

DRAFT Statement of Work for NASA Goddard Space Flight Center (GSFC)

CASTS, MACAL, and FLORESTA (CMAF) Instrument Engineering Support Services

1.0 Background

The Cloud-Aerosol Transport System (CATS), Multi-Angle Cloud-Aerosol Lidar (MACAL), and Forest Lidar and Optical Research for Ecosystem Structure on Station (FLORESTA) projects are on-going efforts to develop and demonstrate atmospheric measurements from aircraft or other suitable platforms. The CATS, MACAL, and FLORESTA projects are end-to-end instrument builds of complete lidar systems, culminating in test flights of a prototype instrument onboard a research aircraft or other suitable platform. To successfully complete these projects, we require support for several key areas, including but not limited to, requirements and interface definition, design and fabrication of mechanical components, thermal and structural analysis, and development of ground support equipment.

2.0 Statement of Work

The contractor shall support the CATS, MACAL, and FLORESTA projects (hereafter, “Projects”) under the following tasks.

Task 1: Requirements and interface definition

The contractor shall provide engineering support to the Projects to identify system requirements (optical, mechanical, electrical, thermal and, as required, software). The contractor shall also provide services for interface definition within the system(s) and to the installation platform, aircraft, etc. The contractor shall work with subsystem providers (laser, data system, optics). Where required, Interface Control Documents (ICD) shall be developed to document electrical, mechanical, thermal, and software interfaces. In addition, the contractor shall provide support for design requirements reviews when/if needed. The contractor shall package and present requirements information to GSFC or external reviewers.

Task 2: Manage subassembly delivery and functional testing

The contractor shall provide logistical and engineering support for subsystems delivery and checkout. Subsystems may be procured by GSFC but the contractor shall be responsible for subsystem conformance and delivery of the complete integrated instrument(s). Bench level functional testing shall be performed to verify conformance to specifications.

Task 3: Support system integration and mounting

The contractor shall provide engineering services for system integration into the aircraft/platform, using defined mechanical, electrical and thermal interfaces. Ground support equipment shall be specified as required for this effort.

Task 4: Support for mechanical design and fabrication

The contractor shall provide support for design and fabrication of mechanical components. This task is comprised of two subtasks: developing mechanical designs and detailed drawings, and

fabrication of parts from those designs and drawings. This task encompasses the following specific subtasks and deliverables:

- 4.1 Provide mechanical design support for Project system components. These components include, but are not limited to, the following: pressure vessel boxes for subsystems, pressure vessel boxes for entire instruments, mechanical interface to the aircraft/platform, mechanical interfaces for subsystem mounting, and mechanical mounting of individual components (e.g., lenses, mirrors, etc.). Deliverables shall be detailed drawings of each component and assembly level drawings for groups of components (as necessary).
- 4.2 Fabrication of mechanical components for the Projects. Fabrication of components includes, but is not limited to, those identified in task 4.1. Deliverables shall be completed mechanical components along with proper documentation of flight-certified materials and fasteners.

Task 5: Support for thermal design and fabrication

The contractor shall provide support for design, fabrication and implementation of various thermal controls and components for the Projects. This task is comprised of two subtasks: developing mechanical designs and detailed drawings, and implementation and/or fabrication of parts from those designs and drawings. This task encompasses the following specific subtasks and deliverables:

- 5.1 Provide thermal design support for the Projects. This support includes, but is not limited to, analysis of thermal loads, design of appropriate thermal interfaces and controls, and design of specific thermal components. These components include, but are not limited to heat pipes/straps/plates for subsystems, heat pipes/straps/plates/exchangers for the entire instrument, thermal interface to the aircraft/platform, thermal interfaces for subsystem mounting, and thermal mounting of individual components. Deliverables shall be documented design and analysis studies and/or detailed drawings of each component and assembly level drawings for groups of components (as necessary).
- 5.2 Fabrication/acquisition and implementation of thermal components for the Projects. Fabrication of components includes, but is not limited to, those identified in task 5.1. Implementation of components includes, but is not limited to, those identified in task 5.1. Deliverables shall be completed thermal components along with proper documentation of flight-certified materials and fasteners.

Task 6: Support for structural analysis

The contractor shall provide support for structural analysis of instrument components, subsystems, and/or complete instruments. Deliverables shall be documented analysis studies and/or detailed drawings of each component and assembly level drawings for groups of components (as necessary).

Task 7: Support for development of ground support equipment (GSE)

The contractor shall provide support to design and/or fabricate necessary ground support equipment (GSE) for the Projects. GSE is necessary to permit, e.g., insertion of instruments into the research aircraft/platform. GSE includes lifting and handling fixtures and mounts and test

equipment. Deliverables for this task shall be documented mechanical designs and/or fabricated GSE components.

Task 8: Support for meetings, reviews, and aircraft/platform integration

The contractor shall provide technical support for meetings, reviews and aircraft/platform integration, as necessary. This shall include travel to meetings, reviews, and conferences in support of the Projects. Travel may be required for the following types of meetings: project reviews, technical interchange with vendors, and integration support at the aircraft. Deliverables for this task shall be documented travel reports and/or review packages.