



**SPECIMEN CONTRACT
RFP No. PT-2671-591479
Dated: October 5, 2004**

**FIXED PRICE
RESEARCH & DEVELOPMENT SUBCONTRACT**

Subcontract No. TBD Specimen, TBD

BETWEEN

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

AND

TBD

**THIS CONTRACT FOR
ADVANCED MICROWAVE RADIOMETER (AMR)
REFLECTOR STRUCTURE ASSEMBLY (RSA)
IS A
SUBCONTRACT UNDER JPL's NASA PRIME CONTRACT**

TASK ORDER NO. TBD

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The following documents are incorporated into and made a material part of this Subcontract.

World Wide Web: <http://acquisition.jpl.nasa.gov/e2000.htm>

GENERAL PROVISIONS: Fixed-Price Research and Development Contract R 8/03, with Included Exhibits.

- Affiliate Access Report, Form JPL 1943
- JPL 1737, "Release of Information" R 9/99
- JPL 2385, "Notification to Prospective Contractors of JPL's Ethics Policies and Anti-Kickback Hotline" R 7/91
- JPL 2892, "Certifications" R 8/01
- JPL 2895, "Asbestos Notification" R 9/98
- Management of Government Property in the Possession of Contractors, Form JPL 0968
- Notice of Potential Tax Withholding R 7/03

ADDITIONAL GENERAL PROVISIONS (AGPs)

Cost Accounting Standards (CAS) and Administration of CAS R 9/04

Designation of New Technology Representative and Patent Representative R 9/04

Disclosure and Consistency of Cost Accounting Practices, and Administration of CAS R 9/04

New Technology R 9/04 or

Patent Rights - Retention By The Contractor (Short Form) R 9/04

Security Requirements for Unclassified Automated Information Resources and Access to JPL's Controlled Facilities R 9/04

PREAMBLE

This Subcontract, 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 TBD (hereinafter called the "Subcontractor"), a corporation organized and existing under the laws of the State of _____ and constituting a subcontract under Prime Contract NAS7-03001 between the Institute and the Government;

WITNESSETH THAT:

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

SCHEDULE

ARTICLE 1. STATEMENT OF WORK AND DELIVERY INSTRUCTIONS

On or Before

1.0 The Subcontractor shall deliver the Advanced Microwave Radiometer (AMR) Reflector Structure Assembly (RSA) and the Mechanical Ground Support Equipment (MGSE) for the RSA. The AMR is a JPL payload instrument for the Ocean Surface Topography Mission (OSTM). The AMR Instrument consists of the AMR-RSA and its associated electronics mounted to the Electronic Support Structure (ESS). In accordance with the attached Exhibits, the Subcontractor shall provide two Flight AMR-RSA. The AMR-RSA includes the Reflector, support structure and interfaces to the ESS and Proteus Spacecraft Payload Interface Module (PIM). In addition, the Subcontractor shall assemble and test the two flight AMR-RSA with the JPL-supplied mass model of the ESS and shall develop all AMR-RSA Mechanical Ground Support Equipment (MGSE) which is required for handling, hoisting, testing, and shipping the AMR-RSA.

In the performance of this effort, the Subcontractor shall:

1.1 Design

Perform all design and analysis necessary for fabrication of the RSA and related MGSE.

1.1.1 RSA Flight Hardware Design

Develop and document a detailed RSA design that meets all of the requirements of the Exhibits. This effort is to include, but not be limited to, the following:

1.1.1.1 Develop, maintain and release the Mechanical Interface Control Drawing (MICD) which describes the agreed upon interfaces between the Subcontractor and Centre National d'Etudes Spatiales (CNES) spacecraft

hardware.

- 1.1.1.2 Generate, release, deliver all the drawings necessary for fabrication of and assembly of the RSA, as well as the tooling or fixtures necessary for fabrication, assembly, and test. Non-released redlined drawings are acceptable for tooling and fixtures.
- 1.1.1.3 Maintain configuration control using the Subcontractor's existing procedures for all engineering documents (including drawings and specification standards), approval and release procedures, and change control and Material Review Board (MRB) actions.
- 1.1.1.4 Select all materials and processes in accordance with Exhibit II, OSTM AMR-RSA Requirements Specification. Conduct development tests as required to verify/develop design/material properties for specific design features as required.
- 1.1.1.5 Perform all necessary structural analyses of the RSA, to ensure the structural integrity during the OSTM launch and mission.
- 1.1.1.6 Perform venting analyses for any enclosed volumes to ensure that the appropriate venting is provided per Exhibit II.
- 1.1.1.7 Generate thermal models of the RSA per Exhibit I, Contract Data Requirements List and Data Requirements Description, and deliver the models to JPL for integration with JPL's Spacecraft/AMR Instrument level thermal model.
- 1.1.1.8 Perform all necessary thermal analyses of the RSA utilizing JPL generated temperature maps, per paragraph 3.2 below, to ensure that a) the RSA structural integrity during launch is maintained after exposure to worst case protoflight hot/cold conditions; b) that the distortions caused by the thermal environment meet the requirements specified in Exhibit II. MLI patterning and fabrication/installation will be provided by JPL.
- 1.1.1.9 Provide structural models to JPL per the Exhibits
- 1.1.1.10 Present the results of the preliminary design effort to JPL for approval at the Preliminary Design Review (PDR) prior to proceeding with flight hardware detail design.

Three (3) months
After Date Of
Contract
(ADOC)

1.1.1.11 Present the results of the detailed design effort to JPL for approval at the Critical Design Review (CDR) prior to proceeding with flight hardware parts, and material procurement, fabrication and test. Seven (7) months ADOC

1.1.1.12 Place on order any long lead items necessary for tooling or fabrication of the RSA, prior to CDR as required to meet schedule delivery, with JPL approval.

1.1.2 Mechanical & Ground Support Equipment (MGSE) Design.

Develop and document detail MGSE designs that meet all of the requirements of the Exhibits. This effort is to include, but not be limited to, the following:

1.1.2.1 Generate all the drawings necessary for fabrication of and assembly of the MGSE.

1.1.2.2 Perform all necessary structural analyses of the MGSE assemblies to ensure the structural integrity during all OSTM integration and test activities.

1.1.2.3 Perform all required testing of the MGSE assemblies to ensure safe interfacing with flight hardware.

1.1.2.4 The MGSE shall include:

1.1.2.4.1 Two (2) AMR Support Stands that allow for the assembly and support/handling of the fully integrated AMR Instrument.

1.1.2.4.2 Test fixture(s) as required for structural and environmental testing of the AMR-RSA.

1.1.2.4.3 Lift fixture(s) that allow the flight RSA, as well as the fully integrated AMR instrument, to be safely lifted for placing the instrument on a vibration test shaker, in a thermal test chamber, into the shipping container and using a crane to place onto the spacecraft.

1.1.2.4.4 A spacecraft interface tooling plate, that allows verification of Spacecraft to AMR instrument mounting interfaces prior to delivery.

1.1.2.4.5 A shipping container for each RSA that would safely transport the flight RSA from Subcontractor to JPL. The shipping container shall be capable of safely transporting the complete AMR instrument. The container shall be filled with dry GN2 at a pressure greater than ambient pressure. The container shall contain a pressure indication device which is visible from outside the container. The device shall indicate whether the pressure inside the container is greater than or less than the local ambient pressure.

1.2 Part and Assembly Fabrication, Procurements and Assembly.

1.2.1 Fabricate and/or procure all raw materials, piece parts, tooling and fixtures in accordance with the designs generated.

1.2.2 Inspect all flight parts and document all inspections to ensure part materials, processes, and dimensions, meet the released drawings and specifications. Disposition and document all non-conformances.

1.2.3 Document all completed flight assembly procedures with quality assurance concurrences.

1.2.4 After completion of final assembly perform and document all inspections.

1.2.5 Fabricate two (2) Flight RSAs

1.3 Testing.

Addendum change

The testing shall include the following tasks: Thermal cycle (ambient pressure), static proof test (or quasi-static equivalent), low level sine survey, random, sine, thermal vacuum and acoustic. In the performance of the AMR-RSA testing, the Subcontractor shall:

1.3.1 Prepare and submit to JPL all necessary test plans and procedures, which shall include the test tolerances, test setup, and procedures to ensure hardware safety, the test levels and durations, specify the pass/fail criteria.

Three (3) weeks prior to test

1.3.2 Conduct a Test Readiness Review that covers all static and environmental testing planned for the flight hardware.

One (1) week prior to test

- 1.3.3 Document failures and corrective actions taken using the Subcontractor's existing failure reporting/tracking system and provide a copy of the document to JPL, within 24 hours of failure.
- 1.3.4 Conduct and record all final inspections as defined in test plans.
- 1.3.5 Testing shall include the following:

Addendum
change

- 1.3.5.1 Structural Testing: Static proof, acoustic, sine survey, random and sine testing per the environments described in Exhibit II of structural components or assemblies. Each RSA is to be thermal cycled at least five (5) times and no more than ten (10) times to the Protoflight temperature range specified by the subcontractor per Exhibit II prior to structural testing. Thermal cycling shall be done with a chamber pressure of 16 PSI or less.
- 1.3.5.2 Thermal/Vac shall consist of exposure to maximum Protoflight temperature for a minimum duration of 48 hours in 10^{-6} Torr or better vacuum. Hardware shall be monitored with one or more TQCMs and shall achieve an outgassing rate as measured by the TQCM of less than 64 Hz/Hr with the RSA maximum protoflight temperature and the TCQM at 10^0 Celsius.
- 1.3.5.3 Pre and post-test physical inspections of the hardware shall be conducted to ensure the structural integrity and alignment requirements of Exhibit II are met.
- 1.3.5.4 Proof testing of MGSE hardware assemblies per Exhibit V, OSTM Structural Requirements & Verification Plan, prior to use.

1.4 Critical Inspections

The following critical inspections shall be conducted prior to fabrication, assembly and delivery. The results of these inspections shall be provided to JPL.

- 1.4.1 Reflector Lay-up tool.

Prior to lay-up
and use.

- 1.4.2 The assembly tools. Prior to assembly and use.
- 1.4.3 Reflector surface. Prior to and after integration to structure results to JPL within three (3) business days after inspection.
- 1.4.4 Completed RSA. Prior to delivery.
- 1.4.5 All interface locations as defined in AMR-RSA MICD's Prior to delivery.
- 1.5 Delivery and Post Delivery
 - 1.5.1 Flight hardware shall be delivered with an exterior surface cleanliness level of: Particulate: Visibly Clean – Level 2.
 - 1.5.1.1 Surface cleanliness inspection level 2 specifies an incident light of 1080 lux to 1340 lux (100 to 125 foot-candles) at the surface. The surface to be inspected shall be visibly clean when observed by the unaided (except for corrected vision)eye at a distance of 15 cm to 45 cm (6 to 18 inches).
 - 1.5.2 Packaging of the flight AMR-RSA for transportation shall be in accordance with Exhibits I and IV. Each Flight AMR RSA shall be stored and shipped in its own sealed container, as specified in paragraph 1.1.2.4.5 above.
 - 1.5.3 Transportation of the Flight AMR-RSA from Subcontractor's facility to JPL shall be in accordance with all Exhibits.
 - 1.5.4 Except as otherwise provided in this Subcontract, the point of inspection, acceptance and delivery of all supplies deliverable under this Subcontract shall be the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, California 91109. All such supplies shall be package, packed, boxed, or crated in such a manner to ensure safe delivery and shall be shipped prepaid and at the Subcontractor's expense to the point of delivery.
 - 1.5.5 Deliverable Hardware Items:

- | | | |
|-----------|---|--------------------------------|
| 1.5.5.1 | Two (2) Flight AMR-RSAs | |
| 1.5.5.1.1 | First Flight AMR-RSA | Fifteen (15) months ADOC. |
| 1.5.5.1.2 | Second Flight AMR-RSA | Nineteen (19) months ADOC. |
| 1.5.5.2 | Mechanical GSE that is required to ship and handle the AMR Instrument at JPL, per paragraph 1.1.2 above, with the exception of test-specific MGSE | With delivery of each AMR-RSA. |
| 1.5.5.3 | One (1) spacecraft interface tooling plate to allow verification of spacecraft interfaces | Fifteen (15) months ADOC. |

1.6 Program Management

- 1.6.1 The Subcontractor shall assign a program manager who shall be responsible for successful completion of the effort and serve as a liaison with the JPL Contract Technical Manager (CTM).
- 1.6.2 Implement Quality Assurance program upon JPL acceptance of a Quality Assurance Plan in accordance with Exhibit I.
- 1.6.3 Implement Safety program upon JPL acceptance of a Safety Plan in accordance with Exhibit I. The Safety Plan shall address hardware and personnel safety, and identification of safety hazards.
- 1.6.4 Reviews and Meetings
- 1.6.4.1 Conduct a presentation for reviews with JPL personnel as follows:
- | | | |
|-----------|-------------------------------------|------------------------|
| 1.6.4.1.1 | OSTM ATM-RSA PDR at JPL facilities. | Three (3) months ADOC. |
| 1.6.4.1.2 | OSTM AMR-RSA CDR at JPL facilities. | Seven (7) months ADOC. |
- 1.6.4.2 Respond as necessary to close all action items from the above stated reviews.

- | | | |
|---------|--|-------------------------------------|
| 1.6.4.3 | Test Readiness Reviews: Conduct a Test Readiness Review that covers all functional and environmental system testing planned for the flight hardware, prior to the start of testing. | One (1) week prior to test. |
| 1.6.4.4 | Safety Surveys: Prior to start of environmental testing, the Subcontractor shall support a JPL safety survey of the environmental test set-ups. | Two (2) weeks prior to test. |
| 1.6.4.5 | Pre-Ship Review. Conduct a pre-shipment review, at Subcontractor's facility, for each AMR-RSA with the purpose of reviewing the contents of the Subcontractor prepared, End Item Data Package (EIDP) and reviewing the Subcontractor's inspection, packaging and shipping procedure. JPL will conduct a pre-ship inspection of the AMR-RSA at this time. This is only for acceptability to ship, not an acceptance inspection. | One (1) week prior to shipment. |
| 1.6.4.6 | Monthly Management Review. Subcontractor shall submit a Monthly Management Report (MMR), indicating work accomplished during the period, work planned for the next period, any potential and/or real schedule problems, technical updates, problems encountered and solutions proposed and/or implemented and schedule status. | The 10 th of each month. |
| 1.6.4.7 | Plans and Documentation. Provide plans and documentation in accordance with Exhibit I. | |

1.7 Quality Assurance.

Provide JPL with advance notification to allow inspection and witnessing of tests as follows:

- 1.7.1 Forty-eight (48) hour advance notification of the JPL Quality Assurance Representative (QAR) and CTM of Contractor Material Review Board activities that involve repair or use-as-is dispositions.
- 1.7.2 Three (3) working days advance notification of the QAR of the start of a mandatory in process inspection. These inspection points will be documented in the approved Quality Assurance Plan.
- 1.7.3 Five (5) working days advance notification of the JPL CTM before commencement of any formal tests so that JPL may send personnel to witness tests. After JPL acknowledges the notification, the Subcontractor may proceed with the planned tests as scheduled whether or not JPL attends.

1.8 Safety.

The Subcontractor shall comply with all applicable sections of Exhibit IV, Safety Requirements for Mechanical Support Equipment for JPL Critical Items Equipment.

1.9 Retention of Records, Data, Parts and Materials

The Contractor shall retain original test data, fabrication logs, traceability documents and a complete set of reproducible design and production documents for five (5) years after delivery of the AMR-RSA to JPL. The Contractor shall retain tooling used exclusively for the AMR-RSA for two (2) years after delivery of the AMR-RSA. The Contractor shall maintain all flight quality parts and materials in a separate area within a controlled access storage facility with a complete and dated inventory and make the inventory available to JPL representatives. The Contractor shall grant JPL representatives the right to audit parts and materials in stores.

2.0 Exhibits

The following Exhibits are hereby incorporated into and made a material part of this Contract:

- 2.1 Exhibit I - Subcontract Data Requirements List and Data Requirements Description, dated September 9, 2004.

- 2.2 Exhibit II - OSTM AMR-RSA Requirements Specification dated September 2, 2004.
- 2.3 Exhibit III - AMR RSA Mechanical ICD, 10229971 Rev. A.
- 2.4 Exhibit IV - ES 50149, Safety Requirements for Mechanical Support Equipment for JPL Critical Items Equipment, Rev. G, dated July 27, 2000.
- 2.5 Exhibit V - JPL D-25614, OSTM Structural Requirements & Verification Plan, dated February 12, 2003.
- 2.6 Exhibit VI - JPL D-560, JPL Standard for System Safety, Rev. C, dated March 1999.

3.0 JPL will:

- 3.1 Provide the interface configuration and requirements of the AMR RSA.
- 3.2 Provide temperature maps of the AMR-RSA utilizing the Subcontractor's thermal model per paragraph 1.1.1.7 above, on or before six (6) weeks after receipt of Subcontractor's model.
 - 3.2.1 One (1) iteration prior to PDR, two (2) iterations between PDR and CDR and one (1) post CDR iteration.
- 3.3 Attend and support AMR-RSA reviews and Technical Interchange Meetings (TIMs).
- 3.4 Review all documentation submitted by Subcontractor and provide written approval or rejection with comments within the time frame specified in Exhibit I.
- 3.5 Deliver one (1) mass mock-up of the ESS on or before nine (9) months ADOC.

ARTICLE 2. FIXED PRICE AND PAYMENT

- 1.0 Total Fixed Price: \$ TBD.
- 2.0 Invoices. Invoices shall be submitted, in triplicate, to JPL Supplier Payment Section, M/S 601-208, 4800 Oak Grove Drive, Pasadena, California 91109.

The Subcontractor shall attach to each invoice, submitted in accordance with the General Provision of this Subcontract entitled "Payments and Discounts," a fully completed "Contractor's Request for Progress Payment," Standard Form 1443, or equivalent.

Detailed billing instructions and samples that will ensure the correct processing of your invoices can be found at the following link:

http://acquisition.jpl.nasa.gov/pdf/FP_Billing.pdf

ARTICLE 3. SPECIAL PROVISIONS

1.0 Data Removal from Computers.

The Contractor shall erase or otherwise remove all JPL or contract related data (which can include sensitive, Privacy Act, proprietary, and mission critical data) from hard drives and other computer storage devices and remove licensed software from Government-owned computers before such computers leave the control of the Contractor organization by transfer or disposal. JPL data shall also be removed from Contractor-owned computers when the computer will be no longer used for this Contract. The Contractor shall archive all data required to be retained, pursuant to the "Rights in Data - General" Article. Guidance on what constitutes mission-critical data and sensitive information (such as business and restricted technology information and scientific, engineering, and research information) is contained in NASA Procedure and Guidelines for Security of Information Technology (NPG) 2810, available on the worldwide web or from the JPL Negotiator. Proprietary data consists of trade secrets and other commercial or financial information confidential to the individual owner or organization. Proprietary data is normally labeled as such. Trade secrets or commercial or financial information that has been released to the public or is otherwise in the possession of persons other than the individual owner or organization is in the public domain and may no longer be entitled to proprietary protection. The Contractor shall submit to JPL a written certification that all applicable data has been erased or otherwise removed from computers when returned to JPL or disposed of.

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

CALIFORNIA INSTITUTE OF TECHNOLOGY

TBD

By:

By:

Signature

Signature

Name

Name

Title

Title

Instructions to Subcontractor: Do not insert date on Preamble page.