



# ASAC - Preliminary Response to Charges from June meeting

Presented by Richard Hills on behalf of  
the Committee



# Charges

1. Assess the preparation of the ALMA real time, observing, and off-line software for early science. In particular, review the impact of the recommendations of the recent software review and the schedule for the next two years. [For detailed discussion at Feb'08 f2f.](#)
2. Revisit the correlator requirements for early science operations, in particular prioritizing the order of development of software modes. Compare broad early science requirements to correlator modes. Which modes enable the majority of the science? What other capabilities are important? [Fully discussed.](#)
3. Review the calibration plan and scientific aspects of Assembly, Integration, Verification testing and for Commissioning. Being mindful of the finite resources (human, financial) available, are changes necessary or desirable for scientific reasons to the plans being implemented? [Preliminary discussion: initial response only.](#)



# Correlator Modes for Early Science

1. Pseudo-continuum mode  
**Mode 70: full polarization (4 Stokes'), time domain multiplexed**
2. Spectral line mode with as large bandwidth as possible for extra-galactic studies  
**Mode 7: dual-polarization, 2GHz bandwidth, 0.5MHz resolution**
3. Spectral line mode with high spectral resolution for Galactic studies, but, when possible, also with a sufficient bandwidth to conduct line surveys.  
**Mode 9: dual-polarization, 500MHz bandwidth, 125kHz resolution**
4. After those, the priorities should be the highest resolution modes:  
**Mode 12: dual-polarization, 62MHz bandwidth, 15kHz resolution**  
**Mode 18: full polarization, 62MHz bandwidth, 30kHz resolution**

Together these modes will cover a very large fraction of the required capabilities. ASAC expects all these modes to be commissioned by the start of Early Science and that in reality many additional modes will be available by then.



# Preliminary Review of the Calibration Plan and the Science Aspects of the AIV and CSV

AIV – Assembly Integration and Verification  
CSV – Commissioning and Science Verification

1. Plans are well-adapted to the requirements of Early Science.
2. All significant aspects of single-dish and interferometric observations are covered.
3. Note that the Early Science performance must represent a real advance over existing facilities.  
*Site, receiver sensitivity and bandwidth should all be ahead of the field. Issues are the number of fully-equipped antennas (16 is the level that has been set) and the observing efficiency.*
4. Point out the importance of a good catalogue of calibration sources – suggest trying to arrange early release of Herschel and Planck data.
5. Urge that Science Demonstration should be as early as possible, but note that schedule will have to “evolve”.



## Concerns about the AIV and CSV plans

1. Timescale - 20 months is short for commissioning a 16-antenna system. This would be made worse by delays in front-end deliveries or hiring staff. Point to need for flexibility and for contingency.
2. Plan apparently assumes that final specifications have to be demonstrated before Science can proceed. Define (lower) initial requirements?
3. Simultaneous commissioning of the ACA and the 12m array and use of ACA in early science.



## More Detailed comments on AIV plan

1. Importance of a successful and efficient AIV phase.
2. Benefits of sharing effort between the AIV and CSV teams.
3. Crucial that a recruiting plan be put in to effect immediately.
4. Valuable role that external astronomers could play in the CSV phase.
5. An announcement for astronomers interested in participating in the CSV to be issued as soon as possible.
6. Possible redundancy of tests for AIV at the OSF and for CSV at the AOS.
7. Not clear in the CSV plan how the commissioning of the ACA and the total power antennas will be achieved.



# Comments on the Calibration Plan

1. Documents are well-written and thorough. They represent the state of the art in this field.
  2. Lots of detailed questions and suggestions:
    - Amplitude – relative calibration clear, but problem of absolute scale picked out.
    - Phase – issue of catalogues again. Plus need to develop the detail of WVR + switching scheme.
    - Bandpass – possible use of transfer from low to high frequencies?
    - Polarization – time variability of instrumental effects. Possible effects of ice and water droplets?
    - Pointing – strategy after moving antenna, expected variability?
    - Location and delay – more numerical details required. Will be long programme to reach the full precision required.
    - Optics and Primary beam. Concerns about highest frequencies.
-