



**FIXED-PRICE RESEARCH AND  
DEVELOPMENT CONTRACT**

NO. TBD

**BETWEEN**

CALIFORNIA INSTITUTE OF TECHNOLOGY  
JET PROPULSION LABORATORY  
(The "Institute" or "JPL")  
4800 OAK GROVE DRIVE  
PASADENA, CALIFORNIA 91109-8099

**AND**

CONTRACTOR (TBD)

**SPECIMEN CONTRACT**

FOR

**LIGHTWEIGHT SYNTHETIC APERTURE RADAR (LIGHTSAR) SATELLITE  
SYSTEM**

IS A

SUBCONTRACT UNDER JPL's NASA PRIME CONTRACT

TASK ORDER NO.

CONTRACT PRICE: \$

A DO - C9 Rating is assigned to this Contract under DMS Regulation 1

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PREAMBLE

This Contract, entered into on \_\_\_\_\_ by and between the CALIFORNIA INSTITUTE OF TECHNOLOGY, (hereinafter called the "Institute or "JPL), a corporation organized and existing under the laws of the State of California, and \_\_\_\_\_(hereinafter called the "Contractor"), a corporation organized and existing under the laws of the State of \_\_\_\_\_ and constituting a subcontract under the NASA Prime Contract between the Institute and the Government;

WITNESSETH THAT:

The Contractor agrees to furnish and deliver the supplies and perform the services set forth in this Contract for the consideration stated herein.

SCHEDULE

ARTICLE 1. STATEMENT OF WORK

(a) The Contractor shall define, develop, launch, and operate a lightweight synthetic aperture radar (LightSAR) system, and process, deliver, and archive the data acquired by that system for NASA science applications. In the performance of this effort the Contractor shall:

(1) **PHASE 1**: Definition

- (A) Perform LightSAR system definition;
  - (i) Define mission and system requirements; prepare the flow down of mission requirements into lower level project requirements and performance specifications;
  - (ii) Define user requirements in a draft Data Management Agreement (DMA) document, DRD01; identify mission and design requirements in a draft Mission Requirements Document (MRD), DRD02; and plan mission and system implementation in a draft Project Implementation Plan (PIP), DRD03;
  - (iii) Define the mission and system design;
  - (iv) Demonstrate that the mission and system concepts meet user requirements;
  - (v) Present the results of this effort at the System Requirements Review (SRR); and
  - (vi) Update the system definition based on SRR results.
- (B) Perform LightSAR system preliminary design;
  - (i) Maintain under configuration control the mission and system requirements, and flow down of mission requirements into lower level project requirements and performance specifications;
  - (ii) Define and maintain under configuration control the technical designs and interface definitions for all elements/ components/ parts of the system and mission, including all hardware and software for the flight and ground elements;
  - (iii) Prepare, submit, and maintain under configuration control final DMA, MRD, and PIP documents, mutually agreed to by JPL and the Contractor;
  - (iv) Demonstrate all items are addressed adequately and all designs are workable;
  - (v) Present results of this effort at the Preliminary Design Review (PDR);
  - (vi) Update the preliminary design based on PDR results.

**[Statements of work for Phases 2 and 3 are in ARTICLE 6, OPTION PROVISION]**

(b) The Contractor shall manage the LightSAR system definition, development, and operation, and processing, delivery, and archiving of the data acquired for NASA science applications, in accordance with the approved DMA, MRD and PIP. In the performance of this effort the Contractor shall perform the following:

- (1) Implement an information management system that provides effective communication within the entire Project Team, including JPL;
- (2) Provide continuous visibility to JPL into project technical, schedule, cost, and risk status, issues and plans.
- (3) Submit updates of DMA, MRD, PIP and technical documents for approval, as needed;
- (4) Conduct Monthly Management Reviews (MMRs) and Quarterly Management Reviews (QMRs) at which cost, technical, schedule, and risk status, variances with plans, and problem resolution plans are reported at mutually agreed upon locations;
- (5) Provide data packages and conduct project reviews, including SRR, PDR, CDR, PTR, MRR, OAR, AORs, and DR, at mutually agreed upon locations, by a non-advocate review panel;
- (6) Update data packages and define, track and close out action items from project reviews, including SRR, PDR, CDR, PTR, MRR, OAR, AORs, and DR to reflect actions taken as a result of review.
- (7) Provide supporting information and representation at NASA Governing Program Management Council (GPMC) ½-hour long reviews at JPL periodically, as required.
- (8) Conduct demonstrations of flight and ground segment capabilities on an incremental basis to provide continuous validation of the system design;
- (9) Provide Summary Contract Report SF 295 periodically, per instructions on the form;

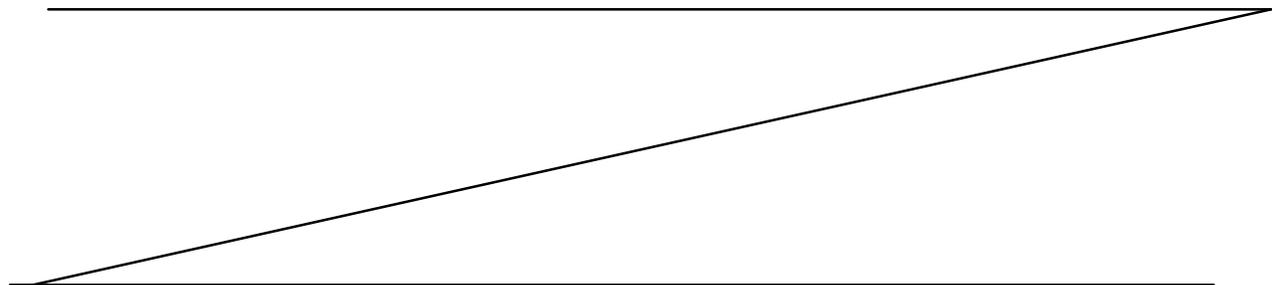
(c) JPL will:

- (1) Maintain visibility and insight into project technical, schedule, cost, and risk status, issues, and plans.
  - (2) Review Contractor draft documents and provide comments, as appropriate.
  - (3) Participate in MMRs, QMRs, and project reviews
  - (4) Present project status at periodic GPMC reviews
  - (5) Coordinate and manage project science activities;
  - (6) Provide the Contractor a Science Mission Plan.
  - (7) Review and approve drafts of Contractor deliverable documents and proposed revisions.
  - (8) Provide funding in a timely manner.
-

ARTICLE 2. DELIVERY OR PERFORMANCE SCHEDULE

- (a) Except as otherwise provided in this Contract, the point of inspection, acceptance and delivery of all supplies deliverable under this Contract, shall be the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, California 91109. All such supplies shall be packaged, packed, boxed, or crated in such a manner as to insure safe delivery and shall be shipped prepaid at the Contractor's expense to JPL.
- (b) The Contractor shall furnish and deliver the supplies and perform the services required by ARTICLE 1 STATEMENT OF WORK, in accordance with the following schedule:

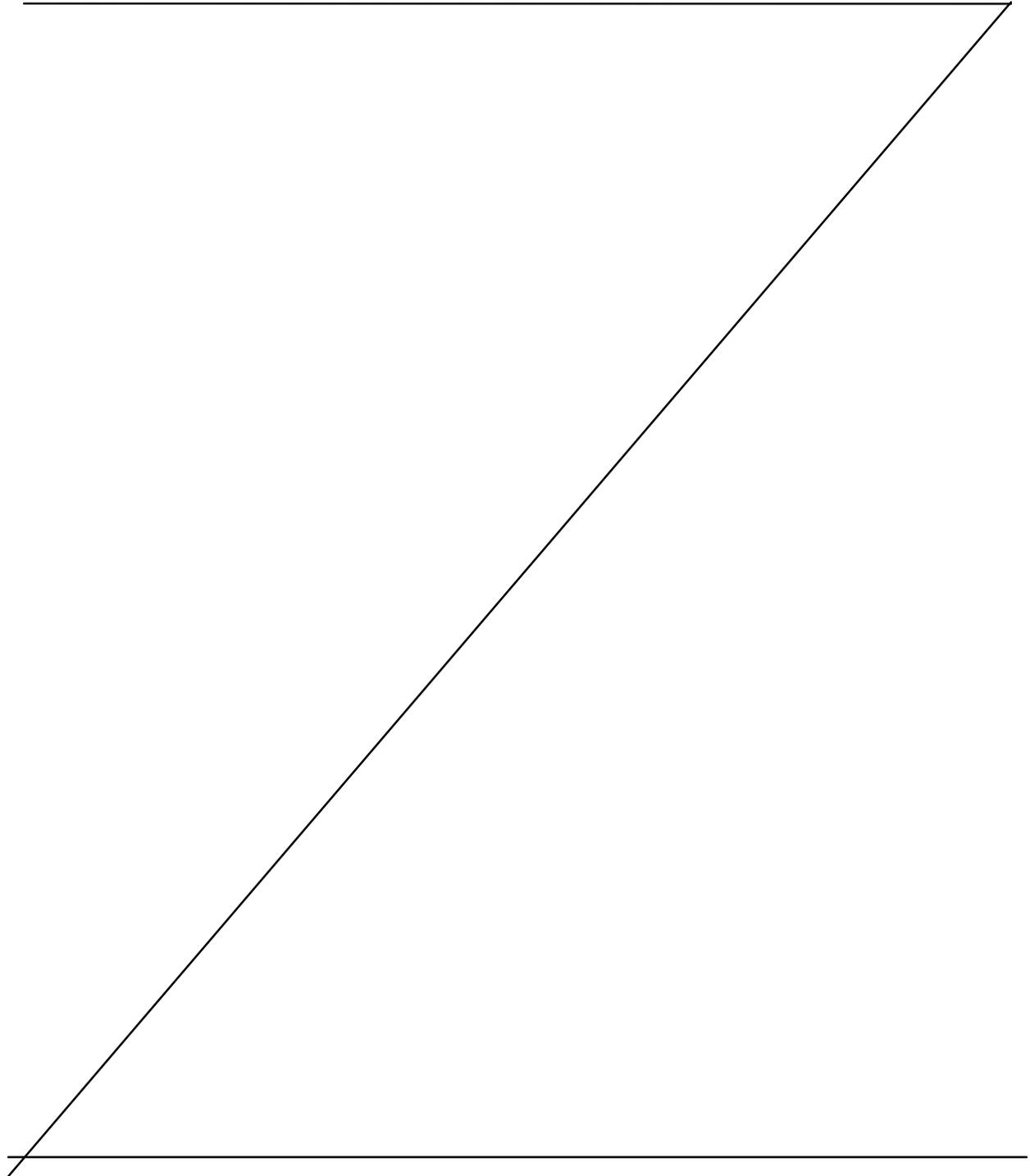
	<u>Item</u>	<u>On or Before</u>
(1)	DMA, MRD, and PIP, draft versions, in accordance with paragraph 1(a)(1)(A)(i)	TBD days before SRR
(2)	DMA, MRD, and PIP, released versions, in accordance with paragraph 1(a)(1)(B)(iii)	TBD days before PDR
(3)	DMA, MRD, and PIP, updated versions, in accordance with paragraph 1(b)(3)	As revised
(4)	MMR, QMR, and GPMC data packages in accordance with paragraph 1(b)(4) and (7)	5 days before each scheduled review
(5)	Review data package(s) in accordance with paragraph 1(b)(5)	5 days before each scheduled review
(6)	Review data package(s) updates in accordance with paragraph 1(b)(6)	30 days after each scheduled review
(7)	Summary Contract Report SF 295 in accordance with paragraph 1(b)(9)	Periodically
(8)	Processed science data in accordance with paragraph 1(a)(3)(A)(i)	TBD



ARTICLE 3. PRICE AND PAYMENT

(a) TOTAL FIXED PRICE: \$ TBD

(b) Invoices. Invoices shall be submitted, in triplicate, to JPL Accounts Payable, Mail Stop 171-366, 4800 Oak Grove Drive, Pasadena, California 91109.



ARTICLE 4. LIMITATION OF JPL'S OBLIGATION

- (a) The Firm Fixed Price of this Contract is the amount set forth in paragraph (a) of ARTICLE 3, PRICE AND PAYMENT, subject to the limitations set forth in this Article.
- (b) Subject to paragraph (f) below, the amount set forth in Period No. 1 of the following Incremental Liability Schedule reflects the maximum limitation of the Institute's liability for all purposes, including incurred costs, termination costs (including amounts payable with respect to subcontracts and settlement costs) and allowance for profit or fee (if any):

**INCREMENTAL LIABILITY SCHEDULE**

<b><u>Period No.</u></b>	<b><u>Cumulative Maximum Liability</u></b>	<b><u>Terminal Date</u></b>
1	\$TBD	TBD
2	\$TBD	“
3	\$TBD	“
4	\$TBD	“
5	\$TBD	“
6	\$TBD	“
7	\$TBD	“
8	\$TBD	“
etc.	etc.	etc.
.	.	.
.	.	.
.	.	.
.	.	.

- (c) It is anticipated that JPL shall, prior to the terminal date, if any, of the Period specified in the first line of paragraph (b) above, issue a Unilateral Modification to revise the maximum limitation to the amount set for the next successive period. The determination as to whether to issue such a modification shall be at JPL's sole discretion. In the event that JPL does not issue such a modification prior to the terminal date, this Contract shall, unless the Contractor requests a terminal date extension in writing prior to the terminal date, be deemed terminated for convenience and the Contractor shall proceed as if the Contractor has received a Notice of Termination pursuant to the GP Article entitled "Termination for Convenience." JPL shall, upon receipt of a written request from the Contractor for Terminal Date extension, immediately issue a unilateral modification extending the Terminal Date in accordance with Contractor's request. If the Contractor or JPL have reason to believe that any other change in the Incremental Liability Schedule would be in the best interest of the contract effort, the Contractor or JPL may notify the other party in writing to that effect, together with the requested change. If the Contractor and JPL agree with the requested change, the Incremental Liability Schedule will be revised by Supplemental Agreement to the Contract.

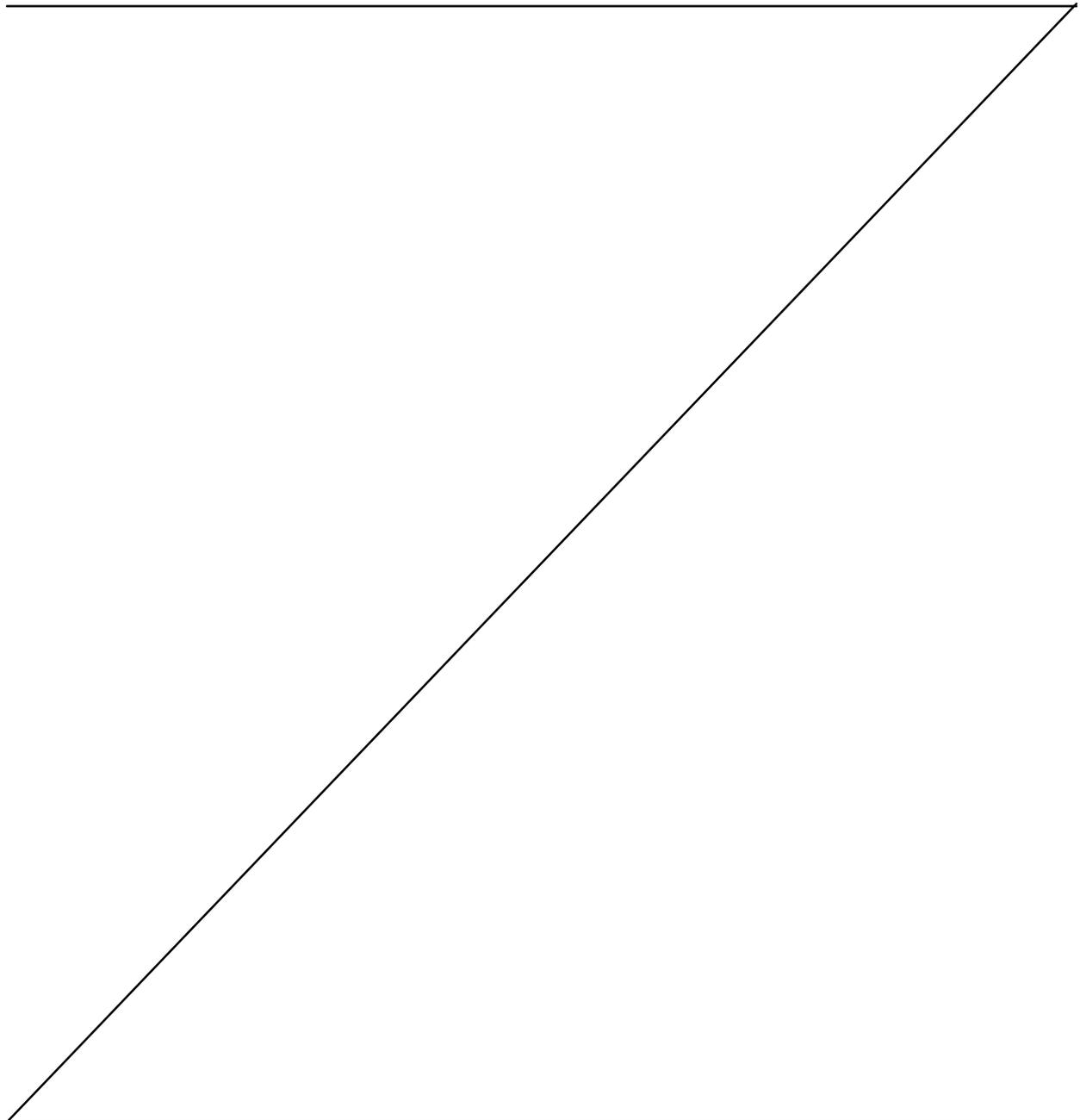
- (d) In the event that JPL issues such a UM to increase the liability after the terminal date, the Contract shall no longer be deemed terminated, and such UM shall have the same effect as if it had been issued prior to the terminal date; provided however, that if JPL's failure to issue the UM by the terminal date caused an increase of the cost of, or the time required for, performing this Contract, because the Contractor proceeded as if a Notice of Termination had been issued, an equitable adjustment shall be made in (i) the Contract Price, the time of performance, or both; and (ii) other affected terms of the Contract. The Contractor must assert its right to such equitable adjustment within 30 days of receipt of the UM. However, if JPL decides that the facts justify it, JPL may receive and act upon a proposal submitted before final payment of the Contract. Subject to paragraph (f) below, in the event that this Contract is terminated pursuant to this Article, or otherwise terminated by JPL pursuant to the GP Article entitled "Termination for Convenience," the cumulative liability amount set forth in the Incremental Liability Schedule for the Period referenced in the first sentence of paragraph (b) of this Article, reflects JPL's maximum liability notwithstanding anything to the contrary in the GP Article entitled "Termination for Convenience," or the value of supplies and services delivered to and retained by JPL.
- (e) The Contractor has used the Incremental Liability Schedule to plan its progress payments, partial payments, obligations and termination liability. It is a management prerogative of the Contractor to determine if any part of these elements are to be under funded or at risk (relative to the Incremental Liability Schedule) for any period of time. This is a firm fixed price type Contract. The Contractor assumes all risk for any variance between planned and actual costs, including planned and actual termination liability. The Contractor is strictly liable for all cost variances, including cost variances attributable to indirect rate changes and shall in no event be excused from the obligation to complete performance in accordance with the price, delivery schedule, and technical requirements of this Contract.
- (f) If the Contract is modified, the provisions of this Article shall not limit the Contractor's obligation pursuant to GP Article entitled "Changes," to diligently pursue the performance of the Contract as modified. In the event that a unilateral modification contains a liability limit for work performed under such modification, the Contractor's obligation to pursue performance of such modification and the Institute's liability for such modification, shall, until the UM(s) is bilaterally settled, be limited by the amount of the liability limit included in the UM. Until such a UM is settled, the liability limit on the UM does not increase the baseline liability in paragraph (b). In the event that this Contract is deemed terminated pursuant to paragraph (c) of this Article or the GP Article entitled "Termination for Convenience," prior to the settlement of an outstanding UM(s), the Institute's maximum liability for all purposes, including incurred costs, termination costs (including amounts payable with respect to subcontracts and settlement costs and consideration for delivered supplies and services) and allowance for profit or fee, shall be no more than the sum of the cumulative liability amount set forth in the Incremental Liability Schedule for the Period referenced in the first sentence of paragraph (b) of this Article, plus the liability limit(s) set forth in the UM(s).

(g) Unilateral Modification Liability Limits

- (1) Reserved.
- (2) Reserved.

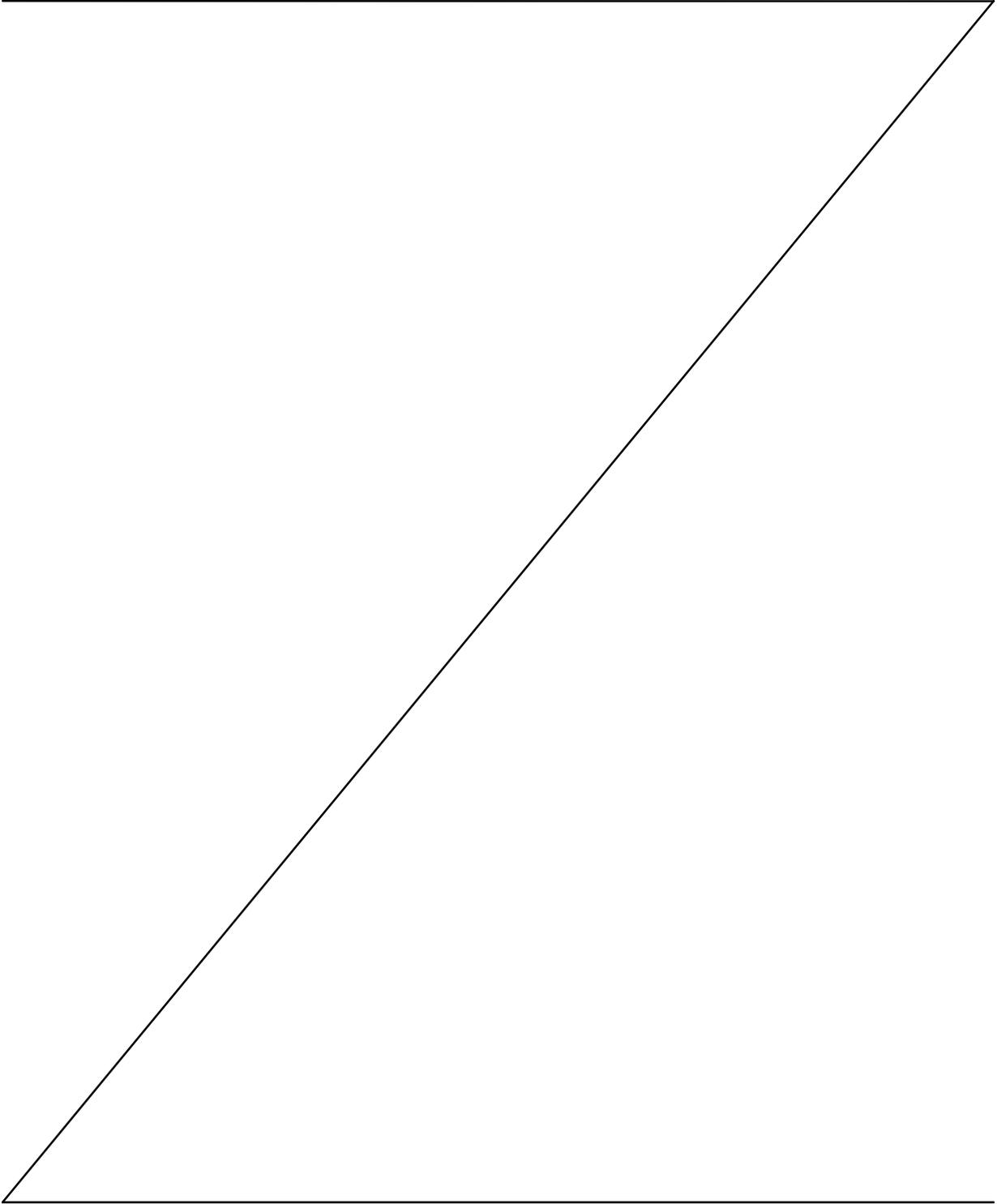
(h) In the event that this Contract contains a provision providing for progress payments, such provision shall be subject to the limitations set forth in this Article and the "contract amount" referred to in any such provision for progress payments is the Firm Fixed Price of this Contract set forth in paragraph (a) of ARTICLE 3, PRICE AND PAYMENT.

(i) The provisions of this Article shall in no way limit the Institute's rights under the GP Article entitled Default.



ARTICLE 5. CONTRACTOR'S COMMITMENT

- (a) The contractor's proposal dated (To Be Provided) that describes the contractor's commitment of in-kind products/services and co-funding to perform the statement of work is incorporated and made a material part of this contract.



ARTICLE 6. OPTION PROVISION

- (a) Priced Option. JPL shall have the option to modify this Contract to add the following Statement of Work at ARTICLE 1 (a) at a total Fixed Price of \$ TBD :

“(2) **PHASE 2**: Development

- (A) Perform LightSAR system and mission detail design in accordance with the approved DMA, MRD and PIP;
  - (i) Refine technical designs and document at a level sufficient to manufacture or procure every item or product in the LightSAR system, and associated equipment, facilities, hardware, software, and services;
  - (ii) Demonstrate designs meet functional performance and interface requirements;
  - (iii) Prepare for manufacture, procurement, assembly, and checkout of subsystems;
  - (iv) Present the results of this effort at the Critical Design Review (CDR);
  - (v) Update the detail design based on CDR results.
  
- (B) Produce LightSAR subsystems/components/parts, including all hardware and software, in accordance with the approved DMA, MRD and PIP;
  - (i) Manufacture, procure, and assemble LightSAR subsystem hardware, software, and associated equipment as scheduled;
  - (ii) Demonstrate subsystems meet functional performance and interface requirements, and deliver on schedule;
  - (iii) Prepare for integration and test of LightSAR elements and system, including preparation of functional and environmental test plans;
  - (iv) Present the results of this effort at the Pre-environmental Test Review (PTR);
  - (v) Update work based on PTR results.
  
- (C) Perform integration and test of the LightSAR system flight segment and ground segment elements in accordance with the approved DMA, MRD and PIP;
  - (i) Assemble and integrate the flight segment and ground segment elements of the LightSAR system, and associated hardware, software, equipment, facilities, and services;
  - (ii) Verify that the flight segment and ground segment elements meet interface, functional performance, and environmental requirements, on schedule;
  - (iii) Prepare for launch and on-orbit validation of the LightSAR system;
  - (iv) Present the results of this effort at the Mission Readiness Review (MRR);

- (v) Update work based on MRR results.
- (D) Activate the LightSAR system and validate its operational capability in accordance with the approved DMA, MRD and PIP;
  - (i) Place the LightSAR flight segment into the correct Earth orbit, and activate the LightSAR ground segment, on schedule;
  - (ii) Demonstrate the LightSAR system meets performance requirements, on schedule;
  - (iii) Prepare for sustained operations of the LightSAR system;
  - (iv) Present the results of this effort at the Operational Acceptance Review (OAR);
  - (v) Update work based on OAR results.”
- (b) Priced Option. JPL shall have the option, to modify this Contract to add the following Statement of Work at ARTICLE 1 (a) at a total Fixed Price of \$ TBD :

“(3) **PHASE 3**: Operations

- (A) Perform mission operations in accordance with the approved DMA, MRD and PIP;
  - (i) Execute mission plan, respond effectively to NASA science data requests, and process, deliver, and archive the required quantity and quality of science data, on schedule;
  - (ii) Demonstrate the LightSAR system maintains operational performance requirements, on schedule;
  - (iii) Prepare to deactivate the LightSAR system at mission completion;
  - (iv) Report technical status, performance, and costs at periodic Annual Operations Reviews (AORs);
  - (v) Update work based on AOR results.
- (B) Deactivate the LightSAR system in accordance with the approved DMA, MRD and PIP;
  - (i) Safely de-orbit the LightSAR system flight segment;
  - (ii) De-activate the ground segment;
  - (iii) Transfer operations and maintenance of the LightSAR data archive;
  - (iv) Present the results of this effort at the Decommissioning Review (DR);
  - (v) Wrap-up work based on DR results.”

ARTICLE 7. ALTERATIONS IN THIS CONTRACT

(a) Rights in Data

(1) Delete Article GP-51, **Rights in Data-General**, paragraph (b)(1)(A), and substitute as follows:

(A) Data first produced in the performance of this Contract:

(i) And provided to NASA Sponsored Science Data Users under the data delivery provisions of this contract:

(a) Shall be processed to Level 0 and Level 1; cost of any processing of data beyond Level 1 is not included under this Contract and shall be borne by the requester;

(b) Shall be with unlimited rights to use, and to publish results drawn from the data in a scientific journal, etc., without prior approval of the Contractor;

(c) Shall be restricted in redistribution to members of the immediate science research team, without prior approval of the Contractor;

(d) Shall be prohibited from being placed on a public forum (e.g., the Internet) in its original form at any time without the expressed, written consent of the Contractor.

(ii) And archived under the data archiving provisions of this contract:

(a) Shall be retained for a minimum of 5 years after LightSAR system decommissioning;

(b) Shall not be deleted / destroyed without first affording JPL the opportunity to make alternate archive arrangements for such data.

(b) Additional Data Requirements

(1) Delete Article GP-68, **Additional Data Requirements**, paragraph (a), and substitute as follows:

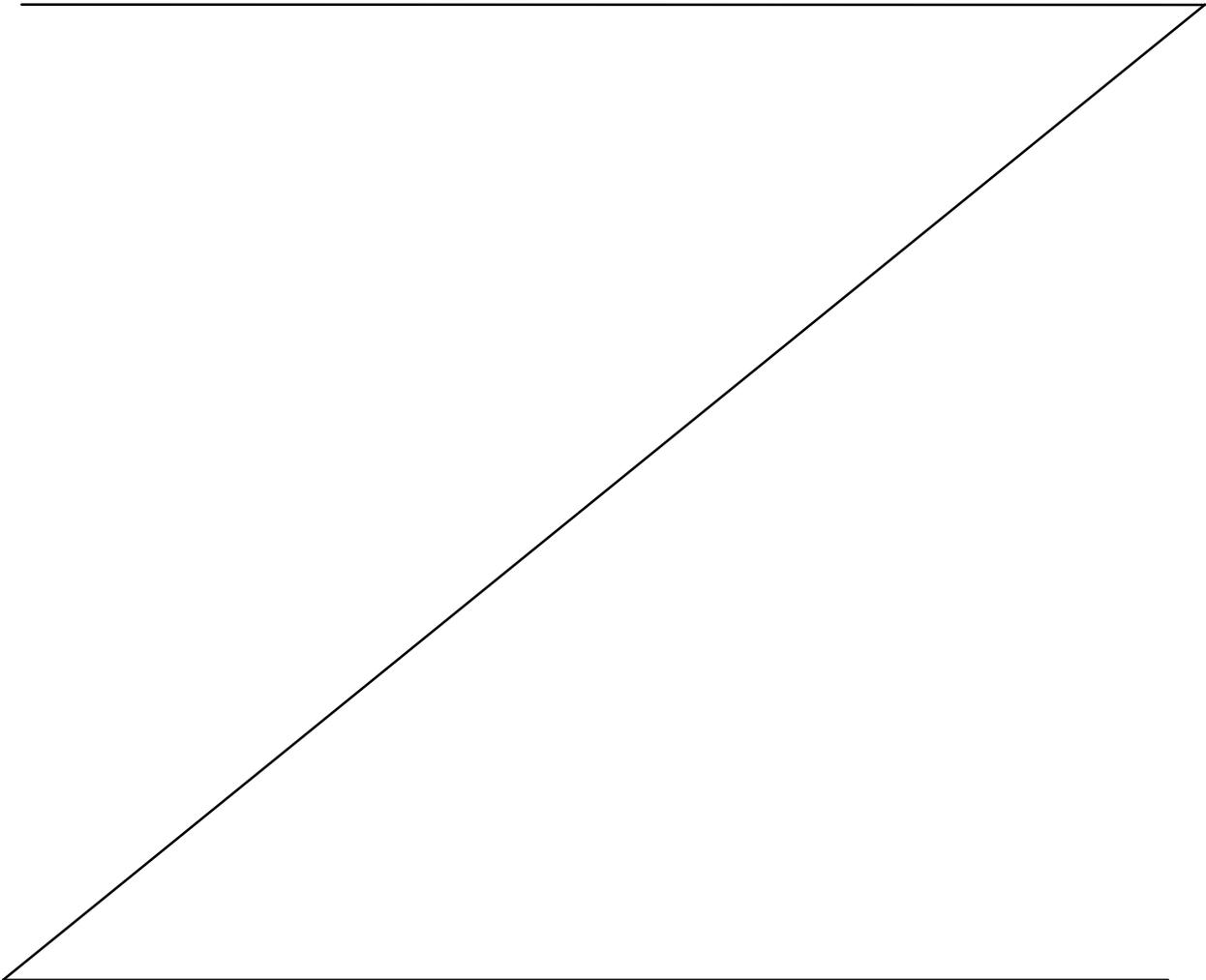
“(a) In addition to the data (as defined in the “Rights in Data - General” Article or other equivalent included in this Contract) specified elsewhere in this Contract to be delivered, JPL may at any time during Contract performance or within a period of 5 years after

acceptance of all items to be delivered under this Contract, order any data first produced or specifically used in the performance of this Contract.”

(c) Termination for Convenience

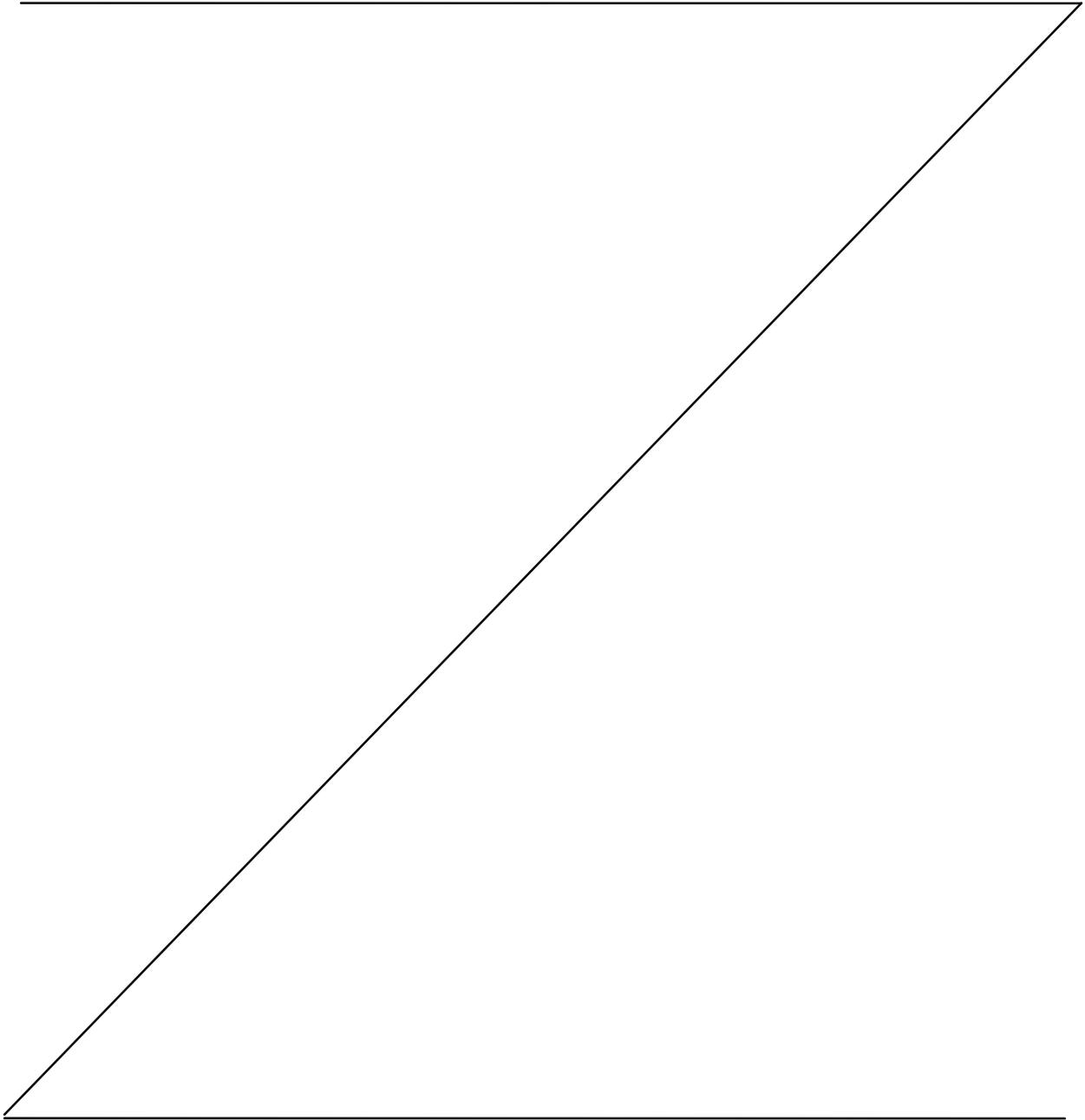
(1) Delete Article GP-69, **Termination for Convenience**, paragraph (a), and substitute as follows:

“(a) JPL may terminate performance of work under this Contract in whole or, from time to time, in part if JPL determines that a termination is in the interest of the Institute or the Government. JPL shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date. Such termination shall be for the JPL funded portion of the contract requirements (and the termination of any obligation by the Institute thereto). Such termination will not reimburse any cost share, either funding or in kind products, used during the performance of the Contract or for any other expense related to the Contractor’s investment or anticipated investment or return on such investment in the future due to a Termination for Convenience under this Article.”



ARTICLE 8. SPECIAL PROVISIONS

- (a) Provide a license of the software used by the Contractor for calibration of Level 1 interferometric, quad-polarimetric, dual-polarimetric, single -polarimetric, and ScanSAR data. The software provided should be an exact duplicate of the calibration processor software developed for LightSAR and used by the Contractor. NASA/ JPL may use this copy to periodically evaluate the quality of data supplied to NASA Science data users. Results of these evaluations will be provided to the Contractor so that appropriate adjustments may be made to the calibration processor if necessary.



IN WITNESS WHEREOF, the parties hereto have executed this Contract as of the day and year first above written.

CALIFORNIA INSTITUTE OF TECHNOLOGY

By \_\_\_\_\_

\_\_\_\_\_

**SPECIMEN CONTRACT**

By \_\_\_\_\_

\_\_\_\_\_

(Typed Name)

\_\_\_\_\_

(Title)

*Instructions to Contractor: Do not insert date on Preamble page.*

**DATA REQUIREMENT DESCRIPTION** Number 01

Title: Data Management Agreement (DMA).

Due: Draft version due prior to SRR. Final approved version due prior to PDR.

Purpose: This document specifies the LightSAR interface and performance requirements of the (NASA) science data user and customer.

Format/ Content: Format may follow the Contractor's standard practices. Use the content outlined below to guide preparation of the document. Commercial user/customer requirements may be included. An asterisk (\*) indicates a topic that could be a separate document or appendix. In a separate file document, trace each DMA requirement to its source, for future reference.

- I. SCOPE. State the purpose and scope of the document, provide background information, and define key terms. Provide a data flow diagram, with an end-to-end system overview description.
- II. REFERENCES. List documents or sources cited or imposed elsewhere in the document.
- III. REQUIREMENTS. In separate sub-paragraphs, state known or derived requirements that relate to the LightSAR data system.
  - A. Data Acquisition.
    1. Data Requests. Specify data request types, formats, volumetrics and throughput, interfaces, tracking, and reporting.
    2. Scheduling. Specify parameters of the mission planning process, including mission plan development (refinement, changes update timeliness), data request conflict resolution, over-riding priority list, and definition of the order fulfillment system.
    3. Data Content. State target accessibility, revisit frequency, etc., operating requirements. Specify the parameters of the SAR data source, the operating modes, and the associated image quality requirements, including geometric and radiometric accuracy, calibration, and isolation.
  - B. Data Processing.
    1. Data Products. Specify the parameters for the standard data products, including Levels (0 and 1, minimum), types, modes, formats. Specify the media on which data will be captured.
    2. Data Processor. Specify the performance parameters of the data processor, including characteristics, interfaces, operator qualification, and calibration.
    3. Processor Algorithms. Specify the algorithm theoretical bases for the Level 0 and Level 1 standard data products
  - C. Data Calibration.\*
    1. Specify end-to-end radiometric, polarimetric, and interferometric calibration requirements.
    2. Define SAR instrument testing and processor verification requirements to assure delivery of calibrated data products throughout the LightSAR mission life cycle.
    3. Define the in-situ calibration requirements.
    4. Define quality control process requirements placed on day-to-day processing operations

- D. Data Distribution. State requirements that relate to LightSAR data distribution to users, including delivery methods/means, media, format, delivery times, software tools to be made available to users, and recipients.
- E. Data Rights. State requirements that relate to LightSAR user data rights limitations.
- F. Data Archive. State requirements that relate to LightSAR data archive, including storage types/formats, media, archive life, handling of data requests, delivery times, inventory catalog, archive access.

IV. VERIFICATION. In as many sub-paragraphs as necessary, define a program of incremental demonstration activities, progressing from paper analysis through operational measurement, that builds confidence, and ultimately confirms, that the end product LightSAR data system meets the above requirements. Indicate what progress demonstration results will be available at each LightSAR project review milestone.

**DATA REQUIREMENT DESCRIPTION** Number: 02

Title: Mission Requirements Document (MRD).

Due: Draft version due prior to SRR. Final version due prior to PDR.

Purpose: To document LightSAR system top level technical and operational requirements.

Format/ Content: The Contractor's standard format and practices may be used. However, the topics that follow should be addressed. An asterisk (\*) indicates a topic that could be a separate document or appendix. In a separate file document, trace each MRD requirement to its source, for future reference.

I. INTRODUCTION. State the purpose and scope of the document and its relationship to other project documents, identify the project, and define key terms.

II. REFERENCES. List all documents or sources mentioned in the document.

**III. REQUIREMENTS.****A. Mission**

1. Objective(s): primary, secondary
2. Constraints: costs, schedule, regulatory, environmental, technological; available launch vehicle; equipment, software, infrastructure, and/or facility availability
3. Customer Requirements: Reference DMA document

**B. System**

1. System overview, partitioning, interfaces
2. End-to-end SAR Data System Requirements\*
3. Flight Segment
  - a. Satellite. Specify orbit, attitude, and position accuracy, pointing accuracy, mission duration, reliability, availability, etc.
  - b. Payload. Specify performance parameters: SAR frequency SAR beam modes, swath widths, resolutions, etc.; SAR on time per orbit, SAR on-board data storage, switching time between beam modes, radiometric, polarimetric, and interferometric calibration requirements, etc.
  - c. Launch Vehicle.
4. Ground Segment
  - a. Ground Data System Overview
  - b. Mission Planning and Management
  - c. Operations Facilities
  - d. Data/ Communications Links
  - e. Earth Stations
  - f. Data processor, data archive
  - g. Data delivery to users
  - h. Information management

**B. Operations**

1. Overview. Mission phases and timeline
2. Mission Planning and Management
3. Mission Phases
  - a. Pre-Launch Preparations

- (1) Documentation
- (2) Training and Rehearsals
- (3) Staffing
- b. On-orbit check-out/ turnover/certification milestone
- c. Routine Operations, and Contingencies

#### IV. ASSURANCE PROVISIONS

- A. Performance Demonstration Requirements
- B. Risk Reduction
- C. Safety
- D. Security

**DATA REQUIREMENT DESCRIPTION** Number 03.

Title: Project Implementation Plan (PIP).

Due: Draft version due prior to SRR. Final approved version due prior to PDR.

Purpose: To detail how the LightSAR project will be successfully accomplished.

Format/ Content: Format may follow the Contractor's standard practices. The outline below is only a guide. An asterisk (\*) indicates a topic that could be a separate document or appendix. A checklist for PIP contents is at <http://eisjpl.nasa.gov/~majohnso/pip/stdoutline.html>.

- I. INTRODUCTION. Summary description and overview of project
- II. OBJECTIVES. Project objectives, goals and success criteria.
- III. MANAGEMENT
  - A. Relationships, Dependencies, and Agreements.
  - B. Organization. Project team composition, hierarchy, roles & responsibilities, authority, reporting chain (with charts)
  - C. Controls. Constraints on cost, schedule, or technical performance.
  - D. Management Support Systems
    1. Management Philosophy
    2. Management Tools (e.g., systems for scheduling, budgeting and tracking, performance management and earned value management, action item tracking, receivable/ deliverable trackers, etc.)
    3. Communications Approach
    4. Information Management Approach
    5. Science Management Approach
    6. Configuration Management Approach
    7. Software Management Approach
    8. Acquisition Plan
    9. Performance Measurements and Assessments
    10. Support Systems, Facilities, Logistics, and Packaging/Transport Approach
  - E. Outreach Plan
  - F. Closeout Plan. Includes capture of process knowledge
- IV. TECHNICAL APPROACH
  - A. Implementation Approach
  - B. Requirements
  - C. System Engineering Management & Architecture
  - D. Work Breakdown Structure, and WBS Dictionary
  - E. Mission and Product Design, Fabrication, Integration/Assembly, and Test Approaches
  - F. Ground Operations Concept
  - G. Operations Approach. Includes pre-launch, launch, and post-launch operations
  - H. Technology and Commercialization Plan

V. PERFORMANCE ASSURANCE

- A. Risk Management Plan. Includes significant risk list, risk management process and tools, and descope plan.
- B. Safety
- C. Environmental Impact
- D. Mission Assurance. Includes reliability, quality assurance, parts, contamination allowance and control, software assurance, and performance verification

VI. SCHEDULES. Master, intermediate; milestones; deliverables

VII. RESOURCES

- A. Financial. Includes funding breakdown and profiles, reserves and reserves allocation plan
- B. Workforce

APPENDICES