

Development Upgrades of the Atacama Large

Millimeter/submillimeter Array (ALMA)

Project Proposal

*Insert* *Title* *here*

**Principal Investigator:**

Institution:

Address:

PI Contact Information:

*Telephone Number:*

*Email Address:*

**Abstract**

*Present a two page (or less) description of the work scope and objectives of the project with emphasis on its scientific merits. If applicable, please include a description of prototype hardware and/or software.*

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# Co-Investigator(s) and Collaborating Institution(s)

*Insert/delete rows as needed.*

**Table 1.0:** Co-Investigator(s) and Collaborating Institution(s).

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Institution** | **Email** | **Telephone** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# **Subcontractors**

**2.1 Company/Institution:**

**Address:**

**Subcontracted parts or services:**

*Obtain Company and/or Institution authorization to be proposed as a subcontractor prior to completion and sign-off of this Proposal.*

# **Science Case**

*Present the scientific rationale for the proposal and its significance to ALMA. Explain how the science case is aligned with the priorities of the ALMA Development roadmap including increasing improved receiver performance in priority bands, increased receiver bandwidth, and enhanced usability of the science archive.*

1. Scope

*Insert an explanation of the scope/scale and planned method of the proposal. Describe proposal objectives, technical details, assumptions, working theories, and approaches that will be used, and state hypothesis.*

1. Broader Impacts Plan

*The National Radio Astronomy Observatory is committed to broadening the impact of its research and development activities. Briefly describe how the proposed development proposal will lead to broader impacts (benefits to society beyond the intrinsic scientific merit). Some examples of Broader Impact activities that might be undertaken during the period of funding for the proposed development project include: Promote teaching, training, and learning, by involving undergraduates, graduate students, or postdoctoral researchers in the development proposal; Broaden participation of under-represented groups, by establishing collaborations with students and faculty from institutions and organizations serving women, minorities, and other groups under-represented in the sciences for the purpose of carrying out the research proposal; Dissemination of scientific and technological understanding, by presenting results of development proposal in formats useful to students, teachers, scientists/engineers, and the general public, including presentations at scientific or trade conferences, the public release of data taken for testing purposes and press releases to highlight either scientific results from the development proposal or engineering/software advancements. Unrelated activities pursued by parent organizations do not count. Proposed Broader Impacts should be fully included in the proposal schedule/reporting requirements. The submitted Broader Impacts initiatives should be specific to activities that will be carried out during the period of the development proposal, by participants in the proposal.*

1. Period of Performance

*Define the anticipated period of performance.*

1. Schedule

|  |
| --- |
| ***Insert Schedule (Gantt Chart) Here***  ***Resize Area as Required*** |

**Figure 1.0:** Schedule.

1. Plan Deliverables

*Describe the products that will be delivered at the conclusion of the proposed proposal.*

## Hardware

## Software

## Services

## Documents

* Monthly Progress Reports
* Specifications
* Hardware Design Documentation
* Software/Firmware Design Documentation
* Interface Control Documents (ICDs)
* Technical Manuals and Procedures
* Quality Assurance Procedures
* Safety Procedures
* Acceptance Test Procedures and Reports
* Closeout Report

1. Interfaces to ALMA

*Note the ALMA hardware and/or software control interfaces that may be affected if the proposed design or control scheme is implemented. ALMA Systems Engineering support is available upon request.*

1. Implementation Plan and Site Location Impact Statement

## **Planned implementation at ALMA**

*Describe how the proposal deliverables will be provided to the end-user and how on-site Implementation, Verification, and Commissioning will be achieved. Ensure that nonrecurring (implementation) and recurring costs are accounted for in the proposal cost estimate.*

## **Site Location Impact Statement**

*Describe any new facilities, significant modifications to existing facilities, or use of NRAO facilities that are required. Also indicate when these facilities and/or modification are required.*

## **Implementation schedule**

|  |
| --- |
| ***Insert implementation Schedule (Gantt Chart) Here***  ***Resize Area as Required*** |

**Figure 2.0:** Implementation Schedule.

1. Staffing

*NA ALMA Program Manager support is available upon request if there are questions filling out this portion of the proposal.*

*Estimate the level of effort (unit of measure =* ***F****ull* ***T****ime* ***E****quivalent) to be deployed. Include Collaborating Institutions/Subcontractors until completion of the proposed proposal, as well as the corresponding total cost to be incurred. Identify essential (key) personnel required to ensure success. If two, or more, persons of equivalent labor grade are capable of performing any given task, leave the corresponding Key Personnel cell blank and note the FTE level of effort only.*

* 1. Offerer’s Staffing

**Table 2.0:** Labor Estimate.

|  |  |  |  |
| --- | --- | --- | --- |
| **Title (examples)** | **Key Personnel** | **FTE** | **Duration (Months)** |
| Principal Investigator |  |  |  |
| Scientific Lead |  |  |  |
| Engineering Lead |  |  |  |
| Research Engineer |  |  |  |
| Senior Engineer |  |  |  |
| Engineer 1 |  |  |  |
| Technician 1 |  |  |  |
| Machinist |  |  |  |
| Other |  |  |  |
| ***Totals*** | |  |  |

*Insert/delete rows as needed. Duration should be the expected time actively working on the proposal (e.g., 0.1 FTE over a 3 month period)*

* 1. External Staffing (if applicable)

*Insert/delete rows as needed. All collaborators, including unfunded and in-kind contributors, must be listed below.*

**Table 3.0:** External Staffing and Contact Information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Title** | **Name** | **Institution** | **Email** | **Telephone** |
| Co-Investigator |  |  |  |  |
| Vendor Point of Contact |  |  |  |  |
| Customer Point of Contact |  |  |  |  |

1. Project Management

## Systems/Configuration Control

1. **Systems Requirement and Specification Control**

*Refer to INCOSE Systems Engineering Handbook (INCOSE-TP-2003-002-04).*

Development engineering and design activities shall be conducted in accordance with established Systems Engineering policies, practices, and procedures.

1. **Documentation Control**

*Define your approach.*

All shared documents shall be dated and bear a revision level number.

1. **Product & Quality Assurance Control**

*Refer to ALMA Product Assurance Requirements (ALMA-80.11.00.00-001-E-GEN).* *A unique Product Assurance Plan is unnecessary.*

Development engineering and design activities shall be conducted in accordance with established ALMA PA/QA policies, practices and procedures.

## **Performance to Schedule**

The Principal Investigator has primary responsibility for schedule development and performance to schedule. The NA ALMA Development Program Office will, if requested, provide support to the PI in establishment of a revision-controlled Schedule and monthly preparation of performance to schedule status. In the event of a schedule variance, the PI and the NA ALMA Development Program Manager will assess the impact and develop the appropriate recovery action(s).

## **Performance to Budget**

The Principal Investigator has primary responsibility for intra-proposal budget allocation and cost performance. The NA ALMA Development Program Office, if requested, will provide support to the PI in establishment of cost accounts, budget load, and the preparation of a revision-controlled, monthly Budget Status Report. In the event of a cost variance, the PI and the NA ALMA Development Program Manager will assess the impact and develop the appropriate recovery action(s).

## Measures of Success

*Describe the measures of success (performance metrics and outcomes) for this proposal. Describe the process that will be used to address experiment prioritization, evaluate experiment results, and to modify the approach/redirect experiments. Include an assessment of the likelihood that the proposed method and approach to the Project will further the state of the art. Describe the process that will be used to manage Change Control.*

## Risk Management

*Identify the primary areas of uncertainty (risk) foreseen at the outset of the proposal. Estimate the probability of occurrence and associated cost impact of each identified risk. Also, briefly note the means by which each primary risk may be mitigated or retired altogether. Add/delete rows as needed.*

**Table 4.0:** Risk Assessment.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Primary Risk(s)** | **Prob. (%)** | **Impact ($)** | **Mitigation** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| ***Total Contingency ($)*** | | |  |  |

## Communication Plan and Progress Reporting

A monthly Progress Report shall be prepared by the Principal Investigator in accordance with NRAO Program Management practices and procedures. Informal reviews will be conducted by the NA ALMA Development Program Manager upon the completion of milestones.

1. Cost Breakdown

*NA ALMA Program Manager support is available upon request if there are questions filling out this portion of the proposal. Provide all figures in US Dollars.*

* 1. Offerer’s Cost

*Work Breakdown Structure (WBS) Number should correspond to Level 1 tasks/activities in the proposal Schedule. Insert rows as needed.*

**Table 5.0:** Offerer’s Cost.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **WBS No.** | **Task Description** | **Labor ($)** | **Materials & Services ($)** | **Travel ($)** |
| 1.0 |  |  |  |  |
| 2.0 |  |  |  |  |
| n.0 |  |  |  |  |
| ***Subtotals ($)*** | |  |  |  |
| ***Total Offerer’s Cost ($)*** | |  | | |

**Table 6.0:** Total Offerer’s Cost Breakdown.

|  |  |  |
| --- | --- | --- |
| **Total Direct ($)** | **Total Indirect ($)** | **Indirect Cost Rate (%)** |
|  |  |  |

* 1. Collaborating Institution / Subcontractor Cost

*Insert rows as needed. Note the value of any In-Kind Contributions.*

**Table 7.0:** Collaborating Institution/Subcontractor Cost & In-Kind Contribution.

|  |  |  |
| --- | --- | --- |
| **Collaborating Institution / Subcontractor** | **Subaward ($)** | **In-Kind Contribution ($)** |
|  |  |  |
|  |  |  |
| ***Total Cost ($)*** |  |  |
| ***Total In-Kind Contributions ($)*** |  |  |

**Table 8.0:** Subaward Cost Breakdown.

|  |  |
| --- | --- |
| **Subaward Direct ($)** | **Subaward Indirect ($)** |
|  |  |

* 1. Total Cost

**Table 9.0:** Total Cost.

|  |  |
| --- | --- |
| **Elements** | **Cost ($)** |
| Total Offerer’s Cost |  |
| Collaborating Institution / Contractor Total Cost |  |
| Contingency |  |
| ***Total Cost ($)*** |  |

* 1. Cost Distribution

*Due to budgetary constraints, no more than one half (50%) of expenditures should be planned in first fiscal year. Insert/delete columns as needed.*

**Table 10.0:** Cost Distribution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FY202X ($)** | **FY202X ($)** | **FY202X ($)** | **FY202X ($)** | **Total Cost ($)** |
|  |  |  |  |  |

* 1. Total Value

**Table 11.0:** Total Value.

|  |  |
| --- | --- |
| **Proposal Elements** | **Cost ($)** |
| Total Offerer’s Cost |  |
| Collaborating Institution / Contractor Total In-Kind Contributions |  |
| ***Total Value ($)*** |  |

# Closeout

Upon conclusion, the NA ALMA Development Program Office will coordinate the orderly closeout of activities; or, the transition of activities to a continuing Study/Project. At a minimum, this will include the following:

* verification of compliance with established procurement policies and procedures;
* verification of Purchase Order final payments;
* verification of compliance with established labor charging practices;
* verification of labor charging accuracy;
* cost and schedule variance analysis;
* resolution of inventory or property control issues;
* inactivation of cost accounts;
* preparation of a Final Report; and
* archiving of records.

1. Commitment

Having read all documents listed in and annexed to the Call for Development Proposals, and having assessed the situation and the nature and difficulties of the proposed services, the undersigned hereby offers the “*insert Title here*” in accordance with the provisions of the present Call for Development Proposals and, if awarded the Agreement, undertakes to carry out the work required according to best trade practices, within the prescribed time limits, and at the price set out in this Proposal.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Institution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Appendix A - Reference Documents

# Appendix B – Curriculum Vitae of Key Personnel

# Appendix C – Allocation Rates