

Roseland  
Centre  
for Solar  
Physics

# SoAP – Solar ALMA Pipeline

Mikołaj Szydlarski  
Roseland Centre for Solar Physics, Univ Oslo  
OSLO, 29 November 2019

# What is (OSLO) SoAP



```
OSLO -> /usr/local/soap/soap_v011/bin/soap_v011_11c.py  
[SOAP] File: /usr/local/soap_v011/bin/soap_v011_11c.py (13030) (P) Rev: 14-10-2018 by MOC  
[SOAP] ver: 011  
SOAP  
ver: 011  
[SOAP] Started with stamp: 20170822_17:01  
[SOAP] Your observation is in Band B [ Freq = 8.87296e+10 Hz ]  
[SOAP] Found field name: Sun_00  
[SOAP] Found: 3 scans for field name: Sun_00  
[SOAP] Your scan list: [1,18,17]  
[SOAP] Determining the image properties ... might take some time!  
[SOAP] Your observation is in single field [ 8.750 arcsec ]  
[SOAP] Adjusted to optimal image size: 291 x 291  
[SOAP] Image size is [ 298 x 298 ] with pixel size [ 0.36 arcsec ]  
[SOAP] ... [ 0 ] spots for scan number [ 11 ] with length [ 204 ] time stamps with cadence [ 2.81600e-4 ]  
[SOAP] ... [ 0 ] spots for scan number [ 11 ] with length [ 204 ] time stamps with cadence [ 2.81600e-4 ]  
[SOAP] ... [ 0 ] spots for scan number [ 36 ] with length [ 204 ] time stamps with cadence [ 2.81600e-4 ]  
[SOAP] ... [ 0 ] spots for scan number [ 36 ] with length [ 204 ] time stamps with cadence [ 2.81600e-4 ]  
[SOAP] ... [ 0 ] spots for scan number [ 37 ] with length [ 204 ] time stamps with cadence [ 2.81600e-4 ]  
[SOAP] ... [ 0 ] spots for scan number [ 37 ] with length [ 204 ] time stamps with cadence [ 2.81600e-4 ]  
[SOAP] There is [ 1 ] images = 998 [ 1 ] to clean to cover obs time [ = 30.00000 min ]
```

Official\* Imaging scripts ( TP & INT )

Calibration & QA2

# Motivation

- There is no easy way to get science ready Solar ALMA images.
- ... especially time series.
- New users have to learn CASA just to access/generate images.

# Design Goals

- It has to be be easy to use.
- Automatic as much as possible (black box functionality)
- Control versions i.e., it must be possible to reproduce results.
- Is it possible to make it generic ?

DEMO

```
CASA <4>: ll -d *.cal*
drwxr-xr-x 23 mikolajs 4098 Jun 15 2018 uid__A002_Xbf792a_X5912.calibration/
drwxr-xr-x 28 mikolajs 4098 Jun 15 2018 uid__A002_Xbf792a_X5912.ms.split.cal/
```

```
CASA <5>: execfile('soap_clean_v012_selfcal_func_lvl_123.py')
```

```
[SoAP] :: Loading clean_with_soap() function.
[SoAP] :: .....: loading done!
[SoAP] :: ..... see help string by entering: clean_with_soap?
[SoAP] :: explore your calibrated ms file with: clean_with_soap(msc_folder='_name_of_your_ms_file_',checkonly=True)
```

```
CASA <6>: clean_with_soap('uid__A002_Xbf792a_X5912.ms.split.cal/',checkonly=True)
```

```
[SOAP] File $Id: soap_clean_v012_selfcal_func_lvl_123 (f1dac90) Fri Dec 14 16:37:08 2018 by Mikolaj Szydlarski $
```



ver. 012

```
[SOAP] Started with stamp [ 20200301-194514 ]
[SOAP] Your observation is in Band 3 [ freq = 9.997895e+10 Hz ]
[SOAP] Found field name [ Sun_10 ]
[SOAP] Found [ 3 ] scans for field name [ Sun_10 ]
[SOAP] Your scan list: [11,14,17]
[SOAP] Estimating the image properties ... (might take some time)
[SOAP] Cellsize estimation from im.advise() [ 0.340 arcsec ]
[SOAP] Your observation is single field
[SOAP] Adjusted to optimal image size [ 297 -> 288 ]
[SOAP] image size : [ 288 x 288 ] with pixel size [ 0.34 arcsec ]
[SOAP] ... [ 4 ] spws for scan number [ 11 ] with [ 300 ] time stamps with cadence [ 2.016000 s ]
[SOAP] ... .. scan number [ 11 ] with lenght [ 2017/04/22/17:20:13 -> 2017/04/22/17:30:17 ]
[SOAP]...spectral windows selected for scan [ 14 ] : [0,1,2,3]
[SOAP] ... [ 4 ] spws for scan number [ 14 ] with [ 300 ] time stamps with cadence [ 2.016000 s ]
[SOAP] ... .. scan number [ 14 ] with lenght [ 2017/04/22/17:32:33 -> 2017/04/22/17:42:37 ]
[SOAP]...spectral windows selected for scan [ 17 ] : [0,1,2,3]
[SOAP] ... [ 4 ] spws for scan number [ 17 ] with [ 300 ] time stamps with cadence [ 2.016001 s ]
[SOAP] ... .. scan number [ 17 ] with lenght [ 2017/04/22/17:44:52 -> 2017/04/22/17:54:56 ]
[SOAP] There is [ nimages = 900 ] to clean to cover obs time [ ~ 30.000000 min ]
```

```
CASA <7>: C S
```



# How to access SoAP

- Create GitHub account at: <https://github.com/>
- Sent your **login name** to [miko@astro.uio.no](mailto:miko@astro.uio.no)
- ... I will then manually add you to developers team and you will be able access SoAP here:

<https://github.com/SolarAlma/SoAP>