Reviewing the WebLog

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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:

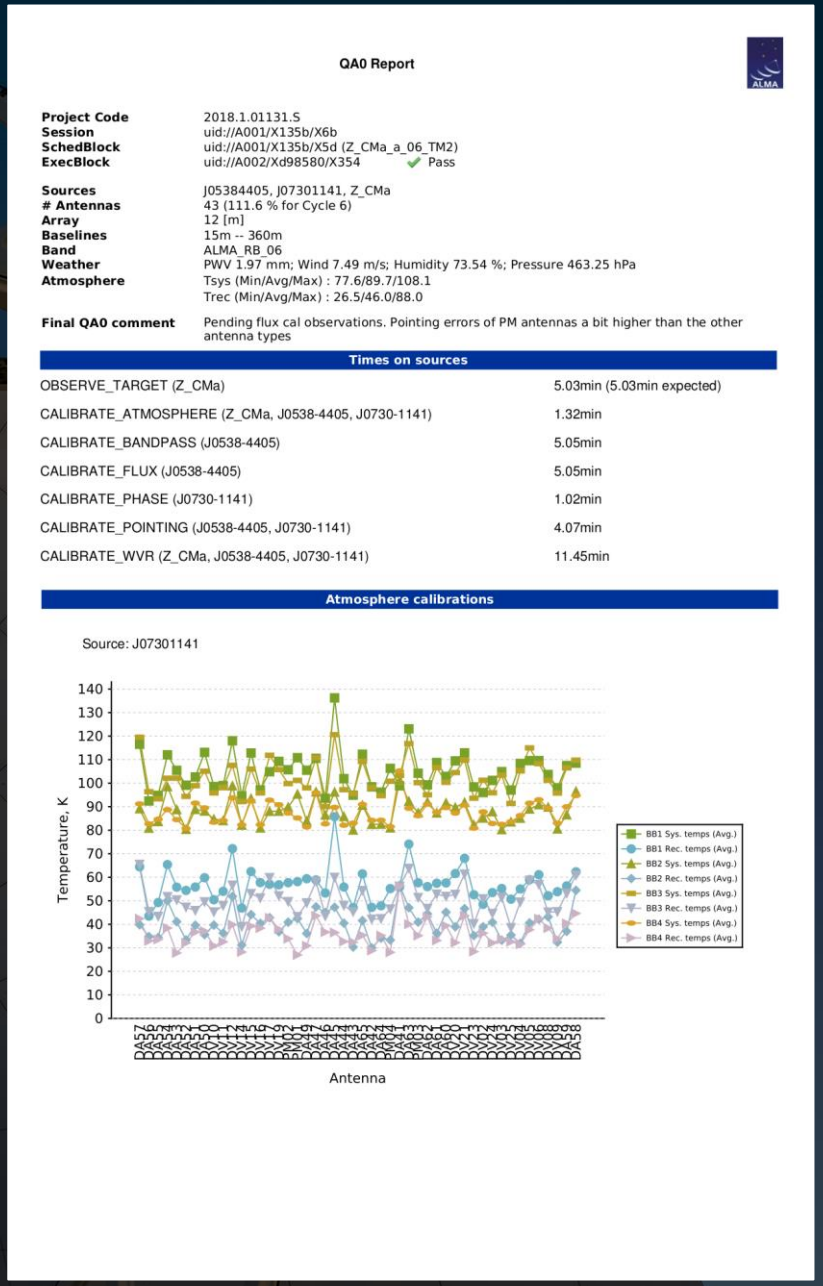
QA0 Simple quality checks performed at the observatory as soon as the data are acquired

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.S
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_{sys} or system temperature (under "atmospheric calibrations") should be checked for any antennas that are outliers.

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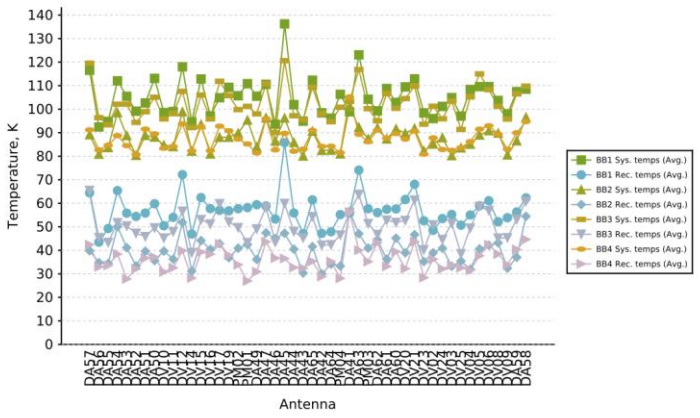
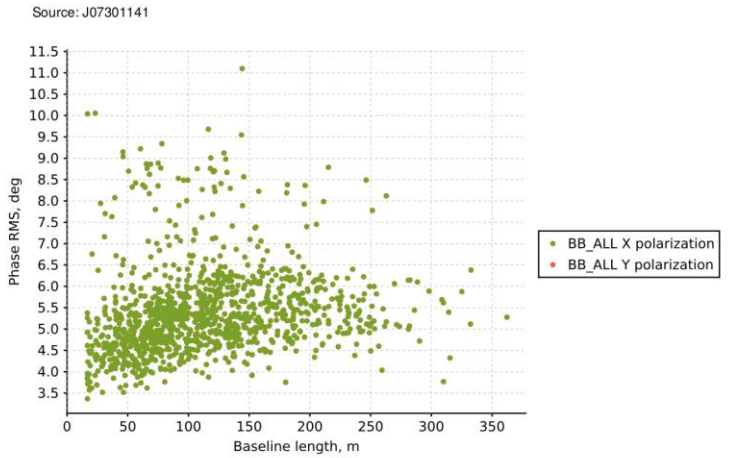
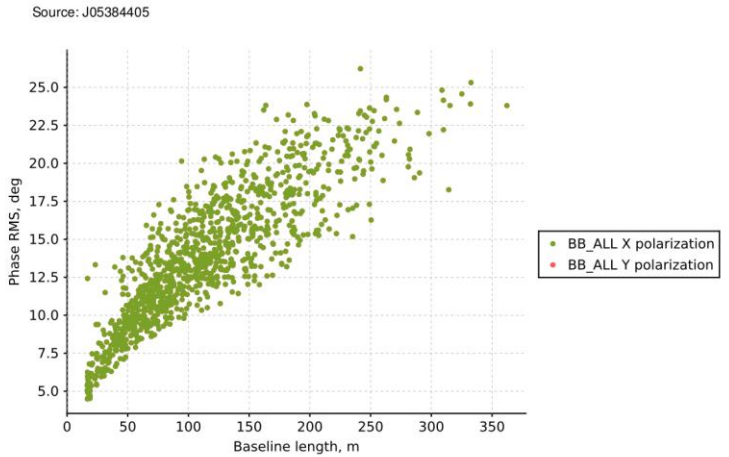
Source: J07301141



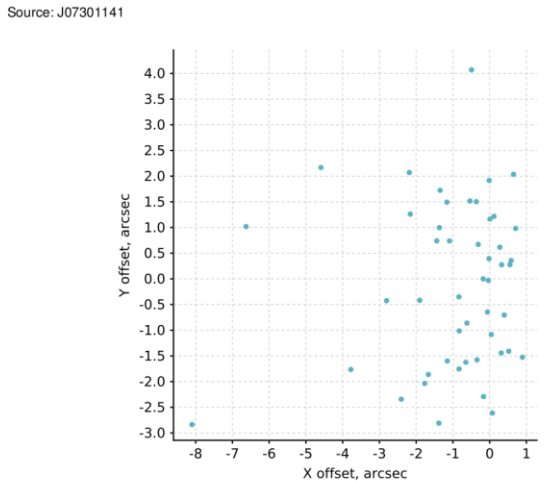
Any outliers in the plots of phase RMS versus baseline length could be indicative of antennas or baselines that were not producing usable data. These data will need to be checked later.

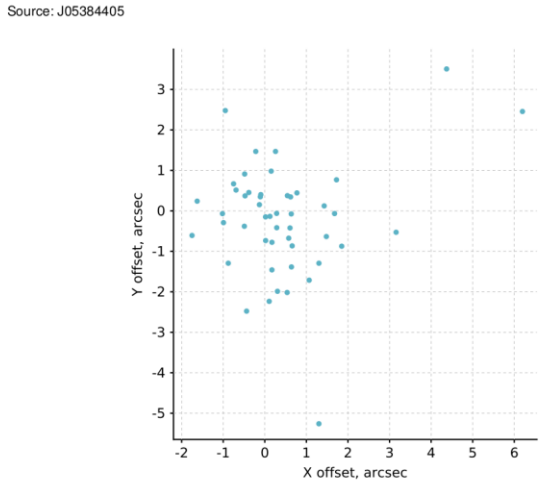




Pointing offsets

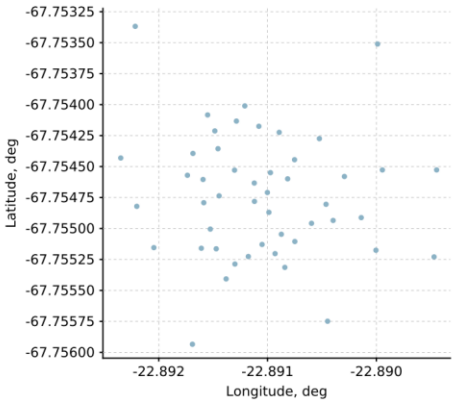
Pointing offsets are usually not a severe problem, but it is useful to be aware of any significant outliers.



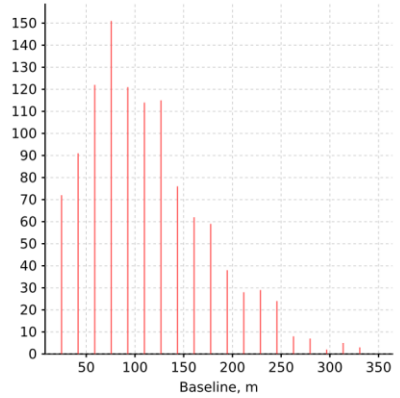


Antenna positions

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.S
PI	Dary Ruíz-Rodríguez
Organization	Chester F. Carlson Center for Imaging, Rochester Institute of Te
Co-Is	L. Cieza, 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 Status ID in brackets):	Z_CMa_b_06_7M (uid://A001/X135b/X6d), Z_CMa_b_06_TM1 (uid://A001/X135b/X69)
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.I.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.

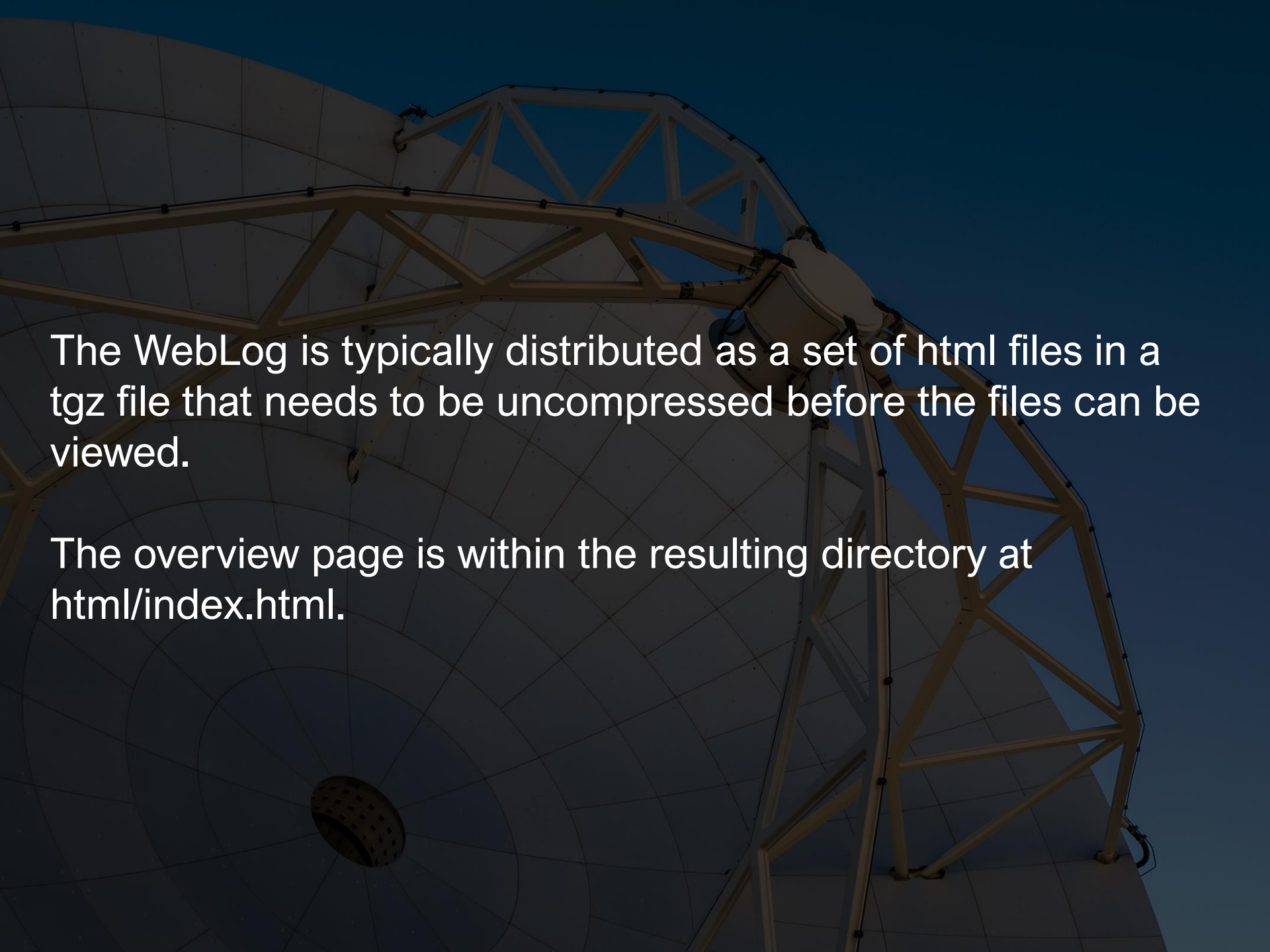
This is produced by the ALMA pipeline as the data are being calibrated and imaged.

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:

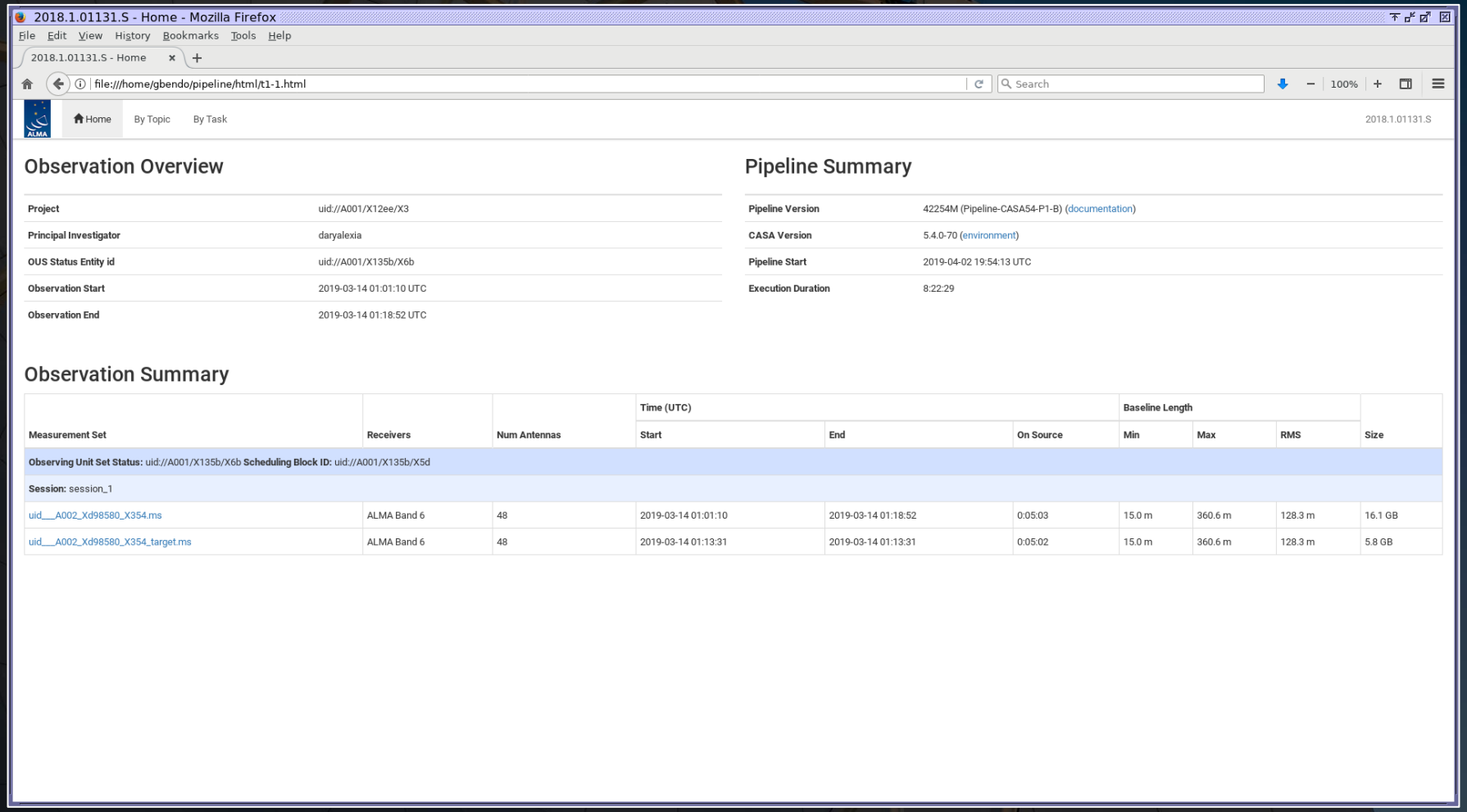
- Image cubes
- Continuum flux images for each spw
- Aggregate continuum image for all spws



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.

The main index (or Home) page provides an overview of the observations. The page has three tabs at the top, which will be discussed later. Clicking on a measurement set in the bottom table leads to a page with more detailed information about those data.



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...

file:///home/gbendo/pipeline/html/t2-1.html?sidebar=sidebar_uid___A002_Xd98580_X354_ms&subpage=t2-1_details.html

Search 100%

Home By Topic By Task 2018.1.01131.S

Session: session_1

uid___A002_Xd98580_X354.ms

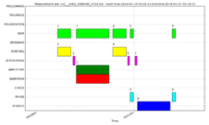
uid___A002_Xd98580_X354_target.ms

Overview of 'uid___A002_Xd98580_X354.ms'

Observation Execution Time

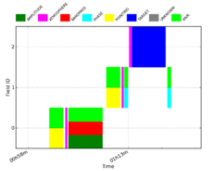
Start Time	2019-03-14 01:01:10
End Time	2019-03-14 01:18:52
Total Time on Source	0:16:06
Total Time on Science Target	0:05:03

LISTOBS OUTPUT



Intent vs Time

Track scan intent vs time



Field vs Time

Track observed field vs time

Spatial Setup

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

Spectral Setup

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

Antenna Setup

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

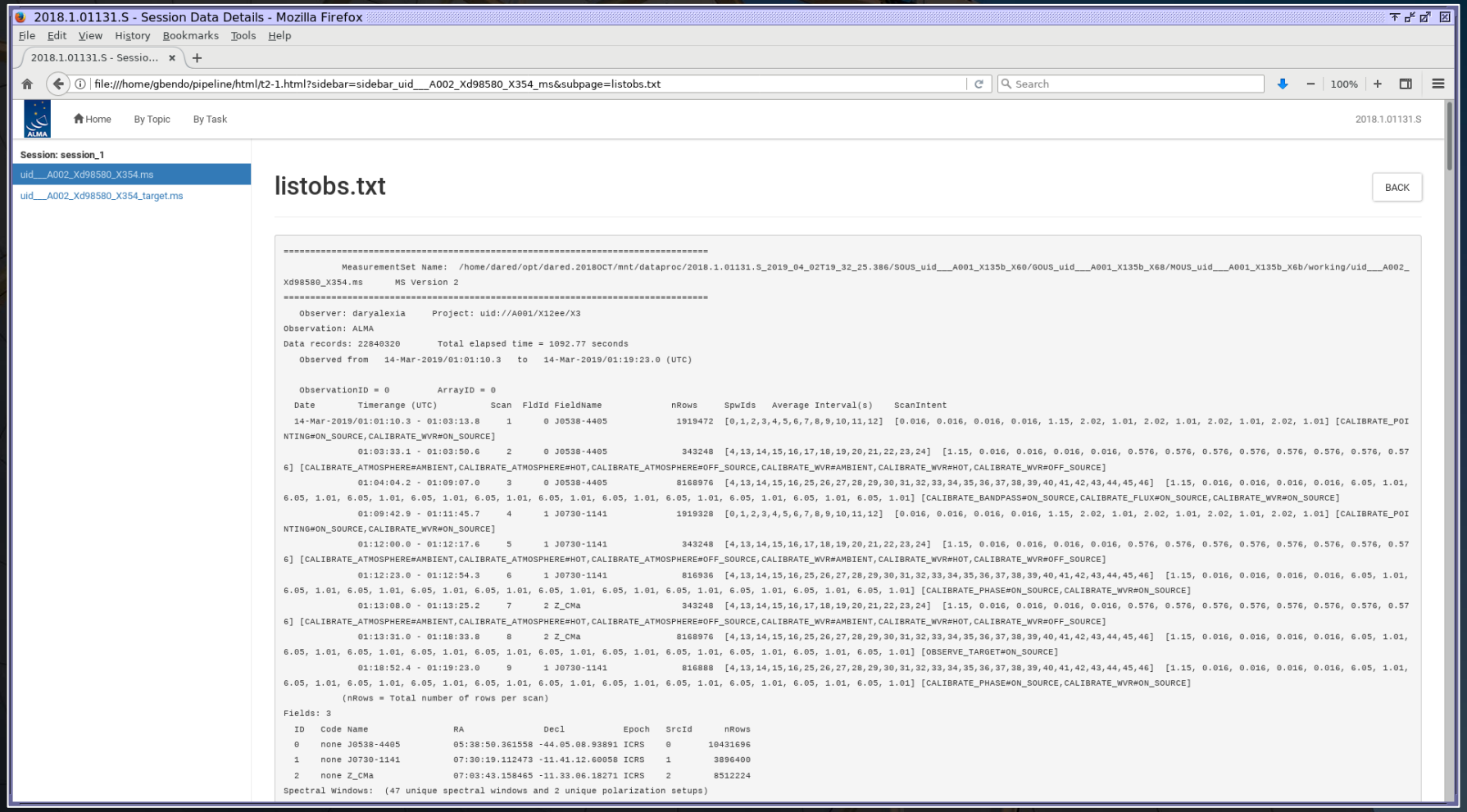
Sky Setup

Min Elevation	53.77 degrees
Max Elevation	75.88 degrees

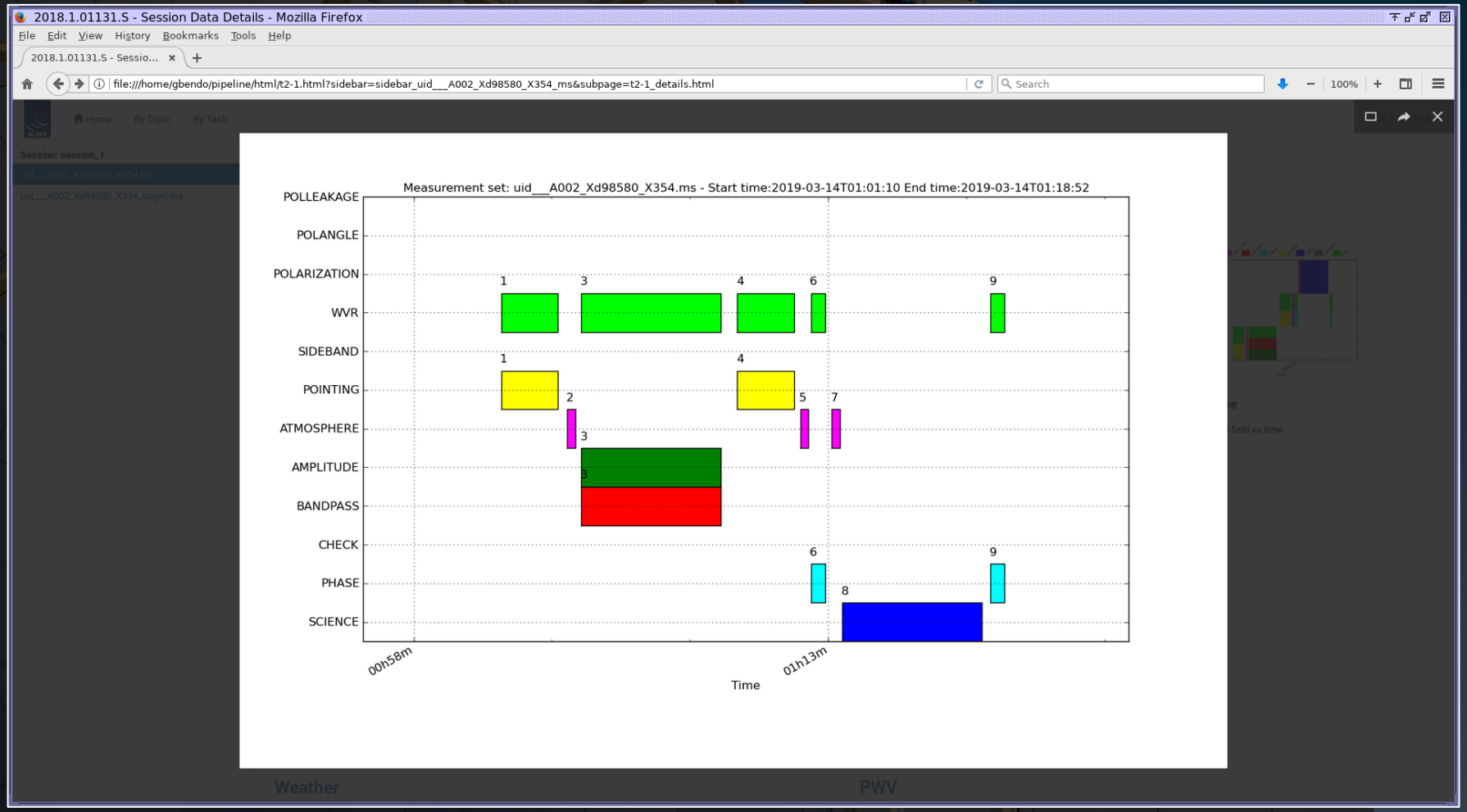
Weather

PWV

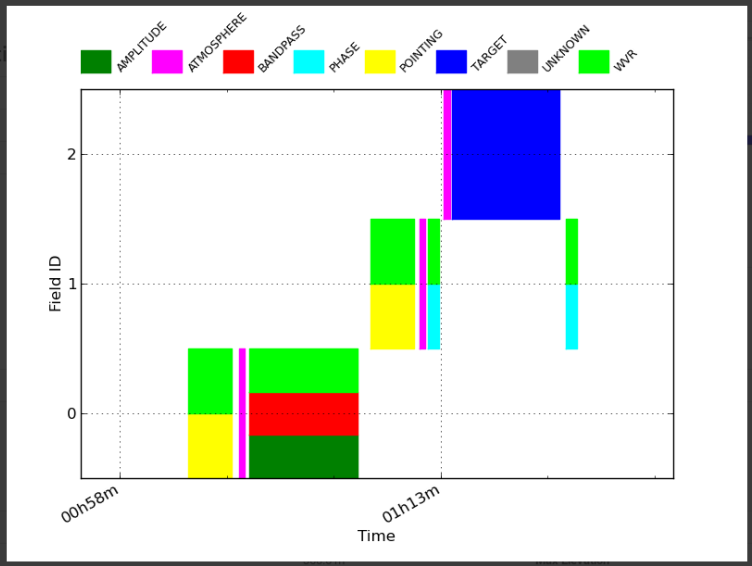
The listobs output button displays a text file with summary information about the sequence of observations, the fields, the spectral windows, and the antennas. Versions of this file can also be created using the listobs command in CASA.



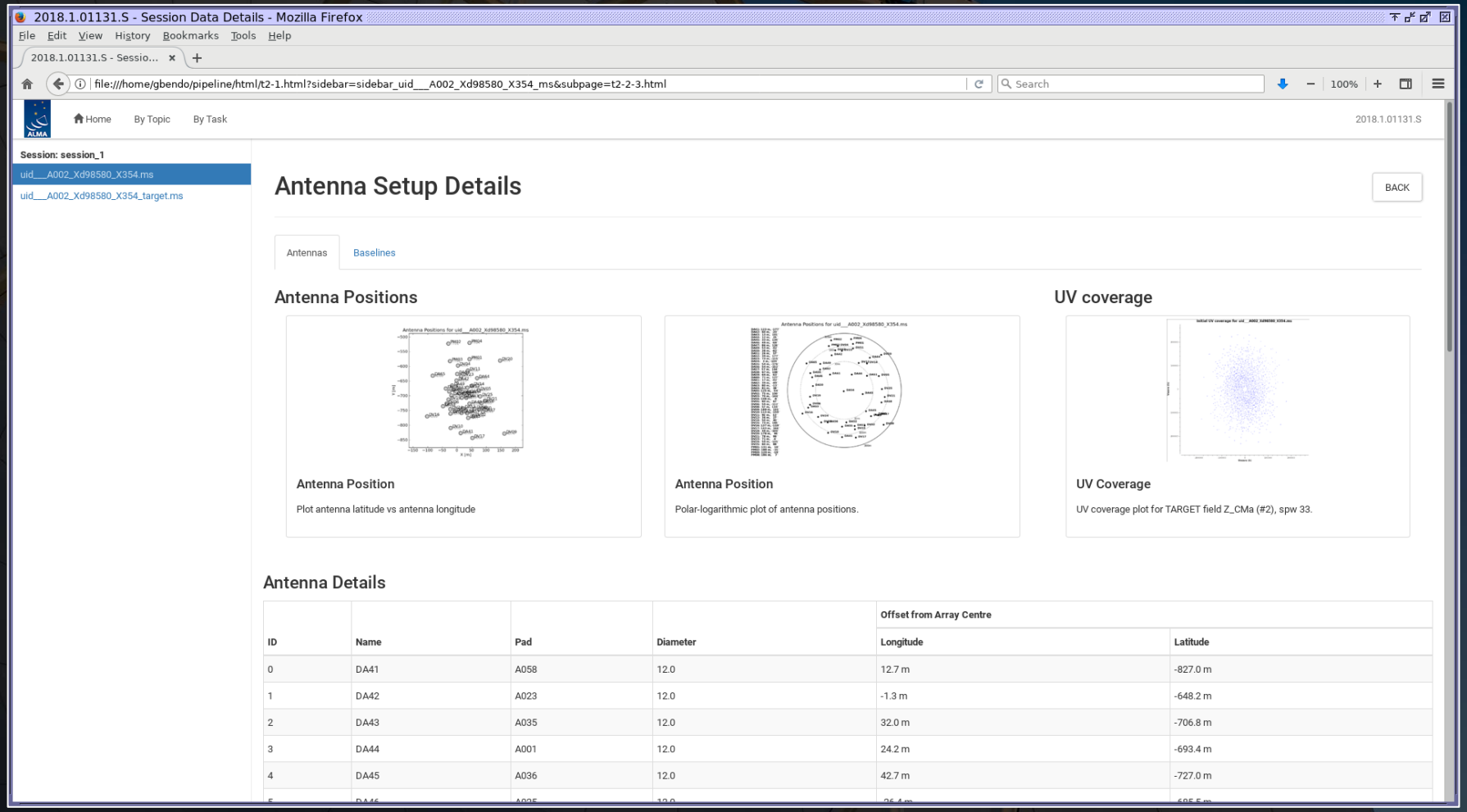
The intent versus time plot shows the sequence of the observations as well as the purpose of those observations. Some observations have multiple purposes.



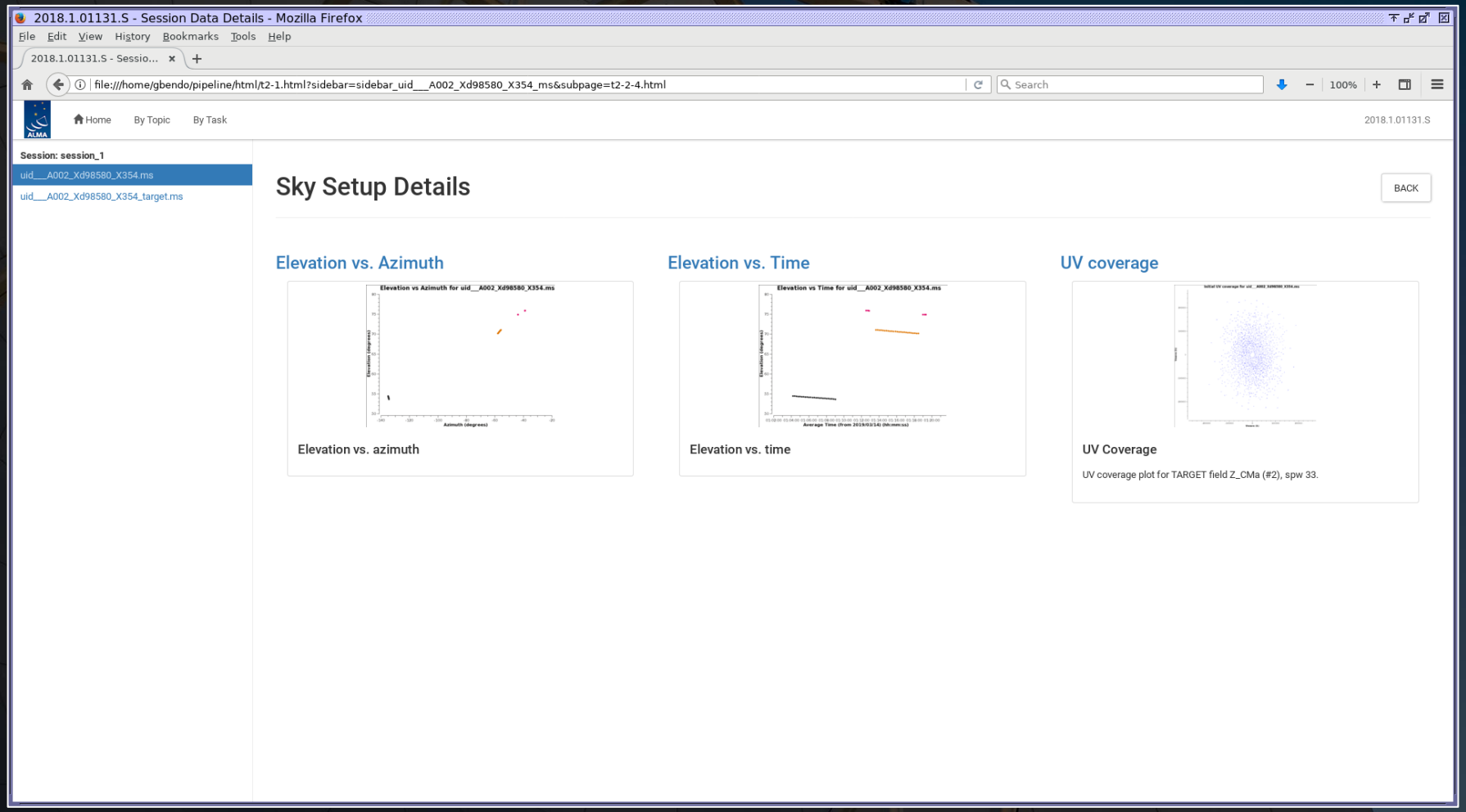
The field versus time plot is similar except that the y-axis indicates the field ID. In this case, 0 is field for the bandpass calibrator, 1 is the field for the phase calibrator, and 2 is the field for the science target (Z CMa).



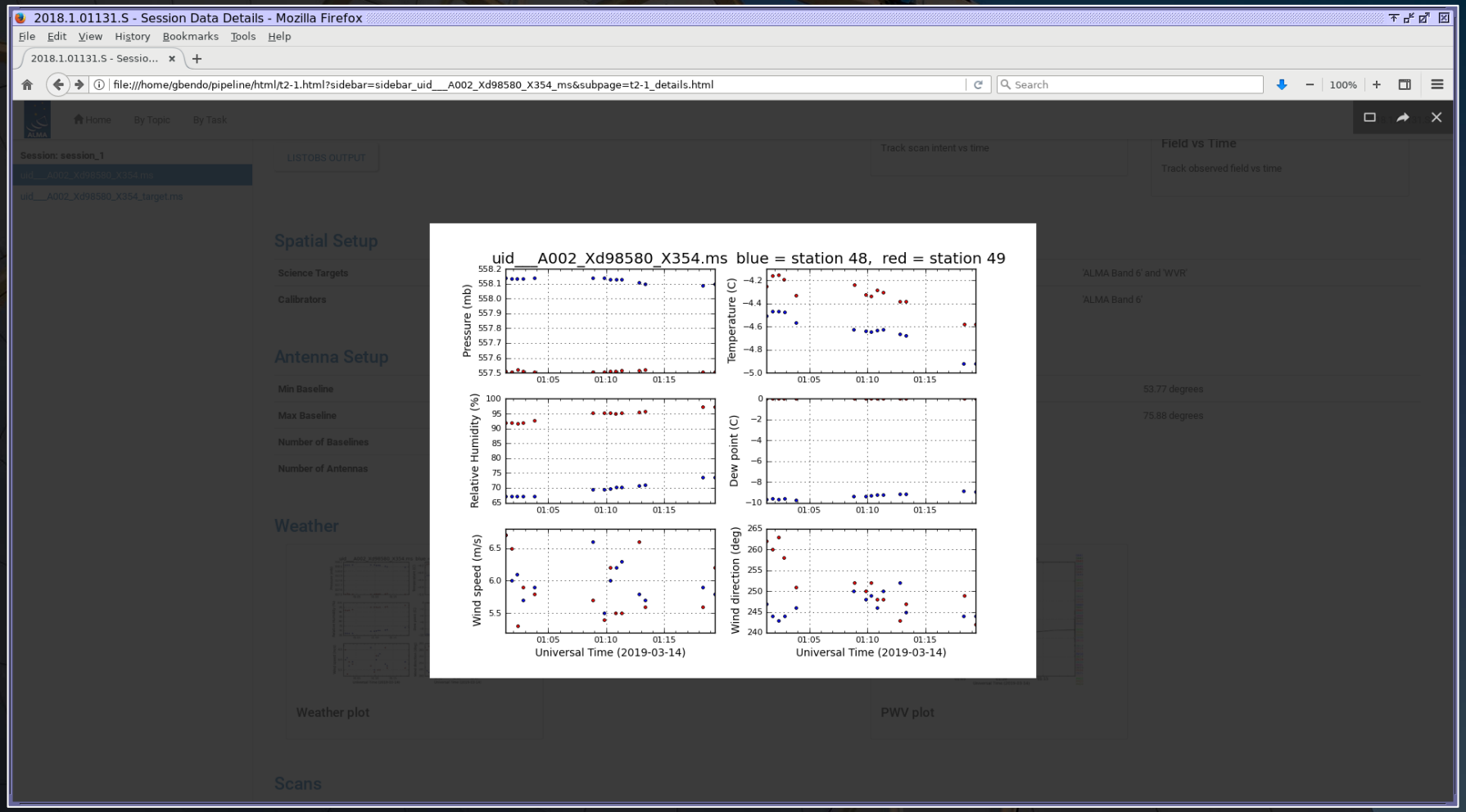
The antenna setup page shows the location of the antennas and the resulting uv coverage (which is related to the final angular resolution and maximum recoverable scale of the data).



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



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.



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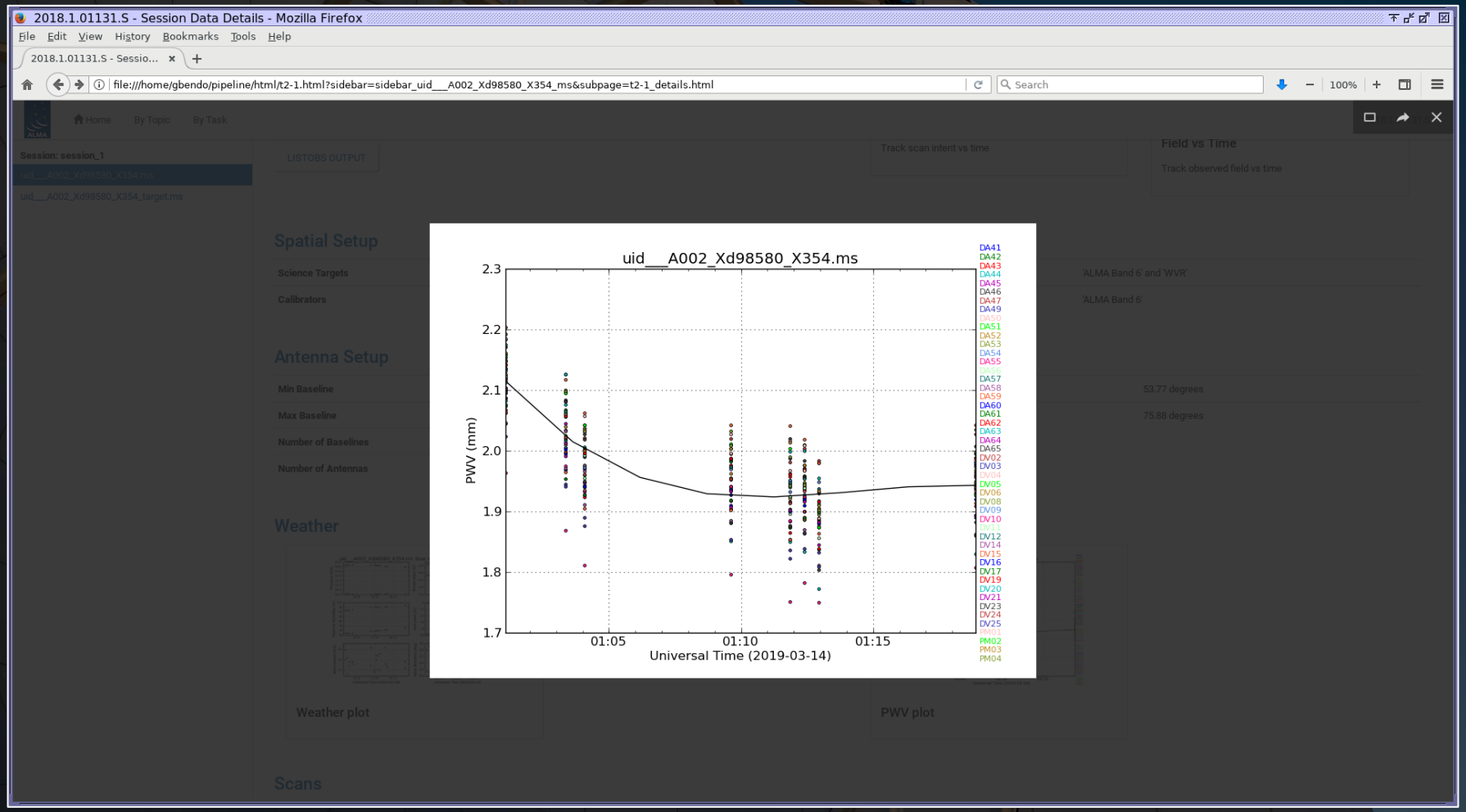
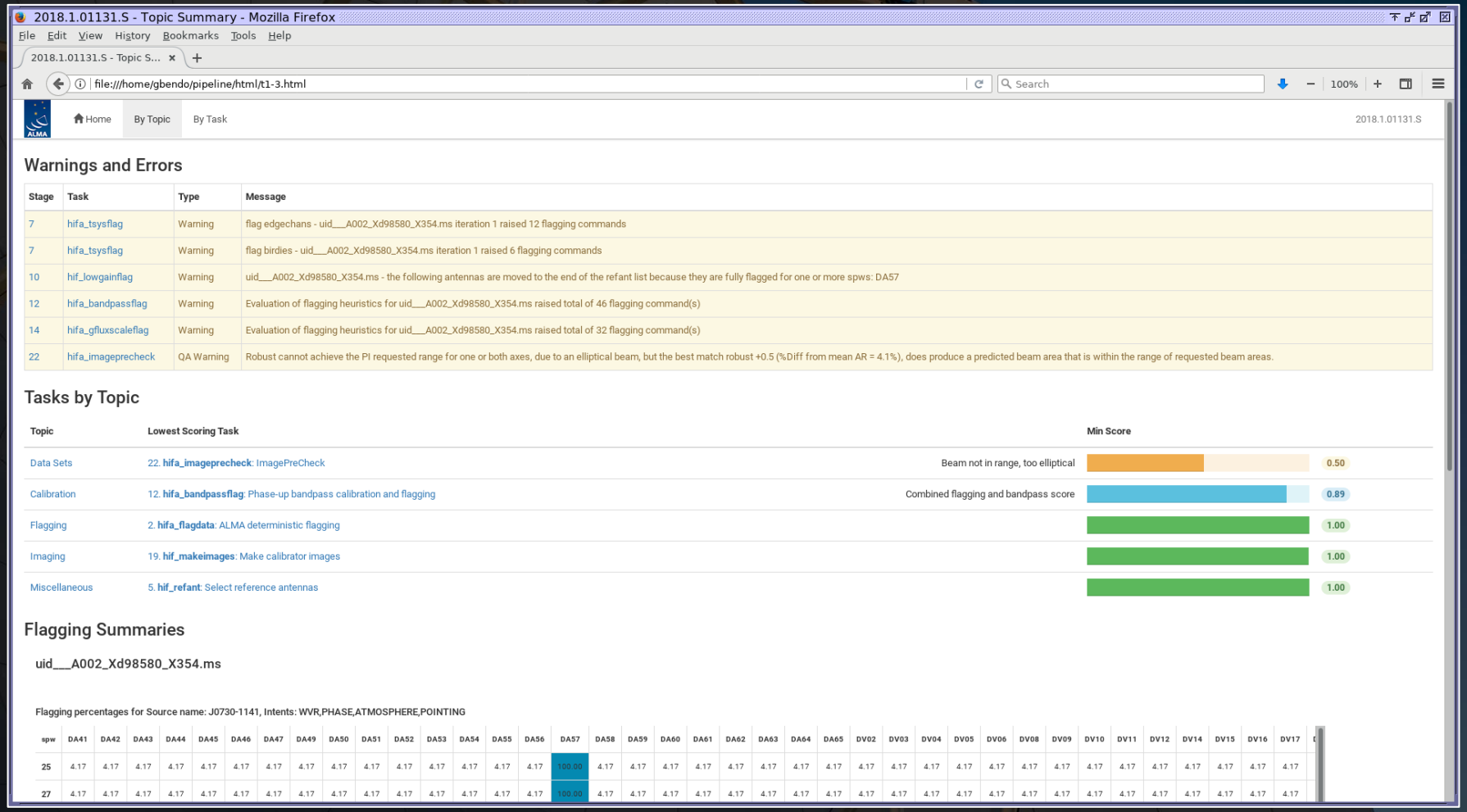
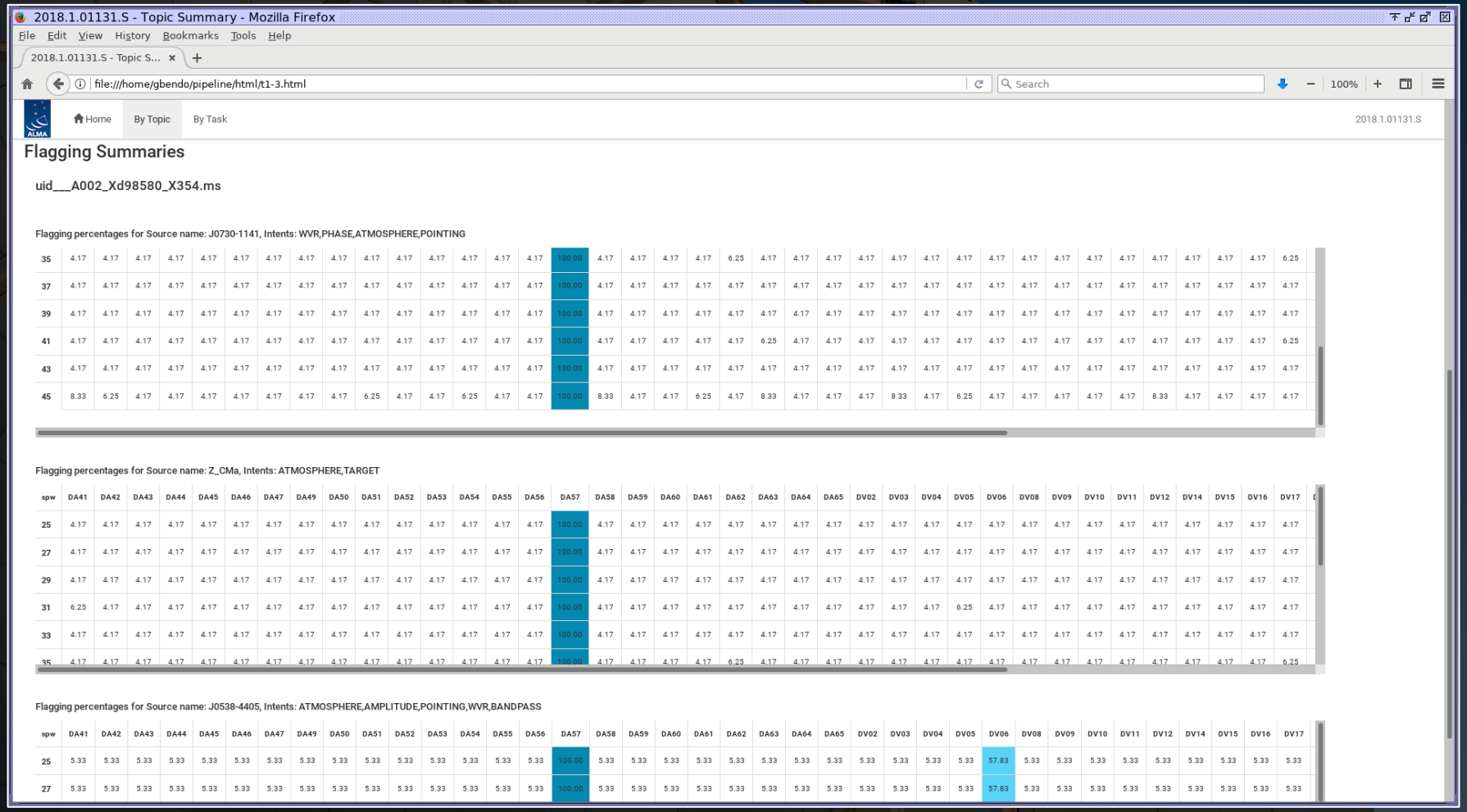


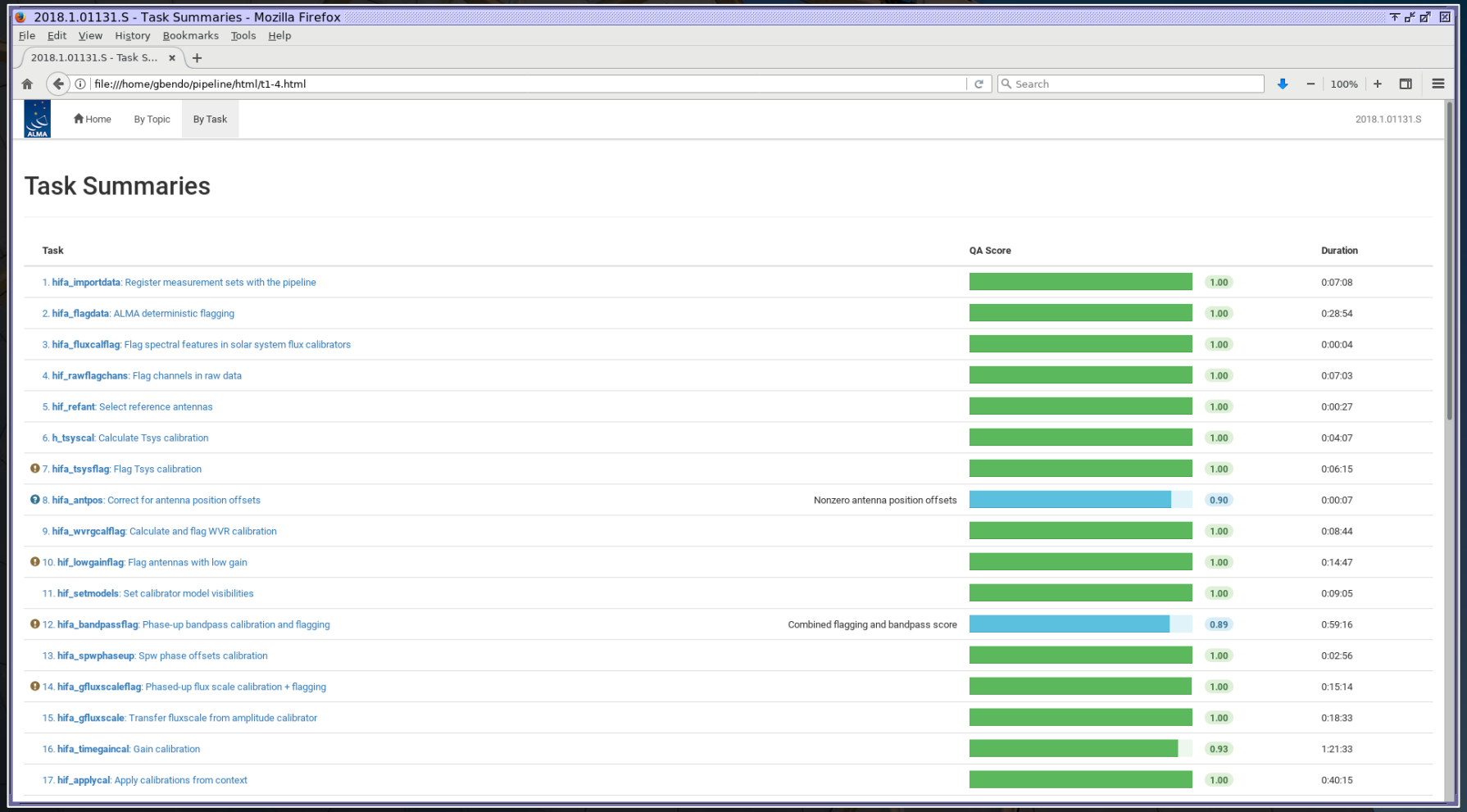
The By Topic page lists warnings that were produced by the pipeline along with grades for those warnings and tables showing the amount of data flagged for each antenna in each field.



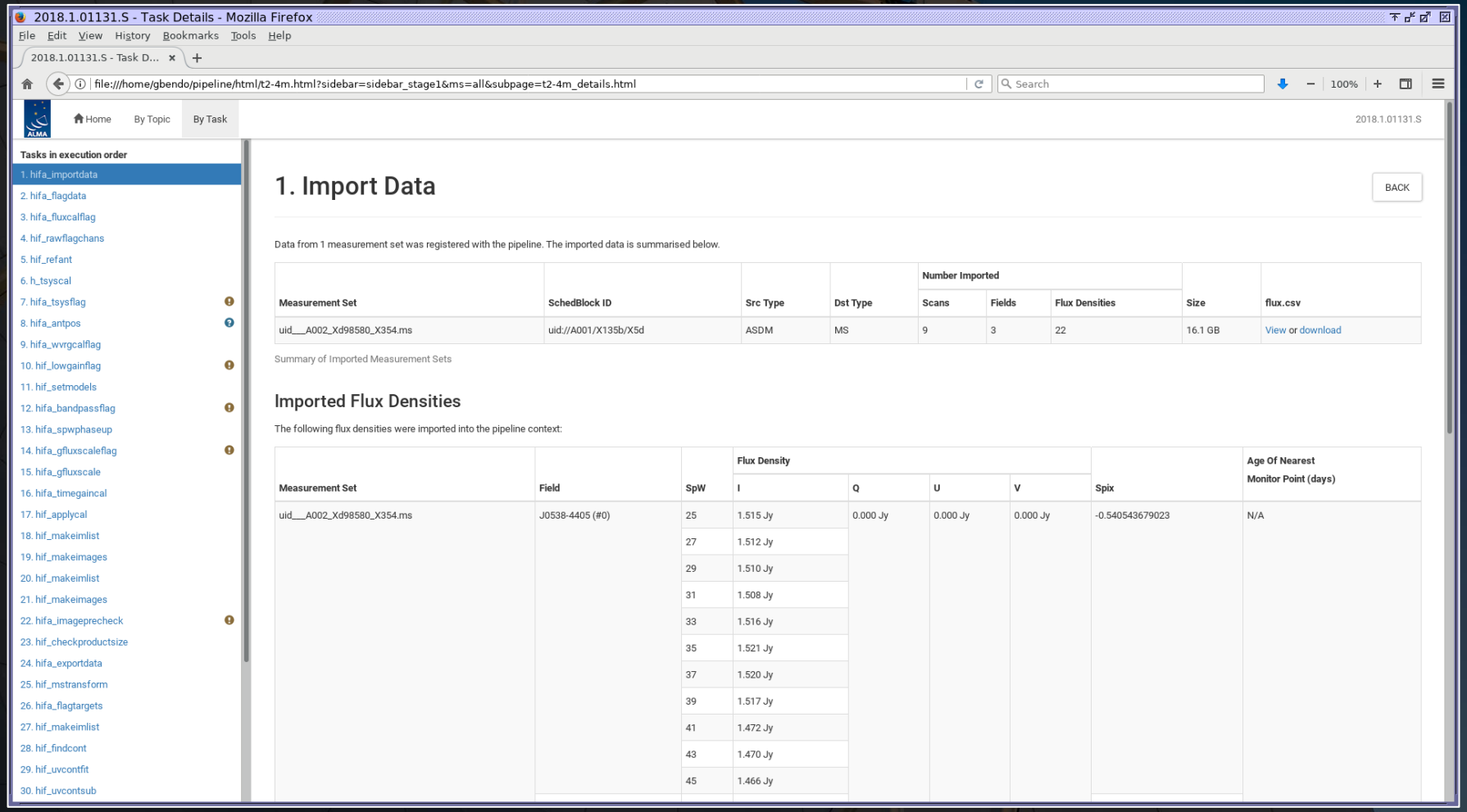
Antennas that were flagged 100% are not usable. Antennas flagged >20% may need to be examined more carefully. Also, data in some fields are not used by the pipeline and are flagged, so a large fraction (>20%) of data for one field could be flagged.



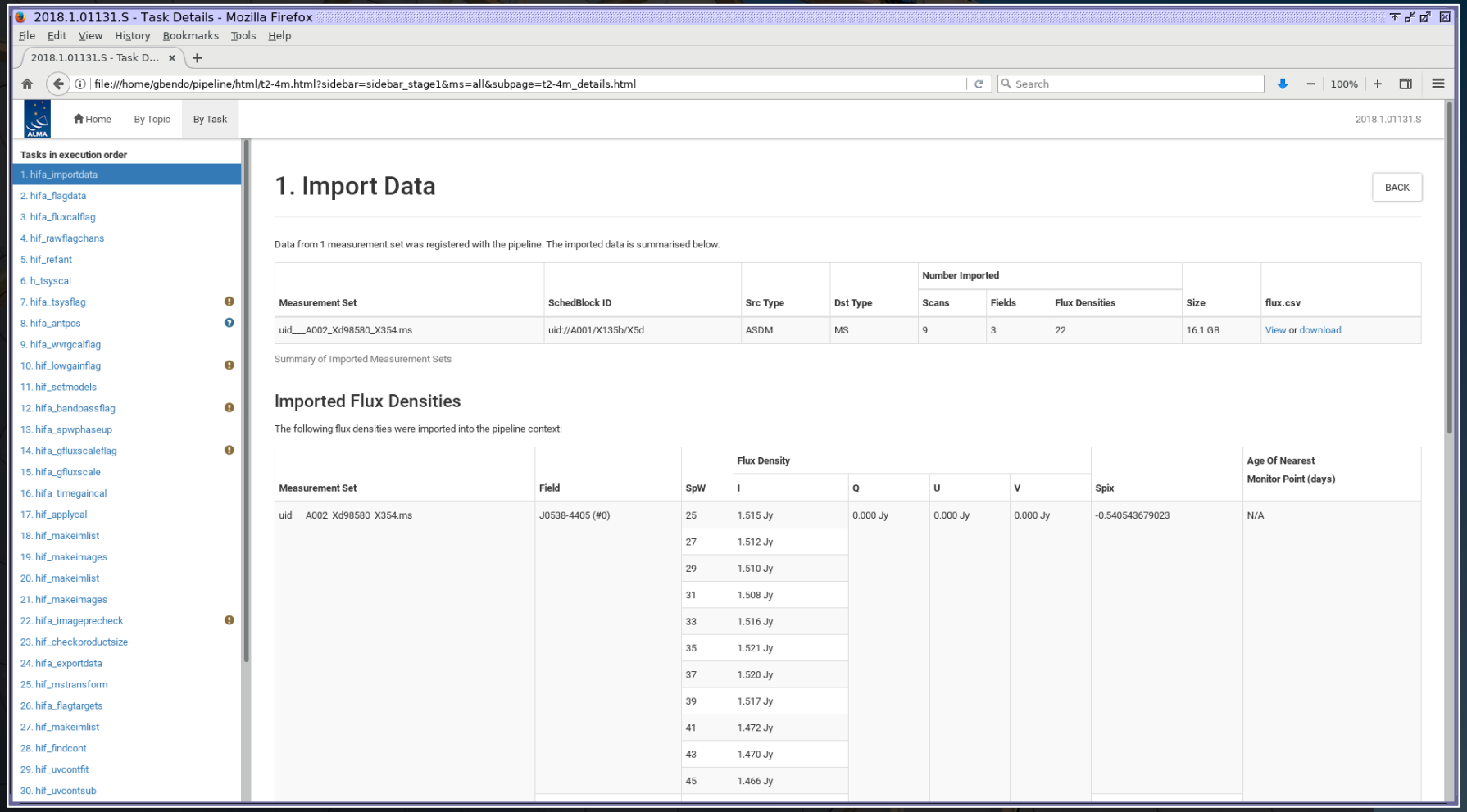
The By Task page lists each of the calibration and imaging steps that were applied in the pipeline. Not all of these steps need to be checked, but the ones listed on the following pages have useful information.



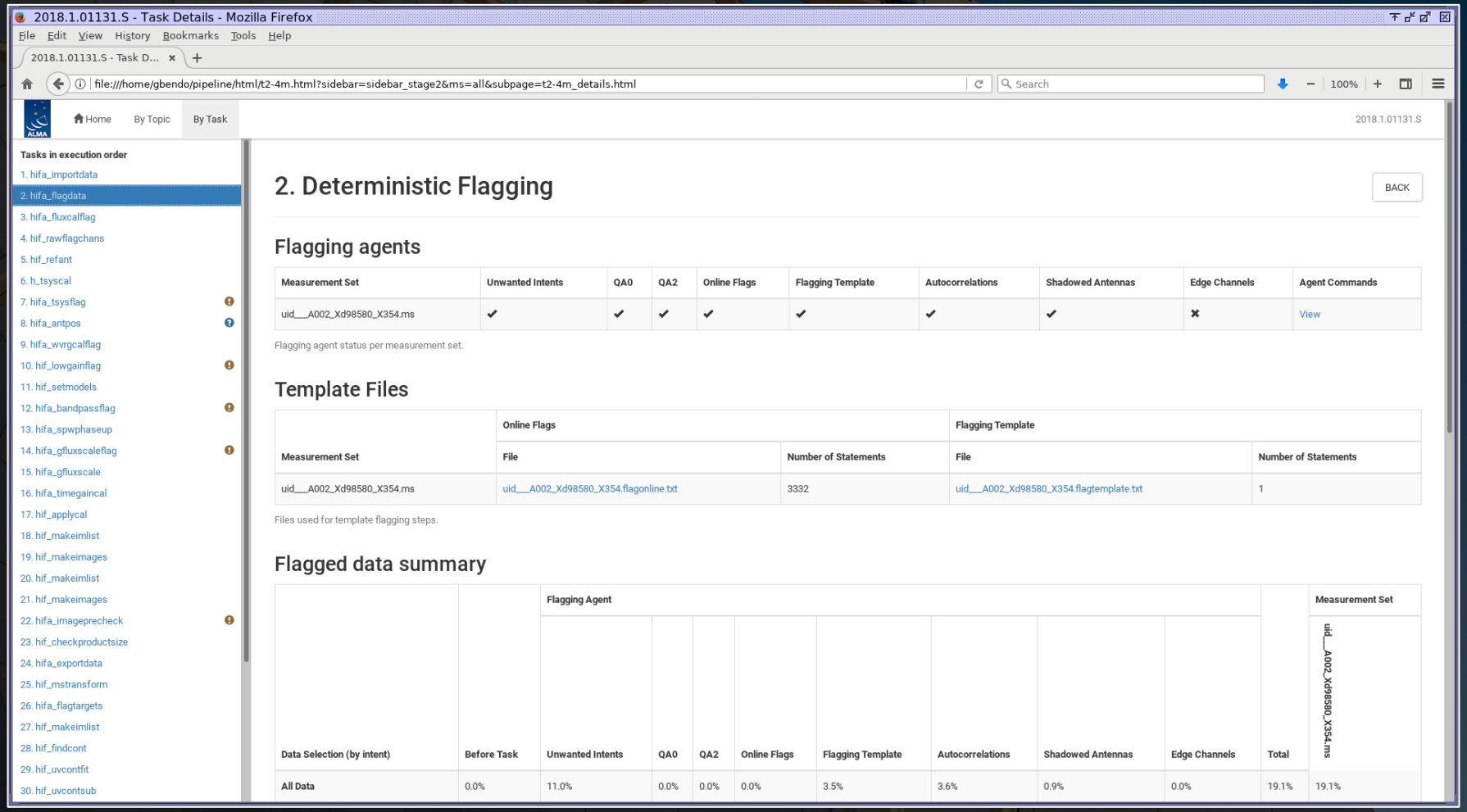
hifa_importdata: This module imports data for the pipeline. The most notable information on this page is the list of model flux densities for the calibration sources.



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, the data should be manually recalibrated.



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 <~20%. If the percentages are higher, the data may have problems.



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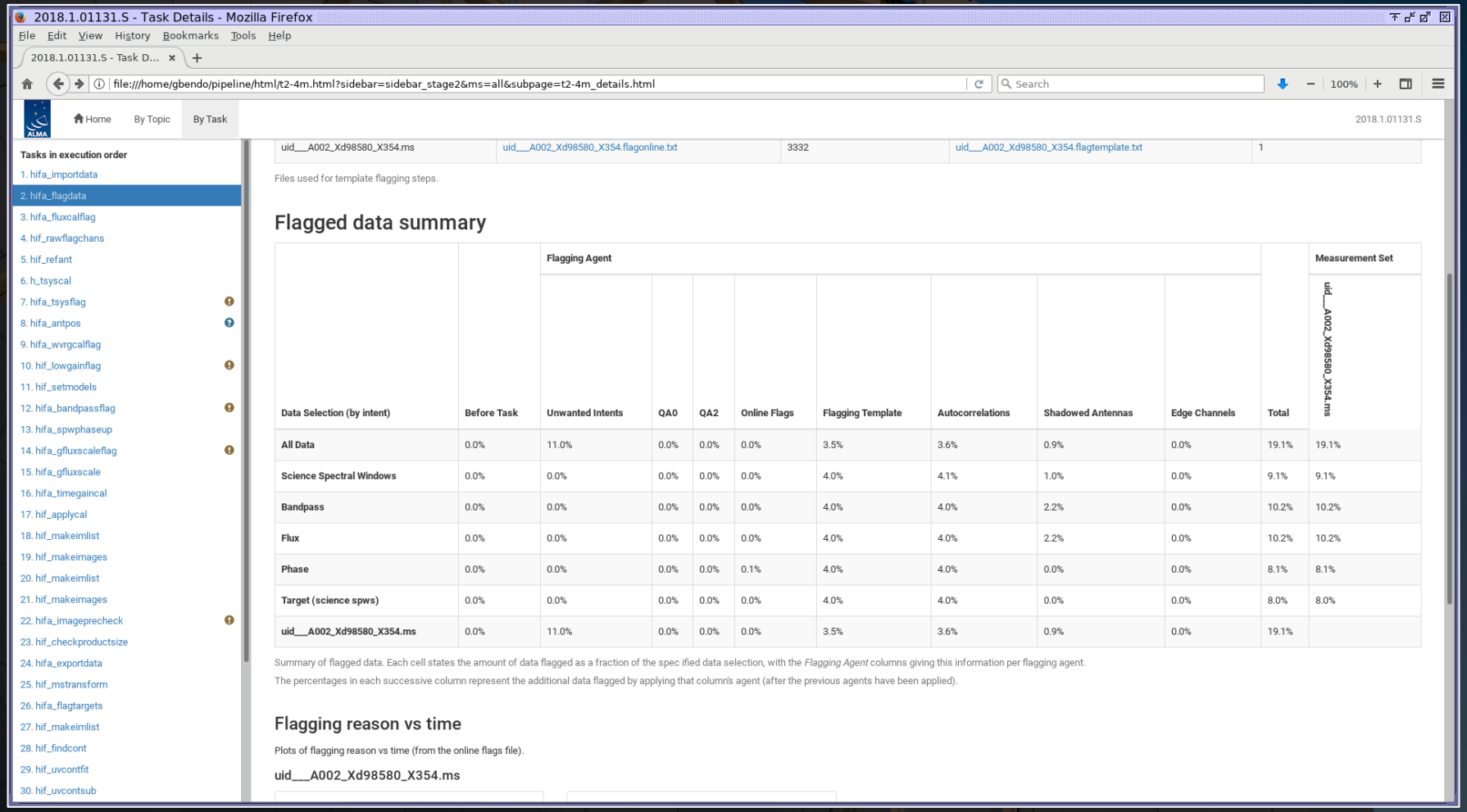
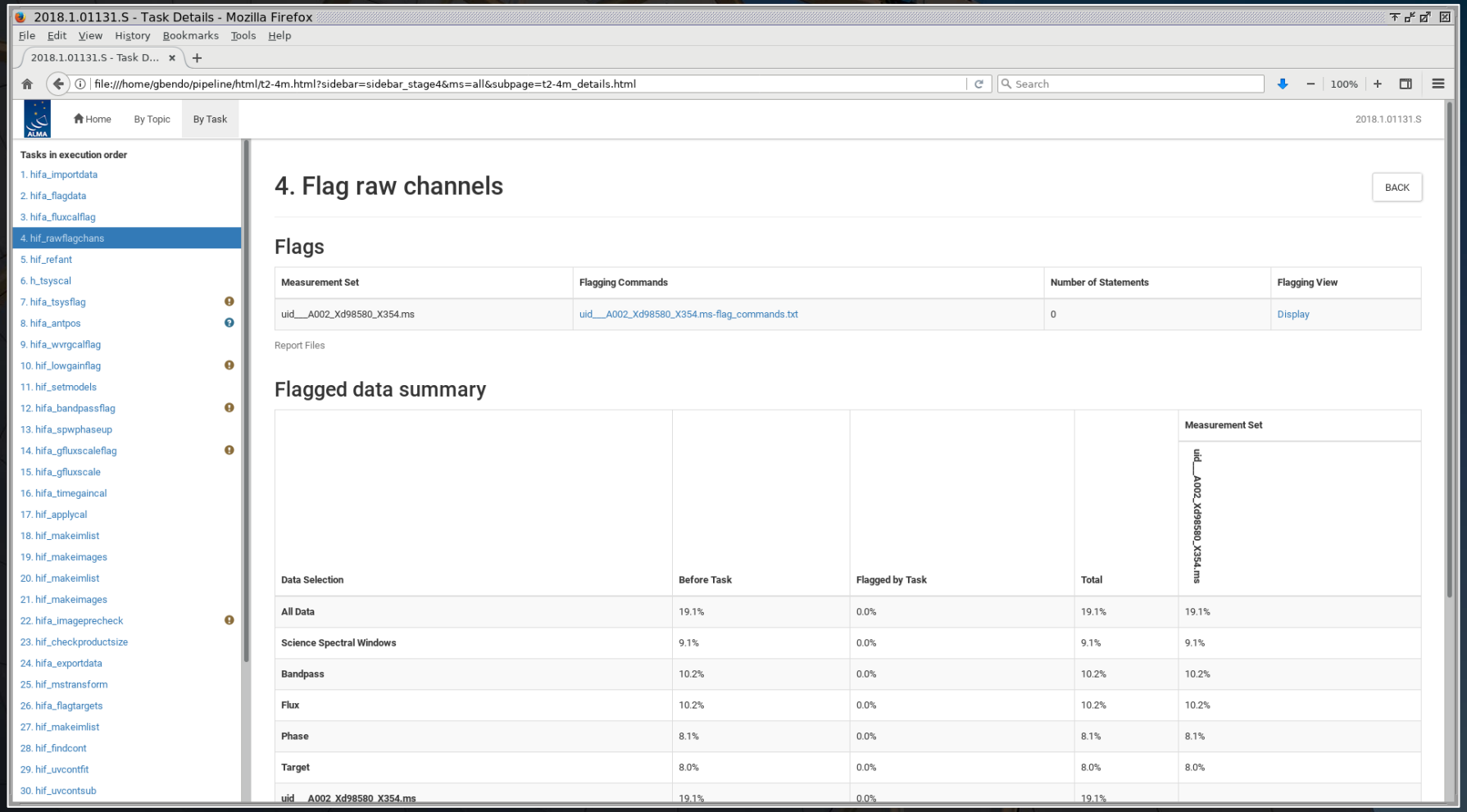
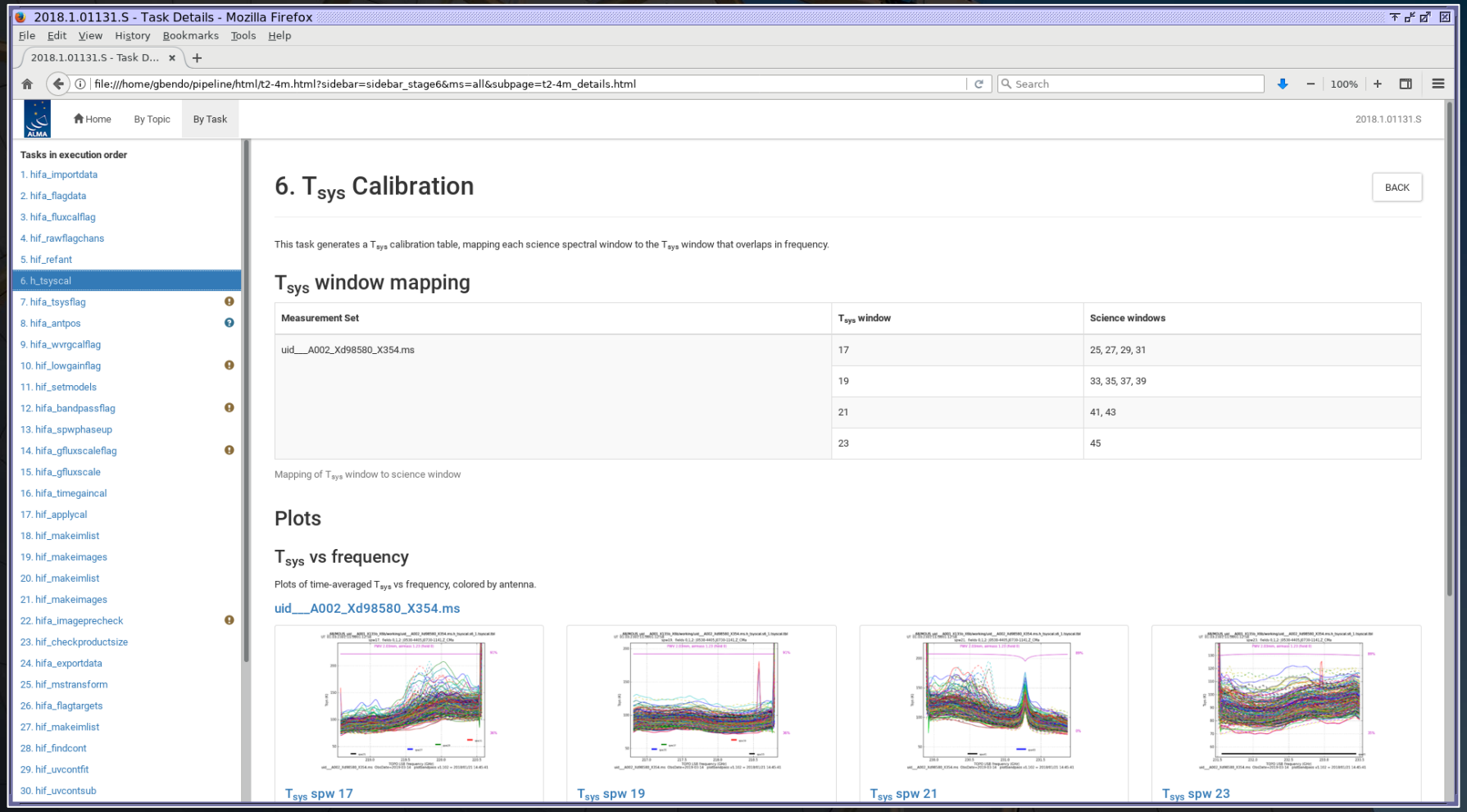


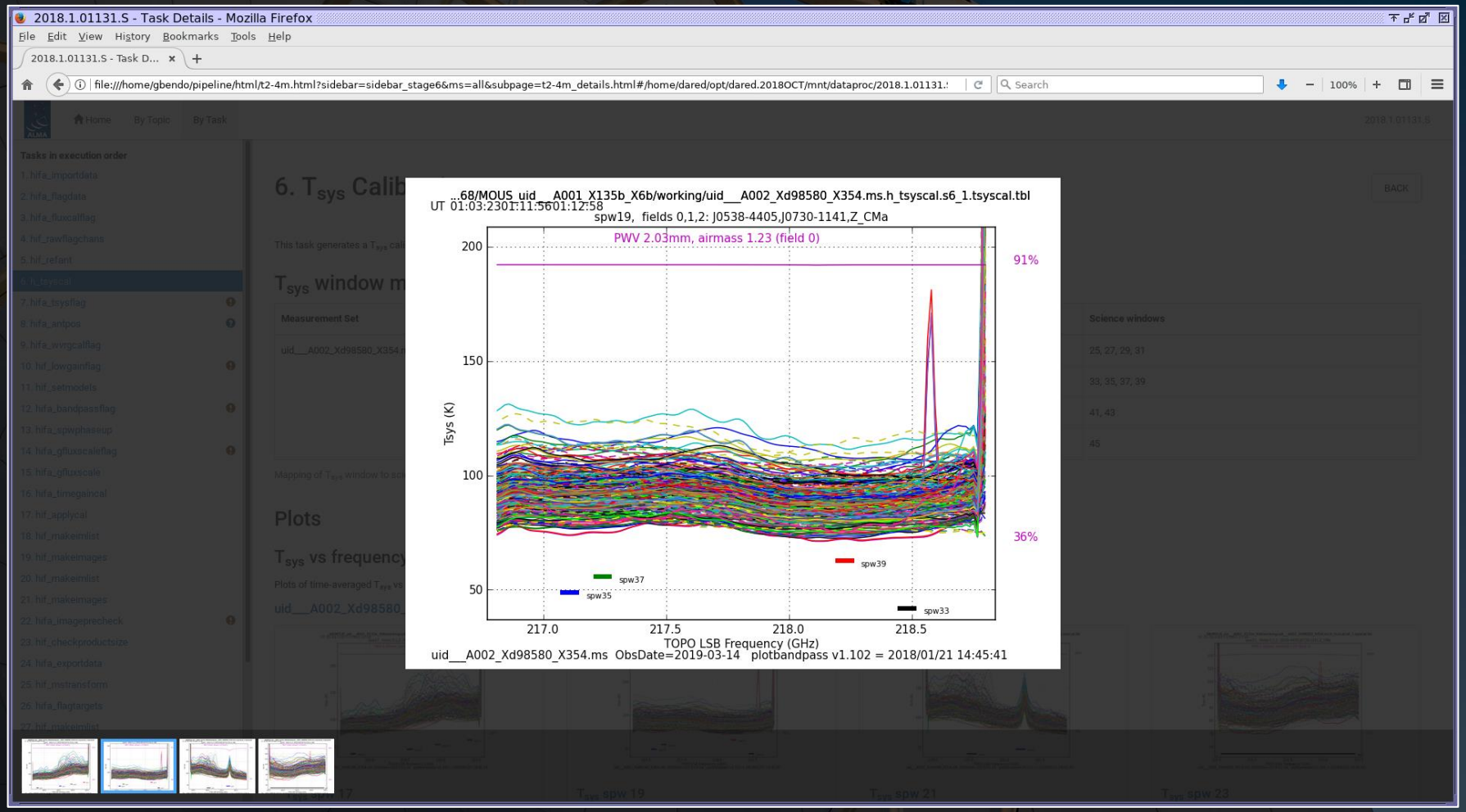
hifa_rawflagchans: More flagging is done here. Again, the total percentages should be <~20%.



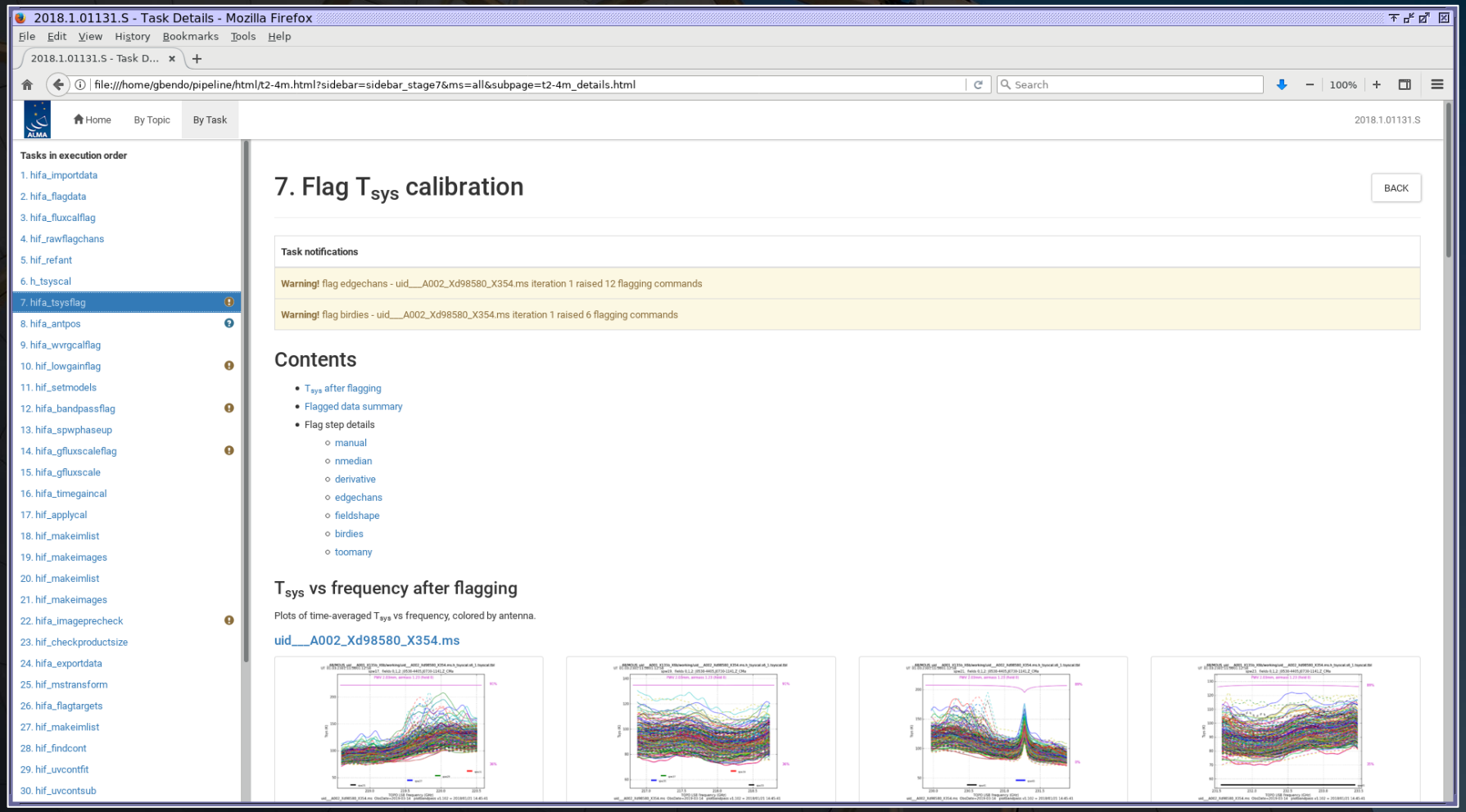
h_tsyscal: In this step, an a priori amplitude correction is derived based on the system temperature of the data. The plots of Tsys versus frequency are important to check.



The plots should be devoid of spectral features except in the locations of atmospheric lines (which may need to be flagged before imaging), 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.)



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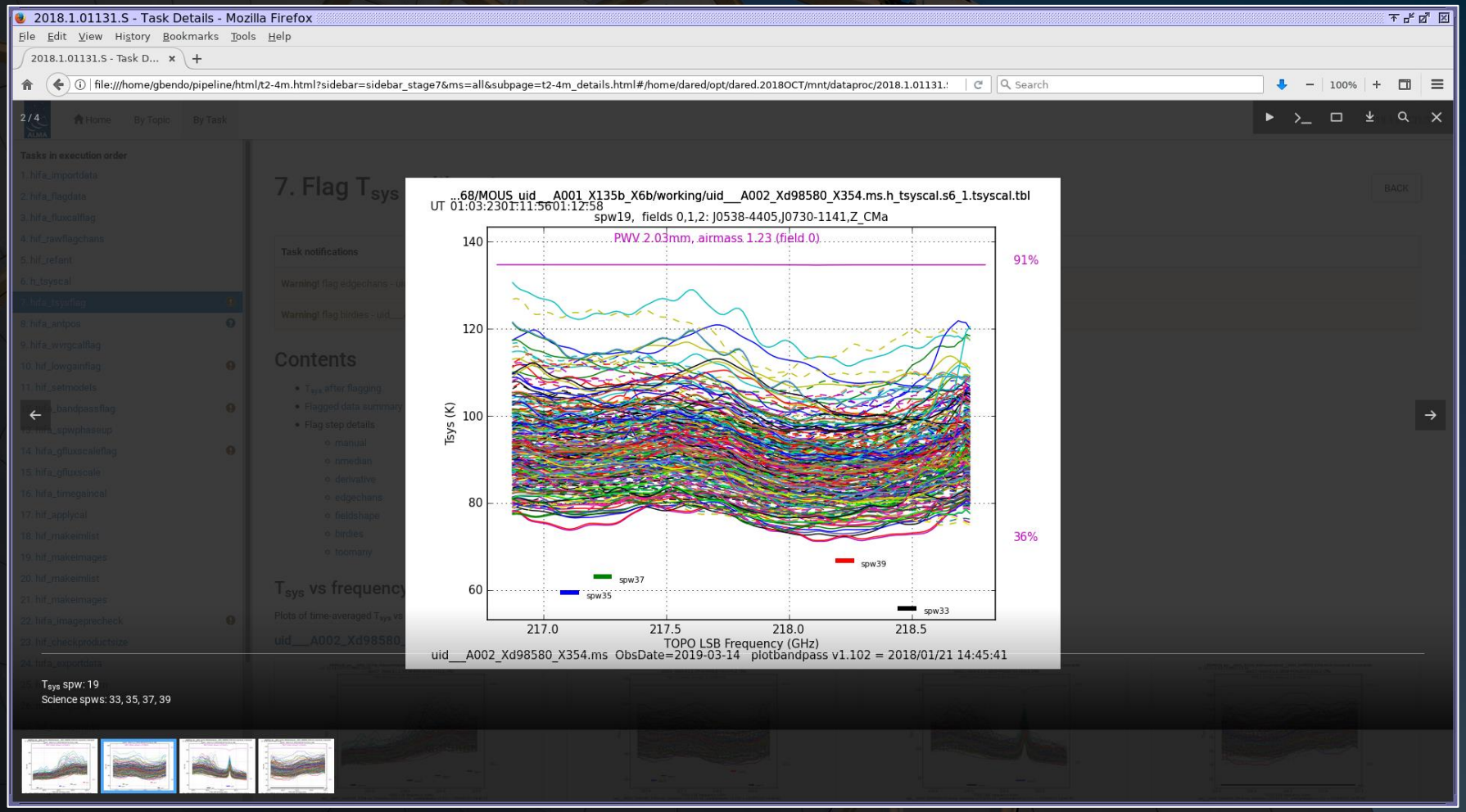
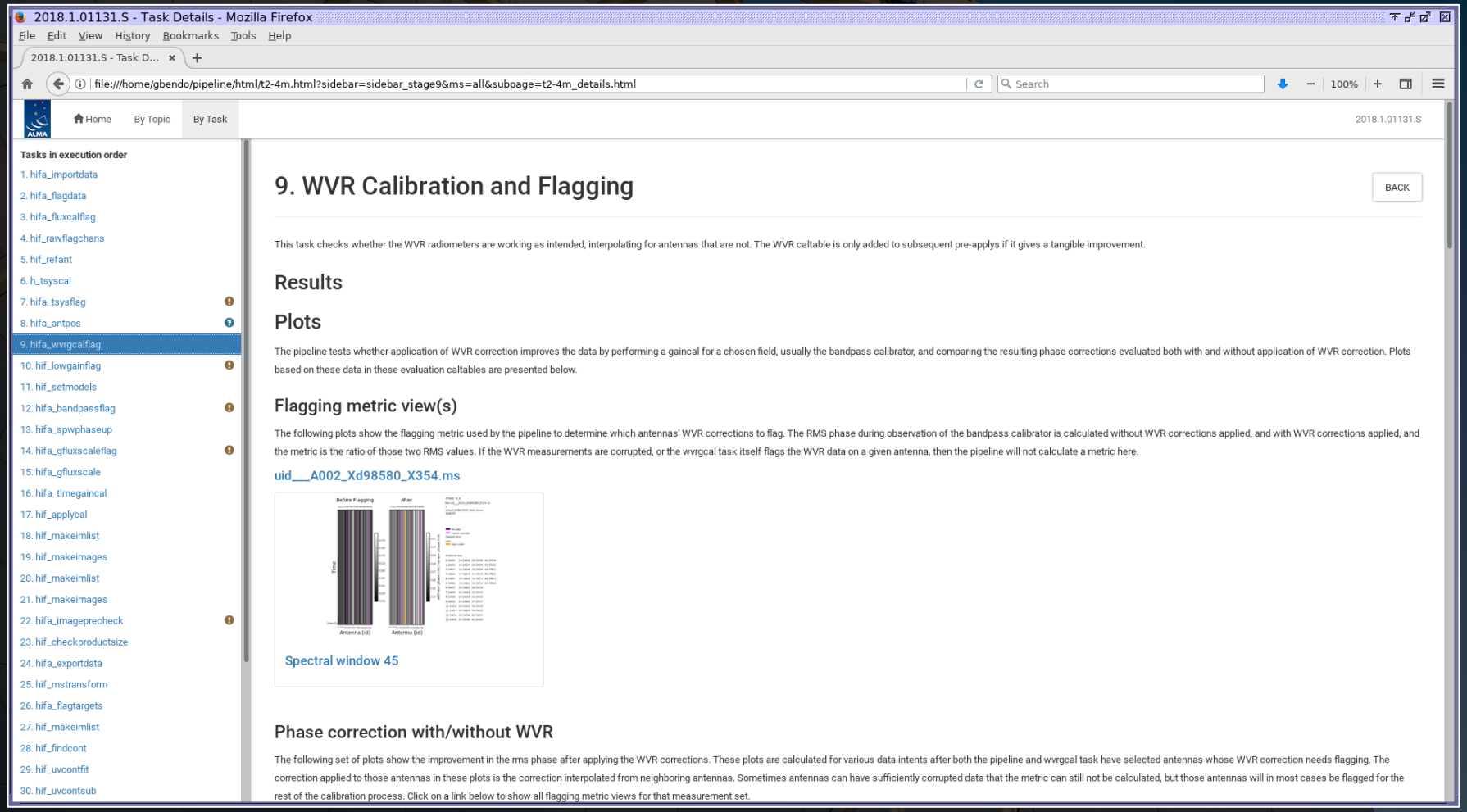


hifa_wvrgcalflag: In this step, an a priori phase correction based on measurements from water vapour radiometers is derived. The plots of the data before and after the application of the corrections should be checked to ensure that the corrections improve the data.



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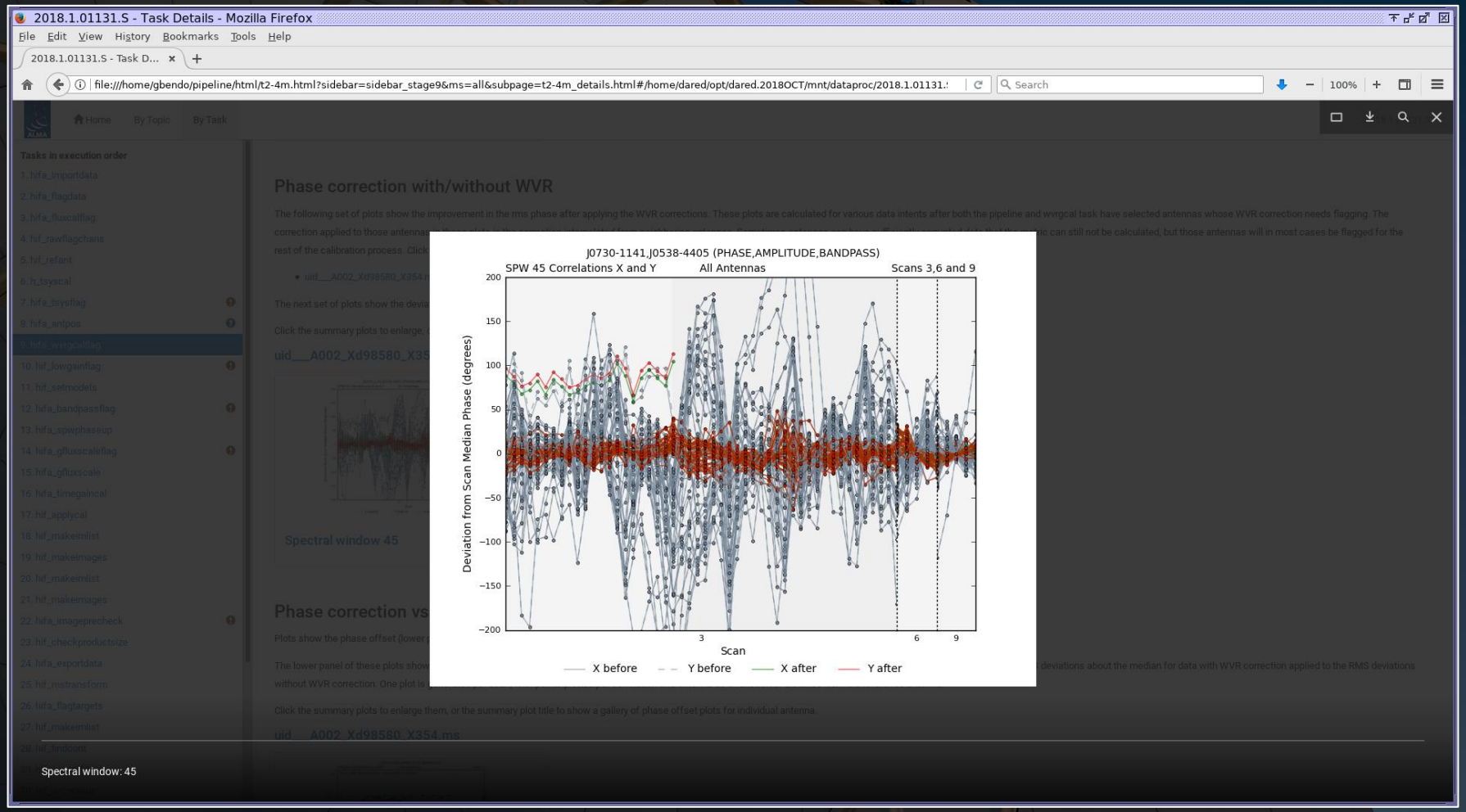

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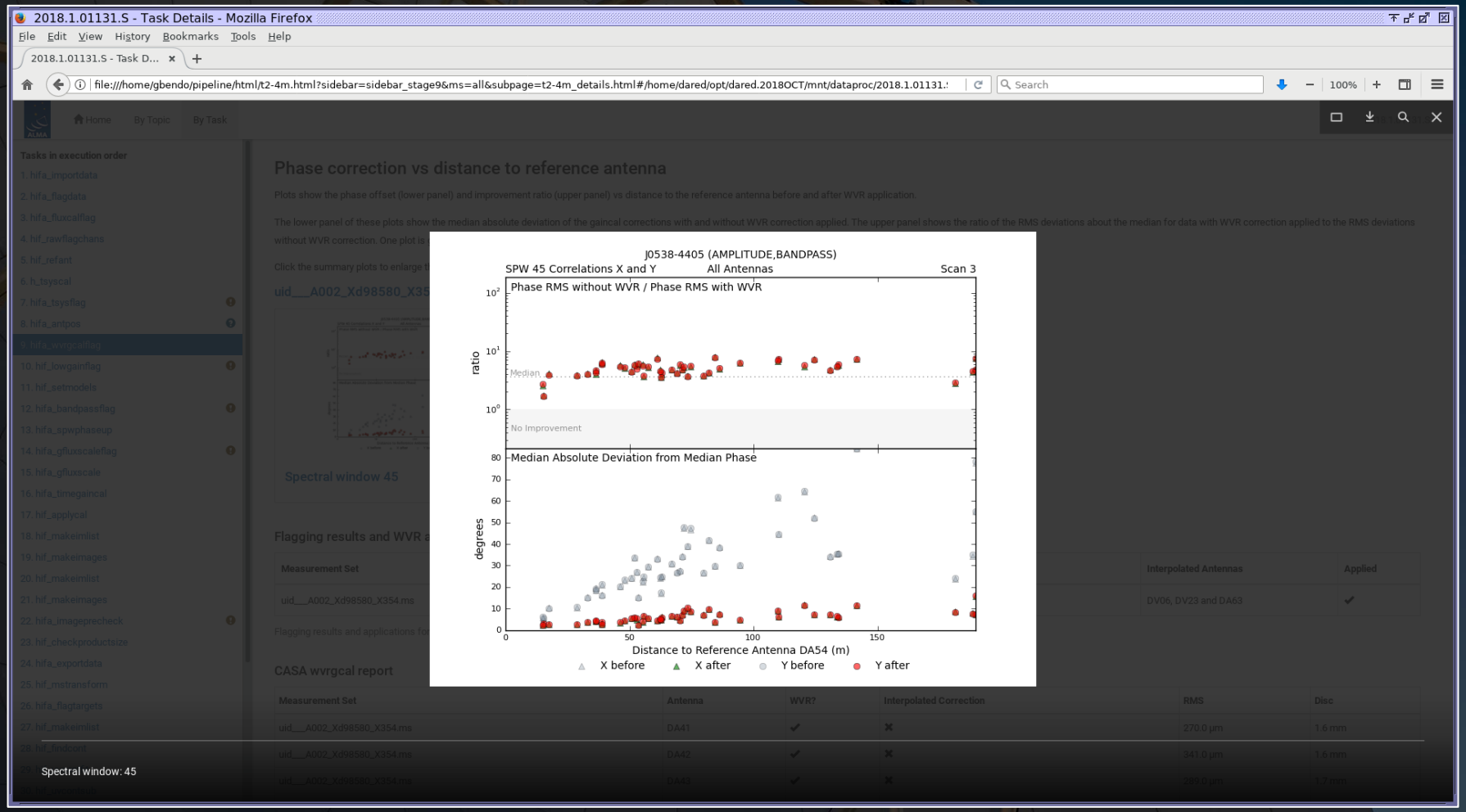
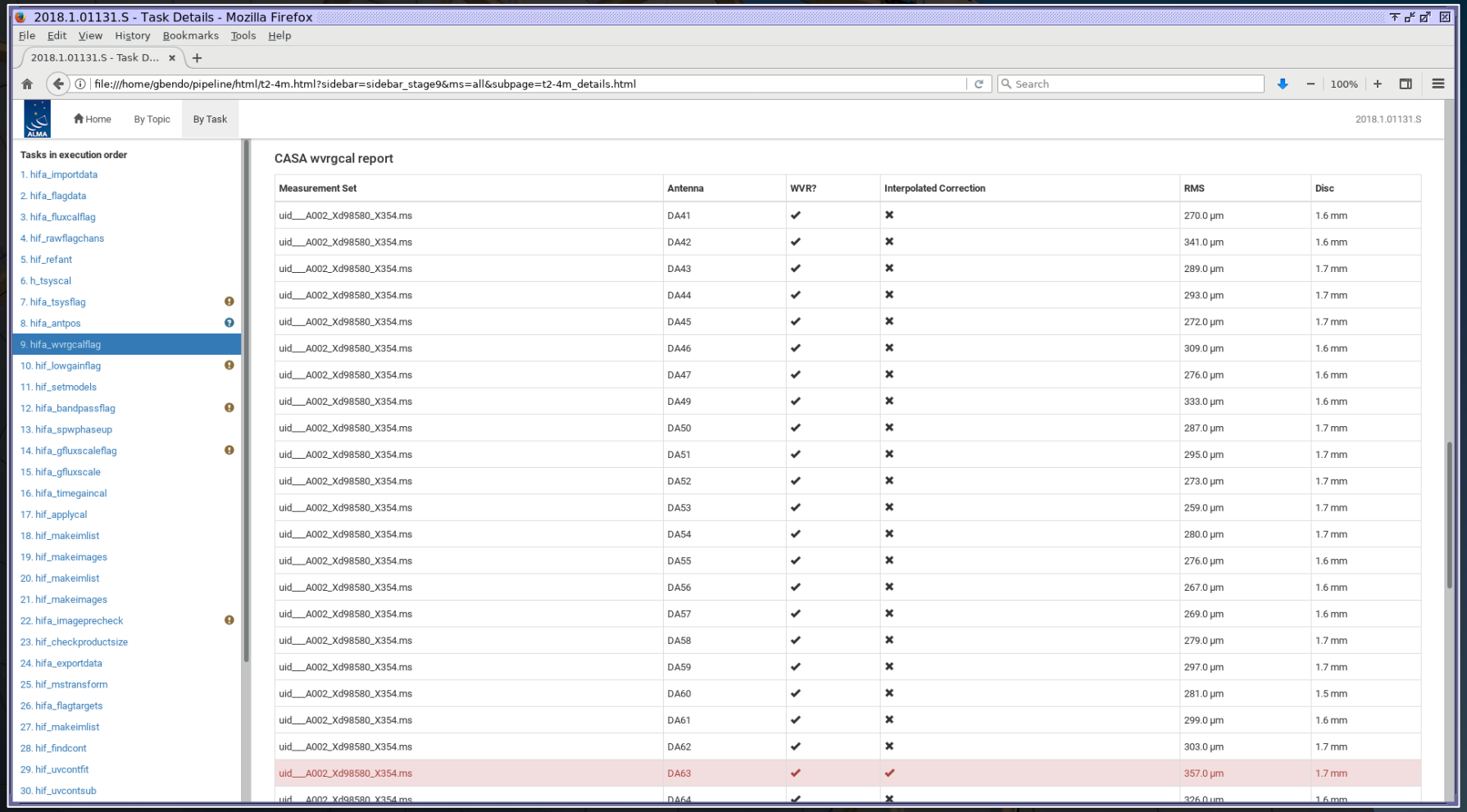
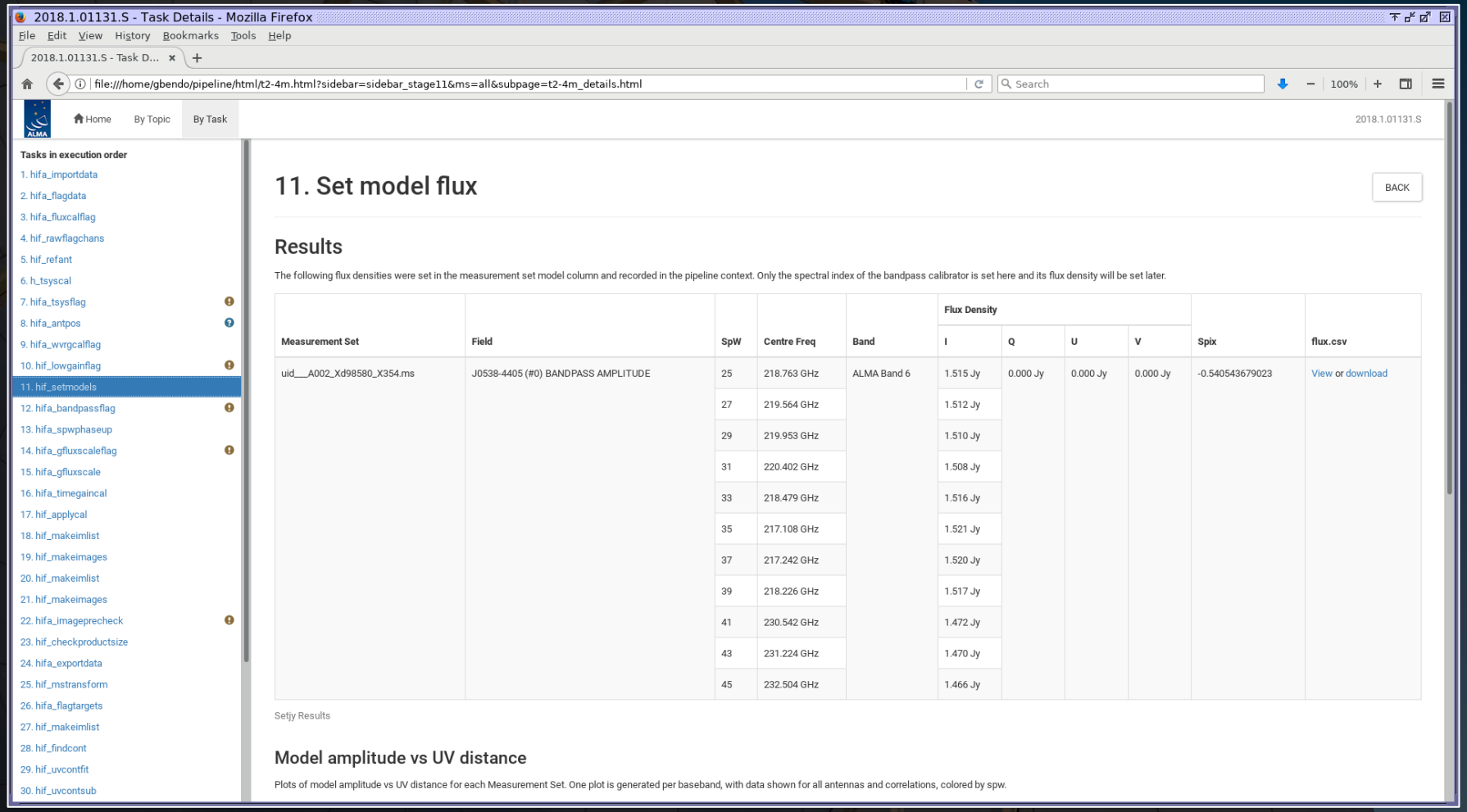


It is also worth noting whether the correction is interpolated for any antennas. This should only be done for very few antennas if any.



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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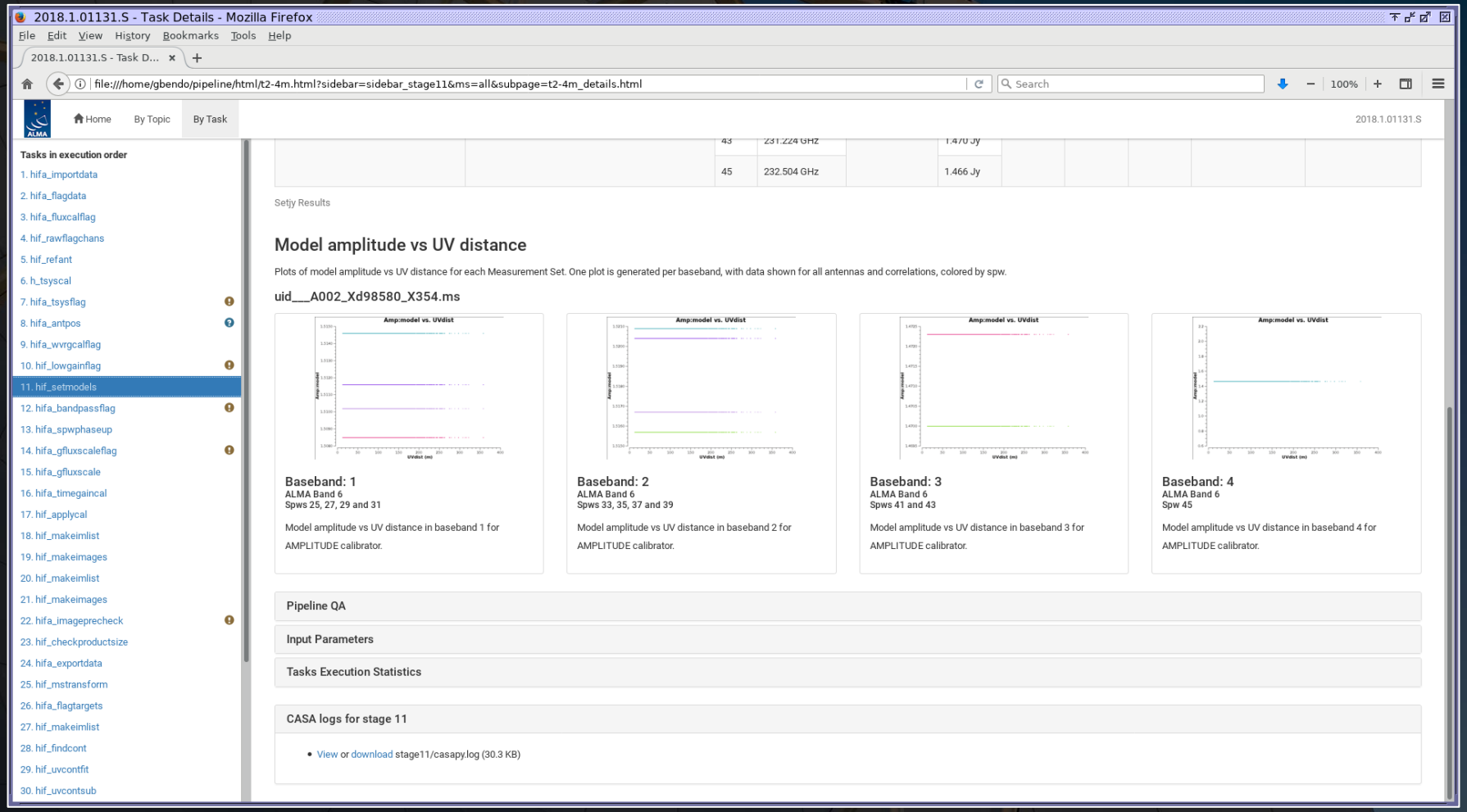
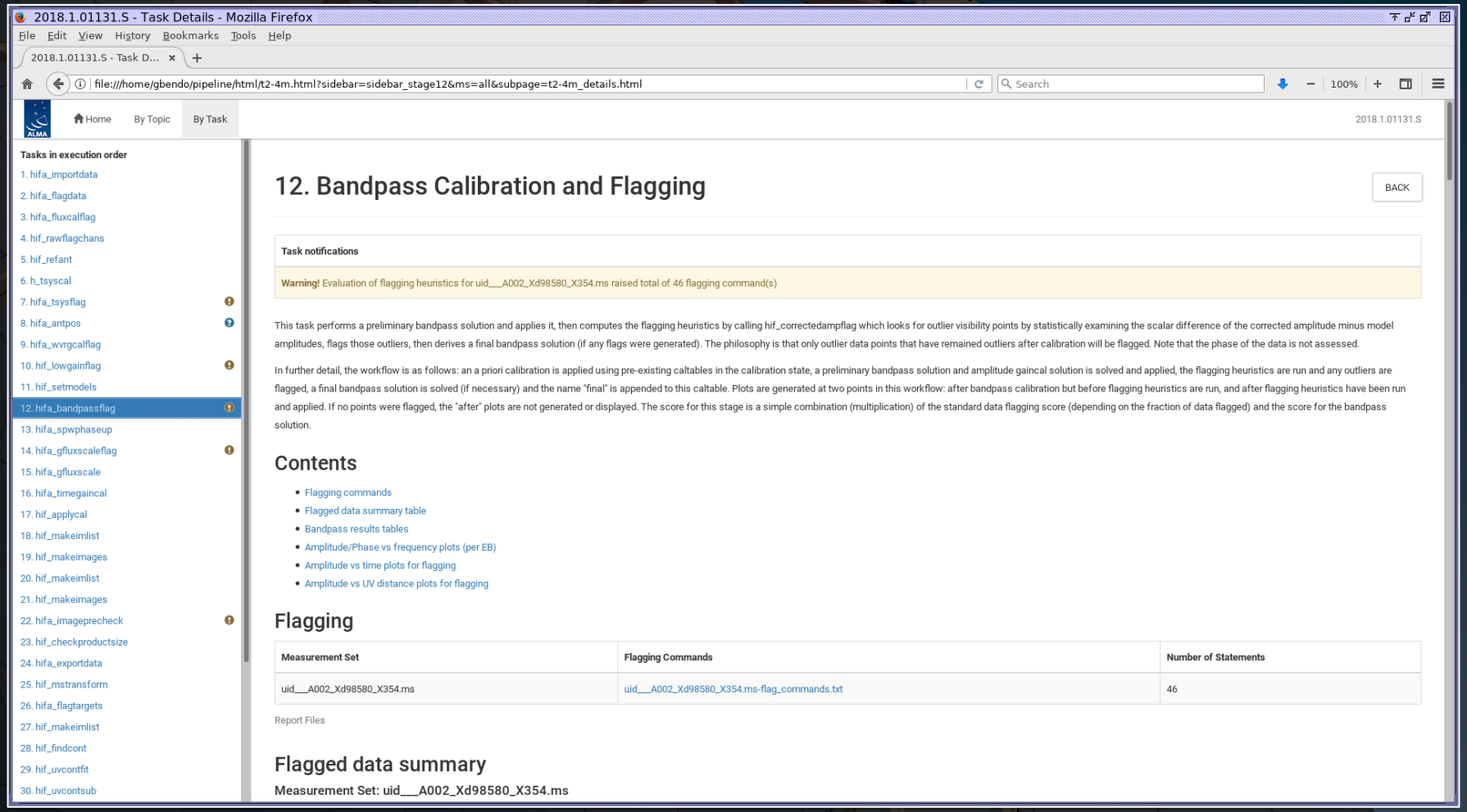


hifa_bandpassflag: Corrections for the phase and amplitude versus frequency are derived in this step. The plots of these quantities versus frequency should be smooth. Otherwise, it may be necessary to re-calibrate the data.



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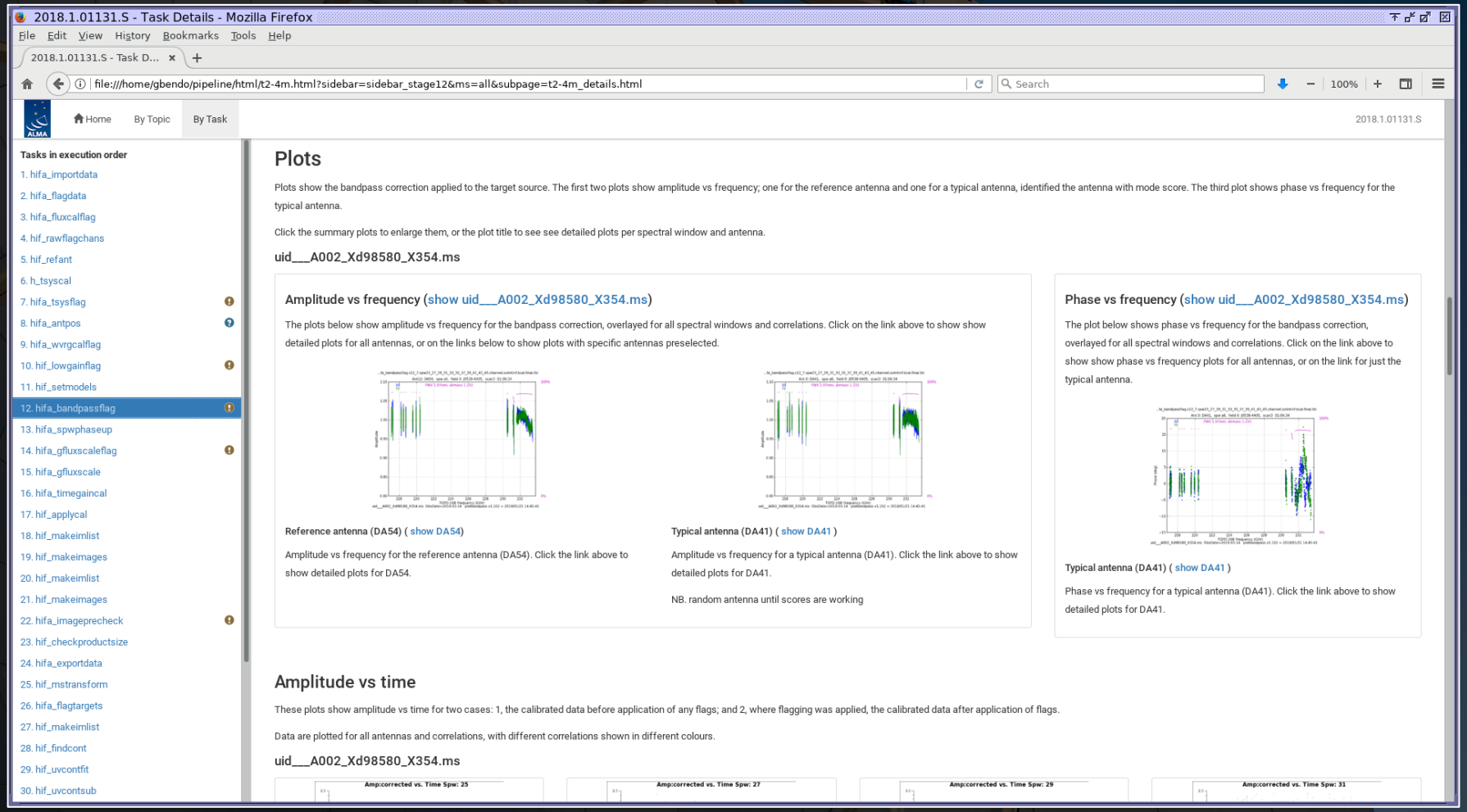
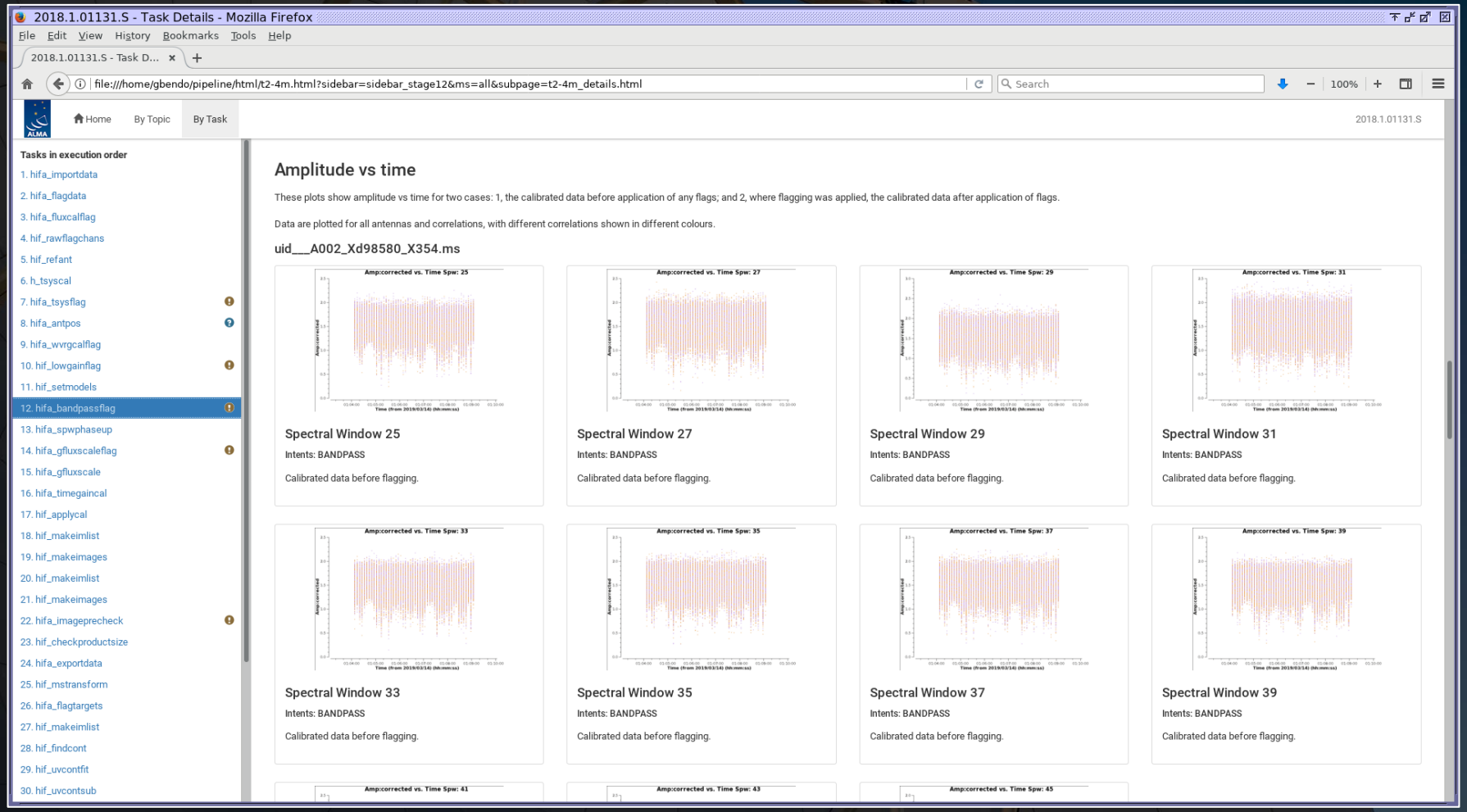


Additionally, the plots of the amplitude versus time and versus uv distance for the bandpass calibrator should contain no severe outliers. Any outliers will need to be flagged before imaging.



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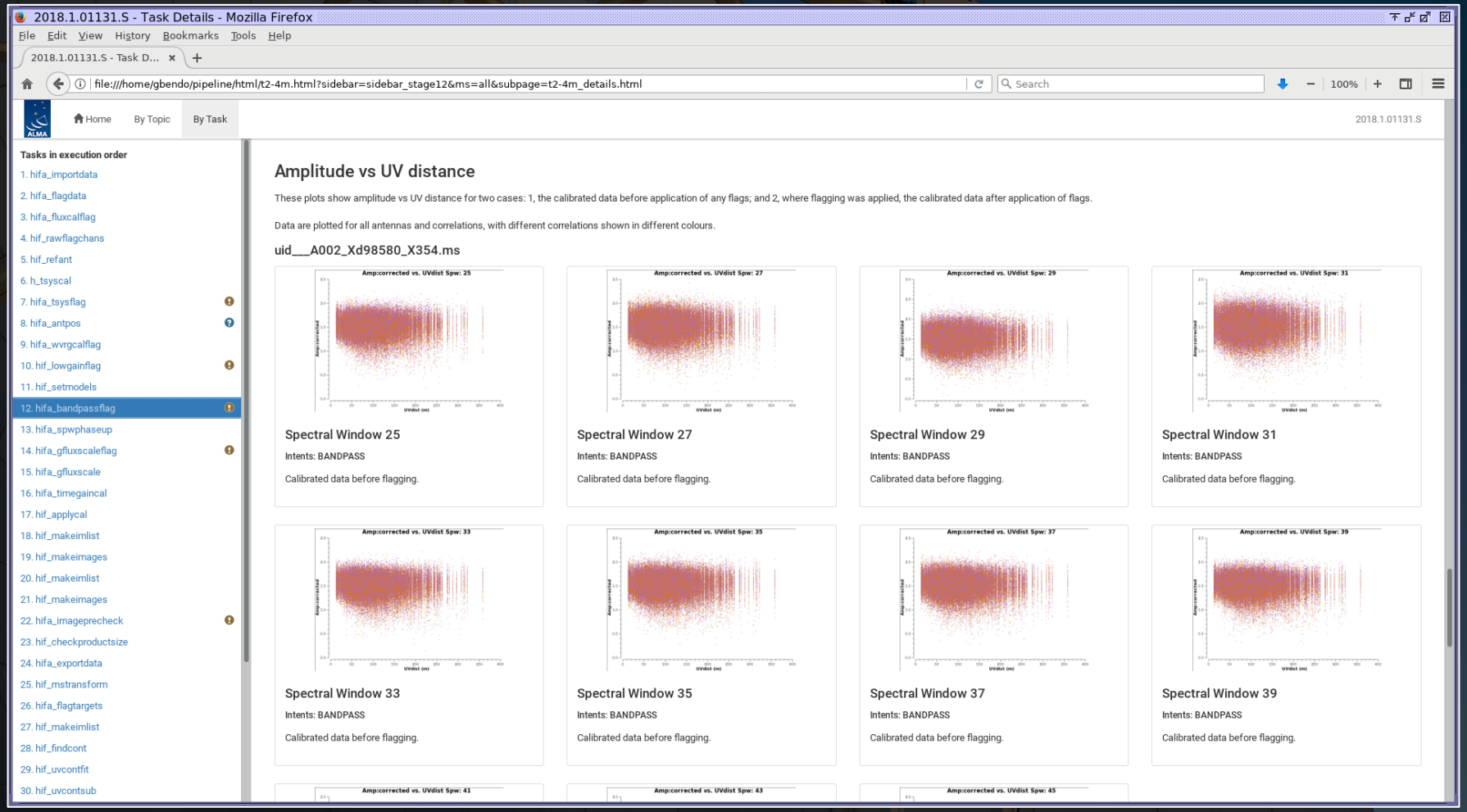
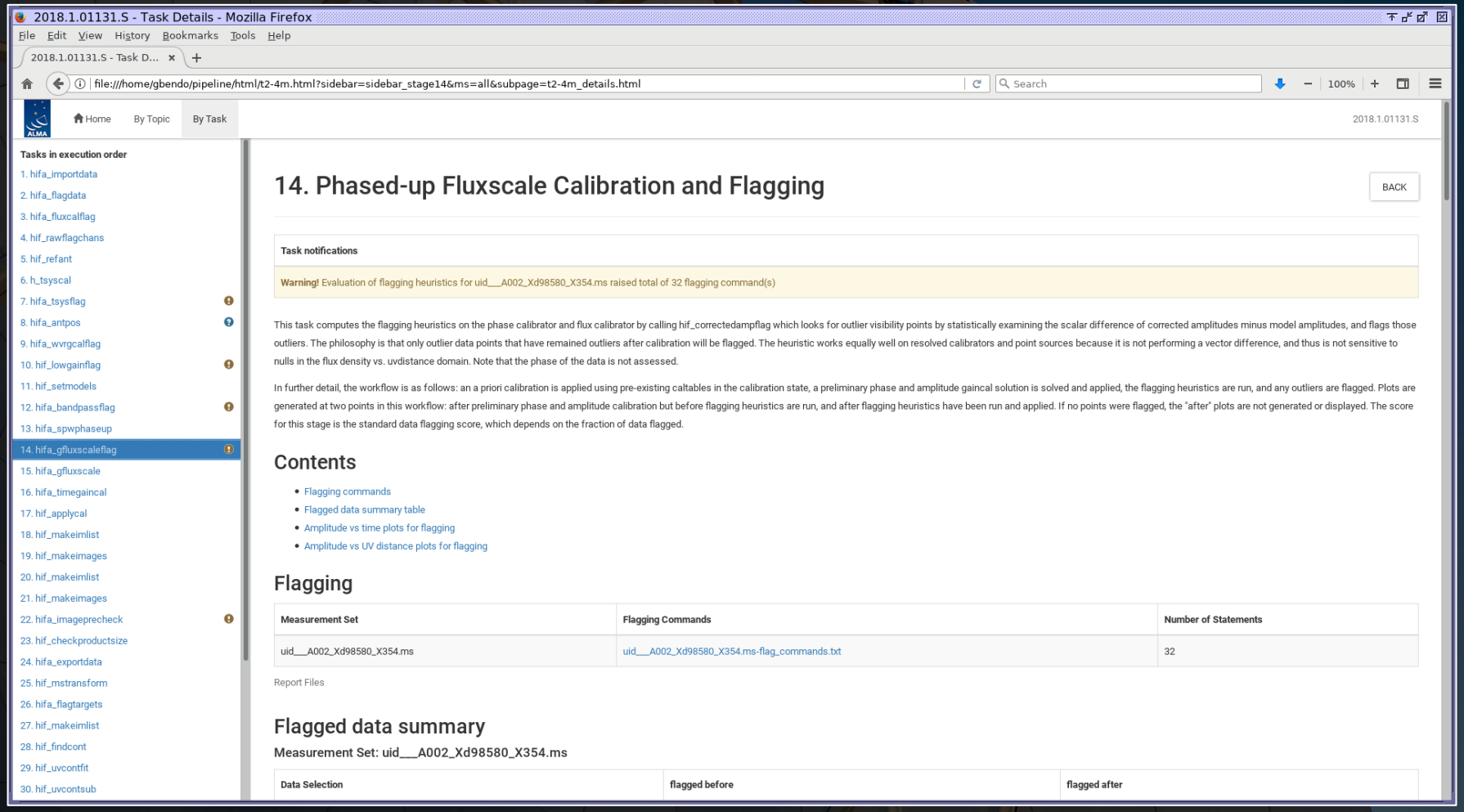


hifa_gfluxscaleflag: Outliers from the hifa_bandpassflag step should be flagged here. It is worth checking the plots of amplitude versus time and versus uv distance, which are now shown for the phase calibrator (and other calibrators when they are present).



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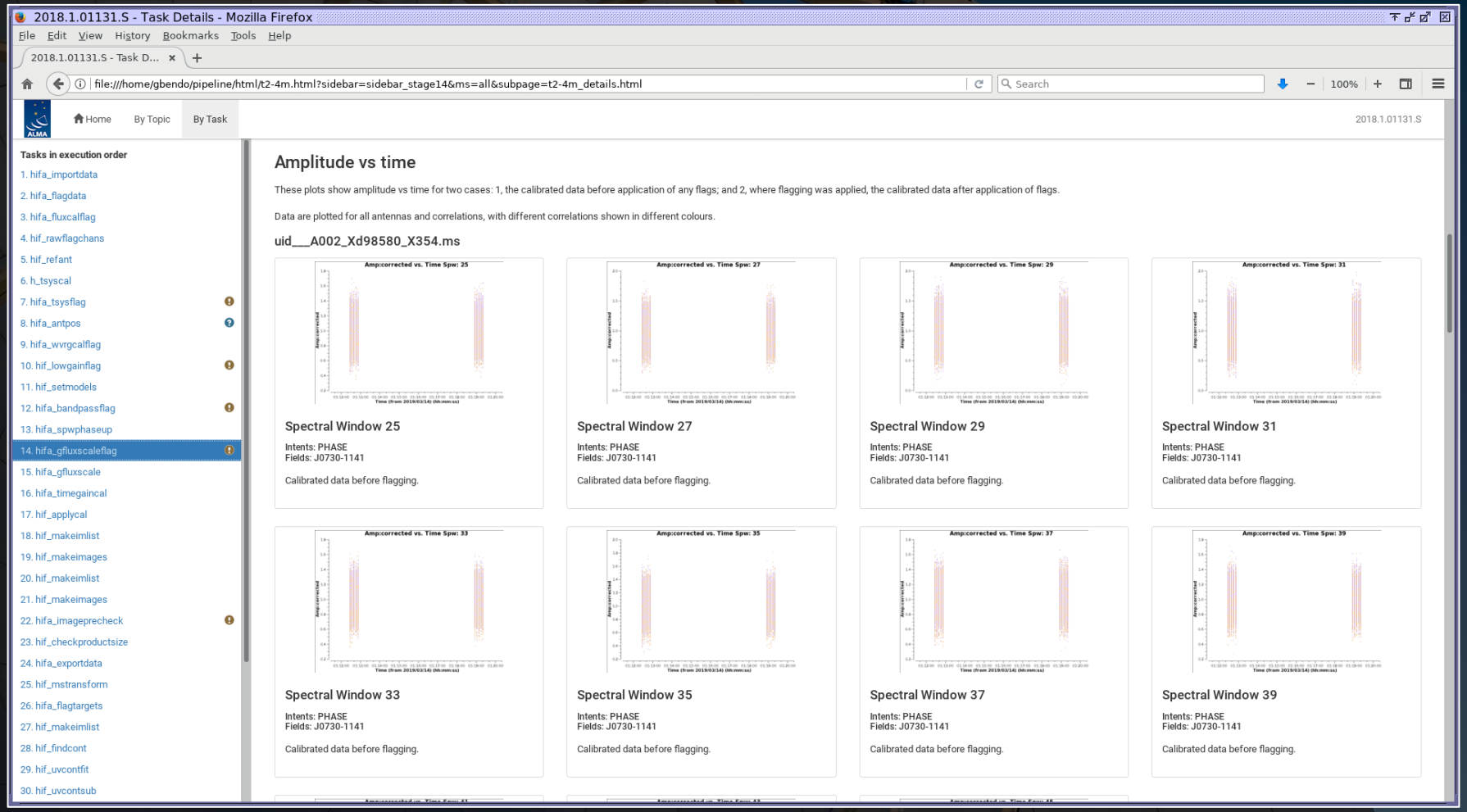

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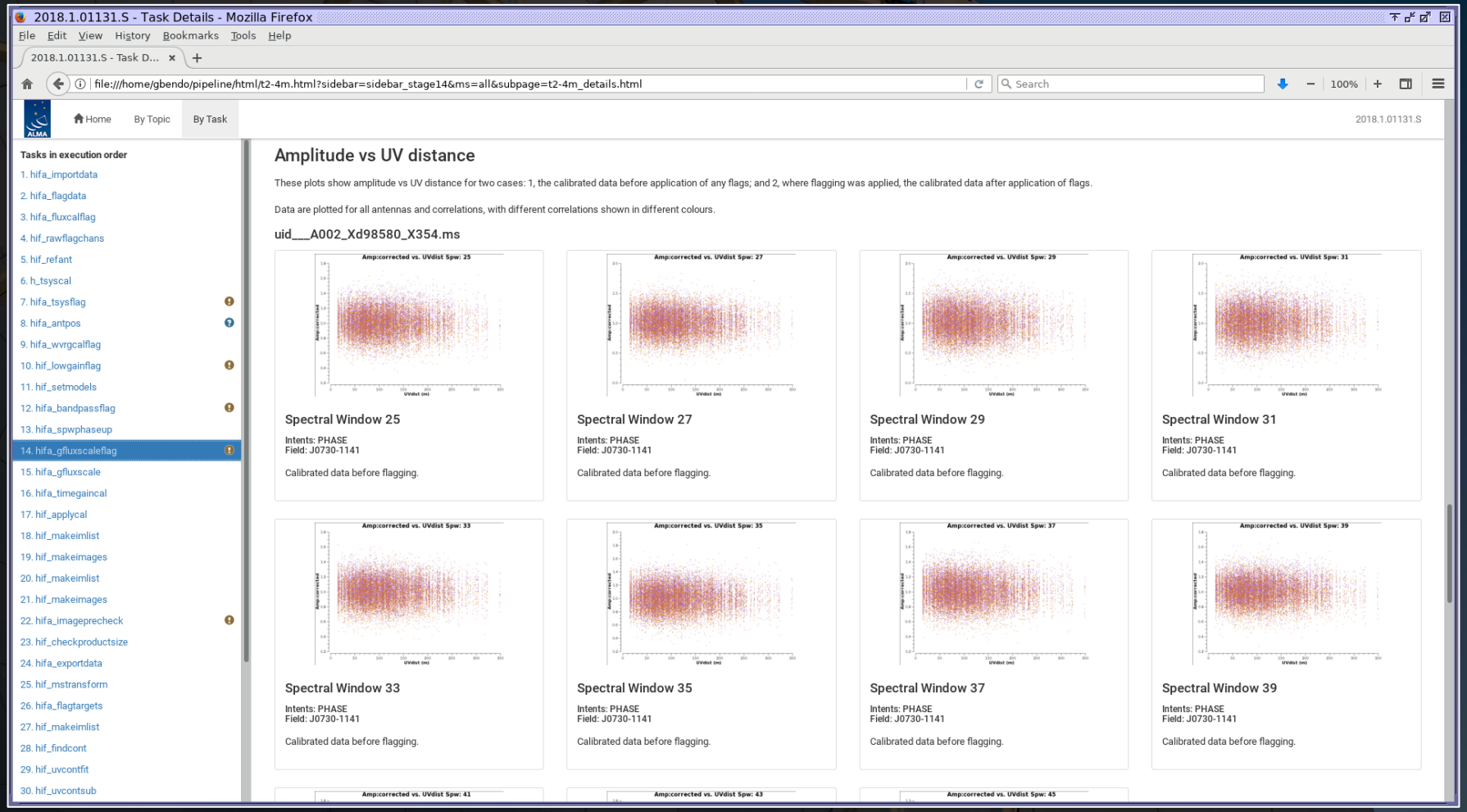
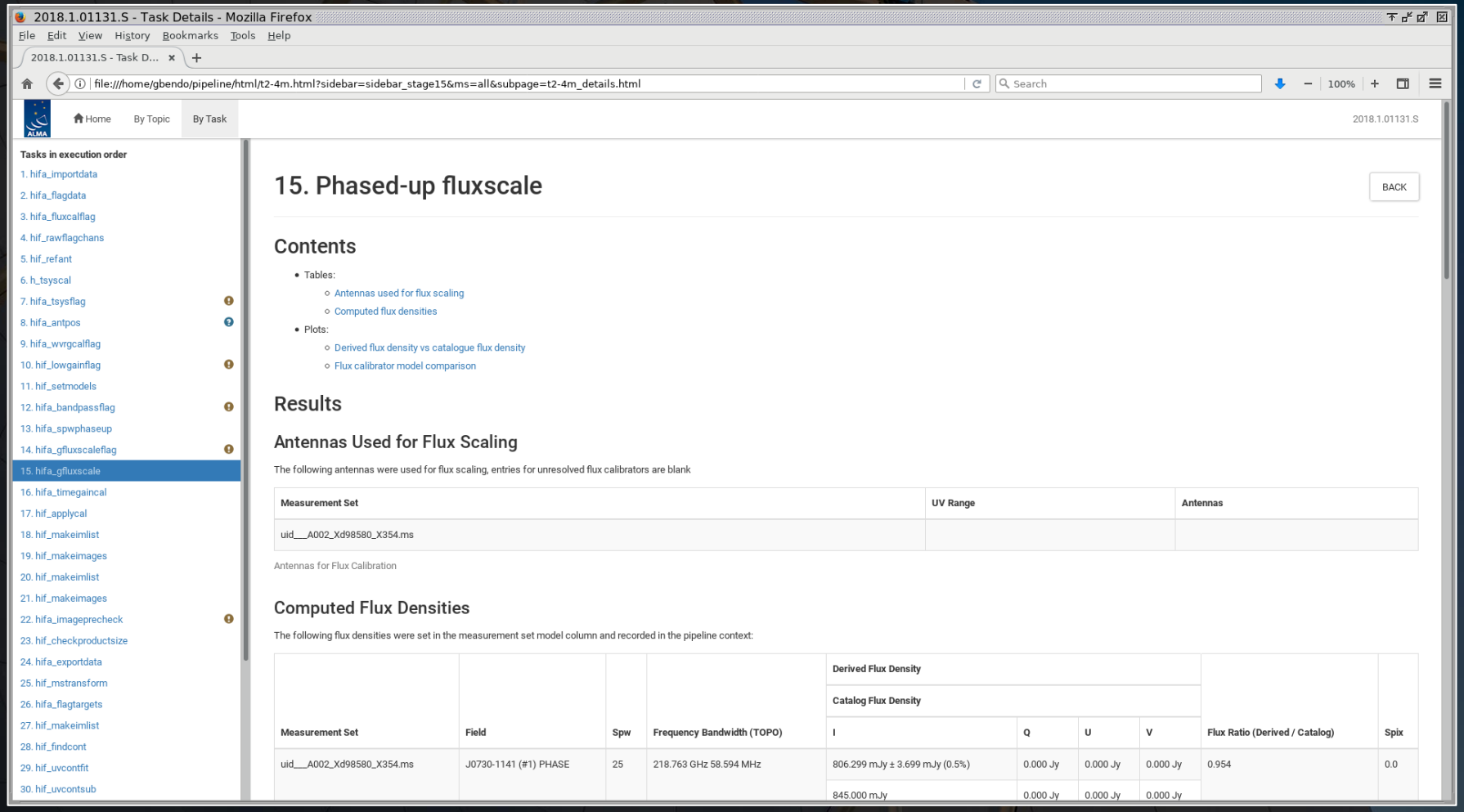


hifa_gfluxscale: The fluxes for the calibration sources (except the flux calibrator source itself) are compared to the values from the calibrator archive here.



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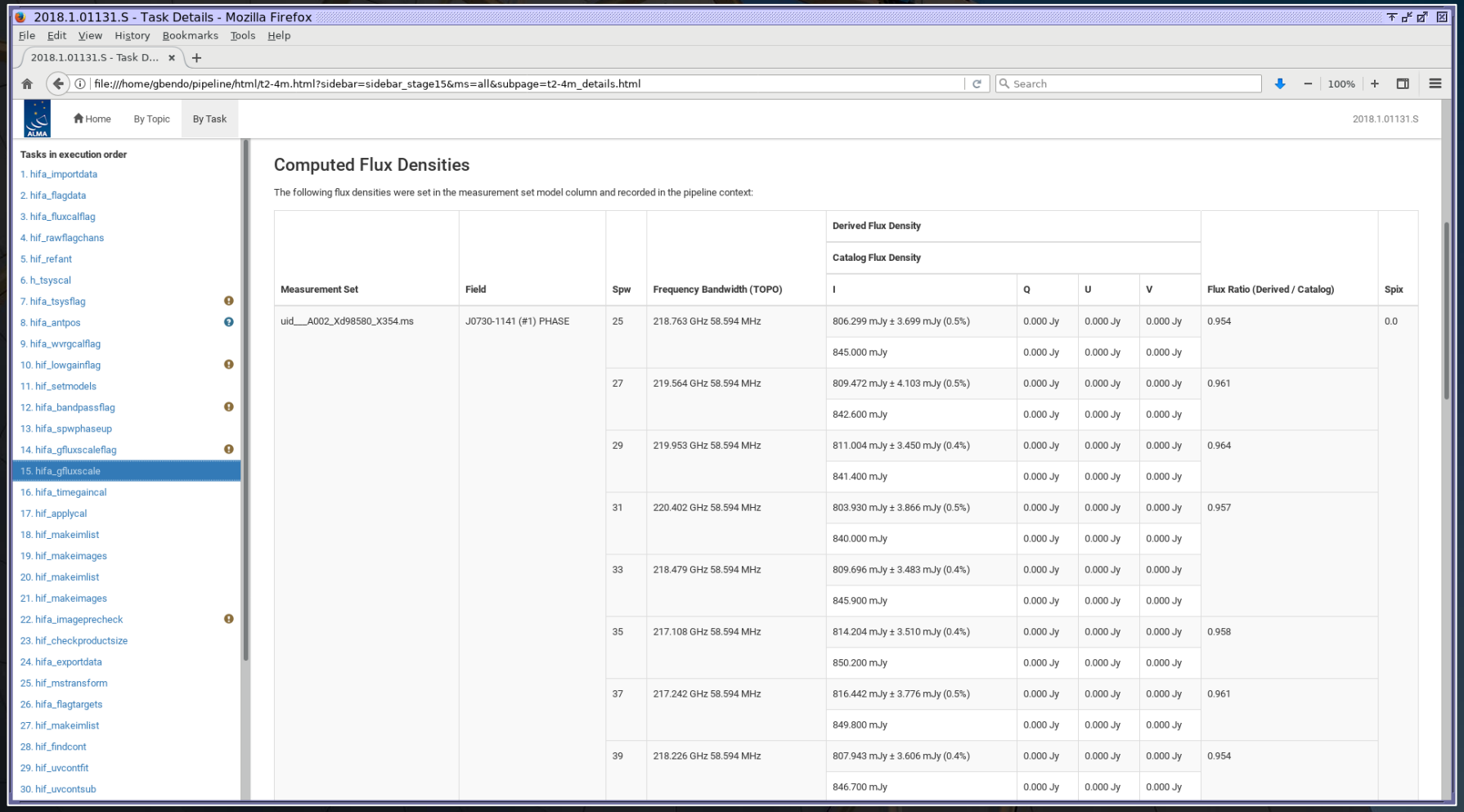
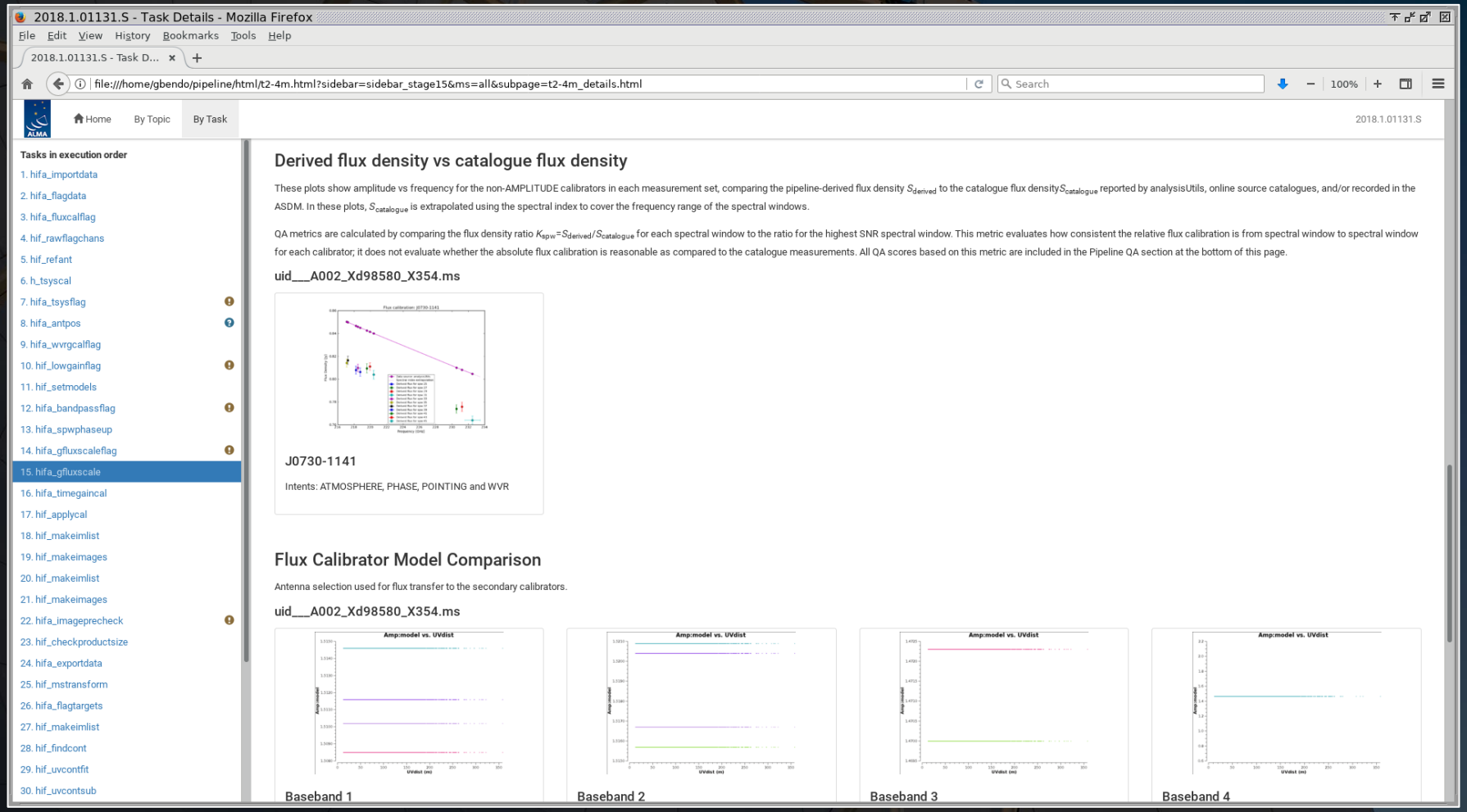
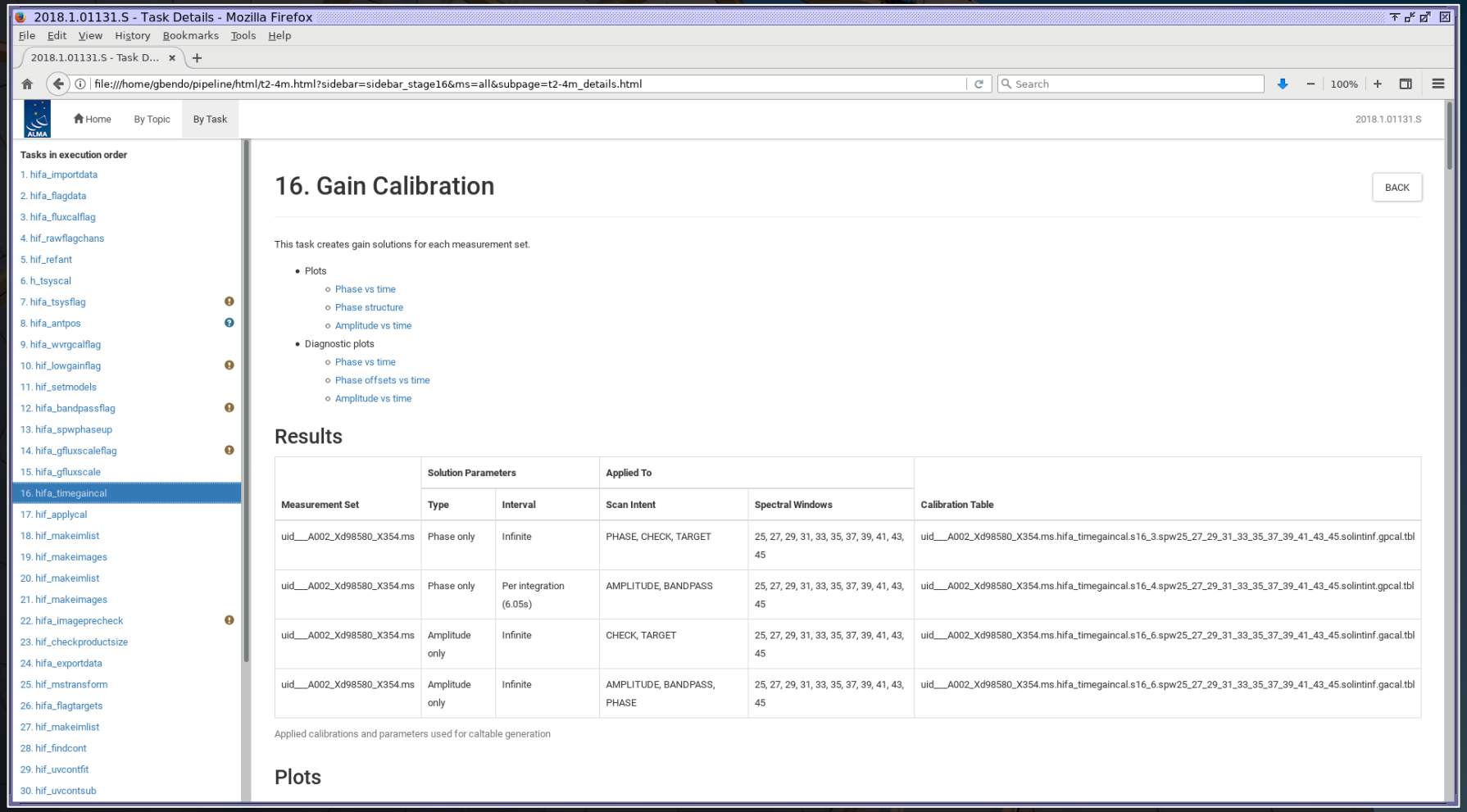


Measurement Set	Field	Spw	Frequency Bandwidth (TOPO)	Derived Flux Density / Catalog Flux Density I	Q	U	V	Flux Ratio (Derived / Catalog)	Spix
uid___A002_Xd98580_X354.ms	J0730-1141 (#1) PHASE	25	218.763 GHz 58.594 MHz	806.299 mJy ± 3.699 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.954	0.0
				845.000 mJy	0.000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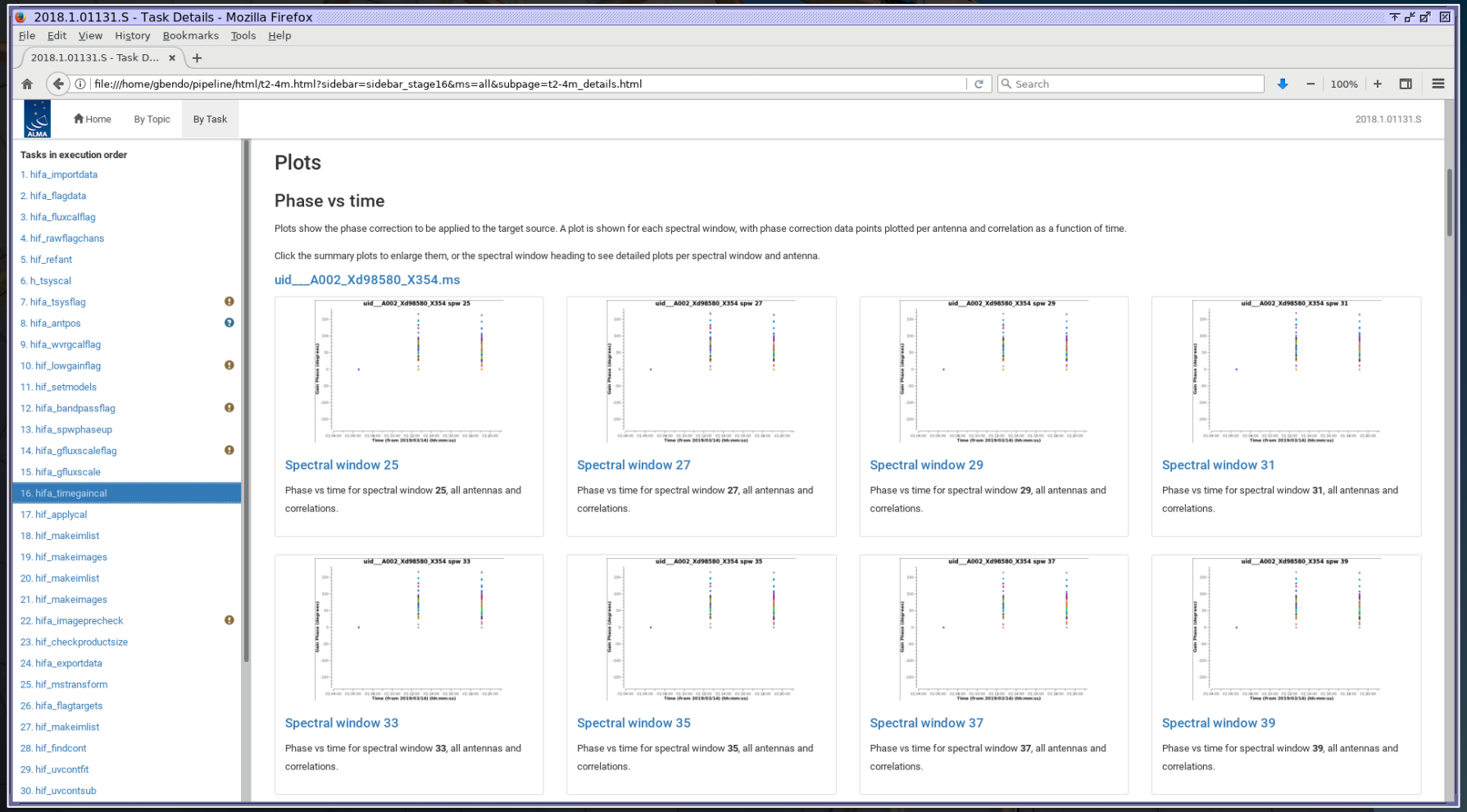

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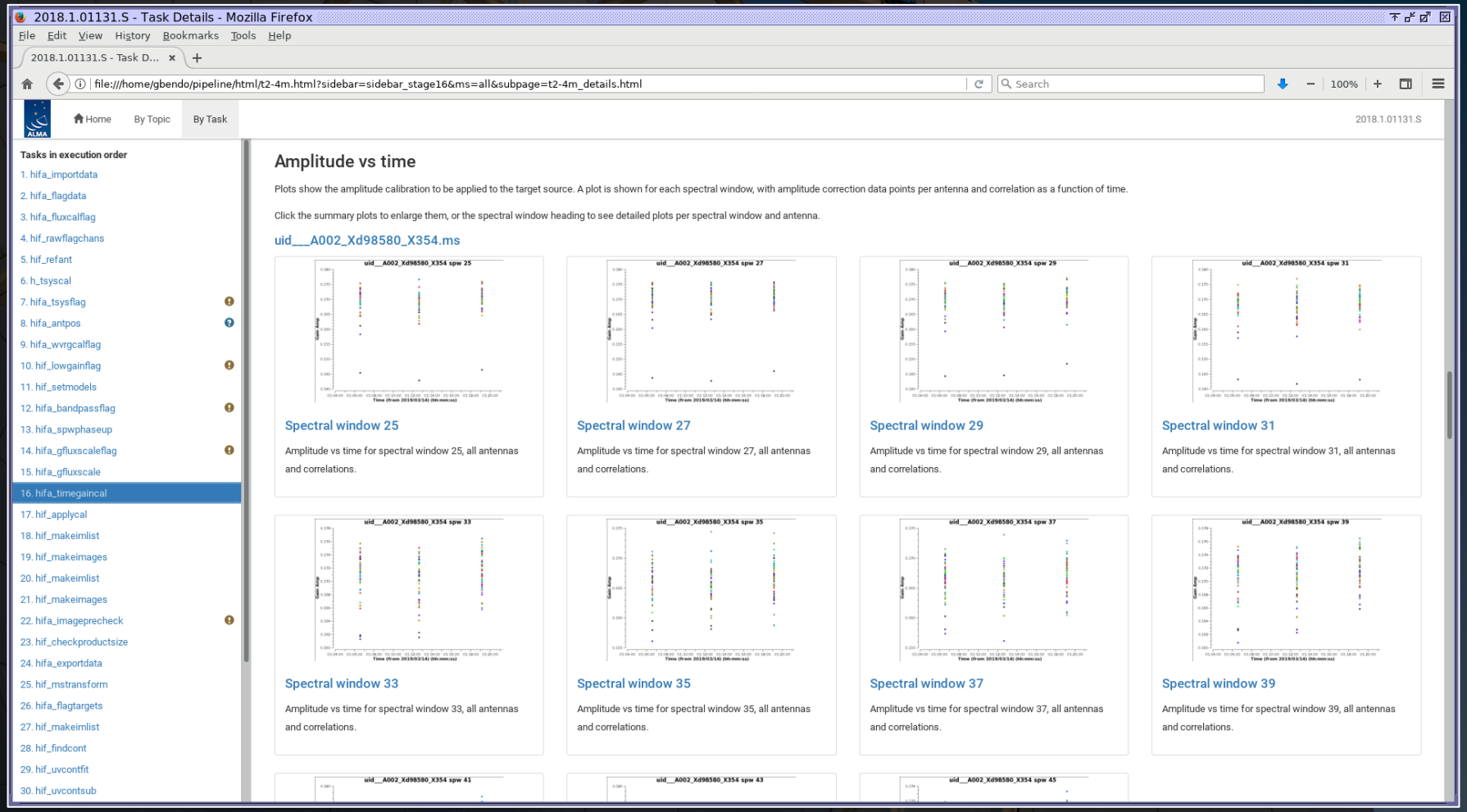
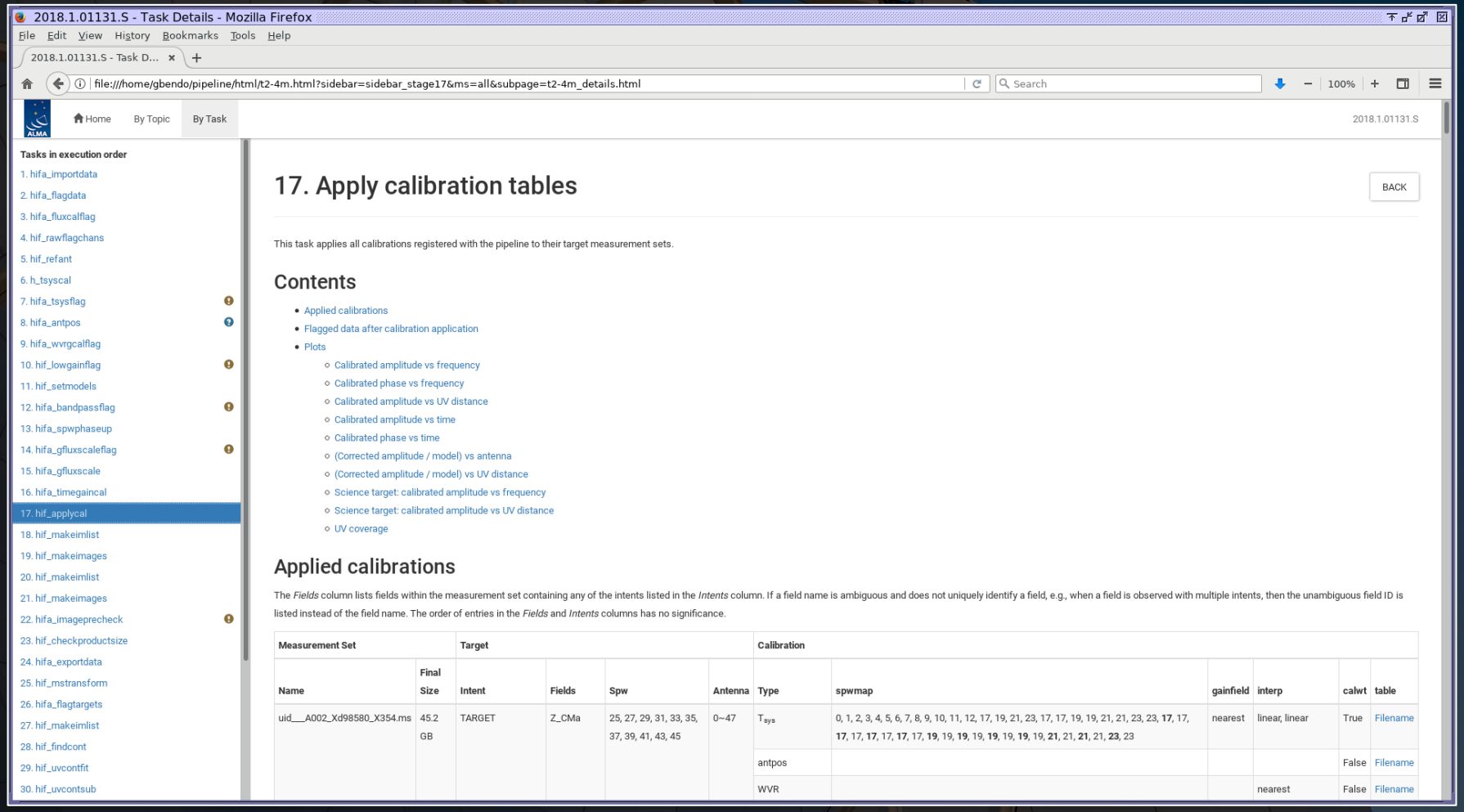
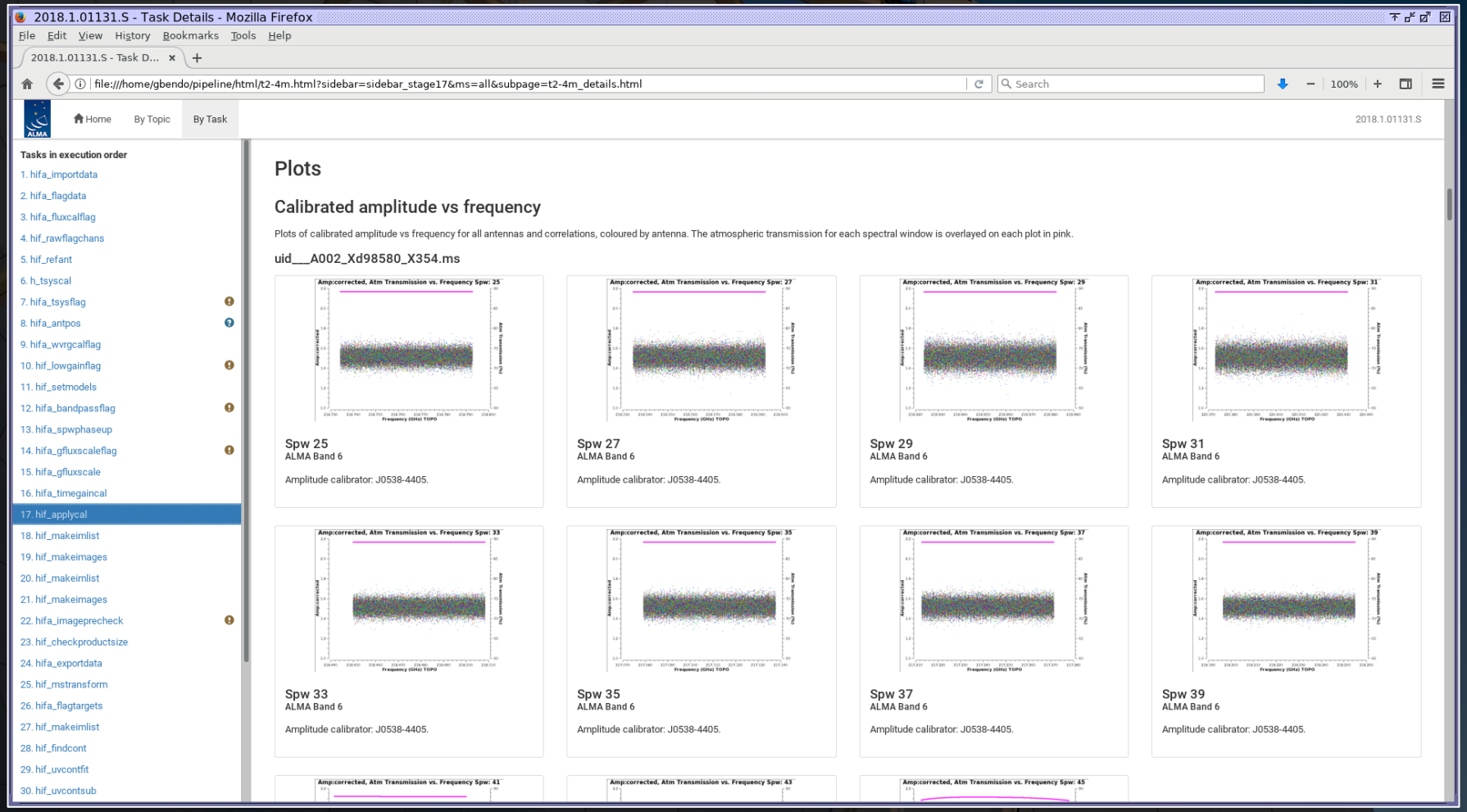


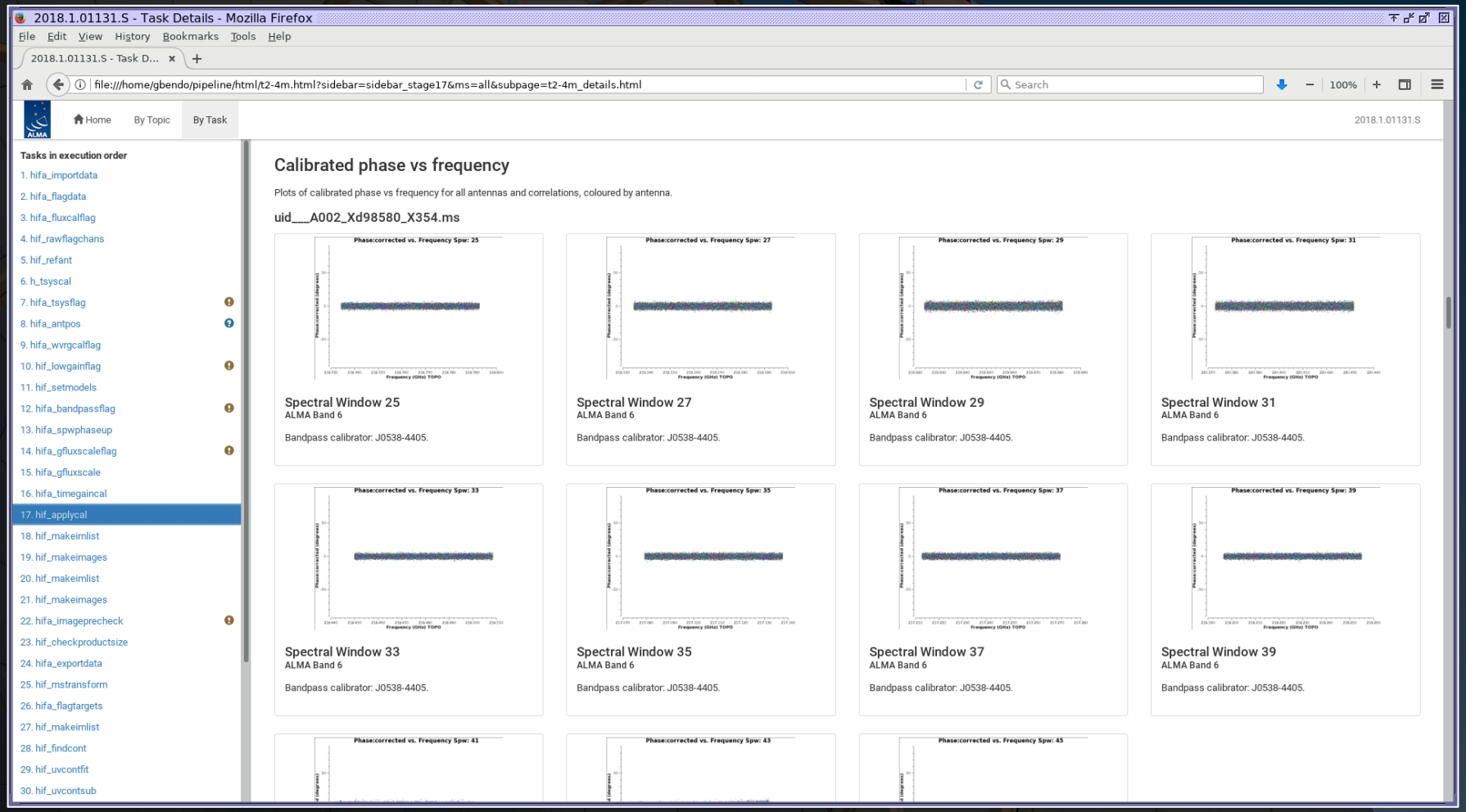
hifa_applycal: This step applies the calibration tables and created plots of the phases and amplitudes afterwards. Any unexpected outliers in these plots will need to be identified and flagged.



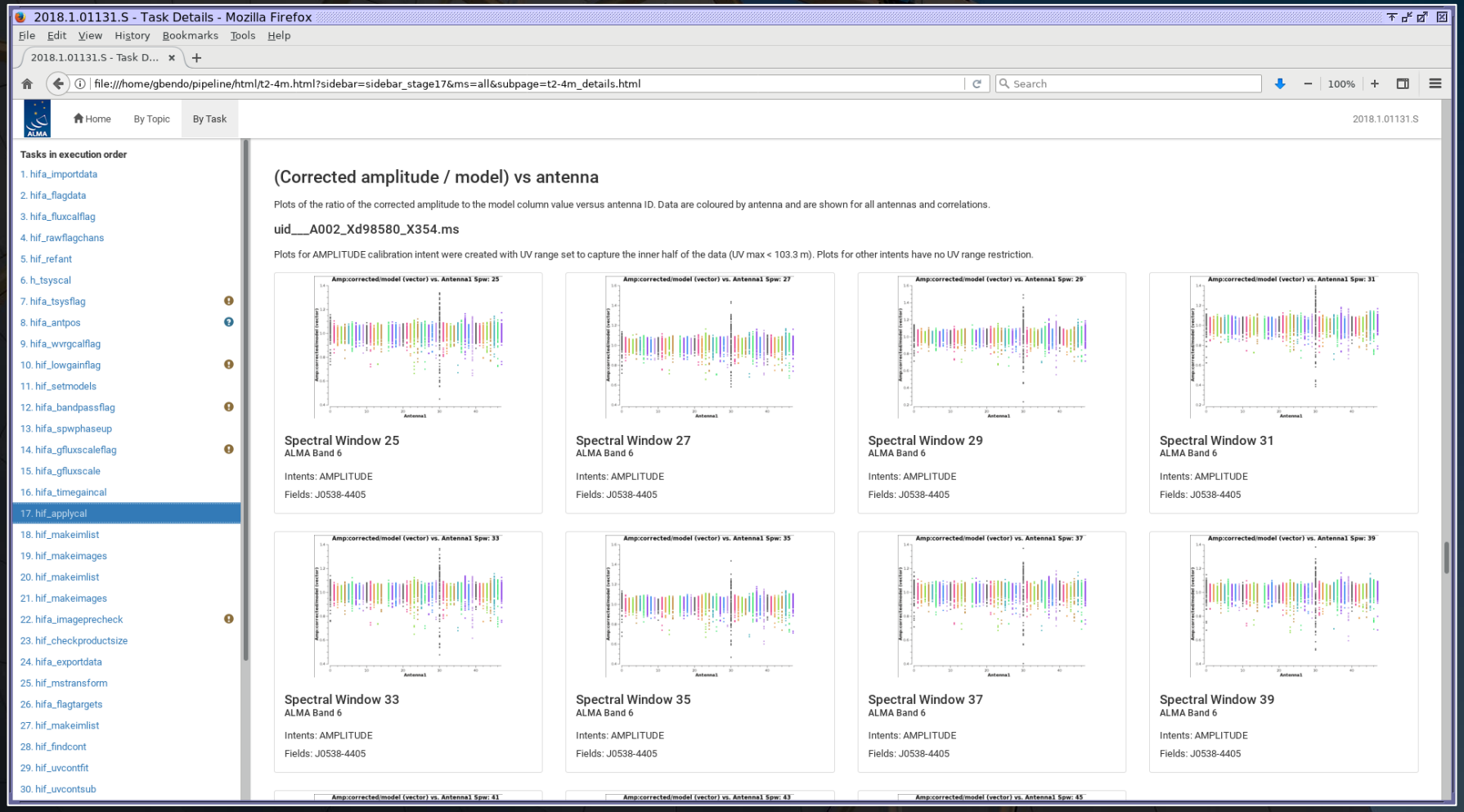
The amplitudes versus frequency, versus uv distance, and versus time should be mostly flat for the calibration sources (but not necessarily for science targets or planetary objects). However, the scatter in the amplitudes may increase where atmospheric transmission decreases.



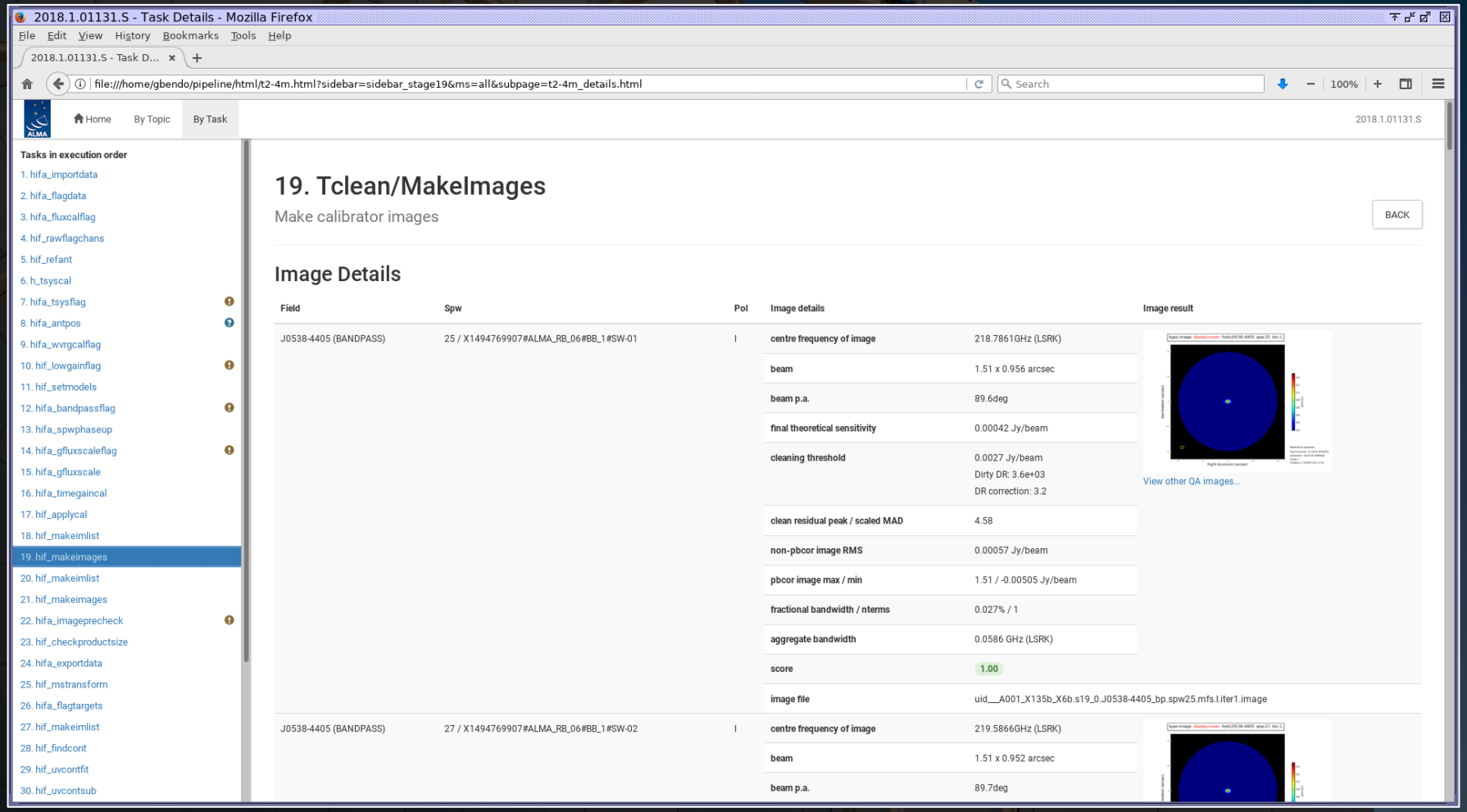
The phases should be equivalent to 0.



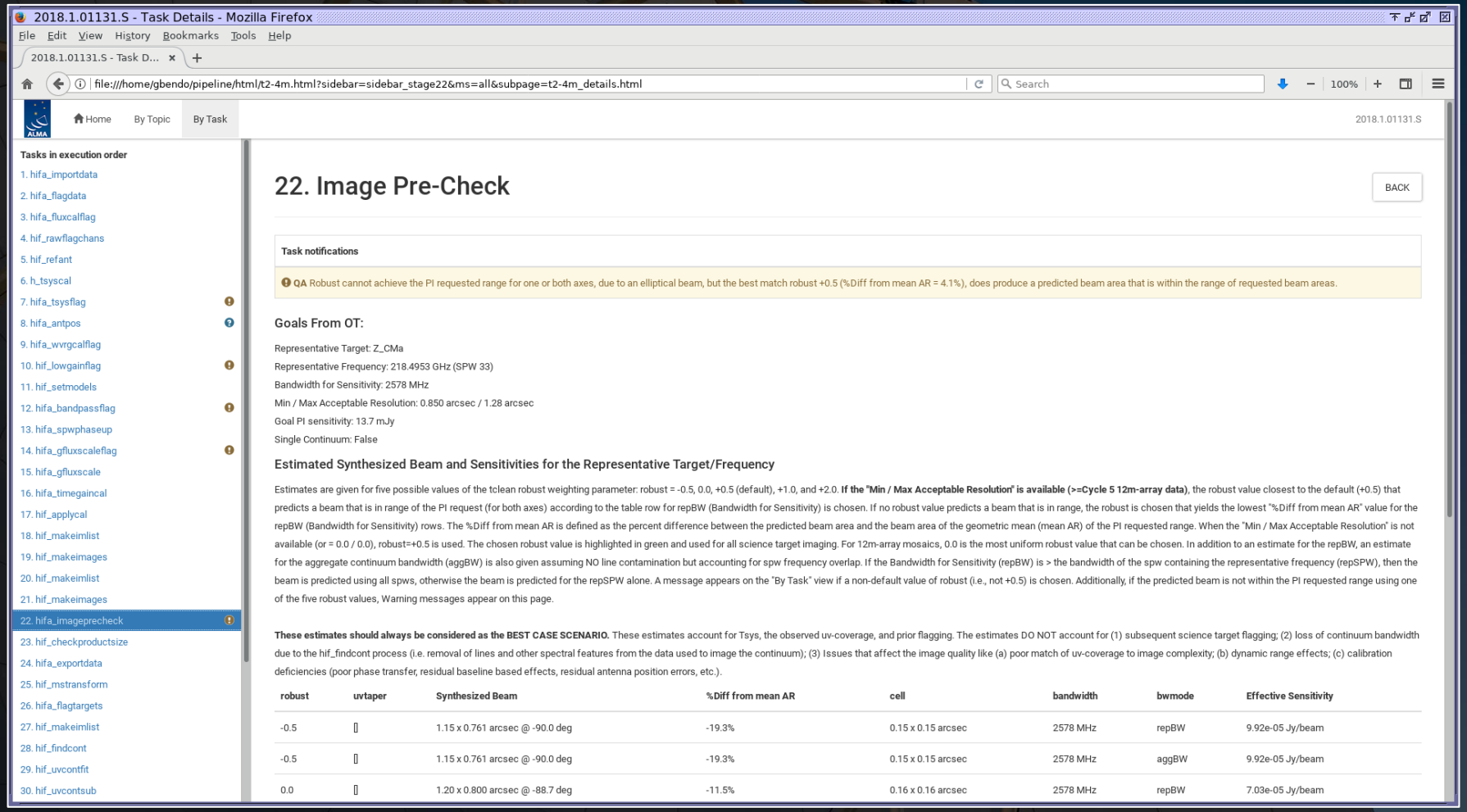
This module also produces plots of the amplitude/model flux ratios versus antenna and uv distance. These should be close to 1. Any antenna exhibiting excess scatter in these plots should be flagged.



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 manually. Also, beam sizes are calculated here.



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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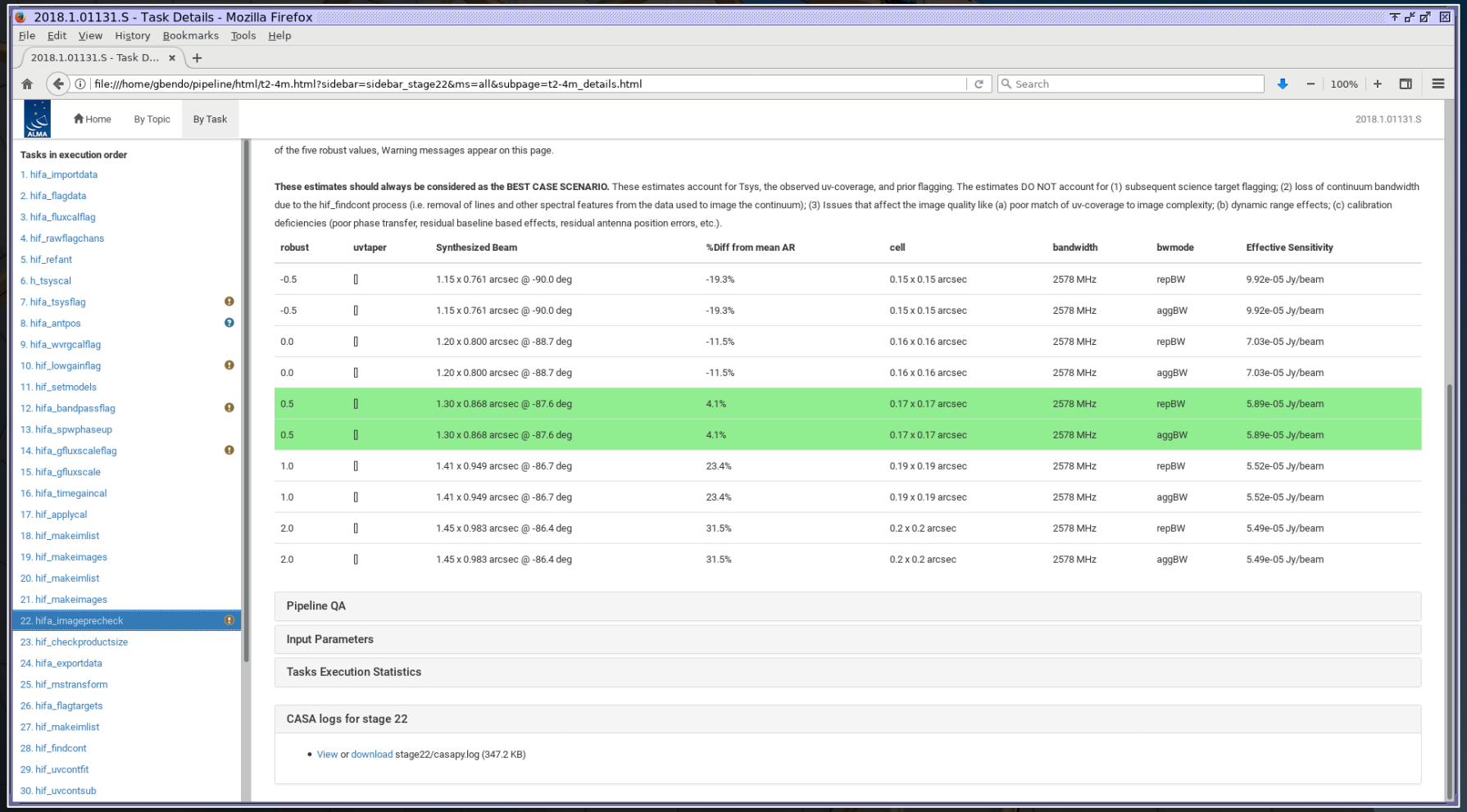
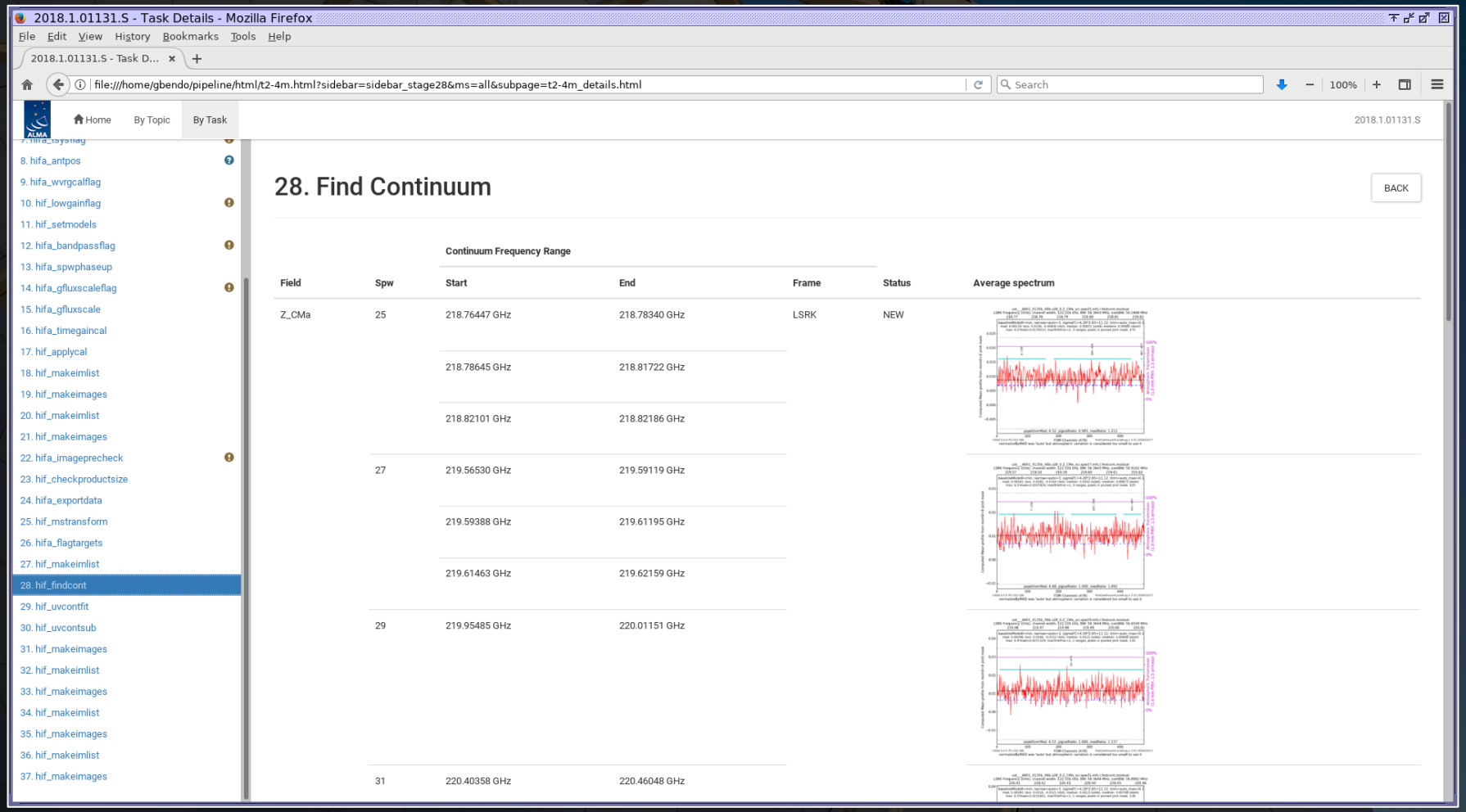
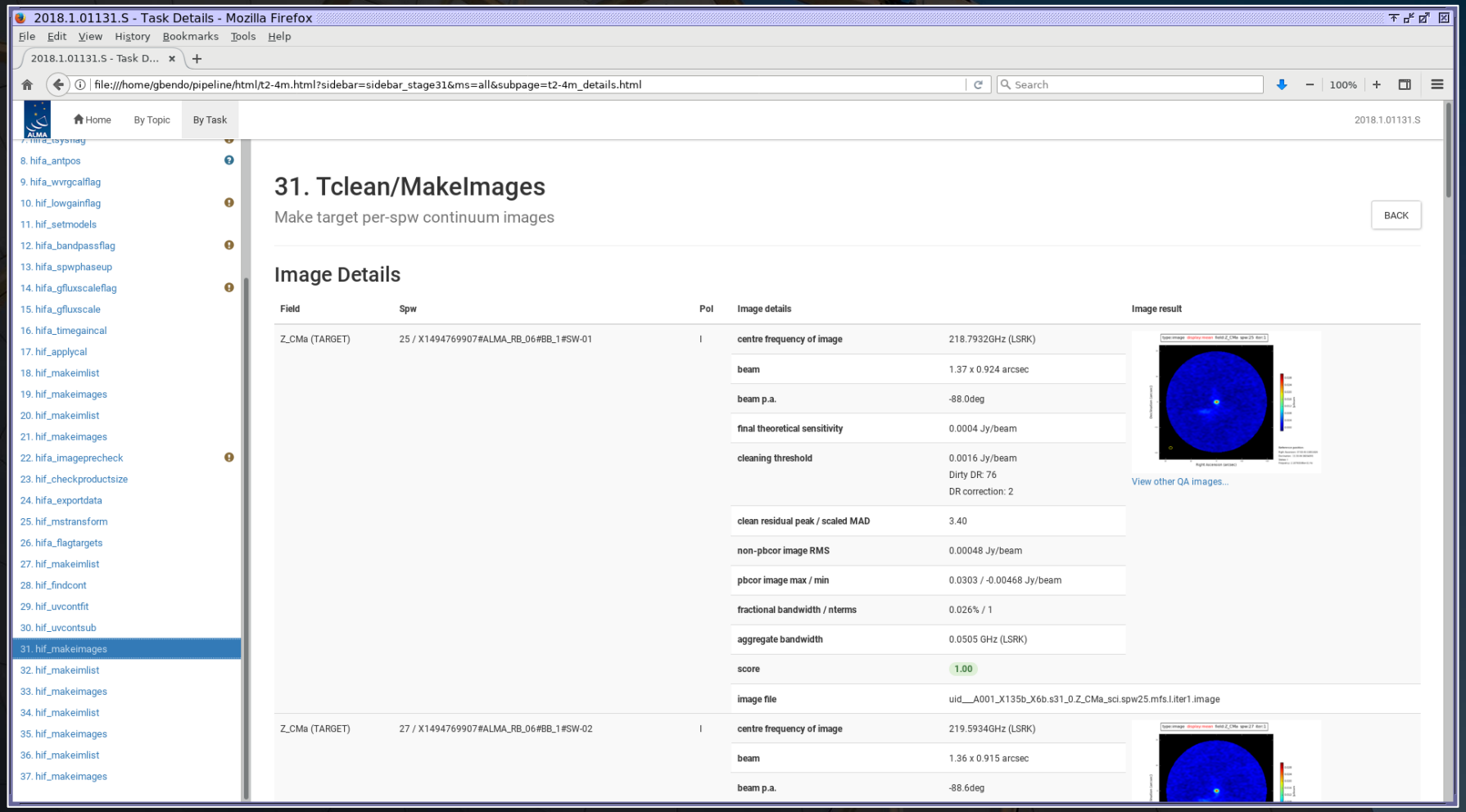


hif_findcont: This is where the pipeline identifies continuum channels. This is useful as a first look at the spectra, although re-imaging the data will be much more effective for identifying spectral lines.



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



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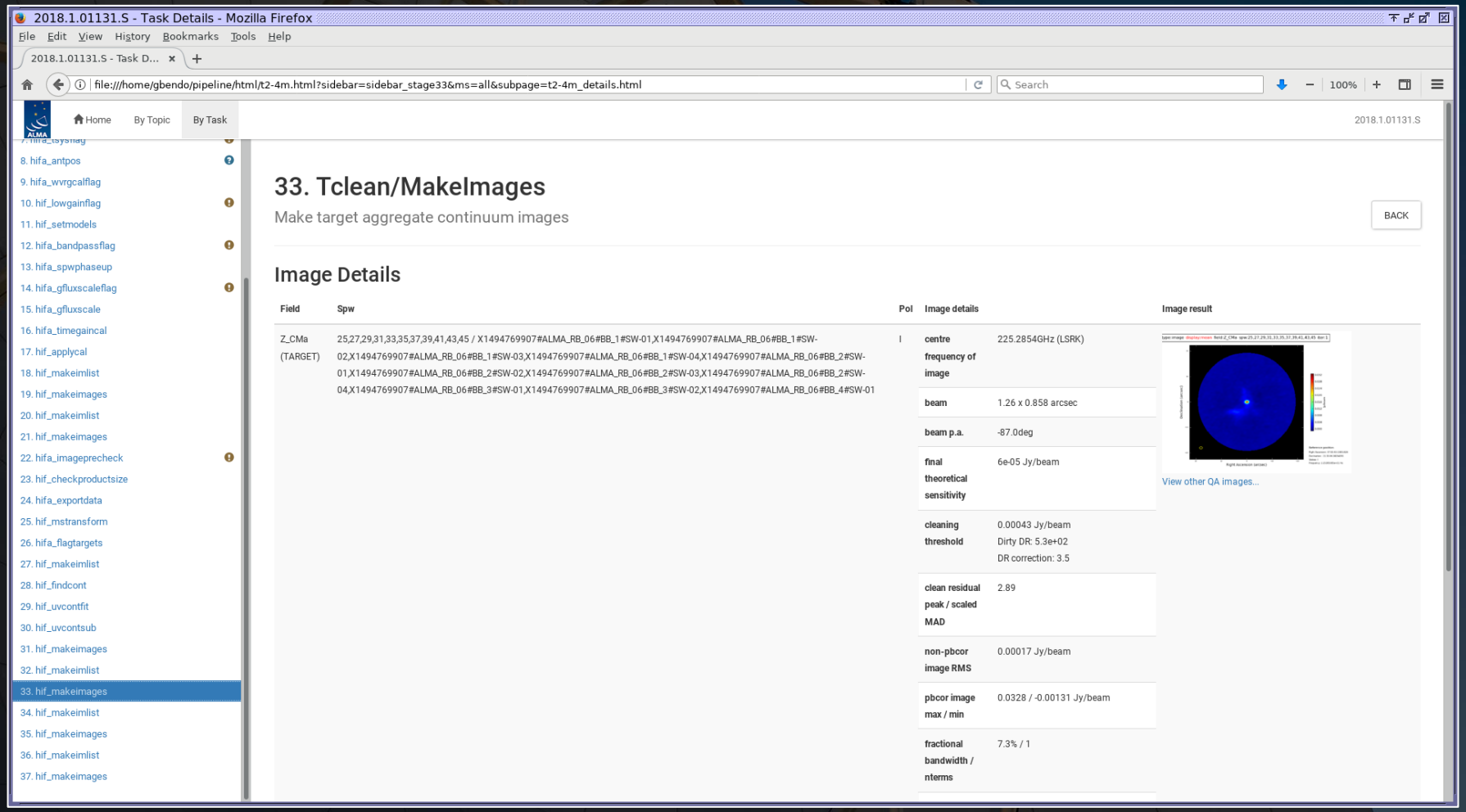

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