

ASAC Report to the ALMA Board

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General considerations

The ASAC face-to-face meeting was held at NRAO's Charlottesville facility, on October 18 and 19, 2018, with all ASAC members present (Roberto Neri remotely via videoconferencing). In addition, Observatory Scientist Dr. John Carpenter and Deputy Director Dr. Stuartt Corder were present, as well as the three regional Project Scientists (Drs. Daisuke Iono, Leonardo Testi and Al Wootten). Local NAASC staff that participated included Dr. Phil Jewell, Dr. Anthony Remijan, and Dr. Crystal Brogan (NRAO). This was likely the last ASAC meeting for Leonardo Testi, who is being replaced as EU Project Scientist by Franciska Kemper.

Since the last face-to-face meeting, Eva Schinnerer's term as chair has ended, and the Committee would like to thank her for her hard work, dedication and attention to preparation, and in particular for working with John Carpenter to establish the current process. Stephen White has been approved by the ALMA Board to serve as ASAC chair, with Kotaro Kohno appointed as the EA deputy chair, and Kirsten Knudsen as the EU deputy chair. In addition this may be the last ASAC meeting for EU members Neri and van Langevelde, and ASAC thanks them for their invaluable service.

ASAC appreciates the timely delivery of all the documentation and presentations for this meeting prior to the meeting itself, which aids in ASAC's preparations and, when possible, gathering of feedback from the regional SACs. It also allows ASAC to determine which areas need more attention in their discussions, improving the efficiency of the face-to-face meeting. The clear responses from both the JAO and the ALMA Board to the ASAC report from the previous meeting were also welcome; such clarity allows ASAC to better understand the concerns involved and to provide meaningful advice.

John Carpenter presented a summary of recent science highlights, including the spectacular gallery of protostellar disks from the large program, showing the overwhelming prevalence of rings and gaps. ASAC was pleased to see confirmation of the success of the VLBI observations through the detection of structure in a calibrator at the tens-of-microarcsecond level. ASAC continues to be impressed by the release of wonderful science justifying the promise of ALMA's capabilities, and congratulates ALMA on reaching the landmark of the 1000th paper.

ASAC would like to thank NRAO-CV/NAASC for hosting the meeting, and NRAO staff, particularly Katelyn Sevin, Tony Remijan and Phil Jewell, for their support of the meeting. This support was essential for remote participation and the smooth running of the face-to-face meeting.

Permanent Charge #1. Assessment of the performance of ALMA scientific capabilities: The ASAC shall indicate what information is required from the Joint ALMA Observatory (JAO) to perform this assessment.

Recommendations:

- ASAC endorses the overall plan of the EOC activities for Cycle 7 presented by JAO.
- ASAC strongly recommends that the project finds the small amount of funds necessary to upgrade the CDP cluster to 10Gb/s ethernet.

ObsMode process. ASAC appreciates the detailed planning approach that has evolved for the ObsMode process, including the formalized schedule, aimed at achieving the EOC priorities for Cycle 7 presented by JAO. ASAC supports the prioritization presented and is happy to see the good progress made to achieve the highest priority items, including particularly capability for Band 7 observations in the most extended configurations, polarization tests, and spectral scans. Also, ASAC was happy to see that the EOC plans include band-to-band calibration for high frequency observations, as this provides a step in the direction of offering standard-mode Band 9+10 observations in Cycle 8 which may help to produce more high-frequency science (discussed further below in our response to Ad Hoc Charge #2). ASAC looks forward to seeing the implementation of the new Cycle 7 capabilities in the upcoming call for Cycle 7 proposals.

Extension and Optimization of Capabilities (EOC). EOC efforts are the route by which the new capabilities are commissioned, but EOC seems to have received low priority at the telescope in recent years. This results in delays in testing capabilities (such as the number of solar features that appear as “no-go” in the Cycle 7 ObsMode list). ASAC therefore welcomes the appointment of Eric Villard to coordinate EOC activities, and ensure that they receive the attention of AoDs at the telescope necessary for EOC activities to be carried out in a timely fashion.

Data rates. One of the items noted in the EOC report is that the CDP cluster can only write data one-tenth as fast as the baseline correlator. The cluster can apparently be upgraded to 10 Gb/s ethernet for around \$10k. For such a small amount this seems like an obvious thing to do, and ASAC strongly recommends that the funds be found.

Spectral scans. ASAC welcomes the news that a more efficient calibration procedure has been implemented that will speed up spectral scans. ASAC is informed that the data-rate limit imposed by the OT due to hardware restrictions will not impact the use of efficient spectral-scan modes for normal use cases. Data rates could become an issue once CUP Phase 1 is implemented, with the possibility of 8 times as many channels, and ASAC is happy to hear that the Observatory already has plans to address this issue.

Permanent Charge #2. Assessment of the technical aspects of the ALMA system performance: ASAC shall indicate what information is required from the JAO to perform this assessment.

Recommendations:

- ASAC appreciates further efforts to mitigate the impact from future snow storms.
- ASAC welcomes the continued improvements in observing efficiency, as this remains a priority for the committee.
- ASAC supports the efforts by JAO management to verify that VLBI agreements on data releases are implemented in view of future observing campaigns.

System performance. ASAC noted that the observatory concluded Cycle 5 with a satisfactory completion rate and total hours observed, despite two periods of severe weather. The recovery after snow storms was less complicated this year, because the array was in compact configurations. In view of this it is necessary to continue with developing ways to recover from storms, and ASAC appreciates JAO's attention to this effort. It was particularly good to see the strong completion statistics on the large programs. ASAC is also encouraged by the reported release times for data to reach the users, which are close to the target values, and by the news that tests show that the computational side of pipeline processing can largely be moved to JAO without stressing resources, as planned.

Efficiency. ASAC was happy to see the success of ALMA in improving the Observatory's overall observing efficiency. It also appears that the transition to data processing in Cycle 6 has proceeded with much less disruption than was seen at the outset of Cycle 5. ASAC commends the Observatory for having all 66 antennas available for observing when Cycle 6 started. Improved efficiency results in both more time for science observations as well as capability development and maintenance activity, and remains a priority for ASAC. We note that a number of items in the EOC document (e.g., all-sky survey mode, dynamic adjustment of calibration scan length) will further improve observing efficiency.

TP observing. The Total Power array time observed in Cycle 5 was significantly below target. ASAC was informed that this was anticipated due to the use of Total Power dishes in the long-baseline campaigns, resulting in TP data missing for a fraction of projects. ASAC welcomes the plan to complete Total Power array measurements for grade-B proposals with completed ACA observations.

VLBI campaigns. ASAC received detailed reports on the participation of the observatory in the VLBI campaigns in Cycles 4 & 5. ASAC is very glad to see the success of these campaigns, and it is clear from these reports that ALMA is living up to the expectation of being a key element for mm-VLBI. ASAC was informed about further development and in particular the Band 7 testing. It is clear that ALMA staff recognize the importance of living up to the agreements on making these results accessible and public in the future. It was deemed that the situation for release of the 3mm VLBI data is in good shape, but the 1mm VLBI data release needs follow-up. ASAC commends the Observatory for pursuing a resolution of this issue, and regards it as a necessary step for continued collaboration in these efforts.

Vertex antenna astigmatism. ASAC asked for an update on the effort to remediate the astigmatism in the Vertex 12m dishes. There is now a tested procedure to adjust the Vertex antennas actively by applying

heating strips, and the project is confident that this approach will work. ASAC looks forward to implementation of this plan and hopes that it will be successful in dealing with the issue.

Permanent Charge #4. Recommendations of ways to maximize ALMA's scientific impact: This includes review of the scientific effectiveness of the Proposal Review Process after each Proposal cycle.

Recommendations:

- ASAC supports the changes to the review process proposed for Cycle 7, and in particular efforts to reduce reviewer workload.
- 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.
- ASAC encourages the Observatory to be more restrictive in the enforcement of the font size rule in proposal submission in order to ensure a fair assessment process.
- ASAC recommends that the rules and guidelines for the ACA stand-alone Supplemental Call in Cycle 7 should be spelled out by the time of the announcement of the main Cycle 7 Call for Proposals.
- ASAC re-iterates the importance of making polarization capabilities available for the ACA stand-alone mode.

Cycle 6 proposal review. ASAC reviewed the report from the APRC Chair Masao Saito on the Cycle 6 review and the results of the survey of the APR panel members. The Chair's report contains a number of suggested improvements, and ASAC found that these suggestions would likely improve the process. The Observatory Scientist provided a list of changes that are already planned for Cycle 7, including an increase in the number of panels (with fewer reviewers per panel) in order to reduce reviewer workload, and changes in the presentation of the author list to try to minimize the chance of bias. ASAC approves of these changes.

On the question of workload, ASAC suggests adding two additional questions in the APR assessor survey: (a) If panel members prefer the current model of three consecutive years, or would prefer to serve every other year; (b) How useful do they find the stage 2 process?

Reviewers also complain that proposals do not always follow the requirements on font size, which is an issue both for reviewer workload as well as fairness: ASAC recommends that JAO take actions necessary to address this issue, such as the rejection of proposals that fail to meet the requirements.

Resubmissions of grade B+C proposals accepted in the previous cycle was also highlighted as an issue by APR panellists. Ways to address this were discussed, e.g., increasing the fraction of proposals awarded grade A, but an analysis by the Observatory suggests that increasing this fraction to 50% would only have

reduced resubmissions by 24 proposals. Other actions have been contemplated such as assuming more realistic weather conditions in generating observing queues. ASAC recommends that JAO continue to seek ways to reduce the effect of resubmissions on panellist workload.

Demographics. ASAC reviewed the demographic statistics provided from the Cycle 6 outcomes. Regional balance at the grade A level has now been assured in the time allocation process. At first glance there appears to be a difference in gender success in the upper quartile of grades for NA and EA regions, which would diminish the allocation of observing time to female proposers. ASAC asked the Observatory Scientist for further analysis. This showed that the difference was statistically marginal, albeit possibly at the 2σ level for EA, and likely affected by the difference in experience levels between male and female proposers. Ideally the difference in experience levels will diminish over time, and we hope to see gender differences correspondingly small. ASAC appreciates the continued efforts on monitoring the demographic statistics, and welcomes the foreseen change in the Cycle 7 review to remove the first names and present the proposer names in a random order.

Large Programs. While the Large Programs are proving very successful, there has been a gradual decrease in the number of Large Program submissions. This could be the result of small-number statistics, but other causes were also discussed, such as the fact that the proposal must be designed to be completed in one cycle, and the possibility that proposers do not wish to make the extra effort needed to prepare such a proposal. ASAC suggests that this should continue to be tracked. ASAC notes that no Large Programs for ACA stand-alone were submitted, and suggests that JAO encourages the community to explore this capability.

ACA stand-alone supplemental call in Cycle 7. ASAC received information about the plans for the ACA stand-alone supplemental call for Cycle 7. The supplemental call seeks to increase the number of ACA proposals - and thereby scientific quality - as well as provide an opportunity to test the “distributed peer review model” (see Ad Hoc Charge #3). ASAC recommends that the rules and guidelines regarding this supplemental call be clearly spelled out with the announcement of the main Cycle 7 Call for Proposals, e.g., potential proposers may wish to know that the intention is to schedule ACA grade-A+B projects in the main call, while successful proposals from the supplemental call would be scheduled as grade C. To follow up on the process, ASAC would like to receive information after the call regarding how many proposals are resubmissions from the main call and how many are new submissions in order to understand if the supplemental call has indeed increased the number of scientifically interesting proposals.

Polarization observations with ACA. ASAC continues to emphasize the importance of making polarization capabilities available for the ACA in stand-alone mode. This will help to generate scientifically strong proposals for ACA, and would be expected to increase the number of ACA stand-alone proposals submitted.

Permanent 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).

Recommendations:

- 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.

CASA mosaicking issues. An ALMA user reported issues with mosaic imaging in CASA that were made public just before the ASAC meeting. The issue itself was discussed at the meeting, as was the process undertaken by the Observatory in deciding when and how to inform the community of the issue. The Observatory chose to delay announcement for a fixed period to provide time to better understand the cause of the problem and implement the necessary fixes. While ASAC understands the reasoning for the decision to wait to inform the community at a stage where the problem was understood and solved, at least in part because it was significant only for a small fraction of projects, nevertheless, it ran the risk that papers containing incorrect results could have been submitted during this delay. ASAC feels that earlier informing of the community could have been beneficial as this would allow the affected scientists to evaluate the impact of the issue(s) for their projects.

The problem arose because of the use of incorrect primary beam models in CASA, and a truncation of the gridding of the primary beam implemented in later versions of CASA. These issues are believed to have been corrected in CASA 5.4. ASAC learnt that issues had shown up in regression testing of CASA versions but that they were not followed up, which is unfortunate since they may have revealed the problem sooner. ASAC feels that a more rigorous evaluation of the CASA regression testing for ALMA data should be established to ensure that issues affecting the data quality are caught early on and, hopefully, before a new version of CASA is released to the community.

Further ASAC urges the ALMA Observatory to define a policy that allows for a timely and proactive informing of the user community on any hardware or software issues, internal or external, that affect released data and conclusions drawn from them. Publication of this policy is recommended to ensure that the community continues to trust that the Observatory will inform them of potential issues that affect their data.

Helpdesk related issues. ASAC notes that the fraction of projects requesting proprietary period extensions may have dropped across the regions, but the rate of requests from EU PIs is still significantly higher than from other regions. A much higher number of extension requests than in the past are now being rejected, many of them asking for extensions for datasets that seek to combine 12m and ACA (7m and/or TP) data which are explicitly excluded. ASAC would like to better understand the reason for this practice and would appreciate a short explanation by the Observatory Scientist of the reasoning for this class of decisions at its next face-to-face meeting.

Large Program PI survey. ASAC received a summary of the results of the survey of PIs of Large Programs in Cycles 4 and 5 and notes that all PIs provided feedback. ASAC would like to highlight the overall happiness of PIs with the Large Program process and that no major issues were identified in the survey. The committee notes that the public data products that should be delivered by the active Large Programs are not codified and need to be laid out. It is also helpful to proposing PIs to have the requirements clearly defined. ASAC therefore looks forward to seeing a policy describing the public data products expected to be delivered by ALMA Large Programs.

Given the fact that some PIs of active Large Programs noted a struggle with the data processing, it might be good to request more details in the management plan to ensure that PIs are aware of potential challenges in this area. ASAC suggests that ALMA revisit the requested information on the management plan, potentially adopting a more structured requirement, and ensure that a technical review of the management plan be carried out.

Raw data release pilot project. ASAC was informed of the start of the “raw data release pilot project” and notes that there is interest by some of the PIs contacted in receiving raw data, however, it is still early in the process. ASAC is looking forward to seeing the update on this initiative at its next face-to-face meeting.

ALMA press releases. ASAC received a short presentation on the process by which ALMA press releases are generated. The process differs slightly between the different regions and JAO, with press releases from the regions ultimately being up to the discretion of the regions themselves.

Permanent Charge #6. Assessment of the scientific impacts of the ALMA Development Program, and particularly of new projects that are proposed.

Recommendations:

- 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.

Phase 1 Correlator Upgrade Project. ASAC is pleased to see that Phase 1 of the correlator upgrade project is proceeding on schedule. We continue to support the completion of the full scope of the proposed project, including all aspects that prepare the correlator to be ready for possible future bandwidth-doubling (e.g., allowing doubled clock speeds on the correlator chips, new tunable filter banks). ASAC also notes that it has asked previously for a full system analysis of the impact of CUP. While JAO has assessed the observatory-wide consequences of Phase 1 of the correlator upgrade, we note that if in the future a proposal to proceed with Phase 2 is made then further evaluation of the full impact of the additional developments involved will be needed.

The discussion of anticipating CUP Phase 2 revealed some internal uncertainty within the project of the value of doubling the bandwidth at a time when even wider bandwidths are being discussed. This internal debate underscores the need for ALMA to outline/draft/design specifications for the next stages of ALMA development as soon as possible. Such specifications are needed to guide the regional development processes and ensure timely progress toward ALMA2030 capabilities. It is also important to create a timeline under which these upgrades could proceed given the pace of ALMA development and the availability of funds so that conflicts between developments and the scope of variants of those developments can be evaluated in the context of ALMA2030.

ARI-L Development Project. ASAC reviewed the revised version of the Additional Representative Images for Legacy (ARI-L) project put forward for funding as a European development project and recommends that it proceed. This re-reduction of Cycle 2-4 data sets would add value to the archive by providing access to QA2-like reference images, and by generating calibrated measurement sets whose production might otherwise require individuals to install outdated versions of CASA that may not be interoperable with modern operating systems. At present the ARI-L team is promising to store the calibrated visibilities for 3 years at the Italian ARC node. We recall that ASAC has consistently been emphasizing the value of calibrated visibility datasets to users for some time now, and would like to see them made available through the archive.

The Japanese Virtual Observatory (JVO) is proving to be a popular tool for ALMA archive searches and we urge the ARI-L team to ensure that the image products they produce can be ingested into JVO in the same way that QA2 products can be. We also encourage the team to continue to engage with the imaging pipeline team both to benefit from any improvements in the pipeline and to ensure that their delivered products are consistent with any future changes to the pipeline data products. We note that it would have aided ASAC's discussion of this project if the results of the technical feasibility analysis that the ALMA management team is undertaking were available. There is a question of whether the ARI-L team have access to the computing resources that they will need, and this may be an issue for EU to address in the future.

Regional development plans. Brief reviews of the highlights for each of the regional development efforts were presented and discussed. Many of these do look ahead to ALMA 2030. EA is looking at ultra-wideband SiS junctions that show excellent system temperature properties. NA is studying a Band 6

receiver with much wider IF bandwidth and improved noise characteristics. Data for the study of the full-field polarization primary beam models has been taken, although it may have to be repeated due to poor weather. We note that the beacon transmitter, which will help with such efforts, is still under construction, but that upgraded hardware with both Band 3 & 6 transmitters has been delivered by NAOJ. EU continues to work on the Band 2 receivers with a number of collaborators, and is exploring partnership with the VLT in order to obtain a 100 Gb/s connection to ALMA. Apart from the request for better coordination towards ALMA 2030 expressed above, ASAC continues to be impressed by these efforts.

Ad-hoc Charge #1. The ASAC should identify the main science cases that would require joint observing proposals between ALMA and other facilities, especially JWST.

At a superficial level it would seem that this should be a simple request. We note that 3 of the 4 top-level JWST science goals overlap with high-priority science for ALMA. High-redshift galaxies are an obvious area of synergy, particularly between the MIR capabilities of JWST and the high-frequency capabilities of ALMA for probing their spectral energy distributions. Similarly, observations of protoplanetary and circumstellar disks will benefit with data from both observatories. The relatively short lifetime of JWST (nominally 5 years, of which 6 months coincide with ALMA downtime for the CUP upgrade) would also seem to argue for allowing joint proposals between the two observatories. ASAC notes that students and postdocs, in particular, would benefit from the certainty involved in having research that required both telescopes approved in a single proposal.

However, despite extensive discussion, ASAC was unable to come up with truly compelling science cases that could not be handled by the usual proposal avenues, given that ALMA is effectively far ahead in targeting the types of sources discussed above and JWST will be playing catch-up, at least in the early years when JWST proposals are likely to target sources that have already been observed by ALMA. The types of science where joint observing proposals seemed likely to be most important, such as time-critical events or transients such as gravitational-wave sources or gamma ray bursts, can already be handled via ToO and DDT proposals.

On the other hand, the JWST GTO observations will cover a lot of targets and it is quite likely that new sources or classes of source will be identified for which further follow-up with both ALMA and JWST together would be beneficial. Therefore, while 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.

Ad-hoc Charge #2. The ASAC should suggest additional ways to further engage the community in proposing for high frequency observations.

Recommendations:

- 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.

ASAC discussed the reasons for the disappointing number of high-frequency proposals, which was again an issue for Cycle 6. We addressed the question of which is more discouraging for a proposer: to be declined at the proposal review stage, or to be approved but not to receive any data? A number of PIs have been in the latter situation for a number of cycles in a row, and the committee feels that the resulting discouragement is likely to be a factor when the same teams consider what proposals to submit in the future. While everyone should recognize that the low completion rate for A- and B-ranked high-frequency proposals is primarily a consequence of weather conditions, that does not lessen the psychological impact on PIs.

ASAC discussed the impact on proposers of the fact that Bands 9 & 10 are not standard modes. This is largely due to the lack of well-distributed strong high-frequency calibrators, and ASAC prioritises development of band-to-band calibration that may help with this issue. ASAC notes that by offering Band 8 as a standard mode, ALMA was able to increase significantly the number of ACA stand-alone proposals for Band 8, even though the number of 12m Band 8 proposals did not increase as a fraction of the total number of 12m proposals. Given that the net result was an increase in the number of Band 8 proposals, this suggests that an increase in Band 9/10 proposals may result if those bands are offered as standard modes, and provides a strong incentive to push forward, with high priority, to make the improvements needed. Completing this transition in time for Cycle 8 should continue to be a very high priority for ALMA.

ASAC agrees that the real-time scheduling processes currently implemented at the telescope are appropriate to improve completion rates for high-frequency proposals. In particular, the decision to promote B-ranked high-frequency proposals ahead of A-ranked low-frequency proposals in Cycle 5, when warranted by weather conditions, seems very appropriate and should be continued. There was no strong support within ASAC for the idea of changing the procedures so as to promote C-ranked high frequency proposals ahead of B-ranked low frequency proposals. Similarly, selecting high-frequency projects outside of the normal proposal review process seems unlikely to produce better science outcomes.

Another step taken by the Observatory to approve high-frequency projects is the use of “5% outlier” good-weather year template when queue building. However, this ties in to the discouragement felt by users who are approved but never get data. ASAC feels that by approving many more high-frequency proposals than can be realistically scheduled in a typical year, ALMA may be “over-promising” without appreciating the level of discouragement among potential high-frequency proposers. Based on this, ASAC suggests that ALMA should investigate the pros and cons of basing the queue-building process on a less-optimistic weather scenario. ALMA should explore whether there is a method for proposal evaluation, queue-building, and real-time scheduling that simultaneously (a) ensures sufficient supply of high-frequency projects for even “5% outlier” good-weather years, and (b) avoids “over-promising”.

ASAC urges ALMA to continue highlighting the most exciting high-frequency results via press releases.

Ad-hoc Charge #3. The ASAC should begin to discuss the proper metric to measure the success of the distributed proposal review model pilot, currently slated for the October 2019 ACA delta call (Cycle 7.5).

Recommendations:

- 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.

Following extensive discussion, ASAC reached a consensus that no metric for the success of Distributed Proposal Review (DPR) can be developed without comparison with the traditional peer-review process. While the latter can certainly be criticized, it remains the gold standard and has the acceptance of the community. Therefore ASAC feels strongly that the ideal way to measure the success of DPR is to compare DPR directly with the results of the main APR review. ASAC recommends two possible ways to do this comparison, originating from a suggestion by the project, noting that both could be used in the delta call: i) resubmit the A+B graded ACA stand-alone proposals accepted in Cycle 7 to the delta call, purely as a test with no impact on their accepted status; ii) evaluate the relative rankings of proposals that

were unsuccessful in Cycle 7 and that were re-submitted to the delta call. For both sets of proposals, the relevant metric is how well their relative rank order from Cycle 7 is reproduced by the grades of the delta call. ASAC notes that if the Observatory is going to use option i), then it is important that the abstracts of the successful Cycle 7 ACA proposals are not published on the website until after the delta call review is completed so that DPR reviewers cannot identify them as resubmitted proposals.

Since such a comparison for the ACA Stand-alone call provides just one measurement, ASAC also recommends that the Observatory carry out a direct comparison of the DPR with the standard proposal review in Cycle 8 for a subset of all the proposals (not just ACA-stand-alone) submitted to that call.

The Observatory Scientist has suggested that the metrics for “success” should focus on three areas: *quality*, *fairness* and *transparency*. ASAC agrees with this approach. The analysis described above addresses the metric for *quality*. The other two foci are more straightforward. *Fairness* implies that success should not depend on gender, ethnicity, or background, and this can be determined using analysis of the demographic statistics that the Observatory traditionally collects to assess whether there are undesirable trends compared to the main review. *Transparency* refers to acceptance of the process, and can be measured by a suitably-phrased survey of the reviewers, who in this case are also the proposers. One aspect of this metric is whether PIs feel that the quality of reviewer feedback is satisfactory, and in particular that comments are not perceived to be personally offensive, since it is not currently expected that DPR will have a panel ensuring that the comments sent back to the PIs are appropriate.

The following points should be considered by the Observatory in preparation for the DPR of the proposals submitted to the delta call:

- It is important to maximize the total number of reviewers per proposal, which allows for a more accurate investigation of how the accuracy of the mean grades depends on the number of reviewers, and for a better “jack-knife test” of the proposal grades by dividing the reviews into two equal samples. Additional reviewers could be sought for among existing APR members (although this has the risk that they recognize the test proposals from Cycle 7.0), or each proposal could be asked to provide 2 reviewers instead of 1 for this initial test.
- The Observatory should take into account conflicts of interest in selecting peer-reviewers for the delta call.
- The Observatory should continue to learn from previous and ongoing efforts at DPR, such as at Gemini, at ESO, and as described in Merrifield & Saari (2009).
- There was discussion on the committee as to whether DPR offers obvious opportunities for manipulation, e.g., submission of a large number of proposals by a single team who could then influence the scores on competing proposals. The Observatory should be prepared to identify and address any such manipulation.

It is critical that the Observatory designs and defines the evaluation metrics before the delta call process starts. ASAC believes that two additional important metrics are “Acceptance of the results of the DRP process by the community” and “Percentage participation by the proposal teams in the DRP process”.

ASAC thinks that one more iteration with the Observatory on the DPR process would be beneficial. The JAO should report progress on plans for the DPR of the delta call at the next ASAC meeting.

Future configuration plans.

Recommendations:

- On balance, ASAC continues to prefer the 2-year cycle of the configuration plan.
- This will need to be revisited in the near future to reflect growing interests and demands from the ALMA user community.

While not a charge for this meeting, ASAC welcomed a presentation by the Observatory Scientist of his (current) conclusions and plans for future configuration cycles, explaining the motivating drivers for his decisions (e.g., satisfying both operational constraints to minimize antenna moves and science priorities expressed by ASAC and the Board). ASAC greatly appreciates the Observatory Scientist's efforts towards revising the array plans, which mitigate the risk of losing a configuration due to bad weather, and increase PI science time by avoiding a month-long major reconfiguration in May. While there was a spread of opinion on the committee, the majority of ASAC continues to prefer the 2-year cycle because of the faster turn-around time, which is essential for finishing carry-over projects and student/young postdoc projects in a timely fashion. ASAC recognizes the disadvantage of the 2-year cycle in the lack of the most compact configurations during the best-weather period (June to August), which impacts high-frequency science associated with Galactic plane sources. However, ASAC believes that having the highly weather-dependent C-10 configuration, which is one of the unique capabilities of ALMA, just once every 3 years as in the proposed 3-year cycle constitutes a significant risk to the high-impact, high spatial-resolution science that requires the most extended configuration. ASAC feels that this development would likely be criticized by the community.

The choice of configurations will likely need to be revisited in the near future to reflect the changing capabilities of ALMA and changing interests and demands from the ALMA user community. New receiver bands and new capabilities such as improved high-frequency calibration could have an effect on proposal pressure as a function of frequency, baseline length and LST range. Thus, the 3-year cycle plan may be perceived as more attractive in the near future, particularly when Band-9/10 becomes a standard mode.