

Development Upgrades of the Atacama Large

Millimeter/submillimeter Array (ALMA)

**Study Proposal Template**

|  |  |  |
| --- | --- | --- |
| **Prepared by** | **Organization** | **Date** |
| S. Leff | ALMA Dev. Program | 30 November 2018 |

|  |  |  |
| --- | --- | --- |
| **Approvals (Name and Signature)** | **Organization** | **Date** |
| A. Wootten | NAASC |  |
| P. Jewell | NA ALMA Operations |  |

|  |  |  |
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| **Released by (Name and Signature)** | **Organization** | **Date** |
| S. Leff | ALMA Dev. Program | 03 December 2018 |

***Delete this entire page from your submitted Study Proposal.***

**Change Record**

|  |  |  |
| --- | --- | --- |
|  | **Date** | **Reason** |
| 0.0 | 01 May 2013 | Initial Release |
| 0.1 | 07 August 2015 | Revisions by A. Crossley |
| 0.2 | 10 February 2016 | Revisions by W. Randolph |
| 0.3 | 21 February 2017 | Revisions by L. Jensen |
| 0.4 | 30 November 2018 | Revisions by S. Leff |
| 0.5 | 02 December 2019 | Updated for Cycle 8 |

**Reference Documents**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ref. Doc.** | **Title** | **ALMA Doc. No.** | **PDF Doc.** |
| [RD01] | INCOSE Systems Engineering Handbook | INCOSE-TP-2003-002-04 |  |
| [RD02] | ALMA Product Assurance Requirements | ALMA-80.11.00.00-001-D-GEN |  |

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Development Upgrades of the Atacama Large

Millimeter/submillimeter Array (ALMA)

Study Proposal

*Insert* **Title** *here*

**Principal Investigator:**

Institution:

Address:

PI Contact Information:

 *Telephone Number*

 *Email Address*

**Abstract**

*Present a one page (or less) description of the work scope and objectives of the proposed study with emphasis on your study’s scientific merits. If applicable, please include a description of prototype hardware and/or software.*

*Please make sure you tag your header text in Word appropriately if you wish to automatically update your Table of Contents.*

Contents

[1.0 Co-Investigator(s) and Collaborating Institution(s) 1](#_Toc442973014)

[2.0 Subcontractors 1](#_Toc442973015)

[3.0 Science Case 1](#_Toc442973016)

[4.0 Study Scope 1](#_Toc442973017)

[5.0 Study Deliverables 1](#_Toc442973018)

[5.1 Hardware 1](#_Toc442973019)

[5.2 Software 1](#_Toc442973020)

[5.3 Services 1](#_Toc442973021)

[5.4 Documents 2](#_Toc442973022)

[6.0 Interfaces to ALMA 2](#_Toc442973023)

[7.0 Site Location Impact Statement *(if applicable)* 2](#_Toc442973024)

[8.0 Period of Performance 2](#_Toc442973025)

[9.0 Staffing 2](#_Toc442973026)

[9.1 Offerer’s Staffing 2](#_Toc442973027)

[9.2 External Staffing (if applicable) 3](#_Toc442973028)

[10.0 Cost Breakdown 3](#_Toc442973029)

[10.1 Offerer’s Cost 3](#_Toc442973030)

[10.2 Collaborating Institution / Subcontractor Cost 4](#_Toc442973031)

[10.3 Total Study Cost 4](#_Toc442973032)

[10.4 Total Study Value 5](#_Toc442973033)

[11.0 Study Schedule 5](#_Toc442973034)

[12.0 Study Management 5](#_Toc442973035)

[12.1 Systems/Configuration Control 5](#_Toc442973036)

[12.1.1 Systems Requirement and Specification Control 5](#_Toc442973037)

[12.1.2 Documentation Control 6](#_Toc442973038)

[12.1.3 Product & Quality Assurance Control 6](#_Toc442973039)

[12.2 Performance to Schedule 6](#_Toc442973040)

[12.3 Performance to Budget 6](#_Toc442973041)

[12.4 Measures of Success 6](#_Toc442973042)

[12.5 Risk Management 6](#_Toc442973043)

[12.6 Communication Plan and Progress Reporting 7](#_Toc442973044)

[13.0 Study Closeout 7](#_Toc442973045)

[14.0 Commitment 7](#_Toc442973046)

**Appendix A – Reference Documents ………………………………….. 8**

**Appendix B – Curriculum Vitae of Key Personnel ……………….... 9**

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

*Complete Table 1.0, below. Insert/delete rows as needed.*

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

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

# **Subcontractors**

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

**2.1 Company/Institution:**

**Address:**

**Subcontracted parts and/or services:**

# Science Case

*Present the scientific rationale for the proposed Study and its significance to ALMA. If this is a strategic study, please explain how the science case is aligned with the current development priorities (increasing throughput, improving spatial resolution and mapping efficiency).*

1. Study Scope

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

1. Study Deliverables

*Describe the products that will be delivered at the conclusion of the proposed Study (if applicable.)*

## Hardware

## Software

## Services

## Documents

* Monthly Progress Reports
* Final 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.*

1. Site Location Impact Statement *(if applicable)*

*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.*

1. Period of Performance

*Define the anticipated period of performance (****twelve months maximum for general studies****).*

1. Staffing

*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 Study, 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

*Complete Table 2.0, below. Insert/delete rows as needed.*

**Table 2.0:** Labor Estimate.

|  |  |  |  |
| --- | --- | --- | --- |
| **Title (examples)** | **Key Personnel** | **FTE** | **Duration (Months)** |
| Principle Investigator |  |  |  |
| Scientific Lead |  |  |  |
| Engineering Lead |  |  |  |
| Research Engineer |  |  |  |
| Senior Engineer |  |  |  |
| Engineer 1 |  |  |  |
| Technician 1 |  |  |  |
| Machinist |  |  |  |
| Other |  |  |  |
| ***Totals*** | **0.00** | **0.00** |

* 1. External Staffing (if applicable)

*Complete Table 3.0, below. Insert/delete rows as needed.*

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

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

1. Cost Breakdown

*The total Award Pool for the Cycle 7 Call for Development Study Proposals is $500k.* ***The maximum cost allowance for an individual General Study Proposal is $200K.***

* 1. Offerer’s Cost

*Complete Table 4.0, below. Work Breakdown Structure (WBS) Number should correspond to Level 1 tasks/activities in the Project Schedule. Insert rows as needed.*

**Table 4.0:** Offerer’s Cost Breakdown.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **WBS No.** | **Task Description** | **Labor ($)** | **Materials & Services ($)** | **Travel ($)** |
| 1.0 |  |  |  |  |
| 2.0 |  |  |  |  |
| n.0 |  |  |  |  |
| ***SubTotals ($)*** | **0.00** | **0.00** | **0.00** |
| ***Total Offerer’s Cost ($)*** | **0.00** |

* 1. Collaborating Institution / Subcontractor Cost

*Complete Table 5.0, below. Insert rows as needed. Note the value of any In-Kind Contributions.*

**Table 5.0:** Collaborating Institution/Subcontractor Cost & In-Kind Contribution.

|  |  |  |
| --- | --- | --- |
| **Collaborating Institution / Subcontractor** | **USD ($)** | **In-Kind Contribution****Value in USD ($)** |
|  |  |  |
| ***Total Cost ($)*** | **0.00** |  |
| ***Total Value of In-Kind Contributions ($)*** | **0.00** |

* 1. Total Study Cost

*Complete Table 6.0, below.*

**Table 6.0:** Total Study Cost.

|  |  |
| --- | --- |
| **Study Cost Elements** | **USD ($)** |
| Total Offerer’s Cost (Table 4.0) |  |
| Collaborating Institution / Contractor Total Cost (Table 5.0) |  |
| Study Contingency (requires a supporting Risk Mitigation Plan, Table 9.0) |  |
| ***Total Study Cost ($)*** | **0.00** |

* 1. Total Study Value

*Complete Table 8.0, below.*

**Table 8.0:** Total Study Value.

|  |  |
| --- | --- |
| **Study Elements** | **USD ($)** |
| Total Offerer’s Cost (Table 4.0) |  |
| Collaborating Institution / Contractor Total In-Kind Contributions (Table 5.0) |  |
| ***Total Study Value ($)*** | **0.00** |

1. Study Schedule

|  |
| --- |
| ***Insert Study Schedule (Gantt Chart) Here******Increase Area as Required*** ***(may be added to an appendix in landscape orientation)*** |

**Figure 1.0:** Study Schedule.

1. Study Management

## Systems/Configuration Control

### Systems Requirement and Specification Control

*Refer to [RD1].*

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

### Documentation Control

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

### Product & Quality Assurance Control

*Refer to [RD2].* *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 Study 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-Study 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 Study. 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 Study will further the state of the art.*

## Risk Management

*Identify the primary areas of uncertainty (risk) foreseen at the outset of the Study. 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 9.0:** Project Risk Assessment.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  **No.** | **Primary Risk(s)** | **Prob. (%)** | **Impact ($)** | **Mitigation** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| ***Total Study Contingency ($)*** | **0.00** |  |

## 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 project milestones.

# Study Closeout

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

* verification of compliance with established procurement policies and procedures;
* verification of Purchase Order final payments;
* cost and schedule variance analysis;
* inactivation of cost accounts;
* preparation of a Final Report;
* preparation of an Outcome Report (if applicable); and
* archiving of Study records.
1. Commitment

Having read all documents listed in and annexed to the Call for Development Study Proposals, and having assessed the situation and the nature and difficulties of the proposed services, the undersigned hereby offers the “***insert Study Title here***” in accordance with the provisions of the present Call for Development Study 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**