



ALMA BOARD

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ASAC Report

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Report

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ALMA Board Science Committee Response to the ASAC: April 2022

The ALMA Board thanks the ASAC for a very full report summarizing their latest guidance to the Board on issues related to science. The Board received the ASAC's latest Report prior to its April 2022 meeting. The ASAC Chair, M. Tafalla, summarized the Report first to the Board's Science Committee and again the following week to the entire Board during the Ordinary Session of the Board meeting. The Chair of the Science Committee presented a preliminary response to the Board immediately after Tafalla's second presentation. In this document, we elaborate on our response to the ASAC.

Permanent Charge #1

ASAC endorses the work on the new capabilities for Cycle 10, supports the investigation of new capabilities for future cycles, and appreciates the efforts to implement an on-line correction of the renormalization issue.

At their March 2022 meeting, the ASAC received an excellent presentation by Antonio Hales (JAO) on the ongoing efforts of the Array Performance Group to address issues related to ALMA's scientific capabilities. The Board agrees with ASAC's positive assessment of new and near-future capabilities, and that the renormalization issue continue to be addressed at the highest priority. The Board concurs that the renormalization problem remains an important issue and also welcomes future updates on the efforts being undertaken to resolve it. Likewise, the issue should continue to be communicated to ALMA users as appropriate. The Board will action the ALMA Director to continue prioritizing the renormalization issue and apprise the ASAC and community about progress on resolving it.

Permanent Charge #2

ASAC praises the ALMA staff for their continued commitment to the Observatory despite the covid pandemic, celebrates the good start to Cycle 8, is concerned about the many Grade A projects carried over from Cycle 7, remains concerned about the low rate of completion of high-frequency projects, understands the reasons for not having a Supplemental Call during Cycle 9, and is concerned that no spectral-line VLBI observations will be carried out in Cycle 9.

The Board agrees with ASAC that Observatory staff deserve praise for their efforts to keep ALMA operational during the COVID-19 pandemic and especially for the smooth start to Cycle 8. We also welcome the news that data processing targets are being met. Regarding the carryover of Grade A projects from Cycle 7, we are confident these projects will remain in the queue for Cycle 8, following longstanding policy.

The Board acknowledges the ASAC's concern about the relatively low observing rate of high-frequency projects from ALMA. Projects are indeed executed based on queue rank given prevailing weather conditions, as per policy, and lower frequency projects that also require the

best conditions have tended to be ranked more highly in the ALMA queue. Nevertheless, the low observing rate of high-frequency projects could lead to proposers becoming dissuaded from pursuing such projects. A case could be made for prioritizing high frequency observations, since the ALMA site was selected to enable such observations to occur. To avoid circumventing ALMA's rank-based scheduling policy, however, ALMA's ability to complete unique, high-frequency projects could be demonstrated to the community. We will action the ALMA Director to consider a strategic use of a modest amount of Director's Discretionary Time in near-future Cycles for a dedicated high-frequency campaign. This campaign will yield valuable data products for the global community to use widely, and in turn should stimulate further high-frequency usage of ALMA. In an *ad hoc* Charge below, we request that ASAC investigate if such a campaign is warranted, and if so, how it could be designed to maximize scientific benefit, equity, and fairness to the global ALMA community.

Regarding the lack of a supplemental call for Cycle 9, the Board is pleased to see that the Observatory did indeed encourage the submission of ACA standalone proposals during the main call. We also await the results of this call to see how the community responded, and agree that supplemental calls should be re-examined should demand for projects using only the ACA be relatively low. Indeed, supplemental calls are ways to keep the community engaged with the observatory between main calls but the consequent heavy demand on the JAO must be weighed against that benefit. We share ASAC's concern that no spectral-line VLBI projects were proposed for Cycle 9 due to the earlier, February deadline for proposals to use the Global mm-VLBI Array (GMVA) even though that requirement was communicated. The Observatory Scientist has informed the Board that ALMA and GMVA indeed stepped up their efforts in this regard, with several timely overtures made to the community about the availability of the capability and the early GMVA deadline. We note also that ALMA's current spectral-line VLBI capability is relatively limited, consisting of a single window centred on SiO 2-1 with a flux limit of 4 Jy. We expect the future expansion of the spectral-line VLBI capability will further stimulate community interest.

Permanent Charge #3

ASAC is happy to see the new record and continued positive trends for ALMA publications in 2021, and recommends continuing to monitor publication statistics to assess the impact of the pandemic-related year-long shutdown.

The Board is also pleased to see the healthy number of ALMA publications in 2021 and that the publication rate continues to keep pace with those of other, top observatories like HST. We agree that the recent shutdown due to COVID-19 may have an impact on future ALMA publication rates. Should an impact occur, we are confident that ALMA's current publication tracking methods will detect it. Mindful of the impact of future shutdowns, the Board encourages continued development of the "Hardware-it-the-Loop" testing system that will shorten the durations of shutdowns related to ALMA 2030 upgrades.

Permanent Charge #4

ASAC applauds the detailed analysis of systematics of the Cycle 8 proposal review process, yet remains concerned about a persistent bias against EA Principal Investigators. ASAC is concerned about the poor quality of feedback in some cases and the high dispersion of ranks seen for Distributed Peer Reviewed proposals, and recommends exploration of ways to implement an anonymous feedback system, i.e., a Stage 3, to improve assessments. Furthermore, ASAC is concerned that minority research fields may be damaged by this approach, something that anonymous feedback may also mitigate. ASAC requests a similar in-depth analysis of the Cycle 9 proposal review process.

The Board also commends the JAO for leading a thorough analysis of Cycle 8's proposal review process, as it provided important insights into the relatively novel distributed peer review (DPR) approach. Indeed, the majority of feedback from participants in the DPR has been quite positive. Nevertheless, the Board is mindful that implementation of a new approach could never be perfect on its first try and welcomes the JAO's flexibility to making improvements, such as mandating a minimum number of characters for reviewer feedback. Implementing a more structured basis for feedback, e.g., requiring comments on proposal strengths and weaknesses, will be considered in future, if proposal feedback remains unsatisfactory.

We share ASAC's concern that EA-led proposals continue to receive statistically lower ranks relative to those from other regions, despite the implementation of dual anonymous review. We agree that investigation of the cause of this bias must continue, including an analysis of biases within Cycle 9 proposal results. As in the last Board response to the ASAC Report, the ARCs should explore whether providing guidance on language as part of pre-deadline Helpdesk activities would be too burdensome for available staff, if relative inexperience with English is the culprit. Indeed, the EA ARC already has begun efforts in this regard. Moreover, we agree that the lack of EA representation in the Cycle 8 proposal review analysis team was unfortunate, and will action the ALMA Director to have more balanced participation in Cycle proposal review analyses teams in future.

We thank the ASAC for its suggestion that ALMA explore the implementation of a way for reviewers to revise their initial ranks after a period of anonymous interaction with fellow reviewers. Though attractive in principle, the Board remains concerned that the added burden of another stage of review may be unwelcome to reviewers themselves. We note, for instance, that only ~15% of reviewers changed their ranks during the Stage 2 period of reconsideration during the Cycle 8 review process. For the purposes of improving feedback, improved education for reviewers is needed to emphasize the importance of providing considered and substantiated comments to proposers during Stage 1. The JAO, in collaboration with the ARCs, has implemented such changes in the instructions that will be given to Cycle 9 reviewers. To address the issue of a bias against minority research fields, the Board proposes that domain experts who have not submitted proposals participate in DPR as well as panel reviews to improve the base

expertise needed for fair reviews. The Board awaits the analysis of the Cycle 9 proposal review process to see if these changes have had their desired effect and will consider further actions should data necessitate them. Nevertheless, the Board welcomes ASAC's further involvement in improving the quality of DPR results in future Cycles.

Permanent Charge #5

The ASAC is disappointed that medium-sized proposals have been moved to DPR in Cycle 9 and that believes the balance between small-, medium-, and large-sized proposals needs to be carefully addressed.

Medium-sized proposals were introduced to encourage the community to use ALMA more ambitiously, as recommended, e.g., by the International Visiting Committee. DPR was introduced to lessen the burdens on the ALMA Proposal Review Committee members and provide high-quality peer review of proposals at significantly lower cost. Given its relative novelty, the JAO eased the community into DPR by implementing it first in the Cycle 7 supplemental call and then later in the Cycle 8 main call for small-sized proposals. It was not the intention of the JAO to encourage medium-sized proposals by having them reviewed by panels in Cycle 8. Given the burden on the panel reviewers by the larger-than-expected number of large-sized proposals, and the overall acceptance of DPR for small-sized proposals in Cycle 8, it was necessary for JAO to reconsider the threshold for panel review. Indeed, the JAO suggested raising the threshold from 25 hours to 50 hours during the November 2021 Board meeting, as relayed to the ASAC in our Response to its previous Report, and the Board raised no objections to the idea at that time. The Board and the JAO regrets the disappointment felt by the ASAC and Project Scientists about this change. That said, the wide acceptance of DPR by the ALMA community should result in fair review of both small- and medium-sized proposals for Cycle 9. Moreover, continued community encouragement by the ARCs for the community to 'think big' should result in more ambitious, medium-sized ALMA proposals. At this time, the Board sees no reason to change course, but would be open to adjustments should data from future Cycles warrant intervention. Indeed, prescribing a proper balance between these three types of proposals seems premature, as the impact of Large Projects on the queue has not yet been settled. Recall that for Cycle 9 large-sized proposals can now fill up to 33% of available time in extended configurations C9 and C10 and up to 50% of available time in all other configurations and the ACA. The Board welcomes the ASAC's contributions to future discussions of balance between proposal size if they are needed in future Cycles.

Permanent Charge #6

ASAC notes the importance of the overall Wideband Sensitivity Upgrade (WSU) towards the goals of ALMA2030 and endorses the presentations given to them at their recent meeting. ASAC recognizes that significant coordination between regions by strong centralized management is needed for these projects' success, and offer to provide science input when needed. ASAC strongly

endorses the correlator upgrade, signal chain improvements, and specifically the “ALMA 2030 Digitization to Correlation Path Prototyping and System Demonstration” development project proposal. ASAC notes the data rate challenges implied by the implementation of the WSU plan, and recommends discussing these with the community now so it can prepare accordingly.

The Board appreciates the endorsements of the ASAC on the Development proposals as they help guide its own considerations of these proposals. We also hope that the staffing problems impacting the development of the Next Generation Observing Tool are quickly resolved. The Board is convinced that the scientific benefits of the WSU will be substantial. We share ASAC’s concerns, however, about the high data rates expected from the WSU projects and will action the ALMA Director to complete as soon as possible the study to quantify their impact. With a mature study in hand, it will be easier to prepare the community well in advance of the WSU’s implementation.

Ad hoc Charge #1

ASAC is not able to fully address the ad hoc charge to identify what level of observatory and ARC support is needed to ensure the success of Large Programs, as the survey to the respective PIs is not yet complete. ASAC recommends a summary of support given to each Large Program be compiled by the ARCs and that archive development make future Large Program projects more readily visible in the ALMA Archive.

The Board agrees with these recommendations and will action the ALMA Director to expedite the completion of the survey of Large Program PIs. Also, the Board will action the ALMA Director to work with the ARCs to compile a summary of support given to each Large Program so far to aid ASAC in consideration of this charge. Finally, the Board agrees that the visibility of Large Project data products in the Archive should be high, and will action the Director to instruct the Archive team to prioritize accordingly the necessary developments. We request the ASAC continue consideration of this Charge in advance of the November 2022 Board meeting.

Ad hoc Charge #2

The ASAC is charged to advise the Board on ways to implement a scientifically beneficial, equitable, and fair use of Director’s Discretionary Time on a dedicated campaign (project or projects) that will demonstrate the uniqueness and power of ALMA’s high-frequency capabilities by providing high quality data products to the community. Namely, the ASAC should consider where this approach is warranted and, if so, how such projects should be conceived, competed, and selected to maximize both partner participation and overall impact in a reasonably short execution timeframe.

Specific Actions to the ALMA Director

1. The ALMA Director will continue prioritizing efforts toward solving the renormalization problem, and continue to apprise ASAC and the larger ALMA community on progress.
2. The ALMA Director will consider a strategic use of Director's Discretionary Time for an observational campaign that will demonstrate ALMA's unique, high-frequency capabilities. To assist the Director in his considerations, the Board will ask the ASAC to investigate if such a campaign is warranted, and if so, how it could be planned to maximize scientific benefit, equity, and fairness.
3. The ALMA Director will ensure the teams analyzing future Cycle proposal review processes have balanced representation from across the ALMA partnership.
4. The ALMA Director will expedite the completion of the survey of Large Project PIs so the ASAC can complete the *ad hoc* Charge to evaluate what level of observatory and ARC support is needed to ensure the success of Large Projects.
5. The ALMA Director will work with the ARCs to have summaries of support given to previous Large Programs available to the ASAC.
6. The ALMA Director will instruct the Archive team to prioritize accordingly the development of ways to increase the visibility of Large Project data products in the Archive.