ALMA User Software

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- 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

} Briefly discuss status today

- Scheduling
- Science Software Requirements — Scientists within CIPT
- Software Engineering
- Telescope Calibration

Scientific Involvement – Top Level

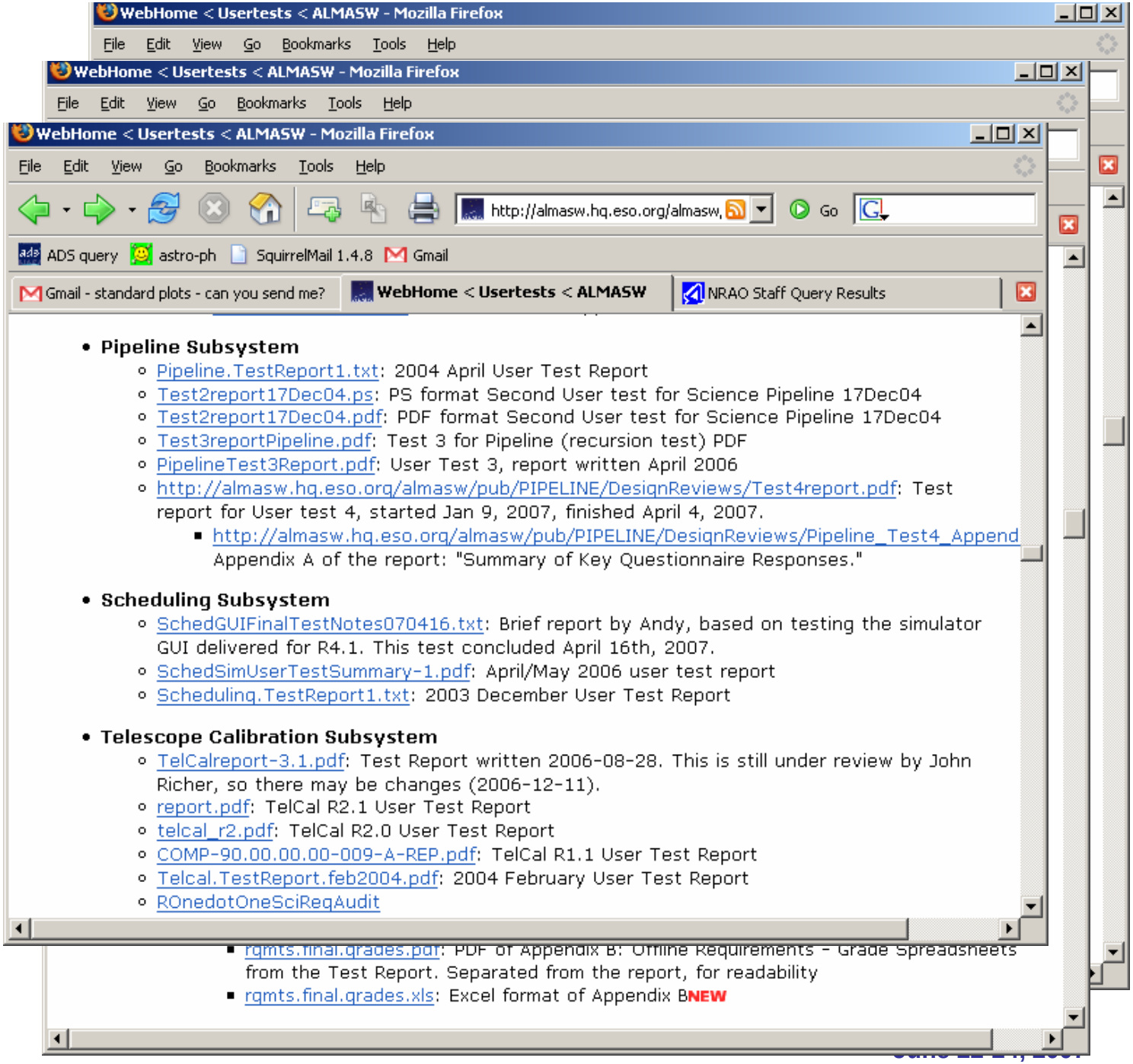
Scientific liaison – Science Software Requirements (SSR) subsystem:
Scientists represent user community concerns, translate science requirements to detailed requirements for development, test software/grade requirements.

- **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.



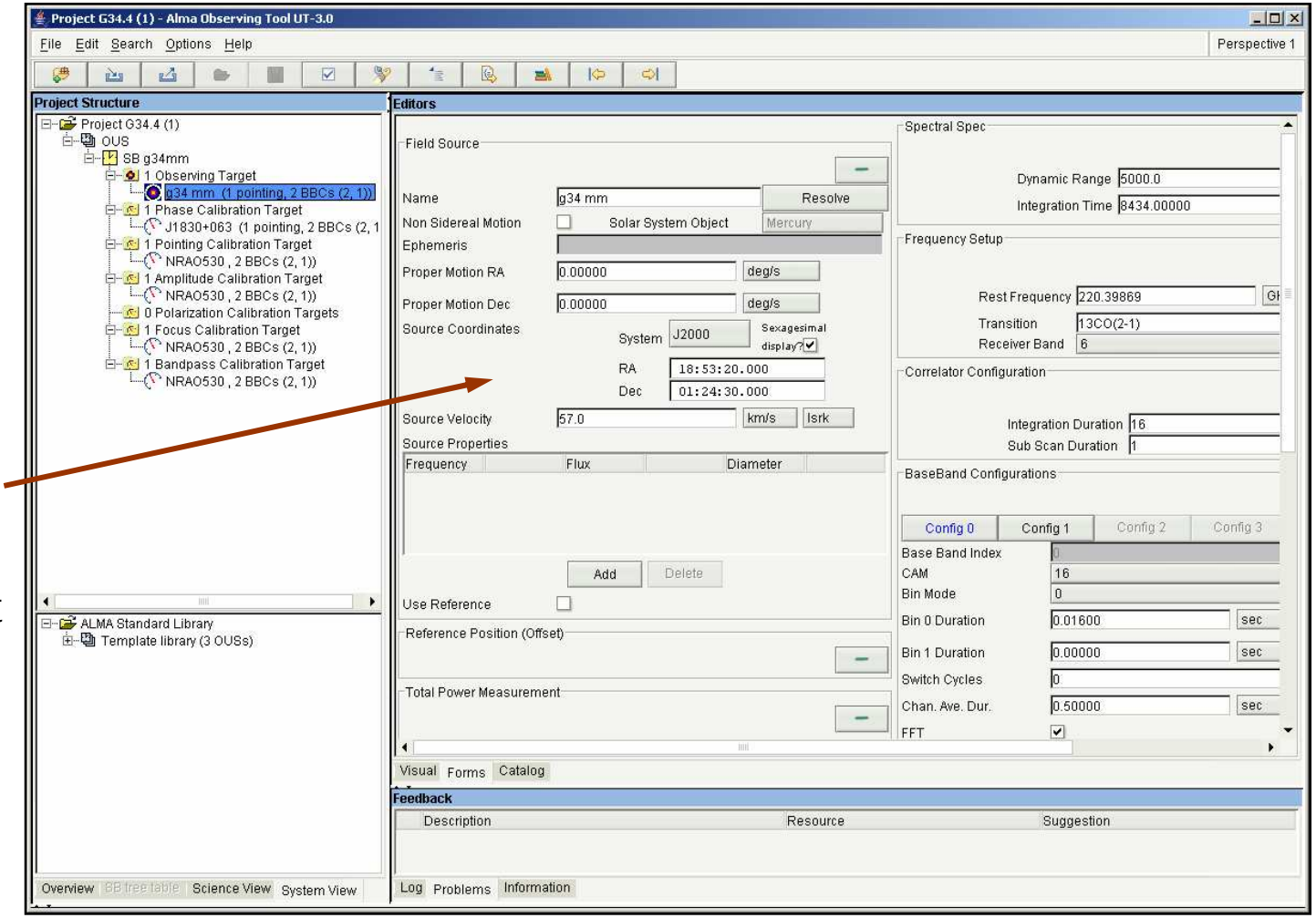
Observing Preparation (Proposals)

- 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

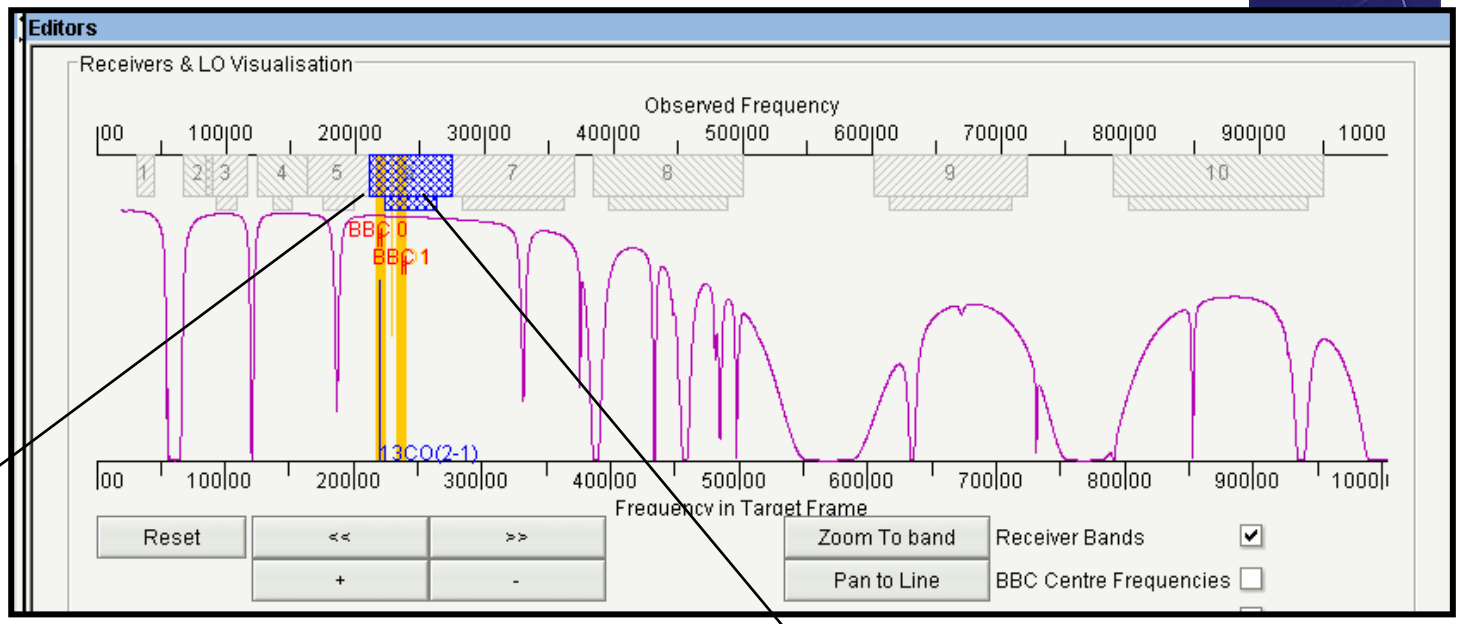
Project created by tester:

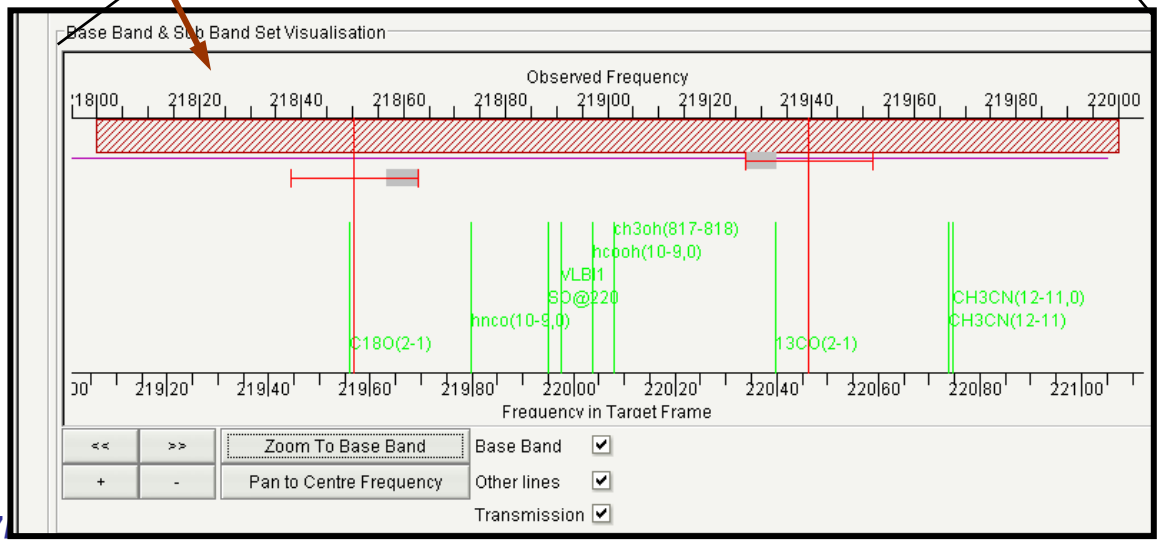
- System view with “tree” project structure.
- Target forms view of project created during user test



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 ($C^{18}O$ 2-1 & ^{13}CO 2-1)

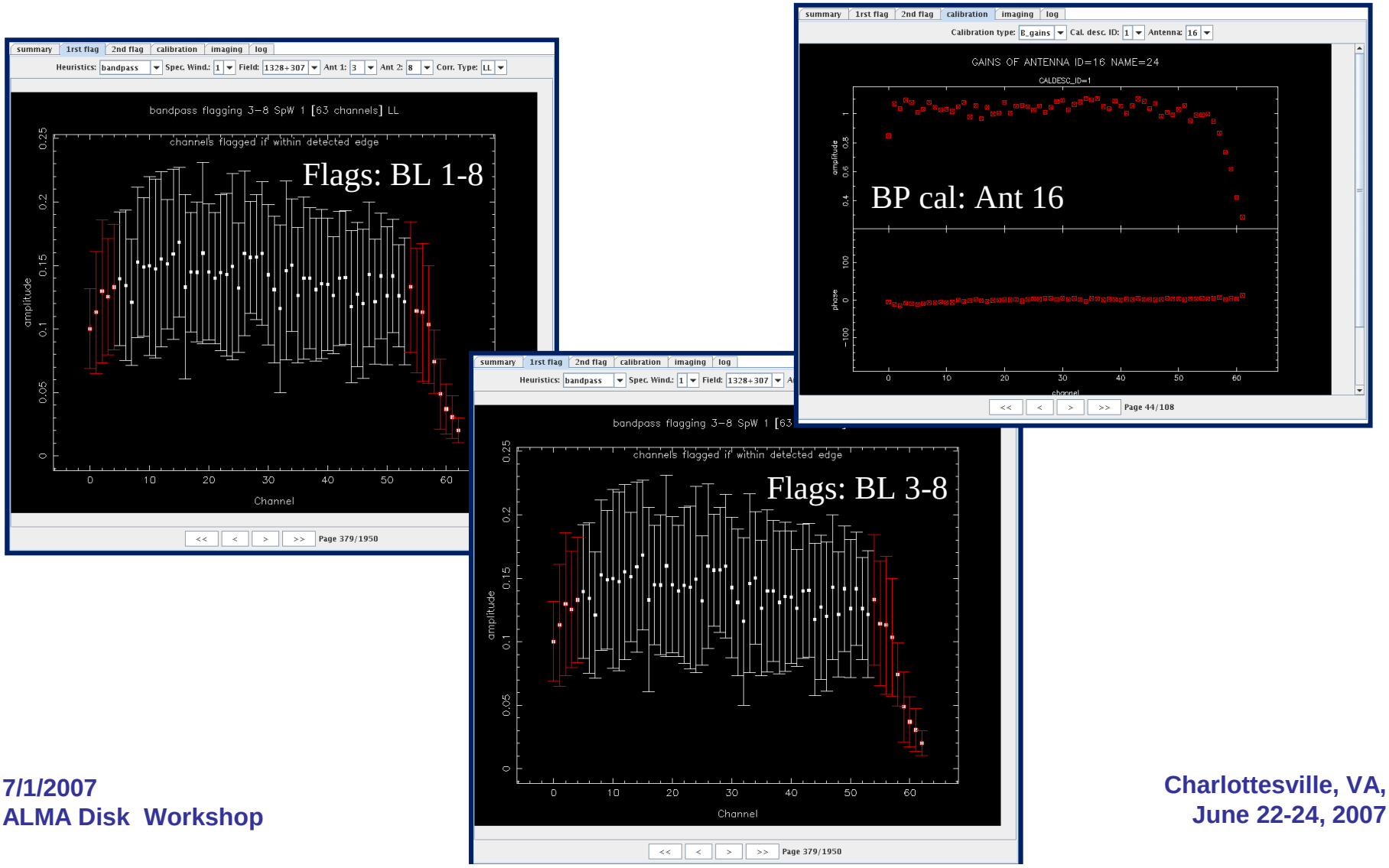
Pipeline Processing & Heuristics

- 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

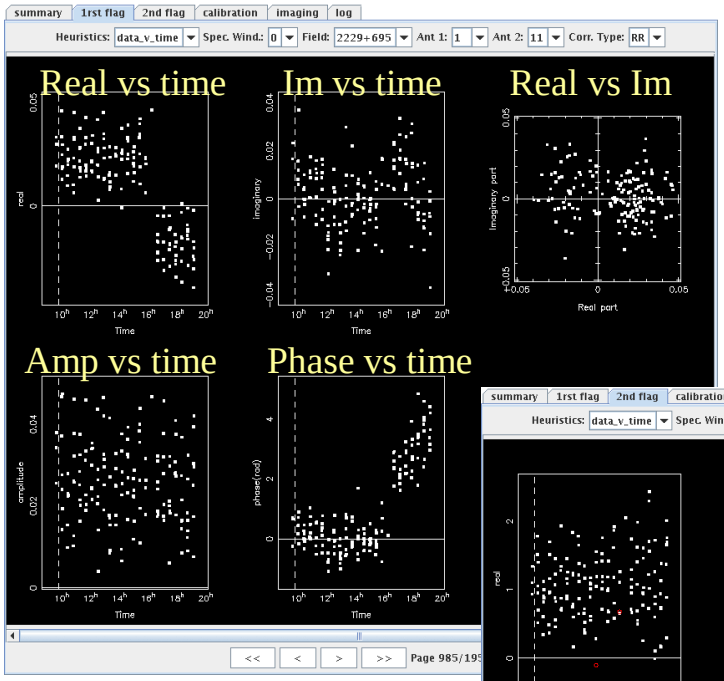
End channel flagging of bandpass calibrator and bandpass calibration



Pipeline selected results

VLA: Gain calibrator – BL 1-11:

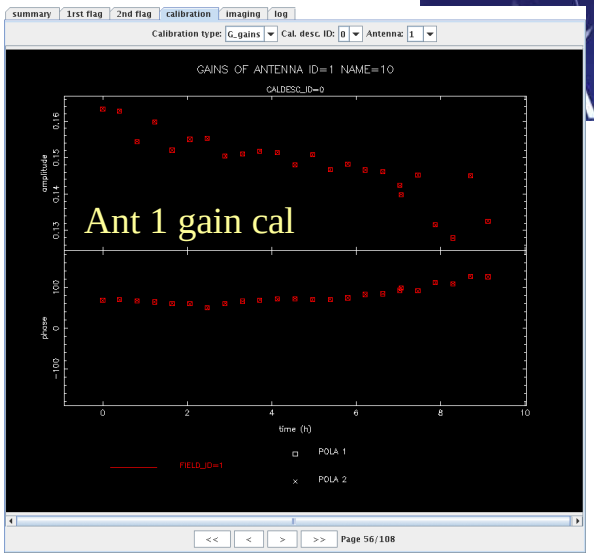
1st flag, calibration, 2nd flag:

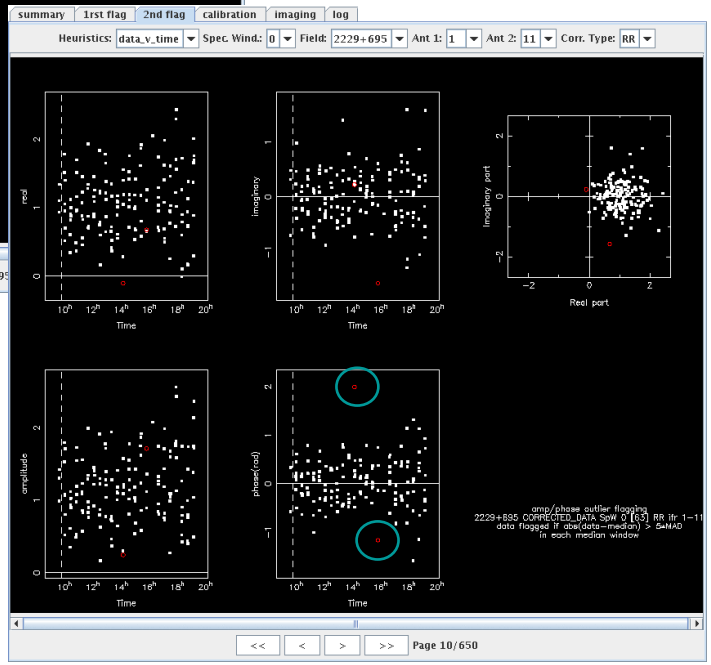


1st flagging:

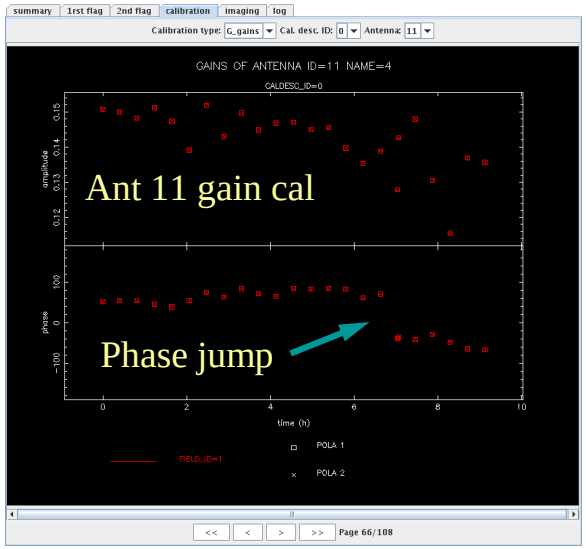
Large scatter, phase jump

No initial flagging.



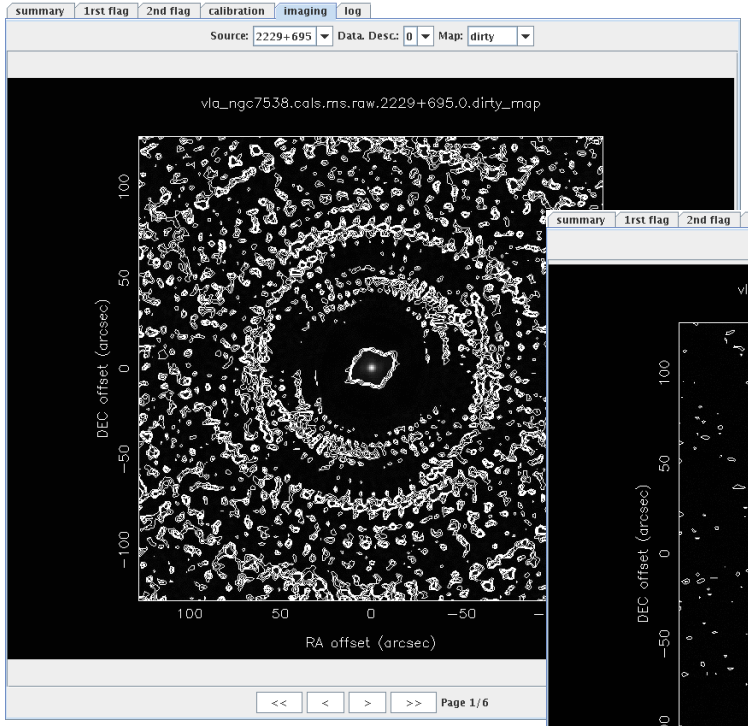


Flagging after calibration: Less scatter in real-Im plot, a few outlier points flagged



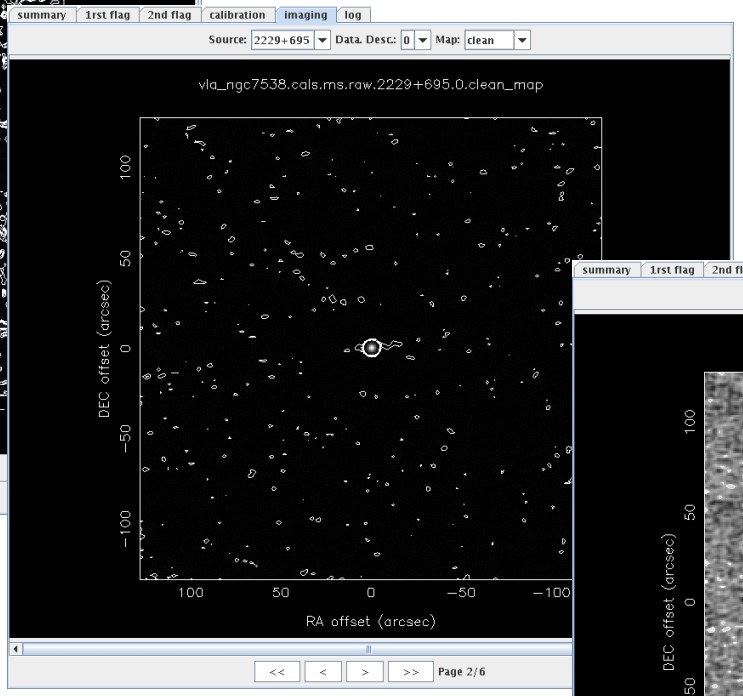
Pipeline selected results

2229+695: dirty image

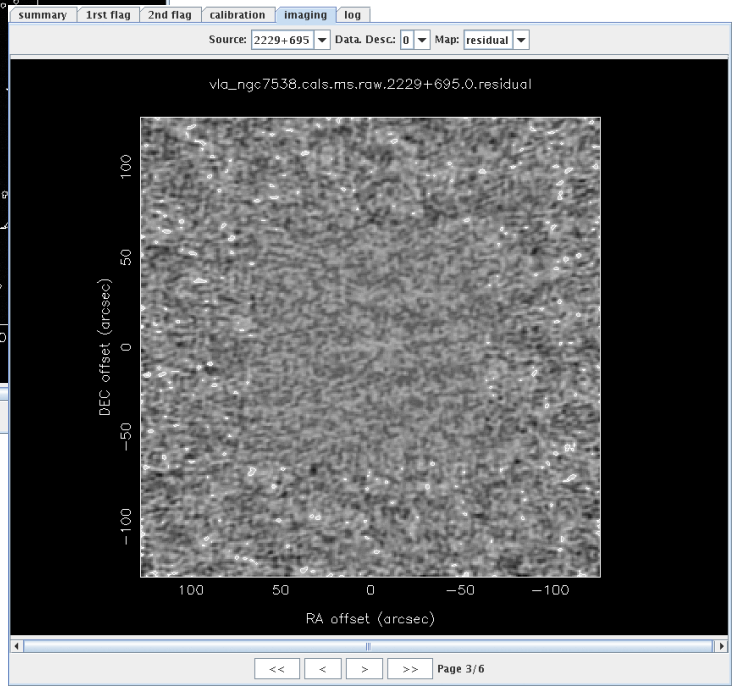


VLA Gain calibrator Images

Clean image



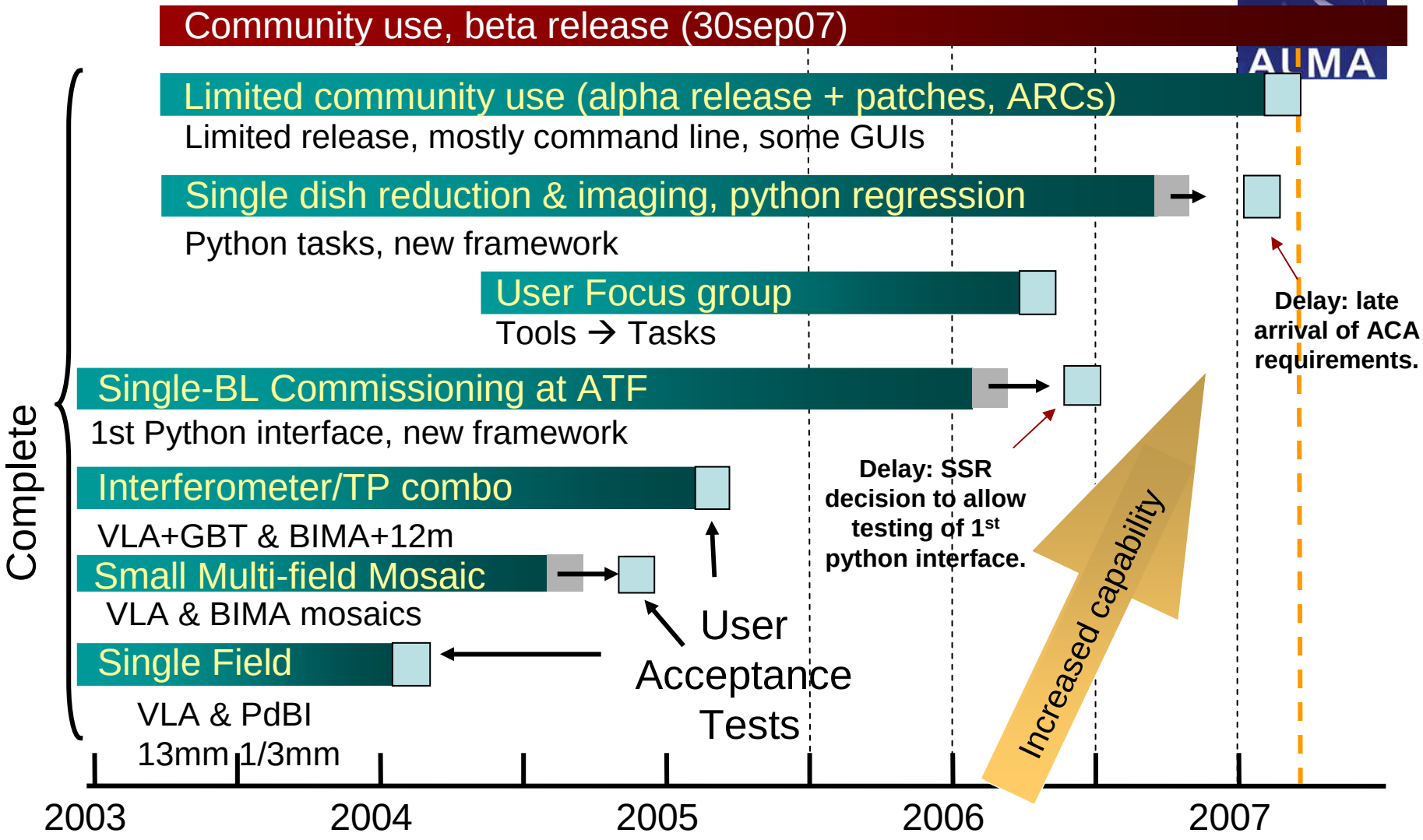
Residual



Offline Data Processing – CASA
(Common Astronomical Software Applications)

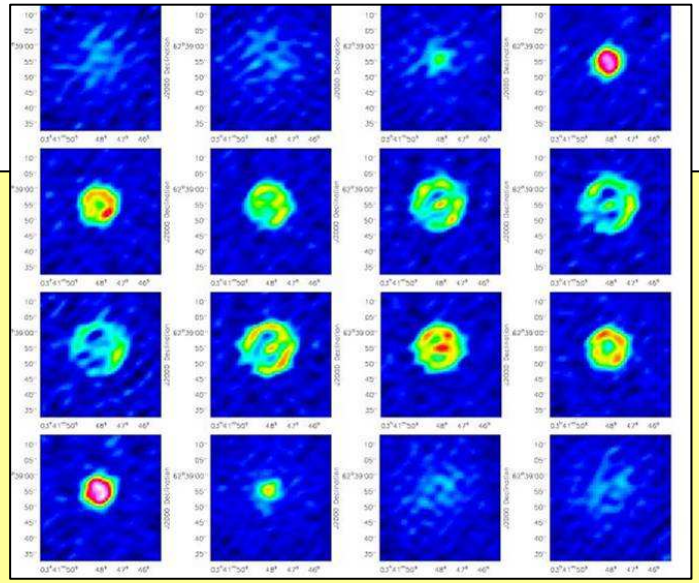
- SSR subsystem scientist organized tests twice a year using data from existing telescopes.
- 6-8 scientists from Europe, N. America, Japan & Chile calibrate and image datasets to evaluate “use path,” processing speed & requirements.
- Organized tests evolving into continual community use.
- NRAO CASA 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

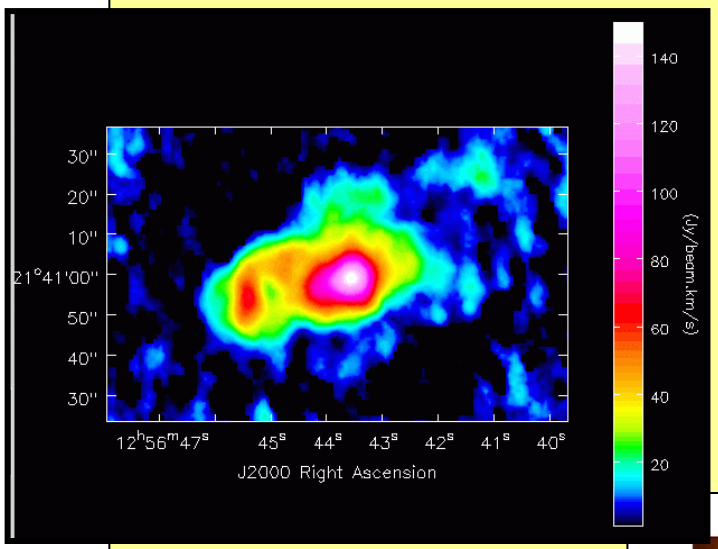


Offline selected user test results

U Cam CO(1-0) spectral line cube

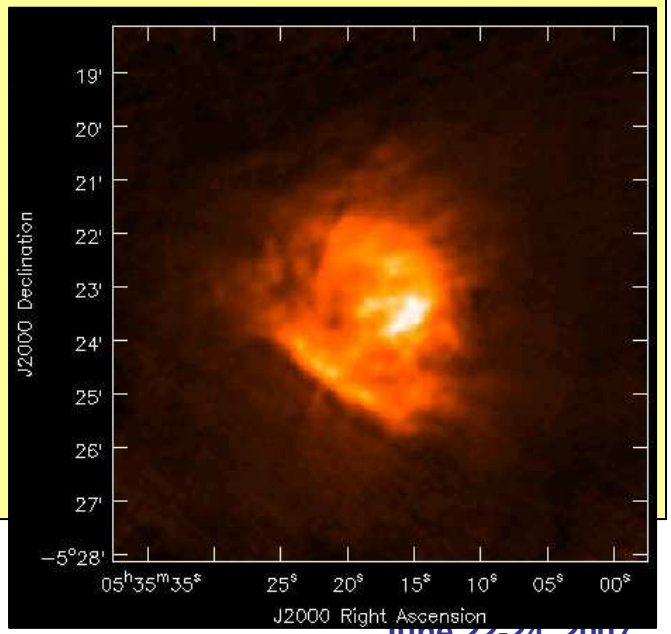


BIMA+12m joint deconvolved CO1-0 cube

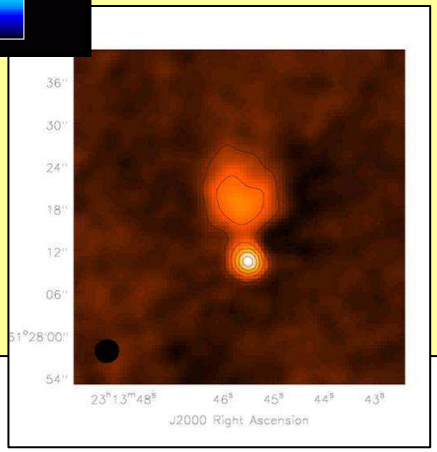


Orion nebula continuum:

VLA+GBT, joint deconvolution



NGC 7538 1.3 cm continuum



Questions?