

Deployable Ka-Band Reflectarray, Phase I Project

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



ABSTRACT

Tyvak, in collaboration with UCLA, proposes a novel approach to the challenge of creating a large reflector for Ka-band high data rate links. We propose to attach the primary reflector surface permanently to the surface of a 6U spacecraft and illuminate the reflector using a Cassegrain style subreflector with an illuminating antenna that is permanently mounted to the transmitter / receiver inside the satellite. While other approaches focus on deploying the reflector surface itself, including Tyvak's own deployable dish project, this proposed innovation uses minimal moving parts to achieve a high gain design.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: NASA has expressed interest in developing swarms of coordinating nano satellites, such as for an interferometer. In such a scenario comms can be a challenging design problem. In order to downlink the data generated by such an array and also to command / control it pointing the spacecraft is typically required, however this can interfere with the primary mission. This antenna allows developing a dedicated comms satellite to fly in the swarm which collects the data over an ISL and then downlinks the data either through TDRSS or through ground stations.

To the commercial space industry:

Potential Non-NASA Commercial Applications: There are many potential commercial applications for an antenna that can be used to maintain a comms link to GEO from a LEO CubeSat. Tyvak is actively pursuing commercial business in this area. The main limitation that Tyvak has faced so far is not being able to accurately quote the development time and cost. With the Phase I STTR award Tyvak would be able to make much more progress in commercializing this technology.

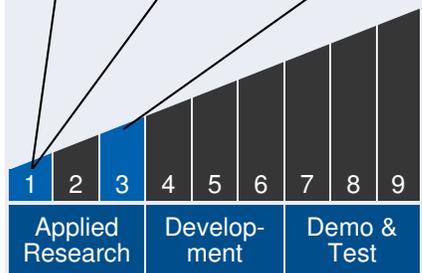


Table of Contents

Abstract	1
Anticipated Benefits	1
Technology Maturity	1
Management Team	1
U.S. Work Locations and Key Partners	2
Technology Areas	2
Image Gallery	3
Details for Technology 1	3

Technology Maturity

Start: 1 | Current: 1 | Estimated End: 3



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

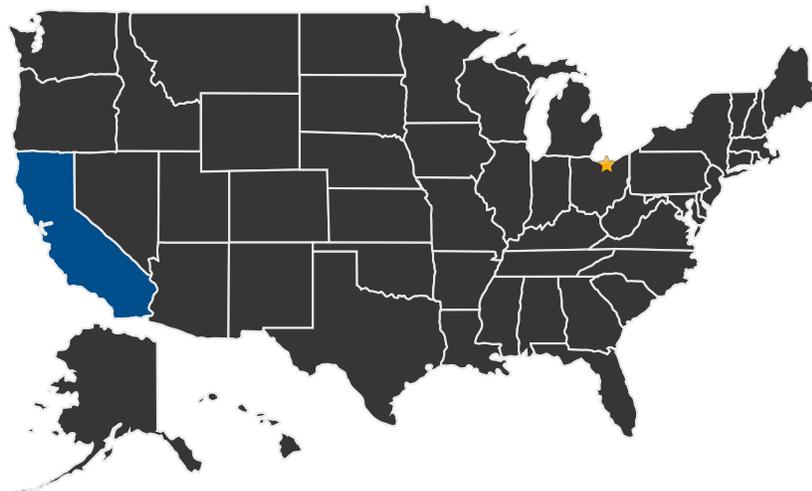
Program Manager:

- Carlos Torrez

Continued on following page.



U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States
With Work

★ **Lead Center:**
Glenn Research Center

Other Organizations Performing Work:

- Tyvak Nano-Satellite System Inc (Irvine, CA)
- University of California, Los Angeles (Los Angeles, CA)

PROJECT LIBRARY

Presentations

- Briefing Chart
 - (<http://techport.nasa.gov:80/file/23179>)

Management Team (cont.)

Principal Investigator:

- Jacob Portukalian

Technology Areas

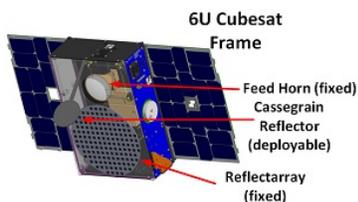
Primary Technology Area:

Communications, Navigation, and
Orbital Debris Tracking and
Characterization Systems (TA 5)

- └ Radio Frequency
Communications (TA 5.2)
 - └ Antennas (TA 5.2.6)



IMAGE GALLERY



*Deployable Ka-Band Reflectarray,
Phase I*

DETAILS FOR TECHNOLOGY 1

Technology Title

Deployable Ka-Band Reflectarray, Phase I

Potential Applications

NASA has expressed interest in developing swarms of coordinating nano satellites, such as for an interferometer. In such a scenario comms can be a challenging design problem. In order to downlink the data generated by such an array and also to command / control it pointing the spacecraft is typically required, however this can interfere with the primary mission. This antenna allows developing a dedicated comms satellite to fly in the swarm which collects the data over an ISL and then downlinks the data either through TDRSS or through ground stations.