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1. INTRODUCTION

1.1 Purpose

The EIP describes the PI's technical and management approach to completing the Instrument design, fabrication and verification of the flight unit, supporting integration with LADEE, supporting LADEE acceptance testing, and subsequent launch operations and post-launch checkout.

1.2 Scope

The EIP covers Investigation design and implementation activities during Phases B through D and pre-launch development and planning for Phase E. The scope and approach is based on the preliminary information contained in the PI's proposal and the terms of the selection letters sent as a result of the NASA AO Proposal evaluation and selection process.

The EIP shall include an appendix which identifies significant changes made in Phase A from the draft implementation described in the Investigation Proposal that affect Phase B-D cost, scope and schedule (identify each change and its impact on cost and schedule.).

1.3 Investigation Summary

This section includes a description of the measurements to be obtained in context of the science goals and objectives as well as discussion of success criteria with reference to the IFRD and SRD

1.4 Applicable Documents

- Contract or governing MOU/ Letter of Agreement
- LADEE Project Documents; CDRL/DRDs
- LADEE Environmental Requirements Document
- LADEE Science Requirements Document

1.5 Reference Documents

- Investigation Proposal
- Investigation Functional Requirements Document
- Investigation Interface Requirements Document
- Investigation Mission Assurance Plan
- Investigation Safety Plan

1.6 Summary Driving Requirements (reference IFRD and LADEE requirements)

1.7 Revisions

Initial Release at completion of Phase A and Accommodation Studies. Revise as needed.

2. TECHNICAL APPROACH

- 2.1 Instrument Design, Acquisition, Assembly & Test,
 - ref. IFRD Instrument descriptions
 - (includes Make/Buy Decision process)
 - Engineering Model Development and Test
 - Protoflight Instrument Development and Test
- 2.2 Accommodation Concept / Constraints with LADEE
- 2.3 Calibration, Verification and Validation (V&V), Pre/Post Delivery to LADEE
- 2.4 Integration Plan with LADEE
- 2.5 Operations Development Planning during Phase B-D
- 2.6 Ground Data System development and test
 - Plans for development and test of hardware and software for instrument operations and data processing
 - Plans for ground data system integration and test and for operations personnel training and test to achieve launch readiness

3. PROJECT TEAM AND ORGANIZATION

- 3.1 Organization
 - 3.1.1 *Staffing*
 - Key Personnel and Roles including delegations of PI Primary responsibilities
 - Include Development Phase Co-I Roles and responsibilities
 - 3.1.2 *International Partners and Contributions*
 - 3.1.3 *Small Business Participation*
- 3.2 Key Interfaces and communication
 - To LADEE Project
 - Between Institutions

4. MANAGEMENT AND SYSTEM ENGINEERING

- 4.1 Management Approach
- 4.2 System Engineering Approach and Methods to be used
 - Requirements Definition and requirements flow-down
 - Key Requirements to be carried in Project level Requirements
- 4.3 Investigation Schedule Management Approach
 - Critical Path Analysis, Schedule Margin Policy, etc.

- Identification of long-lead or high-risk parts including discussion of how schedule and technical risk will be managed
- 4.4 Cost Control and Reporting Approach
- Provide EVM reporting inputs to LADEE Payload EVM system for B-D
 - Reserve management plan
- 4.5 Subcontracts and Subcontract Management
- Including requirements flowdown approach
- 4.6 Risk Identification and Risk Management Approach
- 4.7 Independent Assessment and Oversight:
- Technical Peer Reviews
 - Milestone Reviews, (IAR/IPDR/ICDR/IDR); (RE-002/RE-003/RE-005)
 - Advisory Boards, etc.
- 4.8 Management Reporting and Reviews
- 4.8.1 *MMRs*
- 4.8.2 *Other (e.g., NASA 533M/Q, etc.)*
- 4.9 Configuration Management and Control
- 4.10 Export Control / ITAR compliance Plan
- 4.11 Facility Requirements and Utilization Plans
- 4.12 Requirements for LADEE Support and LADEE-Supplied Hardware
- 4.13 Requirements for Science Team Support and Data Analysis
- 4.14 Education and Public Outreach Plans
- 4.15 Safety Plans

5. VERIFICATION AND VALIDATION

- 5.1 Mission Assurance
 - 5.1.1 *Mission Assurance Plan*
 - 5.1.2 *Reliability Assurance Plan*
 - 5.1.3 *Hardware Quality Assurance Plan*
 - 5.1.4 *Software Quality Assurance Plan*
 - 5.1.5 *Problem/Failure Reporting*
 - 5.1.6 *Electronics Parts*
 - 5.1.7 *Contamination Control and Susceptibility*
 - 5.1.8 *Materials and Processes*
- 5.2 Environmental Testing and Analysis
- 5.3 Calibration Plan
- 5.4 Post-Delivery Support Plans
- 5.5 Hardware & Software Requirements Verification & Compliance Plan/Matrix
- 5.6 Safety Analysis

6. INVESTIGATION BASELINE - SCOPE OF WORK

- 6.1 Key Deliverables
 - 6.1.1 *Instrument Hardware (EM, Flight, GSE, Testbeds, etc.)*
 - 6.1.2 *Instrument Software and Data*
 - 6.1.3 *Ground Data System*
 - 6.1.4 *Documentation*
- 6.2 Receivables
- 6.3 Work Breakdown Structure and WBS Dictionary
 - With Deliverables/Receivables by Work Package
- 6.4 Detailed Investigation/Project Schedule
 - Consistent with WBS
 - Network based, Microsoft Project compatible
 - Critical Path Analysis, Identified Schedule Margin

- 6.5 Baseline Phase B/C/D Cost/Workforce Plan
 - (Not applicable for non US-funded portion of contributed PI Investigations)
 - Time-phased w/ sub-totals by Gov't FY and Runout total in Real-year dollars by WBS element
 - Time-Phased Reserves Recommendations
 - Baseline B/C/D workforce Plan by WBS element (FTE by year with runout total and Investigation Summary Total)
- 6.6 Risk List
- 6.7 Descope List and time value

7. WAIVERS/EXCEPTIONS

- Any waivers/exceptions to LADEE requirements or policies that are known at the time of EIP approval can be included here.

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Appendix A - Acronym List

AO	Announcement of Opportunity
CDRL	Contract Data Requirements List
DRD	Data Requirements Document
EIP	Experiment Implementation Plan
EM	Engineering Model
EVM	Earned Value Management
FRD	Functional Requirements Document
GSE	Ground Support Equipment
IAR	Instrument Accommodation Review
ICDR	Instrument Critical Design Review
IDR	Instrument Delivery Review
IPDR	Instrument Preliminary Design Review
ITAR	International Traffic in Arms Regulations
JPL	Jet Propulsion Laboratory
MMR	Monthly Management Review
MOU	Memorandum of Understanding
LADEE	Mars Science Laboratory
NASA	National Aeronautics and Space Administration
PI	Principal Investigator
PIP	Proposal Information Package
SRD	Science Requirements Document
V&V	Verification and Validation
WBS	Work Breakdown Structure