1U CubeSat Lasercom Terminal for Deep Space Communication, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)

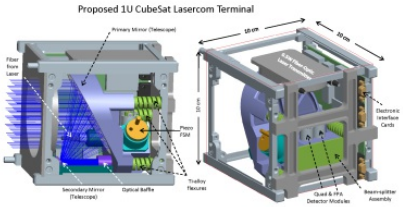
ABSTRACT

In this NASA SBIR-select Phase 2 program Fibertek will develop, test and validate a high-fidelity 1U CubeSat Lasercom Optical Terminal prototype, optimized for deep-space optical communication, and targeting the following characteristics – (i) Low Size/Weight/Power (SWaP) 1U Lasercom Terminal for deep-space mission (total power budget P<10W is targeted), (ii) Athermalized optical design of a fiber-coupled laser transmitter to innovative optical telescope for lasercom transmit/receive function, (iii) quasi-monolithic design and fabrication of the optical assembly with large 65 mm aperture, (iv) integrated beam point-ahead and beam-pointing stabilization capability, (v) integrated radiation-tolerant controller card for all control and interface functions for this 1U CubeSat terminal, (vi) Low power radiation-tolerant FPGA based electronics design, for a reconfigurable and highly capable processing platform, and (vii) compatible with a CubeSat bus interface with the appropriate ADCS system. The prototype optical terminal will be tested and characterized in a lab environment, for optical signal sensitivity levels, acquisition field-of-view requirements, and very low jitter pointing stabilization, representative of the requirements for deep-space optical communication link.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: (1) 1U CubeSat lasercom optical terminal for deep-space and inter-planetary missions (2) Compact, efficient space lasercom optical terminal for LEO/GEO platforms (3) Optical terminal design can be adapted for active remote-sensing of planetary atmospheres. (4) Optical terminal can be used for lidar based entry-descent & landing, as all needed functionalities - laser transmit/receive, processing, and optical telescope are already available (5) Compact and cost-effective optical terminal for potential imaging applications from CubeSat or SmallSat platforms



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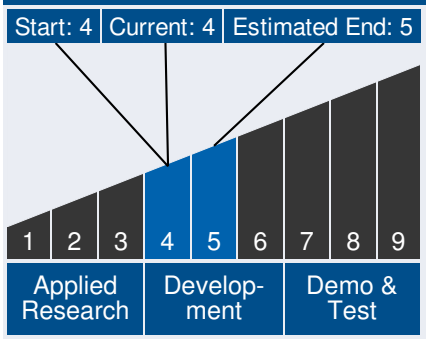
Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

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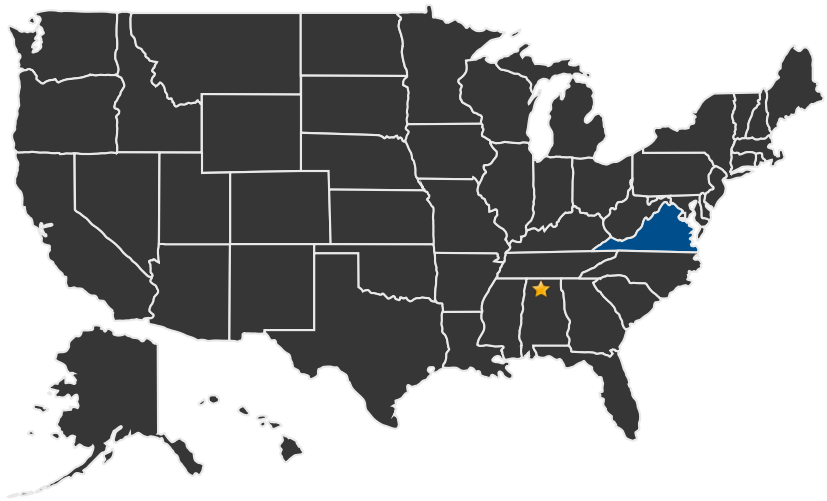
To the commercial space industry:

Potential Non-NASA Commercial Applications: (1) Compact, efficient LEO-GEO space lasercom optical terminal for DoD applications, e.g. AF, NRO (2) Compact, efficient lasercom optical terminal for UAV to satellite applications (3) Can be adapted for any optical terminal (Transmit/Receive) needs for a SmallSat platform on hosted payloads.

U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Marshall Space Flight Center

Other Organizations Performing Work:

- Fibertek, Inc. (Herndon, VA)

PROJECT LIBRARY

Presentations

- Briefing Chart
  - (http://techport.nasa.gov:80/file/17761)

Management Team *(cont.)*

Program Manager:

- Carlos Torrez

Principal Investigator:

- Shantanu Gupta

Technology Areas

Secondary Technology Area:
Communications, Navigation, and Orbital Debris Tracking and Characterization Systems (TA 5)
└ Optical Communications and Navigation (TA 5.1)
  └ Optical Tracking (TA 5.1.6)

DETAILS FOR TECHNOLOGY 1

Technology Title

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