Center for Imaging, Rochester Institute of Te  
**Co-Is** L. Cleza, U. Gorti, J. Kastner, D. Principe, J. Williams

### ObsUnitSet Information

**Name** Member OUS (Z\_CMa)  
**QA2 Status** ✓Pass  
**Member OUS Status ID** uid://A001/X135b/X6b  
**SchedBlock name** Z\_CMa\_a\_06\_TM2  
**SchedBlock UID** uid://A001/X135b/X5d  
**Array** TM2  
**Mode** Standard  
**Band** ALMA\_RB\_06  
**Repr.Freq. (sky)** 218.48 [GHz]  
**Spectral setup** FDM  
**Sources** Z\_CMa  
**Other SBs in this Group**  
**OUS (Member OUS** Z\_CMa\_b\_06\_7M (uid://A001/X135b/X6d), Z\_CMa\_b\_06\_TM1 (uid://A001/X135b/X69)  
**Status ID in brackets):**  
**Execution count** 1.00 of 1 expected

### Final QA2 comment

CASA version: 5.4.0-70

Reduction mode: Pipeline calibration and imaging, pipeline version 42254M (CASA54-P1-B)

Calibration issues: Antenna DV06 was shadowed during the bandpass scan and was therefore flagged for part of that scan. Antenna DA57 showed low gain and showed high scatter in the amplitude versus frequency plots in stage 17, hif\_applycal, therefore it was manually flagged. The pipeline issued lots of flagging in stage 12, hifa\_bandpassflag, for baselines and timestamps that had outlier amplitudes in spectral window 45. Similarly, the pipeline issued many flags for baselines in all spectral windows because of outlier amplitudes in stage 14, hifa\_gfluxscaleflag. The bandpass scan shows high scatter in amplitude versus time plots in stage 17, hif\_applycal, likely due to the low elevation of the calibrator and weather conditions, however the solutions appear adequate for good calibration. Additionally, the bandpass calibrator appears slightly resolved in the residual images of stage 19, hif\_makeimages, however the larger scale emission does not appear to effect calibration. Overall, the data appear well calibrated and the overall flagging rate is quite low.

Imaging issues: The PI may wish to manually identify the continuum and re-image since the pipeline identified continuum appears to have been conservative for some spectral windows.

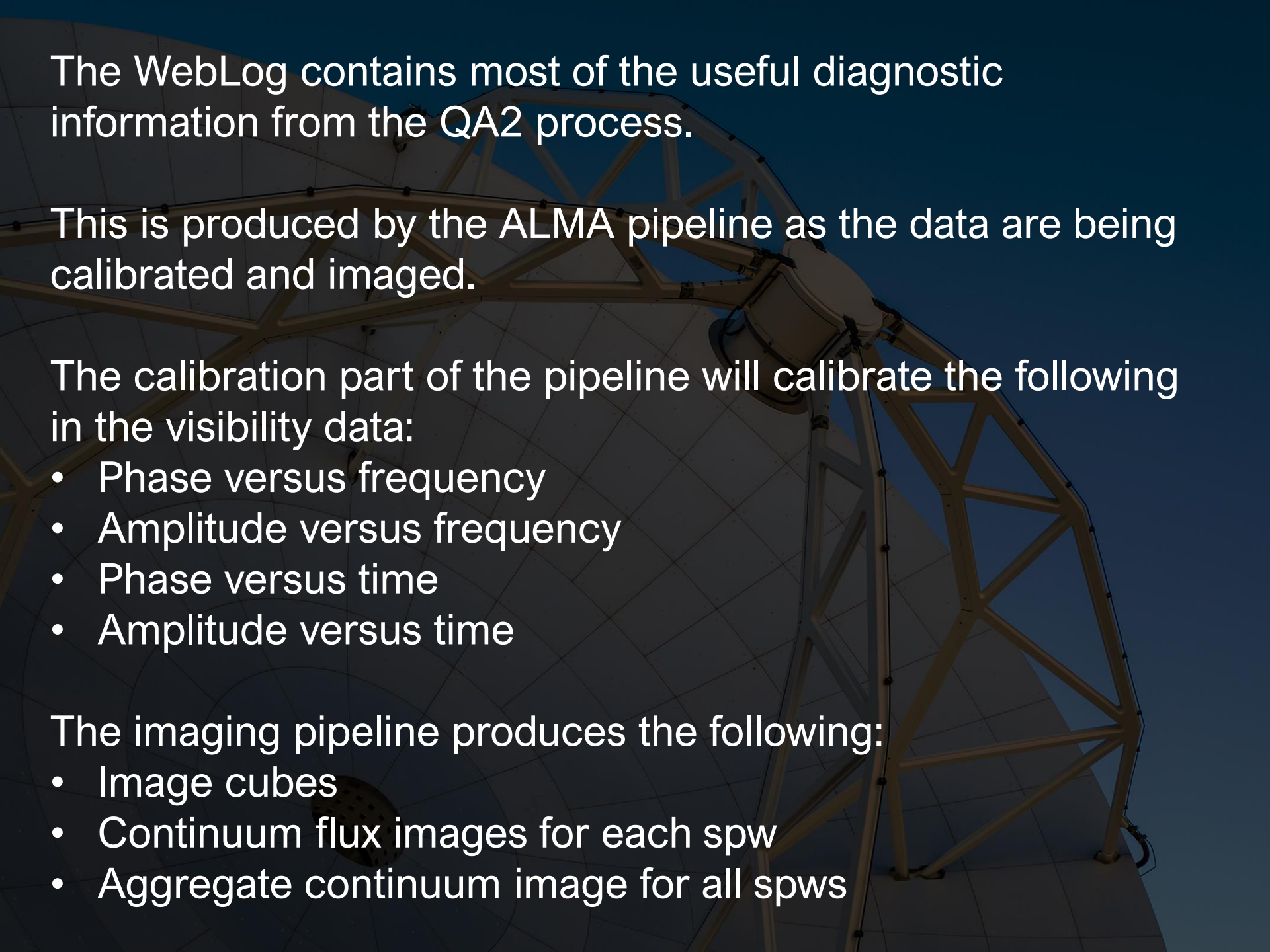
General info: The continuum was identified by the pipeline although it is recommended that the PI do a more careful identification of the continuum. The continuum was subtracted from all the spectral windows. Self-calibration was not performed. All pipeline products only have a shallow clean, the PI may want to do a deeper clean to improve the images.

This is a continuum project, thus QA2 was performed on the Aggregate Continuum. Both the beam size and the RMS meet the PI requested performance parameters. Therefore, this scheduling block has been deemed a QA2 PASS.

Aggregate Continuum -  
Image name: uid\_\_A001\_X135b\_X6b.s33\_0.Z\_CMa\_sci.spw25\_27\_29\_31\_33\_35\_37\_39\_41\_43\_45.cont.l.iter1.image  
Robust = 0.5  
Beam size = 1.26 x 0.858 arcsec  
RMS = 0.17 mJy/beam over 2.42 GHz

For additional information on the calibration and imaging pipeline products please see the Knowledgebase article:  
<https://help.almascience.org/index.php?Knowledgebase/Article/View/375/>





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

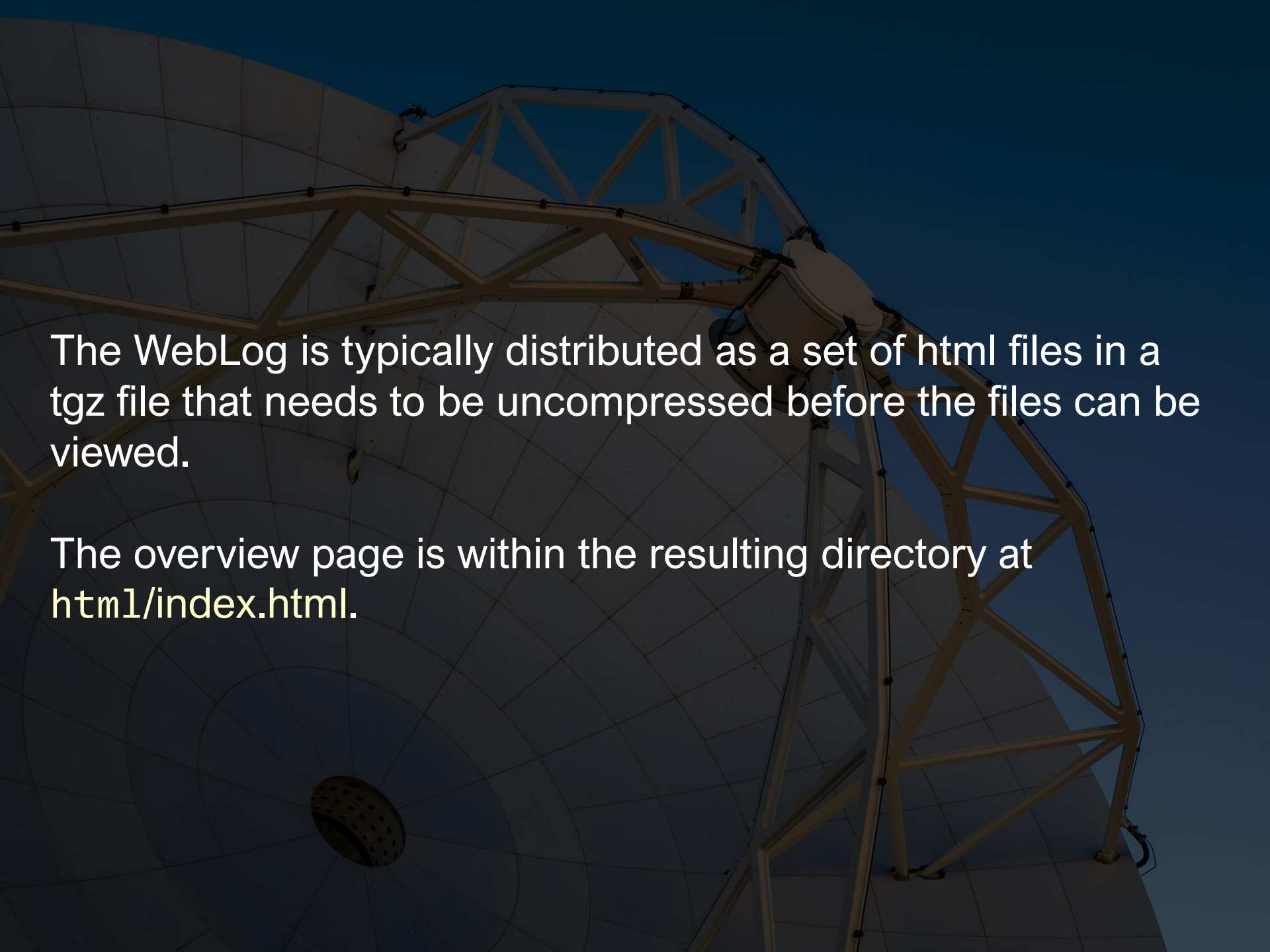
This is produced by the ALMA pipeline as the data are being calibrated and imaged.

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 many small, square panels arranged in a grid pattern. A complex metal framework of beams and supports is visible, particularly on the right side of the dish. The overall image has a dark, moody aesthetic.

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.

The overview page is within the resulting directory at  
[html/index.html](http://html/index.html).

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.

2018.1.01131.S - Home - Mozilla Firefox

File Edit View History Bookmarks Tools Help

2018.1.01131.S - Home x +

file:///home/gbendo/pipeline/html/t1-1.html

Search

100%

Home By Topic By Task

2018.1.01131.S

Observation Overview

Project	uid://A001/X12ee/X3
Principal Investigator	daryalexia
OUS Status Entity id	uid://A001/X135b/X6b
Observation Start	2019-03-14 01:01:10 UTC
Observation End	2019-03-14 01:18:52 UTC

Pipeline Summary

Pipeline Version	42254M (Pipeline-CASA54-P1-B) <a href="#">(documentation)</a>
CASA Version	5.4.0-70 <a href="#">(environment)</a>
Pipeline Start	2019-04-02 19:54:13 UTC
Execution Duration	8:22:29

Observation Summary

Measurement Set	Receivers	Num Antennas	Time (UTC)			Baseline Length			Size			
			Start	End	On Source	Min	Max	RMS				
Observing Unit Set Status: uid://A001/X135b/X6b Scheduling Block ID: uid://A001/X135b/X5d												
Session: session_1												
<a href="#">uid__A002_Xd98580_X354.ms</a>	ALMA Band 6	48	2019-03-14 01:01:10	2019-03-14 01:18:52	0:05:03	15.0 m	360.6 m	128.3 m	16.1 GB			
<a href="#">uid__A002_Xd98580_X354_target.ms</a>	ALMA Band 6	48	2019-03-14 01:13:31	2019-03-14 01:13:31	0:05:02	15.0 m	360.6 m	128.3 m	5.8 GB			

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

2018.1.01131.S - Session Data Details - Mozilla Firefox

File Edit View History Bookmarks Tools Help

2018.1.01131.S - Sessio... x +

file:///home/gbendo/pipeline/html/t2-1.html?sidebar=sidebar\_uid\_\_A002\_Xd98580\_X354\_ms&subpage=t2-1\_details.html

Search

100% +

2018.1.01131.S

Home By Topic By Task

Session: session\_1

uid\_\_A002\_Xd98580\_X354.ms

uid\_\_A002\_Xd98580\_X354\_target.ms

## Overview of 'uid\_\_A002\_Xd98580\_X354.ms'

### Observation Execution Time

Start Time	2019-03-14 01:01:10
End Time	2019-03-14 01:18:52
Total Time on Source	0:16:06
Total Time on Science Target	0:05:03

LISTOBS OUTPUT

### Spatial Setup

Science Targets	'Z_CMa'
Calibrators	'J0538-4405' and 'J0730-1141'

### Antenna Setup

Min Baseline	15.0 m
Max Baseline	360.6 m
Number of Baselines	1128
Number of Antennas	48

### Weather


### PWV

### Spectral Setup

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

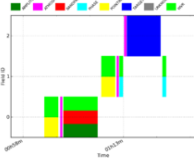
### Sky Setup

Min Elevation	53.77 degrees
Max Elevation	75.88 degrees



Intent vs Time

Track scan intent vs time



Field vs Time

Track observed field vs time



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

2018.1.01131.S - Session Data Details - Mozilla Firefox

File Edit View History Bookmarks Tools Help

2018.1.01131.S - Sessio... x +

🏠 🔍 file:///home/gbendo/pipeline/html/t2-1.html?sidebar=sidebar\_uid\_\_A002\_Xd98580\_X354\_ms&subpage=listobs.txt

ALMA Home By Topic By Task 2018.1.01131.S

Session: session\_1

uid\_\_A002\_Xd98580\_X354.ms

uid\_\_A002\_Xd98580\_X354\_target.ms

## listobs.txt

BACK

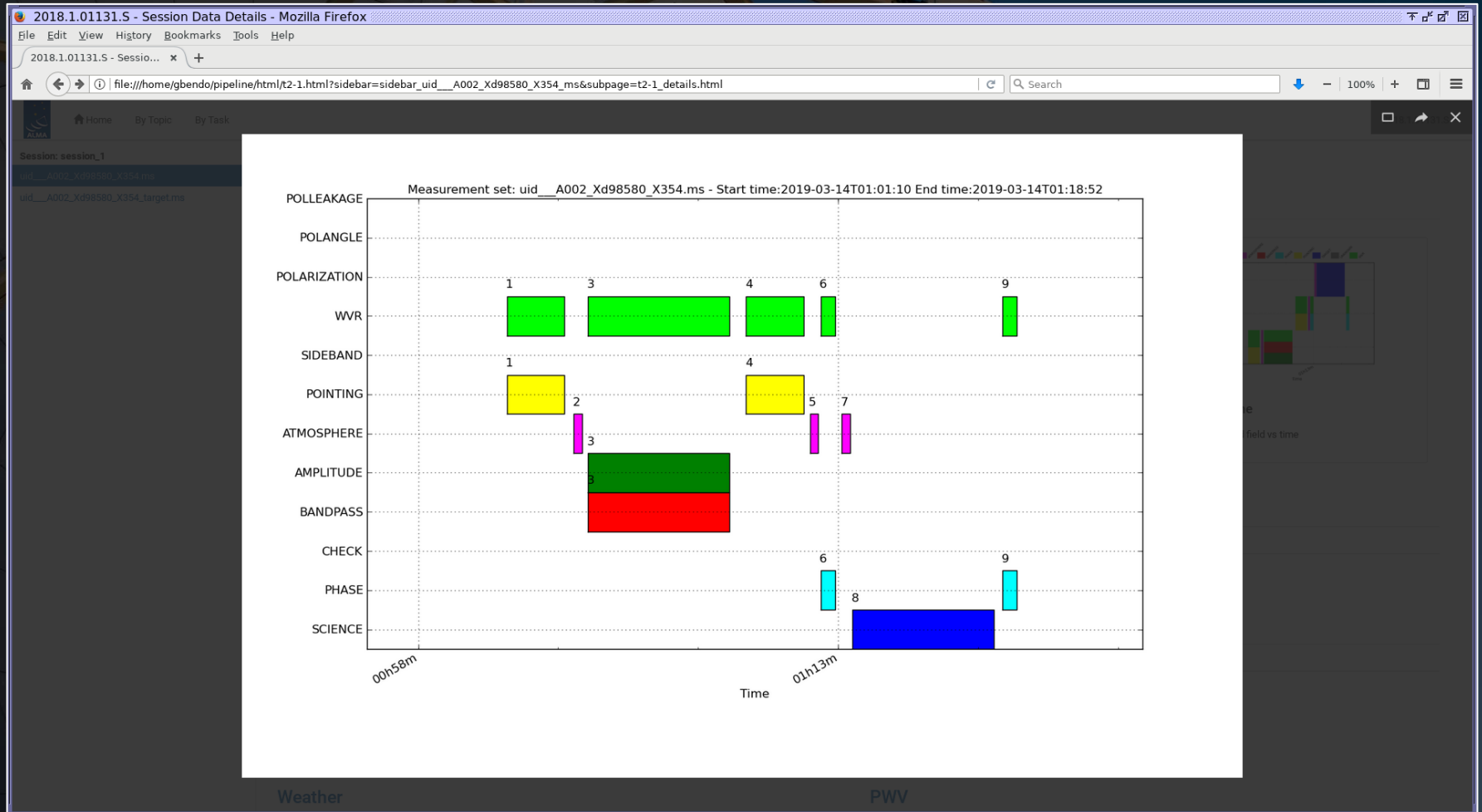
```
=====
MeasurementSet Name: /home/dared/opt/dared.20180CT/mtt/dataproc/2018.1.01131.S_2019_04_02T19_32_25.386/SOUs_uid__A001_X135b_X60/GOUS_uid__A001_X135b_X68/MOUS_uid__A001_X135b_X6b/working/uid__A002_Xd98580_X354.ms
MS Version 2
=====
Observer: daryalexia Project: uid://A001/X12ee/X3
Observation: 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 - 01:03:13.8 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, 2.02, 1.01] [CALIBRATE_POI
NTING#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, 0.576, 0.576]
6 [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 [4,13,14,15,16,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46] [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] [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, 2.02, 1.01] [CALIBRATE_POI
NTING#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, 0.576, 0.576]
6 [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 [4,13,14,15,16,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46] [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] [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, 0.016, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576, 0.576]
6 [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 [4,13,14,15,16,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46] [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] [OBSERVE_TARGET#ON_SOURCE]
01:18:52.4 - 01:19:23.0 9 1 J0730-1141 816888 [4,13,14,15,16,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46] [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] [CALIBRATE_PHASE#ON_SOURCE,CALIBRATE_WVR#ON_SOURCE]
(nRows = Total number of rows per scan)

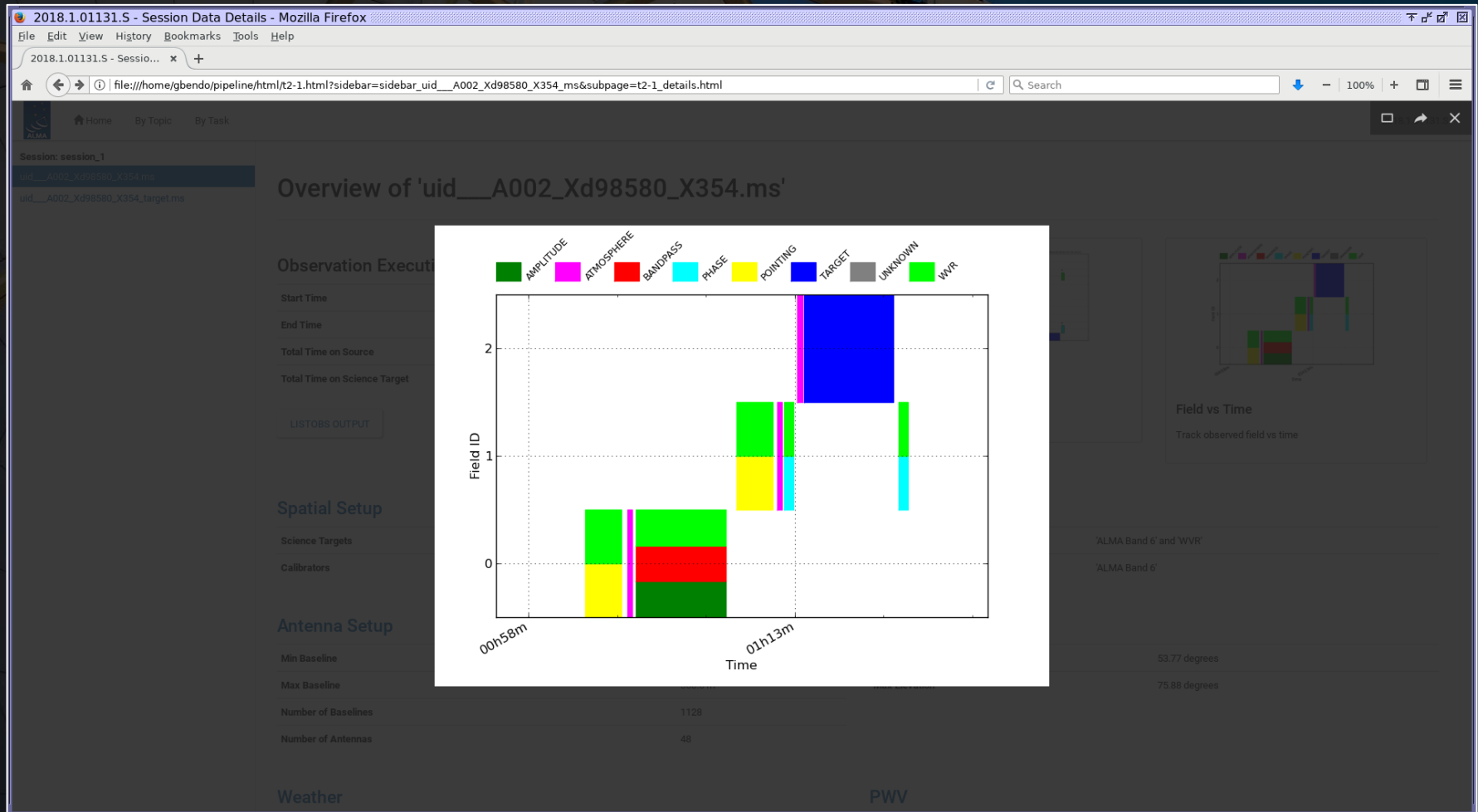
Fields: 3
ID Code Name RA Decl Epoch SrcId nRows
0 none J0538-4405 05:38:50.361558 -44.05.08.93891 ICRS 0 10431696
1 none J0730-1141 07:30:19.112473 -11.41.12.60058 ICRS 1 3896400
2 none Z_CMa 07:03:43.158465 -11.33.06.18271 ICRS 2 8512224

Spectral Windows: (47 unique spectral windows and 2 unique polarization setups)
```

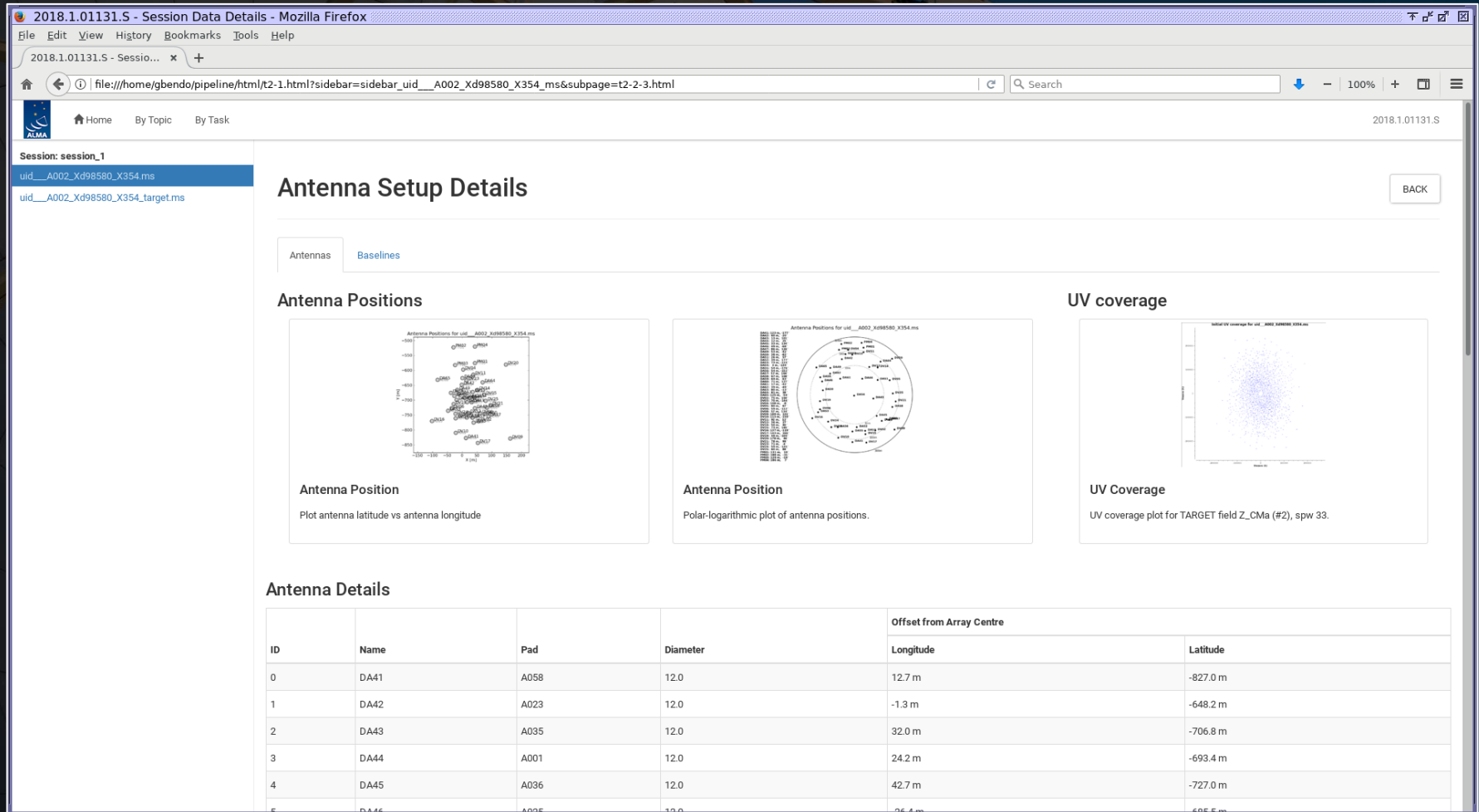
The intent versus time plot shows the sequence of the observations as well as the purpose of those observations. Some observations have multiple purposes.



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).

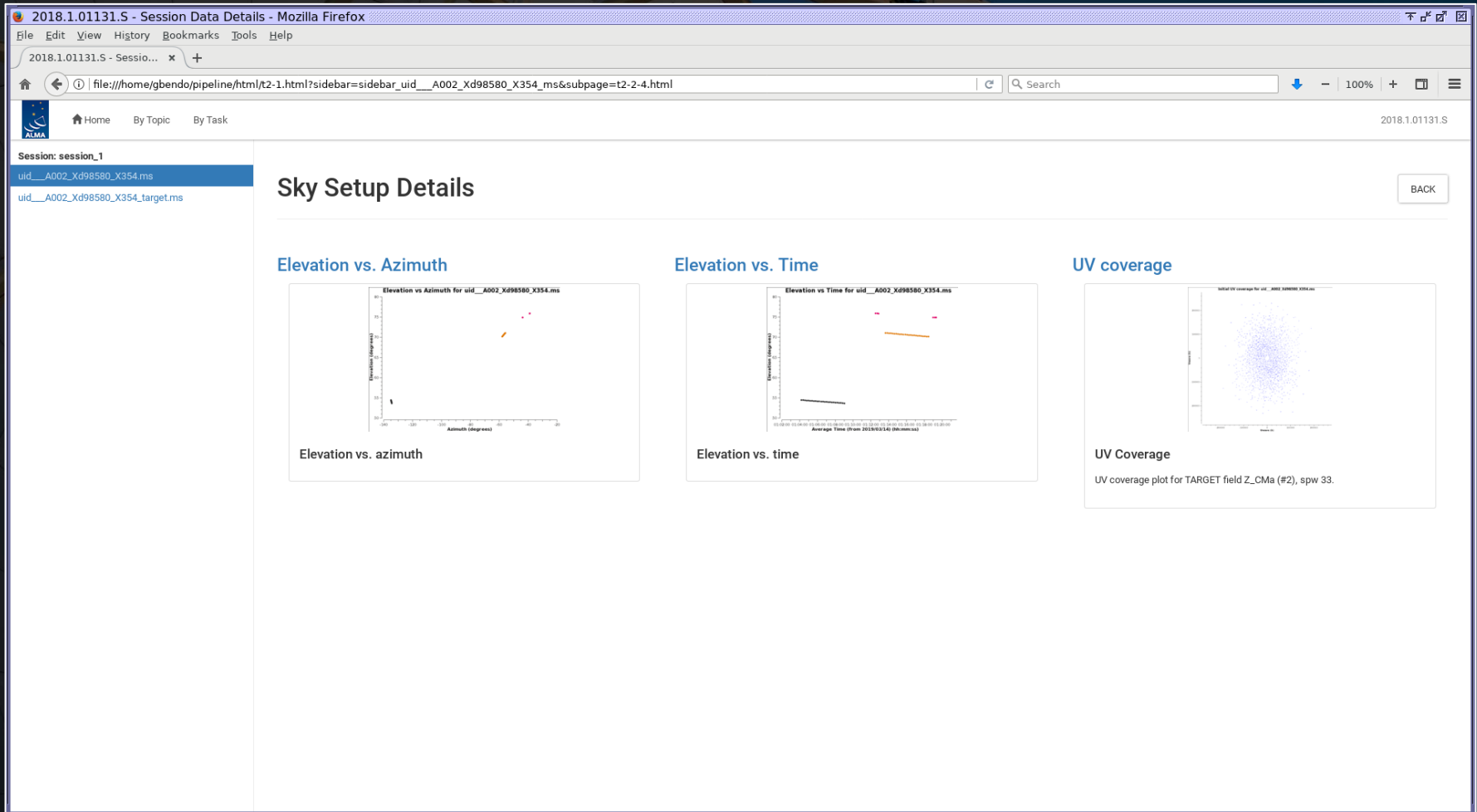


The antenna setup page shows the location of the antennas and the resulting uv coverage (which is related to the final angular resolution and maximum recoverable scale of the data).

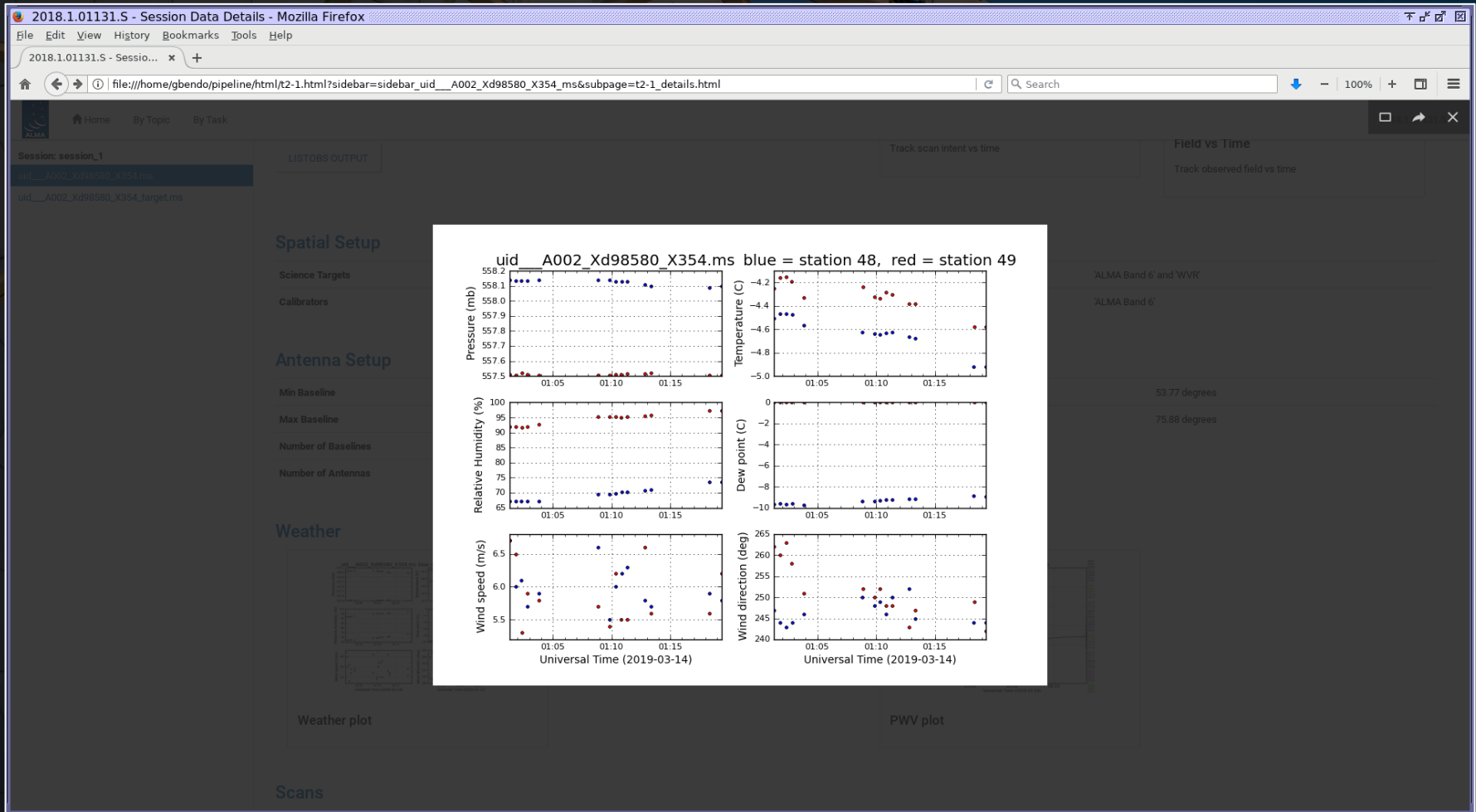




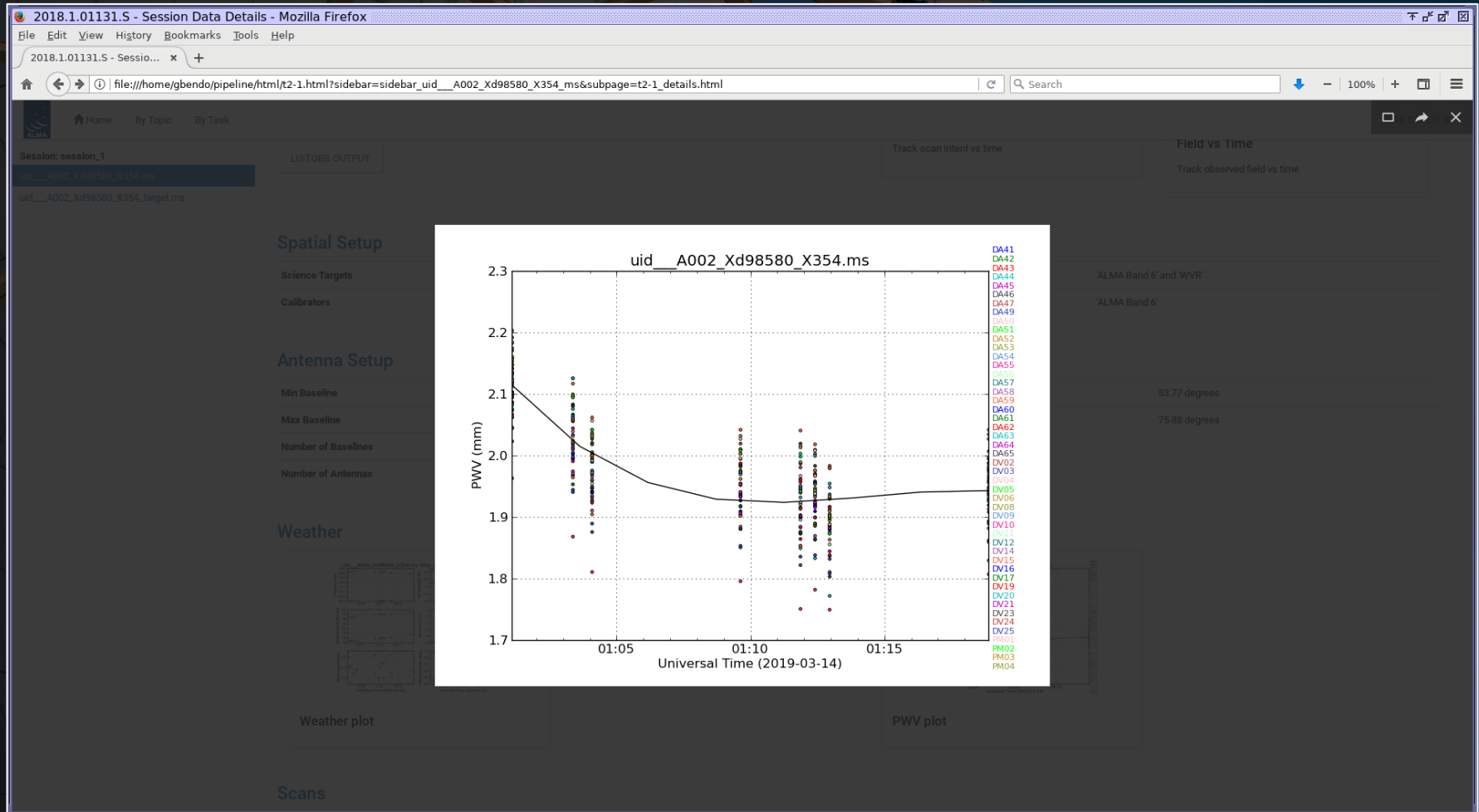
The sky setup shows the elevation and azimuth of the fields during the observations. The beam for sources observed at low elevations ( $<45^\circ$ ) could appear elongated. Calibration problems may occur if the phase calibrator and science target are too far apart ( $>10^\circ$ ).



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



[illegible]



[illegible]

[illegible]

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.

2018.1.01131.S - Task Summaries - Mozilla Firefox

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file:///home/gbendo/pipeline/html/t1-4.html

ALMA Home By Topic By Task 2018.1.01131.S

## Task Summaries

Task	QA Score	Duration
1. <a href="#">hifa_importdata</a> : Register measurement sets with the pipeline	<div><div></div></div> 1.00	0:07:08
2. <a href="#">hifa_flagdata</a> : ALMA deterministic flagging	<div><div></div></div> 1.00	0:28:54
3. <a href="#">hifa_fluxcallflag</a> : Flag spectral features in solar system flux calibrators	<div><div></div></div> 1.00	0:00:04
4. <a href="#">hif_rawflagchans</a> : Flag channels in raw data	<div><div></div></div> 1.00	0:07:03
5. <a href="#">hif_refant</a> : Select reference antennas	<div><div></div></div> 1.00	0:00:27
6. <a href="#">h_tsyscal</a> : Calculate Tsys calibration	<div><div></div></div> 1.00	0:04:07
7. <a href="#">hifa_tsysflag</a> : Flag Tsys calibration	<div><div></div></div> 1.00	0:06:15
8. <a href="#">hifa_antpos</a> : Correct for antenna position offsets	Nonzero antenna position offsets <div><div></div></div> 0.90	0:00:07
9. <a href="#">hifa_wvrflag</a> : Calculate and flag WVR calibration	<div><div></div></div> 1.00	0:08:44
10. <a href="#">hif_lowgainflag</a> : Flag antennas with low gain	<div><div></div></div> 1.00	0:14:47
11. <a href="#">hif_setmodels</a> : Set calibrator model visibilities	<div><div></div></div> 1.00	0:09:05
12. <a href="#">hifa_bandpassflag</a> : Phase-up bandpass calibration and flagging	Combined flagging and bandpass score <div><div></div></div> 0.89	0:59:16
13. <a href="#">hifa_spwphaseup</a> : Spw phase offsets calibration	<div><div></div></div> 1.00	0:02:56
14. <a href="#">hifa_gfluxscaleflag</a> : Phased-up flux scale calibration + flagging	<div><div></div></div> 1.00	0:15:14
15. <a href="#">hifa_gfluxscale</a> : Transfer fluxscale from amplitude calibrator	<div><div></div></div> 1.00	0:18:33
16. <a href="#">hifa_timegaincal</a> : Gain calibration	<div><div></div></div> 0.93	1:21:33
17. <a href="#">hif_applycal</a> : Apply calibrations from context	<div><div></div></div> 1.00	0:40:15

**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.

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Home By Topic By Task

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\_wvrflag
10. hif\_lowgainflag
11. hif\_setmodels
12. hifa\_bandpassflag
13. hifa\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
19. hif\_makeimages
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsizes
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

## 1. 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	Flux Densities		
uid__A002_Xd98580_X354.ms	uid://A001/X135b/X5d	ASDM	MS	9	3	22	16.1 GB	<a href="#">View or download</a>

Summary of Imported Measurement Sets

### Imported Flux Densities

The following flux densities were imported into the pipeline context:

Measurement Set	Field	SpW	Flux Density				Spix	Age Of Nearest Monitor Point (days)
			I	Q	U	V		
uid__A002_Xd98580_X354.ms	J0538-4405 (#0)	25	1.515 Jy	0.000 Jy	0.000 Jy	0.000 Jy	-0.540543679023	N/A
		27	1.512 Jy					
		29	1.510 Jy					
		31	1.508 Jy					
		33	1.516 Jy					
		35	1.521 Jy					
		37	1.520 Jy					
		39	1.517 Jy					
		41	1.472 Jy					
		43	1.470 Jy					
		45	1.466 Jy					



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.

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Home By Topic By Task

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\_wvrflag
10. hif\_lowgainflag
11. hif\_setmodels
12. hifa\_bandpassflag
13. hifa\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
19. hif\_makeimages
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsizes
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

## 1. 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	Flux Densities		
uid__A002_Xd98580_X354.ms	uid://A001/X135b/X5d	ASDM	MS	9	3	22	16.1 GB	<a href="#">View or download</a>

Summary of Imported Measurement Sets

### Imported Flux Densities

The following flux densities were imported into the pipeline context:

Measurement Set	Field	SpW	Flux Density				Spix	Age Of Nearest Monitor Point (days)
			I	Q	U	V		
uid__A002_Xd98580_X354.ms	J0538-4405 (#0)	25	1.515 Jy	0.000 Jy	0.000 Jy	0.000 Jy	-0.540543679023	N/A
		27	1.512 Jy					
		29	1.510 Jy					
		31	1.508 Jy					
		33	1.516 Jy					
		35	1.521 Jy					
		37	1.520 Jy					
		39	1.517 Jy					
		41	1.472 Jy					
		43	1.470 Jy					
		45	1.466 Jy					

**hifa\_flagdata:** This module performs a series of a priori flagging steps that remove data not usable for science (such as autocorrelated data and shadowed antennas). Ideally, the total percentages should be  $\leq \sim 20\%$ . If the percentages are higher, the data may have problems.

2018.1.01131.S - Task Details - Mozilla Firefox

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🏠 Home By Topic By Task

2018.1.01131.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\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

2. Deterministic Flagging

BACK

Flagging agents

Measurement Set	Unwanted Intents	QA0	QA2	Online Flags	Flagging Template	Autocorrelations	Shadowed Antennas	Edge Channels	Agent Commands
uid__A002_Xd98580_X354.ms	✓	✓	✓	✓	✓	✓	✓	✗	<a href="#">View</a>

Flagging agent status per measurement set.

Template Files

Measurement Set	Online Flags	Flagging Template	
	File	Number of Statements	File
uid__A002_Xd98580_X354.ms	<a href="#">uid__A002_Xd98580_X354.flagonline.txt</a>	3332	<a href="#">uid__A002_Xd98580_X354.flagtemplate.txt</a>

Files used for template flagging steps.

Flagged data summary

		Flagging Agent								Total	Measurement Set
		Unwanted Intents	QA0	QA2	Online Flags	Flagging Template	Autocorrelations	Shadowed Antennas	Edge Channels		
Data Selection (by intent)	Before Task										
All Data	0.0%	11.0%	0.0%	0.0%	0.0%	3.5%	3.6%	0.9%	0.0%	19.1%	uid__A002_Xd98580_X354.ms

**hifa\_flagdata:** This module performs a series of a priori flagging steps that remove data not usable for science (such as autocorrelated data and shadowed antennas). Ideally, the total percentages should be  $\leq \sim 20\%$ . If the percentages are higher, the data may have problems.

2018.1.01131.S - Task Details - Mozilla Firefox

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Home By Topic By Task

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\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

uid\_\_\_A002\_Xd98580\_X354.ms uid\_\_\_A002\_Xd98580\_X354.flagonline.txt 3332 uid\_\_\_A002\_Xd98580\_X354.flagtemplate.txt 1

Files used for template flagging steps.

### Flagged data summary

Data Selection (by intent)	Before Task	Flagging Agent								Total	Measurement Set uid___A002_Xd98580_X354.ms
		Unwanted Intents	QA0	QA2	Online Flags	Flagging Template	Autocorrelations	Shadowed Antennas	Edge Channels		
All Data	0.0%	11.0%	0.0%	0.0%	0.0%	3.5%	3.6%	0.9%	0.0%	19.1%	19.1%
Science Spectral Windows	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	4.1%	1.0%	0.0%	9.1%	9.1%
Bandpass	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	4.0%	2.2%	0.0%	10.2%	10.2%
Flux	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	4.0%	2.2%	0.0%	10.2%	10.2%
Phase	0.0%	0.0%	0.0%	0.0%	0.1%	4.0%	4.0%	0.0%	0.0%	8.1%	8.1%
Target (science spws)	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	4.0%	0.0%	0.0%	8.0%	8.0%
uid___A002_Xd98580_X354.ms	0.0%	11.0%	0.0%	0.0%	0.0%	3.5%	3.6%	0.9%	0.0%	19.1%	

Summary of flagged data. Each cell states the amount of data flagged as a fraction of the specified data selection, with the *Flagging Agent* columns giving this information per flagging agent.

The percentages in each successive column represent the additional data flagged by applying that column's agent (after the previous agents have been applied).

### Flagging reason vs time

Plots of flagging reason vs time (from the online flags file).

uid\_\_\_A002\_Xd98580\_X354.ms

**hifa\_rawflagchans:** More flagging is done here. Again, the total percentages should be  $< \sim 20\%$ .

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Home By Topic By Task

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\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
19. hif\_makeimages
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsizes
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

## 4. Flag raw channels

BACK

### Flags

Measurement Set	Flagging Commands	Number of Statements	Flagging View
uid__A002_Xd98580_X354.ms	uid__A002_Xd98580_X354.ms-flag_commands.txt	0	<a href="#">Display</a>

Report Files

### Flagged data summary

Data Selection	Before Task	Flagged by Task	Total	Measurement Set
All Data	19.1%	0.0%	19.1%	uid__A002_Xd98580_X354.ms
Science Spectral Windows	9.1%	0.0%	9.1%	
Bandpass	10.2%	0.0%	10.2%	
Flux	10.2%	0.0%	10.2%	
Phase	8.1%	0.0%	8.1%	
Target	8.0%	0.0%	8.0%	
uid__A002_Xd98580_X354.ms	19.1%	0.0%	19.1%	



**h\_tsyscal:** In this step, an a priori amplitude correction is derived based on the system temperature of the data. The plots of  $T_{\text{sys}}$  versus frequency are important to check.

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Search

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Home By Topic By Task

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\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsize

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvconfit

30. hif\_uvcontsub

## 6. $T_{\text{sys}}$ Calibration

This task generates a  $T_{\text{sys}}$  calibration table, mapping each science spectral window to the  $T_{\text{sys}}$  window that overlaps in frequency.

### $T_{\text{sys}}$ window mapping

Measurement Set	$T_{\text{sys}}$ window	Science windows
uid__A002_Xd98580_X354.ms	17	25, 27, 29, 31
	19	33, 35, 37, 39
	21	41, 43
	23	45

Mapping of  $T_{\text{sys}}$  window to science window

### Plots

#### $T_{\text{sys}}$ vs frequency

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

uid\_\_A002\_Xd98580\_X354.ms

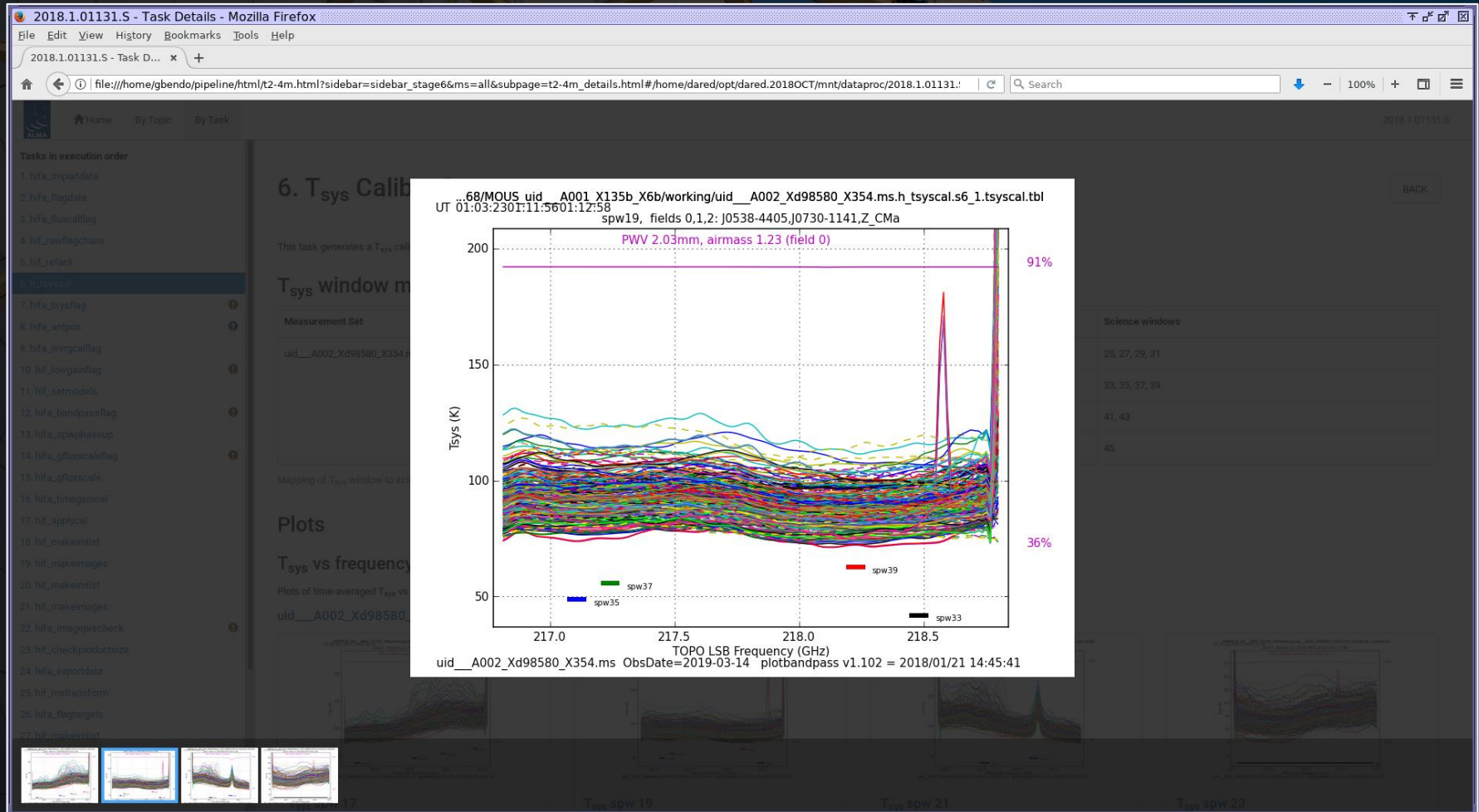
$T_{\text{sys}}$  spw 17

$T_{\text{sys}}$  spw 19

$T_{\text{sys}}$  spw 21

$T_{\text{sys}}$  spw 23

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  $T_{\text{sys}}$  data. It is useful to check the plots of  $T_{\text{sys}}$  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.)

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2018.1.01131.S

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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\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
19. hif\_makeimages
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsize
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

## 7. Flag $T_{\text{sys}}$ calibration

Task notifications

Warning! flag edgechans - uid\_\_\_A002\_Xd98580\_X354.ms iteration 1 raised 12 flagging commands

Warning! flag birdies - uid\_\_\_A002\_Xd98580\_X354.ms iteration 1 raised 6 flagging commands

BACK

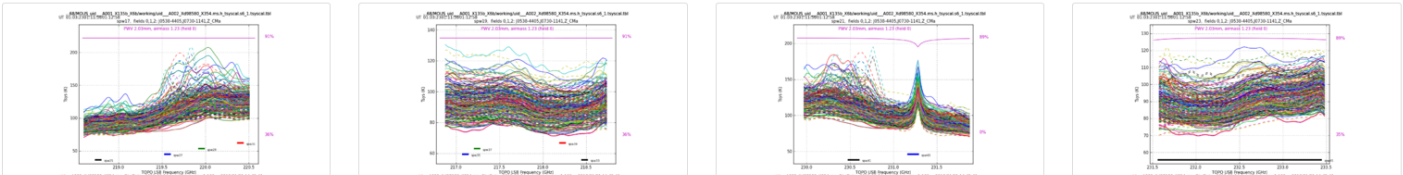
### Contents

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

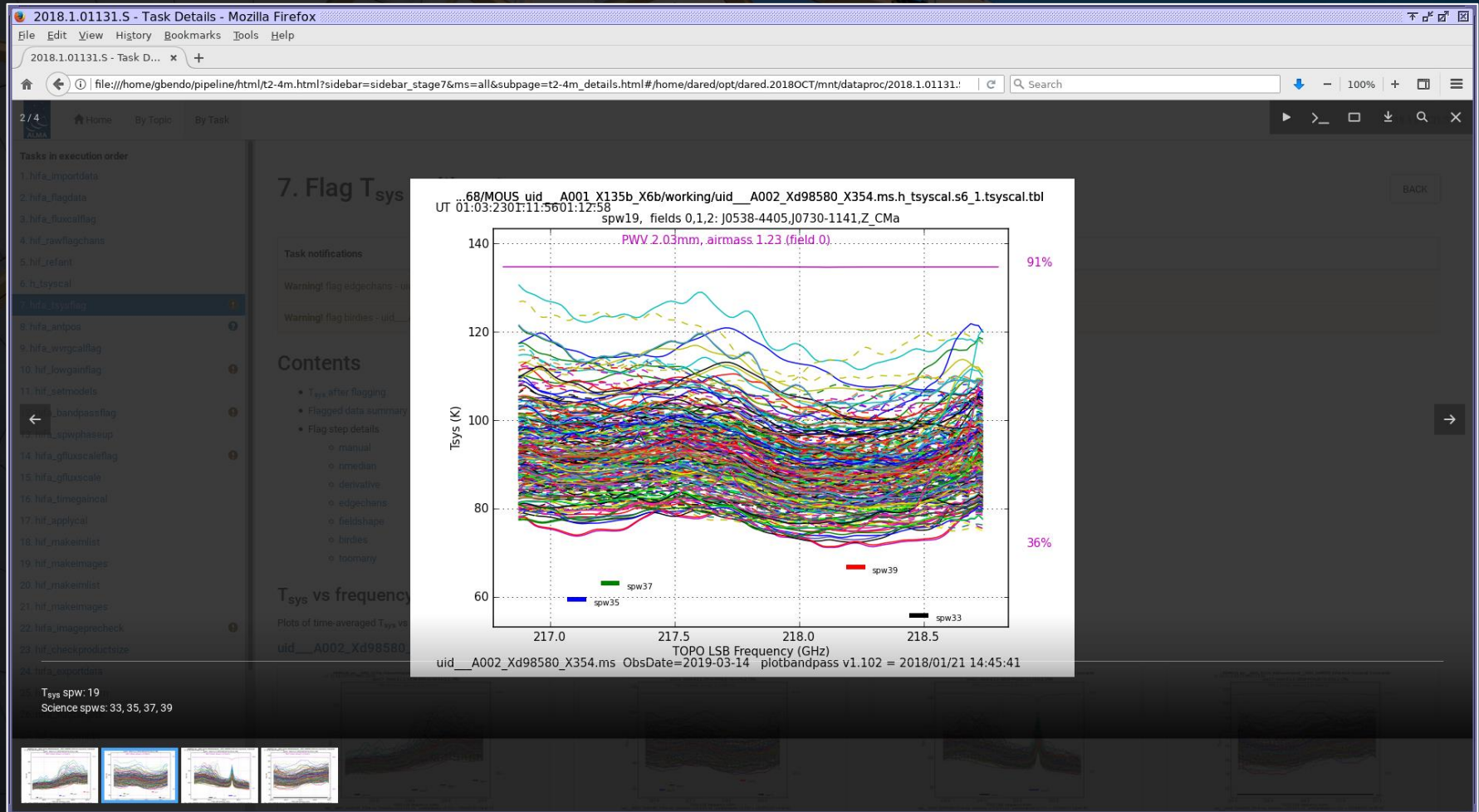
### $T_{\text{sys}}$ vs frequency after flagging

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

uid\_\_\_A002\_Xd98580\_X354.ms



**hifa\_tsysflag:** This step applies flagging to bad  $T_{\text{sys}}$  data. It is useful to check the plots of  $T_{\text{sys}}$  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.

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🏠 Home By Topic By Task

2018.1.01131.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\_swpphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. 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\\_Xd98580\\_X354.ms](#)

Before Flagging

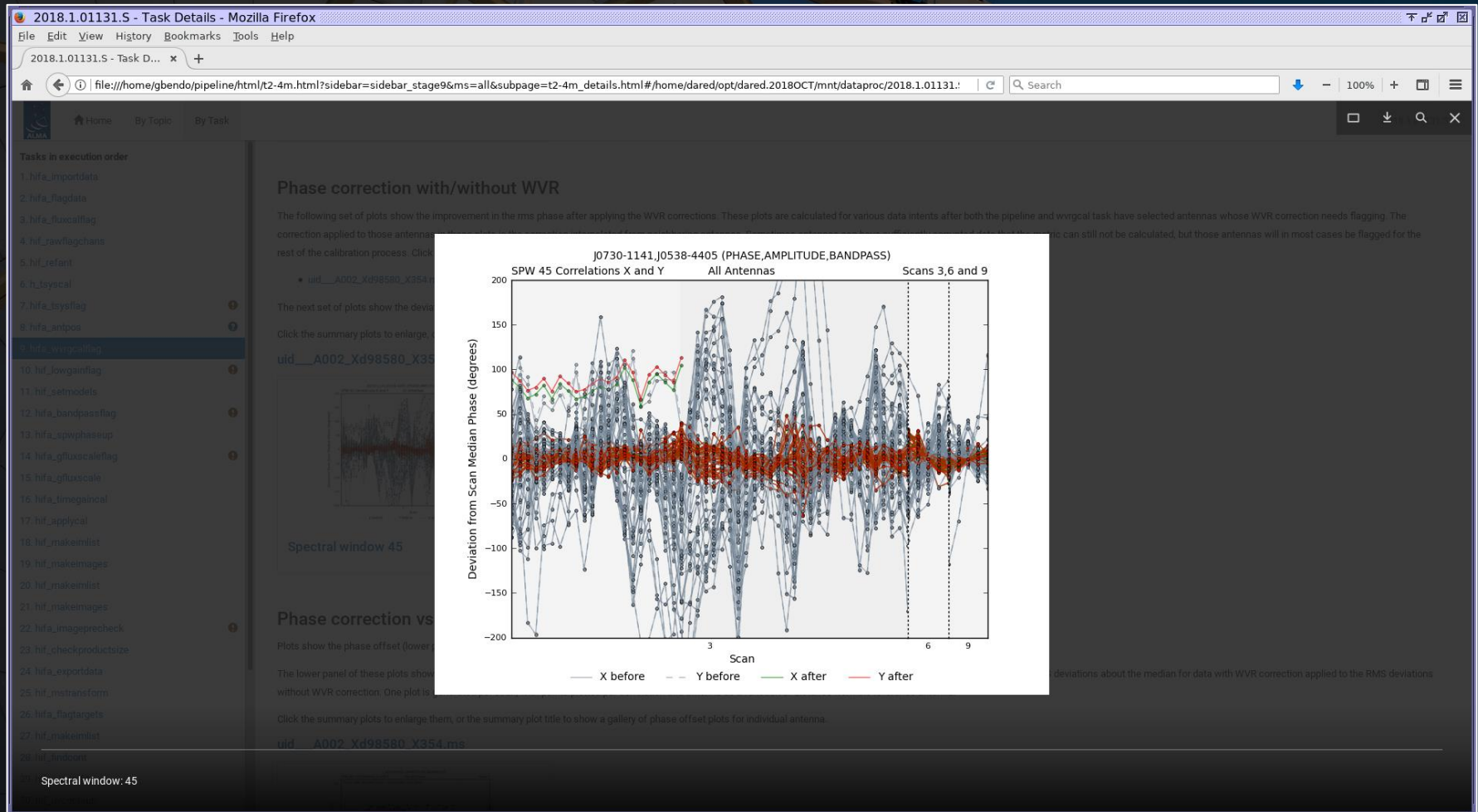
After

Spectral window 45

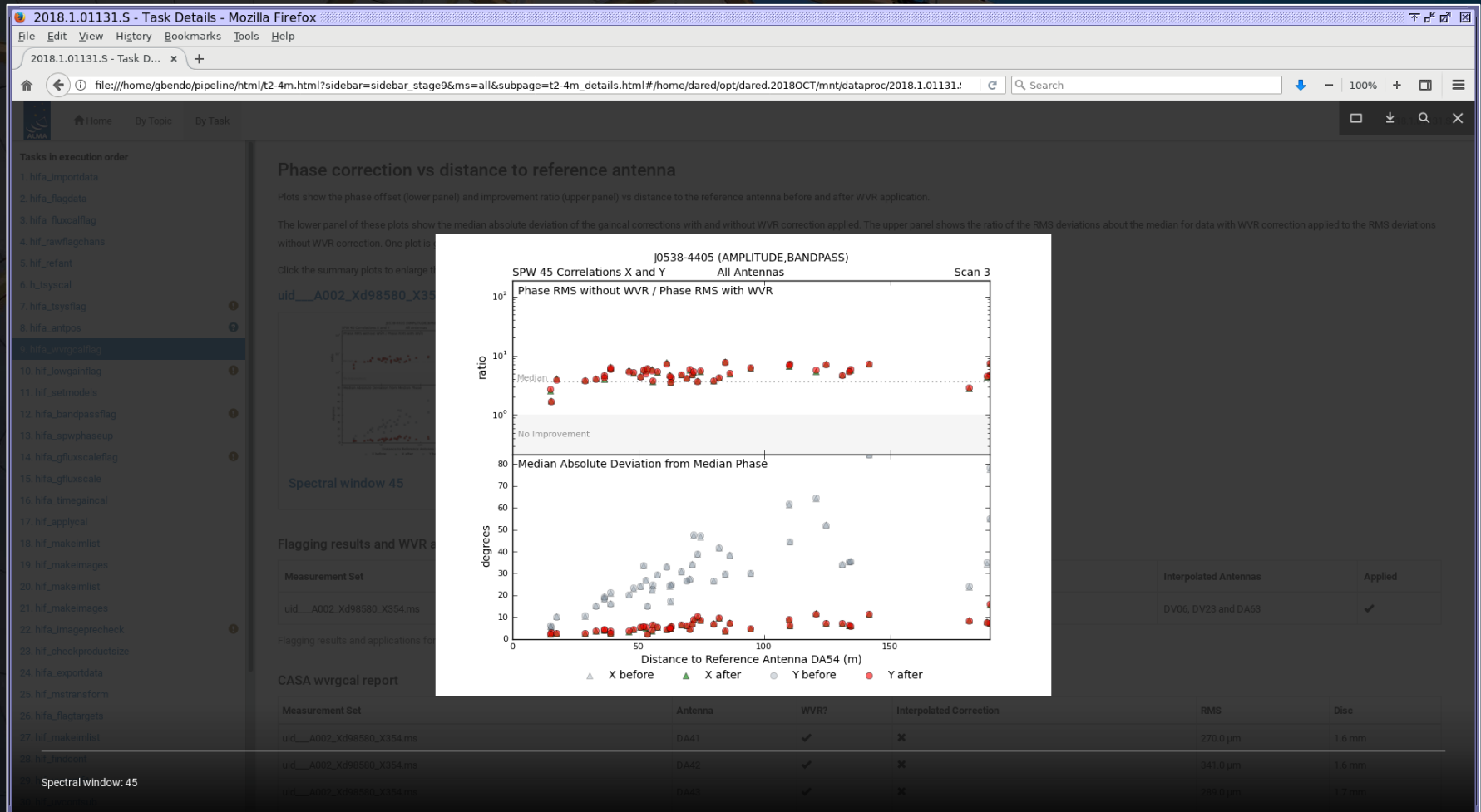
## Phase correction with/without WVR

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.

**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.



**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.



It is also worth noting whether the correction is interpolated for any antennas. This should only be done for very few antennas if any.

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2018.1.01131.S

Home By Topic By Task

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\_wvrflag
10. hif\_lowgainflag
11. hif\_setmodels
12. hifa\_bandpassflag
13. hifa\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
19. hif\_makeimages
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsizes
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

CASA wvrgcal report

Measurement Set	Antenna	WVR?	Interpolated Correction	RMS	Disc
uid__A002_Xd98580_X354.ms	DA41	✓	✗	270.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA42	✓	✗	341.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA43	✓	✗	289.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA44	✓	✗	293.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA45	✓	✗	272.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA46	✓	✗	309.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA47	✓	✗	276.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA49	✓	✗	333.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA50	✓	✗	287.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA51	✓	✗	295.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA52	✓	✗	273.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA53	✓	✗	259.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA54	✓	✗	280.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA55	✓	✗	276.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA56	✓	✗	267.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA57	✓	✗	269.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA58	✓	✗	279.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA59	✓	✗	297.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA60	✓	✗	281.0 µm	1.5 mm
uid__A002_Xd98580_X354.ms	DA61	✓	✗	299.0 µm	1.6 mm
uid__A002_Xd98580_X354.ms	DA62	✓	✗	303.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA63	✓	✓	357.0 µm	1.7 mm
uid__A002_Xd98580_X354.ms	DA64	✓	✗	326.0 µm	1.6 mm

**hif\_setmodels:** This is where the model flux densities (displayed by hifa\_importdata) are applied to data for the flux calibrator. The model amplitudes versus uv distance are useful for showing if any interferometry effects could cause issues (as would be expected for planetary objects).

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ALMA

Home By Topic By Task

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\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

## 11. Set model flux

BACK

### Results

The following flux densities were set in the measurement set column and recorded in the pipeline context. Only the spectral index of the bandpass calibrator is set here and its flux density will be set later.

Measurement Set	Field	SpW	Centre Freq	Band	Flux Density				Spix	flux.csv
					I	Q	U	V		
uid__A002_Xd98580_X354.ms	J0538-4405 (#0) BANDPASS AMPLITUDE	25	218.763 GHz	ALMA Band 6	1.515 Jy	0.000 Jy	0.000 Jy	0.000 Jy	-0.540543679023	<a href="#">View or download</a>
		27	219.564 GHz		1.512 Jy					
		29	219.953 GHz		1.510 Jy					
		31	220.402 GHz		1.508 Jy					
		33	218.479 GHz		1.516 Jy					
		35	217.108 GHz		1.521 Jy					
		37	217.242 GHz		1.520 Jy					
		39	218.226 GHz		1.517 Jy					
		41	230.542 GHz		1.472 Jy					
		43	231.224 GHz		1.470 Jy					
		45	232.504 GHz		1.466 Jy					

Setjy Results

### Model amplitude vs UV distance

Plots of model amplitude vs UV distance for each Measurement Set. One plot is generated per baseband, with data shown for all antennas and correlations, colored by spw.



**hif\_setmodels:** This is where the model flux densities (displayed by hifa\_importdata) are applied to data for the flux calibrator. The model amplitudes versus uv distance are useful for showing if any interferometry effects could cause issues (as would be expected for planetary objects).

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2018.1.01131.S

Home By Topic By Task

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\_wvrflag
10. hif\_lowgainflag
11. hif\_setmodels
12. hifa\_bandpassflag
13. hifa\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
19. hif\_makeimages
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsizes
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

43	ZST.ZZ4 GHz	1.4/0 Jy
45	232.504 GHz	1.466 Jy

Setjy Results

### Model amplitude vs UV distance

Plots of model amplitude vs UV distance for each Measurement Set. One plot is generated per baseband, with data shown for all antennas and correlations, colored by spw.

uid\_\_A002\_Xd98580\_X354.ms

Baseband: 1  
ALMA Band 6  
Spws 25, 27, 29 and 31

Model amplitude vs UV distance in baseband 1 for AMPLITUDE calibrator.

Baseband: 2  
ALMA Band 6  
Spws 33, 35, 37 and 39

Model amplitude vs UV distance in baseband 2 for AMPLITUDE calibrator.

Baseband: 3  
ALMA Band 6  
Spws 41 and 43

Model amplitude vs UV distance in baseband 3 for AMPLITUDE calibrator.

Baseband: 4  
ALMA Band 6  
Spw 45

Model amplitude vs UV distance in baseband 4 for AMPLITUDE calibrator.

Pipeline QA

Input Parameters

Tasks Execution Statistics

CASA logs for stage 11

- [View or download stage11/casapylog \(30.3 KB\)](#)

**hifa\_bandpassflag**: 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.

2018.1.01131.S - Task Details - Mozilla Firefox

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2018.1.01131.S

Home By Topic By Task

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\_wvrgainflag

10. hif\_lowgainflag

11. hif\_setmodels

12. hifa\_bandpassflag

13. hifa\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

12. Bandpass Calibration and Flagging

BACK

Task notifications

Warning! Evaluation of flagging heuristics for uid\_\_\_A002\_Xd98580\_X354.ms raised total of 46 flagging command(s)

This task performs a preliminary bandpass solution and 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, flags those outliers, then derives a final bandpass solution (if any flags were generated). 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.

In further detail, the workflow is as follows: an a priori calibration is applied using pre-existing caltables in the calibration state, a preliminary bandpass solution and amplitude gaincal solution is solved and applied, the flagging heuristics are run and any outliers are flagged, a final bandpass solution is solved (if necessary) and the name "final" is appended to this caltable. 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. The score for this stage is a simple combination (multiplication) of the standard data flagging score (depending on the fraction of data flagged) and the score for the bandpass solution.

Contents

- Flagging commands
- Flagged data summary table
- Bandpass results tables
- Amplitude/Phase vs frequency plots (per EB)
- Amplitude vs time plots for flagging
- Amplitude vs UV distance plots for flagging

Flagging

Measurement Set	Flagging Commands	Number of Statements
uid___A002_Xd98580_X354.ms	uid___A002_Xd98580_X354.ms-flag_commands.txt	46

Report Files

Flagged data summary

Measurement Set: uid\_\_\_A002\_Xd98580\_X354.ms

**hifa\_bandpassflag**: 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.

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2018.1.01131.S

Home By Topic By Task

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\_wvgcalflag

10. hif\_lowgainflag

11. hif\_setmodels

12. hifa\_bandpassflag

13. hifa\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

## 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.

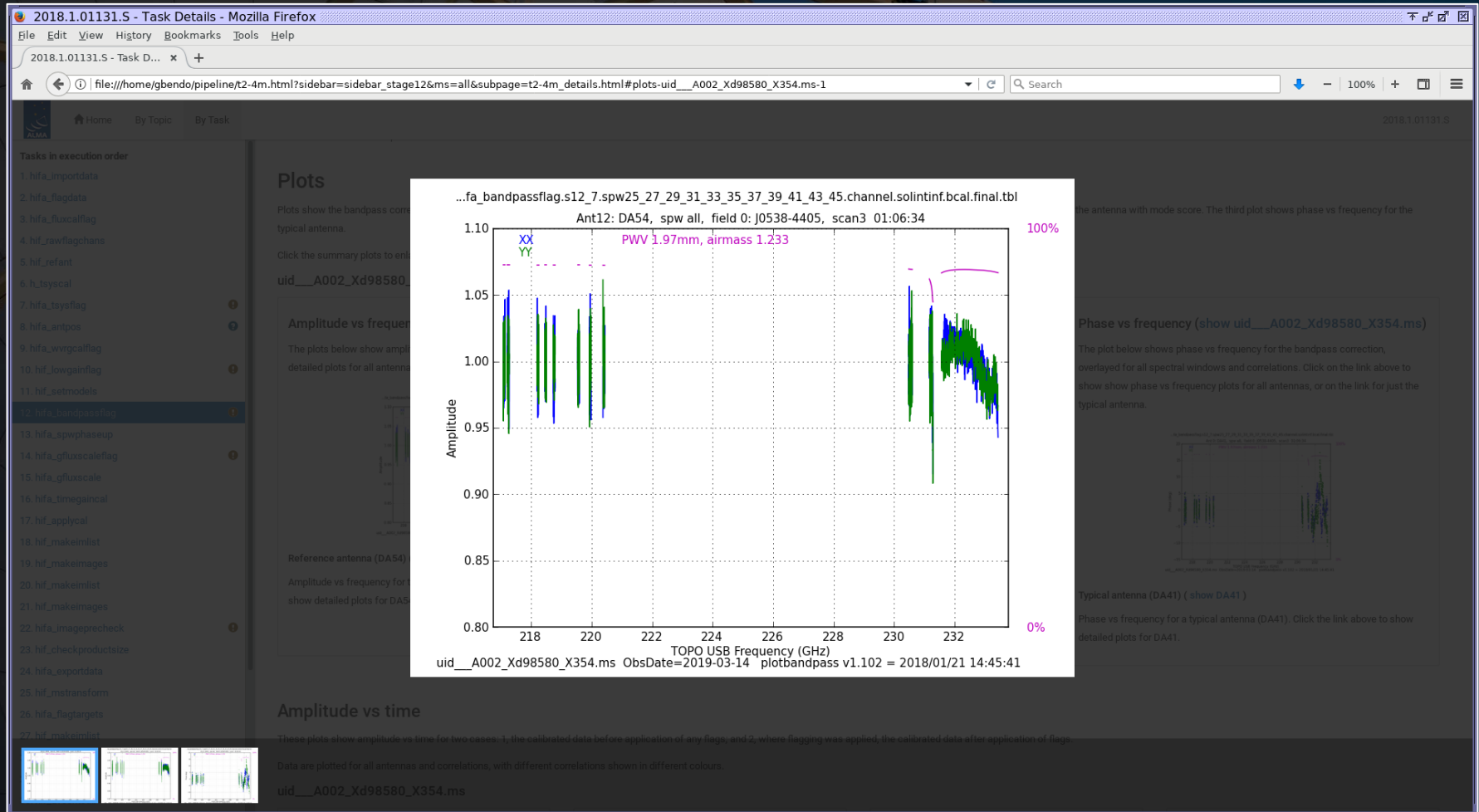
Click the summary plots to enlarge them, or the plot title to see detailed plots per spectral window and antenna.

**uid\_\_A002\_Xd98580\_X354.ms**

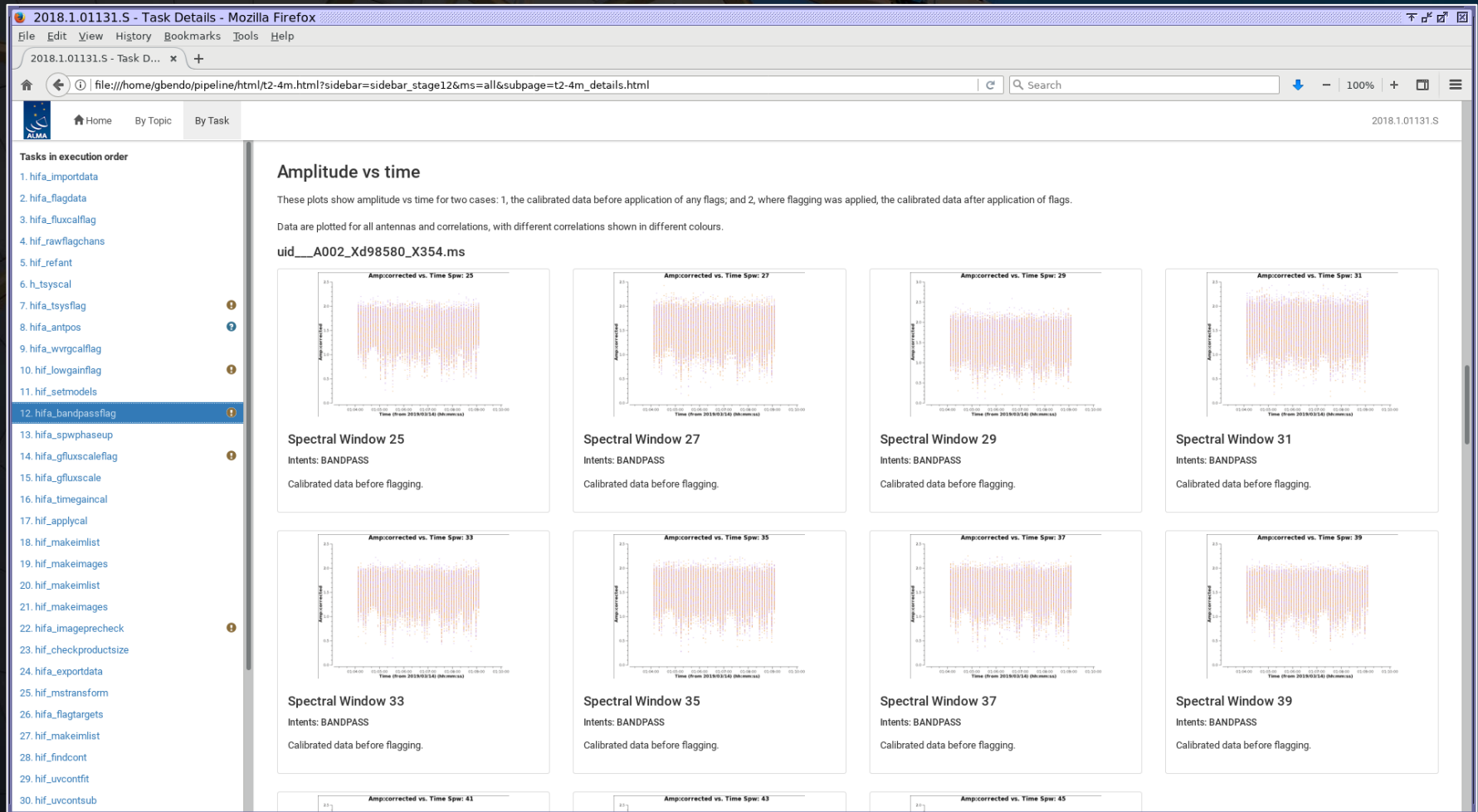
### Amplitude vs frequency (show uid\_\_A002\_Xd98580\_X354.ms)

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

**hifa\_bandpassflag**: 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.

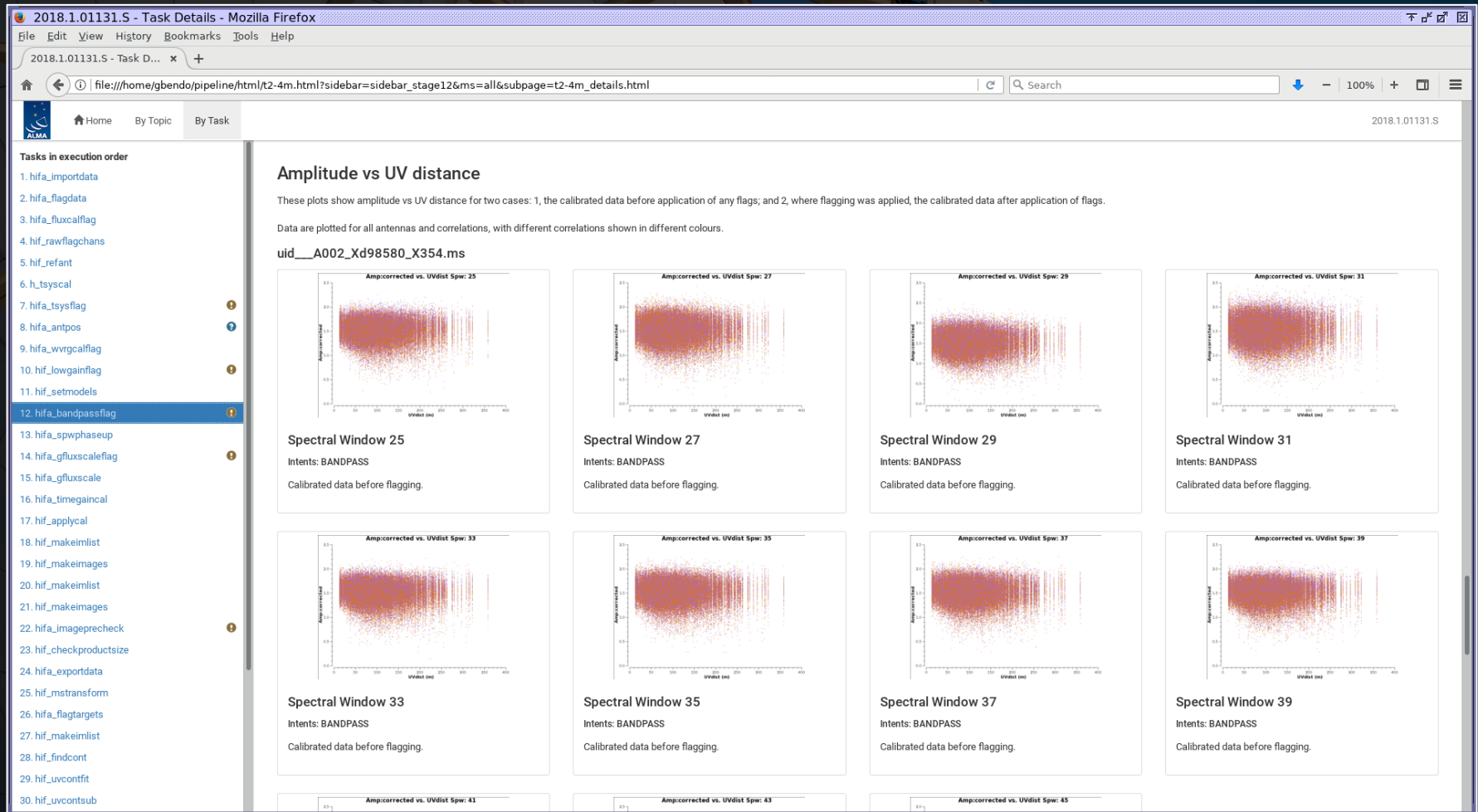


Additionally, the plots of the amplitude versus time and versus uv distance for the bandpass calibrator should contain no severe outliers. Any outliers will need to be flagged before imaging.





Additionally, the plots of the amplitude versus time and versus uv distance for the bandpass calibrator should contain no severe outliers. Any outliers will need to be flagged before imaging.



**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).

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🏠 Home By Topic By Task

2018.1.01131.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\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

14. Phased-up Fluxscale Calibration and Flagging

BACK

Task notifications

Warning! Evaluation of flagging heuristics for uid\_\_\_A002\_Xd98580\_X354.ms raised total of 32 flagging command(s)

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
uid___A002_Xd98580_X354.ms	uid___A002_Xd98580_X354.ms-flag_commands.txt	32

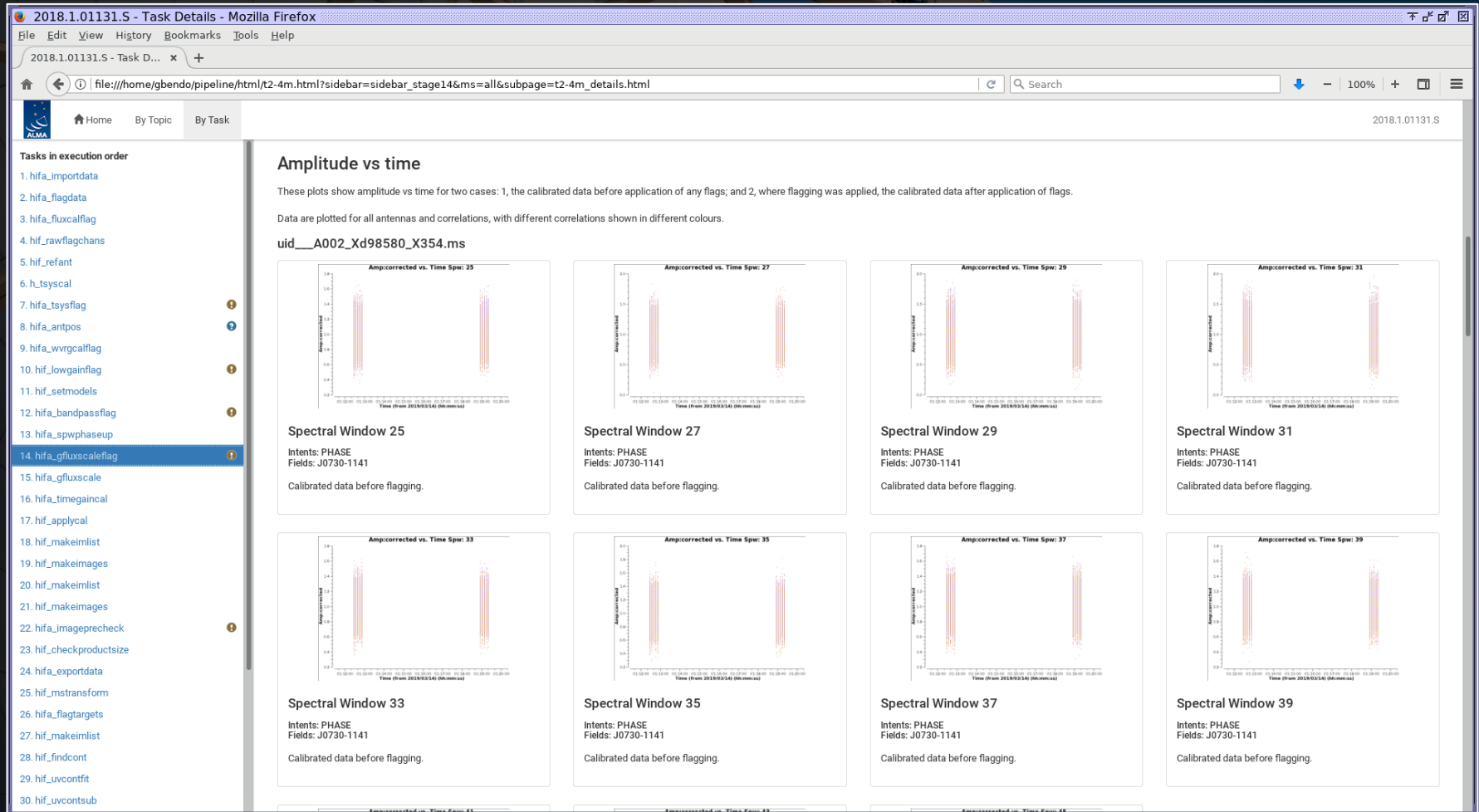
Report Files

Flagged data summary

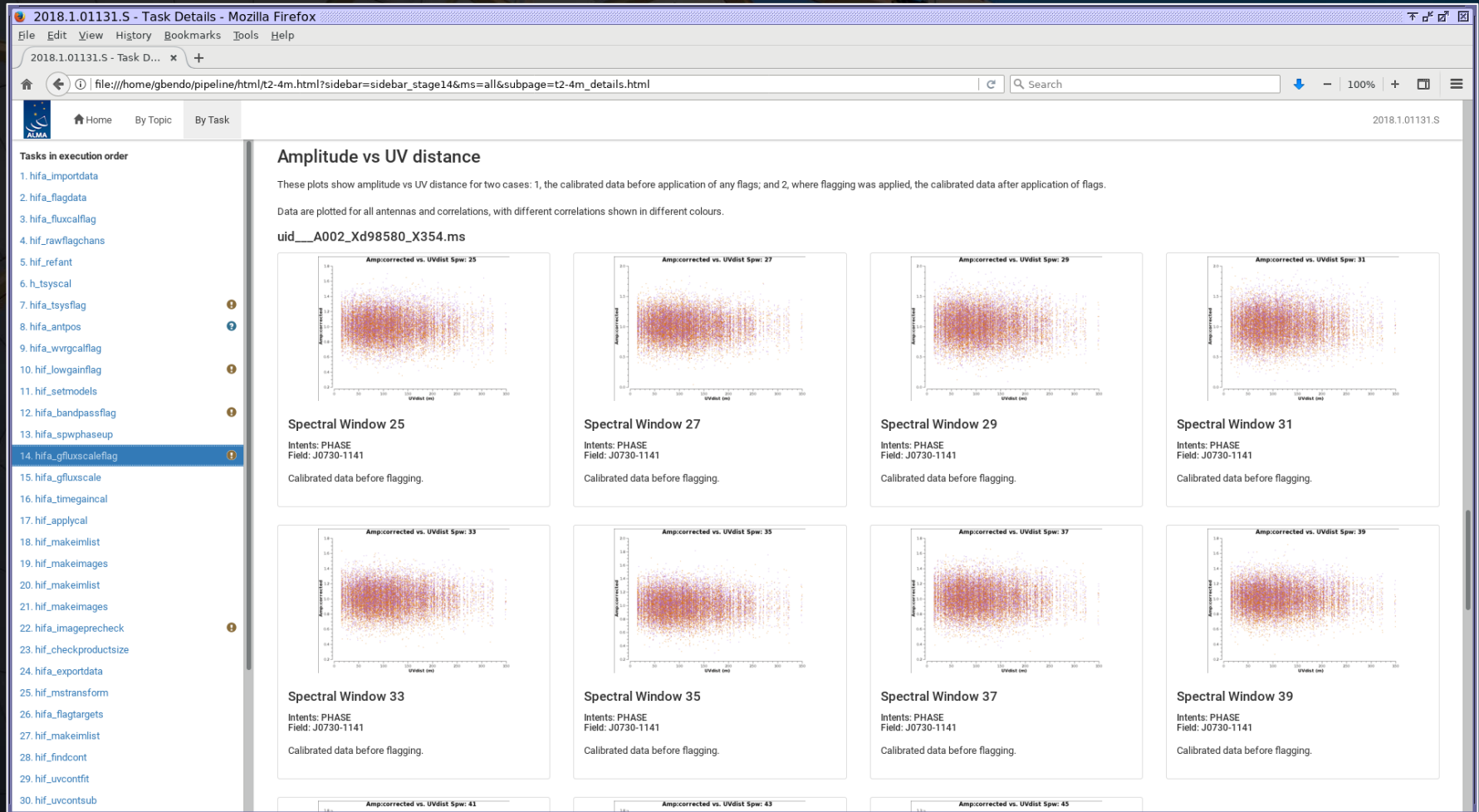
Measurement Set: uid\_\_\_A002\_Xd98580\_X354.ms

Data Selection	flagged before	flagged after
----------------	----------------	---------------

**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).



**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).



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

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2018.1.01131.S

Home By Topic By Task

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\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

15. Phased-up fluxscale

BACK

Contents

Tables:

Antennas used for flux scaling

Computed flux densities

Plots:

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_Xd98580_X354.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 Flux Density				Flux Ratio (Derived / Catalog)	Spix		
				Catalog Flux Density							
				I	Q	U	V				
uid___A002_Xd98580_X354.ms	J0730-1141 (#1) PHASE	25	218.763 GHz 58.594 MHz	806.299 mJy ± 3.699 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.954	0.0		
				845.000 mJy	0.000 Jy	0.000 Jy	0.000 Jy				



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

2018.1.01131.S - Task Details - Mozilla Firefox

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2018.1.01131.S

Home By Topic By Task

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\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

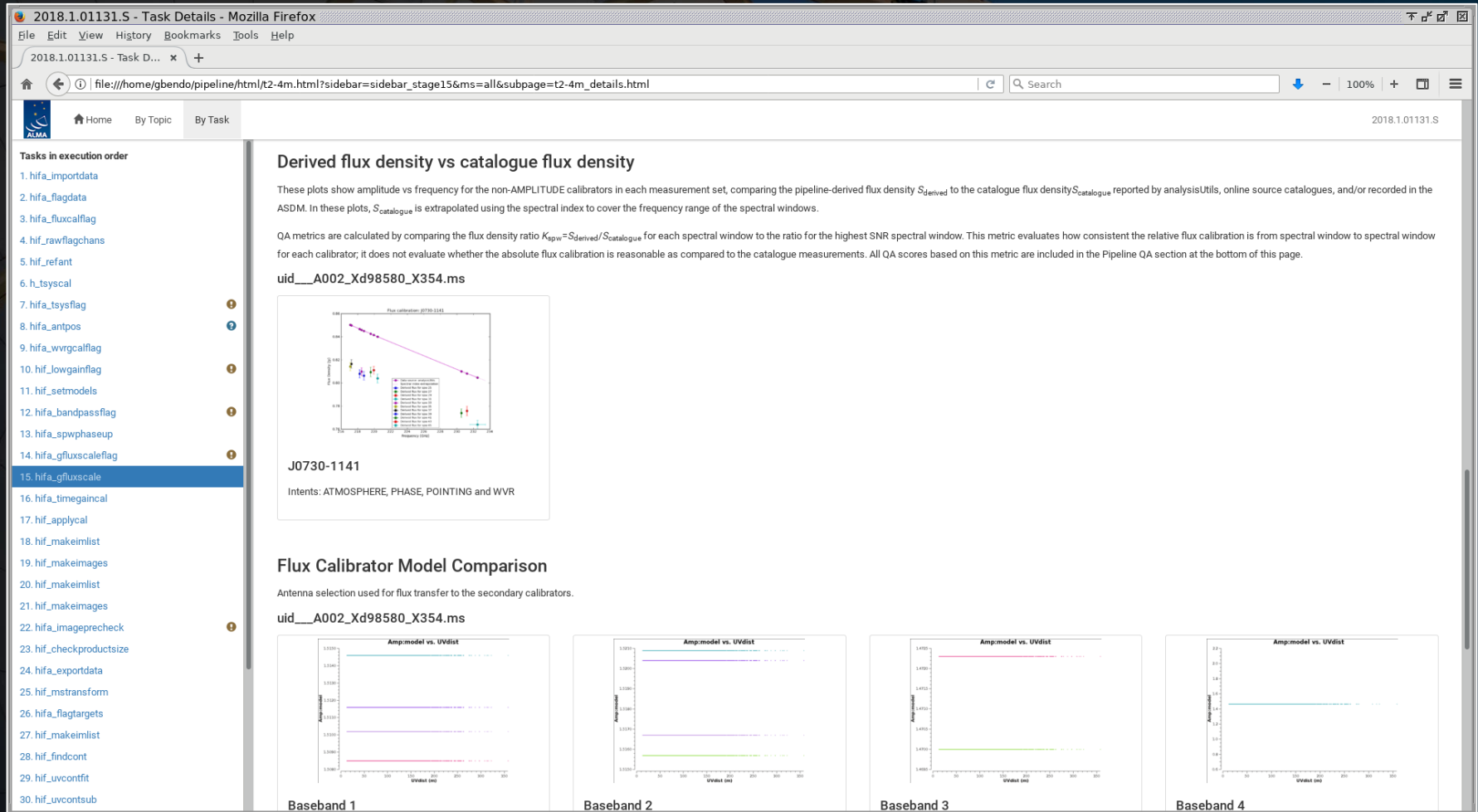
30. hif\_uvcontsub

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 Flux Density				Flux Ratio (Derived / Catalog)	Spix
				Catalog Flux Density					
				I	Q	U	V		
uid__A002_Xd98580_X354.ms	J0730-1141 (#1) PHASE	25	218.763 GHz 58.594 MHz	806.299 mJy ± 3.699 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.954	0.0
				845.000 mJy	0.000 Jy	0.000 Jy	0.000 Jy		
		27	219.564 GHz 58.594 MHz	809.472 mJy ± 4.103 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.961	
				842.600 mJy	0.000 Jy	0.000 Jy	0.000 Jy		
		29	219.953 GHz 58.594 MHz	811.004 mJy ± 3.450 mJy (0.4%)	0.000 Jy	0.000 Jy	0.000 Jy	0.964	
				841.400 mJy	0.000 Jy	0.000 Jy	0.000 Jy		
		31	220.402 GHz 58.594 MHz	803.930 mJy ± 3.866 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.957	
				840.000 mJy	0.000 Jy	0.000 Jy	0.000 Jy		
		33	218.479 GHz 58.594 MHz	809.696 mJy ± 3.483 mJy (0.4%)	0.000 Jy	0.000 Jy	0.000 Jy		
				845.900 mJy	0.000 Jy	0.000 Jy	0.000 Jy		
		35	217.108 GHz 58.594 MHz	814.204 mJy ± 3.510 mJy (0.4%)	0.000 Jy	0.000 Jy	0.000 Jy	0.958	
				850.200 mJy	0.000 Jy	0.000 Jy	0.000 Jy		
		37	217.242 GHz 58.594 MHz	816.442 mJy ± 3.776 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.961	
				849.800 mJy	0.000 Jy	0.000 Jy	0.000 Jy		
		39	218.226 GHz 58.594 MHz	807.943 mJy ± 3.606 mJy (0.4%)	0.000 Jy	0.000 Jy	0.000 Jy	0.954	
				846.700 mJy	0.000 Jy	0.000 Jy	0.000 Jy		

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



**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.

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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\_wvrflag
10. hif\_lowgainflag
11. hif\_setmodels
12. hifa\_bandpassflag
13. hifa\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
19. hif\_makeimages
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsizes
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

## 16. Gain Calibration

BACK

This task creates gain solutions for each measurement set.

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

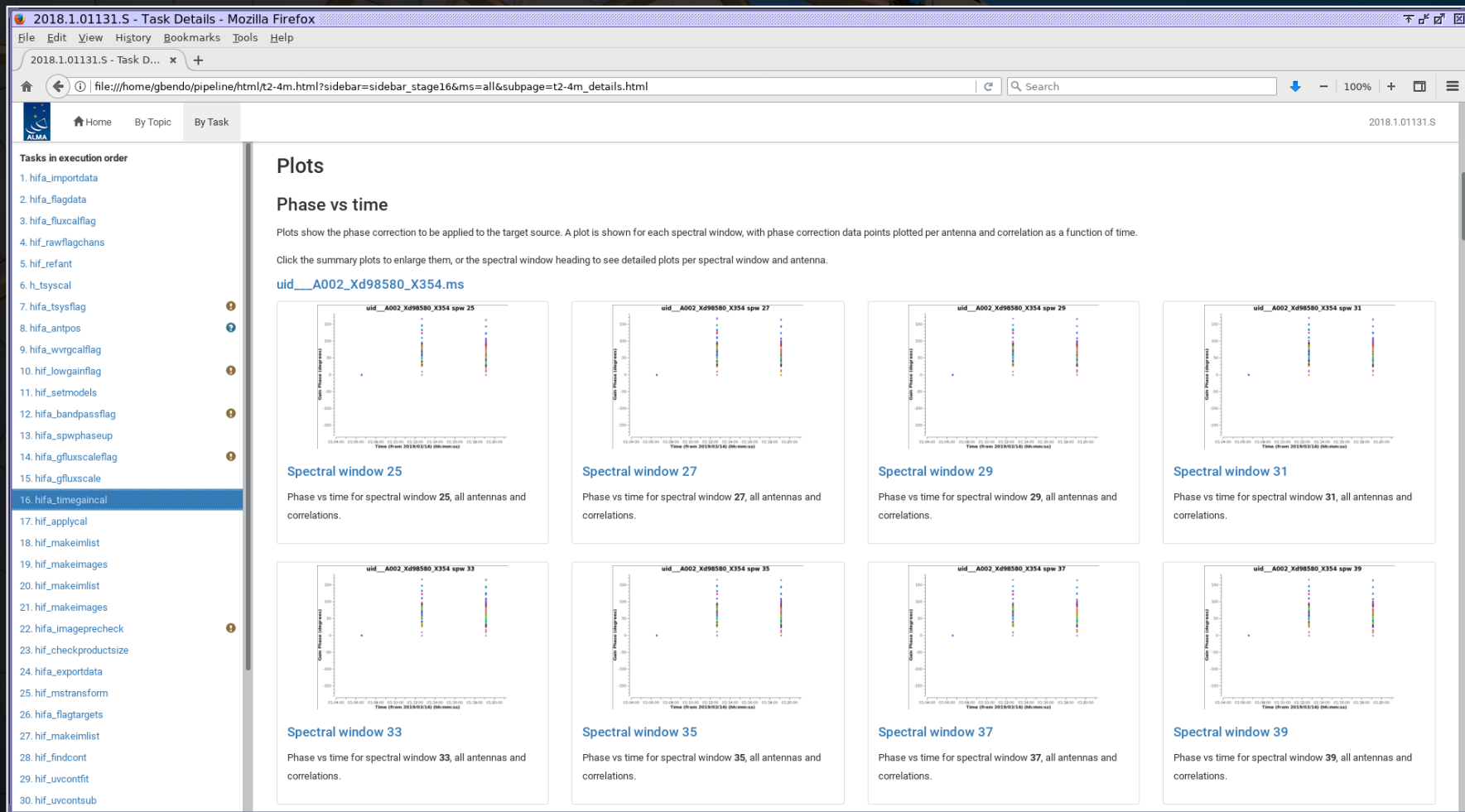
## Results

Measurement Set	Solution Parameters		Applied To		Calibration Table
	Type	Interval	Scan Intent	Spectral Windows	
uid__A002_Xd98580_X354.ms	Phase only	Infinite	PHASE, CHECK, TARGET	25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45	uid__A002_Xd98580_X354.ms.hifa_timegaincal.s16_3.spw25_27_29_31_33_35_37_39_41_43_45.solintinf.gpcal.tbl
uid__A002_Xd98580_X354.ms	Phase only	Per integration (6.05s)	AMPLITUDE, BANDPASS	25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45	uid__A002_Xd98580_X354.ms.hifa_timegaincal.s16_4.spw25_27_29_31_33_35_37_39_41_43_45.solintinf.gpcal.tbl
uid__A002_Xd98580_X354.ms	Amplitude only	Infinite	CHECK, TARGET	25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45	uid__A002_Xd98580_X354.ms.hifa_timegaincal.s16_6.spw25_27_29_31_33_35_37_39_41_43_45.solintinf.gacal.tbl
uid__A002_Xd98580_X354.ms	Amplitude only	Infinite	AMPLITUDE, BANDPASS, PHASE	25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45	uid__A002_Xd98580_X354.ms.hifa_timegaincal.s16_6.spw25_27_29_31_33_35_37_39_41_43_45.solintinf.gacal.tbl

Applied calibrations and parameters used for caltable generation

## Plots

**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.

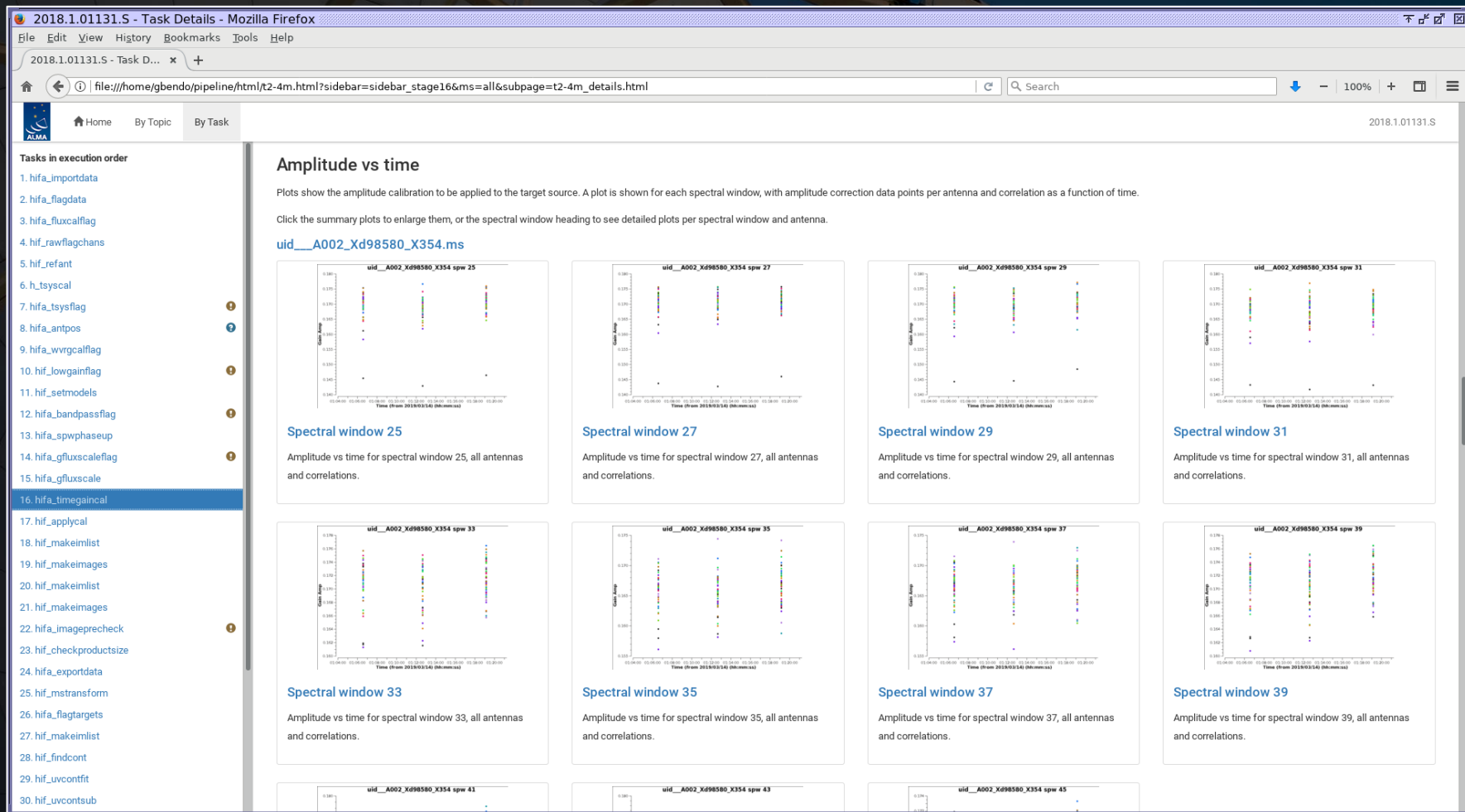


**hifa\_timegaincal**: This module derives phase and amplitude corrections versus time. The various plots should be inspected for outliers, which may need to be flagged before imaging.





**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.



**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.

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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\_wvrflag

10. hif\_lowgainflag

11. hif\_setmodels

12. hifa\_bandpassflag

13. hifa\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsizes

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

17. Apply calibration tables

BACK

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

### Contents

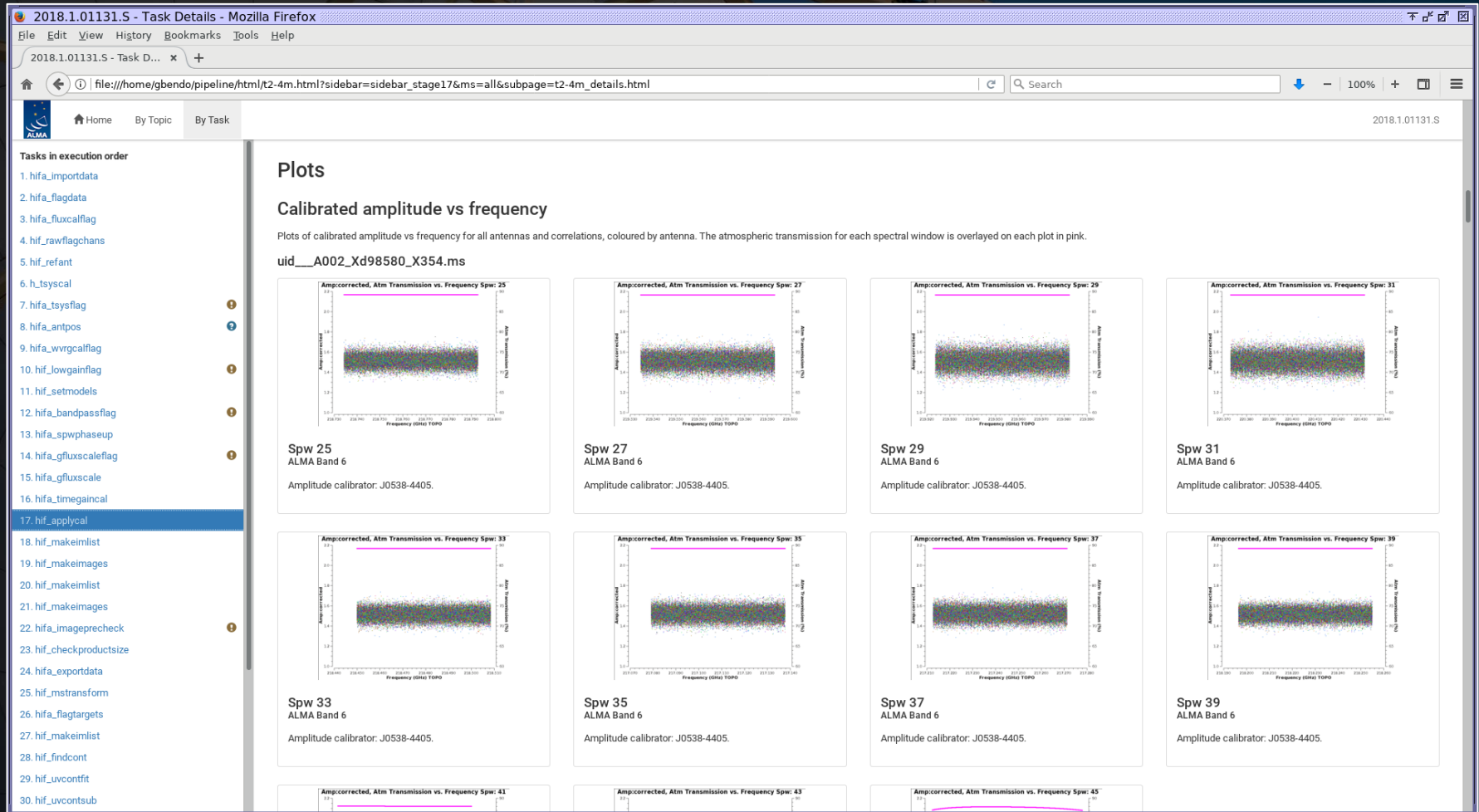
- Applied calibrations
- Flagged data after calibration application
- Plots
  - Calibrated amplitude vs frequency
  - Calibrated phase vs frequency
  - Calibrated amplitude vs UV distance
  - Calibrated amplitude vs time
  - Calibrated phase vs time
  - (Corrected amplitude / model) vs antenna
  - (Corrected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

### Applied calibrations

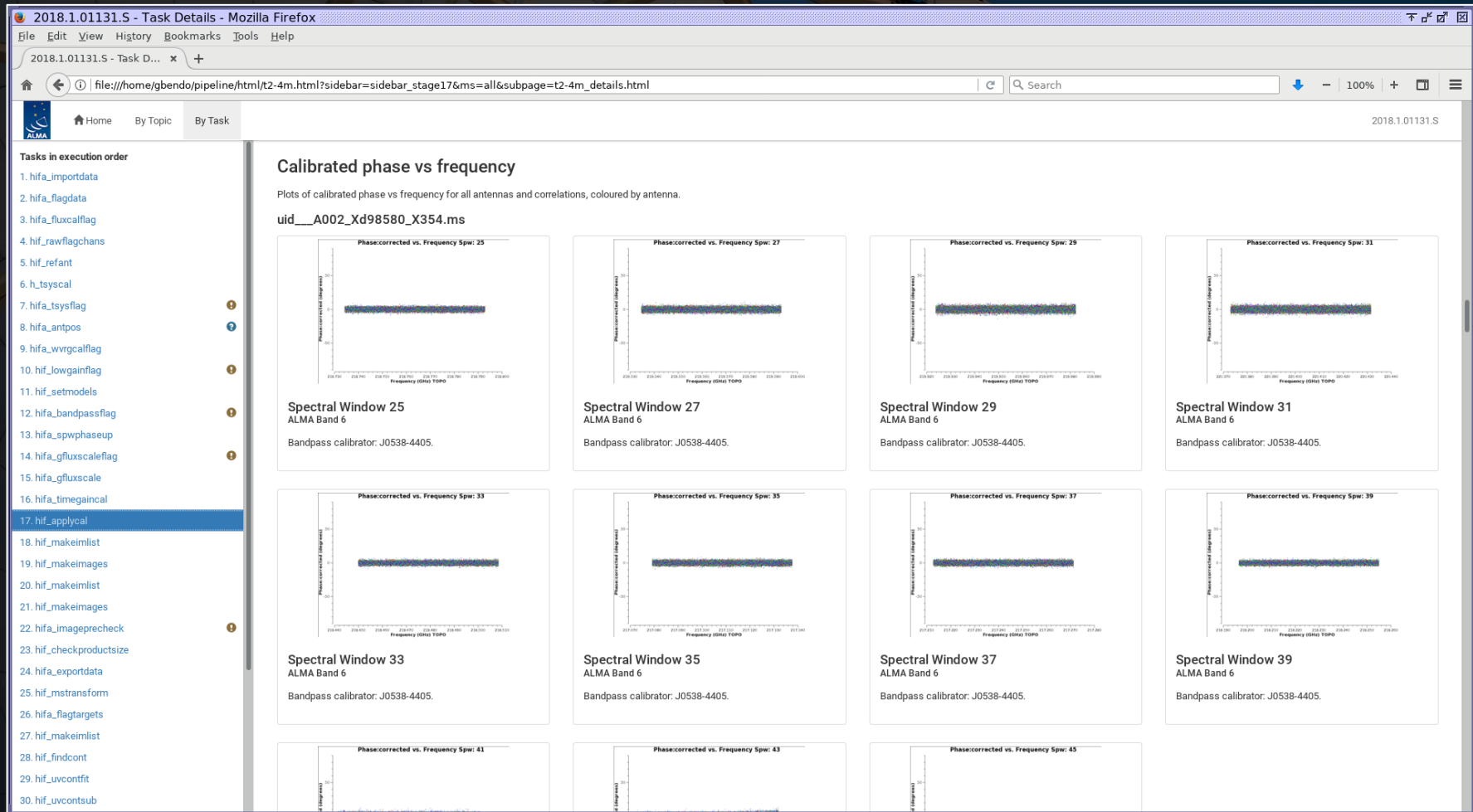
The *Fields* column lists fields within the measurement set containing any of the intents listed in the *Intents* column. If a field name is ambiguous and does not uniquely identify a field, e.g., when a field is observed with multiple intents, then the unambiguous field ID is listed instead of the field 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_Xd98580_X354.ms	45.2	TARGET	Z_CMa	25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45	0~47	Tsys	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 17, 19, 21, 23, 17, 17, 19, 19, 21, 21, 23, 23, 17, 17, 17, 17, 17, 17, 19, 19, 19, 19, 19, 19, 21, 21, 21, 23, 23	nearest	linear, linear	True	<a href="#">Filename</a>
	GB					antpos				False	<a href="#">Filename</a>
						WVR			nearest	False	<a href="#">Filename</a>

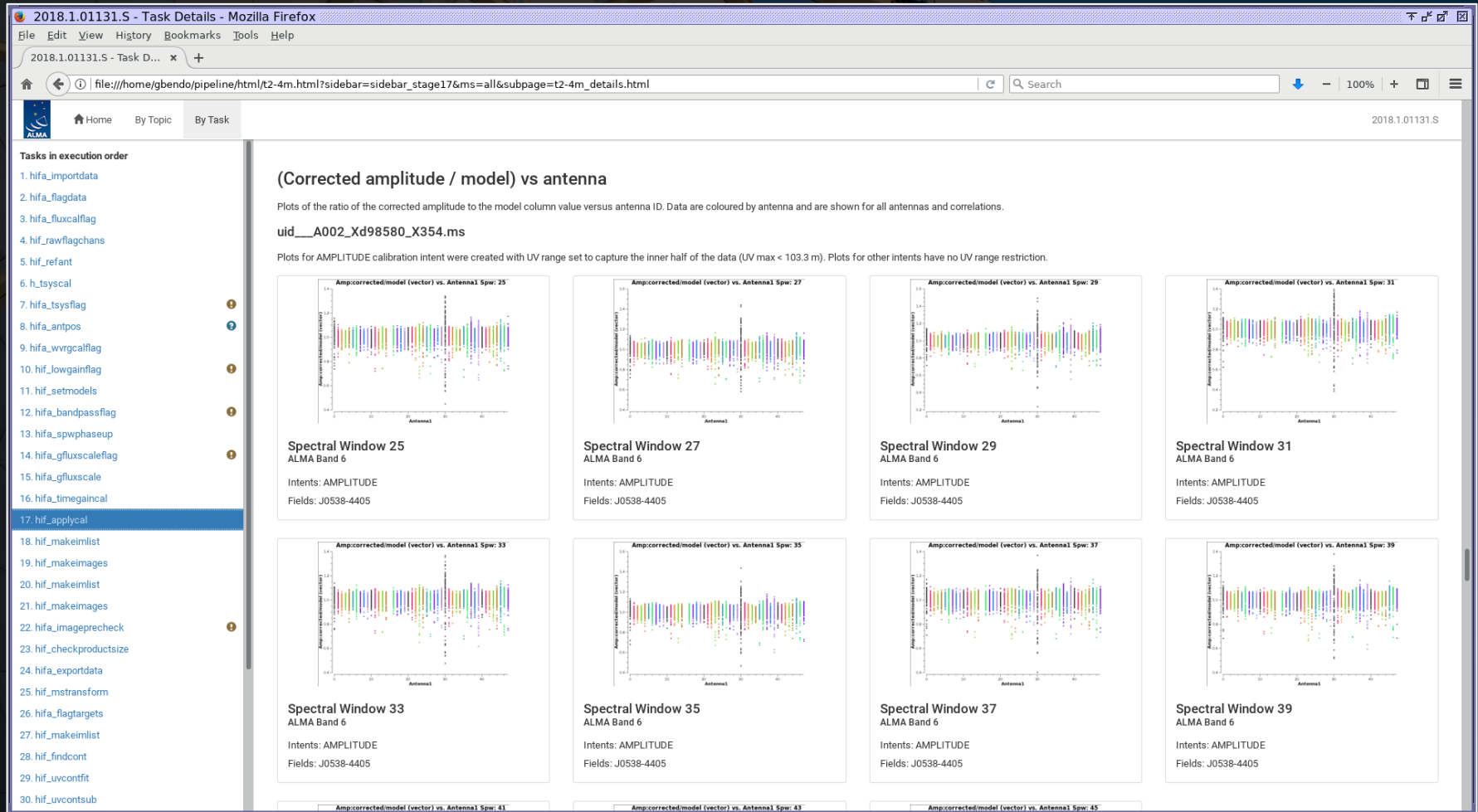
The amplitudes versus frequency, versus uv distance, and versus time should be mostly flat for the calibration sources (but not necessarily for science targets or planetary objects). However, the scatter in the amplitudes may increase where atmospheric transmission decreases.



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



This module also produces plots of the amplitude/model flux ratios versus antenna and uv distance. These should be close to 1. Any antenna exhibiting excess scatter in these plots needs to be checked carefully and may need to be flagged.





**hif\_makeimages:** 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. Beam sizes are calculated here.

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Tasks in execution order

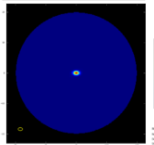
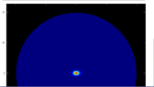
1. hifa\_importdata
2. hifa\_flagdata
3. hifa\_fluxcalflag
4. hif\_rawflagchans
5. hif\_refant
6. h\_tsyscal
7. hifa\_tsysflag
8. hifa\_antpos
9. hifa\_wvrgcalflag
10. hif\_lowgainflag
11. hif\_setmodels
12. hifa\_bandpassflag
13. hifa\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
- 19. hif\_makeimages**
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsizes
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

## 19. Tclean/MakeImages

Make calibrator images

BACK

### Image Details

Field	Spw	Pol	Image details	Image result
J0538-4405 (BANDPASS)	25 / X1494769907#ALMA_RB_06#BB_1#SW-01	I	<p>centre frequency of image 218.7861GHz (LSRK)</p> <p>beam 1.51 x 0.956 arcsec</p> <p>beam p.a. 89.6deg</p> <p>final theoretical sensitivity 0.00042 Jy/beam</p> <p>cleaning threshold 0.0027 Jy/beam Dirty DR: 3.6e+03 DR correction: 3.2</p> <p>clean residual peak / scaled MAD 4.58</p> <p>non-pbcor image RMS 0.00057 Jy/beam</p> <p>pbcor image max / min 1.51 / -0.00505 Jy/beam</p> <p>fractional bandwidth / nterms 0.027% / 1</p> <p>aggregate bandwidth 0.0586 GHz (LSRK)</p> <p>score 1.00</p> <p>image file uid__A001_X135b_X6b.s19_0_J0538-4405_bp.spw25.mfs.l.iter1.image</p>	 <p>View other QA images...</p>
J0538-4405 (BANDPASS)	27 / X1494769907#ALMA_RB_06#BB_1#SW-02	I	<p>centre frequency of image 219.5866GHz (LSRK)</p> <p>beam 1.51 x 0.952 arcsec</p> <p>beam p.a. 89.7deg</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.

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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\_spwphaseup

14. hifa\_gfluxscaleflag

15. hifa\_gfluxscale

16. hifa\_timegaincal

17. hif\_applycal

18. hif\_makeimlist

19. hif\_makeimages

20. hif\_makeimlist

21. hif\_makeimages

22. hifa\_imageprecheck

23. hif\_checkproductsize

24. hifa\_exportdata

25. hif\_mstransform

26. hifa\_flagtargets

27. hif\_makeimlist

28. hif\_findcont

29. hif\_uvcontfit

30. hif\_uvcontsub

## 22. Image Pre-Check

BACK

Task notifications

QA Robust cannot achieve the PI requested range for one or both axes, due to an elliptical beam, but the best match robust +0.5 (%Diff from mean AR = 4.1%), does produce a predicted beam area that is within the range of requested beam areas.

Goals From OT:

Representative Target: Z\_CMa

Representative Frequency: 218.4953 GHz (SPW 33)

Bandwidth for Sensitivity: 2578 MHz

Min / Max Acceptable Resolution: 0.850 arcsec / 1.28 arcsec

Goal PI sensitivity: 13.7 mJy

Single Continuum: False

Estimated Synthesized Beam and Sensitivities for the Representative Target/Frequency

Estimates are given for five possible values of the tclean robust weighting parameter: robust = -0.5, 0.0, +0.5 (default), +1.0, and +2.0. If the "Min / Max Acceptable Resolution" is available ( $\geq$  Cycle 5 12m-array data), the robust value closest to the default (+0.5) that predicts a beam that is in range of the PI request (for both axes) according to the table row for repBW (Bandwidth for Sensitivity) is chosen. If no robust value predicts a beam that is in range, the robust is chosen that yields the lowest "%Diff from mean AR" value for the repBW (Bandwidth for Sensitivity) rows. The %Diff from mean AR is defined as the percent difference between the predicted beam area and the beam area of the geometric mean (mean AR) of the PI requested range. When the "Min / Max Acceptable Resolution" is not available (or = 0.0 / 0.0), robust=+0.5 is used. The chosen robust value is highlighted in green and used for all science target imaging. For 12m-array mosaics, 0.0 is the most uniform robust value that can be chosen. 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 five 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.).

robust	uvtaper	Synthesized Beam	%Diff from mean AR	cell	bandwidth	bwmode	Effective Sensitivity
-0.5	⌈	1.15 x 0.761 arcsec @ -90.0 deg	-19.3%	0.15 x 0.15 arcsec	2578 MHz	repBW	9.92e-05 Jy/beam
-0.5	⌈	1.15 x 0.761 arcsec @ -90.0 deg	-19.3%	0.15 x 0.15 arcsec	2578 MHz	aggBW	9.92e-05 Jy/beam
0.0	⌈	1.20 x 0.800 arcsec @ -88.7 deg	-11.5%	0.16 x 0.16 arcsec	2578 MHz	repBW	7.03e-05 Jy/beam

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

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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\_spwphaseup
14. hifa\_gfluxscaleflag
15. hifa\_gfluxscale
16. hifa\_timegaincal
17. hif\_applycal
18. hif\_makeimlist
19. hif\_makeimages
20. hif\_makeimlist
21. hif\_makeimages
22. hifa\_imageprecheck
23. hif\_checkproductsizes
24. hifa\_exportdata
25. hif\_mstransform
26. hifa\_flagtargets
27. hif\_makeimlist
28. hif\_findcont
29. hif\_uvcontfit
30. hif\_uvcontsub

of the five 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.).

robust	uvtaper	Synthesized Beam	%Diff from mean AR	cell	bandwidth	bwmode	Effective Sensitivity
-0.5	[]	1.15 x 0.761 arcsec @ -90.0 deg	-19.3%	0.15 x 0.15 arcsec	2578 MHz	repBW	9.92e-05 Jy/beam
-0.5	[]	1.15 x 0.761 arcsec @ -90.0 deg	-19.3%	0.15 x 0.15 arcsec	2578 MHz	aggBW	9.92e-05 Jy/beam
0.0	[]	1.20 x 0.800 arcsec @ -88.7 deg	-11.5%	0.16 x 0.16 arcsec	2578 MHz	repBW	7.03e-05 Jy/beam
0.0	[]	1.20 x 0.800 arcsec @ -88.7 deg	-11.5%	0.16 x 0.16 arcsec	2578 MHz	aggBW	7.03e-05 Jy/beam
0.5	[]	1.30 x 0.868 arcsec @ -87.6 deg	4.1%	0.17 x 0.17 arcsec	2578 MHz	repBW	5.89e-05 Jy/beam
0.5	[]	1.30 x 0.868 arcsec @ -87.6 deg	4.1%	0.17 x 0.17 arcsec	2578 MHz	aggBW	5.89e-05 Jy/beam
1.0	[]	1.41 x 0.949 arcsec @ -86.7 deg	23.4%	0.19 x 0.19 arcsec	2578 MHz	repBW	5.52e-05 Jy/beam
1.0	[]	1.41 x 0.949 arcsec @ -86.7 deg	23.4%	0.19 x 0.19 arcsec	2578 MHz	aggBW	5.52e-05 Jy/beam
2.0	[]	1.45 x 0.983 arcsec @ -86.4 deg	31.5%	0.2 x 0.2 arcsec	2578 MHz	repBW	5.49e-05 Jy/beam
2.0	[]	1.45 x 0.983 arcsec @ -86.4 deg	31.5%	0.2 x 0.2 arcsec	2578 MHz	aggBW	5.49e-05 Jy/beam

Pipeline QA

Input Parameters

Tasks Execution Statistics

CASA logs for stage 22

- [View or download stage22/casapylog \(347.2 KB\)](#)

**hif\_findcont:** This is where the pipeline creates initial image cubes and identifies continuum channels. This is useful as a first look at the spectra, although re-imaging the data will be much more effective for identifying spectral lines.

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28. Find Continuum

BACK

Field	Spw	Continuum Frequency Range		Frame	Status	Average spectrum
		Start	End			
Z_CMa	25	218.76447 GHz	218.78340 GHz	LSRK	NEW	
		218.78645 GHz	218.81722 GHz			
		218.82101 GHz	218.82186 GHz			
	27	219.56530 GHz	219.59119 GHz			
		219.59388 GHz	219.61195 GHz			
		219.61463 GHz	219.62159 GHz			
	29	219.95485 GHz	220.01151 GHz			
	31	220.40358 GHz	220.46048 GHz			

**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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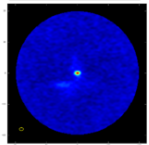
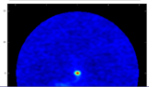
2018.1.01131.S

## 31. Tclean/MakeImages

Make target per-spw continuum images

BACK

### Image Details

Field	Spw	Pol	Image details	Image result
Z_CMa (TARGET)	25 / X1494769907#ALMA_RB_06#BB_1#SW-01	I	<p>centre frequency of image 218.7932GHz (LSRK)</p> <p>beam 1.37 x 0.924 arcsec</p> <p>beam p.a. -88.0deg</p> <p>final theoretical sensitivity 0.0004 Jy/beam</p> <p>cleaning threshold 0.0016 Jy/beam Dirty DR: 76 DR correction: 2</p> <p>clean residual peak / scaled MAD 3.40</p> <p>non-pbcor image RMS 0.00048 Jy/beam</p> <p>pbcor image max / min 0.0303 / -0.00468 Jy/beam</p> <p>fractional bandwidth / nterms 0.026% / 1</p> <p>aggregate bandwidth 0.0505 GHz (LSRK)</p> <p>score 1.00</p> <p>image file uid__A001.X135b.X6b.s31_0_Z_CMa_sci.spw25.mfs.liter1_image</p>	<p>Open image: <a href="#">display image</a> <a href="#">load 2.0 file size (3.1 sec)</a></p>  <p>View other QA images...</p>
Z_CMa (TARGET)	27 / X1494769907#ALMA_RB_06#BB_1#SW-02	I	<p>centre frequency of image 219.5934GHz (LSRK)</p> <p>beam 1.36 x 0.915 arcsec</p> <p>beam p.a. -88.6deg</p>	<p>Open image: <a href="#">display image</a> <a href="#">load 2.0 file size (3.1 sec)</a></p> 



**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.

2018.1.01131.S - Task Details - Mozilla Firefox

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file:///home/gbendo/pipeline/html/t2-4m.html?sidebar=sidebar\_stage33&ms=all&subpage=t2-4m\_details.html

2018.1.01131.S

Home By Topic By Task

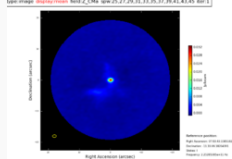
8. hifa\_antpos  
9. hifa\_vwgcalfag  
10. hif\_lowgainflag  
11. hif\_setmodels  
12. hifa\_bandpassflag  
13. hifa\_spwphaseup  
14. hifa\_gfluxscaleflag  
15. hifa\_gfluxscale  
16. hifa\_timegaincal  
17. hif\_applycal  
18. hif\_makeimlist  
19. hif\_makeimages  
20. hif\_makeimlist  
21. hif\_makeimages  
22. hifa\_imageprecheck  
23. hif\_checkproductsize  
24. hifa\_exportdata  
25. hif\_mstransform  
26. hifa\_flagtargets  
27. hif\_makeimlist  
28. hif\_findcont  
29. hif\_uvcontfit  
30. hif\_uvcontsub  
31. hif\_makeimages  
32. hif\_makeimlist  
33. hif\_makeimages  
34. hif\_makeimlist  
35. hif\_makeimages  
36. hif\_makeimlist  
37. hif\_makeimages

### 33. Tclean/MakeImages

Make target aggregate continuum images

BACK

#### Image Details

Field	Spw	Poi	Image details	Image result	
Z_CMa (TARGET)	25,27,29,31,33,35,37,39,41,43,45 / X1494769907#ALMA_RB_06#BB_1#SW-01,X1494769907#ALMA_RB_06#BB_1#SW-02,X1494769907#ALMA_RB_06#BB_1#SW-03,X1494769907#ALMA_RB_06#BB_1#SW-04,X1494769907#ALMA_RB_06#BB_2#SW-01,X1494769907#ALMA_RB_06#BB_2#SW-02,X1494769907#ALMA_RB_06#BB_2#SW-03,X1494769907#ALMA_RB_06#BB_2#SW-04,X1494769907#ALMA_RB_06#BB_3#SW-01,X1494769907#ALMA_RB_06#BB_3#SW-02,X1494769907#ALMA_RB_06#BB_4#SW-01	I	<b>centre</b> <b>frequency of image</b>  <b>beam</b>  <b>beam p.a.</b>  <b>final theoretical sensitivity</b>  <b>cleaning threshold</b>  <b>clean residual peak / scaled MAD</b>  <b>non-pbcor image RMS</b>  <b>pbcor image max / min</b>  <b>fractional bandwidth / nterms</b>	225.2854GHz (LSRK)  1.26 x 0.858 arcsec  -87.0deg  6e-05 Jy/beam  0.00043 Jy/beam Dirty DR: 5.3e+02 DR correction: 3.5  2.89  0.00017 Jy/beam  0.0328 / -0.00131 Jy/beam  7.3% / 1	 View other QA images...

**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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File Edit View History Bookmarks Tools Help

2018.1.01131.S - Task D... x +

file:///home/gbendo/pipeline/html/t2-4m.html?sidebar=sidebar\_stage35&ms=all&subpage=t2-4m\_details.html

2018.1.01131.S

Home By Topic By Task

ALMA

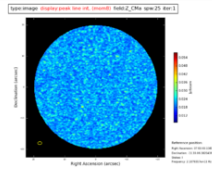
7. hifa\_tsysflag  
8. hifa\_antpos  
9. hifa\_vwgcalfag  
10. hif\_lowgainflag  
11. hif\_setmodels  
12. hifa\_bandpassflag  
13. hifa\_swpphaseup  
14. hifa\_gfluxscaleflag  
15. hifa\_gfluxscale  
16. hifa\_timegaincal  
17. hif\_applycal  
18. hif\_makeimlist  
19. hif\_makeimages  
20. hif\_makeimlist  
21. hif\_makeimages  
22. hifa\_imageprecheck  
23. hif\_checkproductsize  
24. hifa\_exportdata  
25. hif\_mstransform  
26. hifa\_flagtargets  
27. hif\_makeimlist  
28. hif\_findcont  
29. hif\_uvcontfit  
30. hif\_uvcontsub  
31. hif\_makeimages  
32. hif\_makeimlist  
33. hif\_makeimages  
34. hif\_makeimlist  
35. hif\_makeimages  
36. hif\_makeimlist  
37. hif\_makeimages

## 35. Tclean/MakeImages

Make target cubes

BACK

### Image Details

Field	Spw	Pol	Image details	Image result
Z_CMa (TARGET)	25 / X1494769907#ALMA_RB_06#BB_1#SW-01	I	<p>centre / rest frequency of cube</p> <p>218.7932GHz / 218.7601GHz (LSRK)</p> <p>beam</p> <p>1.37 x 0.925 arcsec</p> <p>beam p.a.</p> <p>-88.0deg</p> <p>final theoretical sensitivity</p> <p>0.0064 Jy/beam</p> <p>cleaning threshold</p> <p>0.013 Jy/beam Dirty DR: 6.2 DR correction: 1</p> <p>clean residual peak / scaled MAD</p> <p>5.49</p> <p>non-pbcor image RMS / RMS<sub>min</sub> / RMS<sub>max</sub></p> <p>0.0072 / 0.0066 / 0.0080 Jy/beam</p> <p>pbcor image max / min</p> <p>0.109 / -0.109 Jy/beam</p> <p>channels</p> <p>478 x 0.1221MHz (LSRK)</p> <p>score</p> <p>1.00</p> <p>image file</p> <p>uid__A001_X135b_X6b_s35_0_Z_CMa_sci.spw25.cube.l.iter1.image</p>	 <p>View other QA images...</p>
Z_CMa (TARGET)	27 / X1494769907#ALMA_RB_06#BB_1#SW-02	I	<p>centre / rest frequency of cube</p> <p>219.5936GHz / 219.5604GHz (LSRK)</p> <p>beam</p> <p>1.37 x 0.916 arcsec</p> <p>beam p.a.</p> <p>-88.7deg</p> <p>final theoretical sensitivity</p> <p>0.0076 Jy/beam</p>	