



Atacama Large Millimeter / submillimeter Array

ALMA Science Operations Phase II Proposal Change Policies


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Prepared By:		
Name(s) and Signature(s)	Organization	Date
M. G. Rawlings, J. E. Hibbard, A. Biggs, C. L. Brogan, D. Johnstone, B. Vila Vilaro, L.-A. Nyman, S. Okumura, E. Humphreys, S. Randall (Ph2 Policy Working Group)	ALMA	2011-08-12
Approved By:		
Name and Signature	Organization	Date
Released By:		
Name and Signature	Organization	Date
	Joint ALMA Observatory	

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1 Motivation

The Atacama Large (sub)Millimeter Array (ALMA) is a large international observatory sponsored by agencies spread over three continents and potentially open to users worldwide. Users submit proposals to the observatory using the ALMA Observing Tool (hereafter “OT”) to describe the “science goals” of their proposed observations – the targets, observing frequencies, sensitivity limits, desired resolution, etc. Entering this information is considered “Phase I” mode of the OT. At the end of the Phase I process, the “Primary Investigator” (PI) of the proposal submits it to the ALMA archive for consideration by the ALMA Proposal Review committees. The Proposal Review Process (PRP) is described in other documents [RD3, RD4].


After the proposals are reviewed, some are awarded grades that qualify them to be scheduled for observations during the following ALMA observing season. In order to be observed, the Science Goals must be converted into “Scheduling Blocks” (SBs), the atomic observing units that are submitted to the ALMA scheduling queue for eventual execution. The process of converting project science goals into SBs is also done in the OT, in what is considered the OT’s “Phase II” mode of operation.

While converting a projects Phase I inputs into Phase II products, it is possible to change the instrument specifications originally entered into the OT. This document describes the policies under which such changes are considered, requested, allowed and disallowed. The Phase II Change Request Implementation Plan [RD5] describes the process for requesting, documenting, and making such changes.

2 Supporting Material

2.1 Acronyms [NEED CHECKED]


ACA	ALMA Compact Array
ADO	ALMA Directors Office
ALMA	Atacama Large (sub)Millimeter Array
APRC	ALMA Proposal Review Committee
AOP	ALMA Operations Plan
ARC	ALMA Regional Center
ARP	ALMA Review Panel
ASA	ALMA Science Archive
DC	Directors Council
DSO	Department of Science Operations
EA	East Asia
ESO	European Organization for Astronomical Research in the Southern Hemisphere
EU	Europe
JAO	Joint ALMA Observatory
JIRA	From Wikipedia: “Rather than an acronym, JIRA is a truncation of Gojira (the Japanese name for Godzilla)”

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MOU Memo of Understanding
NA North America
NGAS Next Generation Archive System
OT Observing Tool
PI Principle Investigator
PRC Proposal Review Committee

2.2 Reference Documents [REMOVE UNREFERENCED ONES AND UPDATE REFERENCE IN TEXT]


No.	Title	Authors	Version & Date	AEDM ID or document name
RD1	ALMA Operations Plan (AOP)	R. Smeback & Operations Working Group	Version D, 29 October 2007	ALMA-00.00.00.00-002-D-PLA.A
RD2	ALMA Project Plan	JAO	III, 07 May 2009	N/A
RD3	Principles of the ALMA Proposal Review Process	ALMA TAC Subcommittee	Rev 3, 26 January 2011	AEDM 2010-078
RD4	ALMA Proposal Review Process Implementation Plan	Lars-Ake Nyman & Gautier Mathys	v1.4, 06 March 2011	ALMA-90.25.03.00-001-A-PLA
RD5	Phase II Process and Change Request Procedures (Cycle 0)	M. Rawlings & J. Hibbard	A0, 11 August 2011	

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3 Types of Changes

There are a number of possible scenarios in which a reviewed ALMA proposal/project might be required to undergo change. These scenarios may be broadly classified as those identified during the Proposal Review Process (PRP), those identified following the review process by ALMA staff, and those requested by the PI after the completion of the PRP. Examples for each of these scenarios are summarized below, and addressed in greater detail later in this document.

- I. **Changes mandated by the ALMA Proposal Review Process.** These include changes identified by the proposal review panels and assessment process, and would be part of the review panel output. Such modifications might include:
 - The descopeing of a project;
 - Changes to calibration/observing strategies suggested by the Technical Assessment and approved by the proposal review panels.
- II. **Changes identified by ALMA staff, based on technical considerations.** These changes may be identified during the Phase II process or during SB execution. These might include the following:
 - Changes to default OT-generated parameters or observing strategies necessary to ensure consistency with evolving thoughts on best practices for a particular observing mode, increase observing efficiency, or to reach stated science goals. These are expected to become less frequent after the early stages of ALMA Science Operations as observing strategies mature;
 - Changes needed to fix errors in Phase II Scheduling Blocks (SBs) discovered upon their execution.
- III. **PI-instigated requests for changes.** These might conceivably originate during the review period, the Phase II preparation period or the actual observing period. These might include:
 - Requests for changes that in no way change the science goals of the proposal (e.g. minor changes to pointing positions or observing frequencies).
 - Requests to change the default OT generated parameters or observing strategies based on technical considerations that are not suggested by ALMA staff.
 - Requests for changes motivated by events occurring subsequent to proposal submission, e.g. independent new information on planned observing targets, externally-imposed changes to the scheduling of time-coordinated observations at other observatories, etc.
 - Requests for changes motivated by interim observational results of a project. Such cases would most likely occur for projects being run during routine science operations that include break points, and that upon reaching such a break point, the PI feels that in light of the progress so far, a change is warranted.
 - Requests for a review of proposal changes imposed upon a project as a consequence of the PRP.

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The remainder of this document will attempt to establish some policies and guidelines on the handling of each of the above cases in turn. The processes for requesting and/or documenting changes are described in the “Phase II Process and Change Request Procedures” document [RD5].

4 Guiding Principles

Given the versatility of the ALMA facility, and the ingenuity of its user community, it is practically impossible to anticipate every possible project change request. It is consequently also impossible to establish a definitive and complete set of policies for every type of project change request that may be encountered during the operational lifetime of the observatory. Ultimately, therefore, all such changes must be considered on a case-by-case basis. Nevertheless, some obviously clear-cut examples of change requests exist, and definitive rules for these should inform the decision-making process for the more subtle cases. The following principles shall inform the decision of whether or not to accept a proposed change:

Basic Principles:


- Any change to a project shall not change the scientific objectives of that project, except for the cases in which a reduction in scope has been mandated as the result of the PRP.
- Any changes made to a project shall be no greater than necessary.
- The decision regarding the implementation or rejection of any major changes requested by the PI of a project shall, insofar as it is possible, be made by a panel of qualified professional astronomers from the ALMA staff and/or associated community, in accordance with the established principles of impartial peer review.
- All changes must be clearly documented and associated with a project in such a way that they are readily available to relevant ALMA staff and future investigators. Reasons for the changes must be clearly documented, and acknowledgement from the PI captured.

Principles concerning Proposal Review:

- Any changes made to a project shall not significantly affect the total time of project execution anticipated at the end of the PRP.
- Apart from duplication of targets (as defined in the PRP documentation), the proposal review panels shall be instructed to make changes to projects only under rare situations and for very compelling scientific (and/or technical) reasons. Compelling technical reasons might include changes made to improve the calibration strategy, etc. of a project.
- Every effort shall be made by the Observatory to accommodate changes to projects that are mandated as part of the output of the PRP.

Principles concerning Timing of Requests & Decisions:

- The default position adopted by the Observatory is that there shall be no unnecessary changes made during the actual observing period, with the obvious exception of allowing the correction of errors in a Phase II project not initially identified (and corrected) by the appropriate observatory staff. Any other project changes that are approved and implemented should be regarded as exceptional, rather than routine.

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- In the rare event that a ruling on a proposed change to an ALMA project is required to be made on very short timescales, any such decisions shall be made by Observatory staff previously identified for the role by the ALMA Director's Office (and approved by the Directors' Council for this role).

5 Changes Mandated by the Proposal Review Process

5.1 Descoping of Projects

In what are anticipated as being rare cases, the PRP may recommend the descoping of a project, e.g. if the same target is granted time in another project (see proposal review document). Descoping of projects shall only arise as a result of the PRP, and should be made only for compelling scientific and/or technical reasons. Criteria for the descoping of projects shall be included in the Proposal Review document provided to all Scientific and Technical Assessors.

All descoping requirements arising from the PRP shall be required to conform to a specific format and set of criteria. The acceptable format and associated descoping criteria shall be clearly defined by a set of rules included in the handbook documentation provided to all proposal review panel members, in order to ensure that all descoping can be practically implemented.


5.2 Merging of Projects

At least for the first few years of ALMA science operations, the merging of projects shall not be permitted. This policy may be reviewed after several years of successful ALMA operations, if necessary.

5.3 Changes Suggested by the Technical Assessment Process

As part of the review process, each proposal shall undergo a technical assessment by the ALMA technical staff acting as Technical Assessor (TA). If the technical assessment clearly indicates that a proposal simply cannot be executed, then the proposal should simply be rejected*. Projects deemed technically feasible may include suggestions for modifying the observing and/or calibration strategies to achieve the stated science goals. The review panels will factor these comments into their overall assessment of the proposal. Accepted proposals must include explicit instructions from the review panels as to whether or not any recommended changes included in the technical assessment are to be incorporated into the project. If any such change recommendations are not adopted by the APRC, then this should be recorded during the APRC meeting, along with the reason for that decision.

* For Cycle 0, all projects initially identified as not technically feasible in the initial technical assessment shall be internally reviewed a second time by ALMA staff to ensure consistency between Technical Assessments.

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5.4 Procedural Policies for PRP Related Changes

For a given observing cycle, the output of the PRP may include mandated changes to one or more of the submitted projects as noted above. All such changes shall be recorded via the Phase I Manager (PhIM) tool and written to the project stored in the ASA at the conclusion of the PRP. Details of the required changes shall be included in the final consensus feedback to the PIs of the affected projects.

A full written description of PRP-mandated changes shall be available to the ALMA staff who prepare the Phase II products and any ARC staff who need to work with the PIs of the affected projects. This will ensure that all changes are satisfactorily in place before the affected projects are admitted to the observing queue.

At least for the first few ALMA observing cycles, all such changes shall only be made to a project by authorized ALMA science staff, in close consultation with the PI of the project in question. A project shall only be admitted to the observing queue when the required changes have been implemented and approved.

6 Changes Identified by ALMA Staff, based on Technical Considerations


These include changes identified by ALMA staff outside of the PRP. They may be identified by ALMA staff preparing or reviewing the Phase II products, by the scheduling team, or by the Astronomer on Duty (AoD) upon execution of SBs associated with a project. All changes made to projects following the Phase II process shall be logged in the project, along with the name of the ALMA staff member that implemented the change. These logs shall only be writable by authorized ALMA science staff, but shall be viewable by the project PI. The change log shall consequently be an integral part of the project file.

6.1 Changes to Default OT generated parameters or observing strategies

During the Phase II process, the OT is used to generate a set of SBs that define all of the science and calibration sources, observing resources, and default system parameters required to reach the scientific objectives defined in the Phase I Science Goals. The default structure and parameters of these SBs (the “observing strategy”) are included in the OT based on input from the Observatory staff for a given observing mode and associated calibration requirements. In some cases, particularly during the first few observing cycles, these defaults may need to be changed in order to reach the stated goals. The following scenarios are anticipated, although others may occur as further experience is gained.

Changes to Default OT-Generated Parameters

The OT will create SBs with default observing parameters, such as dump times, cycle times, etc. These defaults will have been supplied to the OT by the Observatory in advance of the release of the OT to users. Particularly during Early Science and probably for several cycles afterwards, the “best observing practices” will evolve over time and it is likely that recommendations for some parameters will change between the release of a particular version of the OT and the Phase II

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stage. In such cases, the Observatory/ARC staff will update the observing parameters to the current state of "best observing practices".

Changes to Default OT-Generated Observing Strategies

During the Phase II process, ALMA staff may identify more efficient ways to structure an approved project to achieve a higher observing efficiency, e.g. the inclusion of multiple targets into the same SB to enable the reuse of calibration data. Such changes may be made as long as they in no way alter the approved science goals of the project. An expanding library of such observing strategies is under development, with the ultimate aim of making the need for such changes increasingly rare.

Changes to Default OT-Generated Calibration Strategies

The OT will automatically generate a default calibration "strategy" based on standard or typical observing modes, for which the strategy encompasses the range of calibration observations needed to fully calibrate the data in post-processing. At minimum, these might typically include pointing, bandpass, amplitude, system temperature, and phase calibration observations.


Additional calibration in terms of time spent on the calibration source(s), cadence of calibration observations, or the addition of supplementary calibrator sources may be needed. Such deviations from standard OT calibration strategies must have been adequately justified in the proposal and subsequently approved during the PRP. Examples may include requirements for unusually sensitive bandpass, astrometry, or polarization calibration. In these cases, ALMA staff will need to insert the additional required calibration by hand during the Phase II process.

A change to the observing or calibration strategy may also be necessary for cases in which a PI could not reasonably have known that he/she would need to observe in a particular mode and/or include certain calibrations (i.e. any such need was not stated in the initial Call for Proposals). For example, if it were to be determined after the Call that all projects requesting a dynamic range above some threshold at Band 7 should be observed in full polarization mode, then the ALMA staff would alter the project to ensure that the necessary observing mode and calibration strategy are used.

6.2 Changes to Repair Errors in Phase II Scheduling Blocks

In the event that a Phase II project is admitted to the observing queue, and is subsequently found to contain errors, then these shall be corrected as soon as possible by the Observatory science staff. If such an error is associated with one or more SBs, then all of the affected SBs shall be immediately flagged as having a status that prevents execution. The Astronomer on Duty (AoD) identifying the affected project shall file a report in the shared JAO/ARC bug reporting system; the affected SBs shall be examined, repaired and re-enabled for queue execution by ALMA staff. The cause for the error and eventual solution shall be documented in the shared DSO/ARC JIRA system. Should it be deemed necessary to discuss such an issue with the project PI, all such communication shall be through the ARCs.

Since any such SBs would have previously already passed validation, their existence in the ALMA Science Archive (ASA) must be attributed to flaws in the ALMA software validation

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process. Consequently, the project/Executive shall not normally be charged for any observing time lost. Changes necessitated by an error on the part of the PI are discussed in Section 8.

7 PI-Initiated ALMA Project Change Requests

In addition to the changes identified above, it is anticipated that PIs themselves may occasionally wish to change the details of their observing proposal. All PI-initiated change requests must be fully justified through a formal change request process and are required to include a justification for each and every requested change. The justification must be both clear and substantive. A simple example of this might be the sudden availability of new, better pointing information for a target field object. Any requests lacking an accompanying justification shall be rejected.


Processing of change requests will include consideration of the time period in which they are submitted:

- Change requests submitted after the proposal deadline but before the PRP process has completed shall be noted and handled on a case-by-case basis by the PHT. Normally, the request will be simply noted and suspended until the conclusion of the PRP, although exceptionally, some other suitable action might be taken (e.g. notifying the appropriate review panel), depending on the exact nature of the request. A PI-initiated request for a proposal to be withdrawn completely shall normally be considered immediately.
- Change request received during the actual observing period will cause the project to be flagged, and any further execution of the affected project shall be halted until the requested change has been either denied or implemented.
- Changes requested after a project has been completed, quality assured, and archived are regarded as part of the Quality Assurance (QA) process, and are hence not discussed here.

The range of requested project changes may be quite broad. Consequently, for efficient observatory operations, it is logical to differentiate between minor and major changes to projects. Such changes shall be considered minor change requests if they imply no changes to the approved scientific goals and do not increase the estimated execution time of the project. All other change requests shall be considered major change requests. The project shall maintain and make available the definition of major and minor change requests. The details of all submitted project change requests shall be made available to the Department of Science Operations (DSO) and Proposal Handling Team (PHT) staff, no matter how apparently trivial. The appropriate DSO staff shall track all proposal change requests, major and minor.

Before approving any changes involving new targets or positions or additional frequency coverage, a search of the ALMA Science Archive (ASA) for duplication of both position within a certain specified target radius and frequency band with other projects shall be performed. The potential impact of all proposed changes on the ALMA observing queue and the potential for project overlaps arising shall be assessed and summarized. The ALMA Directors Office (ADO) will appoint a standing review committee to review assess each change request on a case-by-case basis, keeping in mind the default first-order position adopted by the Observatory that there shall be no unnecessary changes made during the actual observing period (Section 4),

The results of the change request assessment shall be communicated back to the PI via a uniform interface, indicating whether the change request has been approved or rejected. Any approved

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changes shall be documented and associated with a project in such a way that they are readily available to relevant ALMA staff and future investigators.

8 Time Charging and PI Errors

The Observatory shall take no responsibility for errors in tuning or pointing due to incorrect information being included in the project by the PI. All ALMA time allocations charged to observations that are flawed due to user error shall be charged to the relevant Executives as if the observation had been completed without errors.

In the vast majority of cases, any PI-introduced errors in a logically correct project (e.g. mistakes in the tuning or pointing information supplied by the PI) are extremely unlikely to be noticed before the project has been completed. This is because fully reduced data shall only be made available to the PI upon completion of ObsUnitSets and/or entire projects. Under such circumstances, the PI may consider requesting DDT time or reapplying for the next observing cycle.


Identification of PI-originated error may, however, occasionally be made between the completion of ObsUnitSets, and/or when projects reach break points.

Should a PI realize after observations of his/her project have been made that, due to an error on the PI's part, they do not actually produce the expected scientific outcome, then the allocated observing time already used shall not be compensated. Any remaining unexecuted SBs from the same project without errors may be retained in the observing queue at the discretion of the Observatory. If unexecuted parts of the project are found to contain similar (or any other) errors before the project execution has been completed, then the PI should immediately submit a change request to correct those errors. All such change requests shall be evaluated as described in Section 7.

If the PI can make a strong case (also via a change request) that an incorrectly-observed target is of a sufficiently higher priority than another target in that same project that has not yet been observed, then the SB for the lower priority target (or some repeats thereof) may exceptionally be instead replaced with a corrected version of the SB for the higher-priority target, as long as there is no significant difference in the total anticipated execution time of the project. All such SB substitution requests shall be submitted as PI-initiated change requests, and considered on a case-by-case basis by the standing review committee.

9 Changes to Phase II Policies

The Board and Management of the ALMA Observatory reserve the right to modify the above policies regarding proposed changes to Phase II projects from one observing period to the next.

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Appendix I: Summary of Change Type Handling by Period

This document discusses policies for changes to projects that are identified at some point between the Phase I submission deadline has been reached and before the end of the associated observing period. This total span of time may be naturally divided up into three distinct periods:

- **Period 1:** Between the Phase I proposal submission deadline and the end of the PRP. See the PRP Policies and Implementation documentation for more details of how changes will be handled during this period.
- **Period 2:** Between the end of the proposal review period, and the start of the associated observing period.
- **Period 3:** Between the start and end of the observing period.

Project Change Type	Period 1* (During the PRP)	Period 2* (After the PRP, before the start of the associated observing period)	Period 3* (During the associated observing period)
PRP-Mandated Changes			
Descoping	Assessed by: PHT; APRC N/A	N/A Implemented by: ARCs (with PI)	N/A N/A
Motivated by Technical Assessment recommendations	Assessed by: TA; PHT; ARP; APRC N/A	N/A Implemented by: ARCs (with PI)	N/A N/A
Merging	Not permitted	Not permitted	Not permitted

* The PHT shall co-ordinate the initial handling of all proposal change requests during the first two periods, and work in close conjunction with the HSO and PMG Managers during the third period.

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Project Change Type	Period 1* <i>(During the PRP)</i>	Period 2* <i>(After the PRP, before the start of the associated observing period)</i>	Period 3* <i>(During the associated observing period)</i>
PI-Instigated Change Requests			
Motivated by external events	<i>Assessed by:</i> PHT, APRC <i>Implemented by:</i> PHT	<i>Assessed by:</i> PHT (if minor)/ ALMA Standing Review Committee <i>Implemented by:</i> ARCs (with PI; JAO input if major)	<i>Assessed by:</i> ARCs (if minor)/ ALMA Standing Review Committee <i>Implemented by:</i> ARCs (with PI; JAO input if major)
Motivated by observational results (from within the project)	<i>Assessed by:</i> PHT, APRC <i>Implemented by:</i> PHT	<i>Assessed by:</i> ALMA Standing Review Committee <i>Implemented by:</i> ARCs (with PI; JAO input if major)	<i>Assessed by:</i> ALMA Standing Review Committee <i>Implemented by:</i> ARCs (with PI; JAO input if major)
Changes Necessitated On Technical Grounds			
Phase II SB Error Repairs	N/A	<i>Assessed by:</i> PHT, ARCs (if minor) <i>Implemented by:</i> ARCs (if minor), DSO	<i>Assessed by:</i> ARCs, DSO <i>Implemented by:</i> ARCs (if minor), DSO
Phase II Project Efficiency Improvements	N/A	<i>Assessed by:</i> PHT, DSO, ARCs <i>Implemented by:</i> DSO	<i>Assessed by:</i> DSO / ARCs <i>Implemented by:</i> DSO

* The PHT shall co-ordinate the initial handling of all proposal change requests during the first two periods, and work in close conjunction with the HSO and PMG Managers during the third period.