ALMA BOARD

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Subject: ALMA Board Response and Charges to the ASAC for the first 2019 ASAC Meeting

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Purpose of Document: To provide the ASAC with its Charges for its 2019Q1 face-to-face meeting

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I. Board's response to the ASAC Report

The Board addressed the ASAC Report and thanked the Committee and its Chair, Stephen White, for a comprehensive and well-written report. The ASAC recommendations are very valuable to continuously strive to improve ALMA for the benefit of the world-wide community.

The Board welcomed the JAO's clarifications (through the Observatory Scientist) provided in response to the ASAC questions, which are also included in this written response from the Board.

The Board addressed the following specific issues (addressed recommendations from ASAC are in italics):

1. Charge 1: Assessment of the performance of ALMA scientific capabilities

ASAC strongly recommends that the project finds the small amount of funds necessary to upgrade the CDP cluster to 10Gb/s ethernet.

The Observatory agrees that the implementation of the CDP switch upgrade is important, especially in light of the upcoming Phase 1 of the correlator upgrade project. The JAO will investigate the proper timing of this specific upgrade compared to the overall roll out. The funds are identified as part of the upgrade project implementation and are in principle available on the timescale seen to be appropriate.

2. Charge 2: Assessment of the technical aspects of the ALMA system performance

ASAC welcomes the continued improvements in observing efficiency, as this remains a priority for the committee.

The JAO indicated that the Observatory will continue work on all of these aspects to improve the overall observing efficiency of the array and to maximize the amount of time available for PI science.

The Board noted the ongoing efforts to improve the spectral scans, including efficiency improvements to existing approaches and further efforts regarding differential gain calibration. A clear summary will be given to ASAC on the current improvements and the magnitude of future improvements (prior to CUP1 implementation, which will result in factors of several improvements in speed).

The Board would also like to ensure to the ASAC of the ongoing NA effort to identify potential improvements needed to CASA to reach required polarization specifications.

3. Charge 4: Recommendations of ways to maximize ALMA's scientific impact

ASAC notes that on the specific case of proposal 'resubmissions', the panel reviewers clearly feel that this adds significant extra workload. Changes in the grade A fraction would avoid some resubmission, but the analysis seems to suggest that this would affect only a limited number of proposals. ASAC would like to better understand this conflict between reviewer perception and the Observatory analysis.

Regarding the specific case of proposal 'resubmissions', the JAO pointed out that there were 272 Cycle 6 proposals classified as resubmissions, which represents ~ 15% of all submitted proposals. The breakdown by Grade is as follows:

Cycle 4 Grade A: 18 proposals
Cycle 5 Grade B: 98 proposals
Cycle 5 Grade C: 156 proposals

The majority of the resubmitted proposals are Grade C. Note that the reviewers typically do not know the grade of the previous proposal unless noted by the PI.

The ASAC had previously recommended that the Observatory increases the percentage of time allocated to Grade A proposals to 50% from 33%. In Cycle 6, this would have increased the number of Grade A proposals by ~72. Since 33% of the Cycle 5 Grade B proposals were resubmitted, it is expected the number of resubmissions to decrease by ~72 * 33% = 24 proposals if the Grade A fraction was 50%.

The Board noted that the observing queue is overscheduled in order to accommodate a range of observing efficiencies and weather conditions.

The Board discussed ways to maximize the scientific impact of ALMA, noting that the ASAC supports the efforts to reduce the reviewers' workload and address resubmission issue.

The Board noted that all reviewers should have flexibility on the terms they serve for the Proposal Review, although the Observatory will make it explicit for post-docs, as the junior reviewers tend to follow the rules more strictly.

The two additional questions added by ASAC to the reviewers' survey, in the opinion of the Science Committee, should keep going into the reviewers' surveys in the future. A recent report

posted by a member of the community on the Research Notes of the American Astronomical Society suggested that reviewers had a higher acceptance rate of proposals while serving on the review panels. While the observatory was not specified, the results appear to pertain to ALMA in Cycles 2-4. An analysis by the JAO showed that the ALMA reviewers in Cycles 2-4 did not have a higher acceptance rate as a result of serving on the review panels.

ASAC re-iterates the importance of making polarization capabilities available for the ACA stand-alone mode.

The JAO has not offered ACA polarization capabilities since the data cannot be pipeline processed. Timely data delivery to the community has received the highest priority, and adding additional manual modes, which typically take longer to reduce, would detract from the high-priority goal of delivering 90% of the pipeline data within 30 days of being fully observed.

The decision to offer ACA polarization capabilities can be re-evaluated for Cycle 8, depending on two factors. First, high frequency observations need to become a standard mode, which is a high-priority goal. Second, the data processing speed needs further improvement such that ALMA is comfortably within our target of delivering > 90% of pipeline processed data within 30 days. If both conditions are satisfied, it will be possible to offer ACA polarization capabilities in Cycle 8.

4. **Charge 5: Reporting on operational or scientific issues raised by the wider community as communicated by the three regional Science Advisory Committees (ANASAC, ESAC and EASAC).**

ASAC urges the ALMA Observatory to define and adopt a written, open policy for timely and proactive informing of the user community on any hardware or software issues, internal or external, that affect the data that is being and that has been released.

ASAC recommends a more rigorous evaluation of the CASA regression tests for ALMA data, in particular independent of the ALMA pipeline efforts.

ASAC recommends that ALMA revisit the guidelines for Large Programs in the Call for Proposals to ensure that PIs are aware of potential computational challenges, and that the feasibility of the management plan is carefully reviewed.

ASAC recommends that the Observatory develop a clear policy on the requirements for the public data-product deliveries from Large Programs.

ASAC recommends continuing the survey of Large Program PIs on a yearly basis to track PIs' satisfaction and to identify potential improvements of the Large Program implementation.

Regarding the errors in mosaic imaging discovered by a community member and the decision of the JAO to not inform immediately, the Board noted that the Science Committee is sympathetic to the concerns of the JAO but felt a more structured approach was needed. The Board endorsed that the community should not be warned about and alarmed by a problem until the true impact is known. The Observatory agrees with the ASAC that it is important for ALMA to provide timely information to the community when significant problems are found with the data or data products. The exact timing of the notification is a tradeoff between informing the community when a problem is first reported versus when the problem is

understood and mitigation strategies are in place. The Observatory will examine if a general policy can be established to address the ASAC's concerns.

The Board also appreciated that the Observatory is addressing the following issues highlighted by the ASAC:

The ALMA Deputy Director is in contact with CASA/NRAO to understand the CASA regression tests.

The Observatory Scientist and the Integrated Science Operations Team (ISOpT) will discuss the instructions in the Call for Proposals and make revisions as needed regarding the guidelines for Large Programs in the Call for Proposals to ensure that PIs are aware of potential computational challenges, and that the feasibility of the management plan is carefully reviewed.

ISOpT is developing a policy for data deliveries for the Large Programs that should be available soon for the PIs. The Observatory also passed to ISOpT the recommendation of continuing the survey of Large Program PIs on a yearly basis to track PIs' satisfaction and to identify potential improvements of the Large Program implementation.

5. **Charge 6: Assessment of the scientific impacts of the ALMA Development Program, and particularly of new projects that are proposed.**

ASAC endorses the completion of all aspects of CUP Phase 1, including those aspects that anticipate Phase 2.

Looking ahead to ALMA 2030, ASAC strongly encourages the ALMA project to outline/draft/design specifications for the next stages of ALMA upgrades as soon as possible, to coordinate the regions in order to most efficiently achieve these goals, and to plan a timeline under which these developments could be implemented.

ASAC recommends the ARI-L project as an EU development project.

The Board noted the recommendations from the ASAC and the points highlighted by the JAO, specifically that there have been no requests to descope any aspect of the CUP Phase 1 requirements.

The technical specifications for the ALMA Development Roadmap need to be developed in as timely as manner as possible. In the interest of matching the development effort with the available funding lines, considering the availability of system level staff, the ALMA Management Team and the ALMA Director decided to prioritize an update of the requirements for the related to the Front End and Digitizer subsystems. The requirements related to other subsystems, e.g., back-end, data transmission, correlator, will be updated similarly as and when resources allow, ideally concurrently with the front end and digitizer requirements. A requirement upgrade team has been appointed to reach out to the detector and digitizer technical communities, formulate updated requirements for these subsystems balancing expectations for future performance in the next 5 years against practical restrictions of the ALMA system, optimize these requirements against scientific motivations and trade-offs, present them for external review, and finally seek approval for implementation.

The ASAC recommendation to approve the ARI-L Small development Project has been noted by the ALMA Director, who approved it in December 2018.

6. Ad-Hoc Charges

- **Science cases for joint observing proposals between ALMA and other facilities, especially JWST.**

[W]hile ASAC does not identify any science cases to justify the need for joint proposals between ALMA and JWST at present, it will be appropriate to revisit this question once JWST is taking data.

Both the Board and JAO were extremely interested in this discussion and thanked the ASAC for their input.

As a practical note, the JAO pointed out that if ALMA ever decides that it wants to offer Joint Proposals, these proposals will need to be flagged in the OT so that they can be suitably processed. Therefore, the decision to offer Joint Proposals will need to be finalized a year in advance of the start of the Cycle when they would first be offered. The JAO would need additional time to negotiate the logistics of the call with the participating observatory, so realistically one would need to start implementing Joint Proposals at least ~ 18 months before the relevant cycle begins. Therefore, if one waits for the JWST to start observations, it will be well into the JWST mission before Joint Proposals could be offered.

The Board noted that NA will continue to explore the possibility to enable joint proposals for JWST+NRAO facilities, including ALMA, using the Open skies observing time and that ESO is exploring enabling joint VLT-ALMA proposals, although the compatibility aspects, like proposal review processes, are still the main constraint.

Based upon the recommendation of the science committee, the Board requested that the ASAC seek additional community input to identify compelling science cases that might benefit from joint observations between ALMA and other facilities, especially the James Webb Space Telescope.

- **Ways to further engage the community in proposing high frequency observations**

Since the lack of strong calibrators is an impediment for completion of high-frequency projects, ALMA should continue to prioritize band-to-band calibration and other improvements with the goal of offering Bands 9 and 10 as standard modes in Cycle 8.

ALMA should continue to promote B-ranked high-frequency proposals ahead of A-ranked low frequency proposals when the weather conditions are appropriate.

Press releases advertising exciting high-frequency ALMA observations should be sought.

ALMA should further investigate the pros and cons of basing the queue-building process on a less optimistic weather scenario.

The Board discussed the JAO input, especially that offering band-to-band calibration and establishing Bands 9 and 10 as standard modes are high priority tasks for the Observatory on a timescale of Cycle 8. The Observatory will continue to promote B-ranked high-frequency proposals ahead of A-ranked low frequency proposals when the weather conditions are appropriate.to follow this procedure.

The JAO EPO department has developed a communications strategy regarding the large programs results. The JAO agrees that this can be effective in highlighting high frequency capabilities, as long as the quality of the science in the press releases are not compromised. The JAO will explore the consequences on the queue building exercise, especially for Band 9 and 10 programs, if we assume less optimistic weather scenarios.

The Board stressed the importance of advertising remarkable high frequency observations to encourage these proposals.

- **The pilot program for a distributed review model**

ASAC recommends testing the Distributed Proposal Review (DPR) process via a direct comparison of ACA-only proposals submitted to the Cycle 7 main call, and included in the ACA-delta review as a test sample.

The quality metric is then the comparison of the rank order of the proposals common to Cycle 7.0.

Since the ACA-delta test provides just one data point, ASAC also recommends a direct DPR-APRC parallel-comparison of a subset of proposals in Cycle 8.

ASAC proposes that demographic results for the ACA-delta call will serve as a metric for fairness, while a reviewer survey should serve as the metric for transparency.

ASAC recommends maximizing the total number of reviewers per proposal for the delta call to test the DPR.

ASAC recommends that the Observatory designs and defines the evaluation metrics before the delta call process starts.

ASAC recommends that the Observatory make all efforts to learn from experience in any previous implementations of DPR.

ASAC would like a report on progress towards the DPR test with the delta call at our next face-to-face meeting.

The Board noted that this topic will be a continuing discussion. The ASAC suggests that the primary quality assessment is the *relative* difference between the rankings from review panels and distributed peer review, although it remains to be seen large a difference between the two systems' rankings would be considered acceptable to the community and to ALMA. This comparison has been discussed previously within the JAO and also by the Board Science Committee in April 2018, but it was noted that this metric only implies that there is a difference

in the rankings, not that one approach is “better” or “worse”. The Board agrees with the ASAC that the developing an absolute metric is difficult.

The Board also noted that the JAO will share experiences and requirements with ESO, who is investigating this same issue for its own proposal review process. The Observatory Scientist indicated that the ESO report will be out early next year and will be used to design the ALMA process. Some points of consideration for the distributed review system:

- Reviewers will have the ability to say decline to assess a particular proposal if they have a conflict of interest.
- The larger number of reviewers per proposal relative to the current system will minimize cases where a final ranking can be determined by a single, persuasive reviewer. Dropping the highest and lowest scores for each proposal in the distributed proposal review will further mitigate this effect.
- A Query will go out to PIs for quality of feedback on their proposals and difference from main call.

The Board noted and welcomed the preparations of the pilot program for the ACA supplemental call in October 2019, also including success metrics, which will be addressed by the ASAC and the JAO.

The Board stressed the importance of keeping an open mind about the distributed proposal review model, both for budgetary and practical reasons. The main metric to assess the success of the supplemental call has to be the quality of the feedback to PIs. ALMA has to ensure the process is fair and that the feedback is objective and not offensive.

II. New ad-hoc charge recommended by the Science Committee

The Board requested that the ASAC:

1. Seek additional community input to identify compelling science cases that might benefit from joint observations between ALMA and other facilities, especially the James Webb Space Telescope.

III. Other ASAC matters

The Board is happy to inform the ASAC that the following new ASAC members have been appointed to serve for the next three years:

- Kotaro Kohno to be reappointed for the experience and extensive knowledge of ALMA he brings to the ASAC.
- Anne Dutrey, to be appointed due to her strong track record in circumstellar disks and experience in observatory operations.
- Mario Tafalla, to be appointed for his strong track record in star formation.