

# CASA

Common Astronomy  
Software Applications

## CASA Update

Recent Progress and Future Plans  
of CASA and PIPELINE

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on behalf of CASA and  
PIPELINE teams



# Common Astronomy Software Applications (CASA)

- A data reduction and analysis software of data observed by radio astronomical telescopes, both interferometer and single-dish
- Developed in collaboration with NAOJ, NRAO, ESO, and ASIAA
- CASA officially supports ALMA, VLA, Nobeyama 45-m, and ASTE
- All ALMA PI data are processed by CASA before delivered to observers and data processed by CASA are archived
  - ALMA Pipeline also uses CASA inside
- **The latest CASA release is 5.1.1**
- Schedule of next release:
  - A patch release 5.1.2 for VLA (TBD)
  - CASA release 5.2 for HPC (TBD, may be internal release)
  - **CASA release 5.3 for Cycle 6 (ETA March 2018)**



# CASA Progress (as of 5.1.1)

See <https://casa.nrao.edu> for detail

## General

- **Launch CASA Docs** to consolidate and streamline reference manual, cookbook, inline help and other material
- **Crash reporter has been introduced** to collect information to help diagnose why CASA crashed
- **Boolean shortcuts, *T* and *F*, are no longer accepted (True/False)**

## Interferometry

- **tclean improvements:**
  - new automasking algorithm: `usemask='auto-multithresh'`
  - *absorption masking support* (`usemask='auto-multithresh'`, experimental)
- **Pipeline improvements:** Flagging based on calibrated visibility amplitude



# CASA Progress - continued

## Single-dish

- **MS-transition is completed**
  - ATNF Spectral Analysis Package (ASAP) is removed from CASA
  - All tasks based on ASAP are also removed
- importasdm in **lazy mode** accepts **FLOAT\_DATA**
- **Support of ALMA Cycle 5**
  - Improved processing workflow for Solar fast-scanning observations
  - Improved logging in sdbaseline
- **Support of NRO 45m Telescope**
  - Task **importnro** supports import of NRO 45-m observations in the spectral window mode
  - Task **sdimaging** supports several types of projections



# CASA - Major Development Activities

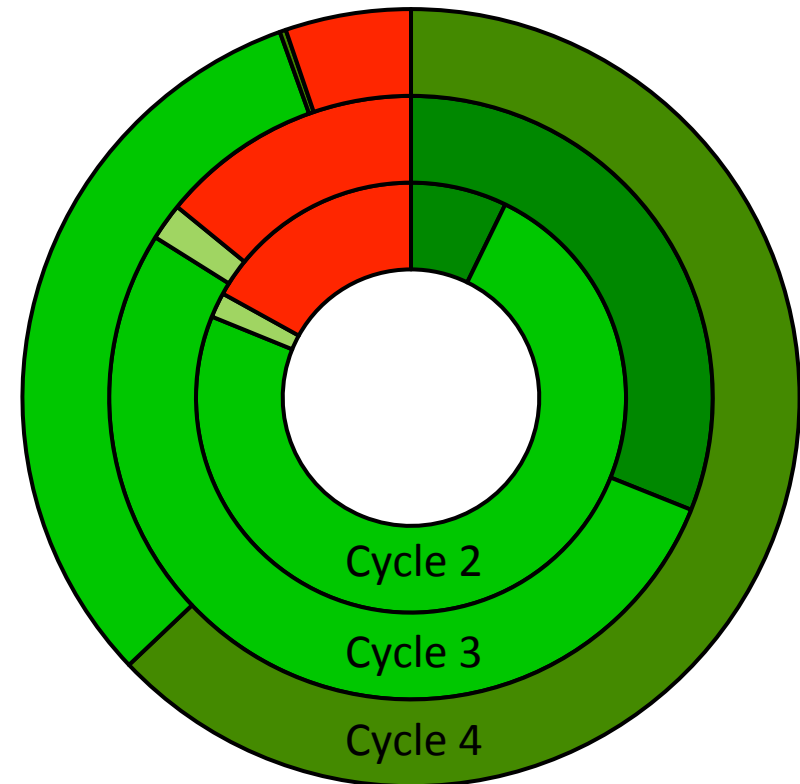
- Update MeasurementSet to version 3 (**MSv3**)
  - for ALMA, ng-VLA, and SKA
  - converter from version 2 will be provided
- Support for polarization calibration heuristics
- Further improvement of tclean:
  - automasking, beam model, performance, memory footprint, ...
- resolved calibrator data
- A systematic benchmarking campaign for CASA performance and its tracking

**Users feed back would be appreciated (via help desk, etc.)**



# ALMA Pipeline Status - Interferometry

- Calibration pipeline first acceptance Cycle 2
- Informative imaging pipeline first deployed Cycle 3
- Imaging pipeline first acceptance Cycle 4
- Enhanced calibration and imaging pipeline acceptance Cycle 5



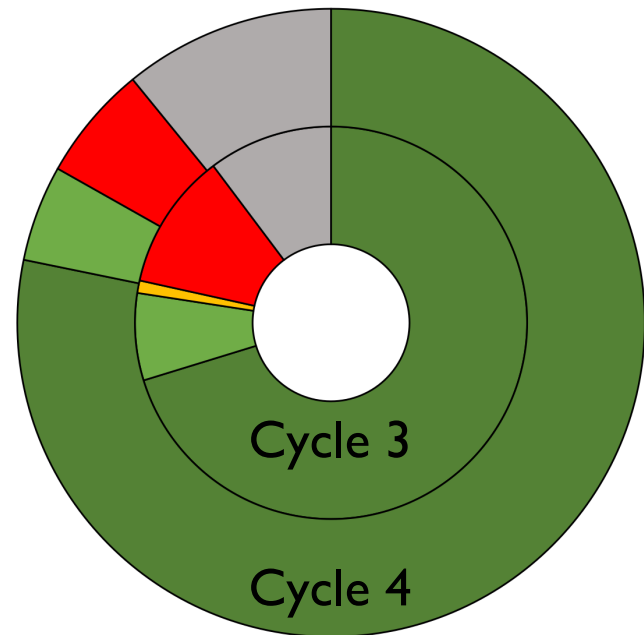
■ No Intervention   ■ Intervention  
■ Tweaked   ■ Sent to Manual

# ALMA Pipeline Status - Single-Dish

- Standard mode observations of ALMA are processed by Pipeline

## Pipeline Results (as of Dec. 4)

- Cycle 3
  - 195 MOUSes processed
  - 70% Delivered to PI (w/o intervention)
- Cycle 4
  - 101 MOUSes processed
  - 78% Delivered to PI (w/o intervention)



# ALMA Pipeline: Toward Cycle 6

- **Parallelization**
- **Ephemeris support**
- **Interferometry imaging improvements:**
  - performance: automasking, exit criterion, imaging parameter calculation
  - findContinuum improvement
- Calibration improvement: eliminate “nearest” applycal
- Detection of **resolved calibrators** (BP, PH)
- web-accessible **Jy/K factors database** (single-dish)
- **TP Band 8 spectral line observation** support
- **Nobeyama Pipeline:**
  - working but still need some tweaks specific for Nobeyama data

