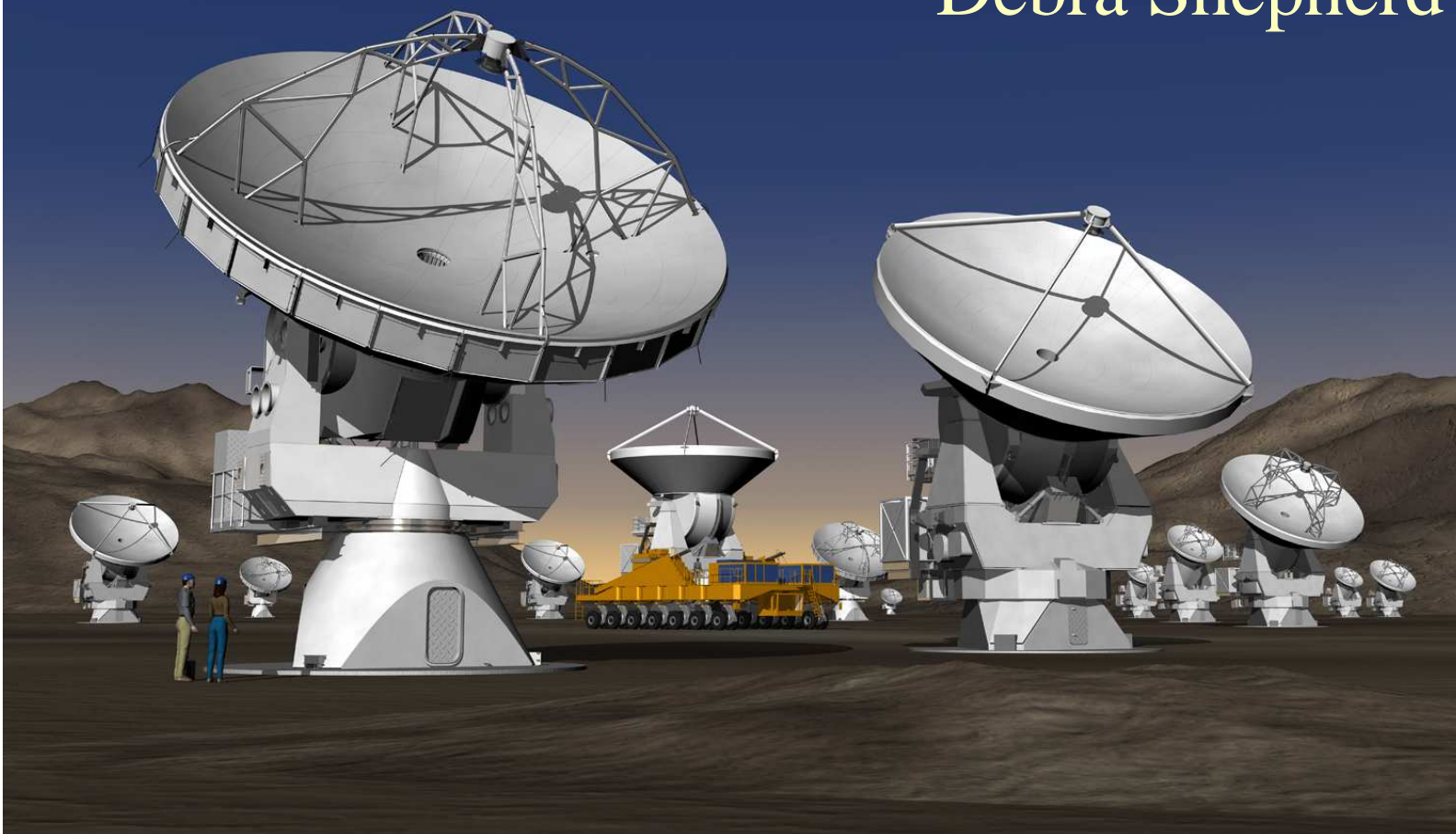


ALMA User Software

Debra Shepherd



7/1/2007
ALMA Disk Workshop

Charlottesville, VA,
June 22-24, 2007

Contents



- ALMA Computing – what is “user software
- Status & Scientific involvement
- Selected test results

ALMA Computing Subsystems



- ALMA Compact Array (ACA)
- Archive
- Common Software
- Control
- Correlator
- Executive (operator interface)
- High-Level Analysis
- Integration, Test & Support
- Observatory Operations
- Observing Preparation
- Offline Data Reduction
- Pipeline Processing
- Scheduling
- Science Software Requirements
- Software Engineering
- Telescope Calibration



Briefly discuss status today

— Scientists within CIPT

Scientific Involvement – Top Level



Scientific liaison – Science Software Requirements (SSR) subsystem:

Scientists represent user community concerns, translate science requirements to detailed requirements for development, test software/grade requirements.

- **ALMA CIPT:**

- Robert Lucas (IRAM) – SSR & TelCal Subsystem Lead;
- Debra Shepherd (NRAO) – NA Deputy Division head & SSR User Test Coordinator
- Andy Hale (NRAO) – SSR Test Assistant
- Philippe Salome (IRAM) – SSR standard mode script development

- **Subsystem Scientists:**

- ACA – Munetake Momose (NAOJ)
- Archiving – Gary Fuller (U. of Manchester) & Francois Villefond (Paris Observatory)
- Control – Jeff Mangum (NRAO, Science IPT)
- Correlator – Ed Fomalont (NRAO)
- Executive – Steve Scott (Caltech)
- Observing Operations – Roberto Neri (IRAM)
- Observing Preparation – Leonardo Testi (ESO) & Toshihiro Handa (ACA)
- Offline Data Reduction – Debra Shepherd (NRAO) & Masatoshi Ohishi (NAOJ, ACA)
- Pipeline – Chris Wilson (McMaster University)
- Scheduling – Mel Wright (Berkeley) & Toshihiro Handa (U. of Tokyo, ACA)
- Telescope Calibration – John Richer (Cambridge) & Munetake Momose (Ibaraki Uni., ACA)

Completed User Test Reports:

Most subsystem
user tests
completed.

Integrated user
tests began in
Feb 2006.

WebHome < Ustests < ALMASW - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://almasw.hq.eso.org/almasw/

ADS query astro-ph SquirrelMail 1.4.8 Gmail

Gmail - standard plots - can you send me? WebHome < Ustests < ALMASW NRAO Staff Query Results

- **Pipeline Subsystem**
 - [Pipeline.TestReport1.txt](#): 2004 April User Test Report
 - [Test2report17Dec04.ps](#): PS format Second User test for Science Pipeline 17Dec04
 - [Test2report17Dec04.pdf](#): PDF format Second User test for Science Pipeline 17Dec04
 - [Test3reportPipeline.pdf](#): Test 3 for Pipeline (recursion test) PDF
 - [PipelineTest3Report.pdf](#): User Test 3, report written April 2006
 - <http://almasw.hq.eso.org/almasw/pub/PIPELINE/DesignReviews/Test4report.pdf>: Test report for User test 4, started Jan 9, 2007, finished April 4, 2007.
 - http://almasw.hq.eso.org/almasw/pub/PIPELINE/DesignReviews/Pipeline_Test4_Append Appendix A of the report: "Summary of Key Questionnaire Responses."
- **Scheduling Subsystem**
 - [SchedGUIFinalTestNotes070416.txt](#): Brief report by Andy, based on testing the simulator GUI delivered for R4.1. This test concluded April 16th, 2007.
 - [SchedSimUserTestSummary-1.pdf](#): April/May 2006 user test report
 - [Schedulingq.TestReport1.txt](#): 2003 December User Test Report
- **Telescope Calibration Subsystem**
 - [TelCalreport-3.1.pdf](#): Test Report written 2006-08-28. This is still under review by John Richer, so there may be changes (2006-12-11).
 - [report.pdf](#): TelCal R2.1 User Test Report
 - [telcal_r2.pdf](#): TelCal R2.0 User Test Report
 - [COMP-90.00.00.00-009-A-REP.pdf](#): TelCal R1.1 User Test Report
 - [Telcal.TestReport.feb2004.pdf](#): 2004 February User Test Report
 - [RonedotOneSciReqAudit](#)
 - [rqmts.final.grades.pdf](#): PDF of Appendix B: Offline Requirements - Grade Spreadsheets from the Test Report. Separated from the report, for readability
 - [rqmts.final.grades.xls](#): Excel format of Appendix B **NEW**

Observing Preparation (Proposals)



- SSR subsystem scientist organizes tests twice a year (major/minor)
- Major Release Tests: 6-9 expert scientists from Europe, N. America & Japan build projects from scratch. Evaluate new features & documentation.
- Minor Release Tests: 4 SSR scientists evaluate bug fixes identified in last test and some minor improvements/additions.
- Integrated tests (SSR) & commissioning (Science IPT) use the OT to generate projects associated with test use cases with a real-time connection to Archive.

Observing Tool Test



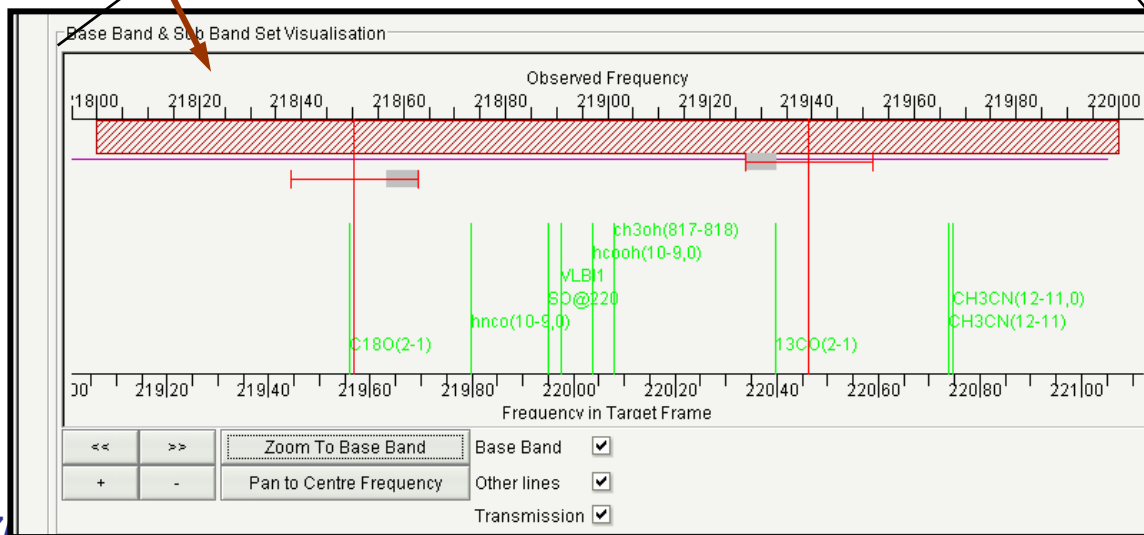
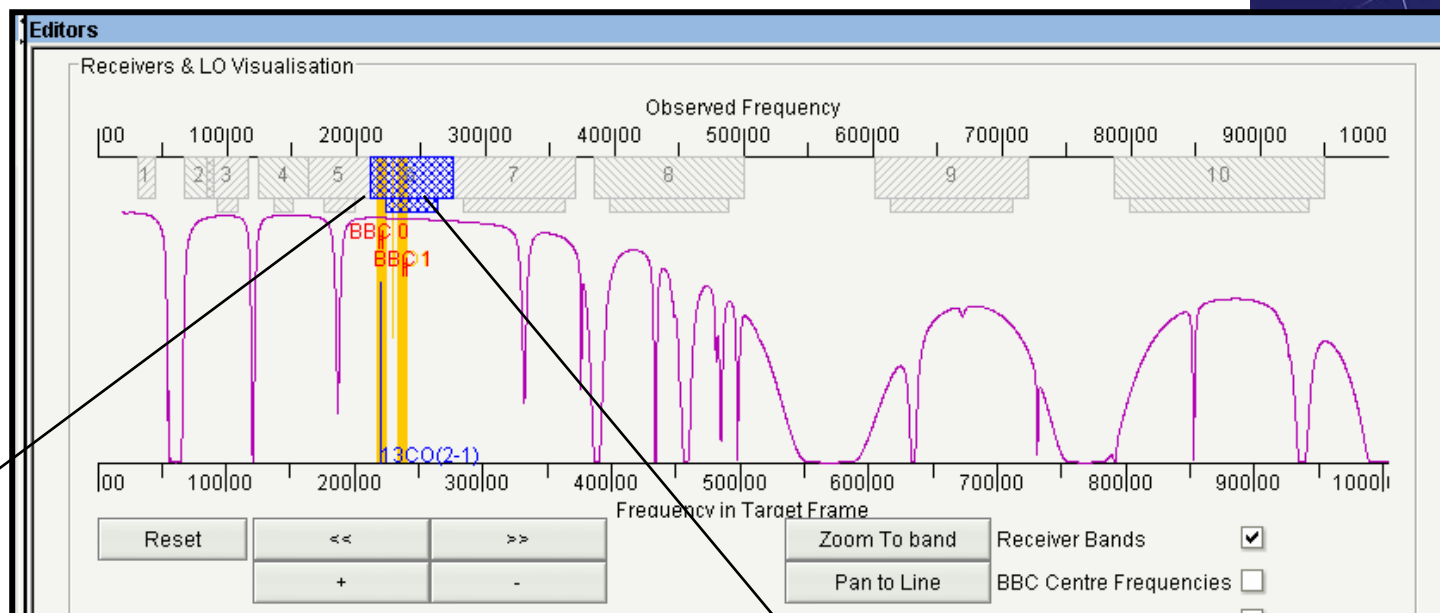
Project created by tester:

- System view with “tree” project structure.
- Target forms view of project created during user test

Observing Tool Test



Band 6 close up showing lines in spectral database and windows on selected lines.



Target source visual representation of correlator setup to observe multiple lines at 1mm Band 6 (C¹⁸O 2-1 & ¹³CO 2-1)

Pipeline Processing & Heuristics



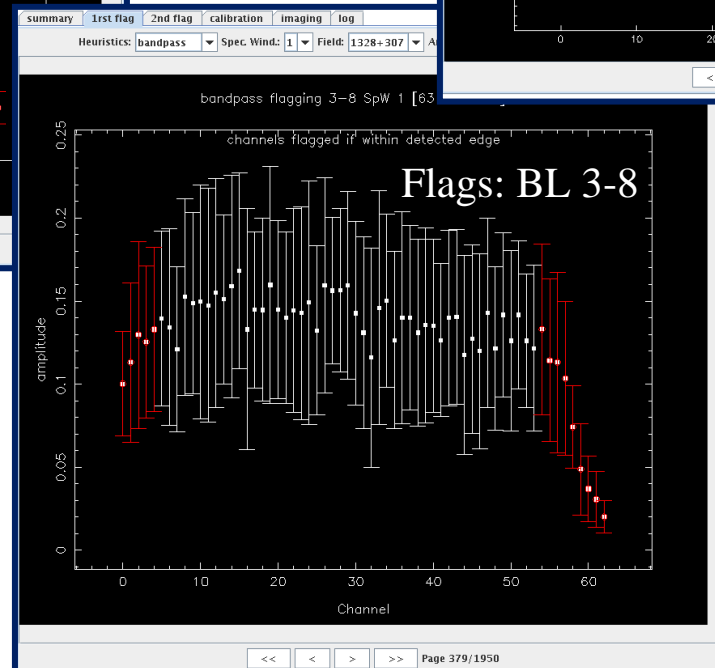
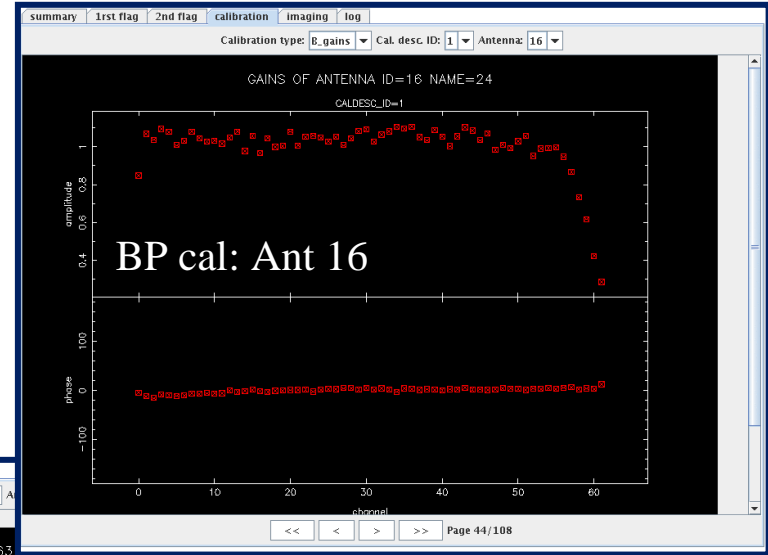
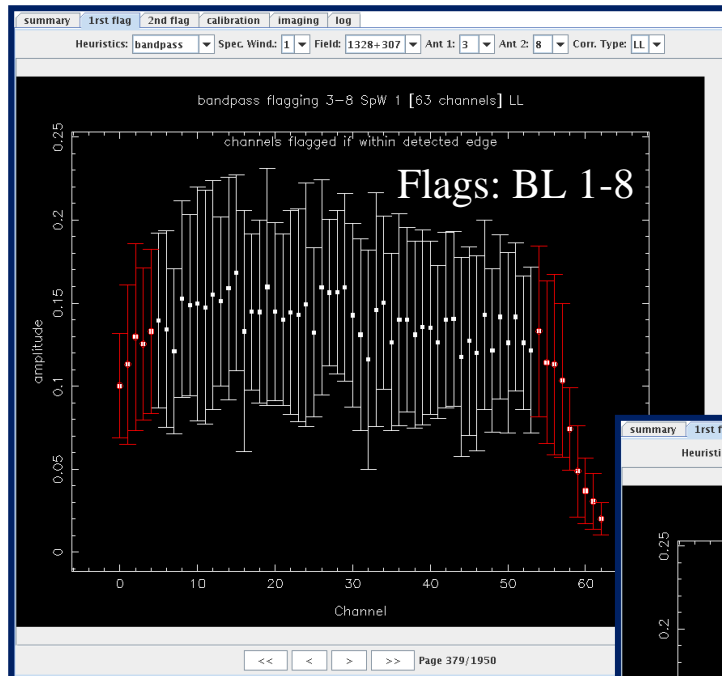
- SSR subsystem scientist organizes tests twice a year
- 6-9 expert scientists from Europe & N. America evaluate new heuristics (flagging, reduction, imaging) on multiple datasets using browser tool.
- Results compared with documentation on heuristics development

Pipeline selected results

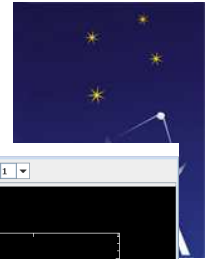


VLA: Ammonia spectral line observation at 13 mm

End channel flagging of bandpass calibrator and bandpass calibration

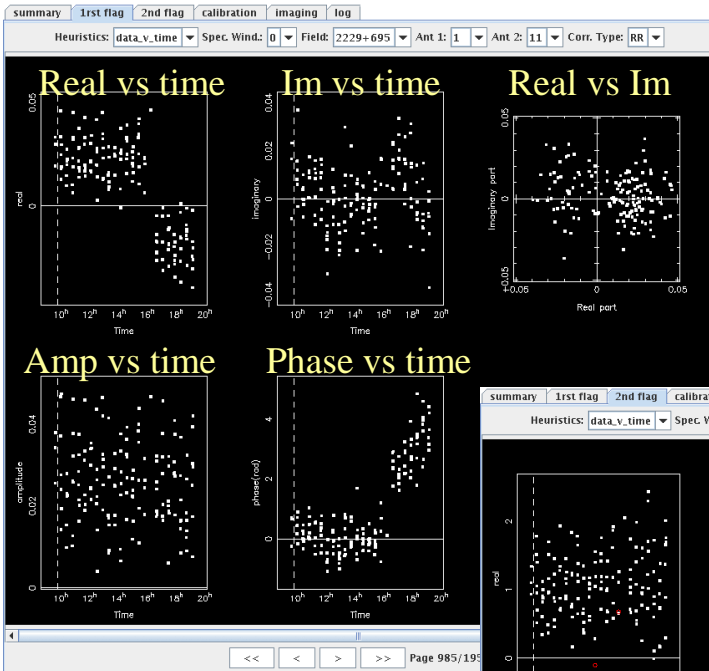


Pipeline selected results

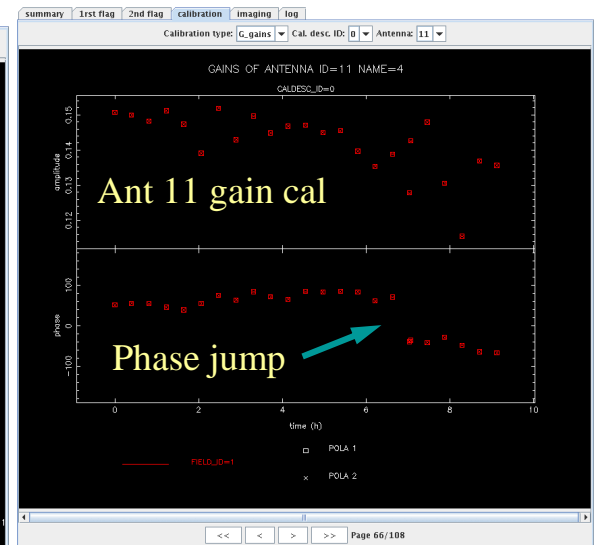
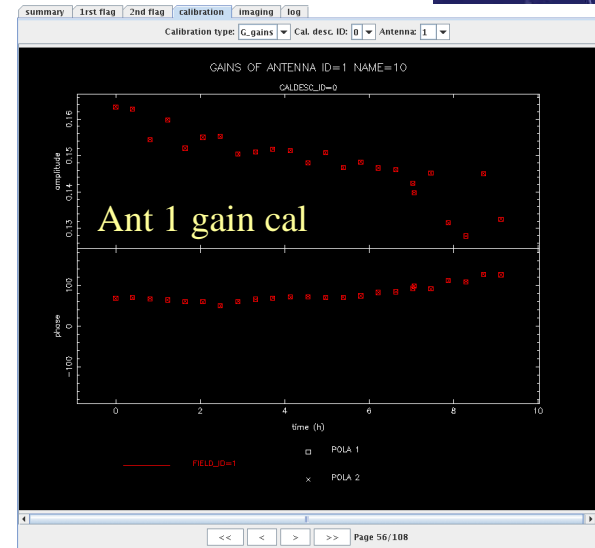


VLA: Gain calibrator – BL 1-11:

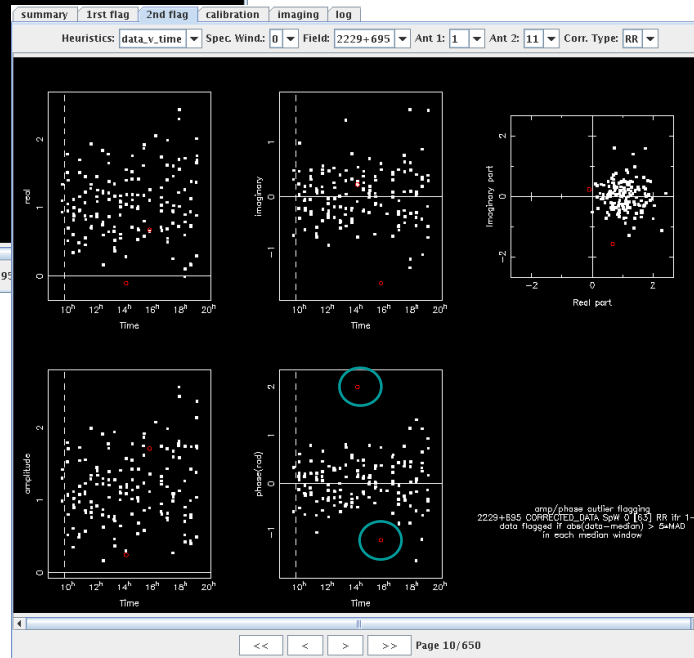
1st flag, calibration, 2nd flag:



1st flagging:
Large scatter,
phase jump
No initial
flagging.



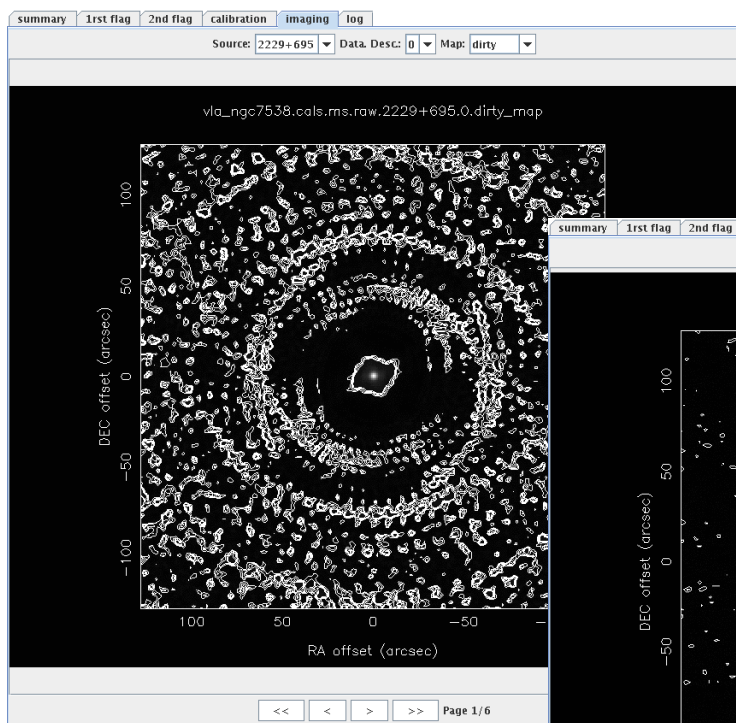
Flagging after
calibration: Less scatter
in real-Im plot, a few
outlier points flagged



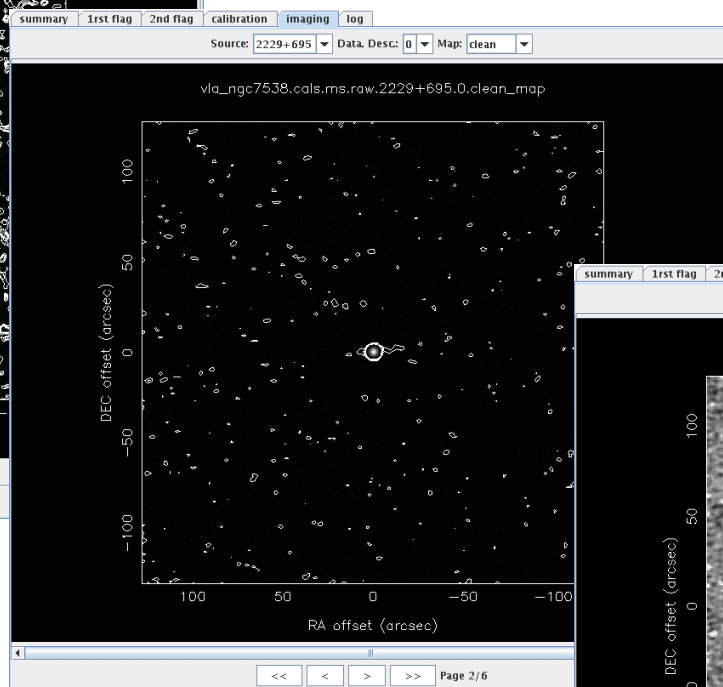
Pipeline selected results



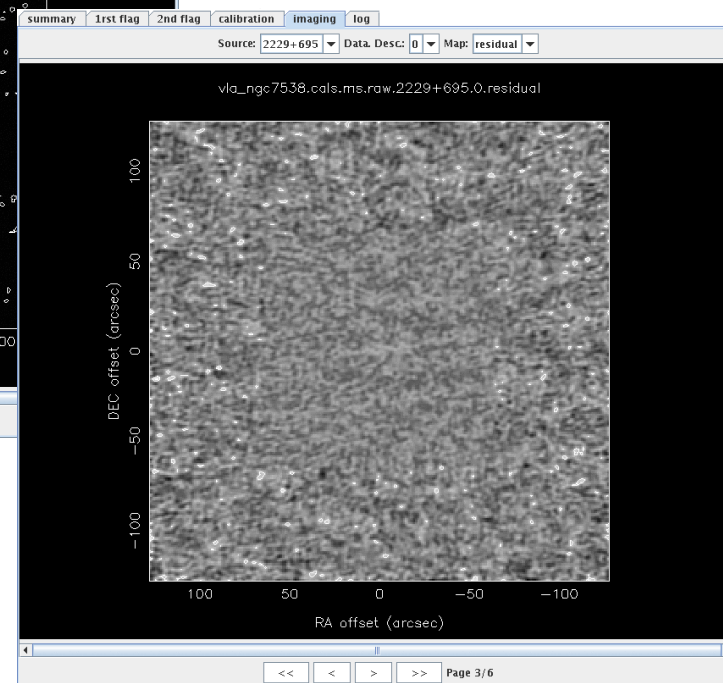
2229+695: dirty image



Clean image



Residual



VLA Gain calibrator Images

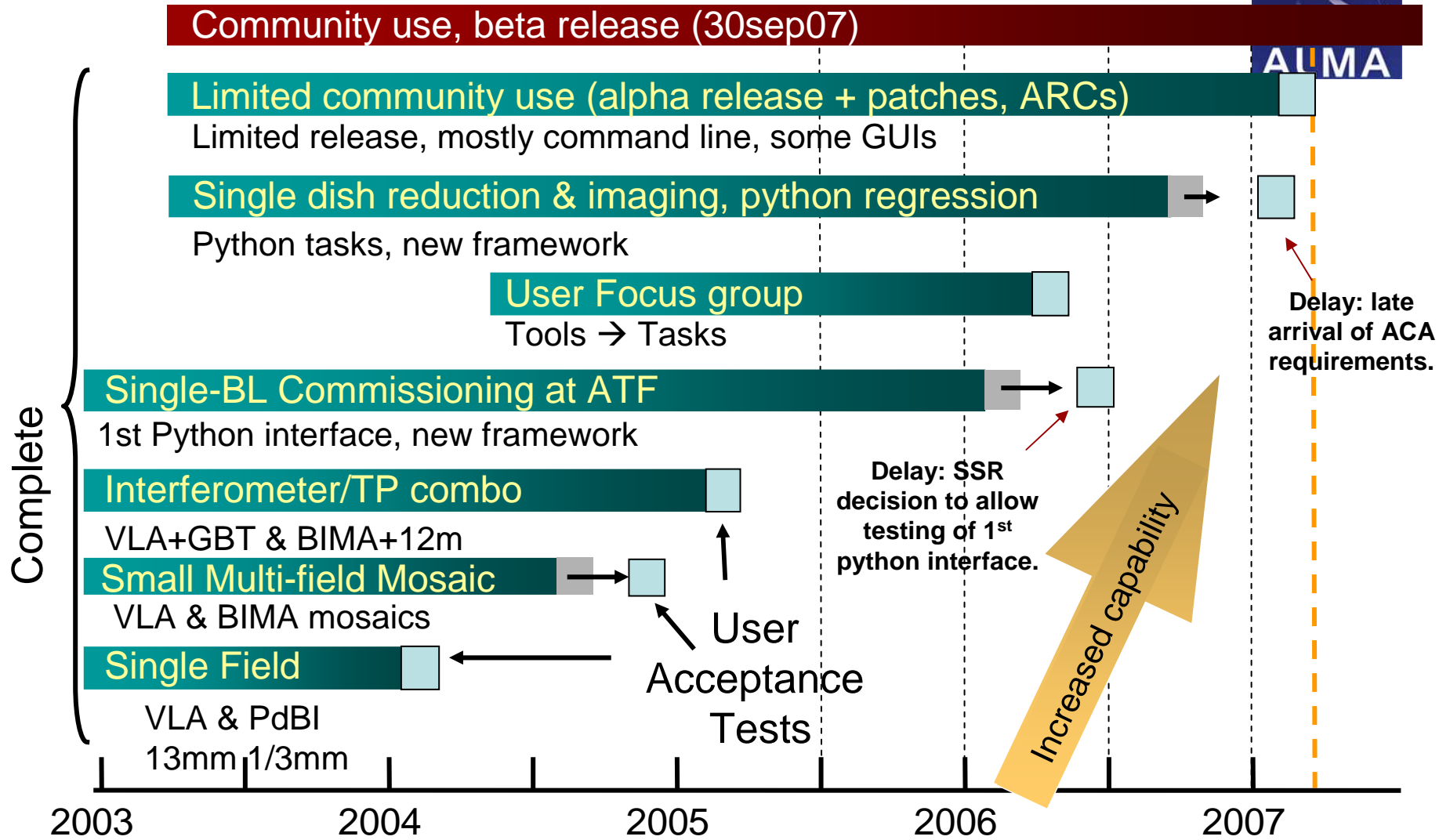
Offline Data Processing – CASA

(Common Astronomical Software Applications)



- SSR subsystem scientist organized tests twice a year using data from existing telescopes.
- 6-8 scientists from Europe, N. America, Japan & Chile calibrate and image datasets to evaluate “use path,” processing speed & requirements.
- Organized tests evolving into continual community use.
- NRAO CASA users group – scientific use/testing by NRAO scientists.
- CASA alpha-release to ARC personnel April 2007.
- Beta release to wider community late September 2007.

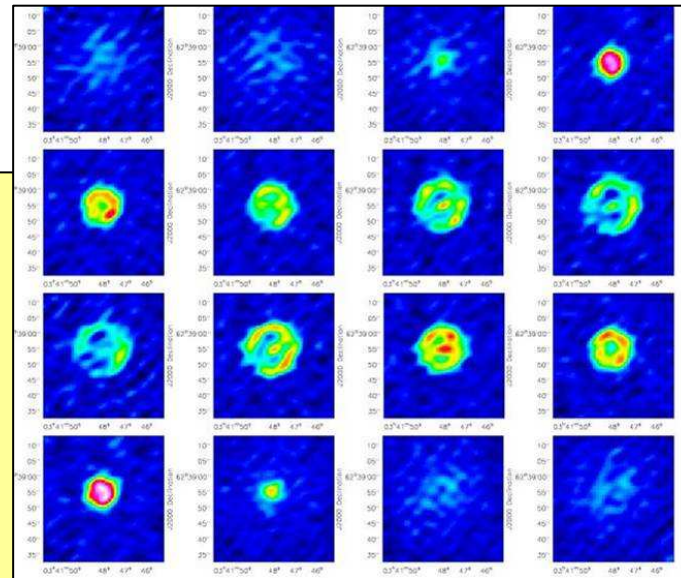
Offline Development & Test Schedule



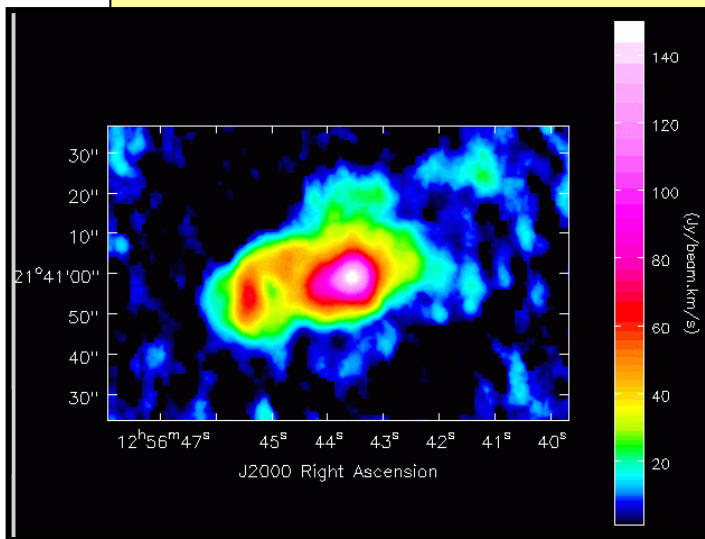
Offline selected user test results



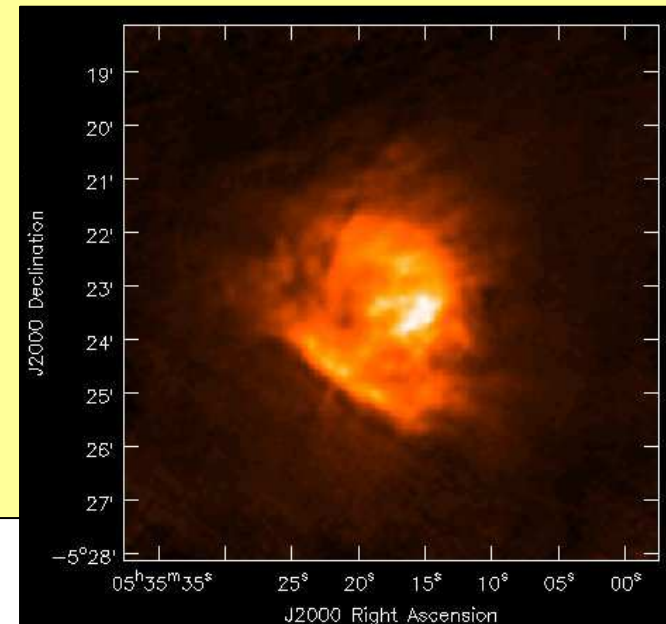
U Cam CO(1-0) spectral line cube



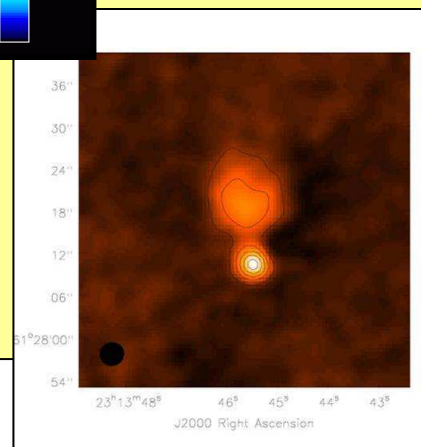
BIMA+12m joint deconvolved CO1-0 cube



Orion nebula
continuum:
VLA+GBT, joint
deconvolution



NGC 7538
1.3 cm
continuum





Questions?