



# CSV Status and Planning

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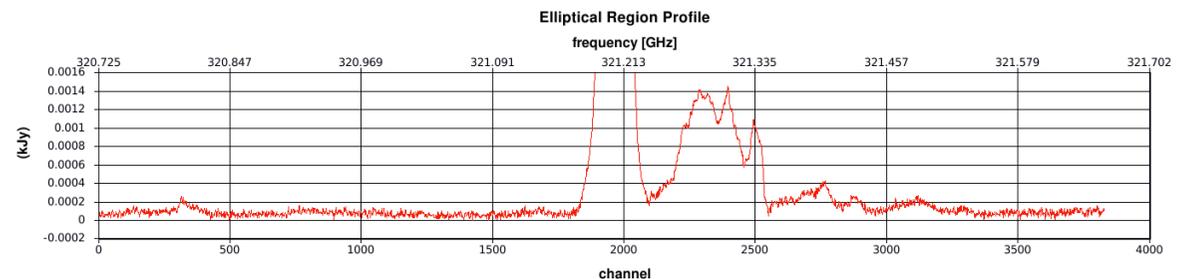
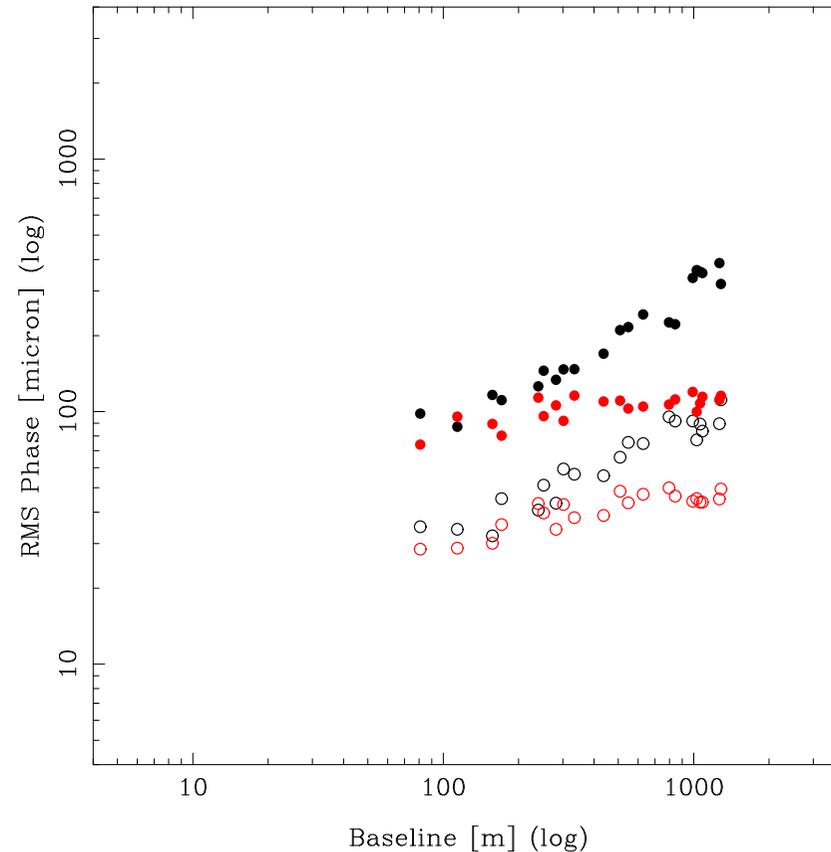
# General Progress

- Slow down to deal with software largely successful:
  - Number of restarts down by a factor of a few and they take less time
  - Baseline Array+ACA in parallel works well (multiple arrays on the ACA still has poorly understood [hardware] issue.)
  - Efficiency improvements on the BLC effective (~x2 improvement)
  - Some residual issue, only one of which is critical (ACA correlator)
- Array element (AE) availability
  - We have not used more than 32 AE since July 10th
  - Problems are varied, usually related to front ends (11 of 18) but not all (4 shutters, 2 UPS, 1 awaiting relocation, random subreflectors, encoders, and drive problems)
  - Additional problem getting all AE with same bands working
  - Weather and power recovery time significant
  - Recovery will get more difficult on longer baselines: Need a new plan for recovery
- Since June 18<sup>th</sup>: 40 nights on sky, 16 highly restricted or spent recovering AE → 24 useful nights (out of 112, ~20%)



# Long Baselines: Current Status

- Fast switching calibration: Looks promising but timeouts with large numbers of antennas
- Coherence loss in SV data: Too hard a source chosen!
- Working on additional test data (AS209)
- Knee in structure function is at  $\sim 500\text{m}$





# Long Baselines: Status and Plans

- Pad status and timeline:
  - Repair of first two ~0.7-5km pads started Oct 7
  - If successful, repair should conclude for Cycle 1 pads in November, end of the year for all 51 out of spec 0.5-5km pads
  - Extended branch pads also expected end of the year
- Plans for testing long baselines: (~Sept-Nov 2014)
  - Failed to get 3 km pads to test in time for Cycle 2
  - Extended Cycle 2 allows for focused commissioning effort
  - Spend ~1 month in 2014 relocating all antennas out and back in, 1-2 months dedicated to extended array commissioning:
    - Upside: No antennas kept in reserve for testing extended array, efficient for commissioning
    - Downside: Will require we bring in help, requires long ES stoppage



# Single Dish: Spectral Line

- Status:
  - Issues with level setting for ACA Correlator inputs
  - Short term fix results in unfortunately large overheads
  - Finalizing basic approach has pushed some performance evaluations back in the queue
- Improvements:
  - Need to alternate scan direction in executions where reasonable
  - DSB observational strategy being handed over again
  - Trying to use library of beam models/efficiencies rather than measuring at execution



# Single Dish

- **Fast scanning:**
  - Software development well underway
  - Mission scheduled for early November for first tests
  - Scientific performance needs to be assessed
  - Delivery of software mode in January 2014, full commissioning then to begin
- **Nutator accepted by the project:**
  - Preliminary work in lab in late September.
  - Some issues being followed up by AIV/SIST
  - Integration into an antenna is scheduled for end of October
  - Full software delivery ~mid 2014
- **Frequency switching: Currently scheduled for late next year**



# Polarization

- Current performance:
  - 3C286 tests to assess systematic and random errors
  - Stability and magnitude of D-terms verified to be within specifications
- Next steps:
  - High spectral resolution assessment of D-terms (initial data taken)
  - Characterization of 7-m antenna profiles



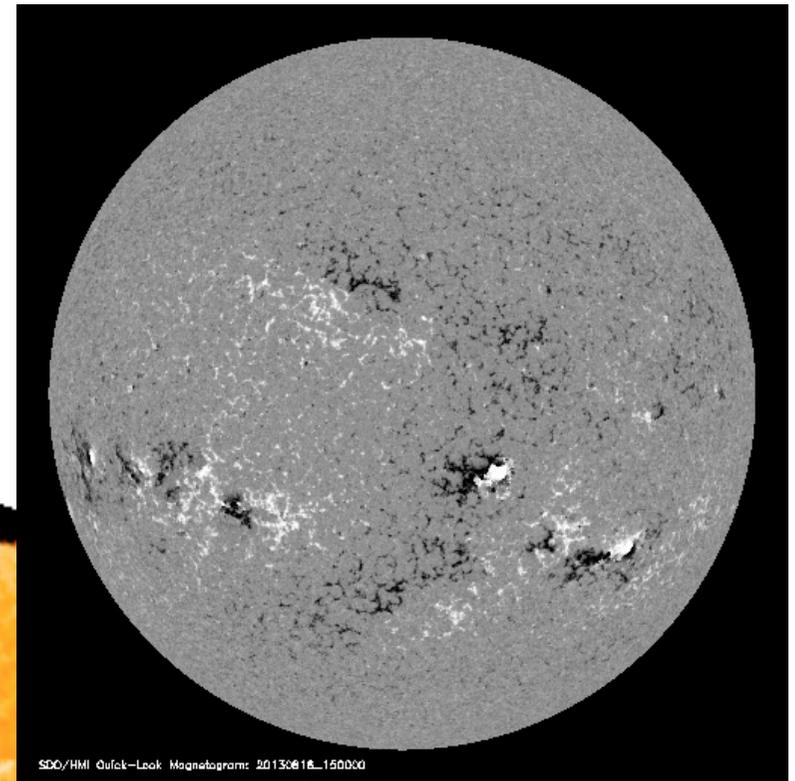
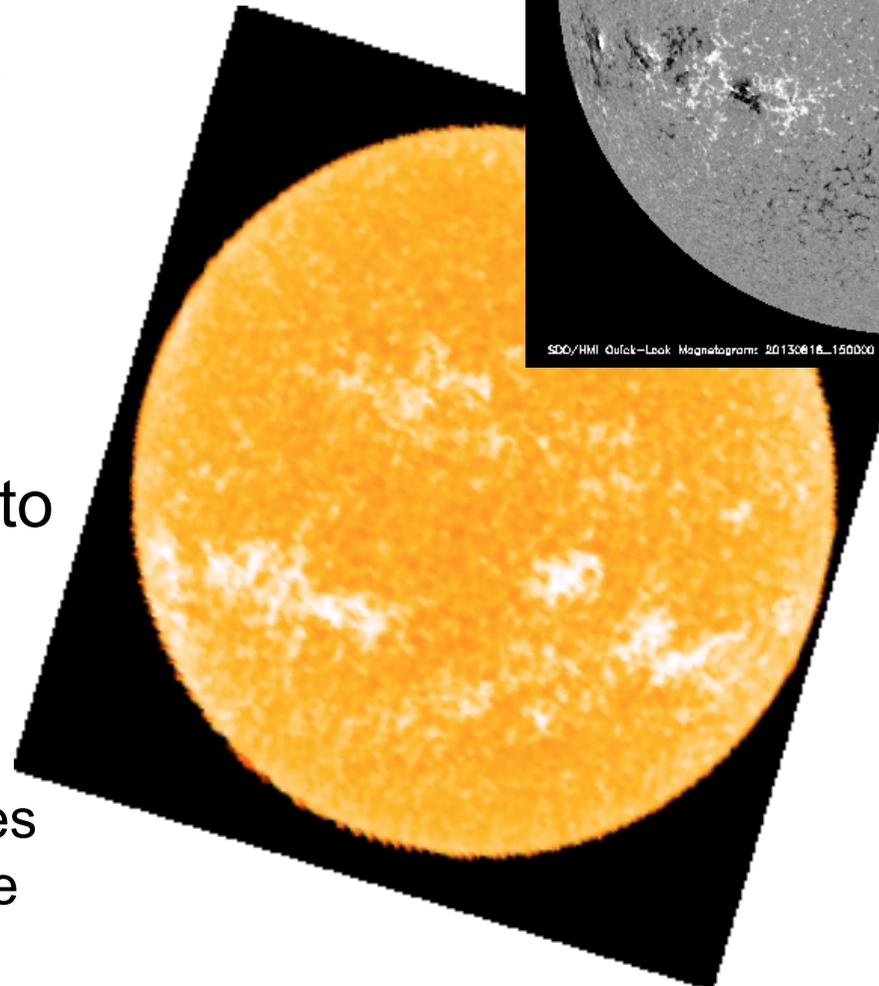
# Mosaicking & New Bands

- Mosaicking:
  - OTFi testing was dropped in May
  - Basic approach is known to work but full data rates are needed in most use cases
  - More test data is needed to validate performance
- Bands 4, 8 and 10:
  - Initial images at bands 4 and 8 obtained awhile ago.
  - Imaging performance experiments have been hampered by lack of array elements and delays in installations (engineering loses even more time recovering from weather/power than science)
  - Several antennas with all three bands awaiting relocation to the AOS. No OSF to AOS transport since May.
  - Few band 10 cartridges at AOS, configuration is too extended
  - Will relocate antennas with band 10 to inner array



# Solar

- Mission for solar scheduled for late October
- Focus on calibration of data
- New approach of biasing the mixer to reduce the gain:
  - Is more flexible
  - May require significant changes to control software



NASA: Soho  
Asayama: Band 8



# New Correlator Modes

- Subarray modes:
  - ACAC still having some residual problems
  - BLC subarrays scheduled for January 2014 delivery
- 90 degree switching:
  - BLC capability nominally done in November 2012, needs substantial software work still
  - ACAC work in progress
- Full data rates on the BLC (Dec 2013):
  - Needed for online WVR correction
  - Needed to achieve full data rate to archive
- Multi-resolution mode, followed by higher bit and twice Nyquist are next on the BLC list (Q2-4 2014)
- ACA full linearity correction (~March 2014)



# Efficiency Improvements

- Correlator Calibrations:
  - Better correlator calibration management possibilities to be delivered in November (2013)
  - Needs Science Observing Script (SOS) work to exploit it.
  - Could save 5 (BLC) and 25 (ACAC) seconds per scan
- Scan sequences:
  - Can better use existing implementation in Phase+Science cycle
  - Next generation (April 2014) will allow more complete “waits” so that pointing corrections can be applied in sequence
- Sessions:
  - Need to characterize stability of calibrations across execution boundaries.
  - Significant SOS work needed to realize benefits
- Array Station Calibration:
  - SOS work needed to optimize the executions (e.g. source selection/order)
  - General approach is well established



[www.almaobservatory.org](http://www.almaobservatory.org)

*The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership among Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA is funded in Europe by the European Organization for Astronomical Research in the Southern Hemisphere (ESO), in North America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC) and in Japan by the National Institutes of Natural Sciences (NINS) in cooperation with the Academia Sinica (AS) in Taiwan. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI) and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction, commissioning and operation of ALMA.*