

# Department of the Navy SBIR/STTR Transition Program

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NAVWAR

Topic # N181-090

Rapidly Integrated Tactical Communications Payload  
CesiumAstro, Inc.

## WHO

**SYSCOM:** NAVWAR

**Sponsoring Program:** PEO Space

**Transition Target:** Mobile User Objective System (MUOS)

**TPOC:**

(619)553-1020

**Other transition opportunities:** Space Development Agency - National Security Space Architecture

**Notes:** The 36 element L-Beam AESA provides tactical communications payloads for small commercial satellites that enables communications with tactical users without the need for new radio terminals or modifications on ships, aircraft, or other platforms. The multiple beams make possible pointing and tracking of multiple users simultaneously.

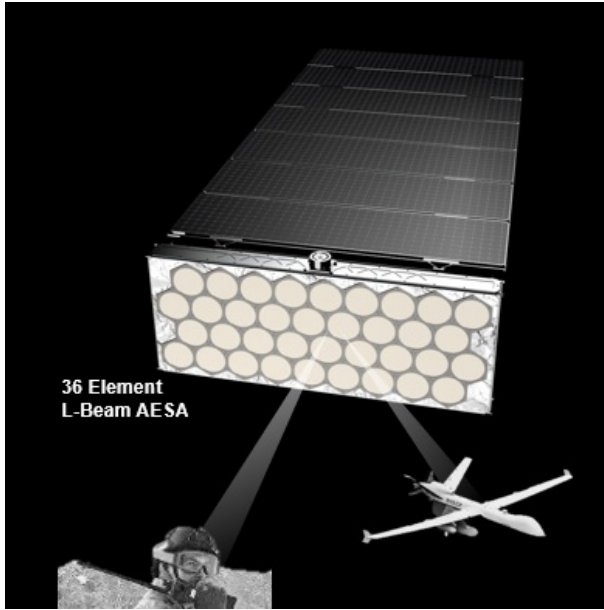


Image courtesy of CesiumAstro

## WHAT

**Operational Need and Improvement:** The Navy has expressed a need for a tactical communications payload for small commercial satellites that enables communications with tactical users without the need for new radio terminals or modifications on ships, aircraft, or other platforms.

**Specifications Required:** Achieving constellation-wide deployment of tactical payloads in low-Earth orbit (LEO) requires design simplicity compatible with large-scale production, along with typical constraints on size, mass, and power consumption.

**Technology Developed:** Cesium's solution is a small reconfigurable payload offering the right balance between performance, size, weight, and power consumption utilizing AESA technology. Modular antenna elements combine to create any size array supporting both space and airborne deployment.

**Warfighter Value:** Multi-beam L-Band AESA technology enables communications with tactical users using existing communications infrastructure on ships, aircraft, or other platforms. The solution enables increased quality of service, improved wireless security, and greater immunity to jamming. Beams can be pointed without physical movement of the spacecraft and fewer satellites needed to cover the theatre than traditional directional antenna approaches.

## WHEN

**Contract Number:** N68335-19-C-0640 **Ending on:** April 1, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
L-Band AESA Technical Concept	N/A	Report with analysis	1	November 2018
AESA Design Design Trade	N/A	Predicted performance, mass and power	2	June 2020
AESA Element Prototyping	N/A	Fabrication	3	October 2020
AESA Performance Analysis	N/A	Actual vs Simulated Results	4	April 2021

## HOW

**Projected Business Model:** CesiumAstro is looking to the Navy or another government customer to partner in a small satellite flight test of the technology, ideally in 2022 on the path to building a full payload that can be hosted on any bus in 2023.

**Company Objectives:** CesiumAstro is connecting with additional government customers that can benefit from the L-Band AESA technology. The array can then be customized to meet specific mission requirements and provided either directly to the government customer or integrated into satellites through a prime. The L-Band AESA is part of a family that includes S-Band, C-Band, X-Band, Ku-Band, and Ka-Band AESA to support a wide range of missions.

**Potential Commercial Applications:** The L-Band AESA technology benefits a wide range of commercial applications including commercial telecom, public safety and emergency response, and global navigation services (GNSS). As the number of AESA produces increases and the costs drop we expect them to be very attractive for higher end mobility applications across land, sea, air, and space.

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