

# Technology and Integrated Discipline Engineering Service (TIDES)

All deliverables and requirements must follow the guidelines in NNG15CR65C with no exceptions

## Task Order Statement of Work (SOW)

Date: July 1, 2020

Task Name: **Laser Communication Relay Demonstration (LCRD) Optical Modem Hardware & Equipment Support And Optical Modem Engineering Support**

Task No. / Mod: 21/12

Task Monitor (TM): Richard Butler

Contract number: NNG15CR65C

Contract SOW Reference: Function 3 (Implementation Phase Services), sub-section A (Multidisciplinary Analyses Services), sub-section B (Multi-disciplinary Design Services), sub-section C (Fabrication, Assembly and Testing Services) & sub-section D (Integration, Test, and Verification Services)

### Change Log

1. *Update Scope to reflect new deliverables; CODEC C and CODEC D*
2. *Updated Task Items (sub-tasks) 01, 02, 03, 06, 09; Closed subtask. Work completed.*
3. *Updated Task Item (sub-task 04, 05, 07, 08); Deliverable changed based on summary of work*
4. *Updated Scope to reflect new deliverables; GMCA#1, HPA*
5. *Admin change: Change TM to Richard Butler*
6. *Extend period of performance to 11/30/18*
7. *Extend period of performance to 5/30/19, Updated scope to reflect new analysis sub-task 10, Add travel requirements to subtasks 7 and 8, shift support from subtask 4 to subtask 8 and close subtask 4.*
8. *Extend period of performance to 9/30/2019. Restart subtask 3 and subtask 5 to purchase 3 (three) and assemble 1 (one) additional flight High Speed Rx printed wiring assembly.*
9. *Extend period of performance to 1/31/2020. Close subtask 3. Descop subtask 5 to be as needed assembly support.*
10. *Extend Period of Performance to 4/30/2020. Close subtask 10.*
11. *Extend Period of Performance to 7/31/2020. Updated travel expected date to May, 2020.*
12. *Extend Period of Performance to 9/30/2020. Updated travel expected date to July 2020.*

### I. Scope

- a. **Background** – This work will support the Laser Communication Relay Demonstration (LCRD) project and specifically the CODEC, High Power Amplifier (HPA), Ground Modem, CODEC and HPA (GMCA) and Flight Modem subsystems. The main function of the CODEC is to serve as the high speed interface between the ground modem and user. The main function of the HPA is serve as the optical power amplifier for the communications signal transmitted from the GMCA subsystem. The GMCA subsystem encodes, interleaves

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and converts digital data to an optical signal on the uplink and vice-versa on the downlink. The flight modem converts digital data to an optical signal on the downlink and vice-versa on the uplink,

- b. Summary of work – The work described below in each subtask are in support of five main activities during this performance period. The first activity is to perform the requirements testing for the CODEC C subsystem. The second activity is to complete the assembly, integration and test of the HPA control rack. The third activity is to perform final testing on the GMCA subsystem . The fourth activity is to complete worst case analysis and parts stress analysis for assigned LCRD modem circuit boards. The fifth activity is to procure and assemble a flight printed wiring assembly to address an anomaly found on the flight modems. The work described in the subtasks below will build toward the delivery of GMCA#1 by 9-30-2019
  
- c. Required skills/knowledge –

## **Subtask 01: Optical Modem Electro-Optics hardware and equipment support**

Working knowledge of electro-optics hardware and test equipment as well as a familiarity with vendors and procurement methods. Contractor shall work in collaboration with the TM to support the development of Optical Modems *from (MOD/2-) through 07/31/17*. The results of which shall be the delivery of the necessary electro-optics hardware and equipment in accordance with the Optical Modem Electro-Optics need dates as project formulation dictates.

## **Subtask 02: FPGA Engineering Support**

High speed FPGA design experience is required. Working knowledge of Xilinx Virtex series FPGA is required. Working knowledge of VHDL simulation tools such as ModelSim is required. Familiarity with GSFC code 560 FPGA design standards is required. Familiarity with, and/or working knowledge of, GSFC code 560 Total Verification System is required. Institutional knowledge of the LCRD project is required. Experience with Optical Modem and/or CODEC design, development & testing is required. Majority of work will be detailed design, development & testing of FPGAs needed for Optical Modem and/or CODEC. Contractor shall support and participate in various aspects of concept formulation, requirements development, schedule planning, production of review materials, design, implementation/verification/manufacturing planning and presentations/project meetings.

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## **Subtask 03: Printed Circuit Board (PCB) layout and procurement**

Working knowledge of Mentor Graphics dxDesigner, PADS and interfaces to Mentor Graphics Signal Integrity tools is required. Working knowledge of GSFC flight and ground printed circuit board design standards and IPC-6012-3A is required. Working knowledge of GSFC flight and ground printed circuit board procurement process is required. Institutional knowledge of the LCRD project is required. Experience with Optical Modem development is required. Contractor shall perform the following in a fashion that adheres to the description stated in subtask 04 of this Statement of Work. These steps will iterate as needed:

- 1) Contractor shall, in consultation with the TM, produce and maintain layout(s) in PADS of electrical schematic design(s) from a provided netlist(s). Coupon design(s) shall be a collaborative effort between contractor and GSFC Materials Branch as directed by TM.
- 2) Contractor shall provide to Modem Signal Integrity Engineer files from PADS and dxDesigner as requested.
- 3) Contractor shall procure quantities of PCBs as directed by TM. Extent of quality assurance processes imposed on procurements will be determined by TM.

## **Subtask 04: Test Engineer**

Test software development & implementation experience is required. Years of experience and a working knowledge of LabView software is required. Years of experience and a working knowledge of electronics & electro-optics testing is required. Working knowledge of test equipment as applied to piece part level testing through system level testing is required. Working knowledge of typical GSFC lab and testing protocols (QA, PR, WOA practices) is required. Institutional knowledge of the LCRD project is required. Experience with Optical Modem design, development & testing is required. Contractor shall support the development of test software through the use of the LabView software package. Contractor shall develop the interfaces necessary between the LabView software and required test equipment. Contractor shall participate in specific hardware test activities as directed by Modem PDL (Product Development Lead).

## **Subtask 05: Electronics Assembly Support**

Years of experience and a working knowledge of electronics assembly at GSFC is required. Working knowledge of typical GSFC lab and assembly protocols (QA, WOAs, Assembly Procedures, etc) is required. Current certifications in Surface Mount (8739.2 or IPC J-STD-001ES), Hand Soldering (8739.3 or IPC J-STD-001ES), Polymerics Application & Mixing

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(8739.1 PM), Cable Crimp & Harness (8739.4) and ESD (ANSI/ESD S20.20 or GSFC 300-PG-8730.6.1) is required. Institutional knowledge of the LCRD project is required.

Experience with Optical Modem assembly is required. This support will cover re-work of ground and flight electronics boards, development and re-work of GSE and development and re-work of cables/harnesses.

## **Subtask 06: Laser & Electro-Optics Engineering Support**

Working knowledge and years of experience with lasers, fiber optics (FO) and electro-optics (EO) hardware at the component and system levels is required. FO and EO components of interest include pump lasers, communications lasers, Mach Zehnder Modulators, Delay Line Interferometers, Erbium Doped Fibers, Wavelength Division Multiplexers, Fiber Bragg Gratings and other fiber optics based telecommunication components. Skills and knowledge of handling optical fibers, fiber optics components, fusion splicing of optical fibers, testing and evaluating fiber optics and electro-optics components are preferred. Institutional knowledge of the LCRD project is required. Experience with Optical Modem design, development & testing is required. Majority of the work will be formulation, design, manufacturing and testing of lasers, FO & EO hardware at the component and system level. Contractor shall support and participate in various aspects of requirements development, schedule planning, production of review materials, conceptual design, implementation/verification/manufacturing planning, laboratories activities, testing and evaluating of EO and FO components, optical modem testing and evaluation and presentations/project meetings.

## **Subtask 07: Mechanical & Thermal Engineering Support**

Working knowledge and experience with mechanical and thermal design as it relates to electronics and electro-optics is required. Familiarity with GSFC code 596 mechanical and thermal software tools is required. Institutional knowledge of the LCRD project is required. Experience with Optical Modem design, development & testing is required. Majority of the work will be designing and developing mechanical packaging for electronics and electro-optics, installing electronics into their packaging, supporting testing and performing mechanical and thermal analyses. Contractor shall support and participate in various aspects of concept formulation, requirements development, schedule planning, production of review materials, design, implementation/verification/manufacturing planning and presentations/project meetings.

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## **Subtask 08: GSE Engineering Support**

Working knowledge and experience with ground and flight hardware GSE design and documentation is required. Working knowledge and experience with test equipment as applied to circuit board and subsystem development testing is required. Working knowledge of typical GSFC lab and testing protocols (QA, PR, WOA practices) is required. Familiarity with GSFC code 596 electrical and mechanical software tools is desirable. Institutional knowledge of the LCRD project is required. Experience with Optical Modem GSE design, development & testing is required. Majority of the work will be designing, developing, testing and documenting Optical Modem GSE. Contractor shall support and participate in various aspects of concept formulation, requirements development, schedule planning, production of review materials, design, implementation/verification/manufacturing planning and presentations/project meetings.

## **Subtask 09: Drafting Support**

Working knowledge and experience with ground and flight hardware mechanical drawings, mechanical assembly drawings, electrical assembly drawings and materials & processes lists is required. Working knowledge and experience with code 596 mechanical software tools is required. Working knowledge and experience with GSFC ground and flight hardware drawing processes and procedures is required. Familiarity with GSFC configuration management systems is required. Institutional knowledge of the LCRD project is required. Experience with Optical Modem design, development & testing is required. Majority of the work will be creating drawings from CAD files, converting pdf drawings into native file drawings, performing checker duties and building materials & processes lists.

## **Subtask 10: Worst Case and Parts Stress Analysis Support**

Working knowledge and experience with EEE components, printed wiring board design, worst case analysis and parts stress analysis required. Experience with mixed signal electrical circuit design, electronics circuit design and circuit analysis required. Working knowledge and experience with the EEE-INST-002: Instructions for EEE Parts Selection, Screening, Qualification, and Derating standard. Majority of the work will be completing worst case and parts stress analysis of circuit boards.

## II. Period of Performance

The period during which the work for this task shall be performed is from *(MOD/12) thru September 30, 2020*

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## III. Subtask Description

If your task has subtasks please include in the statement of work:

### Monthly Deliverable Report

The contractor shall provide no later than the 10<sup>th</sup> working day following the close of the contractor's monthly accounting period a 533M for each individual subtask and a summary 533M at the total task level. If it is not possible to provide the individual 533M at the subtask level, the contractor shall provide on the 10<sup>th</sup> working day following the close of the contractor's monthly accounting period a break out of hours and costs by subtasks to the Contract Resource Analyst, Contracting Officer, and the Task Monitor. The report shall include current period hours and costs, cumulative to date hours and costs, and cumulative costs with a one-month cost plan. When needed, the contractor shall make adjustments to the distribution of costs, layout of the report and change reportable elements as specified by the Task Monitor and/or the Contract Resource Analyst.

### **Subtask 01: Optical Modem Electro-Optics hardware and equipment support**

*(MOD/4-) The work for this subtask was complete therefore this sub-task shall be closed.*

Contractor shall provide the support necessary to deliver the LCRD Optical Modem electro-optics hardware and equipment required to build optical modems. As project formulation, design and development continue the TM shall provide updates regarding electro-optics hardware and equipment requirements. The primary impact of these updated requirements will come in the form of changes to parts/materials as identified by the TM.

### **Subtask 02: FPGA Engineering Support**

*(MOD/2-) In June of 2016 the contractor supporting this sub-task resigned. The work for this subtask was complete therefore this sub-task shall be closed.*

Contractor shall support Laser Communication Relay Demonstration (LCRD) Optical Modem & CODEC design, development & test activities. The prime function of the modem is to translate high speed serial data communication between fiber and copper signal domains. The sub-systems within the Optical Modems consists of multiple electronic cards which are dominantly RF analog and high speed digital electronics with supporting power conversion circuits. High speed digital circuits will be implemented in high speed, high density, high I/O type FPGAs

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## **Subtask 03: Printed Circuit Board (PCB) layout and procurement**

*(MOD/4-) Additional board builds complete and delivered in February 2017. The work for this subtask was complete therefore this sub-task shall be closed.*

*(MOD/8-) Additional 3 printed wiring boards needs to be procured, so this sub-task to be reopened.*

*(MOD/9-) This work is complete and this sub-task shall be closed*

Contractor shall support Laser Communication Relay Demonstration (LCRD) PCB layout and procurement. PCB layouts can be based on various types of circuit designs including, but not limited to, digital, analog & mixed signal circuit designs. PCB layouts and procurements shall be in accordance with GSFC flight and/or ground requirements as directed by the TM. The primary support for this Task Item is expected to be additional board procurements to support building spare boards.

## **Subtask 04: Test Engineer**

*(MOD/7-) The work for this subtask has been shifted to subtask 8 and therefore this sub-task shall be closed.*

Contractor shall support Laser Communication Relay Demonstration (LCRD) CODEC testing activities. The main function of the CODEC is to serve as the high speed interface between the ground modem and user. The CODEC sub-system consists of an electronics box (EDID) and control computer. As the CODEC is being developed, testing will begin from piece parts to sub-circuits to board level to box level and finally to system level. Testing will mostly be done through software controlled test equipment at each stage. Engineering support in testing electronics & electro-optics from the piece part level through the system level is required. All activities will be performed under the guidance and direction of the Modem Lead Engineer and/or TM (Task Monitor).

## **Subtask 05: Electronics Assembly Support**

Contractor shall support Laser Communication Relay Demonstration (LCRD) CODEC and GFC (Ground Frame Converter) and HPA electronics assembly activities. This support includes, but is not limited to, electronics board assembly, GSE (Ground Support Equipment) assembly and

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cable/harness assembly. The primary effort is expected to focus on development and re-work of GSE, and development and re-work of cables/harnesses. All support shall be in accordance with the CODEC need dates as development and testing dictates. All activities will be performed under the guidance and direction of the Modem PDL (Product Development Lead) and/or TM (Task Monitor).

*(MOD/2-MOD/3) Contractor shall also provide the support necessary to assemble additional flight electronics boards per TM direction.*

*(MOD/8-) Additional 1 printed wiring assembly needs to be assembled, so this sub-task to be reopened.*

*(MOD/9-) The additional 1 printed wiring assembly is completed, so this sub-task shall be de-scoped to be as necessary support for electrical assembly tasks at the direction of the task monitor*

## **Subtask 06: Laser & Electro-Optics Engineering Support**

*(MOD/4-) Flight modem optical assembly and test completed in July 2017. The work for this subtask was complete therefore this sub-task shall be closed.*

Contractor shall support Laser Communication Relay Demonstration (LCRD) Optical Modem laser & electro-optic engineering activities. The prime function of the modem is to translate high speed serial data communication between fiber and copper signal domains. The sub-systems within the Optical Modems consists of multiple lasers and electro-optic components along the transmit and receive paths. Engineering support in laser & electro-optic design, development and testing is required.

## **Subtask 07: Mechanical & Thermal Engineering Support**

Contractor shall support Laser Communication Relay Demonstration (LCRD) CODEC mechanical & thermal engineering activities. The main function of the CODEC is to serve as the high speed interface between the ground modem and user. Engineering support in mechanical & thermal design/development as required.

*(MOD/4-) Contractor shall also provide drafting support as necessary per Modem PDL and/or TM direction.*

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## **Subtask 08: GSE Engineering Support**

Contractor shall support Laser Communication Relay Demonstration (LCRD) Optical Modem Ground Support Equipment and CODEC GSE activities. This includes design, development, integration, test, and documentation. All activities will be performed under the guidance and direction of the Modem PDL (Product Development Lead) and/or TM (Task Monitor).

## **Subtask 09: Drafting Support**

*(MOD/4-) Flight Modem assembly drawings completed in July 2017. The work for this subtask was complete therefore this sub-task shall be closed.*

Contractor shall support Laser Communication Relay Demonstration (LCRD) Optical Modem drafting activities. All activities will be performed under the guidance and direction of the Modem PDL (Product Development Lead) and/or TM (Task Monitor).

## **Subtask 10: Worst Case and Parts Stress Analysis Support**

*(MOD/10-) The work for this subtask was complete therefore this sub-task shall be closed.*

Contractor shall support Laser Communication Relay Demonstration (LCRD) Optical Modem worst case analysis and parts stress analysis activities. All activities will be performed under the guidance and direction of the Modem PDL (Product Development Lead) and/or TM (Task Monitor).

## *IV.* **Deliverables/Schedules/Milestones**

### **Subtask 01: Optical Modem Electro-Optics hardware and equipment support**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Itemized Hardware and Equipment Status List	Weekly
2	Progress Reports	Monthly
3	Engineering Documentation	As Required

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4	End-of-task Report	End of task
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## **Subtask 02: FPGA Engineering Support**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required
3	End-of-task Report	End of task

## **Subtask 03: Printed Circuit Board (PCB) layout and procurement**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required
3	Each iteration of each PCB design shall require delivery of: 1) Complete dxDesigner Database 2) Complete PADS Database 3) Blank PCBs, Coupons and Associated Documentation	As Required
4	End-of-task Report	End of task

## **Subtask 04: Test Engineer**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required
3	End-of-task Report	End of task

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## **Subtask 05: Electronics Assembly Support**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required
3	End-of-task Report	End of task

## **Subtask 06: Laser & Electro-Optics Engineering Support**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required
3	End-of-task Report	End of task

## **Subtask 07: Mechanical & Thermal Engineering Support**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required
3	End-of-task Report	End of task

## **Subtask 08: GSE Engineering Support**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required

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3	End-of-task Report	End of task
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## **Subtask 09: Drafting Support**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required
3	End-of-task Report	End of task

## **Subtask 10: Worst Case and Parts Stress Analysis Support**

At a minimum, the contractor shall deliver the items specified below:

<u>Ref#</u>	<u>Deliverables</u>	<u>Due Date</u>
1	Progress Reports	Monthly
2	Engineering Documentation	As Required
3	Any completed worst case analysis completed	As Completed
4	Any completed parts stress analysis completed	As Completed
5	End-of-task Report	End of task

## V. Management Approach

### a. Staff Allocation, Expertise, and Skill Mix

The contractor shall staff this work item with the appropriate skill mix and staffing level for the work.

### b. Configuration Management

Systems and documents will be covered under the LCRD Payload Configuration Management Procedure (LCRD-PYLD-PROC-0020).

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c. Facilities

Appropriate IT devices to support the off-site work in subtasks 01, 02, 04 & 07 are required. It shall be the contractor's responsibility to provide and set up local workstations and network connections at the contractor's off-site facilities as required, and to install any required tools and utilities on the contractor's equipment.

d. Risk Management and Best Practices

The contractor shall manage schedule, cost, and technical risk through monitoring and reporting of progress and performance metrics, identifying issues well in advance of negative consequences, recommending corrective action to the TM, and implementing corrective actions with the compliance of the TM.

e. Performance Metrics

The work performed for this task will be evaluated by the TM based on the technical merit. The TM shall develop detailed performance metrics that shall reflect the contractor's performance in meeting research analysis, specific mission requirements, deliverables and delivery schedule, and the contractor's cost. Technical evaluation of the task performance is a subjective combination of performance metrics, technical quality of deliverables, cost control, significant events, innovations and meeting requirements set forth in the SOW. Performance metrics could include but are not limited to:

1. Percent completion of subtasks
2. Planned versus actual
3. Delivery dates

f. Government Furnished Facilities, Equipment, Software and Other Resources

The Government will provide account and passwords to government-furnished workstations where existing versions of various relevant software packages shall be maintained. It shall be the contractor's responsibility to complete any GSFC required security-related training courses.

g. Quality Assurance Requirements

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The contractor shall comply with the LCRD Mission Assurance Requirements (LCRD-SMA-REQ-001), attached to this task order.

## VI. ODC (Travel and Procurement)

Please provide a BOE for all proposed ODC's to determine the reasonableness

Mod/7: There is travel required for this SOW. Engineers supporting to subtask 7 and subtask 8 will be required to travel to JPL for 10 days to support the installation and checkout of the GMCA subsystem. This travel is expected in April, 2019.

Mod/8: Travel is expected in September, 2019

Mod/9: Travel is expected in December, 2019

Mod/10: Travel is expected in March, 2020

Mod/11: Travel is expected in May, 2020

Mod/12: Travel is expected in July, 2020

### **Subtask 01: Optical Modem Electro-Optics hardware and equipment support**

As required by Optical Modem Electro-Optics needs, in accordance with subtask 01 of this Statement of Work. All items shall be subject to government approval and in accordance with the specification identified by TM based on development efforts.

### **Subtask 02: FPGA Engineering Support**

Not required.

### **Subtask 03: Printed Circuit Board (PCB) layout and procurement**

Not required.

### **Subtask 04: Test Engineer**

Not required.

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## **Subtask 05: Electronics Assembly Support**

Not required.

## **Subtask 06: Laser & Electro-Optics Engineering Support**

Not required.

## **Subtask 07: Mechanical & Thermal Engineering Support**

Mate/Demate training as required.

## **Subtask 08: GSE Engineering Support**

Not required.

## **Subtask 09: Drafting Support**

Not required.

## **Subtask 10: Worst Case and Parts Stress Analysis Support**

Not required.

## VII. Work Location

This work shall be performed primarily on-site at the Goddard Space Flight Center, but a few subtasks will require work at the contractor's facility as noted below.

### **Subtask 01: Optical Modem Electro-Optics hardware and equipment support**

Off-site at contractor's facility

### **Subtask 02: FPGA Engineering Support**

On-site at GSFC

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## **Subtask 03: Printed Circuit Board (PCB) layout and procurement**

Off-site at contractor's facility

## **Subtask 04: Test Engineer**

On-site at GSFC

## **Subtask 05: Electronics Assembly Support**

On-site at GSFC

## **Subtask 06: Laser & Electro-Optics Engineering Support**

On-site at GSFC

## **Subtask 07: Mechanical & Thermal Engineering Support**

On-site at GSFC

## **Subtask 08: GSE Engineering Support**

On-site at GSFC

## **Subtask 09: Drafting Support**

On-site at GSFC

## **Subtask10: Worst Case and Parts Stress Analysis Support**

Offsite at the contractor facility

## VIII. Reporting Requirements

### a. Monthly Progress Reports

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The contractor shall provide monthly technical and schedule progress reporting to adequately describe the activities of the contractor team to the TM. The contractor shall provide monthly cost reporting in accordance with the WBS. The contractor, including subcontractors, shall be available to attend monthly status meetings.

## **Monthly Subtask Report Spreadsheet**

The contractor shall provide a break out of hours and costs by close of business on the 15th of each month to the Contract Officer, Contract Resource Analyst, and the Task Monitor. The report spreadsheet shall include current period hours, costs, cumulative-to-date hours and costs, and cumulative costs with a one-month cost plan. When needed, the contractor shall make adjustments to the distribution of costs, layout of the report and change reportable elements as specified by the Task Monitor and/or the Contract Resource Analyst.

## IX. Security Requirements

The Contractor shall adhere to project requirements regarding ITAR related information, as controlled by the ITAR, 22 CFR 120-130, by the U.S. Department of State. Any transfer of controlled information to a foreign person or entity requires an export license issued by the U.S. Department of State or an ITAR exemption to the license requirement prior to the export or transfer. The handling of classified data may be necessary.

## X. Safety

The TIDES Safety/Mission Assurance Officer shall:

- Ensure all contractor personnel understand their safety responsibilities and follow safe practices for all lab and office operations.
- Ensure branch training requirements for contractor employees are implemented.
- Attend safety related training applicable to the operations under their area of responsibility.

The contractor personnel shall:

- Follow safety requirements when performing any task, keeping their workplace in a safe manner.
- Attend all required training, set forth by the ESES-II Safety/Mission Assurance Officer, ensuring certifications are current.

## XI. Data Rights

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This SOW shall adhere to the following Data Rights clause, as stated in this contract: “the default Data Rights clause under this contract is FAR 52.227-14 RIGHTS IN DATA-GENERAL as modified by NASA FAR Supplement 1852.227-14-Alternate II and Alternate III and GSFC 52.227-90. Any exceptions to this clause will be covered by FAR 52.227-17 RIGHTS IN DATA-SPECIAL WORKS as modified by NASA FAR Supplement 1852.227-17, and, if applicable, GSFC 52-227.93.”

## XII. Applicable Documents

In the performance of this task, the contractor shall comply with the following documents:

1. LCRD-SMA-REQ-001                      LCRD Mission Assurance Requirements
2. LCRD-PYLD-PROC-0020              LCRD Payload Configuration Management Procedure
3. EEE-INST-002                        Instructions for EEE Parts Selection, Screening  
Qualification, and Derating

## XIII. References

None