

# Systems Engineering Advance Services (SEAS)

## TASK ORDER

Task No: 97  
Modification: 6  
Task Name: LEMNOS Systems Engineering Support

### 1.0 Task Order History

Mod #	Brief Description
0	Initial task order statement of work.
1	Administrative - Task Monitor Change
2	<b>SOW Change to add subtask 3 Optical Communication Studies</b>
3	<b>Update Period of Performance</b>
4	<b>Administrative/Proposal Journal</b>
5	<b>Complete subtask 3; Add additional labor to support subtask 1</b>
6	<b>Extend Period of Performance</b>

### 2.0 Scope:

**Task Background/Overview: Mission and Instrument Systems Engineering Support:**

This task provides experienced Mission and Instrument Systems Engineering support to Code 456. Included in this effort is senior systems engineering support for missions, instrument flight projects and mission operations. The task is for support covering numerous system engineering efforts.

### 3.0 Statement of Work:

#### **Subtask 1: LEMNOS**

- Provide senior systems engineering as necessary for trade studies, technical consultation and guidance.
- This task mod covers activities related to the architecture and design of the various optical systems and subsystems that are currently under development at the Exploration and Space Communications (ESC) division of the Goddard Space Flight Center (GSFC). Examples include (but not limited) the various types of modems (modulation details, optical amplifier design, amplification dynamics, etc.), communication link margins, system engineering, as well as other optical engineering related activities for the LEMNOS projects. Another important aspect of this task is the design and advancement of the necessary test facilities and setups that will be used to verify the operation of the optical communications terminals under development. The new work requirements, and deliverables are being added and funded via this mod. Work previously included via earlier mods is unchanged and should continue as previously described.

- As assessed by the technical point of contact, engineering support shall have security clearances as determined by the technical point of contact for the individual subtask. This point of contact will determine if the requirement for security clearances can or can't be relaxed and will determine the level of clearance needed.

#### **Modification 5**

- Provide additional labor to support above SOW requirements. Increase support from Systems Engineer 3 (██████), Senior Staff Engineer Chief (██████) and Comp Sys Eng (██████) for SOW 1.b. Subtask 1

#### **Modification 6**

##### **Delete Subtask 2: LOCNESS**

- Provide senior systems engineering as necessary for trade studies, technical consultation and guidance.
- This task mod covers activities related to the architecture and design of the various optical systems and subsystems that are currently under development at the Exploration and Space Communications (ESC) division of the Goddard Space Flight Center (GSFC). Examples include (but not limited) the various types of modems (modulation details, optical amplifier design, amplification dynamics, etc.), communication link margins, system engineering, DSP algorithm development as well as other optical engineering related activities for the LOCNESS projects. Another important aspect of this task is the design and advancement of the necessary test facilities and setups that will be used to verify the operation of the optical communications terminals under development. The new work requirements, and deliverables are being added and funded via this mod. Work previously included via earlier mods is unchanged and should continue as previously described.
- As assessed by the technical point of contact, engineering support shall have security clearances as determined by the technical point of contact for the individual subtask. This point of contact will determine if the requirement for security clearances can or can't be relaxed and will determine the level of clearance needed.

#### **Modification 2**

**Add:**

##### **Subtask 3: Optical Communication Studies**

- The contractor shall support studies concerning space-space and space-ground Optical Communication efforts in code 450. The studies will include research, development of strategies to further the advancement of optical communications technology and architectures, development of papers and documents required to support study efforts, participation in meetings and briefings on the study topics, and preparation of briefing materials to address study interim and final results.

#### **Modification 4 (Per Proposal Journal)**

**Add:**

- **The contractor shall end support on Subtask 3 effective 11/30/2019.**

#### **4.0 Deliverables and Milestones:**

At this time, the deliverables and milestones are to provide senior experienced support to the projects, as needed and as described in the subtasks. No specific reports or due dates have been identified at the task level.

#### **5.0 ODC/Materials:**

The ODC/Materials anticipated on this task will include those expenses necessary to conduct the systems engineering and requirements related work, including moving expenses.

#### **6.0 Travel:**

There is a need for travel for all subtasks identified in the statement of work:

##### **Subtask 1: LEMNOS**

- O2O System Engineering Support
  - Occasional (2 times a year) trip to JSC (2 persons for 3 days) to discuss technical issues with stakeholders
  - Monthly trips to MIT LL (1 person for 2 days)
  - Occasional (2 times a year) trip to Denver, Colorado (2 persons for 3 days) to discuss technical issues with vendors
  - Occasional (2 times a year) trip to Albuquerque, New Mexico (2 persons for 3 days) to discuss technical issues with vendors
- ILLUMA-T System Engineering Support
  - Occasional (1 times a year) trip to JSC (1 persons for 2 days) to discuss technical issues with stakeholders
  - Occasional (2 times a year) trips to MIT LL (1 person for 2 days)
  - Occasional (2 times a year) trip to New Jersey (1 persons for 2 days) to discuss technical issues with vendor

##### **Modification 6**

##### **Delete Subtask 2: LOCNESS**

- LOCNESS System Engineering Support
  - Occasional (3 times a year) trips to MIT LL (1 person for 2 days)
  - Occasional (2 times a year) trip to Albuquerque, New Mexico or Denver, Colorado to discuss technical issues with potential vendors

#### **7.0 Applicable Documents:**

Due to the work under this task being focused on engineering support, there are no applicable documents to identify.

#### **8.0 Period of Performance:**

Modification 0

The Period of Performance for this task is Oct 24, 2018 through September 30, 2019.

Modification 1

No change in Period of Performance

Modification 2

No change in Period of Performance

Modification 3

The Period of Performance for this task is Oct 24, 2018 through September 30, 2020.

Modification 5

No change in Period of Performance. Task ends 9/30/2020.

Modification 6

The Period of Performance for this task is Oct 24, 2018 through April 14, 2021.