CASA Stakeholders

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NRAO

Outline

- CASA Stakeholders
- Requirements process and development prioritization
- Validation testing
- 6.3/6.4 priorities
- 6.5 priorities

tl;dr

- CASA is the pre-eminent interferometric calibration and imaging software used by radio astronomers worldwide
- we have to balance a lot of disparate interests, user groups, and operations needs/models among a finite group of developers
- while maintaining/improving appropriate balance with stability and testing… and looking forward

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CASA Stakeholders

CASA development is driven by these Stakeholders/interests:

- ALMA
  - *users/Obsmode: Amanda Kepley*
  - *ALMA pipeline: Remy Indebetouw*
- VLA
  - *users: Josh Marvil*
  - *VLA/SS pipeline: John Tobin*
- Pipeline: *Joe Masters*
- VLBI: *Justin Linford*
- SRDP: *John Tobin*
- External Users/CASA Users Committee: *Bjorn Emonts*
- ARDG: *Sanjay Bhatnagar*

- Developers: *Urvashi Rau (Science Development Lead)*
- *CASA Lead/CASA Infrastructure: Ryan Raba*
- *CASA Project Scientist: Jen Donovan Meyer*

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External/internal users
Pipelines
Infrastructure needs
Algorithms

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CASA Stakeholder context

- **ALMA:** beholden to strict process, timelines external to CASA, user+Obsmode/PL interests generally well aligned
- **VLA/SS:** external VLA PL delivery recipients, VLASS, and internal users group have fairly disparate needs
- **Pipeline:** supports all of the above in one codebase
- **SRDP:** independent needs from CASA, PLs
- **VLBI:** represents needs of VLB community, JIVE devs
- **Users/CUC:** community feedback, Helpdesk
- **ARDG:** algorithmic research for the needs of several groups, aim to deliver code in production framework

- **Sci dev/Infrastructure leads** represent code needs, stability, maintenance, and forward evolution
- **Project scientist** represents stakeholders, liaison to the developers and leads, umbrella quality control/validation, through release coordination and plan

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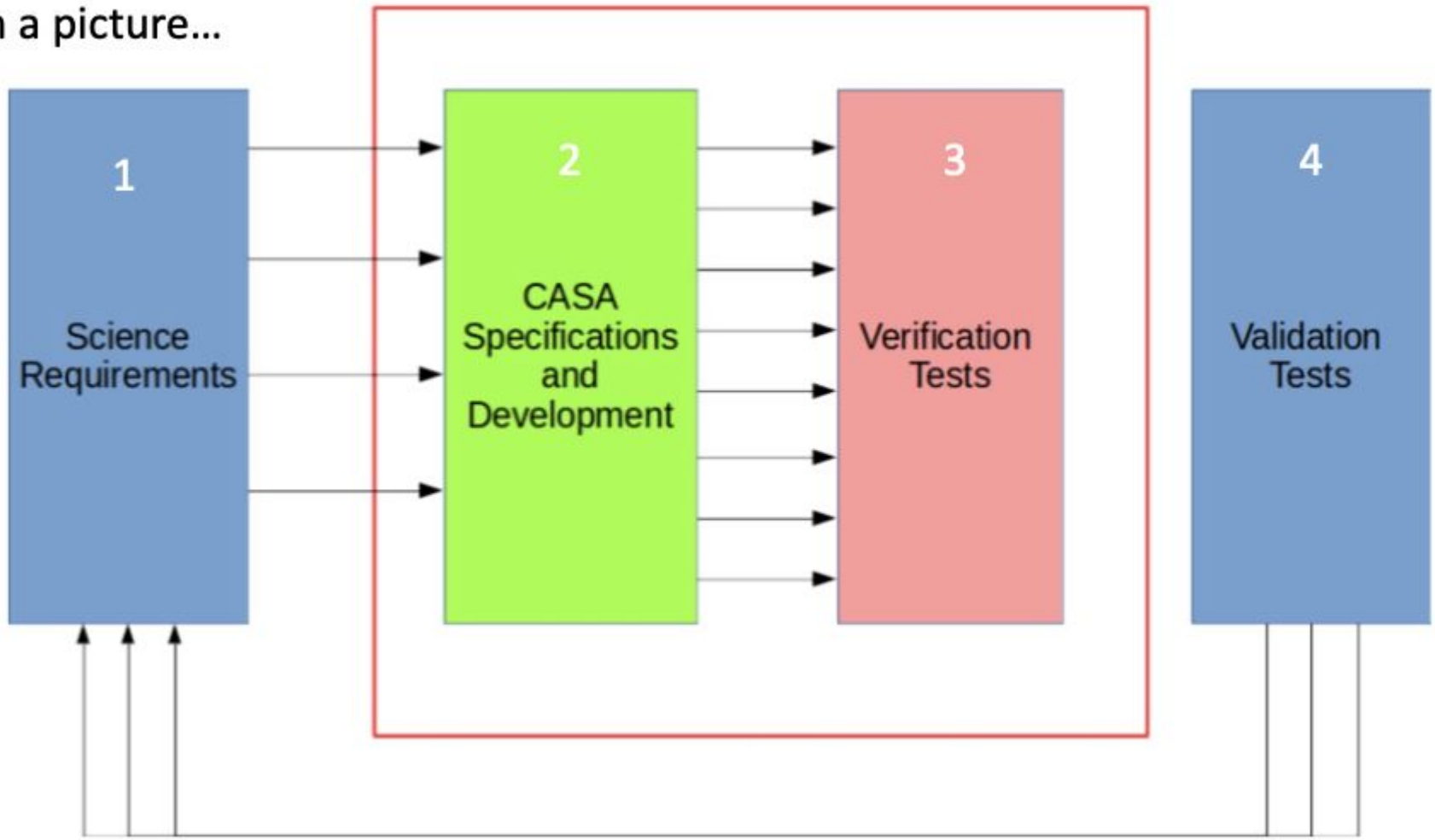
Prioritization and process

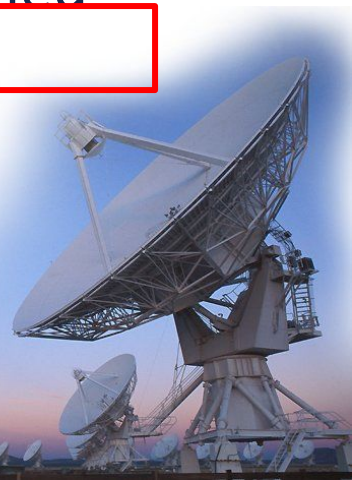
In a picture...



Prioritization and process (biased to stakeholder involvement)

In words…

- Disparate requirement lists collected from Stakeholders
  - these requirements form the basis for eventual validation
  - requirements, use cases, and metrics captured/discussed in a separate JIRA ticket system (on which dev work tickets are based)
1. Requests balanced, prioritized, and consolidated
  - occasional duplicated requests from multiple Stakeholder groups boost priority
  - not all development is a science Stakeholder request
2. Development proceeds, verification testing performed
3. Requested development returned to Stakeholder group for validation
4. (Merge testing branches to trunk)



Requirements collection (#1)

- *Disparate requirement lists collected from Stakeholders*
  - *these requirements form the basis for eventual validation*
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- *Requests balanced, prioritized, and consolidated*
  - *occasional duplicated requests from multiple Stakeholder groups boost priority*
  - *not all development is a (science) Stakeholder request*

- Priority updates solicited formally twice/year via lists of requests from science Stakeholders
  - Informal communication is (much) more regular
  - Bug tickets assessed more quickly, priority has to be balanced with planned development

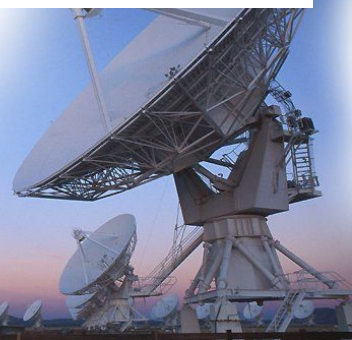
Requirements collection (release planning)

- Historically, CASA has released 200-250 tickets' worth of features + bug fixes in 2 releases/year, one of which is bundled with the Pipeline
  - philosophy: "this is the list of A items that will be in a CASA release called B that will be released on date C"
  - any delay in A, B, or C leads to many delays for software teams with external deadlines
- Beginning with the 6.4 release series, we aim to release trunk 1-3 times per quarter
  - for users: less waiting for fixes, smaller/more frequent updates to install
  - for Stakeholders: emphasis in requirements capture is on necessarily timeline, not trying to hit a release schedule

Validation testing (#4)

- *Requested development returned to Stakeholder group for validation*
- *(Merge testing branches to trunk)*

- Manual testing is performed by scientific staff members (i.e., users), from commissioning scientists to data analysts
- New features and bug fixes both receive validation
  - Generally for one-to-few use cases, depending on complexity
  - Testing plans written by Validation Lead (currently a vacant position) or requesting Stakeholder
- Reminder: pipeline(s) verification and validation is separate
  - ALMA PL validation is handled by PLWG with their own regression testing and validation process, with 100+ ALMA benchmark datasets
  - VLA PL validation is building its own benchmark
  - All based on a CASA version that goes through CASA testing processes
- Exploring ways to enable regular manual testing of trunk as we move to more frequent releases



CASA 6.3/6.4 Stakeholder requests

SCIENCE ITEMS (done in 6.3, scheduled for 6.4, push to 6.5+)

- importasdm to add SDM_CORR_BIT column to SPECTRAL_WINDOW table
- interactive clean fixes to enable it in parallel
- update to model saving capabilities, enable a safer kill for interactive tclean
- update to minor cycle log messages
- corrected version of fixvis (new phaseshift task)
- uvcontsub to support higher order fit (ALMA Band 1) and infrastructure changes needed to support self-cal in pipeline, associated cross-pol bug fix
- wideband mosaics/mtmfs (nterms=3) (ALMA Band 1)
- full Stokes imaging of mosaics
- additional axes in plotms for caltables
- consistent interactive clean behavior when GUI is lost
- feather task fixes and improvements
- frequency metadata improvements, assoc. bug fixes
- standardizing return values and logging for tasks
- removal of unnecessary warning logging
- gaincal S/N edge behavior investigation
- make PSF/PB consistent with residual images
- correct flagging of averaged data, assoc. bug fixes
- support for resolved, wideband calibrator models
- enable high performance gridding
- ASP-clean
- fringefit solution step improvements
- fringefit per-scan interpolation
- msuvbinflag
- switched power data weights units
- updated cal table interface for plotms
- antenna position correction database in gencal (ALMA)
- VLA antenna position corrections over 1 year
- multivariable display in plotms
- SYSPOWER table support

BUG FIXES

- applycal bug with CORRECTED column
- data selection bug fix
- awproject problem after importuvfits
- list of awproject fixes needed for VLASS
- plotms “FlagAll” issue on OSX
- ALMA MFS peculiar spectral set up fix

INFRASTRUCTURE

- support Mac OS 11, Big Sur
- pip wheel support for OS 11
- interactive cleaning tool replacement
- inp/go remaining issues (various)
- several ALMA stakeholder tests (ongoing)
- add FAST to simulator list

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CASA 6.5 Stakeholder requests

- Lists due from Stakeholders this week, plan for spring development based on 6.5 priority set by ~November
- Late 6.4 series development plan can course-correct as necessary

A few expected Stakeholder requirements, part of longer-term goals (already under development in 6.4):

- self-cal support needed in CASA for pipelines
- wideband mosaics
- full polarization/full Mueller imaging
- improved autoflagging

Summary

- Stakeholder process balances the needs of several user groups each release cycle
- Focus on longer term planning while putting out more frequent releases puts the emphasis on timeline in requirements planning
- Validation testing is critical to the stability of CASA