

ALMA Board Response to ASAC May 2007 Meeting Report

The Board is grateful to the ASAC for the report concerning its May 2007 meeting in Tokyo, and for the focussed, effective summary presented by Chair Lee Mundy on 28 June in Santiago. ASAC's carefully considered responses to the four charges, as well as its input to the Board's review of the role of ASAC as ALMA evolves, have been very helpful.

Charge 1: *Review and summarize the science in the version 2 of the DRSP. We are particularly interested in the qualitative changes from Version 1 of the DRSP and implications, if any, for the construction and operation of ALMA. In conjunction with this, review the status of the correlator capabilities and recommend which of its numerous modes should be implemented first.*

The Board appreciates the intense effort that ten ASAC members invested in reviewing the DRSP-2 (<http://www.strw.leidenuniv.nl/~alma/drsp.shtml>), containing 148 projects: 20 new, 43 revised, and 85 unchanged). We note ASAC's observations that:

- “qualitative analysis of DRSP-2 reveals only minor changes with respect to DRSP-1, with the exceptions of increased integration times and a significant number of requests for ‘combined ACA’ operations;”
- “The reduced sensitivity implies continued pressure on the efficiency of operations;”
- 8% and 14% of all 148 projects, revised or unchanged, requested ‘combined ACA’ observations;
- “many of the projects in DRSP-2 are scaled-up versions of research with existing arrays, and may not reflect the truly new programs that ALMA can carry out...DRSP-2 should not be blindly taken to be complete, or even representative in some areas;” and
- “with the inclusion of ACA, ALMA has gained in versatility...but...also gained in complexity, and the ASAC encourages the exploration of ways to present this complexity to potential users, so that non-experts can make informed choices about any ACA requests, possibly as part of OT.” The Board believes that the ALMA Project team is fully aware, and share's the Board's understanding, of the importance of implementing this suggestion.

The Board realizes that the intent of the second portion of the Charge (dealing with correlator modes) was misinterpreted, and we are asking ASAC to revisit that in September in a revised charge.

Charge 2: *Within the context of operational planning, review the status and capability of the Atacama Compact Array both as a set of special purpose sub arrays and as an element of the full ALMA*

The Board welcomes ASAC's observation that “The ACA will make important contributions to the science capability of ALMA as a stand-alone array and as a part of the full ALMA (simultaneous ACA + 12-m array observations of the same source).” We concur with their recommendation “that the project continue to plan for the ability of the

ACA to operate as a separate sub-array and as a full part of the ALMA array with 7-m x 12-m cross correlations.”

The Board notes ASAC’s observations that:

- “The full array mode is likely to be requested... > 25 % of the time in the intermediate and small scale arrays;”
- "the value of 7m x 12m cross correlations in improving u,v coverage, providing significant additional sensitivity on short and intermediate baselines, and improving image fidelity by reducing calibration errors"
- “more work needs to be done to understand in detail the best configurations for the full ALMA and how long to use the ACA to optimize image fidelity;” and
- while “the ACA in full ALMA operations should have very little effect on the real time operations... There will, however, be impact on the scheduling complexity of ALMA and the CASA software needed to produce optimal science images. The scheduling program will need to interleave 12-m array, ACA, and full ALMA observations according to project priority, weather, and project needs.”

The Board sympathizes with ASAC’s recommendation for “further work on the imaging capability of the full ALMA array, the importance of 7-m x 12-m cross correlations and the time requirement placed on the ACA to achieve optimal images in the full ALMA,” and recognizes that cross correlating the 7m antennas with the large collecting area of the 12m array will dramatically improve the calibration accuracy of the 7m antennas. Indeed, we note that there is an existing Board action item on the PM (#06-55, from Nov. 2006) to "Submit a written proposal to the Board outlining the detailed cost and operational information regarding array-wide subarraying and cross-calibration." At the same time, it is clear that more simulations, carefully planned and implemented over time, are necessary to understand the calibration and imaging performance and to plan an operational strategy for both arrays. We believe that students could be usefully employed to help develop the suite of simulations desired. However, in the near term we stress the importance of not making a major diversion from the established tasks of the ALMA software developers, who are working to tight schedules to meet multiple goals, including that of ensuring that ALMA may be used by all astronomers.

Charge 3: *Review the current status of molecular line databases and their readiness for ALMA science. The review should evaluate existing plans for the next five years in light of ALMA’s needs at full operation and in coordination with other major project with similar needs, in particular Herschel and SOFIA.*

ASAC’s summary, including its observation about “the urgency and importance of these molecular databases and share the assessment of their inadequacy for the ALMA era,” mirror the Board’s concerns that led to the charge. However, the need for improved molecular databases, collisional rates, quantum chemistry calculations, etc. is much broader than for ALMA alone. For this and other reasons, we do not feel that it is appropriate “that the necessary molecular physics experiments be eligible for and considered for ALMA development funding in future years.” However, we strongly support ASAC’s suggestion “that the members of the ALMA Board promote these

interdisciplinary activities within the National/International funding Agencies.” Steps are already being taken by some Board members to engage the physics and other communities in discussion, as well as to plan efforts to secure funding from astronomy programmes in support of the vitally important goal of bringing the molecular databases to the level needed by ALMA. These efforts would be significantly more effective if a document were available explaining and summarizing ALMA's molecular data needs. Accordingly, the Board asks that the Project Scientists coordinate a short “white paper” on the molecular data requirements for ALMA, including coordination with other major projects with similar data needs, to be submitted by the end of the year.

Charge 4: *The ASAC should review the Education and Public Outreach Plan.*

We share ASAC’s reaction that “The goals in the ALMA Education and Public Outreach Development Plan are laudatory... (and that) the present document clearly recognizes that coordination among the Executives on this topic is required to produce a product which is greater than the individual parts.” Further we share ASAC’s impression that much work remains to be done to turn the present document into a plan with options that can be evaluated by the Board and then implemented. The Board therefore asks that the Director follow ASAC’s advice that “the EPO working group identify the essential services (minimal) separated from the advanced (intermediate, visionary) and cost these out in full” for presentation no later than the October face to face meeting.

Regarding **Appendix 1** of ASAC’s report, the Board notes that key points of ASAC’s self-evaluation and recommendations were of assistance to its review process and were incorporated in the recommendations received from the Board’s subcommittee, whose report was accepted in its entirety for implementation at the Santiago meeting. We believe these steps will further strengthen the role of ASAC within ALMA. We remain grateful to ASAC for playing your critical role so effectively. (See attachment.)

We reiterate our thanks to Lee Mundy and ASAC for the report of the May 2007 meeting, and look forward to working with the new Chair, J. Cernicharo (Spain), for the coming year and with the new regional Vice Chairs.