

Task Order Statement of Work (SOW)

Date: 8/19/2020

Task Name: RST (Roman Space Telescope) Materials Engineering Support/WFI FPA Engineering Support

Task No. 42/11

Task Monitor (TM): John Gygas

Contract number: NNG15CR65C

Task Modification Change Log

Modification #	Date	Purpose/Changes
0	3/31/2016	Initial mod to add materials support for the task, Period of Performance 4/1/2016 through 3/31/2017
1	5/5/2016	Technical; add focal plane systems engineering support
2	6/2/2016	Technical; add telescope systems engineering support
3	8/18/2016	Technical; add integration systems engineering support
4	3/31/2017	Technical; Extend Period of Performance from 4/1/2017 to 3/31/2018
5	10/16/2017	Technical; add intern and systems engineering support
6	1/9/2018	Technical; delete support for auxiliary guider channel focal plane assembly
7	3/30/2018	Technical; Extend Period of Performance from 4/1/2018 to 3/31/2019; add systems integration and test systems engineering support; add procurement of equipment
8	4/17/2019	Technical; Extend Period of Performance from 4/1/2019 to 3/31/2020; add senior level systems engineering support for interface control and ICD generation.
9	9/13/2019	Technical; Extend Period of Performance from 4/1/2020 to 9/30/2020; add senior level systems engineering support for the focal plane processing system.
10	11/6/2019	Technical; add one full time systems engineer to support accomplishment all focal plane activities on time.
11	8/19/2020	Technical; Extend Period of Performance from 10/15/2020 to 4/14/2021.

Modification 11

10/1/2020 – 4/14/2021. Stated period of performance is consistent with GSFC Task Order requirements. This modification extends the period of performance with the same scope of work. Lentech support to Subtask 42.01 is complete as of 9/30/2020. “WFIRST” is changed to “RST” (Roman Space Telescope).

I. Scope

- 1) The contractor shall provide technical expertise in the area of materials engineering for the RST Payload, including the Telescope, Wide Field Instrument and Coronagraph Instrument. Responsibilities shall include assessing the suitability of flight materials for the two

Instruments and evaluating the pedigree of the existing Telescope. The Contractor will also be required to have a TAA with foreign partners of RST.

In particular, the contractor shall perform the following task when work is authorized:

- a. Provide analysis and expert materials engineering opinions on the existing Telescope hardware as part of the planned audits and inheritance review.
 - b. Provide analysis and expert materials engineering opinions on new development hardware for the Coronagraph Instrument
 - c. As needed, provide general materials engineering support for the Payload.
- 2) The Contractor shall provide but not be limited to, the product development lead of the Wide Field Channel focal Plane assembly. This would include, but is not limited by:
- a) Identifying procurements and then working with the Focal Plane Segment Manager to follow through with those procurements. This would also include any site visits from the vendors that would be required.
 - b) Working with the FPA system engineer on requirement development for all of the focal plane assemblies. Developing a plan with the FPA system engineer for the EDU, ETU and Flight requirements along with a plan that will show that the requirements are verified and validated for each phase of development.
 - c) Leading the design effort of three focal plane assemblies. Working across engineering disciplines to develop a design that will meet the requirements of the three focal plane systems.
 - d) Working a staffing plan and budget with the FPA manager as required. This would include any staffing that would be required.
 - e) Working with the FPA integration team to develop the integration procedures for all three focal plane assemblies. This would include providing technical direction when required.
 - f) Completing a weekly report that would be delivered to the FPA manager by COB Mondays.
 - g) When required taking direction from the Focal Plane Segment Manager.
 - h) Working with the Wide Field team and FPA system engineer to develop the plan for integration into the Wide Field instrument.
 - i) Attending all required meetings when priorities and work schedule permits.

MOD 10: Provide one additional WYE support to for item 2 above. Current work load levels deems necessary to increase the level of support to accomplish all FPA activities on-time, as our delivery is schedule driven.

- 3) The contractor shall provide, but not be limited to, an integration and test leads for the Wide Field Channel focal Plane assembly. This would include, but is not limited by:
- a) Working with the Focal Plane System engineer and FPA PDL to develop an integration procedure for the three EDU, ETU and Flight focal plane assemblies for the Wide Field Instrument.
 - b) Assisting the PDL in the procurement of any items that have been identified and approved by the Focal Plan Segment Manager.
 - c) Providing direction to the Focal Plane Assembly technician(s) as required.
 - d) Attending all required meetings when priorities and work schedule permits.
 - e) Working with all required engineering disciplines to develop a test program with the FPA system engineer and FPA PDL.
 - f) Making sure that all of the environmental conditions for the three focal plane assemblies are met during the integration and test phases.
 - g) Ensuring that all transportation activities are required, planned and executed without violating any requirements.
 - h) The contractor shall provide a senior level Systems engineer to help develop the Interfaces between the SCA-SCE-FPE (Science Data Chain) for the Focal Plane System along with generating

the ICD. This would also include the development of the development/management of requirement definition for each interface along with a V and V plan and traceability for the Science Data Chain. The SE would be charged with reviewing all of the drawings, schematics and operations for the Science Data Chain. This SE will also determine the environmental requirements with respect to the SCE.

- i) The contractor shall provide senior systems engineering support for the Focal Plane processing system within the Wide Field Instrument on RST. Support includes system engineering, production management, fabrication, assembly, test, and delivery of the Focal Plane processing subsystem to the Wide Field Instrument. Perform system engineering to ensure the interfaces and requirements are all documented, hardware testing is complete with verification. Generate appropriate ICDs between subsystems related to the full Focal Plane System and Focal Plane Processing unit, and review any MICDs that are required. Organize and perform system engineering reviews of specific designs that may include schematics, functionality of the design and hardware development. Provide system work to oversee any PCB designers to get the design completed on time from a schedule and cost perspective. Work with parts group and manufacturing to support fabrication and assembling of the Focal Plane processor to complete component assemblies and box development including efforts at the EDU, ETU, and flight levels.
- 4) When approved by the RST Focal Plane Manager an intern can be used under this task to fulfill various task in support of the development of the RST Focal Plane.
- 5) When approved by the RST Focal Plane Manager task in support of the development of the rigid-flex board for the Sensor Chip Assembly that will be used in the Focal Plane Array.

II. Period of Performance

The period during which the work for this task shall be performed is from April 1, 2017 to **April 14th, 2021**.

III. Subtask Description

Subtask 42.00 - Focal Plane Systems Engineering

MOD 10: Add the one additional support person to 42.00 to complete the FPA work on time, as the project is schedule driven.

Subtask 42.01 - Focal Plane Systems Processor Engineering

IV. Deliverables/Schedules/Milestones

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

<i>Ref#</i>	<i>Deliverables</i>	<i>Due Date</i>
1	Monthly Status Report	Monthly

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 Project Configuration Management Plan.

c. Facilities

Appropriate IT devices to support the analyses, specification development, and report development 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.

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

The Government shall provide equipment (computer etc.) as needed.

VI. ODC (Travel and Procurement)

The contractor shall travel for Payload systems efforts in support of the RST team when necessary. For the period of performance, the travel estimate is 4 trips at 3 days each. These destinations are Rochester, NY and Pasadena, CA. In addition to this

there will be travel to Honolulu, HI for an estimated 2 trips at 3 days each during the performance period for Focal Plane Assembly work. At the request of the Focal Plane Manager there could be up to 4 additional trips to various suppliers in support of the RST Focal Plane development.

(MODIFICATION 7 ONLY) The contractor shall procure the following equipment:

Item
Logic Analyzer
Analyzer: Agilent 16864A 136-Channel Portable Logic Analyzer
Probe: E5346A Mictor Probe-Single-ended, with 40-pin Cable Connectors
Oscilloscope
Tektronix MSO2024B, 4 analog channels; 16 digital channels, 1 GS/s analog, 500 MS/s digital (Tek price = \$3610. \$3299 at Newark)
Qty 2, TDP0500 Differential Probes. High-Voltage Differential Probe; Bandwidth: 500MHz (Tek price = \$3570. \$3391 at Newark)
Four TPP0200 Passive Probes. 200MHZ. (Come with the scope)
P6316 logic probe (16 digital channels) (Comes with the scope)
Power Supply
Power MACE (5V analog, 5V digital) E3642A - Digital 2 amp 5V, analog 500mA 5V
E36311A 80W Triple Output Power Supply, 6V, 5A & ±25V, 1A
PC 1 - Development
Dell Precision Tower 7000 Series (7910) with Win 10 Pro, 4TB 3.5" Serial-ATA (5,400 RPM) Hard Drive, SS Hard Drive, Dual Monitors (make sure this isn't raid configuraiton - get Win 7)
PC 2 - Development
Same as above
MAICE
MAICE Card
CameraLink System
Matrox Solios eV-CL.
Cameralink Matrox Software
Cables - MAICE to Matrox - standard CameraLink connections.
Lab Benches
Lab Benches - Anti-Static
Lab Bench Stools

VII. Work Location

This work shall be performed primarily at Goddard Space Flight Center.

VIII. Reporting Requirements

a. Monthly status report

The contractor shall provide monthly status reporting to adequately describe the activities of the contractor team to the TM.

IX. Security Requirements

The contractor shall comply with Information Technology Security procedures and requirements as defined by NPG 2810.1A in the performance of this task. In addition, the contractor shall comply with all applicable federal rules and regulations and agency directives. NOTE: There will not be any handling of classified data.

X. Training Requirements

N/A

XI. References

N/A