High Aspect Ratio Cylindrical Parabolic Antenna for Microsats, Phase I

Completed Technology Project (2018 - 2019)

Project Introduction

The subtopic requests advanced deployable parabolic antennas with an effective aperture of $4m^2$ that operate at frequencies up to 36GHz.

Tendeg will produce a flight antenna design to meet a NASA specific science mission. Various feed systems will be explored including a beam scanning phased array feed along with multi-array feeds.

The primary goal of this Phase I program will be to design and develop the primary reflector deployment mechanism and shape forming net. This will include construction of a proof of concept prototype which will contain a deployment mechanism, parabolic shaped slit tube back support, bulkhead rear supports, reflector netting, and mesh net back structure. This will demonstrate the ability for high packaging efficiencies for SmallSat and CubeSat buses.

Anticipated Benefits

The National Academies Decadal strategy for earth observation currently places high priority on earth observation capability across several areas of interest as part of the Surface Deformation and Change target. Each observation mission has different operational frequency requirements which need to be met. The missions span frequencies from L to Ka Band. These missions can include canopy penetrating radar for Earth surface characterization up to atmospheric weather predicting radar missions.

Non-NASA applications can be similar with regards to measuring and predicting weather phenomena.

The proposed antenna can also be used for synthetic aperture radar applications that allow weather penetrating radar to detect and track assets including land and ocean surface vehicles, aircraft and missiles. This capability is enhanced by the ability to operate at dual frequencies providing high resolution tracking.

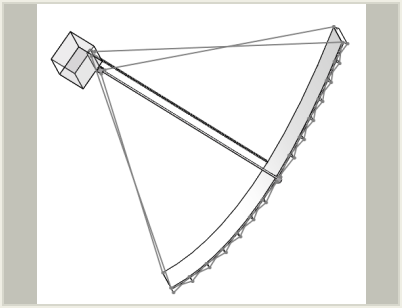

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Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destination	3

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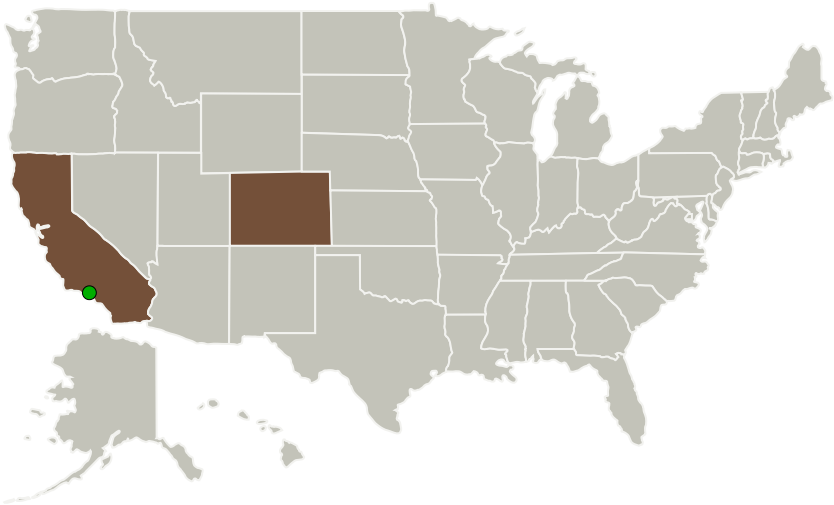
Completed Technology Project (2018 - 2019)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Tendeg LLC	Lead Organization	Industry Small Disadvantaged Business (SDB)	Louisville, Colorado
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Colorado

Project Transitions

July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/141068)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tendeg LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

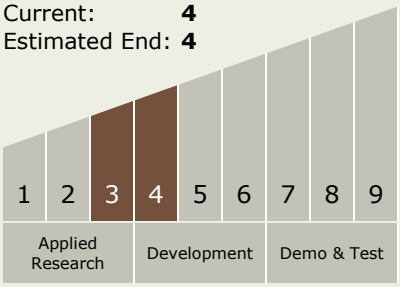
Carlos Torrez

Principal Investigator:

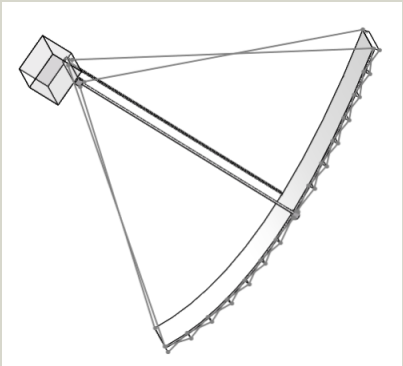
Gregg Freebury

Technology Maturity (TRL)

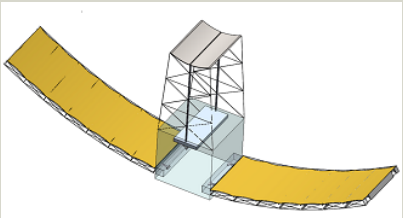
Start: **3**
Current: **4**
Estimated End: **4**



Images



Briefing Chart Image
High Aspect Ratio Cylindrical Parabolic Antenna for Microsats, Phase I
(https://techport.nasa.gov/image/132175)



Final Summary Chart Image
High Aspect Ratio Cylindrical Parabolic Antenna for Microsats, Phase I
(https://techport.nasa.gov/image/133785)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  └ TX08.1 Remote Sensing Instruments/Sensors
    └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destination

Earth