

Disk Substructures at High Angular **Resolution Project (DSHARP)**

Target: HD 163296 Project: 2016.1.00484.L

Publications: e.g. Andrews et al. 2018, ApJL, 869, L41 Rab et al. 2020, A&A, 642, A165

https://almascience.eso.org/alma data/lp/DSHARP/

					Contractor in the second second	Contractor of Contractor	-	and the second se	The second second		
			archiv	/e: h	ttps://	/al	ma	scie	nce.	eso.o	rg/
					-						
Q	ALMA source name: HD	_163296								£ <mark>1</mark>	
Ø Position	S Energy	Project	Publication	ı ©	Observation			Lines		Redshift	
Source name	Frequency	Project code	BibCode	O	oservation Date		-			0.000019 (e	estimated) 👻
							5	- verm	7		Reset extremes
ALMA source name HD_163296	Band	Project Title	Publication Title	Po	larisation Type		H2180 v=0 H13C0+ 2-	HCO+ v=0 H13CN v= C180 2-1	CHRON A	13CH3	CO V-0
RA Dec	Spectral resolution	Project abstract	Abstract	м	ember ous id		v=0 3(1	v=0 3-3 v=0 J= 2-1	03-2 0 j=4-		0.4-3
	Spectral resolution	Flojectabatlact	Abstract		eniber ous iu		1,3)-2(3-2	3 5(2,4)-5	-1-2(1,2)	m
Galactic	Continuum sensitivity	PI Full Name	First Author	0	oject type		2,0)		(1,4)	+-3(2,1)	$1/\Lambda$
					*					U V	V V
Target List	Line sensitivity (10 km/s)	Proposal authors	Authors				200 CHz	7 8	300 GHz	400 CHz	.0
•											
Angular Resolution		Science keyword			Options Public data only						2 × 1
Maximum Recoverable Scale					Calibration						,
					observations		s Ang. res.	Min. vel. res.	Array Mos	aic Max. reco. sca	le FOV
Ψ↔		himis* dimis*	mJy/beam =				arcsec *	km/s ~		arcsec *	arcsec *
(;) ↔ … [mi] 2015.1.0		17-00-21.282 -21-07-21.803 0	0.0792 2	17.04232.99GH	2018-01-28	U	0.082	0.159	12m mos	aic 7.243	05.201
↔ … 📰 2015.1.00		17:56:21.280 -21:57:21.876 6		17.04232.99GH	2018-05-07	0	4.975	0.159	7m mos		78.071
. ↔ … 📰 2015.1.0	11137.S HD_163296	17:56:21.279 -21:57:22.545 8	0.4416 4	76.59492.18GH	2018-05-16	2	0.137	0.149	12m	5.877	12.021
	0484.L HD_163296	17:56:21.277 -21:57:22.563 6	0.0184 2	30.06247.89GH	2018-10-12	30	0.048	0.634	12m	1.125	24.366
↔ … 📰 2016.1.0	1086.S HD_163296	17:56:21.277 -21:57:22.565 3	0.0104	95.00110.67GHz	2018-10-19	0	0.068	2.668	12m	1.650	56.625
↔ … 🖃 2016.1.0	1086.S HD_163296	17:56:21.277 -21:57:22.561 7	0.0323 3	28.38343.81GH	2018-11-03	0	0.066	0.861	12m	0.953	17.325

- Hover mouse on Search box to open the 'search by parameter' window To download data, click on the upper-right download icon -
- -

	ALMA archive: https://a	Imascienc	ce.eso.org
ALMA Request Handler			Login
Anonymous User: Request #165	7722741416 🗸		
Request Title: click to edit			
Download Selected			
Dominioud Selected			
✓ readme ✓ product ✓ auxiliary ✓ raw		. Clas	Accesible Astisme
✓ readme ✓ product ✓ auxiliary ✓ raw Project / OUSet / Executionblock ✓ Request 1657722741416	✓ raw (semipass) ✓ external Updated File	Size 321 GB	Accessible Actions
Project / OUSet / Executionblock			Accessible Actions
Project / OUSet / Executionblock Contemporation Request 1657722741416	Updated File		Accessible Actions
Project / OUSet / Executionblock Image: Control of the second	Updated File		Accessible Actions
Project / OUSet / Executionblock ▼ ✓ ■ Request 1657722741416 ▼ ✓ ■ Project 2016.1.00484.L ▼ ✓ ■ Science Goal OUS uld://A001/X8c	Updated File 5X94 56 5020-07-		Accessible Actions
Project / OUSet / Executionblock ▼ ✓ Request 1657722741416 ▼ ✓ Project 2016.100484.L ▼ ✓ Science Goal OUS uid://A001/X8c5/X1 ▼ ✓ ■ Group OUS uid://A001/X8c5/X1	Updated File 50/94 95		Accessible Actions
Project / OUSer / Executionblock ▼ Ø ■ Project 2016.1.00484.L ▼ Ø ■ Genese Coal OUS udd/A001/X8e5/X1 ▼ Ø ■ Genese Coal OUS udd/A001/X8e5/X1 ▼ Ø ■ Genese Coal OUS udd/A001/X8e5/X1	Updated File 5X94 56 5020-07-		Accessible Actions
Project / OUSet / Executionhlock ♥ Request 1657227416 ♥ Project 2016.10494.L ♥ Project 2016.10494.L ♥ Executionhlock ♥ St HD_16329.a.g.06.TMI	Updated File 5XX94 55 55 55 55 7020-07- 13	321 GB	
Project / OUSet / Executionhlock ♥ ● Request 16677227416 ♥ ● Project 2016.10484.L ♥ ● Project 2016.10484.L ♥ ● Genero Coal OUS ubd/A001/X865X ♥ ● Genero Coal OUS ubd/A001/X865X ♥ ● Genero Coal OUS ubd/A001/X865X ♥ ● Ference Coal OUS ubd/A001/X865X	Updated File 55X94	321 GB 18 k8	
▼ colect / 00541 / Executionblock ▼ @ Request 16577227416 ▼ @ Request 16577227416 ▼ @ Chance Coal OUS ud/A0017626 ▼ @ Chance Coal OUS ud/A0017626 ▼ @ Member OUS ud/A0017626 ▼ @ Member OUS ud/A001762 ▼ @ Member OUS ud/A01762 ▼ @ Member OUS ud/A01762 </td <td>Updated File 50094 </td> <td>321 GB 18 KB 114 MB</td> <td>* * *</td>	Updated File 50094	321 GB 18 KB 114 MB	* * *
Project / OUSet / Executionhlock ♥ ● Request 16677227416 ♥ ● Project 2016.10484.L ♥ ● Project 2016.10484.L ♥ ● Genero Coal OUS ubd/A001/X865X ♥ ● Genero Coal OUS ubd/A001/X865X ♥ ● Genero Coal OUS ubd/A001/X865X ♥ ● Ference Coal OUS ubd/A001/X865X	Updated File 5x094 85 25 72 13 13 memberuid A001 X865 X98 README bd 2205.100484 Luid A001 X865 X98 README bd 2205.100484 Luid A001 X865 X98 auxiliarylar	321 GB 18 kB 114 MB 428 MB	ş

Could try to download at least the auxiliary tar file. It takes ~2min to download and untar

Q	1 18110 STOR ASSA 1111	10 ATA
NEW	ALMA archive: https://almascience.es	so.org/aq/ .∉ ⊲ ≡
	Download (157 GB) MOUS (130) GOUS (130) Ouick select File name Sort by Display only Quick select File Type * * 8 selected *	antimated) = 8 Consoler 1 10 10 Consoler 1
© 0b:	Project: 2018.10.048.4 L Science Goal: ubt///A001/X865/X96 Group OUS: ubt///A001/X865/X96 Gr	D Scientific cat
	Project: 2016.10.048.4 L Science Goal: uid://A001/X8c5/X96 Group OUS: uid://A001/X8c5/X96 Member OUS: uid://A001/X8c5/X96 Texpe OUS: uid://A001/X8c5/X96	Disks and plan Disks and plan Disks and plan Disks and plan Disks and plan
	Documentation: almascience.eso.org/alma-data/archive/archive-	documentation

Use the "quick select" box to choose the type of files you want to download (check sizes!)

Tutorial data

· ATTA AND AND AND A THOMAS

Target: HD 163296 Project: 2016.1.00484.L MOUS: uid://A001/X8c5/X96

Weblogs:

- HD163296_weblog.tgz:
 - Original: pipeline-20170914T223247
 - ARI-L: pipeline-20210529T073751

Datasets for imaging:

• HD163296_data_new.tgz

0		40 4	R CO AR		<u> <u> </u></u>	1 Thomas
	Da	ta p	backa	agi	ng	
Example of	data structure af	ter unpac	cking:			
	34.L/science_goa 4001_X8c5_X96	ıl.uidA	001_X8c5_X9	4/group.	uidA0	01_X8c5_X95/me
With subdire	ectories/files:					
README	calibration	log	product	qa	raw	script

Directory structure

T. TATLO STORATE STRATE A THOMAT A

project_id/

sg_ouss_id/ group_ouss_id/ member_ouss_id/

README

READ THIS FIRST (text file)

calibration/	calibration tables
log/	calibration and imaging log files
product/	the FITS cubes of all images
qa/	diagnostic summary and plots
raw/	created when ASDMs are unpacked
script/	calibration and imaging scripts

- MOUS (Member Observing Unit Set, one per Execution/Scheduling Block) are found inside the GOUS (Group Observing Unit Set) folder. Each GOUS folder can contain several MOUS which will usually be combined during reduction and imaging (e.g. different antenna configs.). The different GOUS folders (often for different sources or spectral setups) are all within a science goal (SG) folder. There can be multiple science goals per project.
- ASDM = ALMA Science Data Model
- README: contains CASA pipe version, QA2 summary, contents of each dir, various kinds of instructions (e.g. how to restore calibrated data)

	1. State scientific with a therefore
[[Directory structure
project_id/	
sg_ouss_id/	
group_o	
me	mber_ouss_id/
README	READ THIS FIRST (text file)
calibration/	calibration tables
log/	calibration and imaging log files
product/	the FITS cubes of all images
qa/	diagnostic summary and plots
raw/	created when ASDMs are unpacked
script/	calibration and imaging scripts

- MOUS (Member Observing Unit Set, one per Execution/Scheduling Block) are found inside the GOUS (Group Observing Unit Set) folder. Each GOUS folder can contain several MOUS which will usually be combined during reduction and imaging (e.g. different antenna configs.). The different GOUS folders (often for different sources or spectral setups) are all within the science goal (SG) folder. There can be multiple science goals per project.
- ASDM = ALMA Science Data Model
- README: contains CASA pipe version, QA2 summary, contents of each dir, various kinds of instructions (e.g. how to restore calibrated data)

Scripts

1. ATTAC STORAGE AND A THORAGE

scriptForPI.py

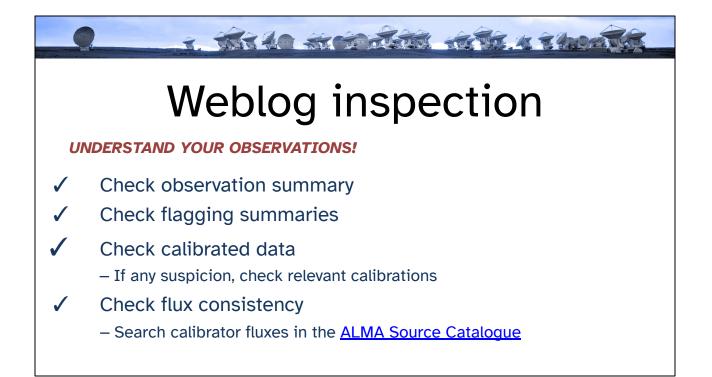
- Performs all necessary steps to obtain a calibrated Measurement Set
- Run within CASA check version in the README file or in WEBLOG

	1 ATTA STATE AND AND A THOUGH
[Directory structure
project_id/ sg_ouss_id/ group_ou mei	uss_id/ mber_ouss_id/
README.txt product/ calibration/ qa/ script/ log/ raw/ calibrated/	READ THIS FIRST the FITS cubes of all images calibration tables diagnostic summary and plots calibration and imaging scripts calibration and imaging log files created when ASDMs are unpacked created when scriptForPI.py is run

Final calibrated MS will be here

	T THE STORE STREET
[Directory structure
project_id/	-
sg_ouss_id/	
group_ou	uss_id/
mer	mber_ouss_id/
README.txt	READ THIS FIRST
product/	the FITS cubes of all images
calibration/	calibration tables
qa/	diagnostic summary and plots
script/	calibration and imaging scripts
log/	calibration and imaging log files
raw/	created when ASDMs are unpacked
calibrated/	created when scriptForPI.py is run

This is where the tarred weblog file is stored. It needs to be untarred and the html/index.html opened in a web browser.



The weblog is checked by the ALMA staff in charge of QA before data delivery, but various parts of it are also useful for the user to review

Weblog inspection

T. ATTA STORAGE ATTA & Though

Please navigate to your folder cd pipeline-20170914T223247/html/ LINUX: firefox index.html & OSX: open -a Firefox index.html &

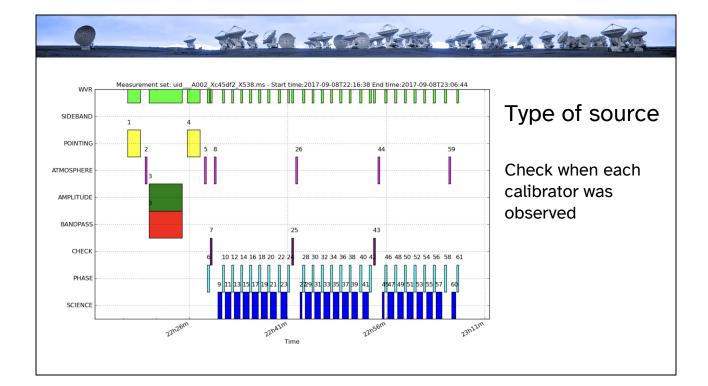
If there are problems: https://help.almascience.org/kb/articles/what-is-the-best-way-to-view-the-weblog

Display error? In a terminal, in the html/ folder, type: python3 -m http.server 8080 --bind 127.0.0.1

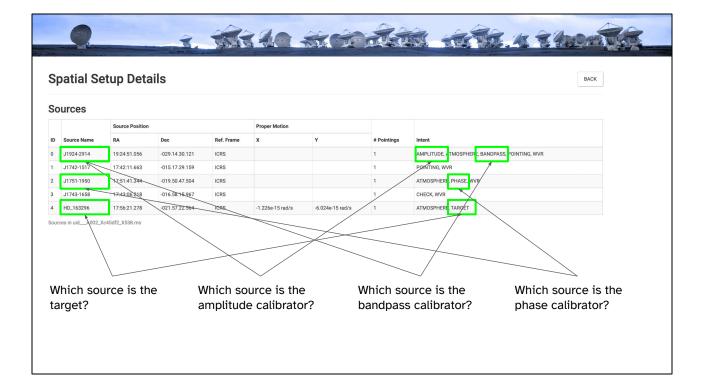
0	N	/ek		g ir		and the second		ct		« Dr	
Home By Topic By	Task			Pipeline Sumr	mary				2	2016.1.00484.L	Who is the PI of the project?
Project	uid://A001/X5ac/X43	Rf		Pipeline Version		ine-Cycle4-R2-B) (documentatio	0)			Which CASA version
Principal Investigator	sandrews			CASA Version	4.7.2 r39762	Ine-cycle4-K2-b) (uocumentatio	•••			— was used for the
OUS Status Entity id	uid://A001/X8c5/X96	i		Pipeline Start	2017-09-14 2	2:32:47 UTC					pipeline run?
Observation Start	2017-09-08 22:16:39	UTC		Execution Duration	23:13:45						pipetille fulli
Disservation End	2017-09-09 00:27:23	UTC									How many antennas observed?
	-		Time (UTC)			_	Baseline L	ength			Minimum and
Measurement Set	Receivers	Num Antennas	Start	End		On Source	Min	Max	RMS	Size	maximum baseline
Diserving Unit Set Status: uid://A001/X8 Session: session_1	c5/X96 Scheduling Block ID:	ui ://A001/X8c5/X43							4		length?
	ALMA Band 6	40	2017-09-08 22:16:38	2017-09-08 23:06	:44	0:20:07	41.4 m	5.8 km	2.2 km	58.7 GB	
idA002_Xc45df2_X538.ms											

- Home weblog page: overview of the observations
- The pipeline is run for each of the observing sessions (EBs) separately. The data for one EB is surrounded by orange box above.

			2014.1.00484.L
verview of 'uidA002_Xc45df2	_X538.ms'	CL	ICK
Ibservation Execution Time withink of Time Time Time Time Time Time Time Time	2073-0448 2216.886 2073-0546 2020-644 0-9556 0-95667	Intent vs Time Taak.can inter us trie	Field vs Time Total classes field vs time
patial Setup		Spectral Setup	
ience Targets 140,168296' iBrators 101742-1517; U1743-1658; U1751-1992	and INSA-SING	All Bands XLD Science Bands XLD	At Sand & and Work
Interins HD,165236' Inners 07742-1517;01743-1658;01751-1990 tenna Setup	and JUDA-SINF Alikan	All Bands XLN	
nee Targets 160,143249 Innees 01742-1617, 01743-1668, 01751-1692 tenna Setup Bandra		Al Bands 24.5 Extense Bands 24.5 Sky Setup	At Band F
tience Targets HD_163296'	41.4 m	Al Bands 2433 Editors Bands 243 Sky Setup Min Devatur	AS Road of AST 12 degrees



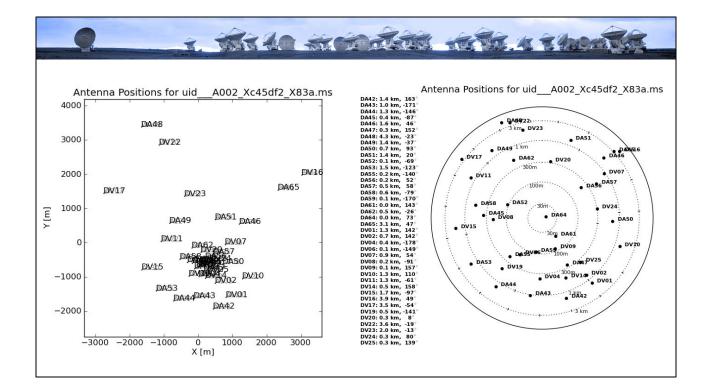
	<u>.</u> 3553 A.C		JUL SUL
Overview of 'uidA002_Xc45c	lf2_X538.ms'		
Ubservation Execution Time	2017 Sevilar 2014 Sall 2017 Sevilar 2014 Sevil 2017 Sevilar 2014 Sevilar 2017 Sevilar 2016 Sevilar	Entert va Time Tech scan intert n tre	Field vs Time This descent statistics
patial Setup CLLICK 90,16336 30000000 3000000 300000 300000 300000 3000000 300000 3000000 3000000 3000000 3000000 3000000 30000000 300000000		Spectral Setup At Book XUA by Exerce Rends 24.54 by Sky Setup	AC 24 M WR G C
din Baseline	41.4 m	Sky Setup Min Elevation	57.12 degrees
ax Baseline	5.8 km	Max Elevation	87.65 degrees
mber of Baselines	780		
Veather	- 20		
Weather plot		PWV plot	
icans			



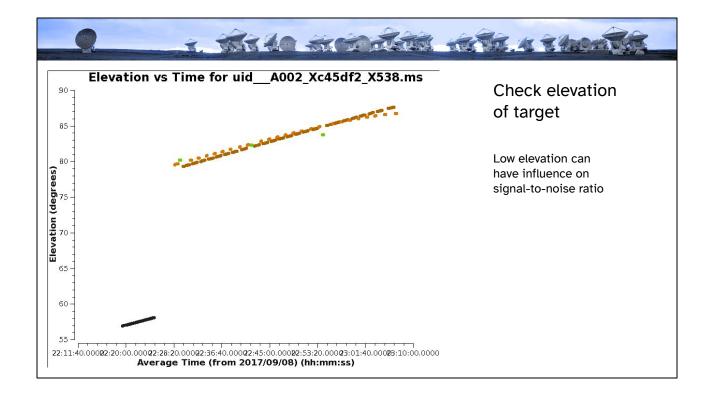
			2016.1.00484.L	
verview of 'uidA002_Xc45df2_	X538.ms'			
oservation Execution Time				
art Time	2017/09/08/22:16:38			
Time	2017/09/08/23/06/44			
I Time on Source	0:39-20 0:20:07			
Time on science Target	02007	Intent vs Time		
STORS OUTPUT		Track scan intent vs time	Field VS Time Track observed field vs time	
atial Oatur				
atial Setup		Spectral Setup		
	and 11024/2014		Band & and WVR	
	and 'J1924-2914'		Band 6'	
brators U1742-1517, U1743-1658, U1751-1950' a	and U1924-2914	Science Bands 74LM		
urraters U1742-1517; U1743-1668; U1751-1997 a	and '119242914' 41.4 m			
inners تا تاکیری تاکی تاکیر تاکیر تاکیر تاکیر تاکیر تاکیری تاکی تاکیری تاکیری		Science Bands XLM	Davd C	
inton 91742-1517, 91742-1658, 91751-1997 o tenna Setup Bustos Bastos	41.4 m	Science Bands 20.00 Sky Setup Mit Devalue	Anna C 15:11 degrees	
inters 2012-1917, 2012-1967, 2012-1997 / tenna Setup basine Basine der of Basines	41.4 m 5.8 km	Science Bands 20.00 Sky Setup Mit Devalue	Anna C 15:11 degrees	
anna 2012-1107/2013-466/2013-1497 tenna Setup Bastine Bastine Bastine Bastine Bastine Bastine	41.4 m 5.5 km 780	Sky Setup Sky Setup Ma Devation Mas Devation	Anna C 15:11 degrees	
	41.4 m 5.5 km 780	Science Bands 20.00 Sky Setup Mit Devalue	Anna C 15:11 degrees	
Notes 2012-117, 2013 466, 2013-1997 Interna Setup Interna Setup Interna	41.4 m 5.5 km 780	Sky Setup Sky Setup Ma Devation Mas Devation	Anna C 15:11 degrees	
Internet 2010/11/11/04/06/2019/00/ tenna Setupundeund	41.4 m 5.5 km 780	Sky Setup Sky Setup Ma Devation Mas Devation	Anna C 15:11 degrees	
www	41.4 m 5.5 km 780	Sky Setup Sky Setup Ma Devation Mas Devation	Anna C 15:11 degrees	
Internet 2010/11/11/04/06/2019/00/ tenna Setupundeund	41.4 m 5.5 km 780	Sky Setup Sky Setup Ma Devation Mas Devation	Anna C 15:11 degrees	
www	41.4 m 5.5 km 780	Sky Setup Sky Setup Ma Devation Mas Devation	Anna C 15:11 degrees	

Sp	ectral Se	etup Details	<u>.</u>				THE WE		BAC
Sci	ence Windows Al	l Windows							
Sci	ence Wind	ows							
	Frequency (TOPO)				Channels (TC				
ID	Start	Centre	End	Bandwidth (TOPO)	Number	Frequency Width	Velocity Width	Correlator Axis	Band
19 21	231.583 GHz	232.583 GHz 244.971 GHz	233.583 GHz 245.971 GHz	2.000 GHz 2.000 GHz	128	15.625 MHz	20.140 km/s	XX, YY XX, YY	ALMA Band 6
23	245.888 GHz	244.971 GHz	245.971 GHz	2.000 GHz	128	15.625 MHz	18.973 km/s	XX, YY	ALMA Band 6
25	230.052 GHz	230.521 GHz	230.990 GHz	937.500 MHz	3840	244.141 kHz	317.505 m/s	XX, YY	ALMA Band 6
	Which spe contains t ine?	ectral windo he ¹² CO u recognize	w	* Broad bar	ndwidth		number of cha		

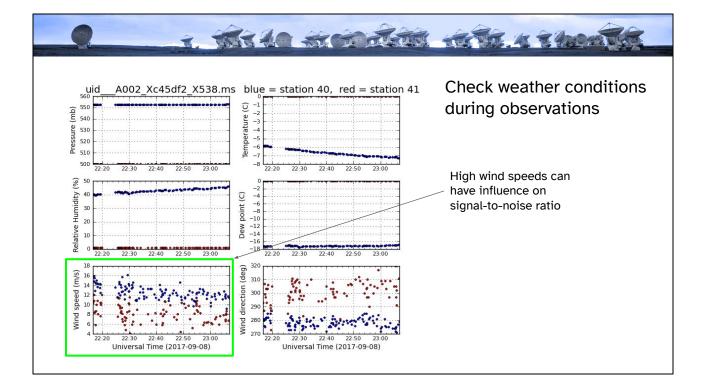
9	1. 23320	Si Co Alta	the Siz. As & back The
			2016.1.85484.L
Overview of 'uidA002_Xc45df2_X53	8.ms'		
Observation Execution Time Iter Time Inf Time	2017-04-68 22.16-38 2017-04-68 22.66-64 0.94-50		
Listops ourput	01007	Intent vs Time Track soal intert vi time	Field vs Time Taok.dournef field vs Time
Spatial Setup		Spectral Setup	
Kiteree Tregets HDL.162280" Withinkes U1742-1937, U1743-1689, U1739-1992 and U1924 Intenna Setup CLIICK	2814	All lands 24,04A lands doineo Bands 24,04A land Sky Setup	4 sud WAR 16
fin Baseline	41.4 m	Min Elevation	57.12 degrees
lax Baseline	5.8 km	Max Elevation	87.65 degrees
umber of Baselines umber of Antennas	780 40		
Veather		PWV	
Weather plot		PWW plot	
Scans			



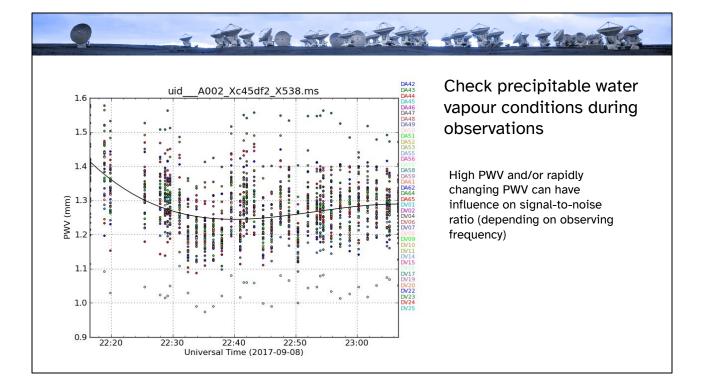
			2016-1.06444.1	
Overview of 'uidA002_Xc45df2	_X538.ms'			
Observation Execution Time	2017/09-68 22:16:38			
ind Time stal Time on Source	2017/09/08 23:06:44 0:39:20			
Ital Time on Science Target	62667	Intent va Time Track scan intert va time	Field vs Time Track daarved field vs time	
patial Setup		Spectral Setup		
kience Targets HD.,163296'			XLMA Band 6' and 'WVR'	
allerators 01742-1517; 01743-1658; 01751-195	0 and 'J1924-2914'	Sky Setup CLICK	Alada Band F	
fin Baseline	41.4 m	Min Lievation	57.12 degrees	
ax Baseline	5.8 km	Max Elevation	87.65 degrees	
iumber of Baselines iumber of Antennas	780			
	10.5	PWV		
Veather				
 Strandbarder state of the state				



			2016.1.00484.L	
Overview of 'uidA002_Xo	45df2_X538.ms'			
Observation Execution Time				
Start Time	2017/09/08 22:16:38			
ind Time	2017 09 08 23 06:44			
Total Time on Source Total Time on Science Target	0.39-20 0.20:07			
and the second second	water or	Intent vs Time		
LISTORS OUTPUT		Track scan intent vs time	Track observed field vs time	
patial Setup		Spectral Setup		
Science Targets HD_163296		All Bands XLMA Band I	E and WVR	
	58; U1751-1959' and U1924-2914'	Science Bands XUMA Band I		
Antenna Setup		Sky Setup		
Min Baseline	41.4 m	Min Elevation	57.12 dogrees	
Max Baseline	5.8 km	Max Elevation	87.65 degrees	
Number of Baselines	780			
Number of Antennas				
Veather	CLICK	PWV		
		R state		
A starter				
the fact that the second		PWV plot		
Weather plot				



verview of 'uidA002_Xc45df2_X	'538 me'			
			a/a/a/a/a/a/a/a/ a/a/	
eservation Execution Time	2017-09-08-22-16-38			
Time	2017/09/08 22 16:36		5- CHINER COMPANY COMPANY	
al Time on Source	0.39:20		- 1	
al Time on Science Target	0:20:07	Intent vs Time	11_11	
ISTORS OUTPUT		Track scan intent vs time	Field vs Time	
attial Setup wree Trayets 140,163256' binkers 1072421517(10742-1668)/01751-19997 and	1119242914	Science Bands XLMA 8	And F and WWR And F	
tenna Setup		Sky Setup		
Baseline «Baseline	41.4 m 5.8 km	Min Elevation Max Elevation	57.12 degrees 87.65 degrees	
n baselines	780	Mex Clevelues	67.03 Udgires	
nber of Anteonas	40			
			ІСК	



	Task									:	2016.1.00484.L
Observation Overvie	ew			Pipe	line Sum	mary					
Project	uid://A001/X5ac/X4	l3f		Pipeline	Version	r39732 (Pipe	eline-Cycle4-R2-B)	(documentati	on)		
Principal Investigator	sandrews			CASA Ve	rsion	4.7.2 r39762					
OUS Status Entity id	uid://A001/X8c5/X9	96		Pipeline	Start	2017-09-14	22:32:47 UTC				
Observation Start	2017-09-08 22:16:3	9 UTC		Executio	n Duration	23:13:45					
Observation End	2017-09-09 00:27:2	3 UTC									
Observation Summa	ary		Time (UTC)					Baseline I	.ength		
Measurement Set	Receivers	Num Antennas	Start		End		On Source	Min	Max	RMS	Size
Observing Unit Set Status: uid://A001/X	8c5/X96 Scheduling Block ID	: uid://A001/X8c5/X43									
Session: session_1											
uidA002_Xc45df2_X538.ms	ALMA Band 6	40	2017-09-08 22:16:3	8	2017-09-08 23:0	06:44	0:20:07	41.4 m	5.8 km	2.2 km	58.7 GB

2	Home By Topic By Task			2016.1.00484.1
/arni	ngs and Errors			
tage	Task	Туре	Message	
	hif_rawflagchans	Warning	uidA002_Xc45df2_X538.ms Iteration 1 raised 14 flagging commands	
	hif_rawflagchans	Warning	uidA002_Xc45df2_X83a.ms iteration 1 raised 3 flagging commands	
	hifa_tsysflag	Warning	flag edgechans - uidA002_Xc45df2_X538.ms iteration 1 raised 12 flagging commands	
	hifa_tsysflag	Warning	flag birdies - uidA002_Xc45df2_X538.ms iteration 1 raised 1 flagging commands	
	hifa_tsysflag	Warning	flag edgechans - uidA002_Xc45df2_X83a.ms iteration 1 raised 12 flagging commands	
4	hifa_spwphaseup	QA Warning	There are 3 mapped science spws for uidA002_Xc45df2_X538.ms	
4	hifa_spwphaseup	QA Warning	There are 3 mapped science spws for uidA002_Xc45df2_X83a.ms	
4	hifa_spwphaseup	Warning	Low SNR - Combined spw map required for uidA002_Xc45df2_X538.ms	
4	hifa_spwphaseup	Warning	Low SNR - Combined spw map required for uidA002_Xc45df2_X83a.ms	
9	19. hif_makeimages	Warning	Check source fit for J1743-1658 spwd 19: offet 5.731 marcsec 0.106 beams fit flux 0.296 Jy decoherence 28.910 percent	
9	19. hif_makeimages	Warning	Check source fit for J1743-1658 spwd 21: offet 6.750marcsec 0.131beams fit flux 0.279Jy decoherence 31.127 percent	
9	19. hif_makeimages	Warning	Check source fit for J1743-1658 spwd 23: offet 6.904marcsec 0.134beams fit flux 0.284Jy decoherence 29.781 percent	
9	19. hlf_makeimages	Warning	Check source fit for J1743-1658 spwd 25: offet 5.633marcsec 0.103beams fit flux 0.304Jy decoherence 27.503 percent	
D	20. hif_checkproductsize	QA Error	Maximum cube size cannot be mitigated. Remaining factor: 1.0240	
o l	20. hif_checkproductsize	Error	Maximum cube size cannot be mitigated. Remaining factor: 1.0240	

- Errors and warnings triggered during pipeline runs

5	≜ H	ome	By To	pic	By Ta:	sk																												201	6.1.004	84
age	ning	Sun	ıma	ries												_				_									_		-					
				_X538	me											С	he	ecl	< i	fa	any	ı a	nt	er	nna	as	ar	е	fu	lly	fla	ag	ge	be		
uiu_	_A00	2_AC	JUIZ		.1115																-									-		-	-			
Flagg	ng per	centage	s for S	ource na	ime: J1	1751-19	50, Inte	ents: W	VR,PHA	SE,ATN	IOSPHE	RE																								
spw	DA42	DA43	DA44	DA45	DA46	DA47	DA48	DA49	DA50	DA51	DA52	DA53	DA55	DA56	DA57	DA58	DA59	DA61	DA62	DA64	DA65	DV01	DV02	DV04	DV06	DV07	DV08	DV09	DV10	DV11	DV14	DV15	DV16	DV17	DV19	0
19	28.02	29.25	28.02	28.20	34.62	28.02	28.02	28.94	28.02	28.02	28.02	28.02	28.96	28.02	28.02	28.02	28.02	28.02	28.02	28.02	28.02	31.69	31.04	31.04	31.04	31.04	30.85	32.41	31.75	31.75	30.30	32.73	31.75	31.75	100.00	3
21	28.02	29.25	28.02	28.22	34.62	28.02	28.02	28.94	28.02	28.02	28.02	28.02	28.96	28.02	28.02	28.02	28.25	28.16	28.02	28.07	28.02	31.69	31.04	31.04	31.06	31.04	30.87	32.53	31.75	31.75	30.30	32.73	31.75	31.75	100.00	2
23	27.99	29.22	27.99	28.18	34.59	27.99	27.99	28.92	27.99	27.99	27.99	27.99	28.93	27.99	27.99	27.99	27.99	27.99	27.99	27.99	27.99	31.66	31.01	31.01	31.01	31.01	30.83	32.38	31.73	31.73	30.27	100.00	31.73	31.73	31.73	3
25	6.97	8.57	6.97	7.20	15.51	6.97	6.97	8.17	6.97	6.97	6.97	6.97	8.19	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	11.62	10.78	10.78	10.78	10.78	10.54	12.52	11.68	11.68	9.84	12.94	11.68	11.68	11.68	1
Elann	na ner	entere	e for S	urce n	me: HI	D_1632	06 Inte	nte [,] AT	MOSDH	EDE T	POET																									
DA4	DA4	3 DA4	4 DA4	5 DA4	DA4	7 DA4	8 DA4	9 DA5	0 DA5	1 DA5	2 DA5	3 DA5	5 DAS	6 DAS	7 DAS	8 DA59	DAG	1 DA6	2 DA6	4 DA6	5 DV01	DV02	DV04	DVD	5 DV0	7 DV08	DV09	DV10	DV11	DV1-	4 DV1	5 DV1	6 DV1	7 DV1	9 DV2	20
29.0	5 29.4	0 29.2	9 29.0	5 35.6	29.2	9 29.0	5 29.0	15 29.4	0 29.0	5 29.7	4 29.0	5 29.0	5 29.4	0 29.3	9 29.0	15 29.63	3 29.0	5 29.0	5 29.0	5 29.0	5 30.06	30.18	29.84	29.6	9 29.9	1 30.04	30.43	30.64	30.41	29.9	5 30.4	6 30.63	3 30.3	1 100.0	30.4	41
29.0	5 29.4	0 29.2	9 29.0	7 35.6	29.2	9 29.0	5 29.0	15 29.4	0 29.0	5 29.7	4 29.0	5 29.0	5 29.4	0 29.3	9 29.0	15 29.8	7 29.1	9 29.0	5 29.1	1 29.0	5 30.06	30.18	29.84	29.7	29.9	1 30.05	30.56	30.64	30.41	29.9	5 30.4	6 30.63	3 30.3	1 100.0	30,4	41
	5 29.4	0 29.2	9 29.0	6 35.6	5 29.2	9 29.0	6 29.0	16 29.4	0 29.0	6 29.7	4 29.0	6 29.0	6 29.4	0 29.3	9 29.0	16 29.64	4 29.0	6 29.0	5 29.0	6 29.0	6 30.07	30.19	29.85	29.6	29.9	1 30.04	30.43	30.64	30.41	29.9	5 100.0	30.6	3 30.3	1 30.5	3 30.4	41
29.0																																				

Flagging summaries. Check for completely flagged antennas, and perhaps also those with >~30% flagged data

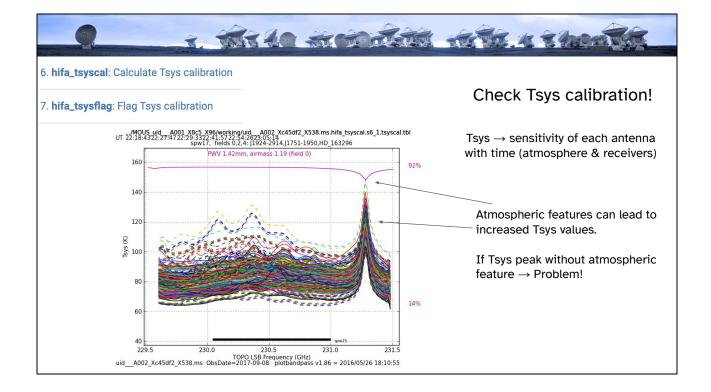
0			i din		A Thomas
Home By Topic By T					2016.1.0048
bservation Overview	N		Pipeline Sun	nmary	
roject	uid://A001/X5ac/X43f		Pipeline Version	r39732 (Pipeline-Cycle4-R2-B) (c	documentation)
Principal Investigator	sandrews		CASA Version	4.7.2 r39762	
US Status Entity id	uid://A001/X8c5/X96		Pipeline Start	2017-09-14 22:32:47 UTC	
bservation Start	2017-09-08 22:16:39 UTC		Execution Duration	23:13:45	
bservation End	2017-09-09 00:27:23 UTC				
bservation Summa	ry				
		Time (UTC)			Baseline Length

			Time (UTC)			Baseline Ler	ngth		
Measurement Set	Receivers	Num Antennas	Start	End	On Source	Min	Max	RMS	Size
Observing Unit Set Status: uid://A001/X8c5/X96	Scheduling Block ID: ui	d://A001/X8c5/X43							
Session: session_1									
uidA002_Xc45df2_X538.ms	ALMA Band 6	40	2017-09-08 22:16:38	2017-09-08 23:06:44	0:20:07	41.4 m	5.8 km	2.2 km	58.7 GB
uidA002_Xc45df2_X83a.ms	ALMA Band 6	40	2017-09-08 23:12:12	2017-09-09 00:27:22	0:34:13	41.4 m	5.8 km	2.2 km	95.4 GB

9. 4.	11140 Stor Alter 44	A Shorth
A Home By Topic By Task	Scor	res for each step
1. hifa_importdata: Register measurement sets with the pipeline		1.00
2. hifa_flagdata: ALMA deterministic flagging		1.00
3. hifa_fluxcalflag: Flag spectral features in solar system flux calibrators		1.00
0 4. hif_rawflagchans: Flag channels in raw data		1.00
5. hif_refant: Select reference antennas		1.00
6. hifa_tsyscal: Calculate Tsys calibration		1.00
7. hifa_tsysflag: Flag Tsys calibration		0.99
8. hifa_antpos: Correct for antenna position offsets		0.90
9. hifa_wvrgcalflag: Calculate and flag WVR calibration	1.37x improvement	0.69
10. hif_lowgainflag: Flag antennas with low gain		1.00
11. hif_gainflag: Flag antennas with gain outliers		1.00
12. hif_setjy: Set calibrator model visibilities		1.00
13. hifa_bandpass: Phase-up bandpass calibration		1.00
14. hifa_spwphaseup: Spw phase offsets calibration	There are mapped science spws	0.66
15. hifa_gfluxscale: Transfer fluxscale from amplitude calibrator		1.00
16. hifa_timegaincal: Gain calibration		1.00
17. hif_applycal: Apply calibrations from context		1.00
18. hif_makeimlist: Set-up image parameters for calibrator imaging		(1.00)
19. hif_makeimages: Make calibrator images	RMS vs. threshold	0.72
O 20. hif_checkproductsize: Check product size	Cube size mitigation error	0.00

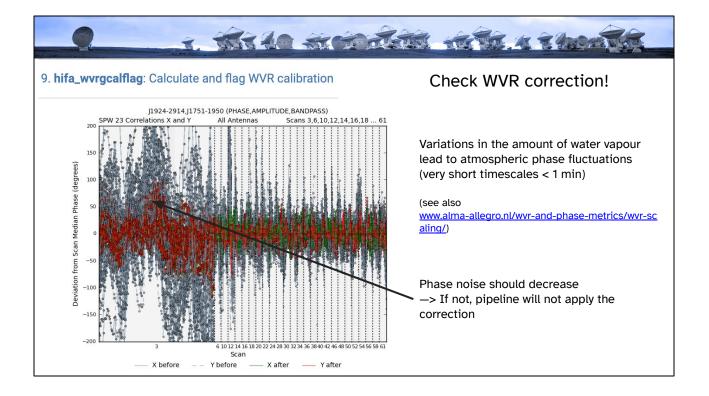
- "By task" summary is not displayed per measurement set as the Pipeline performs each step on every measurement set sequentially before proceeding to the next step
- The pipeline has its automatic algorithms to set the score at each step/task. These are refined each cycle. Colour-coded according to "goodness" of the score (all four colours displayed here)
- The little warning signs in yellow indicate there are warning/flag messages in that step

		AND HER LYND
A Home By Topic By Task		2016.1.00484.L
Task	QA Score	
1. hifa_importdata: Register measurement sets with the pipeline		1.00
2. hlfa_flagdata: ALMA deterministic flagging		1.00
3. htfa_fluxcalflag: Flag spectral features in solar system flux calibrators		1.00
9.4. hif_rawflagchans: Flag channels in raw data		1.00
5. ht/_refant: Select reference antennas CLICK		1.00
6. hifa_tsyscal: Calculate Tsys calibration		1.00
7. htfa_tsysflag: Flag Tays calibration		0.99
8. hifa_antpos: Correct for antenna position offsets		0.90
9. htfa_wvrgcafflag: Calculate and flag WVR calibration	1.37x improvement	0.69
10. tif Jowgainflag: Flag antennas with low gain		1.00
11. hif_gainflag: Flag antennas with gain outliers		1.00
12. hif_setjy: Set calibrator model visibilities		1.00
13. hifa_bandpass: Phase-up bandpass calibration		1.00
14. hifa_spwphaseup: Spw phase offsets calibration	There are mapped science spws	0.66
15. hifa_gfluxscale. Transfer fluxscale from amplitude calibrator		1.00
16. hifa_timegaincal: Gain calibration		1.00
17. hif_applycal: Apply calibrations from context		1.00
18. hlf_makeimlist: Set-up image parameters for calibrator imaging		1.00
19. hif_makeimages: Make calibrator images	RMS vs. threshold	0.72
20. hif_checkproductsize: Check product size	Cube size mitigation error	0.00

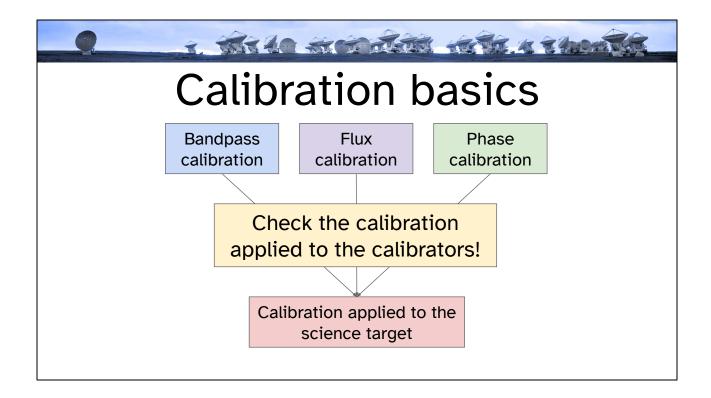


tsysflag: Several kinds of flags, each with its own algorithm. The most common are 'edge flags', and 'birdies' (spikes)

		ANO TRAVENO
and a state of the		
A Home By Topic By Task		2016.1.00484.L
Task	QA Score	
1. hifa_importdata: Register measurement sets with the pipeline		1.00
2. hlfa_flagdata: ALMA deterministic flagging		1.00
3. htfa_fluxcalflag: Flag spectral features in solar system flux calibrators		1.00
9.4. hif rawflagchans: Flag channels in raw data		1.00
5. ht/_refant: Select reference antennas		1.00
6. hlfa_tsyscal: Calculate Tsys calibration		1.00
7. http://tig:Fig:Toys calibration CLICK		0.99
8. hifa_antpos: Correct for antenna position offsets		0.90
9. hifa_wwgcalflag: Calculate and flag WVR calibration	1.37x improvement	0.69
10. hif Jowgainflag: Flag antennas with low gain		1.00
11. hif_gainflag: Flag antennas with gain outliers		1.00
12. htf_setjy: Set calibrator model visibilities		1.00
13. htfa_bandpass: Phase-up bandpass calibration		1.00
14. hifa_spwphaseup: Spw phase offsets calibration	There are mapped science spws	0.66
15. hifa_gfluxscale: Transfer fluxscale from amplitude calibrator		1.00
16. hifa_timegaincal: Gain calibration		1.00
17. hif_applycal: Apply calibrations from context		1.00
18. hif_makeimlist: Set-up image parameters for calibrator imaging		1.00
19. hif_makeimages: Make calibrator images	RMS vs. threshold	0.72
20. htf_checkproductsize: Check product size	Cube size mitigation error	0.00



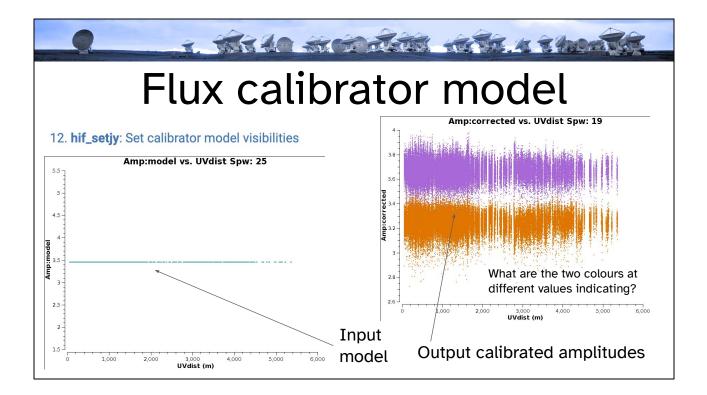
- Typically the decision on whether to apply the correction is based on the BP scan improvement level.
- In our case, the second MS has a smaller improvement (1.37), hence the blue colour on task summary page. Correction applied in both cases.



To be calibrated per antenna, spw, scan and polarisation (except for bootstrapped phase/amp cal when flux cal is polarised)

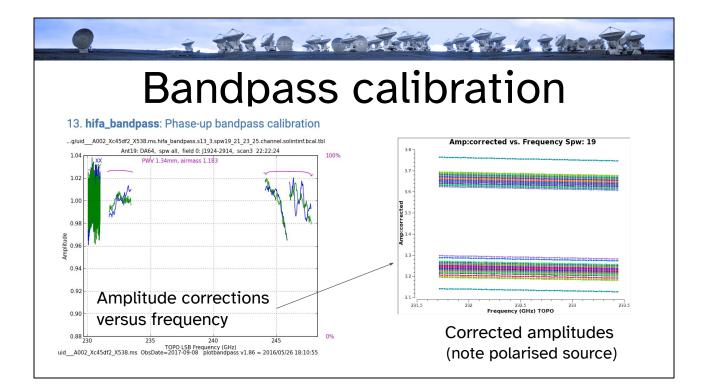
And a man and and a	Bo . no	20
		THE REAL
Annual and a second		
A Home By Topic By Task		2016.1.00484.L
Task	QA Score	
1. hifa_importdata. Register measurement sets with the pipeline		1.00
2. htfa_flagdata: ALMA deterministic flagging		1.00
3. htfa_fluxcalflag: Flag spectral features in solar system flux calibrators		1.00
0 4. htf.rxwflagchans: Flag channels in raw data		1.00
5. ht/_refant: Select reference antennas		1.00
6. htfa_tsyscal: Calculate Tsys calibration		1.00
9 7. hifa_tsysflag: Flag Tays calibration		0.99
8. hifa_antpos: Correct for antenna position offsets		0.90
9. hifa_wyrgcalflag: Calculate and flag WVR calibration 1.37x imp	ovement	0.69
10. hif Jowgainflag: Flag antennas with low gain		1.00
11. Nif_gainflag Flag anternas with gain outliers CLICK		1.00
12. htf_setjy: Set calibrator model visibilities		1.00
13. htfa_bandpass: Phase-up bandpass calibration		1.00
9 14. htfa_spwphaseup: Spw phase offsets calibration There are mapped sciences and the specific scale of the s	ice spws	0.66
15. hifa_gfluxseale: Transfer fluxseale from amplitude calibrator		1.00
16. hifa_timegalincal. Gain calibration		1.00
17. bif_applycal: Apply calibrations from context		1.00
18. Hif_makeimlist: Set-up image parameters for calibrator imaging		1.00
9 19. hif_makeimages: Make calibrator images	hreshold	0.72
0 20. hif_checkproductsize: Check product size Cube size mitiga	ion error	0.00

Weblog shows weird behaviour of model in spw 21 (for both MSs). Needs to be investigated.

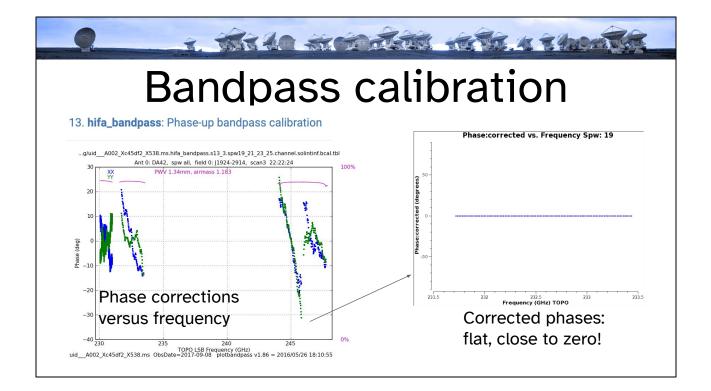


Calibrator is polarised but averaged amplitudes are used for flux calibration

	The In & And	AND LAND
A Home By Topic By Task		2016.1.00484.L
Task	QA Score	
1. http://mportdata: Register measurement sets with the pipeline		1.00
2. ht/a_flagdata: ALMA deterministic flagging		1.00
3. http://tuccalflag: Flag spectral features in solar system flux calibrators		1.00
A. htt_rawflagchans: Flag channols in raw data		1.00
5. htt_refant: Select reference antennas		1.00
6. htfa_tsyscal: Calculate Tsys calibration		1.00
97. htfa_tsysflag: Flag Tsys calibration		0.99
8. hifa_antpos: Correct for antenna position offsets		0.90
9. htfa, wvrgcalflag: Calculate and flag WVR calibration 1.37x impro	vement	0.69
10. ht/_Jowgainflag: Flag antennas with low gain		1.00
11. hif gainflag: Flag antennas with gain outliers		1.00
12. htt_setty: Set calibrator model visibilities CLICK		1.00
13. htfa_bandpass: Phase-up bandpass calibration		1.00
14. htfa_spyphaseup: Spy phase offsets calibration There are mapped science	e spws	0.66
15. Nifa_gfluxscale: Transfer fluxscale from amplitude calibrator		1.00
16. htfa_timegaincal: Gain calibration		1.00
17. htt_applycal: Apply calibrations from context		1.00
18. ht/_makeimlist: Set-up image parameters for calibrator imaging		1.00
19. htt_makeimages: Make calibrator images RMS vs. th	reshold	0.72
20. Mr_checkproductsize: Check product size Oube size mitigati	on error	0.00



The plot on the left shows corrections to be applied to the other calibrators & target source. The plot on the right shows the corrected amplitudes for the bandpass calibrator (shown in a later task, not here).

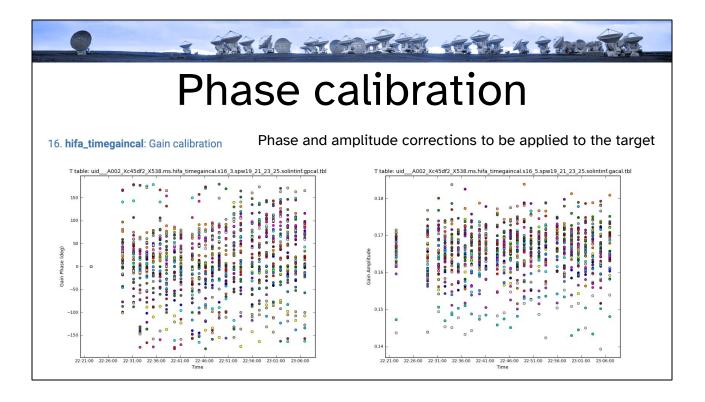


	A THE	R & Desparation	R
	NUMBER OF STREET		-
A Home By Topic By Task		2016.1.00484.L	-
		2010/100/00/12	
Task	QA Score		
1. hifa_importdata: Register measurement sets with the pipeline		1.00	
2. hifa,flagdata: ALMA deterministic flagging		1.00	
3. htfs_fluxcalfiag: Flag spectral features in solar system flux calibrators		1.00	
9.4. htf_rewflegchans: Flag channels in rew data		1.00	
5. htt_refant: Select reference antennas		1.00	
6. ht/fa_teyscal: Calculate Toys calibration		1.00	
7. htfa_tsyafag: Flag Tsys calibration		0.99	
8 hifa_antpos: Correct for antenna position offsets		0.90	
9. http://www.gcalflag: Calculate and flag WVR calibration	1.37x improvement	0.69	
10. hif Jowgainflag: Flag antennas with low gain		1.00	
11. hif_gainflag: Flag antennas with gain outliers		1.00	
12. ht[_setjy: Set calibrator model visibilities		1.00	
13. hts_bandpass: Phase-up bandpass calibration		1.00	
	e are mapped science spws	0.66	
15. htfa.gfluxscale: Transfer fluxscale from amplitude calibrator		1.00	
16. htfa_timegaincal: Gain calibration		1.00	
17. htf_applycal: Apply calibrations from context		1.00	
18. hif_makeimlist: Set-up image parameters for calibrator imaging		1.00	
19. htf_makeimages: Make calibrator images	RMS vs. threshold	0.72	
2 20. htf_checkproductsize: Check product size	Cube size mitigation error	0.00	

		⊢lux	consi	st	er	JC	У
15. hifa_gfluxscale	e: Tran	sfer fluxscale from am	plitude calibrator	C)erive	ed flu	x density
J1751-1950 (#2) PHASE	19	232.583 GHz 2.000 GHz	55.946 mJy ± 810.164 µJy (1.4%)	0.000 Jy	0.000 Jy	0.000 Jy	1.163
			48.100 mJy	0.000 Jy	0.000 Jy	0.000 Jy	
Catalog	21	244.971 GHz 2.000-6Hz	54.629 mJy ± 1.057 mJy (1.9%)	0.000 Jy	0.000 Jy	0.000 Jy	1.177
flux	_		46.400 mJy	0.000 Jy	0.000 Jy	0.000 Jy	
density	23	246.888 GHz 2.000 GHz	54.796 mJy ± 906.133 μJy (1.7%)	0.000 Jy	0.000 Jy	0.000 Jy	1.186
			46.200 mJy	0.000 Jy	0.000 Jy	0.000 Jy	
	25	230.521 GHz 937.500 MHz	58.307 mJy ± 1.064 mJy (1.8%)	0.000 Jy	0.000 Jy	0.000 Jy	1.205
			48.400 mJy	0.000 Jy	0.000 Jy	0.000 Jy	

In new weblogs there is a plot comparing fluxes with online catalog

	The in the	DAPE DUTO
A Home By Topic By Task		2016.1.00484.L
Taak	QA Score	
1. hifa_importdata: Register measurement sets with the pipeline		1.00
2. ht/a_flagdata: ALMA deterministic flagging		1.00
3. http://tuxcalflag:Flag.spectral features in solar system flux calibrators		1.00
14. htf_rawflagchans: Flag channels in raw data		1.00
5. httgrefant: Select reference antennas		1.00
6. https://syscal: Calculate Tays calibration		1.00
17. htms/stag: Flag Toys calibration		0.99
9. hifa_antpos: Correct for antenna position offsets		0.90
9. http://www.califag: Calculate and flag WVR calibration 1.37x imp	provement	0.69
10. ht/ Jowgainflag: Flog antennas with low gain		1.00
11. htt_gainflag: Flag antennas with gain outliers		1.00
12. htf_setjy: Set calibrator model visibilities		1.00
13. hifa_bandpass: Phase-up bandpass calibration		1.00
14. htfa_spwphaseup: Spv phase offsets calibration There are mapped scie	ince spws	0.66
15. htsgthusseale: Transfer fluxscale from amplitude callor CLICK		1.00
16. htfa_timegaincal: Gain calibration		1.00
17. htt_applycal: Apply calibrations from context		1.00
18. htt makelmlist: Set-up image parameters for calibrator imaging		1.00
19. htt_makeimages: Make calibrator images RMS vs.	threshold	0.72
20. hf_checkproductsize: Check product size Cube size mitiga	ation error	0.00

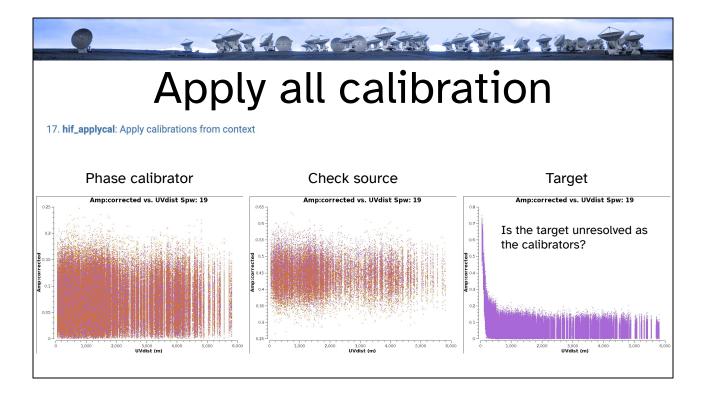


Left: phase; right: amplitude

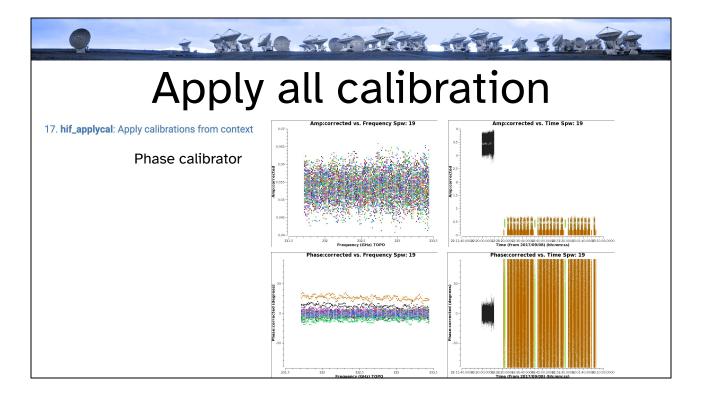
	****	* A		E. M. & Monthly
Ap	oply a	ll cal	ibrat	ion
Calibrator Calibration "Table"	BP CAL	FLUX CAL	PHASE CAL	TARGET
FLUX SCALING	FLUX CAL (Scaled in fluxscale)	FLUX CAL (Model in setJy)	FLUX CAL (Scaled in fluxscale)	
BANDPASS	BP CAL	BP CAL	BP CAL	BP CAL
PHASE	BP CAL (short interval time solutions)	FLUX CAL (short time interval solutions)	PHASE CAL (long time interval solutions	PHASE CAL (long time interval solutions
AMPLITUDE	BP CAL (short interval time solutions)	FLUX CAL (short time interval solutions)	PHASE CAL (long time interval solutions	PHASE CAL (long time interval solutions

For target (rightmost column), you apply the bandpass calibration from the bandpass calibrator and phase and amplitude calibration (bootstrapped from the flux calibrator) from the phase calibrator. The other columns show what source is used to carry out each part of the calibration (flux scaling, bandpass, phase and amplitude calibration) for each calibrator. The calibration shown for the first three columns/sources is not strictly required for calibrating the data, but applying the calibrations back onto the calibrator sources serves as a check of how well the calibration has gone, as we know what these should look like once calibrated.

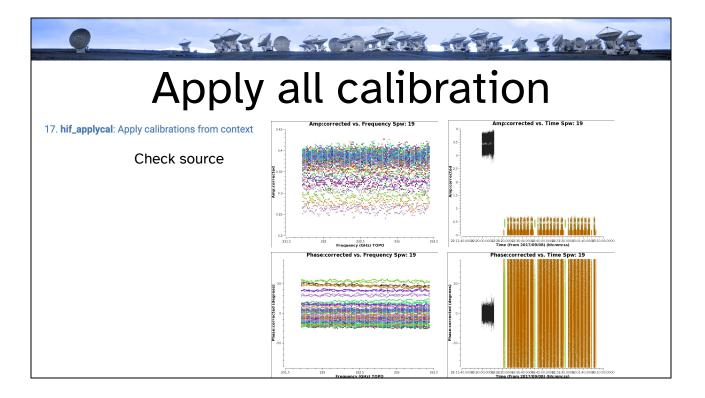
	AL ANT THE AR	A ADROAD DIATE
A Home By Topic By Task		2016.1.00484.L
Task	QA Score	
1. hifa_importdata: Register measurement sets with the pipeline		1.00
2. hifa_flagdata: ALMA determiniatic flagging		1.00
3. hifa_fluxcalflag: Flag spectral features in solar system flux calibrators		1.00
14. htt_rawflagchans: Flag channels in raw data		1.00
5. htt_refant: Select reference antennas		1.00
6. htfa_tsyscal: Calculate Tsys calibration		1.00
97. hifa_tsysflag: Flag Toys calibration		0.99
8. hifa_antpos: Correct for antenna position offsets		0.90
9. hifa_wwgcalflag: Calculate and flag WVR calibration	1.37x improvement	0.69
10. htf_Jowgainflag: Flag anternas with low gain		1.00
11. hif_gainflag: Flag antennas with gain outliers		1.00
12. hif_setjy: Set calibrator model visibilities		1.00
13. htfa_bandpass: Phase-up bandpass calibration		1.00
14. htfa_spwphaseup: Spw phase offsets calibration	There are mapped science spws	0.66
15. htfa_gfluxscale: Transfer fluxscale from amplitude calibrator		1.00
16. htfa_timegaincal Gain calibration		1.00
17. htf_applycal: Apply calibrations from context		1.00
18. htf_makeimlist: Set-up image parameters for calibrator imaging		1.00
19. hif_makeimages. Make calibrator images	RMS vs. threshold	0.72
20. htt_checkproductsize: Check product size	Cube size mitigation error	0.00



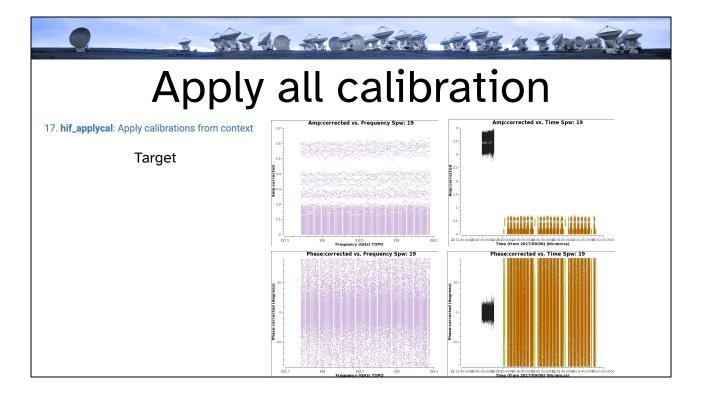
- The target is resolved as the amplitude is not constant with uv distance
- A check source used for resol<0.25" and/or freq>400 GHz it should be bright and point-like. All of the same calibrations applied to the target are applied to the check source. It is used to evaluate the quality of the phase calibration and therefore the image quality expected on the target.



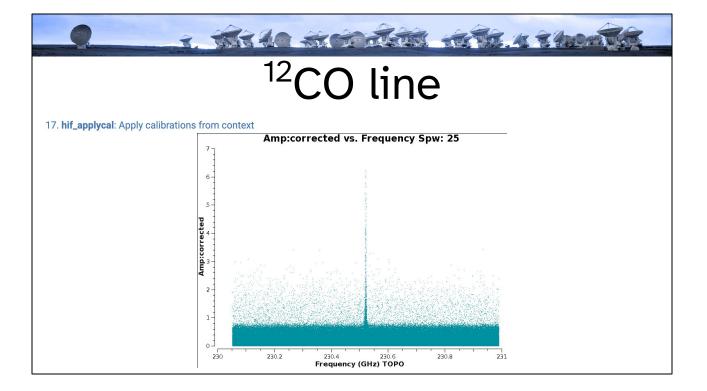
Phases should be around zero and amplitudes constant in time for phase calibrator and check source.



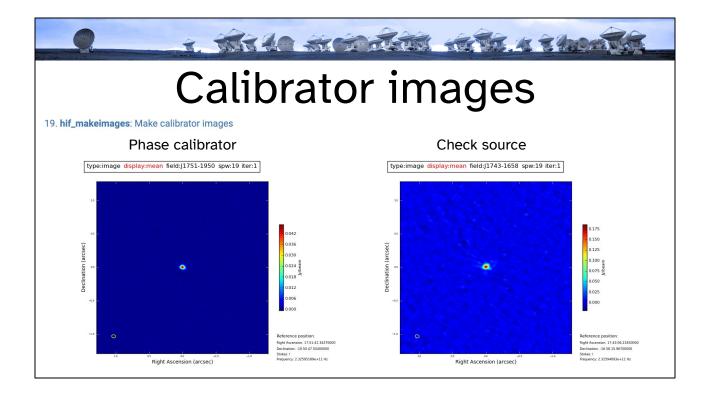
Phases should be around zero and amplitudes constant in time for phase calibrator and check source.



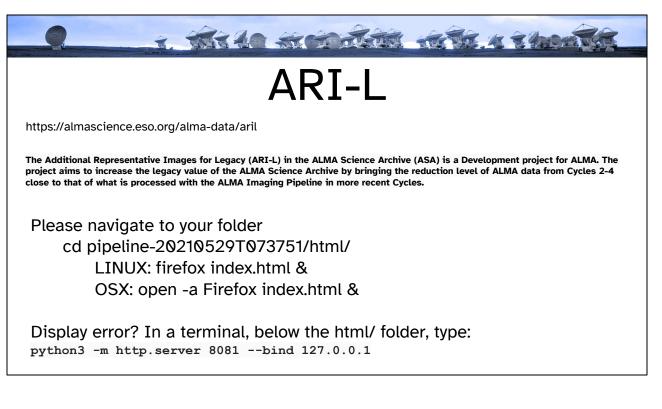
Corrected data for target may be more complex, however you can see above that source is centred at phase centre as data is clustered around phase=0 deg.



	ATTA ATA A ST	have been the state
n Home By Topic By Task		2016.1.00484.L
Task	QA Score	
1. hifa_importdata: Register measurement sets with the pipeline		1.00
2. hlfa_flagdata: ALMA deterministic flagging		1.00
3. hifa_fluxcalflag: Flag spectral features in solar system flux calibrators		1.00
4. hif_rawflagchans: Flag channels in raw data		1.00
5. hif_refant: Select reference antennas		1.00
6. hifa_tsyscal: Calculate Tsys calibration		1.00
7. hifa_tsysflag: Flag Tsys calibration		0.99
8. hifa_antpos: Correct for antenna position offsets		0.90
9. hifa_wvrgcalflag: Calculate and flag WVR calibration	1.37x improvement	0.69
10. hif_lowgainflag: Flag antennas with low gain		1.00
11. hif_gainflag: Flag antennas with gain outliers		1.00
12. htf_setjy: Set calibrator model visibilities		1.00
13. hifa_bandpass. Phase-up bandpass calibration		1.00
14. htfa_spwphaseup: Spw phase offsets calibration	There are mapped science spws	0.66
15. hifa_gfluxscale: Transfer fluxscale from amplitude calibrator		1.00
16. hifa_timegaincal: Gain calibration		1.00
17. htf.applycal: Apply calibrations from context		1.00
18. hif_makeimlist: Set-up image parameters for calibrator image		1.00
19. hif_makeimages: Make calibrator images	RMS vs. threshold	0.72
20. hif_checkproductsize: Check product size	Cube size mitigation error	0.00



Once data are calibrated we can start making images, starting with the calibrators



ARI-L project: re-imaging pre-Cycle 5 data in pipeline mode to add functionality that is now part of the standard pipeline weblog since Cycle 5.

ARI-L Weblog

THE ALL STOCKED WITH A SHORT ST

Observation Overview				Pipeline Summary			
			. ipenne eunin				
Project	uid://A001/X5ac/X43f		Pipeline Version	42866 (Pipeline-CASA56-P1-B) (documentation)			
Principal Investigator	sandrews		CASA Version	5.6.1-8 (environment)			
Observation Start	2017-09-08 22:19:17 UTC		Pipeline Start	2021-05-29 07:37:51 UTC			
Observation End	2017-09-09 00:27:41 UTC		Execution Duration	6 days, 3:16:00			
Observation Summary							
		Time (UTC)			Baseline Length		

		Time (UTC)			Baseline Lengt			
Receivers	Num Antennas	Start	End	On Source	Min	Max	RMS	Size
ALMA Band 6	40	2017-09-08 22:19:17	2017-09-08 23:07:03	0:19:58	41.4 m	5.8 km	2.2 km	105.6 GB
ALMA Band 6	40	2017-09-08 22:30:22	2017-09-08 23:06:34	0:19:58	41.4 m	5.8 km	2.2 km	31.8 GB
ALMA Band 6	40	2017-09-08 23:14:51	2017-09-09 00:27:41	0:33:52	41.4 m	5.8 km	2.2 km	173.2 GB
ALMA Band 6	40	2017-09-08 23:29:15	2017-09-09 00:27:07	0:33:52	41.4 m	5.8 km	2.2 km	53.9 GB
	ALMA Band 6 ALMA Band 6 ALMA Band 6	ALMA Band 6 40 ALMA Band 6 40 ALMA Band 6 40	ALMA Band 6 40 2017.09.08 22.19.17 ALMA Band 6 40 2017.09.08 22.30.22 ALMA Band 6 40 2017.09.08 23.14.51	ALMA Band 6 40 2017/09-08 22 19:17 2017/09-08 23 07:03 ALMA Band 6 40 2017/09-08 23:02.22 2017/09-08 23:05:34 ALMA Band 6 40 2017/09-08 23:14:51 2017/09-09 00:27:41	ALMA Band 6 40 2017/09-08 22:19:17 2017/09-08 23:07.03 0.19:58 ALMA Band 6 40 2017/09-08 22:02:22 2017/09-08 23:06:34 0.19:59 ALMA Band 6 40 2017/09-08 23:02:22 2017/09-08 23:06:34 0.19:59 ALMA Band 6 40 2017/09-08 23:14:51 2017/09-09 02:74:14 0.33:52	ALMA Band 6 40 201709-08 22:19:17 201709-08 23:07:03 0.19:58 41.4 m ALMA Band 6 40 201709-08 22:06:22 201709-08 23:06:34 0.19:58 41.4 m ALMA Band 6 40 201709-08 23:06:22 201709-08 23:06:34 0.19:58 41.4 m ALMA Band 6 40 201709-08 23:06:23 201709-09 027:07:11 0.32:52 41.4 m	ALMA Band 6 40 2017.0P-08 22.19.17 2017.0P-08 23.07.03 0.19.58 41.4 m 58 km ALMA Band 6 40 2017.0P-08 23.02.22 2017.0P-08 23.06.34 0.19.58 41.4 m 58 km ALMA Band 6 40 2017.0P-08 23.06.34 0.19.58 41.4 m 58 km ALMA Band 6 40 2017.0P-08 23.16.51 2017.0P-09.02.741 0.32.52 41.4 m 58 km	ALMA Band 6 40 2017/09/08 22:19:17 2017/09/08 22:07:03 0.19:58 41.4 m 58.km 2.2 km ALMA Band 6 40 2017/09/08 22:02:22 2017/09/08 22:06:34 0.19:58 41.4 m 58.km 2.2 km ALMA Band 6 40 2017/09/08 22:06:34 0.19:58 41.4 m 58.km 2.2 km ALMA Band 6 40 2017/09/08 22:14:51 2017/09/00/27:41 0.33:52 41.4 m 58.km 2.2 km

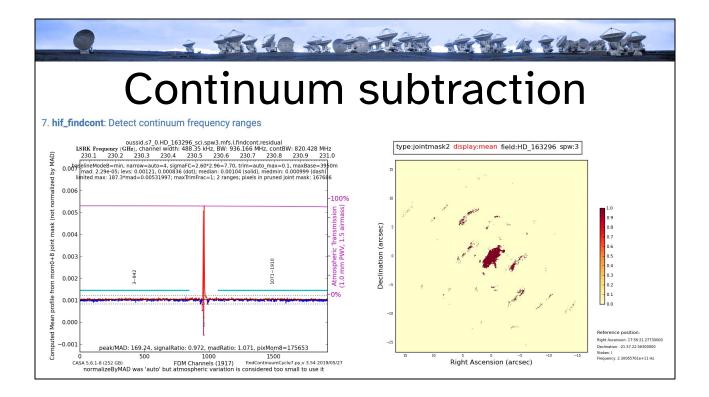
A Home By Topic By Task			Project Code N/A
Task Summaries			
Tesk	QA Score		Duration
1. hifa_importdata: Register measurement sets with the pipeline	1/1 have HISTORY	0.50	0:11:33
2. hif_mstransform: Create science target MS		1.00	0:17:06
3. hifa_flagtargets: ALMA Target flagging		1.00	0.03:29
4. htfa_imageprecheck: ImagePreCheck		1.00	1:49:08
S. hif_checkproductsize: Check product size	Size was mitigated	0.50	0:08:04
6. hif_makeimlist: Set-up parameters for target per-spw continuum imaging		1.00	0:02:26
7. hif_findcont: Detect continuum frequency ranges		1.00	6:01:22
8. hif_uvcontfit: UV continuum fitting		1.00	2:20:32
9. hif_uvcontsub: UV continuum subtraction		1.00	0:15:41
10. htf_makeimages: Make target per-spw continuum images		1.00	8:42:13
11. hif_makeimlist: Set-up parameters for target aggregate continuum imaging		1.00	0:02:31
12. htf_makeimages: Make target aggregate continuum images		1.00	6:31:18
13. hif_makeimlist: Set-up parameters for target cube imaging		1.00	0:02:26
14. htf_makeimages: Make target cubes		1.00	5 days, 0:47:54
15. hif_makeimlist: Set-up parameters for representative bandwidth target cube imaging	No clean targets expected	N/A	0:00:09
16. hif_makeimages: Make representative bandwidth target cube	Nothing to image	N/A	0:00:06

Home By Topic By Task			Project Code N/A
Task Summaries			
Task	QA Score		Duration
1. hifa_importdata: Register measurement sets with the pipeline	1/1 have HISTORY	0.50	0:11:33
2. hif_mstransform: Create science target MS		1.00	0:17:06
3. hifa_flagtargets: ALMA Target flagging CLICK		1.00	0:03:29
4. hifa_imageprecheck: imagePreCheck		1.00	1:49:08
S. hif_checkproductsize: Check product size	Size was mitigated	0.50	0.08:04
6. hif_makeimlist: Set-up parameters for target per-spw continuum imaging		1.00	0:02:26
7. hif_findcont: Detect continuum frequency ranges		1.00	6:01:22
8. htf_uvcontfit: UV continuum fitting		1.00	2:20:32
9. hlf_uvcontsub: UV continuum subtraction		1.00	0:15:41
10. hif_makeimages: Make target per-spw continuum images		1.00	8:42:13
11. hif_makeimlist: Set-up parameters for target aggregate continuum imaging		1.00	0:02:31
12. htf_makeimages: Make target aggregate continuum images		1.00	6:31:18
13. htf_makeimlist: Set-up parameters for target cube imaging		1.00	0:02:26
14. htt_makeimages: Make target cubes		1.00	5 days, 0:47:54
15. hif_makeimlist: Set-up parameters for representative bandwidth target cube imaging	No clean targets expected	N/A	0:00:09
16. hif_makeimages: Make representative bandwidth target cube	Nothing to image	N/A	0:00:06

A hifa_imageprecheck: ImagePrecheck A hifa_imag								
robust	uvtaper	Synthesized Beam	Cell	Beam Ratio	Bandwidth	BW Mode	Effective Sensitivity	
0.0	0	0.0503 x 0.0379 arcsec @ 73.5 deg	0.0076 x 0.0076 arcsec	1.33	15.62 MHz	repBW	0.00019 Jy/beam	
0.0	0	0.0486 x 0.0377 arcsec @ 74.0 deg	0.0075 x 0.0075 arcsec	1.33	6854 MHz	aggBW	1.69e-05 Jy/beam	
0.5	0	0.0618 x 0.0463 arcsec @ 74.4 deg	0.0093 x 0.0093 arcsec	1.33	15.62 MHz	repBW	0.000151 Jy/beam	
0.5	0	0.0602 x 0.0466 arcsec @ 76.7 deg	0.0093 x 0.0093 arcsec	1.33	6854 MHz	aggBW	1.34e-05 Jy/beam	
1.0	0	0.0725 x 0.0626 arcsec @ 84.7 deg	0.013 x 0.013 arcsec	1.16	15.62 MHz	repBW	0.000137 Jy/beam	
1.0	0	0.0716 x 0.0600 arcsec @ 88.0 deg	0.012 x 0.012 arcsec	1.16	6854 MHz	aggBW	1.21e-05 Jy/beam	
2.0	D	0.0800 x 0.0684 arcsec @ 85.2 deg	0.014 x 0.014 arcsec	1.17	15.62 MHz	repBW	0.000135 Jy/beam	
2.0	0	0.0778 x 0.0659 arcsec @ 84.8 deg	0.013 x 0.013 arcsec	1.17	6854 MHz	aggBW	1.19e-05 Jy/beam	

- Usually the P.I. requests are given in the "Assumed Values" section (not available here)
- The task tries different robust weighting schemes for imaging and decides on the one that best matches the P.I.'s requests for imaging

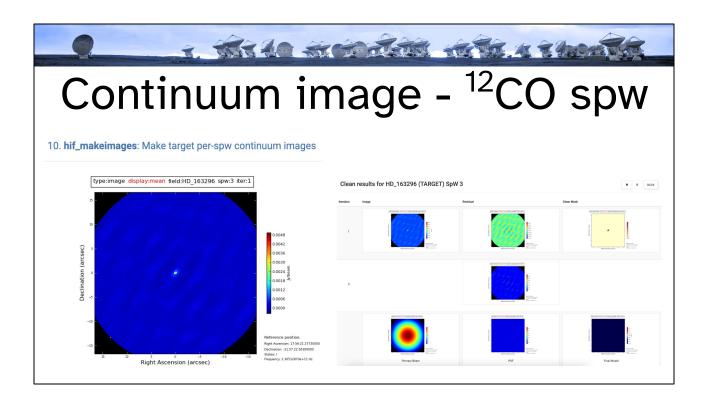
		C. Landston of the second	
A Home By Topic By Task			Project Code N/A
Task Summaries			
Task	QA Score		Duration
1. hifa_importdata: Register measurement sets with the pipeline	1/1 have HISTORY	0.50	0:11:33
2. hif_mstransform: Create science target MS		1.00	0:17:06
3. hifa_flagtargets: ALMA Target flagging		1.00	0:03:29
4. hifa_imageprecheck: ImagePreCheck		1.00	1:49:08
5. hif_checkproductsize: Check product size	Size was mitigated	0.50	0:08:04
6. hif_makeimlist: Set-up parameters for target per-spw continu		1.00	0:02:26
7. hif_findcont: Detect continuum frequency ranges		1.00	6:01:22
8. hif_uvcontfit: UV continuum fitting		1.00	2:20:32
9. hif_uvcontsub: UV continuum subtraction		1.00	0:15:41
10. hif_makeimages: Make target per-spw continuum images		1.00	8:42:13
11. hif_makeimlist: Set-up parameters for target aggregate continuum imaging		1.00	0:02:31
12. htf_makeimages: Make target aggregate continuum images		1.00	6:31:18
13. htf_makeimlist: Set-up parameters for target cube imaging		1.00	0:02:26
14. htf_makeimages: Make target cubes		1.00	5 days, 0:47:54
15. htf_makeimlist: Set up parameters for representative bandwidth target cube imaging	No clean targets expected	N/A	0:00:09
16. hif_makeimages: Make representative bandwidth target cube	Nothing to image	N/A	0:00:06



Spectrum shown is cube integrated over the masked pixels (red) on the right image, which are areas where emission was detected. The pipeline fits a slope (parameters can be tweaked by user) to the line-free channels in the next task.

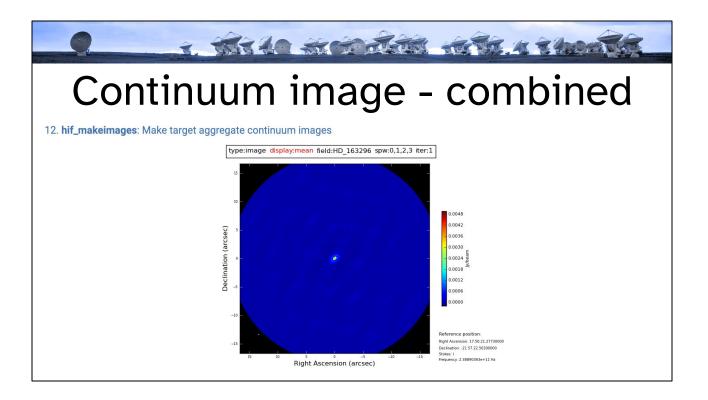
			B. F
A Home By Topic By Task			Project Code N/A
Task Summaries			
Task	QA So	core	Duration
1. hifa_importdata: Register measurement sets with the pipeline	1/1 have HISTORY	0.50	0:11:33
2. hif_mstransform: Create science target MS		1.00	0:17:06
3. hifa_flagtargets: ALMA Target flagging		1.00	0:03:29
4. hifa_imageprecheck: ImagePreCheck		1.00	1:49:08
5. hif_checkproductsize: Check product size	Size was mitigated	0.50	0:08:04
6. hif_makeimlist: Set-up parameters for target per-spw continuum imaging		1.00	0:02:26
7. hlf_findcont: Detect continuum frequency ranges		1.00	6:01:22
8. hlf_uvcontfit: UV continuum fitting		1.00	2:20:32
9. ht/_uvcontsub: UV continuum subtraction CLICK		1.00	0:15:41
10. hif_makeimages: Make target per-spw continuum images	-	1.00	8:42:13
11. hif_makeimlist: Set-up parameters for target aggregate continuum imaging		1.00	0.02:31
12. hif_makeimages: Make target aggregate continuum images		1.00	6:31:18
13. hif_makeimlist: Set-up parameters for target cube imaging		1.00	0:02:26
9 14. htf_makeImages: Make target cubes		1.00	5 days, 0:47:54
15. htf_makeimlist: Set-up parameters for representative bandwidth target cube imaging	No clean targets expected	NA	0:00:09
16. hif_makeimages: Make representative bandwidth target cube	Nothing to image	N/A	0:00:06

Actual tclean task (imaging) in pipeline is run according to previously defined parameters



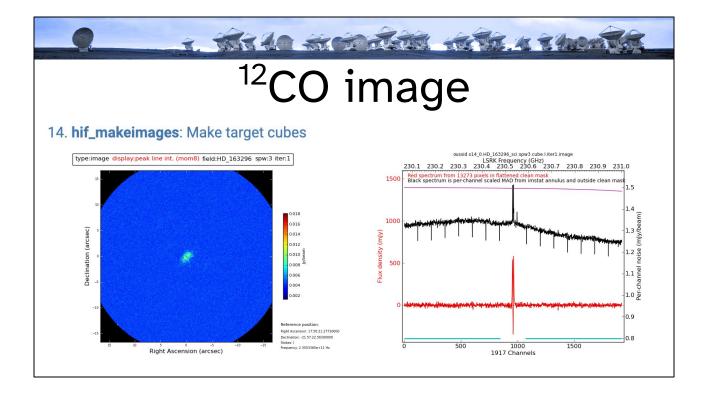
Extra plots displayed for the representative spw (continuum)

	and the second		
Aloos 🕈 Home By Topic By Task			Project Code N/A
Task Summaries			
Task	QA Score		Duration
1. hifa_importdata: Register measurement sets with the pipeline	1/1 have HISTORY	0.50	0:11:33
2. hif_mstransform: Create science target MS		1.00	0:17:06
3. hifa_flagtargets: ALMA Target flagging		1.00	0:03:29
4. hifa_imageprecheck: ImagePreCheck		1.00	1:49:08
5. hif_checkproductsize: Check product size	Size was mitigated	0.50	0:08:04
6. hif_makeimlist: Set-up parameters for target per-spw continuum imaging		1.00	0:02:26
7. hif_findcont: Detect continuum frequency ranges		1.00	6:01:22
8. hif_uvcontfit: UV continuum fitting		1.00	2:20:32
9. hif_uvcontsub: UV continuum subtraction		1.00	0:15:41
10. hif_makeimages: Make target per-spw continuum images		1.00	8:42:13
11. bif_makeimist: Set-up parameters for target aggregate continuum CLICK		1.00	0:02:31
12. hif_makeimages: Make target aggregate continuum images		1.00	6:31:18
13. htf_makeimlist: Set-up parameters for target cube imaging		1.00	0:02:26
14. htf_makelmages: Make target cubes		1.00	5 days, 0:47:54
15. hif_makeimlist. Set-up parameters for representative bandwidth target cube imaging	No clean targets expected	N/A	0:00:09
16. hlf_makeimages: Make representative bandwidth target cube	Nothing to image	N/A	0.00.06



Aggregate continuum image (4 spws combined)

A Home ByTopic ByTask			Project Code N/A
Task Summaries			
Task	QA Score		Duration
1. hifa_importdata: Register measurement sets with the pipeline	1/1 have HISTORY	0.50	0:11:33
2. hif_mstransform: Create science target MS		1.00	0:17:06
3. hifa_flagtargets: ALMA Target flagging		1.00	0:03:29
4. hifa_imageprecheck: ImagePreCheck		1.00	1:49:08
5. hif_checkproductsize: Check product size	Size was mitigated	0.50	0:08:04
6. hif_makeimlist: Set-up parameters for target per-spw continuum imaging		1.00	0:02:26
7. hif_findcont: Detect continuum frequency ranges		1.00	6:01:22
8. hif_uvcontfit: UV continuum fitting		1.00	2:20:32
9. htf_uvcontsub: UV continuum subtraction		1.00	0:15:41
10. hif_makeimages: Make target per-spw continuum images		1.00	8:42:13
11. hif_makeimlist: Set-up parameters for target aggregate continuum imaging		1.00	0:02:31
12. hif_makeimages: Make target aggregate continuum images		1.00	6:31:18
13. htf_makeimlist: Set-up parameters for target		1.00	0:02:26
14. hlf_makeimages: Make target cubes		1.00	5 days, 0:47:54
15. hif_makeimlist: Set up parameters for representative bandwidth target cube imaging	No clean targets expected	N/A	0:00:09
16. hlf_makeimages: Make representative bandwidth target cube	Nothing to image	N/A	0.00.06



Cube provided for the representative frequency spw MAD = Median Absolute Deviation

What's next? If you decide to make your own images: run the scripts/scriptForPI.py within CASA and you can work on the calibrated MS.

Problems? - Tweak the pipeline!

e.g, Extra flagging needed or flux rescale:

- add extra flagging in calibration/*flagtemplate.txt and rerun casa_pipescript.py.
- Modify flux.csv and rerun the pipeline
- Alternatively, add flagging commands before imaging.

More details at:

A THE STORE AND A THORE

"Tweaking the pipeline script" by R. Miura (NAOJ) https://www2.nao.ac.jp/~eaarc/DATARED/referen ce/TweakPipeline.pptx.pdf

The European ARC network

T ATLA STORAGE AND A THEAT



For support on ALMA proposal preparation and data reduction you can contact your local ALMA ARC node or the ALMA helpdesk!

https://www.eso.org/sci/facilities/alma/arc.html

References

1. ATTAC STORAGE WATER A THOUGH

Allegro CASA Training 2018: www.alma-allegro.nl/casatraining2018/#presentations

Data inspection tutorial (H. Nagai): <u>alma-intweb.mtk.nao.ac.ip/~nagai/tutorial/tutorial.pdf</u>

ERIS School 2019 and 2017: https://www.chalmers.se/en/researchinfrastructure/oso/events/ERIS2019/Pages/Software-packages-and-datasets.aspx www.astron.nl/eris2017/lectures.php

Interferometric Data Processing Workshop for eMerlin & ALMA: <u>www.alma.ac.uk/index.php/meetings/uk-arc-node-meetings/256-alma-interferometric-data-processing-workshop-dublin-10-1</u> <u>2-sept-20178</u>

9th IRAM Interferometry School: http://www.iram-institute.org/EN/content-page-342-7-67-331-342-0.html

References

1. TATAO AT CONTRACTOR AT THE AND THE

ALMA Documentation: almascience.eso.org/documents-and-tools

ALMA Technical Handbook: almascience.eso.org/documents-and-tools/cycle9/alma-technical-handbook

ALMA Archive and QA2 Data Products: almascience.eso.org/documents-and-tools#section-3

ALMA Science Pipeline: almascience.eso.org/processing/science-pipeline

i-TRAIN tutorials https://almascience.eso.org/tools/eu-arc-network/i-train