Response of the Board to the ASAC report and Revised Charges

At its April 2008 meeting, the ALMA Board received the ASAC report and was provided with an excellent summary of it in the presentation by the ASAC Chair. The Board appreciates very much the hard work and careful analysis that the ASAC put into the report.

After further discussion at their May 15th telecon, the Board now provides the following feedback to the ASAC. The response from the Project is appended.

The ALMA Board thanks the ASAC for providing a clear view of the status of the software and of the planning and preparations for Calibration, AIV and Commissioning and for its helpful advice to the Project on these topics and on the other specific issues covered in the report. The Board would like the ASAC to continue to monitor these areas as described in the revised charges 1) and 2) below.

The Board appreciates the ASAC's work in identifying the important topics for consideration in preparing a long-range development plan for ALMA and in suggesting the membership of a set of specialist panels to look into these areas. The Board is concerned that that this activity should not be on too large a scale, given especially that the baseline ALMA is still some way from completion. Setting the scientific priorities for ALMA's further development is nevertheless a very high priority. The Board therefore requests the ASAC to continue the planning of this activity but to base it around a single focused team, as described below in charge 3), rather than around a set of separate panels.

General Charge: The ALMA Scientific Advisory Committee (ASAC) will provide advice on those major issues presented to the ASAC by the Project Scientist or the ALMA Board that affect the science capabilities of ALMA and require decisions to be made or priorities to be set regarding project tasks and resources. The Project Scientist serves on the Committee *ex officio.* ASAC members represent an important communications link with the scientific community and should be actively and accurately communicating the progress of the Project back to their communities. Accordingly, the ASAC will be kept informed of progress and developments in ALMA through periodic reports and briefings provided by the Joint ALMA Office and will usually meet in person twice a year, complemented by bimonthly telecons. ASAC members also have a responsibility to monitor scientific developments in the field and report back on those that have implications for ALMA. Reports of the ASAC's deliberations will be made in writing to the Board by the Chairperson of the ASAC following each face-to-face Committee meeting, on a schedule specified in advance by the Board, and may include comments on urgent scientific matters other than those specifically charged by the Board. In accordance with the Board's annual pattern of business, the ASAC Chair will normally be invited to make a presentation in person at the first Board meeting of each year**.**

Continuing Charges:

1) ASAC should continue to monitor and assess the readiness of ALMA software, in particular to review the outcome of software CDR number 6 and the ongoing work on detailing the software requirements for Early Science. These topics should be covered in the ASAC's written report for the Board's November 2008 meeting.
2) ASAC should continue to review AIV/CSV activities and to recommend necessary and desirable changes. Any significant new issues in this area should also be included in the

report for the November 2008 meeting, but the Board expects a more detailed examination of these topics after the ASAC meeting in Chile in early 2009.

3) The ALMA Board has charged the Project to draw up a long-term ALMA Development Plan in consultation with the international astronomy community. The plan should set out the scientific context for transformational science with ALMA in the next two decades, in the era of for example JWST, ELTs and SKA, and recommend developments necessary to achieve this vision. The ALMA Board views this plan as having a high strategic priority, and is coordinating its development across the entire ALMA partnership.

   The process of generating the ALMA Development Plan should be led by the JAO Project Scientist and the ASAC (with support from the Executives). The first stage will involve an examination of the scientific drivers by a team of astronomers, chosen to be representative of the broad astronomy community that is expected to use ALMA. It is therefore important that the proposed team include people with a broad perspective and expertise at wavelengths outside the range that will be observed by ALMA as well as people with experience of mm-wave interferometry and instrumental development.

   This team should take time to work with the community, e.g. by sounding their own 'networks' and holding local discussions, before making a first-order draft of potential long term developments, grouping them in high, medium and low scientific priority, and identifying the ones which require long-lead technical developments. The ASAC should review and comment on the report (again with members taking soundings through their networks) before submitting it to the Board. The Board would like to receive a progress report on this at its November 2008 meeting and, if possible, the full report by March 2009.

   The Board suggests that it would not be appropriate to hold a large community workshop devoted to this topic, but recommends that discussion sessions be planned as part of other workshops (e.g. at one of the annual ALMA-oriented science workshops, or at more general meetings on future astronomical facilities). It is anticipated that a larger-scale activity will follow after the start of Early Science.

Further Charges (to be confirmed at the Board's June 2008 meeting):

4) The ASAC should review the plans for provision of ALMA Regional Centers and report to the Board's March 2009 meeting.

5) Noting that 2009 is the International year of Astronomy, the ASAC should examine the Project's activities in the area of outreach, both to the general public and to the astronomical community, and make suggestions as to how they and the ALMA Project could enhance these activities.

In order to allow time for the preparation of a response from the Project, it would be very much appreciated if the ASAC's report for the Board's November 2008 meeting could be made available by no later than October 30th and that for the first meeting of 2009 by March 2nd.

Response from the Project to the March 2008 ASAC report

The Project gratefully received the ASAC report and responds as follows:

On charge 1 – relating to the readiness of the software – it is accepted that there is still some way to go to have the whole software system in the state needed for Early Science, although there is a general feeling within the Project that there has been a lot of progress on both the real time and the off-line aspects within the past year. The testing at the ATF is being extended for as long as possible – the limitation being the need to move the Master Laser for the Local Oscillator to the OSF before interferometric testing can begin there. Efforts to fill the post of Head of CASA Development are continuing but have not yet been successful.

The value of using data from the existing mm/submm interferometers to test CASA is understood. Efforts have begun to provide "pathways" through which data from the other observatories can be loaded into CASA. The practical approach is for these procedures to be developed by people within ALMA who have recently made observations with the various instruments and therefore have suitable data sets to work with. It is expected that these procedures will be tested and documented at the level of a "guide to experienced users" by later this summer for at least SMA and CARMA and it is hoped that routes for IRAM and Nobeyama data will not be far behind.

The Project expects that there will be more to discuss on various aspects of the software at the September meeting of ASAC, especially the further detailing of the requirements for Early Science and the outcome of the CDR6 review which will have taken place by then.

On charge 2 – relating to plans for Calibration and Commissioning – the Project appreciates the positive report from the ASAC on the status of the plans and agrees that further discussion of this in 2009 would be appropriate.

On charge 3 – relating to the Development Plan – the Project understands the importance of this and also the need to make sure that the interactions with the community are handled well. The Project will endeavour to provide support on technical issues and, e.g. simulations, but it is clear that the effort available for this at present will be quite limited given all the other things we have to do in the same period.

On the other two main topics covered in the ASAC report – the cross-polarization and the configurations – the responses are as follows:

The importance of achieving good instrumental polarization purity is appreciated. A relatively simple modification to the optics of Band 7 has been devised by IRAM and it has been shown that this brings the performance back to the original goals. The formal steps necessary to implement this change (contract amendments, etc.) are under way. In the case of Band 6, it appears that the main cause of problems was in the machining and/or gold plating of the ortho-mode transducers. These have been improved and substantially better results are now being achieved. For Band 3 the current results are generally acceptable except right at the top end of the band. A modification to the design of the horn to improve this is being considered. In the case of Band 9 it turns out that, although the main cause of problems was the same as on Band 7, the optical modification which works for Band 7 cannot be applied and it appears that only a rather major modification would do the trick. It remains to be seen whether it is feasible to implement this at the present stage, especially as polarization measurements in that band do not seem to be of the highest priority.

The re-examination of the intermediate-resolution configurations has produced a scheme with substantially better sidelobe levels. This does however require the construction of a number of additional pads. The work of quantifying the improvement to the final maps so that we can provide a meaningful estimate of the benefits to set against the benefits of this change is continuing.

Richard Hills 11th May 2008