A brief CASA overview and the CASA Users Committee (NOT a CASA tutorial!)

The 2014/15 CASA Users Committee:

EU: Thibault Cavalie (dep. chair), Alex Karim
US: David Wilner (chair), Rachel Akeson, John Carpenter, Danny Jacobs, Rachel Friesen
EA: Kazushi Sakamoto, Tomoya Hirota
CI: Liz Guzman (report)

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CASA

About CASA

CASA, the *Common Astronomy Software Applications* package, is being developed with the primary goal of supporting the data post-processing needs of the next generation of radio astronomical telescopes such as ALMA and VLA. The package can process both interferometric and single dish data, and is developed by an international consortium of scientists based at the National Radio Astronomical Observatory (NRAO), the European Southern Observatory (ESO), the National Astronomical Observatory of Japan (NAOJ), the CSIRO Australia Telescope National Facility (CSIRO/ATNF), and the Netherlands Institute for Radio Astronomy (ASTRON) under the guidance of NRAO.

CASA
Common Astronomy Software Applications

The CASA infrastructure consists of a set of C++ tools bundled togeth under an iPython interface as a set of data reduction tasks. This structure provides flexibility to process the data via task interface or a python script. In addition to the data reduction tasks, many post-processing tools are available for even more flexibility and special purpose reduction needs.

The latest CASA release is 4.2.1

- User Reference and Cookbook
- CASAguides
- NRAO Science Forums
- Old CASA Web Page

ALMA/CASA helpdesk:
https://help.almascience.org

NRAO Science User Forum:
https://science.nrao.edu/forums/

Mainling lists:
http://casa.nrao.edu/mail_list.shtml

CASA

. CASA is developed by international consortium:

NRAO - USA { ESO - Europe, NAOJ - Japan, CSIRO/ATNF – Australia, ASTRON – The Netherlands

. Set of C++ tools bundled together under an iPython interface.

. Python scripts:

Python: *http://python.org/doc*

iPython (interactive shell): *http://ipython.scipy.org/moin/Documentation*

Matplotlib (python 2D plotting library): *http://matplotlib.sourceforge.net/*

CASA

. CASA is designed for interferometer ALMA and EVLA data.

. Single-dish data (developed mainly by NAOJ): ALMA, NRO 45 m, ASTE, GBT and CSIRO/ATNF:

- ASAP: ATNF Spectral Analysis Package (imported as *sd* tool)

. Motivation:

Need to replacement of legacy software package: AIPS
Need to modernize the user interface (scripting!)
Need to update and expand for ALMA data

AIPS -------> AIPS++ -------> CASA

Even though CASA is developed for ALMA and EVLA, it can in principle analyze any radio interferometry data, in particular VLA data.

CASA – overall architecture

. Data structure:

- Tables and Measurement Sets (MS)

. Import/export facilities:

- importasdm, im(ex)portuvfits, im(ex)portfits

. Science analysis:

- C++ classes for radio astronomical calibration and imaging

. High-level analysis procedures (“tasks”)

. Programmable command line interface with scripting:

- myscript.py, MATLAB-like interface

. Documentation

Measurement Set

. Raw adsm data => ms directories (importasdm)

. Fundamental storage mechanism: CASA Tables (inspired by MIRIAD)

. MS = table for radio telescope data (visibilities) + auxiliary sub-tables

. MAIN table contains main data in columns:

- DATA: original visibility data
- CORRECTED_DATA: calibrated data
- MODEL_DATA: Fourier transform of model
- IMAGING_WEIGHT: weights for imaging

Measurement Set

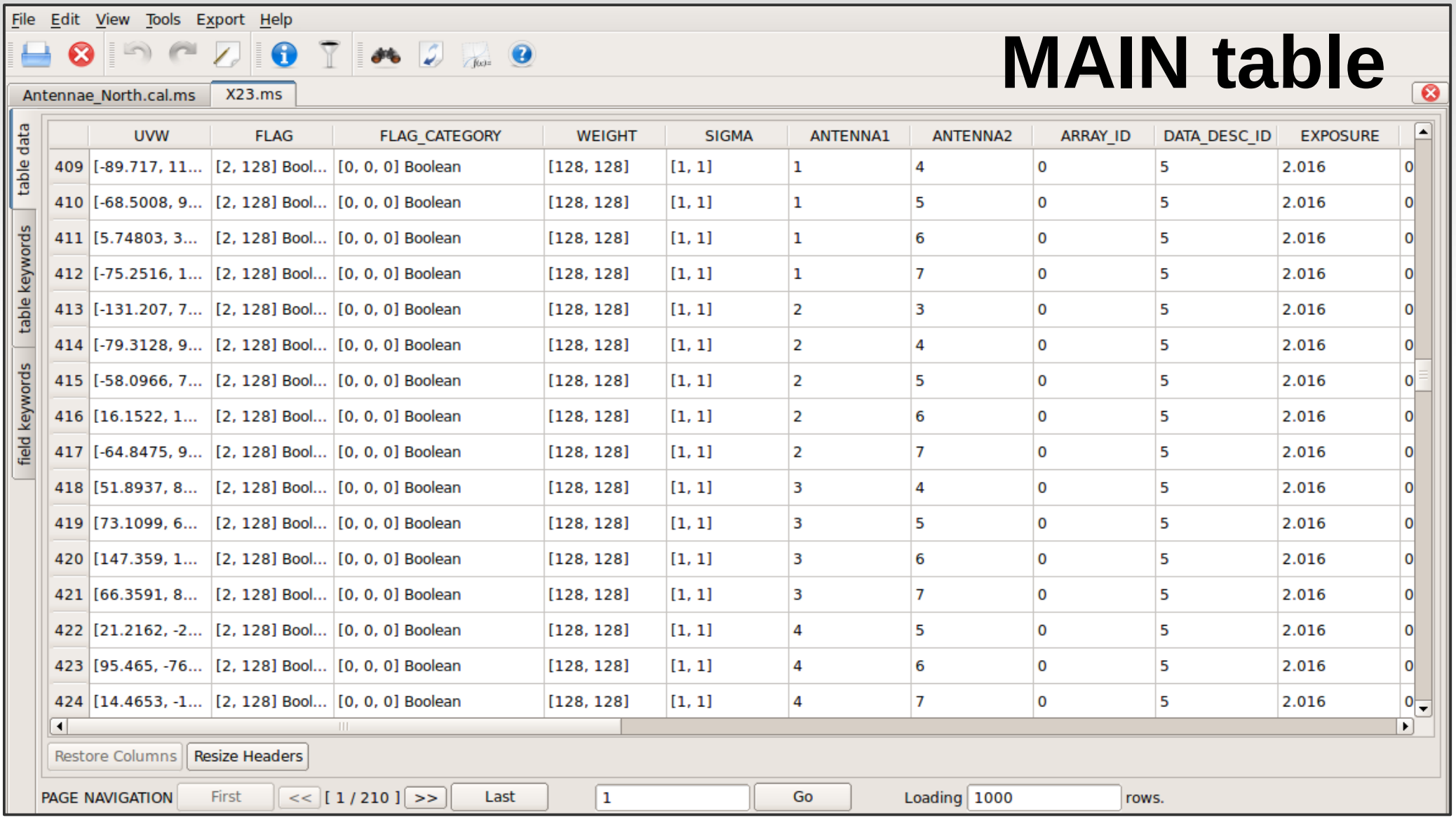
```
|-- ANTENNA
|   |-- table.dat
|   |-- table.f0
|   |-- table.info
|   `-- table.lock
|-- DATA_DESCRIPTION
|   |-- table.dat
|   |-- table.f0
|   |-- table.info
|   `-- table.lock
|-- DOPPLER
|   |-- table.dat
|   |-- table.f0
|   |-- table.info
|   `-- table.lock
|-- FEED
|   |-- table.dat
|   |-- table.f0
|   |-- table.f0i
|   |-- table.info
|   `-- table.lock
|-- FIELD
|   |-- table.dat
|   |-- table.f0
|   |-- table.f0i
|   |-- table.info
|   `-- table.lock
|-- FLAG_CMD
|   |-- table.dat
|   |-- table.f0
|   |-- table.info
|   `-- table.lock
|-- HISTORY
|   |-- table.dat
|   |-- table.f0
|   |-- table.info
|   `-- table.lock
|-- OBSERVATION
|   |-- table.dat
|   |-- table.f0
|   |-- table.info
|   `-- table.lock
|-- POINTING
|   |-- table.dat
|   |-- table.f0
|   |-- table.f0i
|   |-- table.f1
|   |-- table.info
|   `-- table.lock
|-- POLARIZATION
|   |-- table.dat
|   |-- table.f0
|   |-- table.f0i
|   |-- table.info
|   `-- table.lock
|-- PROCESSOR
|   |-- table.dat
|   |-- table.f0
|   |-- table.info
|   `-- table.lock
|-- SORTED_TABLE
|   |-- table.dat
|   `-- table.info
|-- SPECTRAL_WINDOW
|   |-- table.dat
|   |-- table.f0
|   |-- table.f0i
|   |-- table.info
|   `-- table.lock
|-- STATE
|   |-- table.dat
|   |-- table.f0
|   |-- table.info
|   `-- table.lock
|-- table.dat
|-- table.f0
|-- table.f1
|-- table.f10
|-- table.f1_TSM1
|-- table.f2
|-- table.f2_TSM1
|-- table.f3
|-- table.f3_TSM1
|-- table.f4
|-- table.f4_TSM1
|-- table.f5
|-- table.f5_TSM1
|-- table.f6
|-- table.f6_TSM1
|-- table.f7
|-- table.f7_TSM1
|-- table.f8
|-- table.f8_TSM1
|-- table.f9
|-- table.f9_TSM0
|-- table.info
`-- table.lock

15 directories, 88 files
```

```
falves@aibn53:/vol/aibn53/aibn53_2/falves/TWHya_SV$ ls X149.ms
ANTENNA           SOURCE           table.f14       table.f18_TSM0  table.f21_TSM3  table.f7
DATA_DESCRIPTION  SPECTRAL_WINDOW  table.f15       table.f19       table.f21_TSM4  table.f8
FEED              STATE            table.f15_TSM1  table.f19_TSM1  table.f22       table.f9
FIELD             SYSCAL           table.f15_TSM2  table.f19_TSM2  table.f22_TSM1  table.info
FLAG_CMD          table.dat        table.f15_TSM3  table.f19_TSM3  table.f22_TSM2  table.lock
HISTORY           table.f0         table.f15_TSM4  table.f19_TSM4  table.f22_TSM3  WEATHER
OBSERVATION       table.f1         table.f16       table.f2        table.f22_TSM4
POINTING          table.f10        table.f16i      table.f20       table.f3
POLARIZATION      table.f11        table.f17       table.f21       table.f4
PROCESSOR         table.f12        table.f17i      table.f21_TSM1  table.f5
SORTED_TABLE      table.f13        table.f18       table.f21_TSM2  table.f6
```

Measurement Set

browsetable



	UVW	FLAG	FLAG_CATEGORY	WEIGHT	SIGMA	ANTENNA1	ANTENNA2	ARRAY_ID	DATA_DESC_ID	EXPOSURE	
409	[-89.717, 11...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	1	4	0	5	2.016	0
410	[-68.5008, 9...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	1	5	0	5	2.016	0
411	[5.74803, 3...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	1	6	0	5	2.016	0
412	[-75.2516, 1...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	1	7	0	5	2.016	0
413	[-131.207, 7...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	2	3	0	5	2.016	0
414	[-79.3128, 9...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	2	4	0	5	2.016	0
415	[-58.0966, 7...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	2	5	0	5	2.016	0
416	[16.1522, 1...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	2	6	0	5	2.016	0
417	[-64.8475, 9...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	2	7	0	5	2.016	0
418	[51.8937, 8...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	3	4	0	5	2.016	0
419	[73.1099, 6...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	3	5	0	5	2.016	0
420	[147.359, 1...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	3	6	0	5	2.016	0
421	[66.3591, 8...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	3	7	0	5	2.016	0
422	[21.2162, -2...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	4	5	0	5	2.016	0
423	[95.465, -76...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	4	6	0	5	2.016	0
424	[14.4653, -1...	[2, 128] Bool...	[0, 0, 0] Boolean	[128, 128]	[1, 1]	4	7	0	5	2.016	0

X23.ms | ANTENNA

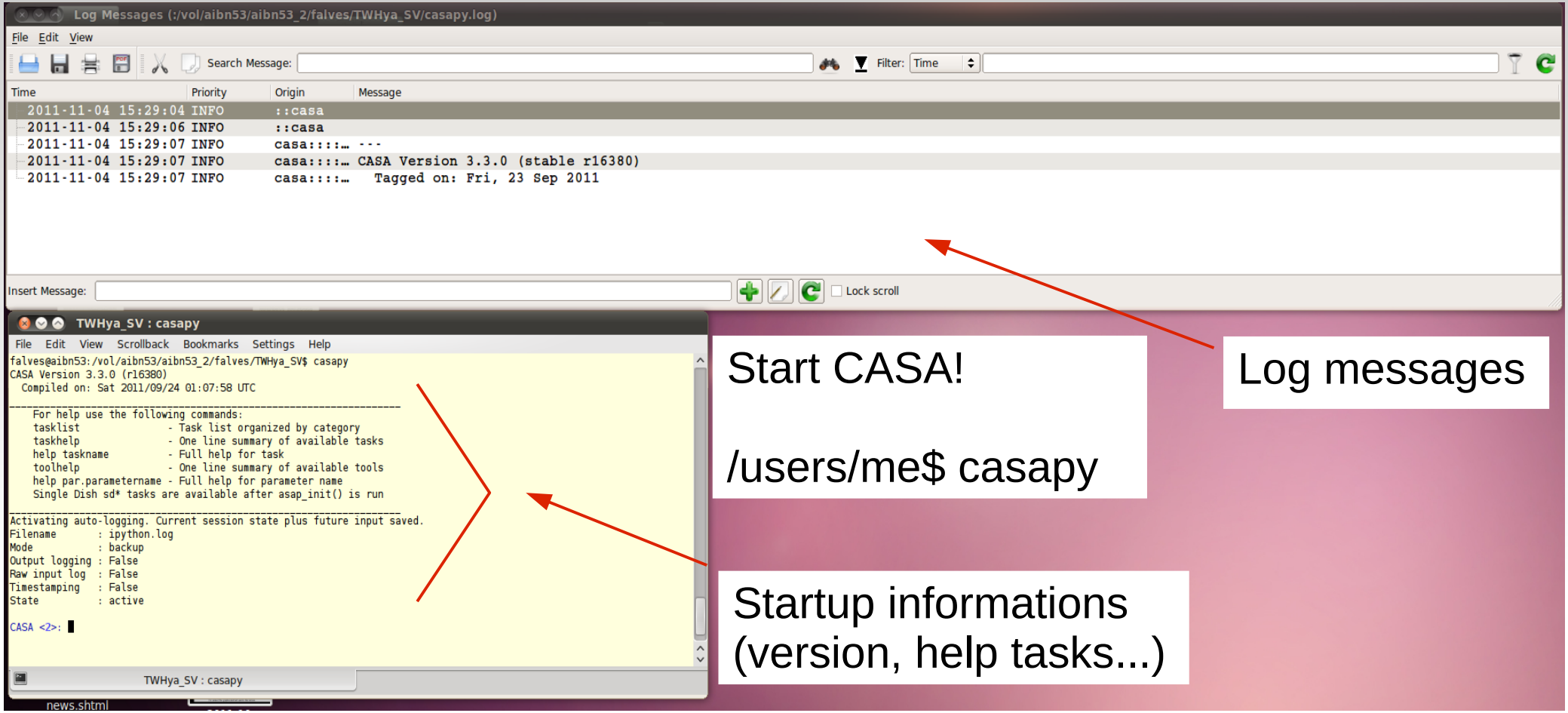
table data | table keywords | field keywords

	Keyword	Type	Value	Extra Information
1	MS_VERSION	Float	2	
2	ANTENNA	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/ANTENNA	Subtable has 8 rows.
3	DATA_DESCRIPTION	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/DATA_DESCRIPTION	Subtable has 17 rows.
4	FEED	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/FEED	Subtable has 192 rows.
5	FLAG_CMD	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/FLAG_CMD	Subtable has no rows.
6	FIELD	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/FIELD	Subtable has 4 rows.
7	HISTORY	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/HISTORY	Subtable has 23 rows.
8	OBSERVATION	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/OBSERVATION	Subtable has 1 rows.
9	POINTING	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/POINTING	Subtable has 658088 rows.
10	POLARIZATION	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/POLARIZATION	Subtable has 2 rows.
11	PROCESSOR	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/PROCESSOR	Subtable has 3 rows.
12	SOURCE	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/SOURCE	Subtable has 100 rows.
13	SPECTRAL_WINDOW	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/SPECTRAL_WINDOW	Subtable has 25 rows.
14	STATE	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/STATE	Subtable has 54 rows.
15	SYSCAL	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/SYSCAL	Subtable has 160 rows.
16	WEATHER	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/WEATHER	Subtable has 336 rows.
17	SORTED_TABLE	Table	/vol/aibn53/aibn53_2/falves/TWHya_SV/X23.ms/SORTED_TABLE	Subtable has 209352 rows.
18	SORT_COLUMNS	String Array	[ARRAY_ID, SCAN_NUMBER, FIELD_ID, DATA_DESC_ID, TIME]	

X23.ms | ANTENNA

table data | table keywords | keywords

	OFFSET	POSITION	TYPE	DISH_DIAMETER	FLAG_ROW	MOUNT	NAME	STATION
0	[0, 0, 0]	[2.22513e+...	GROUND-BA...	12	0	ALT-AZ	DV01	A137
1	[0, 0, 0]	[2.22506e+...	GROUND-BA...	12	0	ALT-AZ	DV04	J505
2	[0, 0, 0]	[2.22506e+...	GROUND-BA...	12	0	ALT-AZ	DV07	J510
3	[0, 0, 0]	[2.2252e+0...	GROUND-BA...	12	0	ALT-AZ	DV08	A072
4	[0, 0, 0]	[2.22511e+...	GROUND-BA...	12	0	ALT-AZ	DV09	A008
5	[0, 0, 0]	[2.2251e+0...	GROUND-BA...	12	0	ALT-AZ	DV10	A009
6	[0, 0, 0]	[2.22504e+...	GROUND-BA...	12	0	ALT-AZ	PM01	T702
7	[0, 0, 0]	[2.2251e+0...	GROUND-BA...	12	0	ALT-AZ	PM02	A017



interactive work with additional helper commands

Command	*example*	
default	`default(clean)`	- reset all input parameters
inp	`inp`	- show parameters of current task
go	`go`	- start current task
saveinputs	`saveinputs(clean)`	- store parameters in file
tget	`tget(clean)`	- restore parameters from file

Support tasks

CASA <11>: help
---------> help()

Welcome to Python 2.6! This is the online help utility.

If this is your first time using Python, you should definitely check out
the tutorial on the Internet at http://docs.python.org/tutorial/.

Enter the name of any module, keyword, or topic to get help on writing
Python programs and using Python modules. To quit this help utility and
return to the interpreter, just type "quit".

To get a list of available modules, keywords, or topics, type "modules",
"keywords", or "topics". Each module also comes with a one-line
summary
of what it does; to list the modules whose summaries contain a given word
such as "spam", type "modules spam".

help> keywords

Here is a list of the Python keywords. Enter any keyword to get more
help.

and	elif	if	print
as	else	import	raise
assert	except	in	return
break	exec	is	try
class	finally	lambda	while
continue	for	not	with
def	from	or	yield
del	global	pass	

CASA <1>: help <taskname>
or
CASA <2>: help par.<par name>

e.g.

CASA <13>: help split
---------> help(split)

CASA <16>: help par.datacolumn
---------> help(par.datacolumn)

ABORT

Control+C or Control+Z => kill -9 (PID)

EXIT

CASA <17>: quit
---------> quit()
Do you really want to exit ([y]/n)?

or

CASA <17>: exit
(no prompt)

Call tasks with pre-defined settings

Recall previous settings

List parameters for a given task

"field" and "spw" common standard selections

expandable "selectdata" with other selections as sub-parameters

dpetry@pc014720:~/temp/radio-analysis/cqtau+mwc480 - Shell - Konsole

Session Edit View Bookmarks Settings Help

```
CASA <15>: fluxscale(vis='AT352_A071103-K', caltable='AT352_A071103-K-gain', fluxtable
='0', transfer='1')

CASA <16>: applycal(vis='AT352_A071103-K', gaintable='AT352_A071103-K-gain', field='2'

CASA <17>: tget clean
---------> tget(clean)
Restored parameters from file clean.last

CASA <18>: inp
---------> inp()
#  clean :: Deconvolve an image with selected algorithm
vis                 = 'AT352_A071103-K' #  name of input visibility file
imagename           = 'cqtau-3-target'  #  Pre-name of output images
field               =        '2'        #  Field Name
spw                 =         ''        #  Spectral windows:channels: '' is all
selectdata          =      False        #  Other data selection parameters
mode                =       'mfs'       #  Type of selection (mfs, channel, velocity,
niter               =        500        #  Maximum number of iterations
gain                =        0.1        #  Loop gain for cleaning
threshold           =    '0.0mJy'       #  Flux level to stop cleaning.  Must include
psfmode             =     'clark'       #  method of PSF calculation to use during min
imagermode          =         ''        #   Use csclean or mosaic.  If '', use psfmode
multiscale          =         []        #  set deconvolution scales (pixels), default:
interactive         =       True        #  use interactive clean (with GUI viewer)
                                        100        #  Number of iterations before interactive pro

                                        []         #  cleanbox(es), mask image(s), and/or region(
                                        2]         #  x and y image size in pixels, symmetric for
                                        rcsec', '0.03arcsec'] #  x and y cell size. default unit
                                        ''         #  Image phase center: position or field index
                                        ''         #  rest frequency to assign to image (see help
```

```
vis                 = 'ngc5921.ms'
caltable            = 'ngc5921.gcal'
field               =      '0,1'
spw                 =    '0:2~56'
selectdata          =       True
     timerange      =         ''
     uvrange        =         ''
     antenna        =         ''
     scan           =         ''
     msselect       =         ''
```

Selection Syntax

field - string with source name or field ID

can use '*' as wildcard, first checks for name, then ID

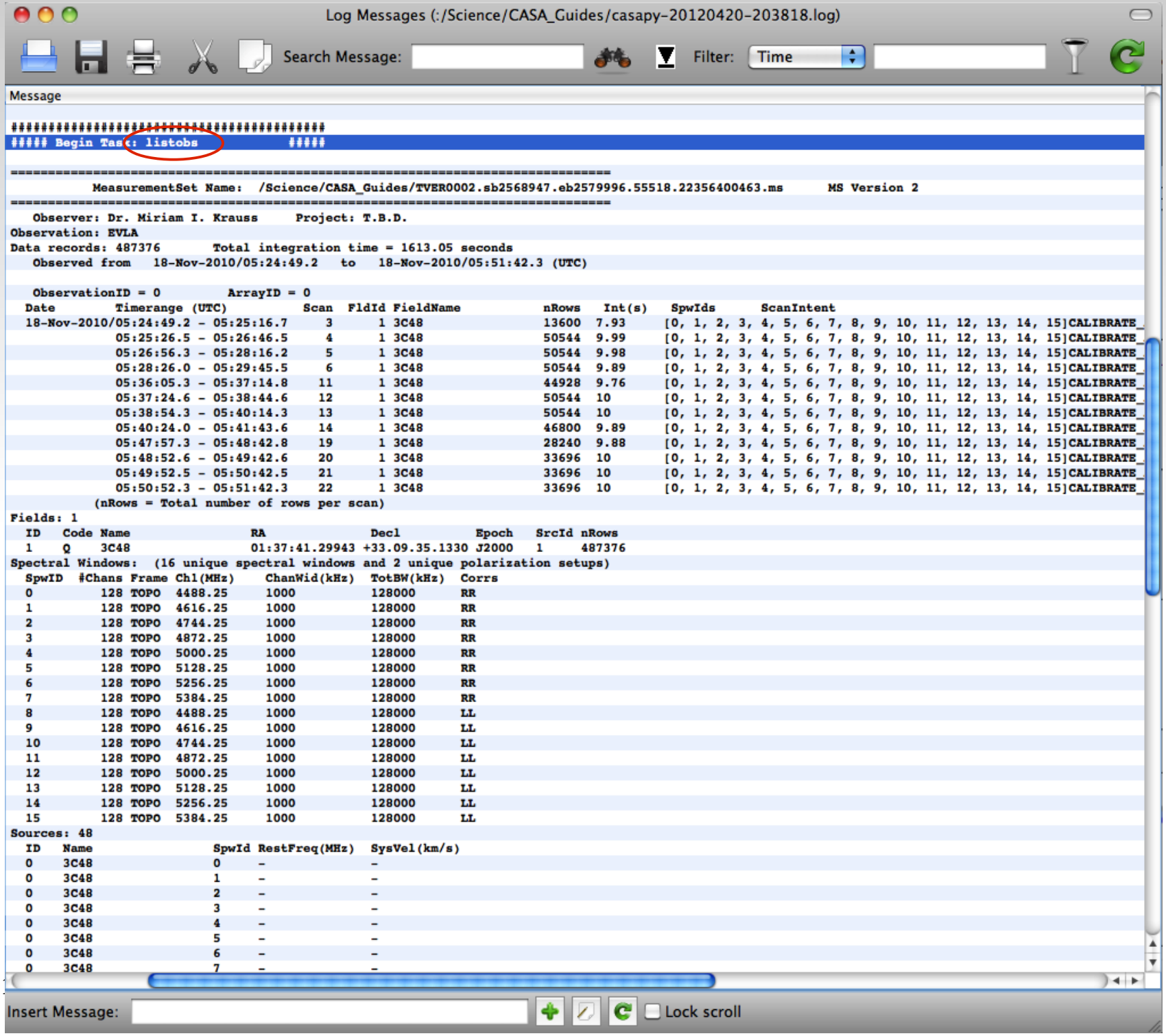
example: field = '1331+305' ; field = '3C*' ; field = '0,1,4~5'

spw - string with spectral window ID plus channels

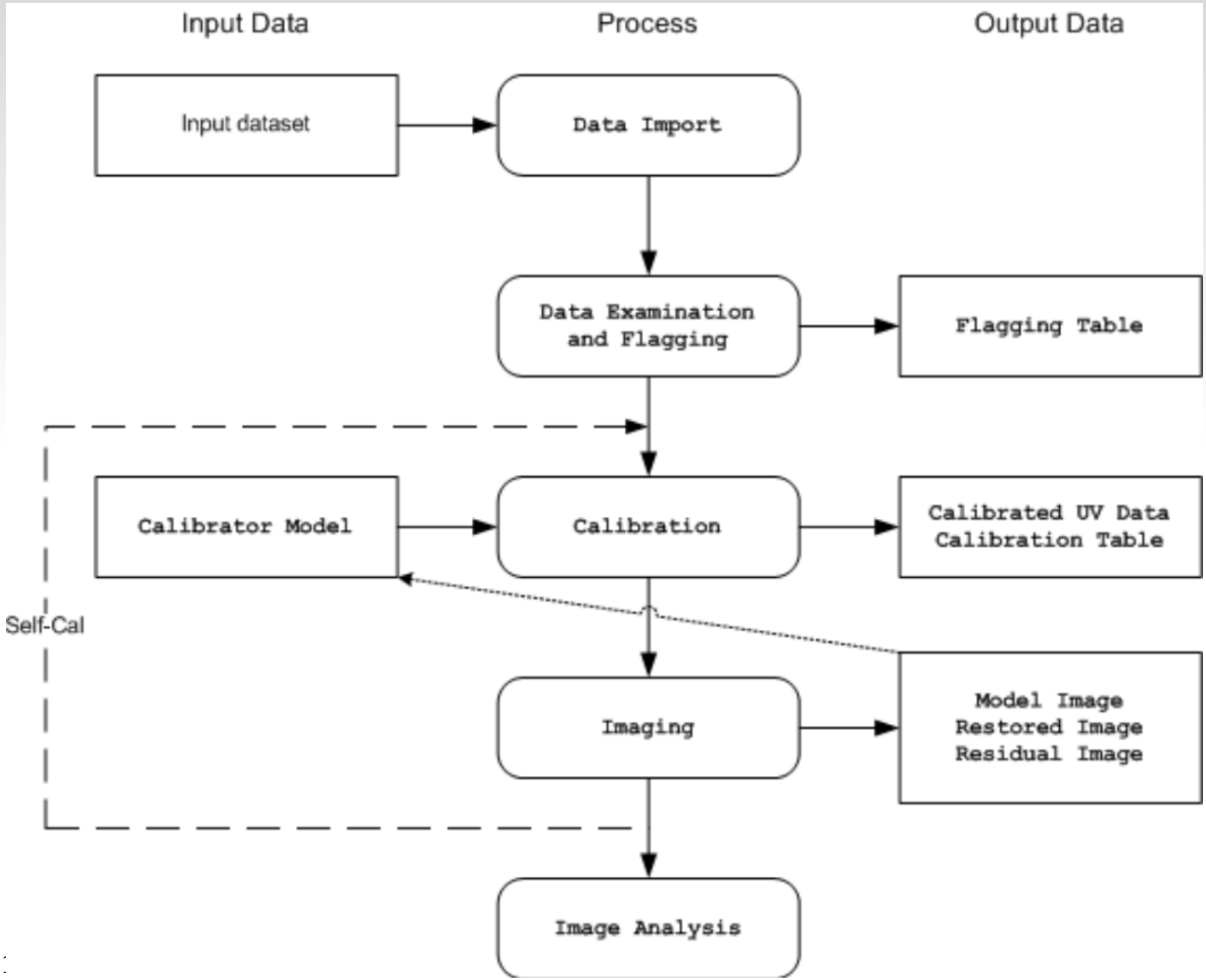
Use ':' as separator of spw from optional channelization

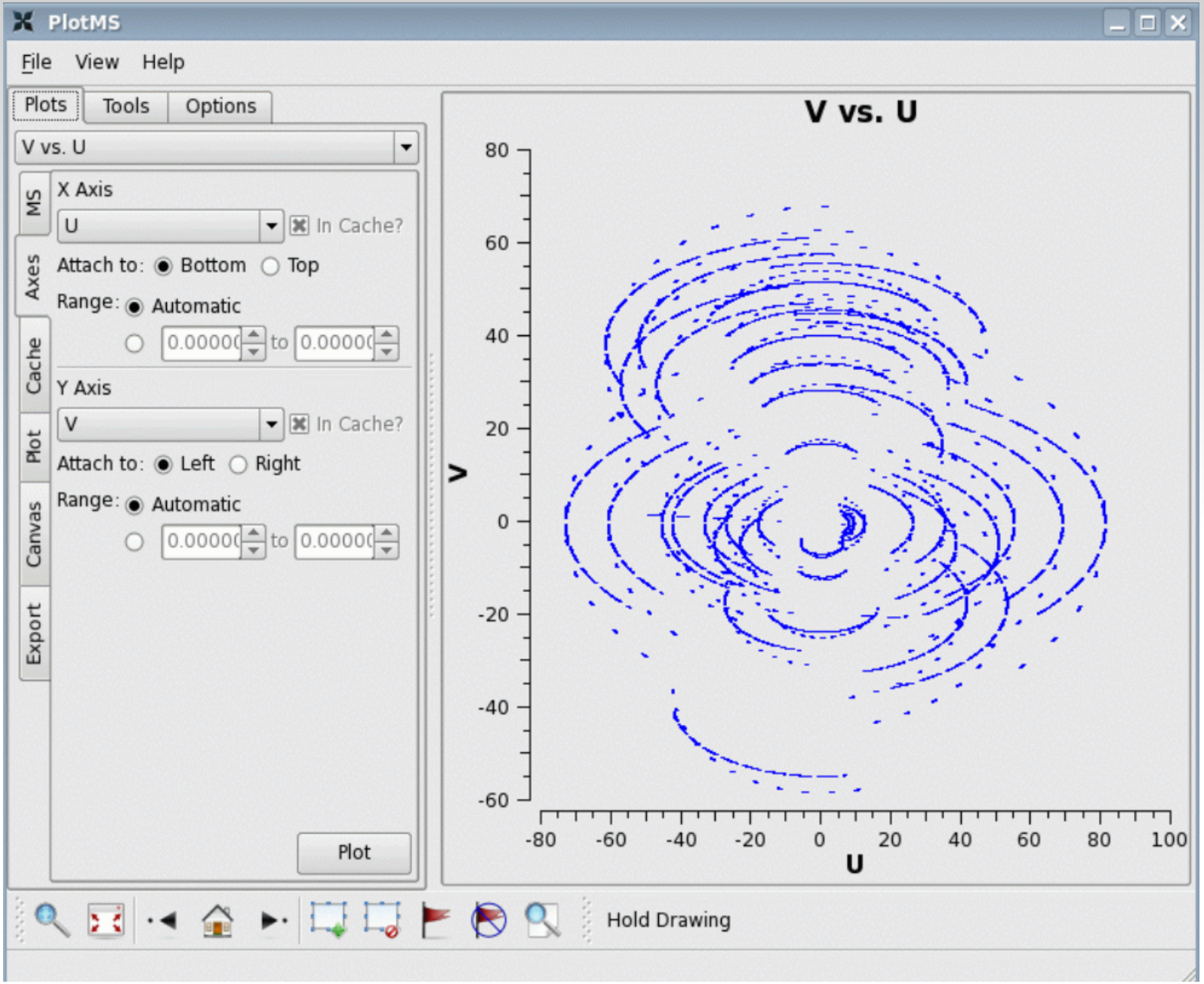
Use '^' as separator of channels from step/width

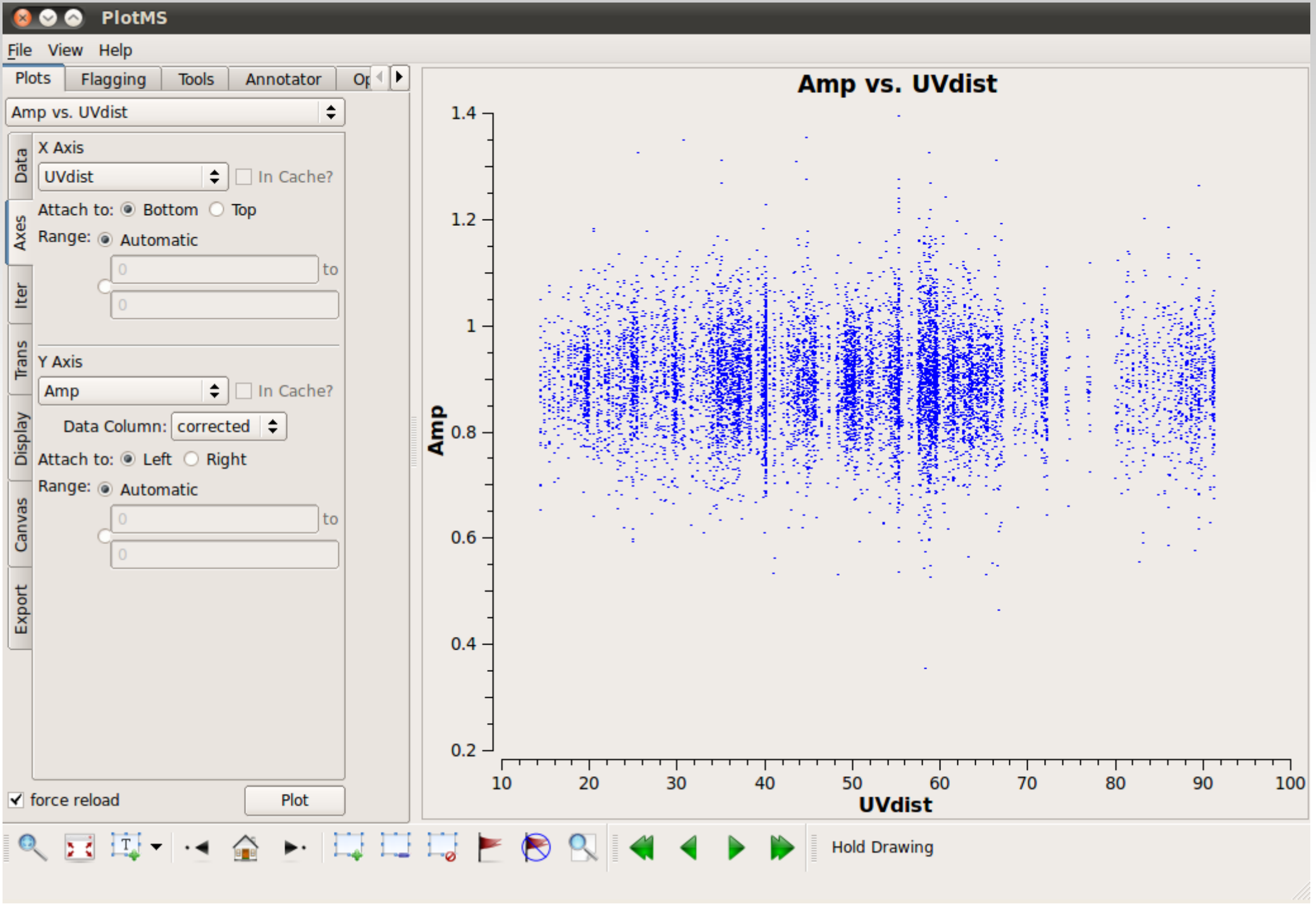
example: spw = ‘0~2’ ; spw = ‘1:10~30’ ; spw = ‘2~5:5~54^5’


Log Messages (:/Science/CASA_Guides/casapy-20120420-203818.log)
Search Message:
Filter:
Time
Message
##
Begin Task: listobs
MeasurementSet Name: /Science/CASA_Guides/TVER0002.sb2568947.eb2579996.55518.22356400463.ms MS Version 2
Observer: Dr. Miriam I. Krauss Project: T.B.D.
Observation: EVLA
Data records: 487376 Total integration time = 1613.05 seconds
Observed from 18-Nov-2010/05:24:49.2 to 18-Nov-2010/05:51:42.3 (UTC)
ObservationID = 0 ArrayID = 0
Date Timerange (UTC) Scan FldId FieldName nRows Int(s) SpwIds ScanIntent
18-Nov-2010/05:24:49.2 - 05:25:16.7 3 1 3C48 13600 7.93 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:25:26.5 - 05:26:46.5 4 1 3C48 50544 9.99 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:26:56.3 - 05:28:16.2 5 1 3C48 50544 9.98 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:28:26.0 - 05:29:45.5 6 1 3C48 50544 9.89 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:36:05.3 - 05:37:14.8 11 1 3C48 44928 9.76 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:37:24.6 - 05:38:44.6 12 1 3C48 50544 10 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:38:54.3 - 05:40:14.3 13 1 3C48 50544 10 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:40:24.0 - 05:41:43.6 14 1 3C48 46800 9.89 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:47:57.3 - 05:48:42.8 19 1 3C48 28240 9.88 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:48:52.6 - 05:49:42.6 20 1 3C48 33696 10 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:49:52.5 - 05:50:42.5 21 1 3C48 33696 10 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
05:50:52.3 - 05:51:42.3 22 1 3C48 33696 10 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]CALIBRATE_
(nRows = Total number of rows per scan)
Fields: 1
ID Code Name RA Decl Epoch SrcId nRows
1 Q 3C48 01:37:41.29943 +33.09.35.1330 J2000 1 487376
Spectral Windows: (16 unique spectral windows and 2 unique polarization setups)
SpwID #Chans Frame Ch1(MHz) ChanWid(kHz) TotBW(kHz) Corrs
0 128 TOPO 4488.25 1000 128000 RR
1 128 TOPO 4616.25 1000 128000 RR
2 128 TOPO 4744.25 1000 128000 RR
3 128 TOPO 4872.25 1000 128000 RR
4 128 TOPO 5000.25 1000 128000 RR
5 128 TOPO 5128.25 1000 128000 RR
6 128 TOPO 5256.25 1000 128000 RR
7 128 TOPO 5384.25 1000 128000 RR
8 128 TOPO 4488.25 1000 128000 LL
9 128 TOPO 4616.25 1000 128000 LL
10 128 TOPO 4744.25 1000 128000 LL
11 128 TOPO 4872.25 1000 128000 LL
12 128 TOPO 5000.25 1000 128000 LL
13 128 TOPO 5128.25 1000 128000 LL
14 128 TOPO 5256.25 1000 128000 LL
15 128 TOPO 5384.25 1000 128000 LL
Sources: 48
ID Name SpwId RestFreq(MHz) SysVel(km/s)
0 3C48 0 - -
0 3C48 1 - -
0 3C48 2 - -
0 3C48 3 - -
0 3C48 4 - -
0 3C48 5 - -
0 3C48 6 - -
0 3C48 7 - -
Insert Message:
Lock scroll

Workflow


Input Data
Process
Output Data
Input dataset
Data Import
Data Examination and Flagging
Flagging Table
Calibrator Model
Calibration
Calibrated UV Data
Calibration Table
Self-Cal
Imaging
Model Image
Restored Image
Residual Image
Image Analysis


PlotMS
File View Help
Plots Tools Options
V vs. U
MS
Axes
Cache
Plot
Canvas
Export
X Axis
U
In Cache?
Attach to: Bottom Top
Range: Automatic
0.0000 to 0.0000
Y Axis
V
In Cache?
Attach to: Left Right
Range: Automatic
0.0000 to 0.0000
Plot
V vs. U
80
60
40
20
0
-20
-40
-60
V
-80 -60 -40 -20 0 20 40 60 80 100
U
Hold Drawing


PlotMS
File View Help
Plots Flagging Tools Annotator Op
Amp vs. UVdist
Data Axes Iter Trans Display Canvas Export
X Axis
UVdist
In Cache?
Attach to: Bottom Top
Range: Automatic
0
to
0
Y Axis
Amp
In Cache?
Data Column: corrected
Attach to: Left Right
Range: Automatic
0
to
0
force reload
Plot
Amp vs. UVdist
Amp
UVdist
1.4
1.2
1
0.8
0.6
0.4
0.2
10
20
30
40
50
60
70
80
90
100
Hold Drawing


PlotMS
File View Help
Plots Flagging Tools Annotator
Amp vs. Time
Data Axes Iter Trans Display Canvas Export
File Location
lves/TWHya_SV/X30f.ms
Browse
Selection
field
spw
timerange
uvrange
antenna
scan
corr
array
observation
msselect
Averaging
Channel 3840 channels
Time 0 seconds
Scan Field
All Baselines Per Antenna
All Spectral Windows
Scalar
All Verbose Summary
force reload Plot
Amp vs. Time
Amp
0.012
0.01
0.008
0.006
0.004
0.002
0
-0.002
04:00:00
04:16:40
04:33:20
04:50:00
05:06:40
05:23:20
05:40:00
Time (from 2011/05/13)
Hold Drawing

Image analysis

. Image data (various deconvolution methods)

- clean, feather, deconvolve...

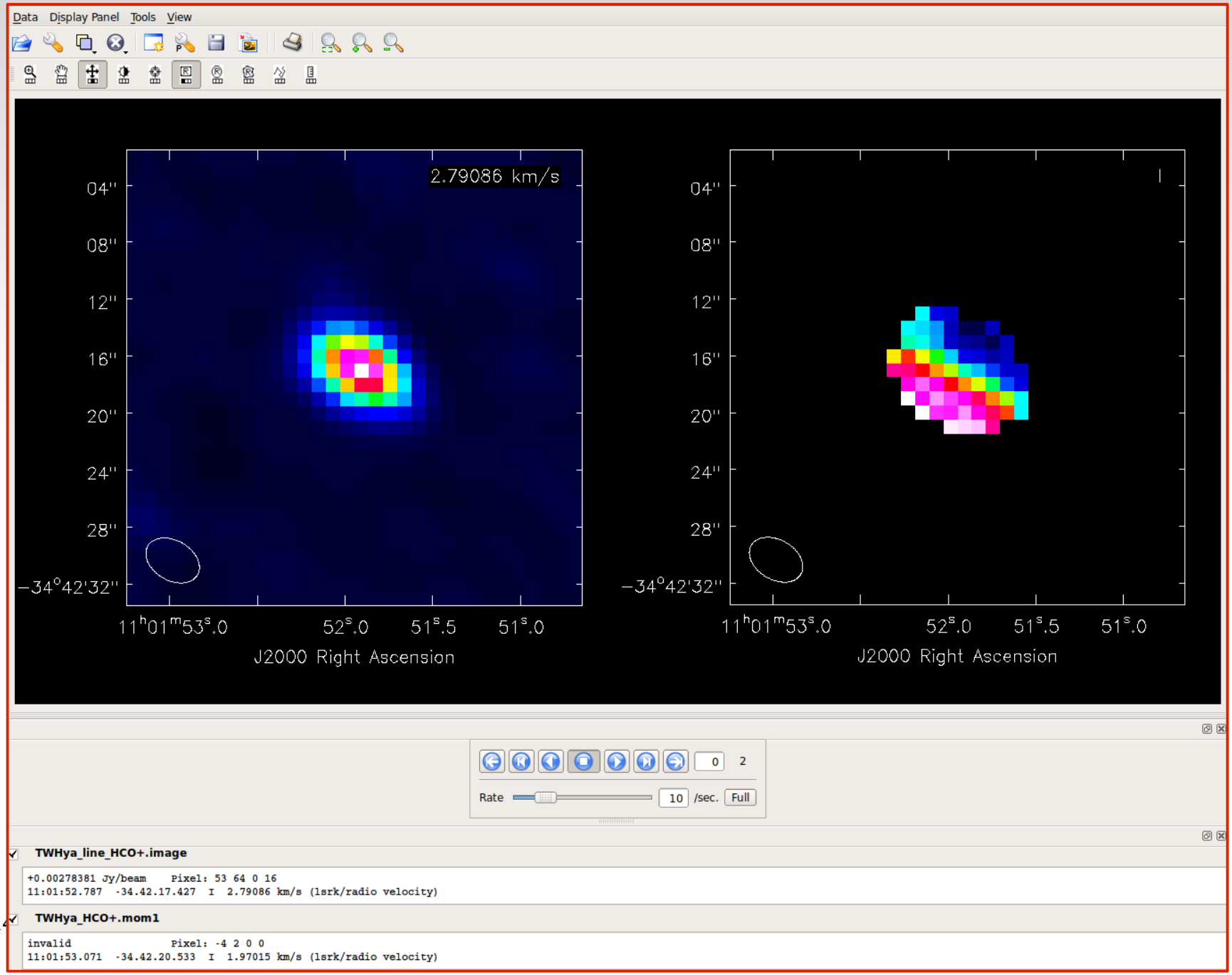
. Image and uv analysis

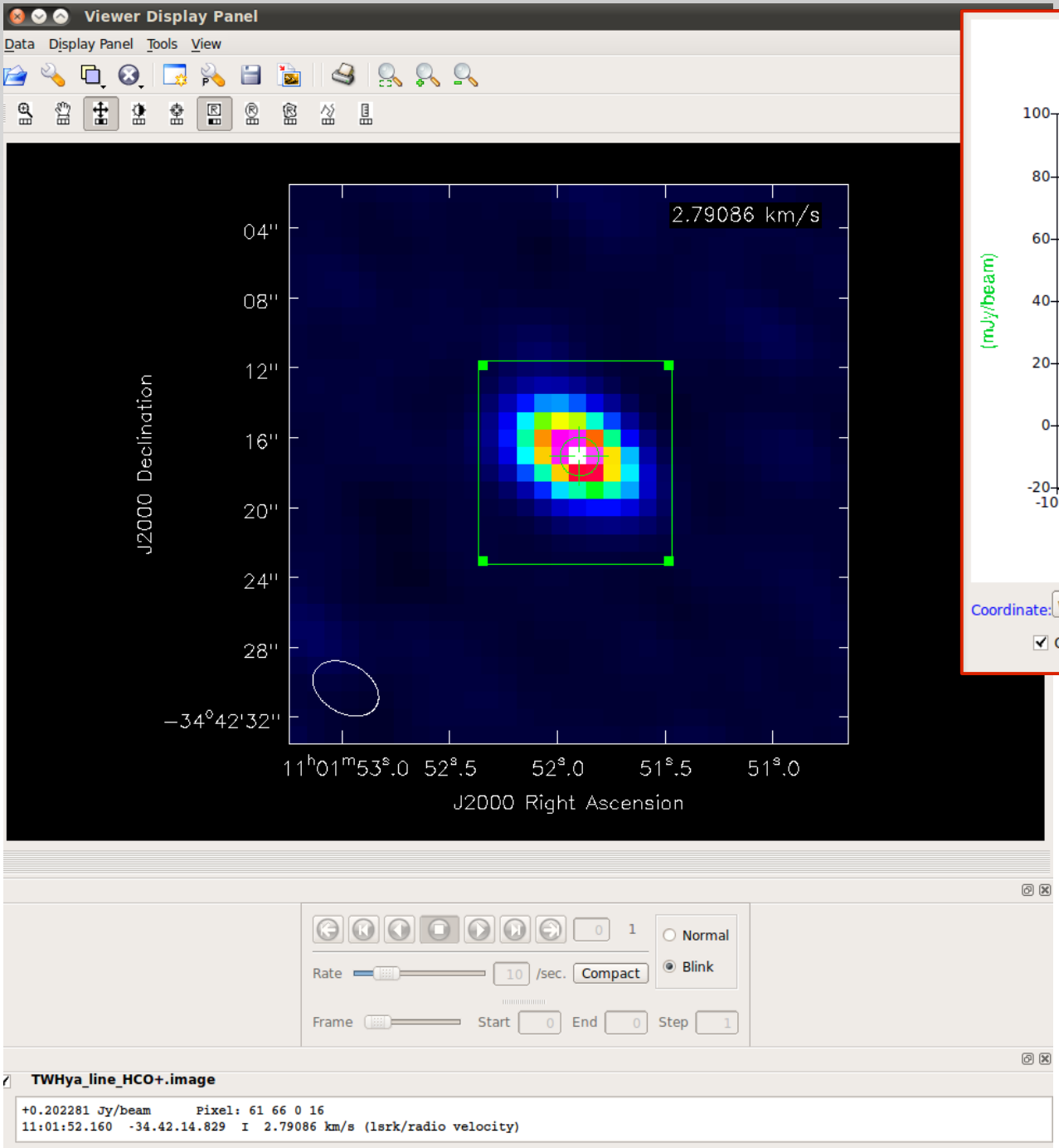
- imhead, immoments, imstat, imcontsub, immath...

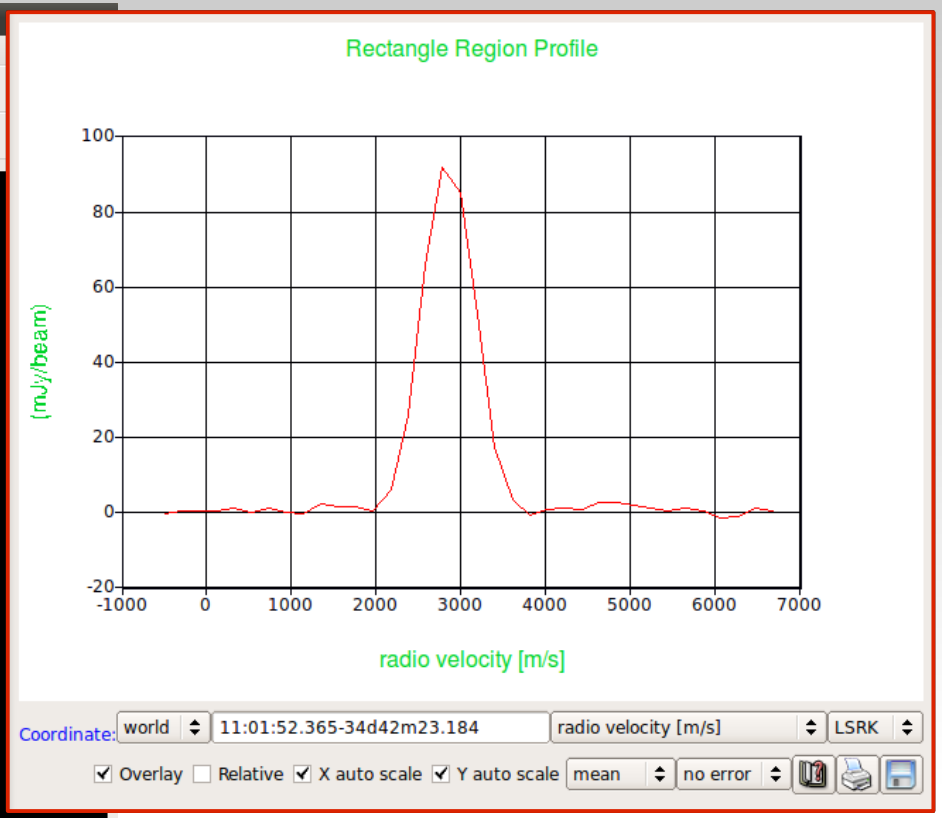
. Data and image visualization

- (casa)viewer

Image analysis







Tools → Spectral Profile

Role of the CASA Users Committee (CUC)

Appointed by science operations of ALMA executives but serving all CASA users

The CUC is supposed to provide

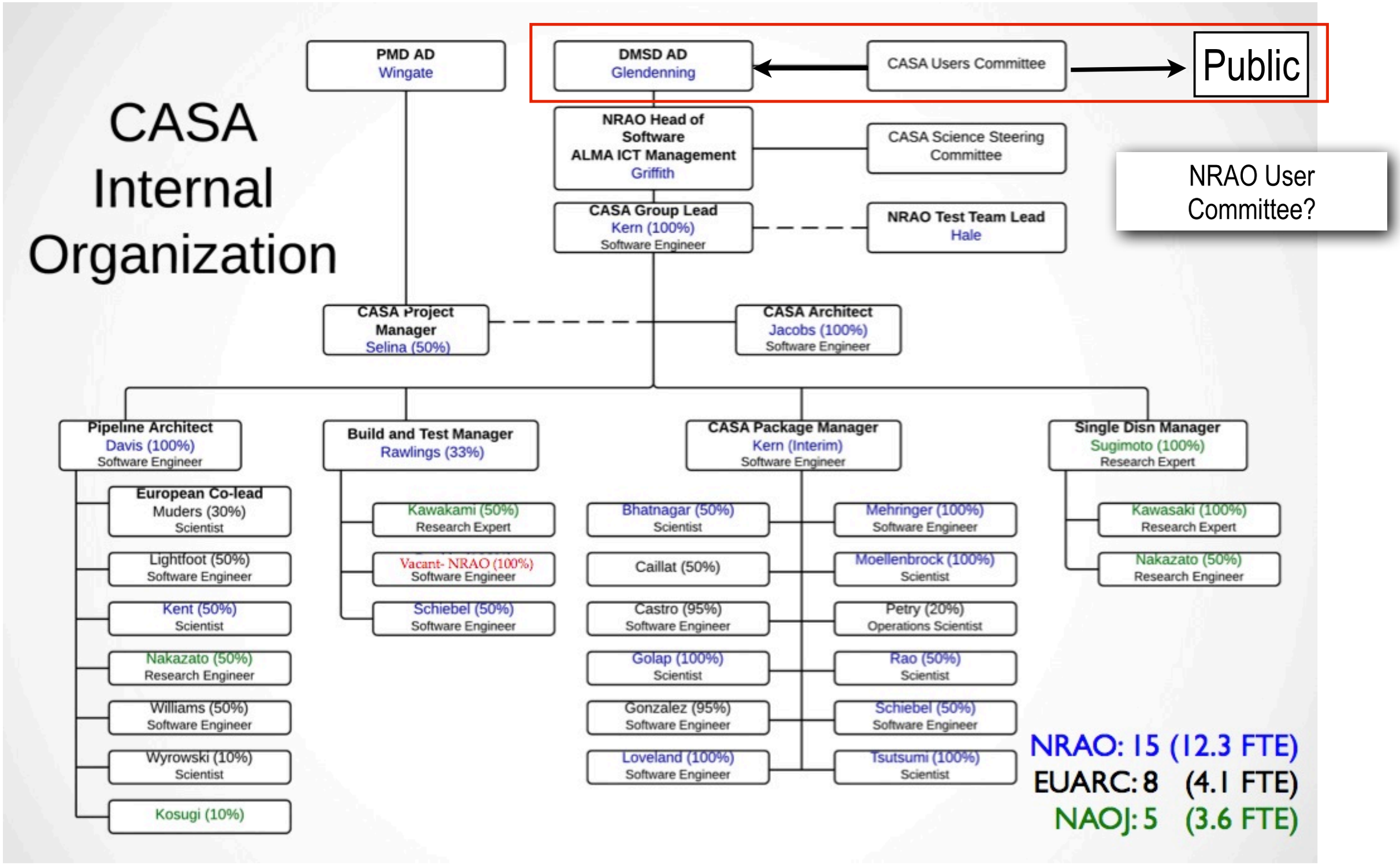
- *independent* feedback on *full* community perception of CASA capabilities, usability, reliability and performance
- insights on user needs to do their science
- strategic input on large scale initiatives
- input for support of other telescopes

The CUC is not (!)

- a replacement for the helpdesk
- a replacement for the existing CASA science steering committee
- an executive body

CASA organization overview

CUC met in fall with developers, NRAO directorate, NAASC and CASA documentation

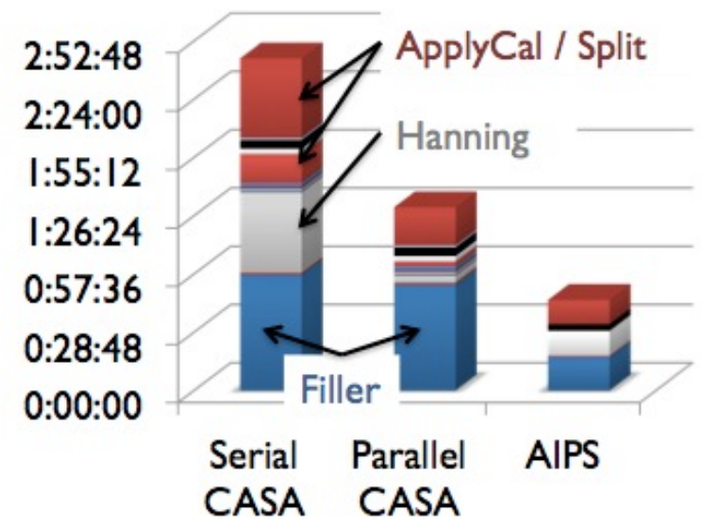


CASA status/outlook

Mac OS 10.7 not supported anymore, speed improvement/HPC solutions priority

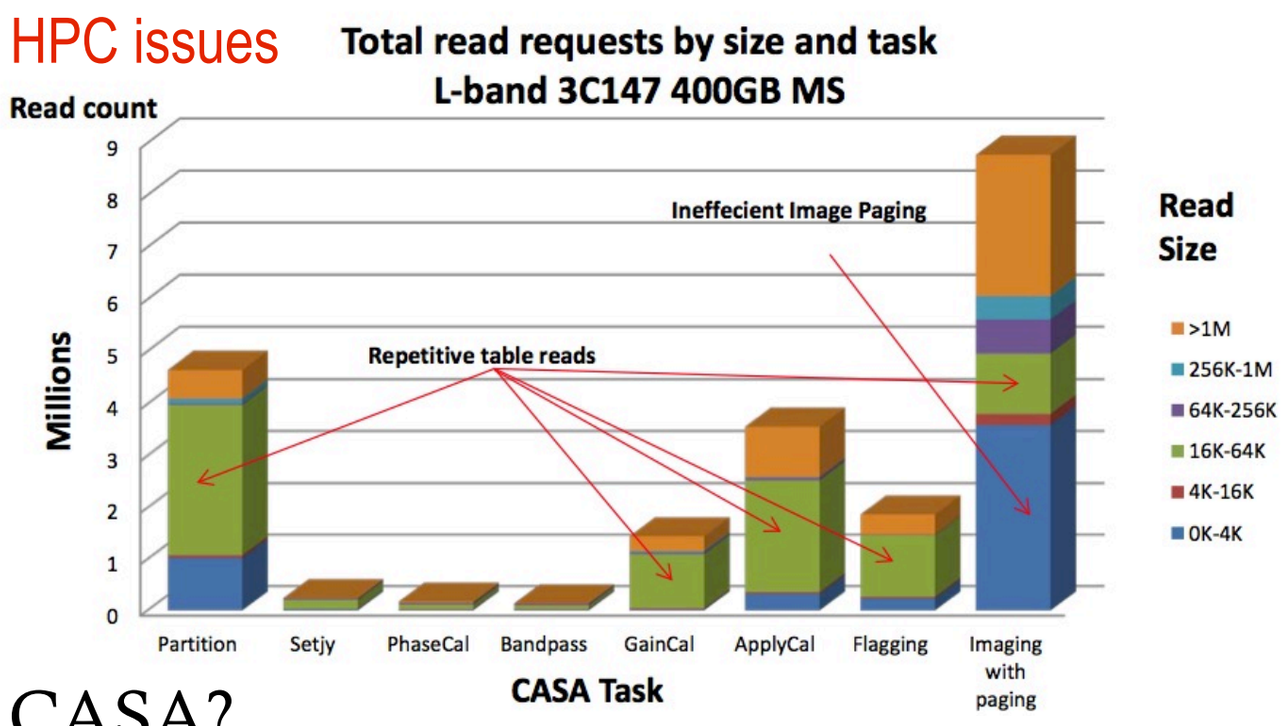
Selected timelines and ongoing efforts

- CASA 4.3 (11/14), 4.4 (03/15)
- CASA 4.4 priorities (random order):
  - CLEAN/imaging refactor
  - parallelization/high performance computing capabilities
  - improving scratchless operation (virtual model data column, I/O & memory footprint)
  - pipelines
  - Mac OS 10.9 & RHEL 7 support
  - ALMA long baseline support
  - casacore unification
- mid-term: viewer replacement ‚CARTA' (U Alberta)
- long-term (CASA 2020): centralized HPC and cloud-based CASA?



From E. Momjan on CASA 4.2.1, 86GB SDM

HPC issues



From Talk by James Robnett

Progress so far

Preliminary from here on (ongoing internal CUC discussions)!

Boundary conditions (CASA team)

- CUC prioritization suggestions need to follow commissioning priority
- triggering a new effort requires cuts in other areas
- efforts are fundamentally manpower-limited
- no interference with personnel management and implementation standards

Preliminary CUC recommendations

- based on own reflection; feedback from ARC nodes, individual PIs, pilot Facebook poll (D. Jacobs) and Cycle 2 user satisfaction survey
- performance demand: stability > speed
- demand for better communication/transparency provided through: regular newsletter, direct user interaction (web 2.0), *user survey*, comprehensive and updated documentation, helpdesk feedback
- better interaction with external developers

Progress so far

Interaction of developers/CUC ongoing through regular telecons

Meeting charge

- contained six requests
- was formulated by CASA team
- provides a structure for ongoing discussion and CUC report

CUC report, developers' feedback and interaction

- CUC report/deverlopers' response online:
  https://safe.nrao.edu/wiki/bin/view/Software/CASA/CASAUsersCommittee
- Can sign up now for new CASA newsletter:
  https://science.nrao.edu/enews/casa_1/
- Initial users survey was open until March 20
- TBD: future community feedback through CUC ideally semi-annually (Jan/Jun), upcoming user surveys (perhaps on annual basis)

Common Astronomy Software Applications

- Official webpage:

  http://casa.nrao.edu/

- Download and installation:

  http://casa.nrao.edu/casa_obtaining.shtml

- **CASA cookbook:**

  http://casa.nrao.edu/Doc/Cookbook/casa_cookbook.pdf

- CASA cheat sheet:

  http://casaguides.nrao.edu/index.php?title=AIPS-to-CASA_Cheat_Sheet