



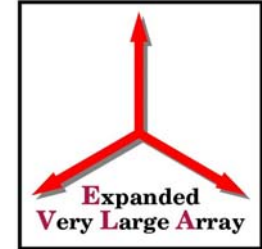
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# EVLA Data Post-processing: SSG (AIPS++/CASA) Development

J. McMullin



# Current Status



- 2004 Planning

- Initial development focus on core applications, common to both ALMA/EVLA
- Establish robust, on-time delivery of functionality

- Status

- Development plan for Priority 1 scientific requirements.
- Project Office page for activities, transparency.
- Nine two-month releases delivered within one week of schedule on average.
- Established strong feedback loop with internal NRAO scientists (Myers)
- Established strong feedback loop with external scientists (Shepherd)
  - ALMA TST1 Passed (Feb 2004)
  - ALMA TST1.1 Passed (Nov 2004)
- ALMA CDR2 passed (Aug 2004)
- Integrating planning, resources, management between ALMA/EVLA



# General Process



- 
- Process
    - integrated development & testing cycles
    - regression scripts & unit/assay tests
    - defect handling
    - documentation
  - Integrated Development & Testing cycles
    - tests focus on functionality (before releases)
    - EVLA follow ALMA schedule



## Regression Test Summary

Dataset	TST	SS5	SS6	SS7	SS8
		2004-Mar-19	2004-May-21	2004-Aug-23	2004-Sep-18
		#489	#615	#803	#819
G 192	1	2110	2205	2440	2160
GG TAU	-	455	440	442	448
H 121(UCam)	1	1635	1582	1572	1437
L02D	1	1156	1157	1122	1124
NGC 1333	2	-	-	-	2390
NGC 4826	2	-	-	-	904
NGC 5921	-	95	F <sup>a</sup>	F <sup>b</sup>	89
NGC 7538	1	811	703	F <sup>b</sup>	678

*Note: Values for each Stable Snapshot (SSn) indicate the time to run to completion. An 'F' indicates a failure; this indicates either a failure to run to completion or inconsistent results. The pass criterion of the tests are the difference in amplitude of the flux density of the calibrator and the maximum amplitude of the source data which must be within 5%.*

**a - calibrator fluxscale problem not noted in assay/unit tests b - vlafiller problem (archive format only) not noted in assay/unit tests**

*These tests were run on ballista: 2x2.8 GHz Intel(R) Xeon(TM) CPU; 512 KB cache; 2 GB RAM.*

### G192

- Script
  - [g192\\_regTest.g](#)
- Log
  - SS8: [AIPS++ Log Regression Log](#)
  - SS7: [AIPS++ Log Regression Log](#)
  - SS6: [AIPS++ Log Regression Log](#)
  - SS5: [AIPS++ Log Regression Log](#)
  - SS4: [AIPS++ Log Regression Log](#)

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**AIPS**

**Current**

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AIPS++ dc

**Update**

**Resolved**

Identifier

[AOCso04](#)

[AOCso04](#)

[AOCso04](#)

[AOCso04](#)

[AOCso04](#)

MS split capabili

calibrate correctio specified opacity

viewer: blinking



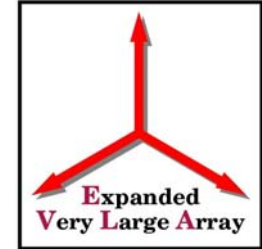
# External Testing



- 
- **ALMA TST1, ALMA TST1.1**
    - Goals/Scope
    - Data sets:
      - TST1: 2 VLA, 2 PdBI reduced and imaged by five astronomers with experience in interferometry.
      - TST2: 1 VLA , 1 BIMA reduced and imaged by six astronomers with experience in interferometry
    - 106 ALMA/EVLA Priority 1 requirements were exercised
    - Information provided to testers: Goals, scope, AIPS++ installation info, detailed cookbook and dataset summaries, blank questionnaire and Offline requirements spread sheet for testers to fill out.
    - Expected results provided in Testing comparison page, final results also posted.
    - Results – *Tests Passed – 2004-03-01, 2004-12-15*
    - All testers successfully reduced and imaged their data
    - 84% of requirements graded A,A/E (improved by 12% from audit)



# Testing



Test	Date	Status	Science	Data
ALMA TST1	Mar 04	Passed	Single Field	G192 – VLA – NH <sub>3</sub> NGC 7538 – VLA – NH <sub>3</sub> U Cam – PdBI- mm line L02D – PdBI – mm line
ALMA TST1.1	Nov 04	Passed	Single Field Mosaic	Previous datasets + NGC 1333 – VLA – SiO NGC 4826 – BIMA – CO
ALMA TST2	Mar 05	Scheduled	Single Field Mosaic SD+Interferometry	Previous datasets + NGC 4826 – BIMA - CO Orion – VLA – continuum
EVLA TST1	Mar 05	Scheduled	Wide Field Imaging	TBD – EF VLA datasets



## Project Office

Project Home | Project Book | Decision Log  
User Documentation |

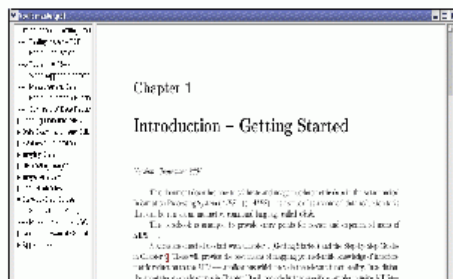
## ALMA TST1.1

## Preparation

- [Timeline](#)
- [Pre-Testing](#)

## Testing Materials

- [ALMA TST1.1 Information](#)
- [ALMA TST1.1 Goals/Scope](#)
- [ALMA TST1.1 Report Questionnaire](#)
- Data set summaries:
  - [TST1.1.data.description.pdf](#) Detailed information on the data set
  - [N1333 - 03may02](#)
  - [N1333 - 03may08](#)
  - [N4826 - 98apr16](#)
  - [N4826 - 98apr22](#)
- [Cookbook](#)



## Project Office

Project Home | Project Book | Decision Log | Change Log | Change Proposals  
User Documentation | Submit Request |[XCAS data set \(used in Cookbook Mosaic chapter\)](#)

- [Testing Comparison Page](#)
- [AIPS++ Installation README](#)
  - [aipsrc](#) - This is the AIPS++ initialization file. Please save this into your home directory where you will run the tests. Edit the file to customize the memory and user information settings.
- Requirements sheets (Priority 1 ALMA Requirements)
  - [PDF](#)
  - [Excel](#)

## TST1.1 Results

- Brogan
  - [Report](#)
  - [Requirements \(Excel\)](#)
  - [Script](#)
  - [Moment 0 Image \(ps\)](#)
- De Breuck
  - [Report](#)
  - [Requirements \(Excel\)](#)
  - [Moment Images \(ps\)](#)
  - [Profiles \(ps\)](#)
  - [Channel Maps \(ps\)](#)
- Di Francesco
  - [Report](#)
  - [Requirements](#)
  - [Script - 16 Apr](#)
  - [Script - 22 Apr](#)
  - [Script - Combine](#)
  - [Moment 0 Image \(ps\)](#)
  - [Moment 1 Image \(ps\)](#)
  - [Channel Maps \(ps\)](#)



# EVLA & ALMA



- 
- NRAO commitments to ALMA
    - Offline & Pipeline Software IPT sub-systems
    - EVLA can leverage off co-development
  - Requirements overlap – >65% in common
    - EVLA requirements are more detailed (=more!)
    - differences in pipeline, solar, VLBI, imaging & calibration (wide-band, wide-field), RFI, etc.
    - data handling (unless EVLA close to ALMA model)





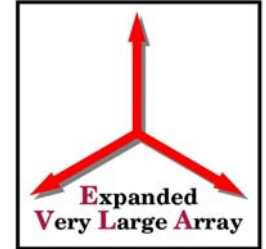
# Resources



- 
- Science Software Group
    - System
      - 2.5 FTEs (Wes, Darrell, David D.)
    - Synthesis Applications
      - 2.75 FTEs (Kumar, George, David K., Joe) + external FTEs
    - ALMA Directed Development
      - Pipeline: 1.5 FTEs (Lindsey, Dongshan)
    - EVLA Directed Development
      - 1.25 FTEs (Sanjay, Urvashi)



# Development Areas

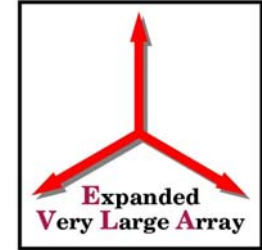


- 
- Common areas
    - Atmospheric correction
    - Automated flagging
    - Mosaic, SD/Synth combination
    - Additional imaging algorithms
    - Interface
    - Science Data Model
    - Pipeline
  - EVLA-specific algorithm development
    - Direction & frequency dependent imaging & calibration (full polarization)
      - Wide-field imaging
      - Antenna-based pointing offsets
      - Wide-band imaging
      - RFI rejection
-

# EVLA-focus development:

## Example 2-year Plan

[https://wiki.nrao.edu/bin/view/ISD/  
Planning-2004](https://wiki.nrao.edu/bin/view/ISD/Planning-2004)



- 
- Wide-field processing
    1. Problem definition – done
    2. Implement w-projection – R1 Q2'05, R2 Q4'05
  - Direction dependent calibration
    1. Problem definition – pointing corrections done
    2. Implement pointing corrections – R1 Q4'05
  - Wide-band processing
    1. Problem definition – narrow-field Q2'05, wide Q2'06
    2. Implement MFS – narrow-field Q2'06
-



# EVLA AC Issues



- 
- ALMA focus
    - Really a core synthesis focus; application development focus on common needs
    - Establish a common process; reliable delivery of working applications.
    - Enumerating the ‘deltas’; scheduling (development, testing, verification, resources) in progress.
  - Robustness, Usability, VLA Users
    - Development Process – application, documentation, test script, data
    - Testing Process – internal testing, internal scientist verification, external scientist testing and verification
    - Enhanced Testing – Cumulative regression battery
    - Deprecate GUI interface/focus on CLI
    - Defer user support until new framework is in place
-



# 2004 Issues



- 
- Scheduling research (Sanjay's talk)
  - User profile
  - Parallelization – how much & when?
  - User support – how much, when, & who?
  - Buy in – observatory & community – AIPS++->CASA



# Framework



- Near-term development based on minimal system using ACS with minor technology developments
  - Task definition (based on AIPS tasks/usage for granularity)
  - Refactor libraries (CASA)
  - Transfer of glish methods to C++
  - Develop standard IDL mappings to AIPS++ types
  - Task/parameter system implementation
  - Host-level execution of tasks
  - Prototype tasks by 2005.5
  - Testing with task system 2006.5
  - Available for 2007.5
- Coordinate with parallel R&D efforts to address longer term concerns such as scalability.