ALMA BOARD

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AUTHOR(S): Stefanie Milam & ASAC

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ASAC Fall 2025 Report

Yuri Aikawa, Sean Andrews (Absent/Furloughed), Arnaud Belloche, Sara Ellison, Maryvonne Gerin (EU Vice-Chair, remote), Ágnes Kóspál, Li-Hwai Lin, Anaëlle Maury, Stefanie Milam (Chair), Neil Nagar, Hideo Sagawa (EA Vice-Chair), Kazushi Sakamoto (remote)

General Considerations:

- ASAC held the Fall 2025 meeting in person October 28-29, 2025 - the first in person meeting since March 2020. ASAC would like to thank the ALMA Board for endorsing and encouraging this. Additionally, ASAC would like to thank ALMA for supporting the meeting in Santiago, Chile and the wonderful hospitality that was received. ASAC members in attendance agree that this was one of the most productive and engaged ASAC meetings held in the last few years and look forward to having more in person meetings in the future.

- ASAC is due for a new chair and vice chairs starting in 2026. Stefanie Milam (NA) is rotating off, and the next chair should be from East Asia. Recommendations came from the regional SACs and were voted on during the ASAC meeting. The following are recommended for consideration:
    - Chair, EA: Hideo Sagawa
    - Vice Chair, NA: Sean Andrews
    - Vice Chair, EU: Arnaud Belloche

- ASAC strongly encourages ALMA to proceed with the organization and initiation of the ALMA2030 Archive Vision Working Group. ASAC recognizes the significance of having the Science Archive upgrade occur and be prioritized in parallel with WSU, this includes ensuring how the archive aligns with all software being developed for WSU, including Data Processing. ASAC supports the scope and vision of the working group charter, the community representation anticipated for this group, as well as the deliverables and timeline described in the charges. Additionally, ASAC is willing to help identify community members for consideration.

- ASAC would like to thank the ALMA Proposal Handling Team, namely John Carpenter and Andrea Corvillón, for the thorough analysis and discussion of Distributed Peer Review with ASAC. The dedicated effort to collect the community's concerns on DPR and provide detailed analytical insights to help address these concerns is greatly appreciated. ASAC strongly encourages this work moves towards publication and for ALMA to make these details available to users through various ways to appease users of the process and fair evaluation it offers with respect to community peer review panels. Dissemination of details could be done through the ALMA webpage, community forums at conferences, and through email lists.

- ASAC continues its strong support of WSU as its impact on the scientific capabilities of ALMA will be transformational. Achieving the 4x bandwidth increase is essential to unlocking the full scientific potential of WSU and should remain as the priority for planning and implementation as WSU advances. Finally, continued efforts to inform the community of WSU progress and impact on future Cycles are greatly appreciated.

Permanent charges:

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.**

Recommendations/issues:

- ASAC congratulates the observatory for the extremely successful cycle 11, both in terms of number of observed hours and timely delivery of calibrated data, and recognizes the efforts of cross-department coordination for this success. ASAC regrets that more than 200 hours were lost due to power outages but hopes that the measures taken recently to mitigate the failures of the control system will be fruitful.

- ASAC welcomes the efforts made by the observatory to manage obsolescence and system aging of ALMA, including the plans to shift to green energy

- ASAC welcomes the improved completion rate of A-ranked and B-ranked proposals. ASAC thinks however that reaching a 100% completion rate of A-ranked projects should be a primary goal of the observatory, possibly by prioritizing the uncompleted A-ranked projects in the subsequent cycle as much as possible.

- ASAC recognizes that prioritizing the completion of projects, rather than simply the completion of Scheduling Blocks (SBs), is important. Furthermore, ASAC considers it equally important to ensure that time-critical observations are completed within their intended time windows.

- ASAC underlines the importance of full polarization observations for ALMA's science output and would like to see an update on the completion rate of such projects at its next meeting.

- ASAC appreciates the measures to address small imbalances in regional observing time share accumulated over the years. It supports ongoing oversight to ensure the canonical regional shares over the two-year ALMA policy period. ASAC also recommends monitoring the regional project completion rates (i.e., the proportion of time spent on completed projects within the regional observing time share).

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.**

Recommendations/issues:

- ASAC expresses its deep appreciation for ALMA's comprehensive statistical investigation into potential biases in the Distributed Proposal Review (DPR) process, as presented at this ASAC meeting. ASAC emphasizes that sharing the DPR analysis widely is essential to address and prevent any possible misunderstandings in the community.

- ASAC considers that enhancing the effectiveness of Stage-2 is one way to improve the quality of the DPR. ASAC recommends that the JAO continue to raise awareness within the community about the significance and importance of Stage-2, and also consider making its participation mandatory.

- ASAC strongly encourages ALMA to move forward with establishing the ALMA2030 Archive Vision Working Group. ASAC emphasizes the importance of developing and prioritizing software in parallel with WSU, this includes ensuring how the archive aligns with all software being developed for WSU, including Data Processing. ASAC supports the working group's scope, vision, community representation, and the proposed deliverables and timeline.

- ASAC considers it necessary to update the discussion on the role of Large Programs (LPs) in the context of WSU's parallel deployment cycles and WSU's commissioned years. There is a very high likelihood that LPs cannot be conducted in their current format due to the limited observing resources available during WSU deployment. In addition, with the unprecedented observational capabilities that will be achieved with WSU, LPs may have a different scientific significance compared with the current situation. ASAC is willing to continue these discussions in future ASAC meetings.

- ASAC appreciates ALMA for providing the report on metric-based publication statistics. It is reassuring that ALMA's performance is comparable to, or better than, other ground-based and some space observatories. ASAC recommends that ALMA continue to monitor these metrics and explore feasible strategies for further improvement. Note that given the delay between project delivery and publication, the current scientific impact largely reflects projects selected a few cycles back.

Distributed Proposal Review: ASAC received a comprehensive statistical report on the Distributed Proposal Review (DPR), prepared by John Carpenter and Andrea Corvillón. Their detailed analysis using multiple evaluation criteria has been extremely valuable in deepening our understanding of the current DPR system. ASAC sincerely appreciates their significant effort in conducting this study.

Thanks to a statistical survey examining the issue from multiple perspectives, the results indicate that the current DPR does not appear to be more biased than the outcomes of the previous Panel Review Stage-1. This provides a meaningful response to user concerns that the DPR might favor specific observation proposals. It is also shown that the top and bottom 10% of proposals display slightly smaller dispersion in their rankings compared to other proposals. ASAC considers it important to share these findings (including the way of merging the rankings from different reviewers) widely, for example, at the next pan-ALMA meeting in February 2027 and other opportunities as available.

A continuing concern among users is the quality of review comments. While this may partly reflect differences in perception, ASAC believes that continuous efforts are needed to improve comment quality. One improvement that could likely be implemented without significant additional resources is enhancing the effectiveness of Stage-2. Details on the Stage-2 process before and after DPR with ALMA were provided to ASAC that included:

A. Stage 2 reduced rank spreads among reviewers more in the pre-DPR cycles (1-7) than in the DPR cycles (8-12); the Stage 1 spreads were similar.

B. Stage 2 had a much greater impact on the final ranking in the pre-DPR era. Among the top 10% of proposals in the final ranking, 34% were promoted to the top group by Stage 2 before DPR, compared to 7% in the DPR cycles.
C. In Cycle 12, only 62.4% of reviewers completed their Stage 2.

ASAC encourages JAO to continue raising awareness of its importance (namely, Stage-2 serves as a practical substitute for mutual interaction among reviewers) and to consider making participation mandatory so that each reviewer can better understand different viewpoints.

ASAC also recommends that JAO continue Reviewer surveys on comment quality, and encourage participation from the community for better statistical reliability.

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).

Recommendations/issues:

- Regional SAC reports are provided to the ALMA Board.
- No regional concerns were raised by the ANASAC or ESAC.
- EASAC:
    - EASAC recommends that the JAO continues to monitor the distribution of PIs and Co-PIs in Large Programs (LPs) across different regions and career stages. EASAC also supports exploring ways to encourage early-career researchers to take leading roles in LPs.
    - The EA region recommends that data release schedules of non-proprietary data for Observatory Projects be made known ahead of time, by publishing on the web site and perhaps email notifications to the community, to best manage fairness across time zones.

There were no regional concerns raised by the ANASAC or ESAC beyond those already addressed throughout the report.

Conversely, several items were raised by the EASAC. First, building on our request from our last report in which we expressed a desire to better understand regional representation, EASAC appreciated the efforts of JAO to track partner representation, address imbalances, and consider changes to current procedures that will mitigate recurrent issues. Nonetheless, it was noted by the EASAC that the participation of EA PIs and Co-PIs in Large Programs (LPs) remains relatively low (around 16%) compared with other regions. To date, only three LPs have included EA PIs, and no EA-led LP has been approved since Cycle 8. Within the EA community, several ideas have been discussed to improve this situation, such as providing funding support for hiring researchers in LP-selected projects and encouraging early-career researchers to submit LP proposals.

Second, there has been a lack of confidence and satisfaction with the DPR review outcomes expressed in the EA region. The main concerns were the generally low quality of comments from the ten reviewers and, in some cases, significant inconsistencies in proposal rankings. Some also

pointed out inconsistencies within the feedback itself. Many of these concerns were addressed by the detailed DPR analyses presented at the ASAC meeting (see also ASAC's response under Charge #2). Communicating these results widely and proactively will help alleviate concerns amongst region members. Nevertheless, there remain several areas for which there is perceived room for improvement, such as enhancing the efficiency of Stage 2 (which also currently does not benefit from the traditional discussions of a panel review) and producing a consensus summary report based on the individual review comments (although it is recognized that individual opinions on the value of this differ). It is perceived that some of these shortcomings may lead to unfavorable reviews of "high-risk, high-return" proposals.

Finally, from the EA region, was the concern about timing of critical announcements or activities. For example, the release of data from observatory projects with no proprietary time, should be announced well in advance, to mitigate the advantage/disadvantage of a given time zone.

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.

Recommendations/issues:

- ASAC thanks the JAO for a clear and complete presentation of the WSU, highlighting key topics for ASAC consideration.

- ASAC strongly supports WSU development efforts and maintaining a goal for 4x bandwidth expansion.

- ASAC congratulates for the advancement of WSU with the system PDR passed, other PDRs scheduled, and excellent progress on the construction activities (OCRO, OSF control room, Fiber optic system). ASAC is happy with the communication plan as communication to the community is essential.

- ASAC congratulates ALMA for the Band 2 deployment. The workshop will trigger interest in the science community for this new frequency range. Since the meeting organization and speakers are almost solely by the EU members, it is important to make the key presentations and remote connection accessible to wider communities.

- ASAC has the following concerns:

    - Procurement of the hardware necessary for extending ATAC to 4x bandwidth as some critical components may soon not be available anymore for purchase. ASAC is interested to know whether a mitigation plan exists regarding this risk.

    - ASAC would like to have a more precise view of the WSU schedule and impact on future observing cycle schedules as it becomes available. It seems that Cycle 15 will be the most impacted. Communication about limited time for observations is essential for PI planning.

    - The WSU time line focuses on Milestones 1 to 3, until the full delivery of the signal chain and all current ALMA observing modes. Completing Milestone 4 (RADPS-ALMA software) and Milestone 5 (upgraded bands 6, 7 and 8, and 4x bandwidth

correlation and beamforming) is essential for getting the full benefit of the huge efforts put in the WSU. ASAC welcomes a presentation of RADPS-ALMA after the PDR is passed.

5. Providing comments on community initiatives regarding ALMA capabilities beyond ALMA2030 once a year (FALL).

Recommendations/issues:

- The community in the EU and EA regions are actively engaged in long-term planning for ALMA in the 2040's, carried out through regional workshops, establishment of working groups and grant applications. However, there is concern that the NA community has encountered unavoidable challenges in matching this progress. ASAC would like to communicate in the strongest possible terms the need for (and its enthusiasm to support) a planning strategy for NA. It is imperative that ASAC, the Board and the regions all prioritize facilitating and promoting these activities in their relative capacities.

- It is recommended that the Board support the inclusion of a dedicated "ALMA 2040" session at the next pan ALMA meeting in Taiwan (Feb 2027).

ASAC recognizes that planning for the future of ALMA needs to be driven by voices from the community, but that support for coordination/facilitation, and funding in many instances, is needed to support these undertakings.

Europe has already established a region-wide, coordinated initiative to plan for ALMA in the 2040's. Extensive information, as well as the timeline for the EU planning exercise, can be found on the Euro ALMA 2040 website: https://www.euroalma2040.com. In summary of the key components that have either already occurred or are imminent, we point to a workshop hosted in Heidelberg in May 2025, as well as a meeting at the Lorentz Centre (Leiden) that will happen in November 2025. Working groups have also been established, and there is an open call for participation. The ASAC is also aware of a supporting COST ACTION proposal to fund networking activities as part of this exercise, which includes co-applicants from other regions as well.

Community engagement is also underway in the EA region. Specifically, there was a workshop entitled "The ALMA Development Workshop 2024" held on October 8-9, 2024 at NAOJ, which discussed prospects for radio interferometry in the 2040s. There are plans for a second follow-up workshop in the EA community in 2026 which is envisioned to take the discussions further and explore more details of community technical preferences/science priorities.

The NA region also recognizes the importance of, and is enthusiastic to engage in, a regional community engagement/discussion exercise. Initial discussions within NRAO had identified a possible roadmap for how this might proceed, beginning with a series of facilitated Town Hall meetings. However, limits on activities and funding in the US have essentially stalled the NRAO's ability to take on a leading role. ASAC is also unaware of any Canadian activities towards ALMA in the 2040's. The lack of a NA community contribution in creating a vision for the next generation of ALMA is clearly a concern. ASAC discussed how NA community members might proactively enable this task, at least in its first steps, and to build momentum. For example, through sessions at national meetings (such as AAS and CASCA meetings). There may also be funds available within the NA community (i.e. to NA applicants/PIs) that could be used to support separate,

dedicated workshops, such as NAASC workshops (currently funding for this is suspended, but may be re-instated).

Separate from these regional updates, ASAC emphasizes that pan-executive discussions also need to occur in order to understand both common priorities as well as potential differences/incompatibilities. For example, the ALMA 2027 meeting to be held in Taiwan is an obvious venue for such a session. Ultimately, coordination across the regions that present a united vision will convey the strongest message.