Reviewing the WebLog and Other QA Documents

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

member.uid____A001_X158f_X7a1.hifa_calimage_renorm.weblog.tgz member.uid____A001_X158f_X7a1.qa2_report.pdf uid___A002_Xf396d6_X45bb.qa0_report.pdf

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

Data from older cycles will have been manually-calibrated. The quality assurance data from these cycles will be in a series of PNG files and a PDF. QA stands for quality assurance. ALMA has four phases of quality assurance:

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

QA1 Long-term monitoring of the performance of the observatory (not specific to any project)

QA2 A complete quality assessment performed on the data after completely calibrating and imaging the data

QA3 Re-assessment of data after they are delivered to users triggered when someone discovers a previously-unidentified problem

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

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

Versions from recent cycles contain several new sets of diagnostic plots as well as preview images. QA0 Report

AU Report

ition Block Summary

Project Code ExecBlock	2021.1.00499.5 uid://A002/Xf396d6/X45bb	SchedBlock ExecBlock Status	PJ113921_a_03_TM2 SUCCESS
QA0 Status	Pass	Exec. Fraction	1.50
Repr. frequency	89.631 GHz (Sky)	Band	ALMA RB 03
Array	12 [m]	Baselines	15m 2617m
Antennas	Antennas: 46 effective, 46 usable, 46 u acceptable: 41 Band observed: 3. Highest recomment	inflagged, 46 total. Ex ded: 4-4	spected for Cycle 9 : 43, minimum
Weather	PWV 4.15 mm; Wind 3.50 m/s; Humidi Phase rms: 193.366 microns	ty 21.51 %; Pressure	493.55 hPa;
QA0 comment	No issues found in the data, except high Tr	x/Tsys on DA52.	
AOS Check comment	2021-12-04T12-2147 uid://A002/X199666 Mean Zenith PWY-415-1/-0.08 mm Reg 46/46 antennas are working in band 3 on PHASEC4. Antennabased mist inhite BANDPASS: WVR-corrected baseline-base baseline: Mean improvement in phaser ms using W Baseline limit with good phase (80%): 131 Bandpass calibrator; 1058-0133 Flux: 4. Phase calibrator; 1058-0133 Flux: 4. Phase calibrator; 1058-0133 Flux: 4. Phase calibrator; 1018-0138 Flux: 0. SNR in calibrated phaseCal flux: Between 9 completed cycles of science/phaseCal. Percentage of all cal data to be flagged: 5 Band observed: 3 HIGHEST RECOMME QA0 PASS	XA5bb Band 3 Freq 89 presentative Tsys: 65.4 k the BLC phaseCal: 20.8 degrees d phase rms on bandpa: VGS: 2.94 Gm. L80 resolution: 0.95 H -0.004 Jy Sky separi antennas: 14.80. Betw D bandpass scan 0.00% Binary size: NDED OBSERVING BAND	.6314199553 GHz standard observation (193.4 microns) ss: 11.8 degrees (109.4 microns) on 1000m 23 arcsec le channels with SNR>30: 3659 ation: 2.80 degrees Resolution slope : 0.00 een scans: 269.8 4.77G8 : 4 - 4
QA0 warnings	Percentage of calibration data flagged	: 0.500 %	0

Achieved angular resolution is outside the expected range. Observed: 0.38, requested: 0.57 - 0.85

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



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.



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

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





Baseline distributio

Page 9 of

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

A41	DA41 FE:03 OA0 MAR high tau contin. Continuum brintheory 22 E K tau 0.420 DMM discrete and before 6.0	
	after 3.1 %	
A42	DA42 FE:62	
	QA0_WVR_high_tau_contin Continuum brightness: 35.9 K tau 0.140 PWV discrepancy: before 6.6	
	after 3.0 %	
0A43	DA43 FE:67	
	QAU_Shadowed_scan : 4 : by antenna DAS/(not in array) Separations: uv 10.3m w 11.6 m	
	QAU_Shadowed_scan : 5 : by antenna DAS/(not in array) Separations: uv 11.1m w 10.8 m	
	QAU Shadowed_scan : 6 : by antenna DAS/(not in array) Separations: uv 10.6m w 11.4 m	
	QAO Shadowed_scan : 7 : by antenna DAS7(not in array) Separations: uv 10.0m w 11.4 m	
	QAQ_shadowed_scan : 6 : by antenna DAS7(not in array) Separations: uv 10.0m w 110 m	
	QAO_shadowed_scan : 9 : by anterna DAS7(not in array) Separations. uv 10.4m w 11.5 m	
	QAO_Shadowed_scan : 10 : by antenna DAS7(not in array) Separations: 00 10.0m w 11.1m	
	OAO Shadowed_scan : 12 : by anterina DAS(not in array) Separations: uv 10 3m w 11.0 m	
	OAO Shadowed_scan : 13 : by antenna DAS7(not in array) Separations: uv 10.7m w 11.7 m	
	OAO Shadowed_scan : 14 : by antenna DAS7(not in array) Separations: uy 10 1m w 11.8 m	
	OAO Shadowed scan : 15 : by antenna DAS((not in array) Separations: uv 10.5m w 11.4 m	
	QA0 Shadowed scan : 16 : by antenna DA57(not in array) Separations: uv 10.0m w 11.9 m	
	QA0 Shadowed scan : 17 : by antenna DA57(not in array) Separations: uv 10.0m w 11.9 m	
	QA0 Shadowed scan : 18 ; by antenna DA57(not in array) Separations; uy 10.4m w 11.6 m	
	QA0 Shadowed scan : 19 : by antenna DA57(not in array) Separations: uv 9.8m w 12.0 m	
	QA0 Shadowed scan : 20 : by antenna DA57(not in array) Separations: uv 10.3m w 11.7 m	
	QA0_Shadowed_scan : 21 : by antenna DA57(not in array) Separations: uv 9.7m w 12.1 m	
	QA0_Shadowed_scan : 22 : by antenna DA57(not in array) Separations: uv 9.7m w 12.1 m	
	QA0_Shadowed_scan : 23 : by antenna DA57(not in array) Separations: uv 10.1m w 11.8 m	
	QA0_Shadowed_scan : 24 : by antenna DA57(not in array) Separations: uv 9.6m w 12.2 m	
	QA0_Shadowed_scan : 25 : by antenna DA57(not in array) Separations: uv 10.0m w 11.9 m	
	QA0_Shadowed_scan : 26 : by antenna DA57(not in array) Separations: uv 9.4m w 12.3 m	
	QA0_Shadowed_scan : 27 : by antenna DA57(not in array) Separations: uv 9.4m w 12.4 m	
	QA0_Shadowed_scan : 28 : by antenna DA57(not in array) Separations: uv 9.9m w 11.9 m	
	QA0_WVR_high_tau_contin Continuum brightness: 40.7 K tau 0.160 PWV discrepancy: before 7.3	
	after 3.1 %	

DA46

DA46 FE:18 . . . QA0_WVR_high_tau_contin Continuum brightness: 38.3 K tau 0.150 PWV discrepancy:

Histogram of antenna median amplitude and RM

uid://A002/Xf396d6/X45bb 2021-12-04T12:21:47 B3 : Amplitude

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



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





Bandnace Phace

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

While these images and data are useful for providing a preliminary view of the results, they may be inaccurate compared to what is in the WebLogs. QA0+ results are only to be used as a guide to assess the data quality, and are not for scientific use. QA0+ image and fluxes are obtained from an online reduction of the combined wideband continuum spectral windows (using mfs TCLEAN in CASA), with no bandpass or Tsys calibration, nor removal of potential line contamination. Fluxes are only approximate. 'QA0+ Eb' is the result from only the current EB. 'QA0+ concat' is the result from concatenating all EBs

Science target	PJ1139	21.7			
Peak	0.055	Integrated	0.05	RMS	0.003
Xoff	0.569	Yoff	0.218	(arcsec from	phase centre)
Beam X	0.603"	Beam Y	0.382"	Beam PA	-17.66°
Selfcal	true				
Peak	0.107 mJy	Integrated	0.192 mJy	RMS	0.004 mJy
Xoff	0.007	Yoff	0.004	(arcsec from	n phase centre)
Phase Cal	J1148+	1840 Separation	2.80°		
Peak	28.255 mJy	Integrated	29.343 mJy	RMS	0.217 mJy
Beam X R=0.5	0.563		Bean	n Y R=0.5	0.376"
Beam PA R=0.5	-17.28	0	RMS	R=0.5	0.217 mJy
Beam X R=2.0	0.805		Bean	n Y R=2.0	0.56"
Beam PA R=2.0	-27.01	0	RMS	R=2.0	0.316 mJy
Beam X R=-0.5	0.428		Bean	n Y R=-0.5	0.287"
Beam PA R=-0.5	-13.38	0	RMS	R=-0.5	0.166 mJy
WVR		Try remcloud	false	PhaseCal RMS	19 209
		, interstud	Idise		10.200
Bandpass			Banc	ipass RMS Top	10.238
Bandpass RMS	[5.53,	7.57, 10.8, 10.73]°	Band	ipass [20.0, 4 scales	0.0, 80.0, 120.0] seconds

age 16 of

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

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Target images

Phase Cal (left)





age 17 of

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

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

			QA0+ concat		
N EBs	1	ExecBlock UIDs	[]		
Beam X R=0.5	0.829		Beam	Y R=0.5	0.76"
Beam PA R=0.5	16.24	0	RMS	R=0.5	0.003 mJy
Beam X R=2.0	1.254		Beam	Beam Y R=2.0	
Beam PA R=2.0	-26.32	2°	RMS	RMS R=2.0	
Beam X R=-0.5	0.593		Beam	Y R=-0.5	0.407"
Beam PA R=-0.5	4.93°		RMS I	₹=-0.5	0.005 mJy
Science target	PJ113921.7	RA	11:39:21.745	Dec	+020:24:50.9136
Xoff	-0.044	Yoff	-0.014	Offset (fraction beam)	of 0.058
Peak	0.117 mJy	Integrated	0.253 mJy	RMS	0.003 mlv

Concatenated target image





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

	2021-12-04112:06 2021-12-04113:38	
	Temperatures	
1.0		
0.9		
0.8		
0.7		
0.6		
0.5		
0.4		
0.3		
0.2		
0.1		
0:00:00.000	UT Time (hh:mm:ss)	
	Humidity	
1.0		
0.9		
0.8		
0.7		
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1.0 0.9 0.8 0.7	ut Time (th:mm:ss) Pressure	
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1.0	UT Time (hh:mm:ss) Pressure UT Time (hh:mm:ss) Wind Speed	
10 03 04 05 04 02 03 04 03 04 04 05 04 05 05 05 05 05 05 05 05 05 05	UT Time (hh:mm:ss) Pressure UT Time (hh:mm:ss) UT Time (hh:mm:ss) Wind Speed	

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



Produced on Wednesday, 15 Dec 2021, 19:16:00 +0000

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 Code Pl Organization	Probing Gas, Dust, Stars, and Star Formation Activity down to 100-pc Scales using Strong Gravitational Lensing 2021.1.00499.5 Patrick Kamieneski Department of Astronomy, Massachusetts at Amherst, University of
Co-ls	O. Cooper, B. Frye, K. Harrington, J. Lowenthal, A. Vishwas, Q. Wang, M. Yun
	ObsUnitSet information
Name QA2 Status	Member OUS (PJ113921.7) Pass
Member OUS Status ID SchedBlock name SchedBlock UID Array Mode Band Repr.Freq. (sky) Spectral setup Sources Other SBs in this Group OILS (Member OILS	uid://A001/X158f/X7a1 P]113921_a_03_TM2 uid://A001/X158f/X782 TM2 Standard ALMA_R8_03 89.63 [GHz] Mixed P]113921.7 P[113921.7
Status ID in brackets): Execution count	1.50 of 1 expected
	Final OA2 comment
Comments from Reducer	
CASA version: 6.2.1.7, Pipe	line version 2021.2.0.128
Reduction mode: PL calibrat	ion and imaging
Calibration issues: None	
Imaging issues: None	
General info:	
This dataset has been check	ked for the so-called "renormalization issue". A detailed description about this issue,

and how the renormalization process is carried out, can be found at the following link: https://help.almascience.org/kb/articles/what-are-the-amplitude-calibration-issues-caused-by-alma-s-normalization-strategy

The requirement of rescaling due to any astronomical lines detected in this dataset has been evaluated and the largest peak rescaling value has been estimated to be 1.002,

as displayed in the table in the hifa_renorm task of the delivered weblog. The effect of rescaling is a channel-dependent increase of the line flux, which is largest in the brightest channels.

This is not an increase in flux-scale uncertainty, but a flux offset correction. When comparing such an offset to the nominal absolute flux accuracy.

which is 5% in Bands 3, 4 & 5 and increasing to 20% in Bands 9 & 10, it is concluded that offsets up to 2% are considered nealiaible

Since the rescaling factor is below this threshold, this dataset has not been corrected for the above issue.

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

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

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

Aggregate Continuum -Image name: uid ___A001_X158f_X7a1.s36_0._PJ113921.7__sci.spw17_21_23_25.cont.l.iter1.image.tt0



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

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

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

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

The imaging pipeline produces the following:

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

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

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

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

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

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

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

😆 2021.1.00499.S - Home × +									~	/ -	- 0	×
$\leftrightarrow \rightarrow \mathbb{C}$ \bigtriangleup file;///D/pipeline/html/t1-1.html											⊡ එ	≡
Home By Topic By Task									2	021.1.0049	19.S	
Observation Overview					Pipeline Summary	/						
Project	uid://A001/X15	25/X705			Pipeline Version	2021.2.0.128 (documentation)						
Principal Investigator	pkamieneski				CASA Version	6.2.1.7 (environment)						
OUS Status Entity id	uid://A001/X15	8f/X7a1			IERSeop2000 Version	0001.0153 (last date: 2021-10-10 00:00:00)						
Observation Start	2021-12-04 12	:23:08 UTC			IERSpredict Version	0623.0662 (last date: 2022-03-04 00:00:00)						
Observation End	2021-12-04 13	:23:12 UTC			Pipeline Start	2021-12-06 15:32:10 UTC						
					Execution Duration	5:54:43						
Observation Summary												
			Time (UTC)					Baseline	Length			
Measurement Set	Receivers	Num Antennas	Start	End			On Target	Min	Max	RMS	Size	
Observing Unit Set Status: uid://A001/X158f/X7a1 Schee	duling Block ID: uid:///	001/X158f/X782 Scheduli	ng Block Name: PJ113921_a_	_03_TM2								
Session: session_1												
uidA002_X7396d6_X45bb.ms ALMA Band 3 46 2021-12-04 12:23:08 2021-12-04 13:23:12 MS dates not fully covered by IERSeop200 MS dates not fully covered by IERSeop200 MS dates not fully covered by IERSeop200						IERSpredict.	0:41:25	15.3 m	2.6 km	749.4 m	13.2 GB	}
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MS dates not fully covered by IERSeop2000. CASA will use IERSpredict.

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

⊌ 2021.1.00499.S - Session Data Details × +				~ - 🗗 ×
$\leftarrow \rightarrow C$ \textcircled{a} \textcircled{b} files,	///D:/pipeline/html/t2-1.html?sidebar=sidebar_	uidA002_Xf396d6_X45bb_ms&subpage=t2-1_details.html		☆ 🗈 ź =
Home By Topic By Task				2021.1.00499.S
Session: session_1				
uidA002_Xf396d6_X45bb.ms uidA002_Xf396d6_X45bb_target.ms	Overview of 'uid_	A002_Xf396d6_X45bb.ms'		
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	End Time	2021-12-04 13:23:12		
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			Track scan intent vs time	Field vs Time
	LISTOBS OUTPUT			Track observed field vs time
	Spatial Setup		Spectral Setup	
	Science Targets 'PJ11	3921.7'	All Bands	'ALMA Band 3' and 'WVR'
	Calibrators 'J105	3+0133', 'J1148+1840' and 'J1150+2417'	Science Bands	'ALMA Band 3'
	Antenna Setup		Sky Setup	
	Min Baseline	15.3 m	Min Elevation	36.99 degrees
	Max Baseline	2.6 km	Max Elevation	54.03 degrees
	Number of Baselines	1035		
	Number of Antennas	46		
	Antenna Diameters	46 of 12 m		

Weather

uid__A002_Xf396d6_X45bb.ms Meteo129 Meteo130

PWV

uid__A002_Xf396d6_X45bb.ms

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	★ ┖ 집	X
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Home By Topic By Task		2018.1.01131.S	
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	Networksentist Name: //new/darref/opt/dard.02100007/mit/dataproc/2018.1.5.2019_04_02T15_32_25.386/5005_uidA001_X135b_X68/0005_UidA001_X135b_X68/0005_UidA001_X1804T_W00005_UidA001_X135b_X68/0005_UidA001_X135b_X68/0005_UidA001_X1804T_W00005_UIdA001_X1804T_W00005_UID_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X100005_UID_X1000005_UID_X1000005_UID_X100005_UID_X100005_UID_X1000005_UID_X100005	X8b/working/uid 22, 1.01] [CALIBRA 576, 0.576, 0.57 016, 0.016, 6.05, 122, 1.01] [CALIBRA 576, 0.576, 0.57 016, 0.016, 6.05, 576, 0.576, 0.57 016, 0.016, 6.05, 016, 0.016, 6.05,	

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

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Sessi	on: session_1												
uid	_A002_Xf396d6_X45bb.ms												
uiu	_4002_x139000_x4300_target.ms		Measurement	set: uidA002	2_Xf396d6_X4	l5bb.ms - Start t	ime:2021-12	-04T12:23:08	B End time:	:2021-12-04	4T13:23:12		
		POLANGLE -										 1=1=1=1=1	
		POLARIZATION -	1 3	4 5	8 10	13	15	18	20	23	25 28		
		WVR -			1						11		
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			12/1231	12h381		12h531		13408	<b>X</b> *		13h23h		

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).

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Session: session_1 uidA002_X39686_X45bb mo uidA002_X39666_X45bb_target ms			
	Sex Time       Image:	d vs Time x observed field vs time	
	Spatial Setup		
	Science Targets YALMA Band 3' and W		
	Calibrators Calibr		
	Min Baseline $23^{n}$ $28^{n}$ $53^{n}$ $08^{n}$ $23^{n}$ 36.99		
	Max Baseline 12 ^{NL} 12 ^{NL} 12 ^{NL} 13 ^{NL} 13 ^{NL} 54 03		
	Number of Baselines		

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).

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	Antenn	as Baselines								
	Anter	nna Positions					UV coverage			
	Antenna Positions				Antenna Position Polar-logarithmic plot of antenna positions.	off, ASDA me and and and and and and and and	UV Coverage UV coverage plot for TA	DVerage Brage plot for TARGET field "PJ113921.7" (#3), spw 25.		
						Offset from Array Centre				
	ID	Name	Pad	Di	ameter	Longitude		Latitude		
	0	DA41	A073	12	.0	-147.1 m		-705.3 m		
	1	DA42	A047	12	.0	38.5 m		-775.2 m		
	2	DA43	A035	12	.0	32.0 m		-706.8 m		
	3	DA45	A104	12	.0	-530.9 m		-492.5 m		
	4	DA46	A016	12	.0	37.5 m		-614.6 m		
	5	DA48	A076	12	.0	-78.0 m		-882.7 m		
	6	DA49	A096	12	.0	-347.1 m		-322.8 m		

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 or PWV values could affect the S/N of the data. Sudden changes in the weather conditions could cause sudden changes in the phases and amplitudes.

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

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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.

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7	hifa_tsysfla	ag	Warning	uidA002_X396d6_X45bb.ms - for intent AMPLITUDE (field 0: J1058+0133) and spw 23, the following antennas are fully flagged: DA52									
7	hifa_tsysfla	ag	Warning	uidA002XX396d6_X45bb.ms - for intent BANDPASS (field 0: J1058+0133) and spw 23, the following antennas are fully flagged: DA52									
7	hifa_tsysfla	hifa_tsysflag uidA002_Xf396d6_X45bb.ms - the following antennas are moved to the end of the refant list because they are fully flagged for one or more Tsys spws, in one or more fields with intent "BANDPASS", "PHASE", and/or "AMPLITUDE": DA52											
10	hif_lowgain	flag	Warning	uidA002XX396d6_X45bb.ms - the following antennas are moved to the end of the refant list because they are fully flagged for one or more spws: DA52									
12	hifa_bandp	assflag	Warning	uidA002XX396d6_X45bb.ms - for intent BANDPASS (field J1058+0133) and spw 17, the following antennas are fully flagged: PM01									
12	hifa_bandp	assflag	Warning	uidA002XY396d6_X45bb.ms - for intent BANDPASS (field J1058+0133) and spw 21, the following antennas are fully flagged: DV08									
12	hifa_bandp	assflag	Warning	uidA002Xf396d6_X45bb.ms - for intent BANDPASS (field J1058+0133) and spw 25, the following antennas are fully flagged: PM01									
12	hifa_bandp	assflag	Warning	uidA002XX396d6_X45bb.ms - the following antennas are moved to the end of the refant list because they are fully flagged for one or more spws, in one or more fields with intents among BANDPASS: PM01 and DV08									
Tas	Tasks by Topic												
Тор	c	Low	est Scorin	ig Task Min Score									
Data	Sets	24. 1	ifa_image	eprecheck: ImagePreCheck Beam within range using non-default robust		0.85							

Calibration	13. hifa_bandpass: Phase-up bandpass calibration	0.95
Flagging	7. hifa_tsysflag: Flag Tsys calibration	0.96
Imaging	34. hif_makeimages: Make target per-spw continuum images	1.00
Miscellaneous	5. hif refant. Select reference antennas	1.00

### **Flagging Summaries**

uid____A002_Xf396d6_X45bb.ms

Antennas that were flagged 100% are not usable. Antennas flagged >20% may need to be examined more carefully.

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5pv	36.907	38.907	36.907	36.907	36.907	36.907	38.907	36.907	36.907	38.342	36.907	38.907	36.907	36.907	36.907	38.907	36.907	36.907	36.907	38.907	36.907	36.907	36.907	36.907	36.907	36.907	38.907	36.907	36.907	38.907	36.907	36.907	36.907		
21	36.907	38.907	36.907	36.907	36.907	38.907	36.907	36.907	38.907	38.342	36.907	38.907	36.907	36.907	38.907	38.907	36.907	36.907	38.907	38.907	36.907	36.907	38.907	38.907	36.907	36.907	38.907	100.000	38.907	38.907	36.907	36.907	38.907		
23	36.935	38.935	45.547	41.241	36.935	39.806	36.935	36.935	36.935	100.000	36.935	38.935	36.935	38.371	36.935	38.935	39.806	36.935	36.935	36.935	36.935	36.935	36.935	38.935	36.935	36.935	36.935	41.241	36.935	36.935	36.935	36.935	36.935		
25	4.391	4.391	4.391	4.391	4.391	4.391	6.565	8.739	4.391	0.505	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	8.739	4.391		
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spv	DA41	DA42	DA43	DA45	DA46	DA48	DA49	DA50	DA51	DA52	DA54	DA55	DA56	DA58	DA59	DA60	DA61	DA62	DA63	DA65	DV01	DV02	DV03	DV04	DV05	DV06	DV07	DV08	DV09	DV10	DV11	DV12	DV13		
17	10.326	10.328	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326		
21	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	100.000	10.326	10.326	10.326	10.326	10.326		
23	10.326	10.326	10.326	10.326	10.326	10.328	10.326	10.326	10.326	100.000	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326		
25	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348		
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spv	DA41	DA42	DA43	DA45	DA46	DA48	DA49	DA50	DA51	DA52	DA54	DA55	DA56	DA58	DA59	DA60	DA61	DA62	DA63	DA65	DV01	DV02	DV03	DV04	DV05	DV06	DV07	DV08	DV09	DV10	DV11	DV12	DV13		
17	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629		
21	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	100.000	28.637	28.637	28.637	28.637	28.637		
23	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	100.000	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637	28.637		
25	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374	4.374		

Having said that, some of the data in some specific fields are not used by the pipeline and are flagged, so a large fraction (>20%) of data for one field could be flagged. Also, ACA data tend to be affected by shadowing, which could lead to high flagging percentages.

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sp	W DA41	DA42	DA43	DA45	DA46	DA48	DA49	DA50	DA51	DA52	DA54	DA55	DA56	DA58	DA59	DA60	DA61	DA62	DA63	DA65	DV01	DV02	DV03	DV04	DV05	DV06	DV07	DV08	DV09	DV10	DV11	DV12	DV13		
17	36.907	38.907	38.907	36.907	38.907	38.907	38.907	36.907	38.907	38.342	38.907	38.907	38.907	36.907	38.907	38.907	38.907	36.907	38.907	38.907	36.907	36.907	38.907	38.907	36.907	36.907	38.907	38.907	38.907	38.907	36.907	36.907	38.907		
21	36.907	38.907	38.907	36.907	38.907	38.907	38.907	36.907	36.907	38.342	38.907	38.907	36.907	36.907	38.907	38.907	36.907	36.907	36.907	38.907	36.907	36.907	38.907	38.907	36.907	36.907	36.907	100.000	36.907	36.907	36.907	36.907	38.907		
23	36.935	36.935	45.547	41.241	36.935	39.806	36.935	36.935	36.935	100.000	36.935	38.935	36.935	38.371	36.935	38.935	39.806	36.935	36.935	38.935	36.935	36.935	36.935	36.935	36.935	36.935	36.935	41.241	36.935	38.935	36.935	36.935	38.935		
25	4.391	4.391	4.391	4.391	4.391	4.391	6.565	8.739	4.391	6.565	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	4.391	8.739	4.391		
Flag	ging perce	entages fo	or Sourc	e name: J	1148+18	40, Inten	ts: PHAS	SE,WVR																											
sp	W DA41	DA42	DA43	DA45	DA46	DA48	DA49	DA50	DA51	DA52	DA54	DA55	DA56	DA58	DA59	DA60	DA61	DA62	DA63	DA65	DV01	DV02	DV03	DV04	DV05	DV06	DV07	DV08	DV09	DV10	DV11	DV12	DV13		
17	10.326	10.326	10.326	10.326	10.326	10.328	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326		
21	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	100.000	10.326	10.326	10.326	10.326	10.326		
23	10.326	10.328	10.326	10.326	10.326	10.328	10.326	10.326	10.326	100.000	10.326	10.326	10.326	10.326	10.326	10.328	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.328	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326	10.326		
25	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348	4.348		
Flag	ging perce	entages fr	or Sourc	e name: F	PJ113921	I.7, Inten	ts: ATMC	SPHER	e,targe	T																									
sp	W DA41	DA42	DA43	DA45	DA46	DA48	DA49	DA50	DA51	DA52	DA54	DA55	DA56	DA58	DA59	DA60	DA61	DA62	DA63	DA65	DV01	DV02	DV03	DV04	DV05	DV06	DV07	DV08	DV09	DV10	DV11	DV12	DV13		
17	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629	28.629		

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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.

2021.1.00499.S - Task Summaries         ×         +		$\checkmark$	- 0 ×
← → C @ file:///D:/pipeline/html/t1-4.html		t2	⊡ £ ≡
A Home By Topic By Task			2021.1.00499.S
Task Summaries			
Task	QA Score	1	Duration
1. hifa_importdata: Register measurement sets with the pipeline	1	.00	0:13:08
2. hifa_flagdata: ALMA deterministic flagging	1	.00	0:42:48
3. hifa_fluxcalflag: Flag spectral features in solar system flux calibrators	1.	00	0:00:03
4. hif_rawflagchans: Flag channels in raw data	1.	.00	0:04:18
5. hif_refant: Select reference antennas	1.	00	0:00:12
6. h_tsyscal: Calculate Tsys calibration	1.	00	0:07:38
• 7. hifa_tsysflag: Flag Tsys calibration	0.	96	0:09:05
8. hifa_antpos: Correct for antenna position offsets	1.	00	0:00:03
9. hifa_wvrgcalfiag: Calculate and flag WVR calibration	1.	.00	0:17:32
<b>9</b> 10. hif_lowgainflag: Flag antennas with low gain	1.	00	0:05:35
11. hif_setmodels: Set calibrator model visibilities	1.	00	0:05:50
<b>9</b> 12. hifa_bandpassflag: Phase-up bandpass calibration and flagging	0.	96	0:20:04
13. hifa_bandpass: Phase-up bandpass calibration	0.	95	0:15:21
14. hifa_spwphaseup: Spw phase offsets calibration	1.	00	0:00:28
15. hifa_gfluxscaleflag: Phased-up flux scale calibration + flagging	1.	00	0:08:55
16. hifa_gfluxscale: Transfer fluxscale from amplitude calibrator	1.	00	0:10:11
17. hifa_timegaincal: Gain calibration	1.	00	0:22:26
18. hifa_targetflag: Target outlier flagging	1.	00	0:11:21
19. hif_applycal: Apply calibrations from context	1.	00	0:35:17

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

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ALMA	ısk												2021.1.0049	9.S
Tasks in execution order														
1. hifa_importdata		1 ALMA Import Data											DACK	
2. hifa_flagdata		T. ALMA IMPOR Data											BACK	
3. hifa_fluxcalflag														
4. hif_rawflagchans		Data from 1 measurement set was registered with the	pipeline. The imported data i	is summarised below.										
5. hif_refant							Number Ima							
6. h_tsyscal							Number Impo	onea						
7. hifa_tsysflag	0	Measurement Set	SchedBlock ID		Src Type	Dst Type	Scans	Fields	Science Target		Size	flux.csv		
8. hifa_antpos		uidA002_Xf396d6_X45bb.ms	uid://A001/X158f/X7	782	MS	MS	28	4	1		13.2 GB	View or download		
9. hifa_wvrgcalflag		Summary of Imported Measurement Sets												
10. hif_lowgainflag	0													
11. htt_setmodels	•	Imported Flux Densities												
12. hita_bandpassilag		The following flux densities were imported into the pipe	line context:											
14 hifa shwnhaseun		The following non densities were imported into the pipe	sine context.											
15 bifa offuxscaleflag							Flux Density					Age Of Nearest		
16. hifa ofluxscale		Measurement Set	Field	Intents		SpW	1	Q	U	v	Spix	Monitor Point (day	s)	
17. hifa timegaincal		uid A002 Xf396d6 X45bb.ms	J1058+0133 (#0)	AMPLITUDE, BANI	OPASS	17	4.272 Jv	0.000 Jv	0.000 Jv	0.000 Jv	-0.503	5.0		
18. hifa targetflag						01	4 002 h	· · ·	í í	· · ·				
19. hif_applycal						21	4.002 Jy							
20. hif_makeimlist (cals)						23	3.971 Jy							
21. hif_makeimages (cals)						25	4.230 Jy							
22. hif_makeimlist (checksrc)			J1150+2417 (#1)			17	1.119 Jy				-0.389	16.0		
23. hif_makeimages (checksrc)						21	1.064 Jy							
24. hifa_imageprecheck	0					22	1.059 1.							
25. hif_checkproductsize						23	1.050 Jy							
26. hifa_renorm						25	1.110 Jy							
27. hifa_exportdata			J1148+1840 (#2)	PHASE		17	133.504 mJy				-0.595	44.0		
28. hif_mstransform						21	123.578 mJy							
29. hifa_flagtargets						23	122.448 mJv							
30. hif_makeimlist (mfs)						25	121.020 m h							
31. hif_findcont						25	131.938 mJy							
32. hif uvcontfit		Flux densities imported from the ASDM. Online flux ca	atalog values are used when	available for ALMA.										
-														

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

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Home By Topic By	Task												2021.1.00499.S	
Tasks in execution order														
1. hifa_importdata		1 ALMA Import Data											PACK	
2. hifa_flagdata		1. ALIVIA IMPORT Data	l										DACK	
3. hifa_fluxcalflag														
4. hif_rawflagchans		Data from 1 measurement set was registered with the	e pipeline. The imported data is	s summarised below.										
5. hif_refant							Number Impo	rted						
7. hifa_tsysflag	0	Measurement Set	SchedBlock ID		Src Type	Dst Type	Scans	Fields	Science Target		Size	flux.csv		
8. hifa_antpos		uid A002 Xf396d6 X45bb ms	uid://A001/X158f/X7	82	MS	MS	28	4	1		13.2 GB	View or download	4	
9. hifa_wvrgcalflag		uu	ald may be managed and managed a	52	MO	WIG	20	-			13.2 00	view of download	·	
10. hif_lowgainflag	0	Summary of Imported Measurement Sets												
11. hif_setmodels		Imported Flux Depoition												
12. hifa_bandpassflag	0	Imported Flux Densities												
13. hifa_bandpass		The following flux densities were imported into the pip	eline context:											
14. hifa_spwphaseup							Flux Density					Age Of Nearest		
15. hifa_gfluxscaleflag		Monsurament Set	Field	Intonts		C. M	1	0		V	Colv	Monitor Point (day	ys)	
16. hifa_gfluxscale		weasurement Set	Field	intents		зри	•	ų	0	V	зріх			
17. hifa_timegaincal		uidA002_Xf396d6_X45bb.ms	J1058+0133 (#0)	AMPLITUDE, BAN	DPASS	17	4.272 Jy	0.000 Jy	0.000 Jy	0.000 Jy	-0.503	5.0		
18. hifa_targetflag						21	4.002 Jy							
19. htt_appiycal						23	3.971 Jy							
21 hif makeimages (cals)						25	4.230 Jy							
22. hif makeimlist (checksrc)			J1150+2417 (#1)			17	1.119 Jv				-0.389	16.0		
23. hif_makeimages (checksrc)						01	1.004 h							
24. hifa_imageprecheck	0					21	1.064 Jy							
25. hif_checkproductsize						23	1.058 Jy							
26. hifa_renorm						25	1.110 Jy							
27. hifa_exportdata			J1148+1840 (#2)	PHASE		17	133.504 mJy				-0.595	44.0		
28. hif_mstransform						21	123.578 mJy							
29. hifa_flagtargets						23	122.448 m ly							
30. hif_makeimlist (mfs)						2.5	122.440 Hby							
31. hif_findcont						25	131.938 mJy							
32. hif_uvcontfit		Flux densities imported from the ASDM. Online flux of	atalog values are used when a	available for ALMA.										

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

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A Home By Topic By Ta	isk												2021.1.00499.S	
Tasks in execution order														
1. hifa_importdata		1 ALMA Import Date	_											
2. hifa_flagdata		T. ALIMA IMPORT Data	4										BACK	
3. hifa_fluxcalflag														
4. hif_rawflagchans		Data from 1 measurement set was registered with t	he pipeline. The imported data i	is summarised below.										
5. hif_refant														
6. h_tsyscal							Number Imp	orted						
7. hifa_tsysflag	9	Measurement Set	SchedBlock ID		Src Type	Dst Type	Scans	Fields	Science Target		Size	flux.csv		
8. hifa_antpos		uidA002_Xf396d6_X45bb.ms	uid://A001/X158f/X7	782	MS	MS	28	4	1		13.2 GB	View or download	l .	
9. hifa_wvrgcalflag		Summary of Imported Measurement Sets												
10. hif_lowgainflag	9	Cummary of imported inclusion entities												
11. hif_setmodels		Imported Flux Densities												
12. htta_bandpasstlag	v													
13. http://www.hoseup		The following flux densities were imported into the p	ipeline context.											
14. nita_spwpnaseup							Flux Density					Age Of Nearest		
16 bifa afluxecale		Measurement Set	Field	Intents		SpW	1	Q	U	v	Spix	Monitor Point (day	rs)	
17 hifa timegaincal		uid A002 Xf396d6 X45bb ms	11058+0133 (#0)		NPASS	17	4 272 by	0.000 Jy	0.000 Jy	0.000 by	-0.503	5.0		
18 hifa targetflag			0103010133 (#0)	Paul Enobe, Bran	BINOO		4.272 09	0.000 0y	0.000 09	0.000 09	-0.000	5.0		
19. hif applycal						21	4.002 Jy							
20. hif makeimlist (cals)						23	3.971 Jy							
21. hif_makeimages (cals)						25	4.230 Jy							
22. hif_makeimlist (checksrc)			J1150+2417 (#1)			17	1.119 Jy				-0.389	16.0		
23. hif_makeimages (checksrc)						21	1.064 Jy							
24. hifa_imageprecheck	0					02	4.050 h							
25. hif_checkproductsize						23	1.058 Jy							
26. hifa_renorm						25	1.110 Jy							
27. hifa_exportdata			J1148+1840 (#2)	PHASE		17	133.504 mJy				-0.595	44.0		
28. hif_mstransform						21	123.578 mJy							
29. hifa_flagtargets						23	122.448 mJv							
30. hif_makeimlist (mfs)						05	404.000							
31. hif_findcont						25	131.938 mJy							
32. hif_uvcontfit		Flux densities imported from the ASDM. Online flux	catalog values are used when	available for ALMA.										

**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.

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Home By Topic By Task				2021.1.00499.S
Tasks in execution order 1. hifa_importdata 2. hifa_flagdata 3. hifa_fluxcaiflag	6. T _{sys} Calibration			BACK
4. hif_rawflagchans 5. hif_refant	This task generates a T _{sys} calibration table, mapping each science :	spectral window to the $T_{sys}$ window that overlaps in frequency	ı.	
6. n_tsyscal 7. hifa tsysflag	i _{sys} window mapping			
8. hifa_antpos	Measurement Set		T _{sys} window	Science windows
9. hifa_wvrgcalflag	uidA002_Xf396d6_X45bb.ms		17	17
10. htt_lowgainflag 🔮			21	21
12. hifa_bandpassflag			23	23
13. hifa_bandpass			19	25
14. htta_spwphaseup 15. htta_dfuxscaleflag	Mapping of T window to eciance window			
16. hifa_gfluxscale	wapping of 1 _{5/5} window to science window			
17. hifa_timegaincal	Plots			
18. hifa_targetflag	T			
19. htt_applycal 20. htt_makeimlist (cals)	I sys VS frequency			
21. hif makeimages (cals)	Plots of time-averaged T _{sys} vs frequency, colored by antenna.			
22. hif_makeimlist (checksrc)	uidA002_Xf396d6_X45bb.ms			
23. hif_makeimages (checksrc) 24. hifa_imageprecheck 25. hif checkproductsize	or Env Tell Vite Tell Control (Control)     and Control     and     and Control     a	uff_mmts_mit_adds_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_add_mit_a		
26. hifa_renorm	and a second sec	Direc.	Brand Control of Contr	a stant
27. hifa_exportdata	40°	40%		En and a second se
28. hif_mstransform	82.6 82.5 years 100 600 500 500 500 500 500 500 500 500 5	40 94.3 100.0 304.5 301.0	40 381.0 391.5 392.9 392.5	
29. hifa_flagtargets	vieADDMEMBER_XXD2x-res_DestRess_VD25132.06 _portheredpets v1.302 = 2018451(21.34.45.41)	uniARE2_NOPHON_NEAR-res Chelleri-2023 12-04 _professionen et. 102 = 201401213 1445.41	usiK002_JP39664_N058.nm Obd2ws=202122.04 _postemplane.st.302 = 20160212134.45.41	
30. nit_makeimiist (mfs)	T _{sys} spw 17	T _{sys} spw 21	T _{sys} spw 23	T _{sys} spw 19
32. hif uvcontfit	Science spw 17.	Science spw 21.	Science spw 23.	Science spw 25.
33 hif iscontach				
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.

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3 hife				
4. hif		UII – A002 X139600 X49001/HS/n USV56185 L 1595641.00 UT 12:24:1012:31:5212:244:0812:56:2613:084:5413:21:02		
5. hif		spw17, fields 0,3: J1058+0133,PJ113921.7		
6. h_t		Teve Window m PWV 4.15mm, airmass 1.23 (field 0)		
7_ hifa		96%		
8. hifa		Measurement Set		
9 hifa		uidA002_X5396d6_X45bb		
10. hit				
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35 bi		state and s		
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19. hi		T _{sys} vs frequency 42%		
20. hi				
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24. hi		TOPO LSB Frequency (GHz)		
25. hi		uia_AUU2_XT396a6_X45bb.ms_ObsDate=2021-12-04_piotbandpass V1.102 = 2018/01/21 14:45:41		
26. hi				
21. ht				
20. hi				
20 64	f malaimliat (mfa)	447 T spw 24 T spw 24		
		ligg spin zi ligg spin zi ligg spin zi		
		VI. Science spw 21. Science spw 23. Science spw 23.		
22.15				

**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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$\leftarrow$	ightarrow C $rightarrow$		file:///D:/pipeline/html/t2-4m.html?sideba	r=sidebar_stage7&ms=all&subpage=t2-4m_details.html	E \$	⊡ பீ ≡				
	A Home By Topic	By Task								
Tasks 1. hifa 2. hifa 3. hifa	in execution order _importdata _flagdata _fluxcalflag		7. Flag T _{sys} ca	alibration		BACK				
4. hif_i 5. hif_i	rawflagchans refant		Task notifications							
6. h_ts	syscal		Warning! uidA002_Xf396d6_X	45bb.ms - for intent AMPLITUDE (field 0: J1058+0133) and spw 23, the following antennas are fully flagged: DA52						
7. hifa 8. hifa	_tsysflag		Warning! uidA002_Xf396d6_2	45bb.ms - for intent BANDPASS (field 0: J1058+0133) and spw 23, the following antennas are fully flagged: DA52						
9. hifa	wvrgcalflag		Warning! uidA002_Xf396d6_X	45bb.ms - the following antennas are moved to the end of the refant list because they are fully flagged for one or more Tsys spws, in one or more fields with intent "BANDPASS", "PHASE	", and/or "AMPLITUDE": DA	<b>.</b> 52				
10. hif <u>.</u> 11. hif_	_lowgainflag _setmodels	wgainflag • etmodels Contents								
12. hifa 13. hifa	a_bandpassflag a_bandpass		Reference antenna update							
14. hifa	a_spwphaseup		<ul> <li>I_{sys} aπer πagging</li> <li>Flagged data summary</li> </ul>							
15. hif	a_gfluxscaleflag a_ofluxscale		<ul> <li>Flag step details</li> <li>manual</li> </ul>							
17. hif	a_timegaincal		∘ nmedian							
18. hifa	a_targetflag		<ul> <li>derivative</li> </ul>							
19. hif	applycal		<ul> <li>eugechans</li> <li>fieldshape</li> </ul>							
20. hif	_makeimlist (cals)		∘ birdies							
21. hif	_makeimages (cals)		○ toomany							
22. hif	_makeimlist (checksrc)		Reference Anten	na undate						
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26 hif	a renorm		measurement sets where it was m	ximeu.						
27. hif	a exportdata		Measurement Set	Reference Antennas (Highest to Lowest)						
28. hif	mstransform		uid A002 Xf396d6 X45bb ms	DA43 DV06 DV03 DV02 DV04 DV01 DA60 DA58 DV21 DA46 DA42 DV25 DA62 DA54 DA65 DV20 DA41 DA51 PM02 DA59 DV09 DA48 DV18 DV22 DV17 DV11 DA5	6 DV23 DA61 DV16 DV1	4 DV13 DV05				
29. hifa	a_flagtargets			DA49, DV10, DV08, PM03, DA45, DA50, DV19, PM01, DV12, DA55, DA63, DV07, DA52	., ,	.,				
30. hifj 31. hifj	_makeimlist (mfs) _findcont	Updated reference antenna selection per measurement set. Antennas are listed in order of highest to lowest priority.								
32. hif	uvcontfit		T ve frequency of	torflogging						
22 hif	weateub		r _{sys} vs nequency al							

**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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portdata			uidA002_Xf396d6_X45bb.ms.	h_tsyscal.s6_1.tsyscal.tbl		-	-		*	-	*	-	-
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	Image:       By Topic         Image:       By Topic <td< th=""><th>Image       By Topic       By Take         weeution order       ordata       adata       adata         adata       adata       adata       adata       adata         adata       adata       adata       adata       adata       adata         adata       adata       adata       adata       adata       adata       adata         uxscaleflag       uxscaleflag       uxscaleflag       uxscaleflag       adata       adata       adata       adata       adata       adata       adata</th><th>Image: Calls)   adata   callag   gapinflag   painflag   models   ndpassflag   uxscaleflag   uxscaleflag   gainflag   geiflag   yygal   ceimist (calls)   teimiges (calls)   teimist (calls)   teimist (checksrc)   teimist (checksrc)   teimist (checksrc)   teimist (mfs)   cont   jatageta   teimist (mfs)   cont   jatageta</th><th>Image: Cales       Image: Cales         Image: Cales       Image: Cales</th><th>Images (cals)       file:///D:/pipeline/html/t2-4m.html/t3idebar=sidebar_stage7&amp;ms=all&amp;s         Images (cals)       By Task         For the measurement set(s) listed below, the reference antenna list measurement set where it was modified.         Images (cals)       For the measurement set(s) listed below, the reference antenna list measurement set where it was modified.         Images (cals)       Images (cals)         Images (cals)       For the measurement set was modified.         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Stata       Intersection order         Stat</th> <th>C       0       fter/lt/b/pipelete/html/l2-4-m.html/bidebarsidebar_stage78m=all8aubpage=t2-4m_details.html         More       By Topic       By Task         Antonic By Topic By Task       Reservement Set where it was modified         Antonic By Topic By Task       Reservement Set Antonic Bifuge Status Dives Div</th> <th>C       □       Mathematical State State</th> <th>Image: Control       The /// Output prime white/Us-dm-thinlif/Selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/selesm-side/</th> <th>$\begin{array}{c c c c c } \hline \hline \\$</th> <th>$\begin{array}{$</th>	Image       By Topic       By Take         weeution order       ordata       adata       adata         adata       adata       adata       adata       adata         adata       adata       adata       adata       adata       adata         adata       adata       adata       adata       adata       adata       adata         uxscaleflag       uxscaleflag       uxscaleflag       uxscaleflag       adata       adata       adata       adata       adata       adata       adata	Image: Calls)   adata   callag   gapinflag   painflag   models   ndpassflag   uxscaleflag   uxscaleflag   gainflag   geiflag   yygal   ceimist (calls)   teimiges (calls)   teimist (calls)   teimist (checksrc)   teimist (checksrc)   teimist (checksrc)   teimist (mfs)   cont   jatageta   teimist (mfs)   cont   jatageta	Image: Cales       Image: Cales         Image: Cales       Image: Cales	Images (cals)       file:///D:/pipeline/html/t2-4m.html/t3idebar=sidebar_stage7&ms=all&s         Images (cals)       By Task         For the measurement set(s) listed below, the reference antenna list measurement set where it was modified.         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**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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Aria_tsysRag     Aria_antpos     Aria_antpos     Aria_wvrgcaiflag     Aria_lowgainflag     Aria_lowgainflag     Aria_setmodels     Aria_bandpassflag		T _{Sys} vs frequency Plots of time-avoraged T _{sys} vs 1 uid_A002_X7396d6	96%					
13. hifa_bandpass 14. hifa_sprephaseup 15. hifa_gfluxacaleflag 16. hifa_gfluxacale 17. hifa_timegaincal 18. hifa_targetflag								
<ol> <li>hif_applycal</li> <li>hif_makeimlist (cals)</li> <li>hif_makeimages (cals</li> <li>hif_makeimlist (check</li> <li>hif_makeimages (che</li> <li>hif_makeimages (che</li> <li>hif_inageprecheck</li> </ol>		Tays spw 17         40           Science appl 17         40           Flagging steps         87.0         87.5         88.0         88.5           TOPO LSB Frequency (GHz)         TOPO LSB Frequency (GHz)         1000 CM /	42%					
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		A002_XI396d6_X46bb ms.h_tsyscal.s6_1 tsyscal.tbl  Elagging Step						

**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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Tasks in 1. hifa_i 2. hifa_f 3. hifa_f	n execution order importdata Ilagdata fluxcalflag		9. WVR Calibration and Flagging		BACK
4. hif_ra 5. hif_re	wflagchans •fant		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-applys if it gives a tangible improvement.		
6. h_tsy 7. hifa t	/scal tsvsflag		Results		
8. hifa_a	antpos	-	Plots		
9. hifa_v 10. hif_l	wvrgcalflag Iowgainflag	(	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 based on these data in these evaluation caltables are presented below.	I without application of WV	VR correction. Plots
12. hifa_	_bandpassflag	•	Flagging metric view(s)		
<ol> <li>hifa,</li> </ol>	_bandpass _spwphaseup _gfluxscaleflag _gfluxscale _timegaincal _targetflag applycal makeimlist (cals) makeimages (cals) makeimlist (checksrc)		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 to flag. The RMS phase during observation of the bandpass calibrator is calculated without WVR corrections to flag. The RMS phase during observation of the bandpass calibrator is calculated without WVR corrections to flag. The RMS phase during observation of the bandpass calibrator is calculated without WVR corrections to flag. The RMS phase during observation of the bandpass calibrator is calculated without WVR corrections to flag. The RMS phase during observation of the bandpass calibrator is calculated a metric here. uidA002_Xf396d6_X45bb.ms	applied, and with WVR co	orrections applied,
24. hifa 25. hifa 26. hifa 27. hifa 28. hifa 29. hifa 30. hifa 31. hifaf	_imageprecheck checkproductsize _renorm _exportdata mstransform _flagtargets makeimlist (mfs) findcont	¢	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 worgcal task have selected antennas who 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 an rest of the calibration process. Click on a link below to show all flagging metric views for that measurement set.	ise WVR correction needs Itennas will in most cases	: flagging. The J be flagged for the

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

hif uvcontfi

**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.

6 2021.1.00499.S - Task Details	x +	~ – Ø ×
$\leftarrow \rightarrow$ C $\textcircled{D}$	file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage9&ms=all&subpage=t2-4m_details.html#pipeline-20211206T153210/html/stage9/phase_offsets-uidA002_Xf396d6_X45bb.ms.html	E ☆ ID 约 =
AGMA	ByTask	2021.1.00499.S
Tasks in execution order		
1. hifa_importdata 2. hifa_flagdata 3. hifa_fluxcaliflag		antennas whose WVR correction needs flagging. The I, but those antennas will in most cases be flagged for the
4. hif_rawflagchans		
6. h_tsyscal		
7. hifa_tsysflag	Click the summary plots to enlarge, or click the summary title for a callery of more detailed plots for individual antennas.	
8. hifa_antpos 9. hifa_uvegealflag 10. hifa_uvegealflag 11. hif_setmodels 12. hifa_bandpassflag 13. hifa_bandpass 14. hifa_sprephaseup 15. hifa_gfluxscale 16. hifa_gfluxscale 17. hifa_timegaincaf 18. hifa_targettlag 19. hif_makeimilist (calis) 21. hif_makeimilist (calis) 22. hif_makeimilist (calis)	Little Hadou Jubse - 0133 (PHASE, BANDASS, AMPLITUDE)	
23. hif_makeimages (checksrc) 24. hifa_imageprecheck 25. hif_checkproductsize 26. hifa_renorm 27. hifa_exportdata 28. hif_mstransform 29. hifa_flagtargets 30. hif_makeimilist (mfs) 31. hif_findcont 29. Jifa_findcont	The lower panel of these plots show the median a scan ratio of the RMS deviations about the median a without WVR correction. One plot is generated particular to show a gallery of phase offset plots for individual antenna. Click the summary plot to enlarge them, or the summary plot tile to show a gallery of phase offset plots for individual antenna. Uid_A002_XI39666_X455bb ms	for data with WVR correction applied to the RMS deviations
32 bit presented		

**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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A Home     By Topic     By '       Tasks in execution order     I       1. hits_importdata     I       2. hits_flagdata     I       3. hits_flagdata     I       3. hits_flagdata     I       4. hit_reant     I       6. h_tayscal     I       7. hits_taysflag     I       8. hits_antpos     IIII       9. hits_taysflag     IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	$\frac{1}{2} = \frac{1}{2} + \frac{1}$	19.5 ne
31. hif_findcont 32. hif_uvcontfit		
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**hifa_bandpassflag**: This is a step to identify data with aberrant amplitudes before deriving corrections for the phase and amplitude versus frequency. It is useful to check the output from this step to ensure that statistical outliers are removed in the "after flagging" images.

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Tasks in execution order 1. hifa_importdata 2. hifa_flagdata 3. hifa_fluxcallag 4. hifa_reflexebace			12. Bandpass	Calibration Flagging		BA	чСК			
<ol> <li>hit_refant</li> </ol>			Task notifications							
6. h_tsyscal			Warning! uidA002_Xf396d6_X4	15bb.ms - for intent BANDPASS (field J1058+0133) and spw 17, the following antennas are fully flagged: PM01						
7. hifa_tsysflag		0	Warning! uidA002_Xf396d6_X4	15bb.ms - for intent BANDPASS (field J1058+0133) and spw 21, the following antennas are fully flagged: DV08						
9. hifa_wvrgcalflag			Warning! uidA002_Xf396d6_X4	I5bb.ms - for intent BANDPASS (field J1058+0133) and spw 25, the following antennas are fully flagged: PM01						
10. hif_lowgainflag 11. hif_setmodels		0	Warning! uidA002_X396d6_X45bb.ms - the following antennas are moved to the end of the refant list because they are fully flagged for one or more spws, in one or more fields with intents among BANDPASS: PM01 and DV08							
12. hifa_bandpassflag         13. hifa_bandpass         14. hifa_spwphaseup         15. hifa_gfluxscaleflag         16. hifa_gfluxscale         17. hifa_timegaincal         18. hifa_targetflag         19. hif_applycal         20. hif_makeimlist (cals)         21. hif_makeimlist (cals)         22. hif_makeimlist (checksrc)         23. hif_makeimlist (checksrc)         24. hifa_imageprecheck         25. hif_checkproductsize         06. biff_checksrc		•	This task performs a preliminary phr amplitude minus model amplitudes, Plots are generated at two points in <b>Contents</b> • Reference Antenna update ta • Flagging commands • Flagging data summary table • Amplitude vs time plots for fit • Amplitude vs UV distance plot <b>Reference Antenne</b>	Ised-up bandpass solution and temporarily applies it, then computes the flagging heuristics by calling hif_correctedampflag which looks for outlier visibility points by statistically examinia and then flags those outliers. The philosophy is that only outlier data points that have remained outliers after calibration will be flagged. Note that the phase of the data is not assessed. 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 g ble ugging tts for flagging the for flagging heuristics fragging heuristics have been run and applied. If no points were flagged, the "after" plots are not g ble so flagging the for flagging heuristics have been run and applied. If no points were flagged, the "after" plots are not g heuristics have been run and applied. If no points were flagged, the "after" plots are not g heuristics flagging heuristics have been run and applied. If no points were flagged, the "after" plots are not g heuristics flagging heuristics heuristics are run, and after flagging (antennas moved to end and/or removed). See warnings in task notifications for details. Shown below are the upd diffed.	ng the scalar difference of generated or displayed. ated reference antenna lis	the corrected	se			
26. hita_renorm 27. hifa exportdata			Measurement Set	Reference Antennas (Highest to Lowest)						
28. hif_mstransform 29. hifa_flagtargets			uidA002_Xf396d6_X45bb.ms	DA43, DV06, DV03, DV02, DV04, DV01, DA60, DA58, DV21, DA46, DA42, DV25, DA62, DA54, DA65, DV20, DA41, DA51, PM02, DA59, DV09, DA48, DV18, DV22, DV17, DV11, DA DA49, DV10, PM03, DA45, DA50, DV19, DV12, DA55, DA63, DV07, DA52, DV08, PM01	.56, DV23, DA61, DV16, D	)V14, DV13, DV	V05,			
30. hif_makeimlist (mfs) 31. hif_findcont 32. hif_uvcontfit		Updated reference antenna selection per measurement set. Antennas are listed in order of highest to lowest priority.								

Flagging

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

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Tasks in execution order         1. hifa_importdata         2. hifa_flagdata         3. hifa_flauxcaliflag         4. hif_rawflagchans         5. hif_refant         6. h_tsyscal         7. hifa_tsysflag         8. hifa_antpos         9. hifa_wrqcafiflag         10. hif_lowqainflag	0	Amplitude vs time These plots show amplitude vs time for two cases: 1, the cal Data are plotted for all antennas and correlations, with differe uidA002_Xf396d6_X45bb.ms	brated data before application of any flags; and 2, where flagging was nt correlations shown in different colours.	applied, the calibrated data after application of flags.	Ampscorrected vs. Time Spin 25
11. hif_setmodels 12. hifa_bandpassflag 13. hifa_bandpass 14. hifa_spwphaseup 15. hifa_gfluxscaleflag 16. hifa_gfluxscale	0	Spectral Window 17 Intents: BANDPASS Calibrated data before flagging.	Spectral Window 21 Intents: BANDPASS Calibrated data before flagging.	United States and Stat	Spectral Window 25 Intents: BANDPASS Calibrated data before flagging.
<ol> <li>hifa_timegaincal</li> <li>hifa_targetflag</li> <li>hif_applycal</li> <li>hif_makeimiist (cals)</li> <li>hif_makeimiage (cals)</li> <li>hif_makeimiist (checksrc)</li> <li>hif_makeimages (checksrc)</li> <li>hif_aimageprecheck</li> <li>hif_aimageprecheck</li> <li>hif_heckproductsize</li> </ol>	θ	Spectral Window 17	Spectral Window 21	Spectral Window 23	Spectral Window 25
26. hifa_renorm 27. hifa_exportdata 28. hif_mstransform 29. hifa_flagtargets 30. hif_makeimlist (mfs) 31. hif_findcont 32. hif.ueconff		Intents: BANDPASS Calibrated data after flagging. Amplitude vs UV distance These plots show amplitude vs UV distance for two cases: 1	Intents: BANDPASS Calibrated data after flagging.	Intents: BANDPASS Calibrated data after flagging.	Intents: BANDPASS Calibrated data after flagging.

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

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

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10. mi_ovyganingy  11. hif_setmodels 12. hifa_bandpassflag (13. hifa_bandpass 14. hifa_spwphaseup 15. hifa_gfluxscaleflag 16. hifa_gfluxscale	Spectral Window 17 Intents: BANDPASS Calibrated data before flagging.	Spectral Window 21 Intents: BANDPASS Calibrated data before flagging.	Spectral Window 23 Intents: BANDPASS Calibrated data before flagging.	Spectral Window 25 Intents: BANDPASS Calibrated data before flagging.
17. hífa_timegaincal 18. hífa_targetflag 19. híf_applycal 20. híf_makeimilist (cals) 21. híf_makeimages (cals) 22. híf_makeimages (checksrc) 23. híf_makeimages (checksrc) 24. hífa_imageprecheck	Amp:corrected vs. UVidet Spec: 17	Ampconvected vs. UVditt Spire 21	Angicarrected vs. Uvdist Spres 23	Amprometed vs. UVdist Spur? 25
25. hlf_checkproductsize 26. hlfa_renorm 27. hlfa_expotdata 28. hlf_mstransform 29. hlfa_factaroets	Spectral Window 17 Intents: BANDPASS Calibrated data after flagging.	Spectral Window 21 Intents: BANDPASS Calibrated data after flagging.	Spectral Window 23 Intents: BANDPASS Calibrated data after flagging.	Spectral Window 25 Intents: BANDPASS Calibrated data after flagging.
30. hif_makeimlist (mfs) 31. hif_findcont	Pipeline QA			
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5. hif_refant 6. h_tsyscal 7. hifa tsysflag		9	Results								
8. hifa_antpos			Phase-up on bandpass calibrato	r							
9. hifa_wvrgcalflag		•		Phase-up Solution Par	ameters						
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14. hifa_spwphaseup											
15. hita_gtluxscaletlag			Bandpass calibration								
17. hifa timegaincal				Solution Pa	arameters Applied To						
18. hifa_targetflag			Measurement Set	Туре	Interval	Scan Intent	Spectral Windows	Calibration Table			
19. hif_applycal									47.04.00.05.1		
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24. hifa imageprecheck		0			inf 3 906250MHz(1 0ch)		25				
25. hif_checkproductsize		-									
26. hifa_renorm			Parameters used for bandpass calibration								
27. hifa_exportdata			Diete								
28. hif_mstransform			PIOLS								
29. hifa_flagtargets			Plots show the bandpass correction applie	d to the target :	source. The first two plots show a	mplitude vs frequenc	y; one for the reference a	ntenna and one for a typical antenna, identified the antenna	with mode score. The t	hird plot shows phase vs freq	uency for the
30. hif_makeimlist (mfs)			typical antenna.								
31. hif_findcont			Click the summary plots to enlarge them, or the plot title to see see detailed plots per spectral window and antenna.								
32. nir_uvconthit			uidA002_Xf396d6_X45bb.ms	;							

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24. hit 25. hit	a_imageprecheck checkproductsize	Θ	Pipeline QA		
26. hr	a_renorm 'a_exportdata		Input Parameters		
28. hit 29. hit	_mstransform a_flagtargets		Tasks Execution Statistics		
30. hi 31. hi	_makeimlist (mfs) _findcont		CASA logs for stage 13		
32. hi	uvcontfit		<ul> <li>View or download stage13/casapy.log (152.1 KB)</li> </ul>		

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14. hifa_spwphaseup						
15. hifa_gfluxscaleflag	Spectral window filter			Antenna filter		
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19. hif_applycal	1.65	1.609 7/97 4.3400, special 1.03, special 1.237 (8	144 Arth [44], qual?, Ant 6 (054-013), speci [227:16 707 (2440, 470001)201 975	1.69 And 9.1441, quals, find is (1950-1018, usual (2)/110 7/01/01/0000000000000000000000000000000	183 Art (340, unit), Sur (1,000, unit) (2)(1) Per Claure, same (1,00) Per Claure, same (1,00) set	Are ( 642, use); Are 6 (664, use) ( 124 use) ( 122 ) (*           180         ************************************
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Tasks					
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14. hifa_spwphaseup						
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**hifa_spwphaseup**: From Cycle 9 onwards (but not in the example used here), this step produces diagnostic plots showing the rms noise in the phases as a function of uv distance. They look similar to another set of plots from the QA0 reports.

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8. hifa_antpos		Measurement Set					Spectra	Window Map					
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11. hif_setmodels		Phase solution spw map per measurement so	et.										
12. hifa_bandpassflag	•	D Harmon Cat			Dhara	CND downhold			C	Fatimate d CND			
13. hita_bandpass		Measurement Set			Phase	SNR threshold			Spectral Window	Estimated SNR			
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16. hifa_gfluxscale									21				
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20. hif_makeimlist (cals) 21. hif_makeimages (cals)		Estimated phase calibrator signal to noise rat	ios per measuremen	t set. For spectral	windows where	the estimated SNR is below the sp	pecified threshold	d ('phases	an' parameter), the SNR value is indicated in <b>bold</b> .				
22. hif_makeimlist (checksrc) 23. hif_makeimages (checksrc)			Solution Parar	neters	Applied To								
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**hifa_spwphaseup**: From Cycle 9 onwards (but not in the example used here), this step produces diagnostic plots showing the RMS noise in the phases as a function of uv distance. They look similar to another set of plots from the QA0 reports.

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10. hif_lowgainflag     Image: Image of the set models       11. hif_setmodels     Image: Image of the set models       12. hifa_bandpassflag     Image of the set models	Phase solution spw map per measurement	uidA002_X336d6_X45bb.ms       Phase solution spw map per measurement set.       Source: J11481840       10										
13. hifa_bandpass	Measurement Set			Phase SI	NR threshold	20 29						
<ol> <li>hifa_spwphaseup</li> <li>hifa_gfluxscaleflag</li> <li>hifa_gfluxscale</li> <li>hifa_timegaincal</li> <li>hifa_targetflag</li> <li>hifa_targetflag</li> </ol>	uidA002_Xf396d6_X45bb.ms	Measurement Set uidA002_Xf396d6_X45bb.ms				BB_ALL X polarization BB_ALL Y polarization BB_ALL Y polarization						
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31. htt_inndcont 32. htt_uvcontfit 33. htt uvcontruth	Tasks Execution Statistics				[							

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

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32. hif_uvcontfit	Tasks Execution Statistics						

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

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29. hifa_flagtargets 30. hif_makeimlist (mfs)		Pipeline QA					Page 6 of	
31. hif_findcont		Input Parameters					18	
32. htt_uvcontfit		Tasks Execution Statistics						

**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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Tasks in execution order 1. hifa_importdata 2. hifa_flagdata 3. hifa_fluxcalflag		15. Phased-up Fluxscale Calibra	ation	and Flagging				BACk	<					
4. hif_rawflagchans 5. hif_refant 6. h_tsyscal		This task computes the flagging heuristics on the phase calibrator and flux calibr outliers. The philosophy is that only outlier data points that have remained outlier nulls in the flux density vs. uvdistance domain. Note that the phase of the data is	sk computes the flagging heuristics on the phase calibrator and flux calibrator by calling hif_corrected amplitudes, and flags those 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 the flux density vs. uvdistance domain. Note that the phase of the data is not assessed.											
7. hifa_tsysflag 8. hifa_antpos 9. hifa_wvrgcalflag	0	In further detail, the workflow is as follows: an a priori calibration is applied using are generated at two points in this workflow: after preliminary phase and amplitud score for this stage is the standard data flagging score, which depends on the fra	Jetail, 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 at two points in this workflow: after reliminary 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 this stage is the standard data flagging score, which depends on the fraction of data flagged.											
10. hif_lowgainflag 11. hif_setmodels	0	Contents	ents											
12. hifa_bandpassflag 13. hifa_bandpass 14. hifa_spwphaseup 15. hifa_gfluxscaleflag	θ	Flagging commands     Flagged data summary table     Amplitude vs time plots for flagging     Amplitude vs UV distance plots for flagging	Flagging commands     Flagged data summary table     Amplitude vs time plots for flagging     Amplitude vs UV distance plots for flagging											
16. hifa_gfluxscale 17. hifa_timegaincal		Flagging												
18. hifa_targetflag		Measurement Set	Flagging	Commands		Number of Statements								
20. hif_makeimlist (cals)		uidA002_Xf396d6_X45bb.ms	uidA00	2_XI396d6_X45bb.ms-flag_commands.txt		0								
21. hif_makeimages (cals) 22. hif_makeimlist (checksrc)		Report Files												
23. hif_makeimages (checksrc) 24. hifa_imageprecheck 25. hif_checkproductsize	0	Flagged data summary Measurement Set: uidA002_Xf396d6_X45bb.ms												
26. hifa_renorm		Data Selection		flagged before	flagged after									
27. hifa_exportdata 28. hif mstransform		TOTAL		21.352%	21.352%									
29. hifa_flagtargets		BANDPASS		9.914%	9.914%									
30. hif_makeimlist (mfs) 31. hif_findcont		AMPLITUDE												
32. hif_uvcontfit		PHASE	PHASE         10.223%         10.223%											

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

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Home By Topic	By Task				2021.1.00499.S
Tasks in execution order         1. hifa_importdata         2. hifa_flagdata         3. hifa_fluxcalflag         4. hif_rawflagchans         5. hif_refant         6. h_tsyscal         7. hifa_tsysflag         8. hifa_antpos         9. hifa_lowgraifflag         10. hif_lowgraifflag         11. hif_setmodels	0	Amplitude vs time These plots show amplitude vs time for two cases: 1, the Data are plotted for all antennas and correlations, with diffi- uidA002_Xf396d6_X45bb.ms	calibrated data before application of any flags; and 2, where flaggin erent correlations shown in different colours.	g was applied, the calibrated data after application of flags.	Anguitamentaria va Time Spor 25
12. hifa_bandpassflag 13. hifa_bandpass 14. hifa_spwphaseup 15. hifa_gfluxxcaleflag 15. hifa_gfluxxcale	θ	Spectral Window 17 Intents: PHASE Fields: J1148+1840 Calibrated data before flagging.	Spectral Window 21 Intents: PHASE Fields: J1148-11840 Calibrated data before flagging.	Spectral Window 23 Intents: PHASE Fields: J1148+1840 Calibrated data before flagging.	Spectral Window 25 Intents: PHASE Fields: J1148+1840 Calibrated data before flagging.
<ol> <li>hifa_targetflag</li> <li>hifa_targetflag</li> <li>hifa_applycal</li> <li>hif_makeimilist (cals)</li> <li>hif_makeimilist (cals)</li> <li>hif_makeimilist (checksrc)</li> <li>hif_makeimilist (checksrc)</li> <li>hifa_imageprecheck</li> <li>hifa_renorm</li> <li>hifa_renorm</li> <li>hifa_flagtargets</li> <li>hif_makeimilist (mfs)</li> </ol>	Θ	Amplitude vs UV distance These plots show amplitude vs UV distance for two cases Data are plotted for all antennas and correlations, with diff uidA002_Xf396d6_X45bb.ms	1, the calibrated data before application of any flags; and 2, where event correlations shown in different colours.	e flagging was applied, the calibrated data after application of flags.	Anguarretted vs. UVdist Spar 23
31. hif findcont		Spectral Window 17	Spectral Window 21	Spectral Window 23	Spectral window 25

Intents: PHASE Field: J1148+1840

32. hif_uvcontfit

Intents: PHASE

Field: J1148+1840

Spectral Window 23 Intents: PHASE Field: J1148+1840

Spectral Window 25 Intents: PHASE Field: J1148+1840

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

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Home By Topic	By Task										2	021.1.00499.S	
Tasks in execution order 1. hifa_importdata 2. hifa_flagdata 3. hifa_fluxcalflag		16. Phased-up fl	uxscale									BACK	
<ol> <li>4. hif_rawflagchans</li> <li>5. hif_refant</li> <li>6. h_tsyscal</li> <li>7. hifa_tsysflag</li> <li>8. hifa_antpos</li> <li>9. hifa_wvrgcalflag</li> <li>10. hif_lowgainflag</li> <li>11. hif_setmodels</li> <li>12. hifa_bandpassflag</li> <li>13. hifa_psyphaseup</li> <li>14. hifa_spwphaseup</li> </ol>	9 9 9	Contents  • Tables:  • Antennas used for flux scaling  • Computed flux density vs catalogue flux density  • Calibrated flux density vs catalogue flux density  • Calibrated flux density vs catalogue flux density  • Results  Antennas Used for Flux Scaling											
16. hifa_gfluxscale		Measurement Set					IIV Range				Antennas		
17. hifa_timegaincal							ov kange						
19. hif_applycal		uidA002_A159646_A4500.ms											
<ol> <li>20. hif_makeimlist (cals)</li> <li>21. hif_makeimages (cals)</li> <li>22. hif_makeimlist (checksrc)</li> <li>23. hif_makeimages (checksrc)</li> </ol>		Antennas for Flux Calibration Computed Flux Densitie The following flux densities were set in the	S measurement set model column	and recor	ded in the pipeline context:								
24. hifa_imageprecheck	0					Derived Scaling F	actor						
25. htt_checkproductsize 26. htfa renorm						Calibrated Visibili	ity Flux Density						
27. hifa_exportdata			Catalog Flux Den	sity									
28. hif_mstransform		Manager and Cat	Measurement Set Field Sow Frequency Bandwidth (TOPO)					0		N	Flux Dette (Cellberted / Cert 1)	Cali	
29. hifa_flagtargets 30. hif_makeimlist (mfs)		weasurement Set uidA002_Xf396d6_X45bb.ms	J1148+1840 (#2) PHASE	Spw	87.878 GHz 2.000 GHz	132.519 ± 0.657 m.	Jy (0.5%)	Q 0.000 Jy	0.000 Jy	V 0.000 Jy	0.990	0.0	
31. hif_findcont 32. hif_uvcontfit		132.209 :											

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

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Tasks in execution order		Computed Flux Densiti	<b>es</b> ne measurement set model columr	and recor	ded in the pipeline context:							
2. hita_flagdata 3. hifa_fluxcalflag						Derived Scaling Factor						
4. hif_rawflagchans						Calibrated Visibility Flux Density						
5. hit_refant 6. h_tsyscal						Catalog Flux Density						
7. hifa_tsysflag	0	Measurement Set	Field	Spw	Frequency Bandwidth (TOPO)	1	Q	U	v	Flux Ratio (Calibrated / Catalog)	Spix	i.
8. hita_antpos 9. hifa_wvrgcalflag		uidA002_Xf396d6_X45bb.ms	J1148+1840 (#2) PHASE	17	87.878 GHz 2.000 GHz	132.519 ± 0.657 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.990	0.0	
10. hif_lowgainflag	0					132.209 ± 0.109 mJy (0.08%)						
11. hif_setmodels						133 504 m ly	0.000 ly	0.000 by	0.000 by			
12. hifa_bandpassflag	0					133.304 may	0.000 Jy	0.000 3y	0.000 Sy			
13. hita_bandpass				21	100.062 GHz 2.000 GHz	121.772 ± 0.599 mJy (0.5%)	0.000 Jy	0.000 Jy	0.000 Jy	0.983		
15. hifa gfluxscaleflag						121.473 ± 0.112 mJy (0.09%)						
16. hifa_gfluxscale						123.578 mJy	0.000 Jy	0.000 Jy	0.000 Jy			
17. hifa_timegaincal				23	101 619 GHz 2 000 GHz	120 503 ± 0 546 m h/ (0 5%)	0.000 by	0.000 br	0.000 by	0.082		
18. hifa_targetflag				25	101.013 0112 2.000 0112	120.000 ± 0.040 mby (0.070)	0.000 Jy	0.000 59	0.000 39	0.302		
19. hif_applycal						120.196 ± 0.116 mJy (0.1%)						
20. hif_makeimlist (cals)						122.448 mJy	0.000 Jy	0.000 Jy	0.000 Jy			
21. htt_makeimages (cals) 22. htt makeimlist (checksrc)				25	89 639 GHz 1 875 GHz	130.626 ± 0.710 m ly (0.5%)	0.000 Jy	0.000 Jv	0.000 by	0.988		
23. hif makeimages (checksrc)				2.5	03.033 0112 1.073 0112	130.020 1 0.7 10 mby (0.370)	0.000 0y	0.000 09	0.000 09	0.000		
24. hifa imageprecheck	0					130.313 ± 0.113 mJy (0.09%)						
25. hif_checkproductsize						131.938 mJy	0.000 Jy	0.000 Jy	0.000 Jy			
26. hifa_renorm		Phased-up Fluxecale Results										
27. hifa_exportdata		i naseu-up i iuxscale riesuits										
28. hif_mstransform		Calibrated visibility flux	density vs catalog	e flux	density							
29. hifa flagtargets		Guilbrated visibility llux	density vs catalogt		denoity							

30. hif makeimlist (mfs

31. hif_findcont

32 hif uvcontfit

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

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

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

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Tasks in execution order 1. hifa_importdata 2. hifa_flagdata 3. hifa_flaycalflag 4. hif_rawflagchans 5. hif_refant 6. h_tsyscal 7. hifa_tsysflag 8. hifa_antpos 9. hifa_wrgcalflag 10. hif_lowgainflag 11. hif_setmodels 12. hifa_bandpassflag		•	17. Gain Calibration Trist task creates gain solutions for each measurement set. <ul> <li>Plots</li> <li>Phase vs time</li> <li>Diagnostic plots</li> <li>Phase vs time</li> <li>Phase vs time</li> <li>Amplitude vs time</li> <li>Amplitude vs time</li> </ul> Results								BACK
13. hifa_bandpass											
14. hita_spwpnaseup				Solution Par	ameters	Applied To					
16. hifa_gfluxscale			Measurement Set	Туре	Interval	Scan Intent	Spectral Windows	Gainfield	Calibration Table		
18. hifa_targetflag			uidA002_Xf396d6_X45bb.ms	Phase only	Infinite	PHASE	17, 21, 23, 25	nearest	uidA002_Xf396d6_X45bb.ms.hifa_timegainc	al.s17_2.spw17_21_23_2	5.solintinf.gpcal.tbl
19. hif_applycal			uidA002_Xf396d6_X45bb.ms	Phase only	Infinite	TARGET, CHECK	17, 21, 23, 25		uidA002_Xf396d6_X45bb.ms.hifa_timegainc	cal.s17_2.spw17_21_23_2	5.solintinf.gpcal.tbl
21. hif_makeimages (cals) 22. hif_makeimlist (checksrc)			uidA002_Xf396d6_X45bb.ms	Phase only	Per integration (6.05s)	AMPLITUDE, BANDPASS, POLARIZATION, POLANGLE, POLLEAKAGE	17, 21, 23, 25	nearest	uidA002_Xf396d6_X45bb.ms.hifa_timegainc	cal.s17_3.spw17_21_23_2	5.solintint.gpcal.tbl
23. hif_makeimages (checksrc) 24. hifa_imageprecheck		0	uidA002_Xf396d6_X45bb.ms	Amplitude only	Infinite	AMPLITUDE, BANDPASS, PHASE, POLARIZATION, POLANGLE, POLLEAKAGE	17, 21, 23, 25	nearest	uidA002_Xf396d6_X45bb.ms.hifa_timegainc	cal.s17_7.spw17_21_23_2	5.solintinf.gacal.tbl
25. hif_checkproductsize 26. hifa_renorm 27. hifa_exportdata			uidA002_Xf396d6_X45bb.ms	Amplitude only	Infinite	TARGET, CHECK	17, 21, 23, 25		uidA002_Xf396d6_X45bb.ms.hifa_timegainc	cal.s17_7.spw17_21_23_2	5.solintinf.gacal.tbl
28. hif_mstransform 29. hifa_flagtargets			Applied calibrations and parameters	s used for caltal	ble generation						
30. nr_makermlist (mts) 31. hif_findcont			Phase vs time								

32 hif uvcontfi

**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.

<ul> <li>201100095 - Tai but with x +</li> <li>2011000005 - Tai but with x +</li> <li>201100005 - Tai but with x +</li> <li>2011000005 - Tai but with x +</li> <li>201100005 - Tai</li></ul>	✓ – Ø × E £ ≡ 2021.1.00499.S
<ul> <li>Inde/Dop/pointe/htm/h2-dm.htm/Bidebar=sidebar_stage178xm=all&amp;cubpage=12-4m_detail.htm</li> <li>Inde/Dop/pointe/htm/h2-dm.htm/Bidebar_stage178xm=all&amp;cubpage=12-4m_detail.htm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage184</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage184</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm</li> <li>Inde/Dop/pointe/htm/Bidebar_stage178xm<!--</td--><td>© 2021.1.00499.S</td></li></ul>	© 2021.1.00499.S
<ul> <li>Wrone By trade</li> <li>By trade</li> <li>By</li></ul>	2021.1.00499.S
Tasks in exaction order       Plots         1 hds_importdata       Phase vs time         2 hds_digadata       Phase vs time for spectral window 17, all antennas and crelations.         3 hds_uncealing       Phase vs time for spectral window 17, all antennas and crelations.         4 hds_subscaleling       Phase vs time for spectral window 17, all antennas and crelations.         1 hds_subscaleling       Phase vs time for spectral window 17, all antennas and crelations.         1 hds_subscaleling       Phase vs time for spectral window 17, all antennas and crelations.         1 hds_subscaleling       Phase vs time for spectral window 17, all antennas and crelations.         1 hds_strengetta       Phase vs time for spectral window 17, all antennas and crelations.         1 hds_strengetta       Phase vs time for spectral window 17, all antennas and crelations.         1 hds_strengetta       Phase vs time for spectral window 17, all antennas and crelations.         1 hds_strengetta       Phase vs time for spectral window 17, all antennas and crelations.         1 hds_strengetta       Phase vs time for spectral window 23, all antennas and crelations.         1 hds_strengetta       Phase vs time for spectral window 21, all antennas and crelations.         1 hds_strengetta       Phase vs time for spectral window 21, all antennas and crelations.         1 hds_strengetta       Phase vs time for spectral window 21, all antennas and crelations. <th></th>	
15. hifa_gfluxscaleflag     Opcodult Window 17, all antennas and correlations.     Opcodult Window 21, all antennas and correlations.     Opcodult Window 20     Opcodult Window 20       16. hifa_gfluxscale     Phase vs time for spectral window 17, all antennas and correlations.     Phase vs time for spectral window 21, all antennas and correlations.     Phase vs time for spectral window 23, all antennas and correlations.     Phase vs time for spectral window 23, all antennas and correlations.     Phase vs time for spectral window 23, all antennas and correlations.     Phase vs time for spectral window 23, all antennas and correlations.	46 X4316 Kpw 25
Amplitude ve time	ow 25, all antennas and
20. mi_maxemist (cals)       Antipitude vs time         21. hif_makeimages (cals)       Plots show the amplitude calibration to be applied to the target source. A plot is shown for each spectral window and each set of antennas with the same antenna diameter, with amplitude correction data points per antenna and correlation         22. hif_makeimages (cals)       Plots show the amplitude calibration to be applied to the target source. A plot is shown for each spectral window and each set of antennas with the same antenna diameter, with amplitude correction data points per antenna and correlation         23. hif_makeimages (checksrc)       Click the summary plots to enlarge them, or the spectral window heading to see detailed plots per spectral window and antenna.         24. hifa_imageprecheck       uidA002_Xf1396d6_X45bb.ms	as a function of time.
25. hif_checkproductsize viddo2 X05665, X45bi sye 17 viddo2 X05665, X45bi sye 21 viddo2 X0	46, X4554 (ypu 25

**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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← → C @ D fi	e:///Dr/pipeline/html/t2-4m.html?sidebar=sidebar_stage17&ms=all&subpage=t2-4m_details.html	E 🖒	⊡ பீ ≡
Home By Topic By Task			2021.1.00499.S
Tasks in execution order         1. hifa_importdata         2. hifa_flagdata         3. hifa_flagdata         5. hif_refent         6. h_tsyscal         7. hifa_tsysflag         8. hifa_antpos         9. hifa_wrgcatillag         10. hif_lowgainflag         11. hif_setmodels         12. hifa_bandpassflag         13. hifa_bandpass         14. hifa_sphyxcalelalag         15. hifa_gfluxscalelag         16. hifa_gfluxscale         17. hifa_timegaincal         18. hifa_targetflag         19. hifa_apptycal	Diagnostic plots         Dhase vs time         These diagnostic plots show the phase solution for a calibration generated using a short solution interval. In case of very low SNR, solutions averaged in time for the phase calibrator are used with a solint = 1/4 the phase to relation as a function of time.         Click the summary plots to enlarge them, or the spectral window, with phase correction plotted per antenna and correlation as a function of time.         UiA002_X1396d6_X45bb.ms         Plots show the diagnostic phase calibration for uidA002_X1396d6_X45bb.ms         Diagnostic plots         Spectral window 17         Phase vs time for spectral window 17, all antennas and correlations.         Diagnostic plots         Spectral window 17, all antennas and correlations.	ecal scan time. This calibration	s
<ul> <li>20. hif_makeimilist (cals)</li> <li>21. hif_makeimilist (checksrc)</li> <li>22. hif_makeimilist (checksrc)</li> <li>23. hif_makeimilist (checksrc)</li> <li>24. hifa_imageprecheck</li> <li>25. hif_checkproductsize</li> <li>26. hifa_renorm</li> <li>27. hifa_exportdata</li> <li>28. hif_mstransform</li> <li>29. hifa_flagtargets</li> <li>30. hif_makeimilist (mfs)</li> <li>31. hif_findcont</li> <li>32. hif_uvcontfit</li> <li>33. hif_usepateub</li> </ul>	Phase offsets vs time         These diagnostic plots show the phase offsets as a function of time. The phase offsets are computed by preapplying the previous phase only solutions to the data and computing a new phase solution. The new phase as solutions are not applied to the target. One plot is shown for each spectral window, with phase offset plotted per antenna and correlation as a function of time.         Click the summary plots to enlarge them, or the spectral window heading to see detailed plots per spectral window and antenna.         uidA002_Xf396d6_X45bb.ms         Plots show the diagnostic phase offsets for uidA002_Xf396d6_X45bb.ms calculated using solint='inf'.         Note that no spectral windows have been combined or remapped         uig	olutions should scatter around z	s

**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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Home By Topic	By Task											2021	I.1.00499.S
Tasks in execution order 1. hifa_importdata 2. hifa_flagdata 3. hifa_flagdata		19. Apply cali	brat	ion tables	6								BACK
4. hif_rawflagchans		This task applies all calibrations re	egistered v	vith the pipeline to their	r target measureme	nt sets.							
<ul> <li>h. tysscal</li> <li>h. hifa_tsysflag</li> <li>8. hifa_antpos</li> <li>9. hifa_wrigcalflag</li> <li>10. hif_lowgainflag</li> <li>11. hif_setmodels</li> <li>12. bifa_bwgdengflag</li> </ul>	9	<ul> <li>Contents         <ul> <li>Applied calibrations</li> <li>Flagged data after calibration application</li> <li>Plots                 <ul></ul></li></ul></li></ul>											
13. hifa_bandpass 14. hifa_spwphaseup 15. hifa_gfluxscaleflag 16. hifa_gfluxscale 17. hifa_timegaincal 18. hifa_targetflag	Ŭ	Calibrated amplitude vs UV distance     Calibrated amplitude / model) vs antenna     Corrected amplitude / model) vs UV distance     Corrected amplitude / model) vs UV distance     Science target: calibrated amplitude vs UV distance     Science target: calibrated amplitude vs UV distance     UV coverage											
19. hif_applycal         20. hif_makeimlist (cals)         21. hif_makeimages (cals)         22. hif_makeimlist (checksrc)		Applied calibration The Fields column lists fields with listed instead of the field name. The	DNS n the mea e order of	surement set containir entries in the <i>Fields</i> ar	ng any of the intents nd <i>Intents</i> columns	s listed in the has no signif	Intents coli icance.	umn. If a field name is	s ambiguous and does not uniquely identify a field, e.g., when a field is observ	ved with multiple	intents, then the u	.nambiguous	field ID is
23. hif_makeimages (checksrc)		Measurement Set		Target				Calibration					
24. hifa_imageprecheck 25. hif_checkproductsize	0	Name	Final Size	Intent	Fields	Spw	Antenna	Туре	spwmap	gainfield	interp	calwt	table
20. hifa_exportdata 28. hifa_mstransform		uidA002_Xf396d6_X45bb.ms (callibrary: view / download)	32.8 GB	TARGET	"PJ113921.7"	17, 21, 23, 25	0~45	T _{sys}	17, 1, 2, 3, 4, 17, 17, 7, 19, 9, 10, 11, 12, 17, 19, 21, 23, 17, 17, 19, 19, 21 21, 23, 23, 19, 19	, "PJ113921.7"	linear, linear	True	Filename
29. hifa_flagtargets								WVR			nearest	False	Filename
30. hif_makeimlist (mfs) 31. hif_findcont								Bandpass			linearperobs, linearflag	True	Filename
32. hif_uvcontfit								Gain (phase only)		nearest	linear, linear	False	Filename
0.0 1.17													

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.

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Home By Topic	By Task					2021.1.00499.S
Tasks in execution order         1. hifa_importdata         2. hifa_flagdata         3. hifa_fluxcalflag         4. hif_rawflagchans         5. hif_refant         6. h_tsyscal         7. hifa_tsysflag         8. hifa_antpos         9. hifa_worgcalflag         10. hif_lowgainflag         11. hif_setmodels         12. hifa_bandpassflag	0	Plots Calibrated amplitude vs frequency Plots of calibrated amplitude vs frequency for all antennas and corr uidA002_Kf396d6_X45bb.ms	relations, coloured by antenna. The atmospheric transmission for e	ach spectral window is overlayed on each plot in pink.	Amproverselbed, Alter Transmission ye, Preques	<b>57 5941 23</b>
13. hifa_bandpass 14. hifa_spwphaseup 15. hifa_gfluxscaleflag 16. hifa_gfluxscale 17. hifa_timegaincal		Spw 17 ALM-Band 3 Intents: AMPLITUDE;BANDPASS Fields: J1058+0133	Spw 21 ALMA Band 3 Intents: AMPLITUDE,BANDPASS Fields: J1058+0133	Spw 23 ALMA Band 3 Intents: AMPLITUDE, BANDPASS Fields: J1058+0133	Spw 25 ALMA Band 3 Intents: AMPLITUDE,BANDPASS Fields: J1058+0133	
<ol> <li>hifa_targetflag</li> <li>hif_applycal</li> <li>hif_makeimlist (cals)</li> <li>hif_makeimages (cals)</li> <li>hif_makeimlist (checksrc)</li> <li>hif_makeimages (checksrc)</li> <li>hif_aimageprecheck</li> <li>hif_checkproductsize</li> </ol>	0	Angicorrected, Atm Transmission vs. Frequency 5pm: 17	Angological Alm Transmission vs. Prequency Space 21	Amp corrected, Alm Transmission vs. Frequency Sport 23	Amp corrected, Am. Transmission vs. Prequest	y Spec 23
26. hifa_renorm 27. hifa_expottdata 28. hif_mstransform 29. hifa_flagtargets 30. hif_makeimlist (mfs) 31. hif_findcont		Spw 17 ALMABand 3 Intents: PHASE Fields: J1148+1840	Spw 21 ALMA Band 3 Intents: PHASE Fields: J1148+1840	Spw 23 ALMA Band 3 Intents: PHASE Fields: J1148+1840	Spw 25 ALMA Band 3 Intents: PHASE Fields: J1148+1840	
32. hif_uvcontfit		Calibrated phase vs frequency				

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

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$\leftarrow$ $\rightarrow$ $C$ $\textcircled{a}$ $\Box$ file:/	///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage19&ms=all&su	ubpage=t2-4m_details.html		▣ ☆	⊡ එ =
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Tasks in execution order       1. hifa_impondata       2. hifa_flagdata       3. hifa_flaxcalflag       4. hif_rawllagchans       5. hif_refant       6. h_tsyscal       7. hifa_tsysflag	Calibrated phase vs frequency Plots of calibrated phase vs frequency for all antennas and correlation uidA002Xf396d6X45bb.ms	Phasecorrected vs. Frequency Speri 21	Phase.corrected vs. Frequency Spri 23	Phase corrected vs. Frequency Spec	25
8. hifa_antpos 9. hifa_wrgcalflag 10. hif_lowgainflag 11. hif_setmodels 12. hifa_bandpassflag 13. hifa_bandpass 14. hifa_spwphaseup 15. hifa_gluxscaleflag	Spectral Window 17 ALMA Band 3 Intents: BANDPASS Fields: J1058+0133	Spectral Window 21 ALMA Band 3 Intents: BANDPASS Fields: J1058+0133	Spectral Window 23 ALMA Band 3 Intents: BANDPASS Fields: J1058+0133	Spectral Window 25 ALMA Band 3 Intents: BANDPASS Fields: J1058+0133	
16. htfa_gfluxscale 17. htfa_timegaincal 18. htfa_targetflag 19. htf_applycal 20. htf_makeimiist (cals) 21. htf_makeimiist (checksrc) 23. htf_makeimiist (checksrc) 24. htfa_imageprecheck 25. htf_checkproductsize 26. htfa_renorm 27. htfa_expotdata	Planetorested is. Property Spir. 17	Platescorrected vs. frequency Spir 21	Phase-corrected vs. Prequency Sper 23	Phasecorrected vs. Frequency Spr	25
28. hif_mstransform 29. htfa_flagtargets 30. htf_makeimlist (mfs) 31. hif_findcont 32. hif_uvcontfit	Calibrated amplitude vs UV distance Plots of calibrated amplitude vs UV distance for the calibrators in ea	ch measurement set. Data are plotted for all antennas, coloured by	correlation.		

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

1							
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J.MA	A Home By Topic	By T	ask				2021.1.00499.S
Tasks i           1. hifa_           2. hifa_           3. hifa_           4. hifa_ra	in execution order importdata flagdata fluxcallfag awflagchans			(Corrected amplitude / model) vs a Plots of the ratio of the corrected amplitude to the model colu uidA002_Xf396d6_X45bb.ms Plots for AMPLITUDE calibration intent were created with UV	Intenna Imn value versus antenna ID. Data are coloured by antenna and are range set to capture the inner half of the data (UV max < 449.2 m)	shown for all antennas and correlations. . Plots for other intents have no UV range restriction.	
5. hif_n 6. h_ts 7. hifa_ 8. hifa_ 9. hifa_ 10. hif_ 11. hif_	efant yscal tsysflag antpos wwgcalflag Jowgainflag setmodels		9 9	$\begin{array}{c} \begin{array}{c} \begin{array}{c} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	$\begin{array}{c} \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\ \text{Arga corrected under f vectory vs. Antennal 5 per 21} \\ \\$	Ampcorrected model (vector) w. Antenna 1 Sput 23	
12. hifa 13. hifa 14. hifa 15. hifa 16. hifa	_bandpassflag _bandpass spwphaseup gfluxscaleflag gfluxscale		9	Spectral Window 17 ALMA Band 3 Intents: AMPLITUDE, BANDPASS Fields: J1058+0133	Spectral Window 21 ALMA Band 3 Intents: AMPLITUDE, BANDPASS Fields: J1058+0133	Spectral Window 23 ALMA Band 3 Intents: AMPLITUDE,BANDPASS Fields: J1058+0133	Spectral Window 25 ALMA Band 3 Intents: AMPLITUDE, BANDPASS Fields: J1056+0133
17. hifa 18. hifa 19. hif_ 20. hif_ 21. hif_ 22. hif_ 23. hif_ 24. hifa	_timegaincal _targetflag applycal makeimlist (cals) _makeimlist (checksrc) _makeimlist (checksrc) _makeimages (checksrc) _imageprecheck		Ð	Approximated (vector) vs. Astrona 1 Spr: 12	Augustational function in Automation 2 points 2 and 2 points	Approver Cells and a Capacity 21 and a capacity of the capaci	Approximation of frequency w, Annual Jpar 22 1 1 1 1 1 1 1 1 1 1 1 1 1
25. hif_ 26. hifa 27. hifa 28. hif_	checkproductsize L_renorm L_exportdata mstransform			Spectral Window 17 ALMA Band 3 Intents: PHASE Fields: J1148+1840	Spectral Window 21 ALMA Band 3 Intents: PHASE Fields: J1148+1840	Spectral Window 23 ALMA Band 3 Intents: PHASE Fields: J1148+1840	Spectral Window 25 ALMA Band 3 Intents: PHASE Fields: J1148+1840
29. hifa 30. hif_ 31. hif_ 32. hif_	_flagtargets makeimlist (mfs) findcont uvcontfit			(Corrected amplitude / model) vs L Plots of the ratio of the corrected amplitude to the model colu	JV distance umn value versus UV distance. Data are coloured by antenna and a	re shown for all antennas and correlations.	

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

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12. hifa_bandpassflag 13. hifa_bandpass 14. hifa_spwphaseup 15. hifa_gfluxscaleflag 16. hifa_gfluxscale 17. hifa_timegaincal 18. hifa_targeflag 19. hif_applycal 20. hif_makeimlist (cals) 21. hif_makeimlist (checksrc) 23. hif_makeimlist (checksrc) 23. hif_makeimlist (checksrc)	•	J1058+0133 (BANDPASS)	17 / X1620027342#ALMA_RB_03#BB_1#SW-01	21/ X1620027342#ALMA_RB_03#BB_3#SW-01	23 / X1620027342#ALMA_RB_03#BB_4#SW-01	25 / X1620027342#ALMA_RB_03#BB_2#SW-0	7
24. hifa_imageprecheck 25. hif_checkproductsize 26. hifa_renorm	0	centre frequency of image	87.8709GHz (LSRK) 0.533 x 0.504 arcsec	100.0536GHz (LSRK) 0.480 x 0.402 arcsec	101.6100GHz (LSRK) 0.462 x 0.404 arcsec	89.6315GHz (LSRK) 0.542 x 0.490 arcsec	
23. hifa_exportdata 28. hifa_mstransform		beam p.a. final theoretical sensitivity	-65.7deg 50 uJy/beam	-23.5deg 50 uJylbeam	-20.4deg 53 uJylbeam	-63.7deg 52 uJy/beam	
29. hifa_flagtargets 30. hif_makeimlist (mfs) 31. hif_findcont 32. hif_uscontfi		cleaning threshold	3.1 mJy/beam Dirty DR: 8.5e+04 DR correction: 31	2.9 mJy/beam Dirty DR: 7.9e+04 DR correction: 28	2.9 mJy/beam Dirly DR: 7.5e+04 DR correction: 27	3 mJy/beam Dirty DR: 8.2e+04 DR correction: 29	
32. hif uscontoub		clean residual peak / scaled	10.62	14.39	13.49	11.71	

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

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Tasks in execution order 1. hifa_importdata 2. hifa_flagdata 3. hifa_flagdata	Clean res	ults for J1058+0133 (BANDPASS) SpW	/ 17	H H BACK
<ol> <li>hif_rawflagchans</li> <li>hif_refant</li> </ol>	Iteration	Image	Residual	Clean Mask
6. h_tsyscal 7. hifa_tsysflag 8. hifa_antpos 9. hifa_wvrgcalflag 10. hif_lowgainflag 11. hif_setmodels 12. hifa_bandpassflag 13. hifa_bandpass	1	The processing states and states	The number of the second secon	University of the second secon
14. hita_spwphaseup 15. hita_gfluxscaleflag 16. hita_gfluxscale 17. hita_timegaincal 18. hita_targetflag 19. hit_applycal 20. hit_makeimilist (cals) 21. hit_makeimiages (cals) 22. hit makeimist (checksrc)	0		The number of approximation of approxima	
23. hif_makeimages (checksrc) 24. hifa_imageprecheck 25. hif_checkproductsize 26. hifa_renorm 27. hifa_exportdata 28. hif_mstransform 29. hifa_flagtargets 30. hif_makeimiist (mfs) 31. hif_findcont		for a subject of the		Final Model

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

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Tasks in execution order 1. hifa_importdata 2. hifa_itagdata	24. Image Pre	-Check						BACK
1. mig_ubx2amag     4. hif_ravflagchans     5. hif_refant     6. h_tsyscal     7. hifa_tsysflag     9. hifa_wxrgcalflag     10. hif_lowgainflag     10. hif_lowgainflag     11. hif_setmodels     12. hifa_bandpassflag     13. hifa_bandpass     14. hifa_spwphaseup     15. hifa_gfluxscaleflag     16. hifa_gfluxscale	Goals From OT: Representative Target: PJ113921.7 Representative Frequency: 89.6314 Bandwidth for Sensitivity: 11.96 MH Min / Max Acceptable Resolution: C Maximum expected beam axial rati Goal PI sensitivity: 0.405 mJy Single Continuum: False Estimated Synthesized Beat Estimates are given for four possibil that predicts a beam area (defined a is chosen if the predicted beam area aggregate continuum bandwidth (ag is predicted using all spws, otherwise	GHz (SPW 25) z (rounded to nearest integer #channels (3), repBW .566 arcsec / 0.850 arcsec o (from OT): 2.5 arm and Sensitivities for the Represental e values of the tclean robust weighting parameter: r is simply major x minor) that is in the range of the a is too small, and robust=0.0 is chosen if the pred gBW) is also given assuming NO line contaminatio se the beam is predicted for the repSPW alone. A i	/ = 11.72 MHz) tive Target/Frequency obust = 0.0, +0.5 (default), +1.0, and +2.0. If the "N PI requested beam areas according to the table row icted beam area is too large. The chosen robust valu hot accounting for spw frequency overlap. If the Ba message appears on the "By Task" view if a non-defa	tin / Max Acceptable Resolt for repBW (Bandwidth for Sen te is highlighted in green and t dwidth for Sensitivity (repBW ault value of robust (i.e., not +0	ution" is available (>−Cyc sitivity) is chosen. If none c used for all science target in j > the bandwidth of the ).5j is chosen. Additionally.	cle 5 12-m Array data), the first of these robust values pred maging. In addition to an e spw containing the repress ; if the predicted beam is n	he robust value closest to ict a beam area that is in stimate for the repBW, an entative frequency (repSP tot within the PI requested	the default (+0.5) range, robust=+2.0 estimate for the W), then the beam range using one of
17. nina_timegancai 18. hifa_targetflag 19. hif_applycal 20. hif_makeimiist (cals) 21. hif_makeimages (cals) 22. hif_makeimiist (checksrc) 23. hif_makeimages (checksrc)	the four robust values, Warning mer These estimates should always It bandwidth due to the hif_findcont pr calibration deficiencies (poor phase the relevant spws as described abo robust uvtaper	ssages appear on this page. De considered as the BEST CASE SCENARIO. To ccess (i.e. removal of lines and other spectral featur transfer, residual baseline based effects, residual a ve. The synthesized beam for a single channel in to Synthesized Beam	hese estimates account for Tsys, the observed uv-co res from the data used to image the continuum): (3) intenna position errors, etc.). It is also important to r a cube will typically be larger and can be significantly Cell	werage, and prior flagging. The Issues that affect the image q note that both the repBW and y larger depending on the deta Beam Ratio	estimates DO NOT accou uality like (a) poor match o aggBW beam calculations ils of uv-coverage and char Bandwidth	Int for (1) subsequent scier of uv-coverage to image cor a are intrinsically multi-frequence annel width. BW Mode	nce target flagging; (2) los mplexity; (b) dynamic rang uency synthesis continuur Effective Sensitivity	s of continuum ge effects; (c) n calculations, using
24. hifa_imageprecheck	0.0	0.489 x 0.380 arcsec @ -14.2 deg	0.076 x 0.076 arcsec	1.29	11.72 MHz	repBW	0.00033 Jy/beam	
25. hif_checkproductsize	0.0	0.457 x 0.306 arcsec @ -18.5 deg	0.061 x 0.061 arcsec	1.29	7255 MHz	aggBW	1.24e-05 Jy/beam	
27. hifa_exportdata	0.5	0.616 x 0.463 arcsec @ -19.2 deg	0.093 x 0.093 arcsec	1.33	11.72 MHz	repBW	0.00025 Jy/beam	
28. hif_mstransform	0.5	0.581 x 0.387 arcsec @ -20.2 deg	0.077 x 0.077 arcsec	1.33	7255 MHz	aggBW	9.38e-06 Jy/beam	
29. hifa_flagtargets 30. hif makeimlist (mfs)	1.0 []	0.889 x 0.590 arcsec @ -33.7 deg	0.12 x 0.12 arcsec	1.51	11.72 MHz	repBW	0.000222 Jy/beam	
31. hif_findcont	1.0 []	0.809 x 0.508 arcsec @ -29.5 deg	0.1 x 0.1 arcsec	1.51	7255 MHz	aggBW	8.35e-06 Jy/beam	
32. hif_uvcontfit 33. hif_isicontcub	2.0 П	1.03 x 0.665 arcsec @ -36.8 dec	0.13 x 0.13 arcsec	1.55	11.72 MHz	repBW	0.000219 Jv/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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	A Home By Topic	By Task									2021.1.00499.S	3
Tasks in execution order       Estimates are given for four possible values of the tclean robust weighting parameter: robust = 0.0, +0.5 (default), +1.0, and +2.0. If the "Min / Max Acceptable Resolution" is available (>=Cycle 5 12-m Array data), the robust value closest to the default (+0.5)         1. hifimportdata       Estimates are given for four possible values of the tclean robust weighting parameter: robust = 0.0, +0.5 (default), +1.0, and +2.0. If the "Min / Max Acceptable Resolution" is available (>=Cycle 5 12-m Array data), the robust values predict a beam area is to large. The chosen robust value is highlighted in green and use for all science target imaging. In addition to an estimate for the repBW, an estimate for the aggregate continuum bandwidth (aggBW) is also given assuming NO line contamination but accounting for spw frequency overlap. If the Bandwidth for Sensitivity (repBW) is > the bandwidth of the spw containing the representative frequency (repSPW), then the beam is predicted beam is not within the PI requested name as is to large. The chosen robust value is highlighted in green and use for rabust = 0.0, +0.5 (scheme robust value is highlighted in green and use for all science target imaging. In addition to an estimate for the repBW, an estimate for the aggregate continuum bandwidth (aggBW) is also given assuming NO line contamination but accounting for spw frequency overlap. If the Bandwidth for Sensitivity (repBW) is > the bandwidth of the spw containing the representative frequency (repSPW), then the beam is predicted beam is not within the PI requested range using on the four robust values, Warning messages appear on this page.         6. hif_refant       These estimates should always be considered as the BEST CASE SCENARIO. These estimates account for Tys, the observed uv-coverage, and prior flagging. The estimates DO NOT account for (1) subsequent science target flagging;												9
9. nita_	wvrgcamag Iowgainflag	9	robust	uvtaper	Synthesized Beam	Cell	Beam Ratio	Bandwidth	BW Mode	Effective Sensitivity		
11. hif_s 12. hifa	setmodels	9	0.0	0	0.489 x 0.380 arcsec @ -14.2 deg	0.076 x 0.076 arcsec	1.29	11.72 MHz	repBW	0.00033 Jy/beam		
13. hifa	bandpass	Ť	0.0	0	0.457 x 0.306 arcsec @ -18.5 deg	0.061 x 0.061 arcsec	1.29	7255 MHz	aggBW	1.24e-05 Jy/beam		
14. hifa	_spwphaseup		0.5	0	0.616 x 0.463 arcsec @ -19.2 deg	0.093 x 0.093 arcsec	1.33	11.72 MHz	repBW	0.00025 Jy/beam		
16. hifa	_gfluxscale		0.5	0	0.581 x 0.387 arcsec @ -20.2 deg	0.077 x 0.077 arcsec	1.33	7255 MHz	aggBW	9.38e-06 Jy/beam		
17. hifa	_timegaincal		1.0	0	0.889 x 0.590 arcsec @ -33.7 deg	0.12 x 0.12 arcsec	1.51	11.72 MHz	repBW	0.000222 Jy/beam		
18. hifa_ 19. hif_i	_targetflag applycal		1.0	D	0.809 x 0.508 arcsec @ -29.5 deg	0.1 x 0.1 arcsec	1.51	7255 MHz	aggBW	8.35e-06 Jy/beam		
20. hif_i	makeimlist (cals)		2.0	0	1.03 x 0.665 arcsec @ -36.8 deg	0.13 x 0.13 arcsec	1.55	11.72 MHz	repBW	0.000219 Jy/beam		
21. hif_i 22. hif_i	makeimages (cals) makeimlist (checksrc)		2.0	0	0.968 x 0.591 arcsec @ -33.9 deg	0.12 x 0.12 arcsec	1.55	7255 MHz	aggBW	8.21e-06 Jy/beam		
23. hif_i	makeimages (checksrc)											
24. hifa	_imageprecheck	0	Pipeline G	QA								
25. hit_0	renorm		Input Para	ameters								
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30. hif_i	makeimlist (mfs)			-								
31. hif_1	findcont		View	w or download sta	je24/casapy.log (463.2 KB)							
32. hif_i	uvcontfit											
- 22 - kif -	wenteuh											

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

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$\leftarrow$ $\rightarrow$ C $\textcircled{a}$	file:///D:/pipeline/html/t2-4m.html?sidebar=sidebar_stage26&ms=all&sul	bpage=t2-4m_details.html			E 🏠	i	=					
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Tasks in execution order 1. hifa_importdata 2. hifa_flagdata 3. hifa_fluxcalflag	26. Renormalization	26. Renormalization										
<ul> <li>4. hf_rawllagchans</li> <li>5. hf_refant</li> <li>6. h_tsyscal</li> <li>7. hifa_tsysflag</li> <li>8. hifa_antpos</li> <li>9. hifa_wrgcalflag</li> <li>10. hif_lowgainflag</li> <li>11. hif_setmodels</li> <li>12. hifa_bandpassflag</li> <li>13. hifa_bandpass</li> <li>14. hifa_spwphaseup</li> <li>15. hifa_gfluxscaleflag</li> <li>16. hifa_gfluxscale</li> <li>17. hifa_timegaincal</li> <li>19. bica_bandpass</li> </ul>	ALMA cross-correlations are divided by the auto-correlation as a func single dish spectrum), that emission can anomalously decrease the or factor as a function of frequency that can be used as a first order con dotted vertical lines) for that fitting. The fitted AC ratio is presented the All targets, spws, and measurement sets with maximum scaling abo Informative plots are collected in a pdf for each spw and source, linke The first plot in the pdf is a ReNormSpectra summary plot showing th mean is plotted solid. The pdf next contains RenormDiagnosicCheck plots corresponding to Heuristics in the renormalization script have been applied to detect at Features in the scaling spectrum associated with atmospheric featur any applied correction when performing line science at frequencies or	ALMA cross-correlations are divided by the auto-correlation of frequency, in the correlator. This has a variety of advantages for operations and calibration, but if there is strong line emission detected in the autocorrelation (i.e. as would be detected single dish spectrum), that emission can anomalously decrease the cross-correlation amplitude at those frequencies. This effect can be mitigated by comparing the autocorrelation spectrum (AC) of the target AC provides factor as a function of frequency that can be used as a first order correction spectrum. However, atmospheric and instrumental variation (e.g. baseline ripple) need to be fitted and removed, so the spectrum is divided into several segments (marked on the plot dotted vertical lines) for that fitting. The fitted AC ratio is presented here as the 'renorm scale factor' or 'renorm amplitude'. All targets, spws, and measurement sets with maximum scaling above the observatory determined threshold will have the scaling applied. Informative plots are collected in a pdf for each spw and source, linked from the table below. The first plot in the pdf is a ReNormSpectra summary plot showing the average scaling spectrum over all scans, and for mosaics, all fields in the mosaic with peak scaling above the threshold. All antennas are plotted as dashed red and blue (for XX and YY), mean is plotted solid. The pdf next contains RenormDiagnosicCheck plots corresponding to each field and scan. The scaling spectrum is plotted as solid lines for each antenna (again red and blue for XX and YY), and the median as a dashed line (green and black for XX and YY). Heuristics in the renormalization script have been applied to detect and correct spikes, dips, and jumps near the segment boundaries (marked with thin vertical dotted lines). Less significant (below the threshold for applying the correction) features may rema Features in the scaling spectrum associated with atmospheric features require additional care - ALMA data reduction staff will have evaluated these and minimized										
	MS/Source/SPW that trigger the need for renormalization above Please refer to the Pipeline User's Guide (linked to this weblog's Hone MS Name uidA002_Xf396d6_X45bb.ms Renormalization results Pipeline QA Input Parameters	re a threshold of 1.02 highlighted i ne page) for more details on renormal Source Name S PJ113921.7 2	in red. Iization and in SPW 25	expretation of the plots. Max Renorm Scale Factor (field id) 1.0015076 (3)	PDF Link to Diagnostic Plots PDF							
30. htf_makeimlist (mfs) 31. htf_findcont 32. htf_uvcontfit	Tasks Execution Statistics	Iput Parameters asks Execution Statistics										
The PDF linked in this page contains the diagnostic plots. If renormalization is triggered, it is useful to check that it is because of spectral lines from the source and not atmospheric spectral features (which will correspond to dips in the atmospheric transmission curves).





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





sid__ACC2_st79648_64586.ms Target: P[112021.7 Spec 25 Scan: 7 Held : Charsel







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

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32. hif_u	uvcontfit		final theoretical sensitivity	23 uJy/beam	18 uJy/beam	19 uJy/beam	21 uJy/beam	
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39. hif_r	makeimlist (cube_repBW)		non-pbcor image RMS	26 uJy/beam	21 uJy/beam	21 uJy/beam	24 uJy/beam	
40. hif_r	makeimages (cube_repBW)		pbcor image max / min	479 / -299 uJy/beam	297 / -265 uJy/beam	265 / -324 uJy/beam	319 / -294 uJy/beam	

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24. hifa_imageprecheck	0		- Reference position	- Advence poster	- Reference posterio		
25. hif_checkproductsize			Rept Accession (arcsec) Rept Accession (arcsec)	August Accession (1997)     August Accession (1997)     August Accession (Arctice)     August Accession (Arctice)	Rept Accession (1997) (1998)	Right Accession (arcsec)	**
26. hifa_renorm			View other QA images	View other QA images	View other QA images	View other QA images	
27. hifa_exportdata							
28. hif_mstransform		centre / rest frequency of cube	87.8616GHz / 339.0000GHz (LSRK)	100.0440GHz / 386.0000GHz (LSRK)	101.6004GHz / 392.0000GHz (LSRK)	89.6280GHz / 345.7960GHz (LSRK)	
29. hifa_flagtargets		beam	0.915 x 0.617 arcsec	0.819 x 0.465 arcsec	0.748 x 0.463 arcsec	0.907 x 0.608 arcsec	
30. hit_makeimiist (mrs)		beam p.a.	-33.9deg	-29.0deg	-23.6deg	-33.8deg	
32. hif uvcontfit							
33. hif uvcontsub		final theoretical sensitivity	0.12 mJy/beam	0.12 mJy/beam	0.12 mJy/beam	0.37 mJy/beam	
34. hif_makeimages (mfs)		cleaning threshold	0.23 mJy/beam	findCont=AllCont, no cleaning	findCont=AllCont, no cleaning	1.1 mJy/beam	
35. hif_makeimlist (cont)			Dirty DR: 6.3 DR correction: 1	0 Jy/beam Dirty DR: 6.2	0 Jy/beam Dirty DR: 6.2	Dirty DR: 21	
36. hif_makeimages (cont)				DR correction: 1	DR correction: 1	Direction and	
37. hif_makeimlist (cube)		clean residual neak / scaled	5.50	5.60	5.67	6.55	
38. hif_makeimages (cube)		MAD	3.30	-3.03	-5.67	0.00	
<ul><li>39. hif_makeimlist (cube_repBW)</li><li>40. hif_makeimages (cube_repBW)</li></ul>		non-pbcor image RMS / RMS / RMS	0.13 / 0.12 / 0.13 mJy/beam	0.13 / 0.12 / 0.14 mJy/beam	0.14 / 0.13 / 0.16 mJy/beam	0.42 / 0.4 / 0.45 mJy/beam	

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<pre>h Landard Landard</pre>	10. hif_lowgainflag	0	Clean results for	or PJ113921.7 (TARGE	T) SpW 17				M N BACK
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1 Augusta       1 Ref or       1 Ref or <t< th=""><th>12. hifa_bandpassflag</th><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	12. hifa_bandpassflag	0							
<ul> <li>14. Supportance</li> <li>15. Supportance</li> <li>16. Supporta</li></ul>	13. hifa_bandpass		Iteration Image	Residual	Clean Mask	Line-free Moment 0	Line-free Moment 8	Spectr	а
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The inset in the PSF image (when present) corresponds to the central 41 pixels of the PSF. When the beam shape is significantly non-Gaussian, the dotted contour of the 50% level of the PSF image will become distinctly visible apart from the fitted synthesized beam, which is shown as the solid contour.