



ALMA BOARD

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to the October 2023 ASAC Report

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Report

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ALMA Board Science Committee Response to the ASAC: October 2023

The ALMA Board thanks the ASAC for a very comprehensive report summarizing their latest guidance to the Board on issues related to science. The Board received the ASAC's latest Report prior to its October 2023 meeting. The ASAC Chair, Mario Tafalla, summarized the Report first to the Board's Science Committee in October 23rd, 2023 and again on November 16th, 2023 to the entire Board during the Ordinary Session of the Board meeting. After Dr. Tafalla's first presentation, the Science Committee prepared a preliminary response, which the Chair of the Science Committee presented to the Board immediately after Dr. Tafalla's second presentation. In this document, we elaborate on our response to the ASAC.

Permanent Charge #1 (ALMA scientific capabilities)

- *ASAC recommends the release of the science verification data from Band 1 observations as soon as possible to promote the use of the new capabilities.*
- *While ASAC strongly supports the WSU development, ASAC is concerned about the challenge of balancing resources between scientific operations and WSU progress, and recommends the Board follow this issue closely.*
- *For the joint proposals, although the number of the submitted proposals is substantial, the fraction of the awarded proposals is very small. ASAC recommends that the JAO monitor closely the results of future Cycles.*

The Board appreciates the ASAC's recommendation that the Band 1 science verification data be made available for the community and noted this has already been done by the Band 1 commissioning team.

The Board also appreciates that the ASAC is watching carefully the progress of the Wideband Sensitivity Upgrade (WSU) development and continues to support the WSU as the top future scientific capability for ALMA. The Board agrees that it is important for ALMA to share the progress of the development with the community in an appropriate manner.

The Board agrees that the amount of time awarded for joint proposals in the ALMA Proposal Review Committee (APRC) review was surprisingly small, and supports the recommendation that JAO monitor the results closely in upcoming cycles. If the trend persists, there may be need for some changes in how the joint proposals are reviewed, but this requires data from more cycles.

Permanent Charge #2 (ALMA system performance)

- *ASAC applauds ALMA for a quick recovery from the cyber-attack and for a timely start of Cycle 10. ASAC also celebrates that ALMA reached configuration 10 in Cycle 9 for the first time.*

- *ASAC agrees with the need but prefers to minimize to use the Observatory Projects as a last resort option to fill gaps in the schedule. ASAC suggests putting language in the next call for proposals to encourage projects at particular frequencies, configurations, and RAs that are anticipated to be undersubscribed ASAC encourages ALMA to keep an eye on the number of hours and the regional balance of Observatory Projects over the next few Cycles.*
- *ASAC is pleased to see the increase in the success rate and execution of high frequency projects as a result of giving them higher priority. ASAC encourages the JAO to continue to monitor these projects and to look for ways to keep increasing their number.*

The Board reiterates that ALMA time is expensive and any gap in observing time should be avoided. The Board agrees with ASAC that using Observatory Projects to fill queue gaps should be minimized and it is important to encourage the community to propose across the full range of frequencies, configurations, and Right Ascension. The Board recommends that JAO show the statistics of coverage so the community can recognize where potential gaps may occur.

The Board considers it important that the status of the high-frequency projects continue to be monitored. The situation seems to have improved given the higher execution rate of high frequency projects in Cycle 9 and the number of accepted programs in Cycle 10. The Board favors the future strategy to modify the queue building policy to prioritize receiver band (or required PWV) over scientific rank to increase the number of high-frequency projects scheduled for execution. The Board recommends that the ASAC monitor carefully the achieved scientific qualities of the executed high-frequency programs.

Permanent Charge #3 (science outcomes from ALMA)

- *ASAC was glad to serve as part of the Scientific Organizing Committee of the ALMA@10 conference. For future conferences that ASAC supports in this way, the committee recommends having a live meeting with the primary organizers to offer input into the finalization of the program to maximize efforts to find balance across the regions, gender, career stage, and science category.*

The Board thanks the ASAC for its efforts to support the ALMA@10 conference. As the ASAC pointed out, it is important to have a good balance across the regions, gender, career stage, and science category for such an opportunity to showcase ALMA discoveries. The Board supports that ASAC provides such support by closely communicating with the primary organizers of future ALMA-wide meetings.

Permanent Charge #4 (ways to maximize ALMA's scientific impact)

- *ASAC appreciates that the changes in the algorithm for the DPR reviewers led to a better match between reviewers and their expertise. ASAC suggests that the JAO continue to put out PI surveys at every Cycle to gauge the need for further improvement.*
- *ASAC notes that a significant number of proposals were submitted for Cycle 10 with almost identical text by the same (or significantly overlapped) team. ASAC suggests consideration of*

possible countermeasures be introduced to discourage this practice, including software detection algorithms as well as clear instructions in the call of proposals.

- *ASAC is concerned about possible undesirable effects in increasing the limit of regular programs to 100 hours, which is under consideration by JAO based on the feedback from APRC, and recommends a number of measures to minimize them.*
- *ASAC is concerned about a gender bias in the success of proposals identified by JAO in Cycle 10. Female PIs tend to have poorer ranks than male PIs, especially in EA and EU. ASAC agrees with the JAO that more analysis is needed, especially to see if this bias continues in future Cycles.*
- *ASAC is concerned that in contrast with the success of continuum observation proposals, no VLBI spectral line proposal was accepted in Cycle 10 despite much technical effort spent in allowing these types of observations. ASAC recommends that the JAO keep encouraging the line VLBI community to submit proposals to utilize this observing mode.*
- *ASAC remains concerned about the limited uptake in the stage 2 review process in DPR. ASAC wishes to emphasize the critical importance of ongoing enhancements to stage 2 as a means to elevate the quality of the proposal evaluations.*

The Board considers that the algorithms used for DPR should be continuously updated and improved by the JAO, based on feedback from the ASAC and the user community. Multiple proposals with similar content by the same/significantly overlapped authors must be discouraged. The Board recommends the JAO develop a policy against such “proposal cloning” and add appropriate warnings to the next Call for Proposals.

The Board continues to discuss the advantages and positive/negative impacts of increasing the number of hours of regular proposals in the light of maintaining good balance between programs of different sizes.

The Board agrees that the JAO needs to keep their eyes on the possible systematics in gender for accepted proposals. By design, the dual-anonymous review process should have avoided/minimized such bias. The Board considers it important to remind the community that careful and fair reviewing by every ALMA proposal PI is essential to ensure that DPR works effectively.

The Board supports the ASAC’s recommendation that the JAO encourage the VLBI community to utilize more of ALMA’s VLBI spectral line capabilities when appropriate future opportunities arise.

Permanent Charge #5 (by the three regional Science Advisory Committees)

- *All three regional SACs have expressed concerns about the increasingly high oversubscription rates and their possible effect especially in minority fields.*
- *The regional SACs are also concerned that the lack of multi-cycle proposals makes it very difficult to carry out time-domain research.*

- *EASAC is particularly concerned about the regional imbalance seen in the Large Programs both in terms of time and number of PIs. EASAC is also concerned about the gender imbalance in the acceptance rate of proposals, which especially disfavors EA female PIs. While this is a weak effect, it seems to be systematic and deserves further study and correction.*

The Board disagrees with weighting any 'minority field' differently in the proposal selection process. The success and potential impact of ALMA on any new or 'minority' fields can be highlighted in various ALMA-related science communications, including ALMA or ARC-hosted conferences/workshops or in the regular science outputs from ARCs.

The Board notes JAO's assessment that implementation of multi-cycle proposals is not possible in parallel with WSU development. The Board recognizes the importance of multi-cycle proposals and recommends that JAO look for opportunities to change this policy if an appropriate balance in resources can be found in the future.

The Board would like to see the results of the assessment by EASAC for possible causes of the regional imbalance seen in the Large Programs both in terms of time and number of PIs. The Board agrees that imbalances should be monitored over multiple cycles to see if systematic trends are significant.

Permanent Charge #6 (scientific impacts of the ALMA Development Program)

- *ASAC recommends the project proposal of a Phase-1 study for the Band 8v2 receiver upgrade as the extension of IF in Band 8 is very important both in terms of scientific utility and improved observational efficiency.*
- *ASAC appreciates the progress in the development of the next generation Observing Tool. ASAC would like to have more detailed information on a timeline/critical path and effort levels required for the ngOT release in parallel with the WSU integration to understand how the ngOT will be interfaced with the WSU.*
- *ASAC continues to support of all the ongoing studies and projects, and commends the regional executives for developing an exciting set of future capabilities.*
- *ASAC congratulates the Band-2 project for successfully passing its Manufacturing and Readiness Review and being approved by the Board. ASAC commends all members involved for their efforts to date.*

The Board appreciates the ASAC support for the Phase-1 study proposal for the Band 8 receiver upgrades. The Board appreciates the ASAC support for the Band-2 wide-band receiver development and the continued support for regional efforts including ngOT.

Ad Hoc Charges #1

"Evaluate the scientific impact of programs of different sizes with a focus on the optimal balance between Small, Medium, and Large Programs." The Board requests that ASAC evaluate the scientific impact of programs of different sizes with a focus on the optimal balance between Small

and Medium proposals, and Large Programs. The Board also welcomes ideas on how such an optimal balance can be realized.

- *ASAC has conducted a preliminary analysis of the merit of Small, Medium, and Large Programs, and recommends that a more comprehensive study of ALMA's scientific impact be carried out. A preliminary analysis of the publication metrics for programs of all scales shows that high impact science is done with ALMA by programs of all sizes. Large Programs tend to generate more citations per year than small programs, but their citation rate per telescope time invested is not obviously different from that of small and medium programs. The statistics of ALMA proposals show that Large Programs are not the main contributors to the increasingly larger request for ALMA time, which seems to result from the increase in the average requested time per program. Since Large Programs have the potential to create pressure on smaller programs, ASAC recommends that ALMA guarantee a fair treatment of programs of different sizes. This could be done by allocating time according to the time requested by Small, Medium, and Large Programs. Since this balance is now achieved naturally, no correction is needed, although ASAC recommends monitoring the success rate of programs of different sizes and ensuring a fair distribution of the observing time.*

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The Board appreciates the careful assessment of the matter by the ASAC. The Board understands the ASAC's recommendation that programs of different sizes are treated fairly. Currently the balance of different-sized programs is achieved naturally and hence no corrective measures are needed immediately. The Board recommends JAO and ASAC continue to monitor the success rate of programs of different sizes before making any decision about allocating ALMA time according to the pressure from programs of different sizes.