



ALMA BOARD

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Subject: Science Committee Response to the March 2024 ASAC Report

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ALMA Board Science Committee Response to the March 2024 ASAC Report

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 March 2024 Report prior to its April 2024 meeting. The ASAC Chair, Stefanie Milam, summarized the Report first to the Board's Science Committee and then to the entire Board during the Ordinary Session of the Board meeting. After Milam's first presentation, the Science Committee prepared a preliminary response which the Chair of the Science Committee presented to the Board immediately after Milam's second presentation. In this document, we elaborate on our response to the ASAC.

Permanent Charge #1 (ALMA scientific capabilities)

- *ASAC congratulates the organizers and participants for the successful "ALMA at 10 years" conference organized in Puerto Varas in December 2023.*
- *ASAC is happy to see that the achieved data acquisition rate in Cycle 10 is high despite of an inefficient start. ASAC commends the high Cycle 10 data delivery completion rates and the fast timescale of automatic delivery.*
- *ASAC welcomes the start of Band 1 observations planned for March 2024 and awaits a prompt delivery of the remaining Band 1 Science Verification and Observatory Project data which will promote and offer on-sky performance metrics for Band 1 proposals.*
- *ASAC acknowledges that the acceptance rate of joint proposals is close to what is expected based on the oversubscription rates. ASAC recommends these programs are monitored for success and science impact.*
- *ASAC is happy to see the added and the new capabilities offered in Cycle11. ASAC recommends that ALMA promote these capabilities and monitor the proposal pressure of these as well as the success of the programs.*
- *ASAC was pleased with the updates on the Wideband Sensitivity Upgrade (WSU). ASAC encourages ALMA to be open and provide routine updates to the community on the schedule and progress of WSU and supports the efforts proposed to do so (e.g. website, emails, etc.)*

The Board supports ASAC's recommendation of a prompt delivery of the remaining Band 1 science verification data to the community.

The Board appreciates that ASAC is carefully watching 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 the ALMA project to share the progress of the development with the community in an appropriate manner.

The Board agrees that the Joint Proposals programs should be monitored for success and science impact.

Permanent Charge #2 (ALMA system performance)

- *ASAC is concerned about the status of the antenna transporters and its possible impact on the array operations.*
- *ASAC commends JAO for its timely delivery of data to PIs and the start of the automatic data delivery, although it notes that manual processing is generally significantly behind the target schedule.*
- *ASAC commends JAO for the implementation of new measures to promote high-frequency and other weather-critical observations, and reiterates the importance of these types of projects for ALMA.*

The ALMA Board shares ASAC concern about the antenna transporters, and the severe impact of faulty transporters on array operations and therefore on the ALMA science impact. The Board will continue to monitor the situation, and is instructing the ALMA Director to consider additional ways to reduce the risk of this potential single-point failure.

The Board joins ASAC in commending ALMA for the successful roll-out of automatic data delivery.

The Board considers it important that the status of the high frequency projects continue to be monitored. The Board has agreed with the new queue building policy to prioritize high-frequency receiver bands when weather conditions allow, as well as efforts undertaken to increase the number of high frequency projects scheduled for execution. The Board recommends that the ASAC carefully monitor the achieved scientific impact of the executed high frequency programs.

Permanent Charge #3 (science outcomes from ALMA)

- *ASAC is happy with the level of publications in the past year, in particular with the number of publications using archival data, which is increasing every year.*
- *ASAC is concerned with the increasing publication fees of top tier journals, which could potentially affect the publication of ALMA results for certain regions. ASAC encourages the Board to consider ways in which such inequities in Author Page Charge funding could be mitigated.*
- *Statistics of theses using ALMA data could be an option to measure the impact of ALMA on younger generations (e.g., thesis using ALMA data). Such information could be collected by ARCs.*
- *ASAC recommends compiling the statistics for a more granular "impact per program" (and perhaps per hour of observing time), in terms of number of publications and citations. Beyond the overall distributions, these metrics could be explored as a function of time, region, science category, proposal type, and observing band.*
- *ASAC recommends JAO to track the statistics for publications from joint proposals.*

The Board appreciates ASAC concern about increasing publication fees, but do not recommend any action from the ALMA Director to address this, since it is beyond the scope of ALMA operations.

The Board appreciates the efforts of ASAC to carefully monitor the science outcomes of ALMA among multiple axes, but at the present time the Board does not recommend the ALMA Director or the ALMA ARCs to pursue more granular statistics for to measure scientific impact, since this will consume significant resources, and it was not made clear to the Board what potential actions could result from the proposed analysis.

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

- *ASAC remains concerned about the limited use of the Stage 2 opportunity to improve the DPR process. We recommend that JAO guide ALMA PIs to participate more in the Stage 2 review in Cycle 11.*
- *ASAC was informed of the outcome of the investigation by JAO of similar proposals and is happy with the clarification written in the Cycle 11 Call for Proposals*
- *ASAC recommends that the public data from the Observatory Projects should be made available to everyone at the same time. A prior announcement of the time and date of each data release would accomplish this goal.*
- *ASAC welcomes the change in the proposal forms for ALMA Large Programs, with the management plan included in the proposal form and proper justification of data processing resources.*
- *ASAC recommends that the Observatory consider ways to permit (even limited) Large Program proposals for transient science soon (ideally before Cycle 13), to take maximum advantage of the progress expected from the Vera Rubin Observatory.*
- *ASAC is happy with the increased use of the ALMA archive and recommends surveying ALMA archive users for their experience to identify the current issues and understand the needs for the future.*

The Board agrees that the JAO, through the ALMA Director, should continue to evaluate and optimize the algorithms used for DPR, taking into account feedback from ASAC and the user community. The Board does not recommend to make Stage 2 review participation mandatory, but supports reviewing how the stage 2 process is communicated to PIs, and to experiment with different ways to increase participation.

The Board supports the recommendation by ASAC for JAO to improve how each data release of the Observatory Projects is announced, while acknowledging that the precise date and time are sometimes difficult to predict far in advance and charges the ALMA Director with this task.

The Board appreciates that ASAC pointed out potential importance of a Large Program for transient science to take maximum advantage with the upcoming new facilities with powerful time-domain capabilities. The Board recommends that the ALMA Director considers lifting the

Large Program restrictions for transient science and other science categories currently barred from submitting Large Programs.

The Board appreciates ASAC's recommendation to pay extra attention to the Archive utility in the upcoming cycles, especially as we are approaching the WSU implementation.

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

- *ASAC recommends that the statistics of the regional balance of awarded and executed time continue to be monitored and made available to the broader community.*
- *ASAC requests statistics of the fraction of time used for LPs for each region, since the fraction could be more significant for regions with smaller allocations (EA and CL).*
- *ASAC recommends the demography of ALMA users be monitored with attention to the influx of new users.*
- *ASAC recommends that investigations of user challenges with data from the JAO be made available to the community for reference and recommendations with such programs.*

The Board recommends the ALMA Director continuously monitor the statistics of the regional balance of awarded and executed time. Such statistical information should be routinely shared among the representatives of the Regions (including ASAC) while the regional balance is considered over some adequate period.

The Board did not fully understand the concern about LP allocation, and acknowledges that this might vary between regions due to different science priorities by PIs.

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

- *ASAC commends the progress made on various stage 1 programs (Band 2, Band 6v2, and Band 8) and studies have been carried out smoothly and on schedule.*
- *ASAC is happy to see that working groups have been established for WSU for initial impact assessments of the WSU on computing and science operation subsystems and a document with an impact assessment of the WSU has been prepared.*
- *ASAC is pleased to see that JAO has come up with a draft timeline for WSU implementation and commissioning. ASAC recommends the WSU schedule be made available to the community as soon as the plan is fixed.*
- *ASAC is concerned about the impact of the WSU implementation on the oversubscription rate during 2026-2028. It is also important to consider strategies of proposal allocation and scheduling during the impacted period.*
- *The ASAC is concerned over the lack of a clear strategy to integrate ngOT software into the AIVC process for the WSU. Despite funding constraints, ASAC recommends initiating ngOT development for WSU capabilities in the AIVC process as soon as possible.*

The Board supports ASAC's concern that the oversubscription rate will increase further in 2026-2028 due to the WSU commissioning. The Board agrees that it is important to communicate the details of the expected impact of the commissioning on the observing time and operation at the period as soon as these are known.