



ALMA BOARD

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Subject: Science Committee Response to the March 2025 ASAC Report

AUTHOR(S): Linda Tacconi & Science Committee

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ALMA Board Science Committee Response to the March 2025 ASAC Report:

The ALMA Board thanks the ASAC for a very clear, concise and thoughtful report summarizing their response to the Board charges and bringing other issues related to science to the attention of the Board. The Board especially thanks ASAC for providing the report under increased time pressure, with the ASAC and Board meetings occurring closer together than normal. The ASAC Chair, Stefanie Milam, summarized the Report to the Board's Science Committee on March 26, 2025, and then to the entire Board during the Ordinary Session of the Board meeting on April 10, 2025.

The ASAC report contains many comments in support of the efforts of the JAO and ALMA. This response focuses on ASAC major recommendations and concerns.

General Considerations:

- ASAC is increasingly concerned with the delays of reviews for WSU. Evaluation of risks in such delays and a detailed flow of the WSU critical path will better inform ASAC and the community on the impact of such delays to science - including a potential delivery of only 2x bandwidth vs the 4x goal.

The ALMA Director and Board will address ways to increase the clarity of information delivered to ASAC. The ALMA Director and Board emphasize that ALMA is pushing to maximize the capabilities of the WSU, but the details of some of the technical developments are still fluid. The project is truly at the cutting edge and as such will continue to have uncertainties as developers push the limits of what is achievable for approaching 4x the current bandwidth in all bands.

- ASAC was pleased to have the Board Science Committee (SC) Chair join the meeting and take time on the agenda to directly address and respond to questions from the committee. Clarification on the SC response was offered and provided clarity on decisions made at the Board level. We hope this practice will be routine in the future and will keep the Science Committee Chair on the agenda for ASAC meetings in the future.

The Board is happy to hear that its efforts to increase communication between its Science Subcommittee and the ASAC are welcomed. The current SC Chair will continue to participate in the ASAC meetings and continue the dialog with the ASAC as much as possible.

- ASAC would like the Board to consider the goal of Permanent Charge 2 "Recommendation of ways to maximize ALMA's scientific impact:..." and some guidance of what is expected in the evaluation of current scientific impact of ALMA.

The Science Committee discussed this issue at length with the ASAC Chair. The Board encourages the ASAC to think proactively in addressing this charge. When results from statistical impact analyses are presented by one of the regions, the ASAC should use these to address this charge. The SC also welcomes qualitative assessments of ALMA's scientific impact. For example, learning about ASAC members' impressions from and interactions with the community e.g. at conferences, workshops or at their home institutions. The impact of ALMA is more than hard

numbers of publications, citations, etc. One example given in the meeting is that ASAC could look at whether ALMA recent prioritization of high frequency observations has resulted in an increase in publications, presentations, etc. by the scientific community.

Permanent Charge #1: Assessment of the performance of ALMA scientific and technical capabilities: The Joint ALMA Observatory (JAO) shall provide the appropriate information needed to perform this assessment.

The Board endorses the many positive comments that ASAC has made in response to this charge.

Permanent Charge #2: Recommendation of ways to maximize ALMA's scientific impact: This includes review of the scientific effectiveness of the ALMA Archive, proposal tools, and the Proposal Review Process as well as the current scientific impact of ALMA.

- ASAC encourages ALMA to continue discussions on filling gaps in the observing queue efficiently and would appreciate details on the procedure employed for a broader community understanding.

The Board endorses initiatives to minimize gaps in the observing queue at ALMA, given the ever-increasing demand for observing time by the community.

- ASAC is appreciative of ALMA's continuous monitoring of potential biases in the Distributed Proposal Review (DPR) process. ASAC recommends a detailed comparative analysis of the first four cycles of DPR in the fall meeting to evaluate the process and improvements made to date as well as consider other methods to improve DPR. ASAC would be receptive to working with the JAO on other ideas and methods to consider for future cycles to help balance the onerous nature of the proposing/reviewing process for a highly oversubscribed facility.

The Board appreciates the continuous concerns expressed by ASAC about the successes and pitfalls of DPR. The Board encourages ASAC to identify the specific problems they see with DPR and suggest ways to improve the DPR process. As pointed out by the ALMA Director, the JAO is receptive to implementing changes (within the boundaries of available resources) to optimize DPR that could lead to a higher community satisfaction.

-Evaluating the science impact of ALMA will require certain metrics to be provided (e.g., publications, citations, PhDs based on ALMA data, prizes, etc. - to be determined by the SC) in order to properly assess this part of the charge. ASAC will consider other qualitative aspects of ALMA success. ASAC does not see a need for this evaluation of science impact more than once per year.

The Board comments on some of these aspects under the General Considerations section. The Board agrees that once per year is a good cadence to address and evaluate some aspect of ALMA's science impact.

Permanent Charge #3: Reporting on operational or scientific issues raised by the wider community as communicated by the three regional Science Advisory Committees (ANASAC, ESAC and EASAC).

- There were no wider community concerns addressed with the regional SACs for this meeting.

The Board looks forward to hearing about any community issues within the regions if they should arise.

Based on discussions with the ASAC Chair, the Board suggests that the regional SAC reports be appended to the main ASAC Report as additional information to the Board. The Board recommends that these appendices not become publicly available, unless they are also public in the individual regions.

Permanent Charge #4: Assessment of the scientific impact of the ALMA Development Program, with focus on the Wideband Sensitivity Upgrade (WSU) capabilities as well as its implementation.

- ASAC requests a top-level progress report with updates on a critical path, schedule, risks being monitored, and progress on hardware/software be provided prior to development presentations for general understanding and guidance on what presentations will cover which areas.
- ASAC appreciates the efforts made to build a new software superseding CASA. The timeline for RADPS deployment, planned for 2 or 3 years after the WSU is operational, is a major concern, and we encourage ALMA to pursue this effort in a timely manner and deliver RADPS closer if not in sync with WSU.
- ASAC is concerned with onerous data challenges before the community with WSU. ALMA should consider how computational resources could be balanced with resources at ARCs that are accessible to the broader community for timely and equitable access for data reduction.

The Board appreciates the time, effort, and care that the ASAC has put into this charge. The Board proposes that the ALMA Director provides a one slide list of the top take-away points at the beginning of WSU presentations to set the stage for the details that follow. These points can include the latest progress in receiver bandwidth developments across the different frequency bands and in RADPS. Regarding the third point above, the Board notes that other large facilities are dealing with very large data rates on timescales that are even shorter than that of the WSU. ALMA has an opportunity to learn lessons from these other facilities before WSU data are delivered to the ALMA user community. The Board proposes to JAO to update the online information referred to the computing requirements for processing ALMA data, especially for processing WSU data. The Board agrees that it is important to keep the community informed about WSU progress and timescales. Transparency, however, needs to be balanced against potential

schedule volatility, which could unfairly lead to a sense that ALMA does not have control of the WSU project.

Permanent Charge #5: Providing comments on community initiatives regarding ALMA capabilities beyond ALMA 2030 once a year.

The Board looks forward to hearing about progress on this charge after the October 2025 ASAC meeting.

Proposed Action Items to the ALMA Director from the Board:

1. The Board proposes that the ALMA Director provides a one slide list of the top take-away points at the beginning of WSU presentations to ASAC to set the stage for the details that follow.
2. The Board endorses initiatives to minimize gaps in the observing queue at ALMA, given the ever -increasing demand for observing time by the community.