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**PRINCIPLES
OF
THE ALMA PROPOSAL REVIEW PROCESS**

ALMA TAC Subcommittee

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Approved unanimously by the ALMA Board

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Summary

There will be a single proposal review process for ALMA to assign the observing time of the ALMA Partners and Chile, in order to optimize the scientific impact of ALMA. The JAO Director is responsible to the Board for implementation of the ALMA time allocation process, and the details are described in a companion document.

The Joint ALMA Observatory (JAO) through the ALMA Regional Centers (ARCs) will issue the call for proposals, initially once per year.

The ALMA proposal review process will proceed in four stages:

- 1) Written Science Assessment by ALMA Science Review Panel (ARP) members and Technical Assessment by JAO and ARC staff, to be made available for ARP panels when they meet. The technical assessors will comment on the ability of ALMA to accomplish the desired scientific objectives.¹
- 2) Meeting of science category-based ALMA Science Review Panels (ARPs), which will provide a ranked list from each panel based on scientific merit only.
- 3) Synthesis of the rankings from each panel into an overall ranking by the ALMA Proposal Review Committee (APRC). This committee recommends projects to be submitted to the observing queue, considering distribution across right ascension (RA), frequency, weather, etc. It also recommends resolution of duplications or overlaps.
- 4) Actual formation of the observing queue involves technical feasibility issues and would be handled by the Head of Science Operations under the JAO Director. The scheduling of the projects on the observing queue will account for the shares of time for each region such that there is a cutoff for projects that would exceed the shares of any region, allowing for completion of projects already started. The observing queue will be sent to the Directors Council (DC) and a representative of Chile for concurrence before implementation.

1 Principles of Assigning ALMA Observing Time

The overarching goal is to optimize the science impact of ALMA; therefore proposal prioritization will be according to scientific merit, while assuring each region receives its share of observing time. ALMA is an international partnership and differences that may arise in the ALMA PRP will be resolved based on mutual respect among the ALMA partners and Chile.

¹ Most problems are expected to have been caught beforehand by the Observing Tool (ObsTool) in the proposal validation stage.

The ALMA observing time of the Partners, administered by the Executive Observatories (ESO, NRAO and NAOJ, on behalf of Europe, North America and East Asia, respectively) is in proportion to the Value contributed towards ALMA construction by each Partner, and Chile as host receives 10% of the available time. In general, the three Partners and Chile will be treated identically, as four separate regions, for the purposes of time assignment.

Therefore, the shares of the observing time among the four regions are as follows:

- 33.75% for Europe (EU)
- 33.75% for North America (NA)
- 22.5% for East Asia (EA)
- 10% for Chile

2 Proposal Types

Standard Proposals and Large Proposals: There will be no explicit limit to the size of a project. **Projects over the equivalent of 100 hours of observing time will be considered Large Projects for the purposes of time charging among the regions. They will be evaluated in the same way as smaller projects, taking into account their overall scientific value given their cost in time.**

Targets-of-Opportunity: Target of Opportunity (ToO) proposals that can reasonably be anticipated, such as gamma ray bursts and supernovae, will be submitted at the normal deadlines, and inserted into the observing queue as appropriate when an event occurs. They will be assigned an upper limit of time.

Director's Discretionary Time: A small fraction of the observing time can be assigned by the JAO Director to unanticipated ToO or highly-rated proposals that cannot wait for the next proposal deadline. This DDT may also be used to satisfy regional preferences. A small standing review committee, with members from the JAO and the four regions, appointed by the Executive Observatory Directors and Chile, will advise the JAO Director on the proposals for DDT. Targets of Opportunity that require a very rapid response (within hours rather than days) may be observed on approval by the JAO Director who will advise the standing committee within 24 hours. Unused DDT will be used for completing the approved peer-reviewed observing queue. The overall fraction of DDT is to be recommended by the Directors Council and Chile² with the concurrence of the ALMA Board. The JAO Director will report on the usage of DDT on an annual basis.

3 Proposal Submission

Proposals shall be submitted via the ALMA Observe Tool (ObsTool) provided by the JAO and the ARCs.³ Users must be registered in the User Portal before submitting a proposal⁴ and should choose the ARC corresponding to the region of their affiliation.

² By "Directors Council and Chile" here and below, it means Directors Council and a representative of Chile who will be appointed by the CONICYT to oversee the proposal review process along with the Directors Council.

³ Chile is expected to establish its own ARC using the tools developed by the other ARCs and by the JAO.

All available observing modes for a given proposal cycle will be fully described on the ALMA web page accessible at each ARC ALMA User Portal. Proposal support will be accomplished via the ALMA Helpdesk available through any one of the ARCs.

A proposal will include at a minimum: (a) a cover sheet, with details of all investigators, including region affiliation and nationality, and the requested time and type of observations; (b) a scientific goal and justification; (c) the observational configuration; (d) a table of targets; and (e) a summary of the status of any previous ALMA observations.

A proposal must be submitted successfully before the deadline, which will be adhered to strictly. The Observe Tool will deposit all successfully validated proposals into the archive.

4 Management, Science Categories, Set-up of Panels, and Conflicts of Interest

The ALMA Proposal Review Process will be led by the JAO, overseen by the JAO Director and implemented by the Head of Science Operations with assistance by the ARC Managers.

Science Categories: The main science areas are cosmology, the high redshift universe galaxies, galactic nuclei, ISM, astrochemistry, star formation, protoplanetary disks, stellar evolution, planetary systems, and the sun. They will be organized into four themes for the proposal review process:

- Cosmology and the high redshift universe
- Galaxies and galactic nuclei
- ISM, star formation/protoplanetary disks and their astrochemistry, exoplanets
- Stellar evolution, the Sun and the Solar system.

These science categories may change over time to optimize the balance of proposals assigned to each panel.

Review Panels:

- There will be two (or more if required) review panels for each category to minimize the load per reviewer and to accommodate conflicts of interest, resulting in eight (or more) panels overall.
- Each panel comprises up to nine scientists, from whom a Chair and a Deputy Chair will be designated.
- The ARP panel members and the designation of the panel Chairs and Deputy Chairs are proposed by the JAO, incorporating inputs from the ARCs⁵, approved by the Directors Council and Chile, and appointed by the JAO Director.
- The composition of each panel and the panel chairs should aim to represent the regions proportionally.
- None of the panel members or chairs shall be from within the JAO or the ARCs.

⁴ JAO scientific staff members should consider themselves from the regions of their parent Executive Observatory.

⁵ During the period when it has not yet established its own ARC, Chile will also be invited to provide input.

- A technical secretary (JAO or ARC staff member) will provide administrative support to the panels during the meetings, but will not participate in the evaluation of the proposals

Panel membership must include submm/mm expertise as well as topic expertise. Terms of service will be for three observing seasons, staggered to ensure overlap, and the panel chair will normally have served as a panel member the preceding season (except for the first ever observing season).

ALMA Proposal Review Committee (APRC)

- The APRC Chair is appointed by the JAO Director, with approval by the Directors Council and Chile, and is not a member of any of the review panels. She/He should be a senior astronomer with cross-discipline expertise who is not an ALMA Regional SAC, ASAC, ALMA Board member, a staff member of the JAO or the Executives.
- The remainder of the APRC is comprised of the ARP Chairs⁶.
- One of the APRC members will be appointed Deputy Chair.
- A technical secretary (JAO or ARC staff member) will provide administrative support to the panels during the meetings, but will not participate in the evaluation of the proposals.

Directors Council. The Directors Council comprises:

- The JAO Director as Chair,
- ESO Director-General
- NAOJ Director-General
- NRAO Director

Conflicts of Interest. Conflicts occur when:

- A principal investigator (PI), a co-principal investigator (co-PI)⁷ or co-investigator (co-I) sits on the same panel that the proposal is submitted to.
- A panel member is from the same department as a PI, co-PI, or a co-I of a proposal within that panel.
- A panel member is a very close collaborator of a PI, a co-PI, or a co-I of a proposal within that panel.
- A panel member considers that a conflict exists with a proposal within their panel for some other reason.

⁶ Should it arise that the group comprising the APRC Chair and the APRP Chairs does not include astronomers from all four regions, the APRP members from the missing region shall elect among themselves a member to join the APRC, with the concurrence of the JAO Director.

⁷ For large projects, in addition to the PI, there can be co-PI's designated to represent different regions and for the purpose of accounting for time assigned to each region.

While every attempt will be made to avoid conflicts of interest, it will be inevitable that some will remain due to the limited number of potential available reviewers.

- When possible, conflicts will be resolved by assigning the proposal in question to the other panel in the same science category.
- If that is not possible then the panel member with the conflict will absent him/herself from the discussion of that proposal.
- Under no circumstances should a panel member with a conflict be assigned as a primary or secondary reviewer of the proposal in question.
- Panel members who identify a conflict that has not been recognized by the JAO will inform the chair of the panel of the conflict as soon as possible. The panel chair will work with the JAO to solve the problem, following the above guidelines.

5 The Proposal Grading System

The ALMA proposal grading system has four categories:

- Grade A: highest priority proposals which will remain in the queue until completed, including being rolled-over to subsequent observing sessions if necessary.
- Grade B: high priority proposals which will be scheduled at a lower priority than grade A proposals. They remain in the queue only until the end of the current observing session.
- Grade C: scientifically fruitful proposals which will be observed only as filler projects, only if a higher grade proposal is not available for the current conditions.
- Grade D: proposals that shall not be observed.

It is expected that Grade A proposals do not constitute more than 20% of the anticipated available time in each observing session.

6 The Proposal Review Process

Preparation for the ARP Meetings

Each proposal will be assigned a Primary Assessor (PA) and at least one Secondary Assessor (SA). The PA and SA are assigned by the ARP Panel Chairs and the JAO Head of Science Operations (HSO) to assess the proposal purely on scientific merit. The workload should be evenly distributed within each panel.

Each proposal is also assigned a Technical Assessor (TA). The HSO and the ARC Managers assign TAs, drawn from the pool of all ARC and JAO astronomers, to comment on whether the proposal can achieve the stated goals given ALMA's current capabilities.

The ARP Meetings

The ARPs will meet to discuss the ranking of all proposals.

- 1) **The Scientific Review Process:** The only consideration for the ranking of the proposals, which have to be technically feasible, will be scientific merit.

Prior to the meetings, all written SA and TA comments, and grades, will have been filled in and made available to the panels. For each proposal the PA will summarize all scientific and technical assessments into a single consensus report, after discussion by the panel.

The output from the ARP panels is a science ranked list of proposals for each panel. The ARP panels will make explicit recommendations for which proposals are to be rejected.

The ARP panels will provide recommendations for where the dividing lines should be placed between categories A and B, and between B and C by the APRC.

The ARP panels will discuss duplications and overlaps between proposals within their panel, and will make a recommendation for how these should be handled, based on the best scientific use of ALMA.

The ALMA Program Review Committee (APRC) Meeting

The APRC will meet to review the ARP results to produce a single ranked list of all proposals along with the recommended letter grade, and the comments provided by the ARP.

The committee will consider distribution across RA, frequency, weather, etc. in making its final ranked listing. The APRC may revise the comments to proposers made by the ARP, as appropriate, based on any updates they may have made to the status of the proposal. In particular it will be important that the comments still accurately reflect the science merit of the project.

The APRC will recommend final resolution of duplications or overlaps, and descopes, taking into account regional preferences as to how these are to be handled.

Formation and Execution of the Observing Queue

The HSO will take the recommendations of the APRC, apply adjustments that take into account other practical scheduling factors and produce the final ranked list of proposals, with letter grades, and submit to the Observing Queue, taking care not to significantly alter the scientific rankings of the APRC recommendations. The HSO will send the Observing Queue to the Directors Council and Chile before scheduling for concurrence.

The Observing Queue will be executed by the JAO, keeping a continuous account of the shares of time used by each region (including Chile) of projects that have been observed. When the share of time of any region is exceeded, projects with time allocable to that region will no longer be executed from the Observing Queue. However, allowances should be made to minimize the number of projects left unfinished. Effectively, this approach will ensure as much as possible, the share of observing time for each region results from the Observing Queue, while optimizing the scientific efficiency.

If there are over-subscriptions for certain RA ranges or frequencies, the HSO will aim at the goal that each of the partners and Chile receives a fair share of this time, taking into account the weather requirements and feasibility.

The HSO will monitor and record continuously the shares of observing time scheduled for each region and Chile and will regularly provide the relevant statistics to the Directors Council, Chile and the Board.

Reports to the Observers

A report on the status of each proposal will be sent to the PI by the respective ARC.

7 Timeline for the Proposal Review Process

The proposal timeline shall be determined by the JAO Director, taking into account the aim to minimize conflict with other deadlines, traditional holiday periods in the ALMA partner regions, and other relevant factors.

8 The Queue Scheduling System

The job of the Scheduler (either human or computerized) is paramount for ALMA. At any moment, it must select the highest ranked proposal that can be observed based on the weather, array configuration and instrumentation available. Over some longer averaging period it must also achieve a spread of observations that are consistent with the fair return of observing time to the partners.

9 Accounting of Time to the Executives and Chile

The method adopted to charge scheduled time to each of the four regions should be simple, transparent and easy to set guidelines for.

For small proposals, ≤ 100 hrs, 100% of the time will be assigned to the PI's region.

For large proposals, > 100 hrs, there can be a PI and co-PI's (who can be from the same region as the PI or other co-PI's). The time will be assigned to each region in proportion to the number of PI and co-PI's from each region.⁸

If a PI or co-PI has access to ALMA through more than one region (e.g. due to a joint appointment at two organizations or a member of an organization in Taiwan), she/he will select which region the time should be charged to. She/He will also have an option to split the time between both regions.

In the first three years, a balancing of time to each region should be followed on a yearly basis. After three full years of operation⁹, the time scale over which balancing is

⁸ In this context, PI's or co-PI's region refers to the region to which the organization the PI or co-PI is employed by belongs.

required will be relaxed to two years. A longer time scale may be deemed more appropriate and will be determined by the ALMA Board.

10 Open Skies

In principle, all outstanding proposals to use ALMA should be allowable. “Open Skies” proposals have a PI or co-PI’s whose affiliated organization belongs to none of the four regions. Open Skies proposals will be treated in the identical way as all other ALMA proposals. If any such proposals are selected into A/B grades, the Directors Council and Chile will determine how to include the selected proposals in the scheduling queue.

Open Skies Proposals will be handled as follows:

- Open Skies proposals will be assigned to a panel and treated in an identical way to all other proposals by both the ARP and the APRC.
- The JAO Director will adjust the ranking of Open Skies Proposals, as required by the Board, taking into account the preferences of the four regions.
- The ObsTool will record the region and nationality of every investigator on an Open Skies proposal, as for all proposals, so that the unaffiliated time can be easily identified should the proposal be selected for scheduling.
- The unaffiliated time attributable to PI’s or co-PI’s of Open Skies proposals scheduled (under the same time accounting principle and rules set out in Section 9) will be charged to the four regions - EU, NA, EA and CL - in the proportion of 33.75:33.75:22.5:10.
- The amount of Open Skies time charged to the four regions under the above formula shall not exceed 5% of the total available ALMA time. Any Open Skies time that exceeds this limit can be charged to NA, which follows the current US government policy.
- The PI of an Open Skies Project accepted for scheduling will select which ARC she/he wishes to use for support.

11 Handling of Duplications

There may be duplications of proposals to ALMA. Duplications may be classified in three categories:

- When more than one team applies to observe the same objects in the same observing mode (frequency, configuration, area, depth, etc).
- When different teams propose to try to answer similar science questions with different observations.
- Where observations of objects already in the archive are requested.

Specifically, the JAO Director, with the concurrence of the Directors Council and Chile, will supply non-ambiguous guidelines on what constitutes duplication to the ARP panels.

As far as is possible, duplications will be handled within the ARPs, which will make recommendations to the APRC. The APRC will adjudicate when necessary, and will handle duplications occurring between proposals coming from different panels, and from earlier observing seasons.

⁹ At this time Chile will re-evaluate its participation in the common ALMA Proposal Review Process

For ALMA, there is a principle that identical data should not be taken twice unless scientifically necessary. Should two or more proposals to perform the same observations be judged to be of equal scientific merit, the data will be delivered simultaneously to the approved teams.

The Directors Council and Chile will have the final say on duplications, including those among the four regions.

Relevant Documents

THE ALMA PROPOSAL REVIEW PROCESS Version 6, October, 2007, John Richer, Leonardo Testi, Diego Mardones, Satoshi Yamamoto, John Carpenter.

ALMA Operations Plan, Version D, October 2007.

Report of the East Asian ALMA Science Advisory Committee to the ALMA-J Directors, June 11, 2007. EASAC Committee, S. Yamamoto, Chair.

Structure of an ALMA Program Committee, September 2006, ASAC Committee, J. Richer, Chair.

Project Scientist's White Paper: presented to ASAC 17 September 2006, ESAC, EASAC, ANASAC (29 Sept 2006).

Wiki page maintained by A. Wootten with links to these and other documents:

<https://wikio.nrao.edu/bin/view/ALMA/AlmaPRCTAC>

which includes some password protected documents. A history of the discussion on this topic over the past two years is also available as an attachment.