



Scientific Oversight and Testing of Software

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Keeping Track of Software




- Software issues
 - deliverables and requirements
 - what exactly is an “acceptable” user interface?
 - research problems (e.g., dealing with RFI)
 - requirement creep
 - written by software professionals
 - can no longer assume astronomical outlook or knowledge
 - most experienced/demanding users do not write code

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Keeping Track of Software




- Recent NRAO approach: tie software to projects/telescopes (GBT, ALMA, EVLA)
 - immediate positive effects (vs. old “independent contractor” model) in meeting requirements & deadlines, and in getting the code used
- EVLA approach: embed scientists in software development, at all levels
 - from overall priorities, to targeted testing

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High-level Requirements & Priorities




- EVLA Project Scientist for Software: Rupen
 - responsible for requirements, timescales, project book, inter-project interactions, ...
- EVLA SW Science Requirements Committee
 - Rupen, Butler, Chandler, Clark, McKinnon, Myers, Owen, Perley; Brogan, Fomalont, Hibbard
 - consultation for scientific requirements
 - source group for more targeted work

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Subsystem Scientists




- scientific guidance for individual subsystems
- day-to-day contacts for programmers
- interpret scientific requirements for programmers
- oversee (and are heavily involved in) tests
- heavily involved in user documentation
- consult with other scientific staff
- duties vary with subsystem status

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Subsystem Scientists



- Currently:
 - Proposal Submission Tool: Wrobel
 - ObsPrep: Chandler (“daughter of JOBSERVE”)
 - WIDAR: Rupen/Romney
 - Post-processing: Rupen/Owen
 - TBD: Scheduler, ObsMon, Archive

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Less Formal Contacts



- Less formal, more direct contacts
 - e.g., Executor (e.g., ref. ptg. priorities and testing)
 - e.g., Greisen developing plotting programs based on Perley hardware testing
- Testers
 - On-going tests: small in-house group (fast turn-around, very focused)
 - Pre-release tests: larger group of staff across sites and projects
 - External tests: staff + outside users

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7



Why Test?



- Set priorities & deliverables
 - tied to scientific and hardware requirements
- Check (and force) progress on long-term goals
 - wide-field, wide-band, low-noise, high dynamic-range, full polarization imaging
 - user interface
- Sign off on finished products
- Public reports
- **Planned opportunities for scientist/programmer collaboration**

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8



Scientific Support Systems: Prop. Submission Tool



- Feb 10: post-mortem based on user comments
 - set timetable and requirements for releases
- Mar 1: internal test-I (van Moorsel, Butler, Rupen)
 - overall functionality and ease-of-use
- Mar 20: internal test-II (+Frail)
 - “delta” test: bug fixes and “easy” new requirements
- Apr 18: NRAO-wide test (14, incl. CV/GB)
 - suitability for general release; **documentation**

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9



Scientific Support Systems: Prop. Submission Tool



- May 3: internal test-III
 - sessions; documentation
- May 10: public release
- late May: test post-submission handling (“proposal wrangling”)
- Early June: gather user comments, set next goals and schedule

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10



Scientific Support Systems Tests: Summary



- short initial “pure software” period followed by testing and interaction
- size and scope of test group grows from a few locals, to NRAO staff, to outside users
- subsystem scientist responsible for documentation
- subsystem scientist + Proj.Sci./SW + operations decide on public release

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11



Post-Processing: Monthly Checks



- NRAO “AIPS++” Users’ Group (NAUG)
 - progress reports & most recent internal release
 - requests for testing and comments
 - e.g., first look at python interface
- NRAO Algorithms Working Group (NAWG)
 - high-level discussion of algorithms and progress
 - e.g., Urvashi reports on wide-band imaging tests
- Includes Myers, *Brisken*, *Brogan*, *Chandler*, *Fomalont*, *Greisen*, *Hibbard*, *Owen*, *Rupen*, *Shepherd*, *Whysong*, + developers

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12



Post-Processing: Leveraging ALMA



- EVLA participation in ALMA formal tests
 - outside testers with VLA expertise (e.g., Testi)
 - ALMA2006.01-4 (python + single baseline calibration) included Brisken, Owen, Rupen
 - goals
 - CASA experience
 - influence common development (e.g., interface)

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13



Post-Processing: Leveraging ALMA



- Joint development of common 2/3 of requirements
 - User Interface Working Group (Apr 06)
 - refine requirements for user interface
 - Myers, Brogan, *Brisken, Greisen, Hibbard, Owen, Rupen, Shepherd, Whysong*
 - draft results on Web
- Joint planning
 - draft proposal for gradual shift of CASA from development to user support, including scientific staff use, documentation, and hand-holding

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14



Post-Processing: EVLA Tests



- May-July 2005: w-projection
 - first step in the Big Imaging Problem
 - generally good performance (speed, robustness) but lots of ease-of-use issues
 - Myers, Brisken, Butler, Fomalont, van Moorsel, Owen
- Currently concentrating on
 - long lead-time items (e.g., high DR imaging)
 - H/W driven items (e.g., proto-type correlator)
 - shift to user-oriented system

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15



Post-Processing: EVLA Fall 2006 Test



- User interface
 - revised UI (tasks etc.)
 - revamped module organization
 - new documentation system
- Reading and writing SDM
 - ASDM → CASA MS → UVFITS → AIPS
- Basic calibration, incl. calibration of weights
- “Testers’ choice” of data sets, plus a couple common

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Post-Processing: EVLA Fall 2006 Test



- Data examination
 - basic plots (mostly a survey of existing code)
 - first look at stand-alone viewer (qtview)
- Imaging
 - widefield imaging (w term, multiple fields)
 - full pol’n imaging
 - pointing self-cal “for pundits”

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17



Post-Processing: Winter 2006/7



- NOT a formal test
- NAUG and “dedicated” staff
- user interface discussions/testing
- documentation
- “EVLA stress test:” basic calibration and imaging of a many-channel data set, both in CASA and in AIPS

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18



Post-Processing: EVLA Spring 2007 Test



- “Format test” (SDM)
- Focus on calibration and data examination
 - flexible, simple-minded, quick displays
 - wideband issues
- Driven by need to support initial basic modes (e.g., big spectral line cubes), and to learn from the new hardware (e.g., WIDAR + wide-band feeds)
- Currently working on associated requirements



Involving Outside Users



- Scientific Support Systems
 - currently mostly at end of testing/release cycle
- Post-processing
 - algorithmic development: publications, discussions, interactions, student involvement
 - focus shifting to user interactions
 - as this happens, we will involve more non-NRAO astronomers