Department of the Navy SBIR/STTR Transition Program

Topic # N232-110
Multidirectional, Multifrequency Ship-based Meteorological Satellite Receiver Using a Virtual Gimbal
Apothym Technologies Group

WHO

SYSCOM: ONR

Sponsoring Program: PEO C4I PMW/A 170

Transition Target: AN/SMQ-11 Antenna Replacement

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Other Transition Opportunities: APNT, SATCOM, SIGINT, multi-static RADAR

Notes: The multi-band, multiple simultaneous beam antenna technology enables unique combinations of multiple existing systems into a single common aperture.

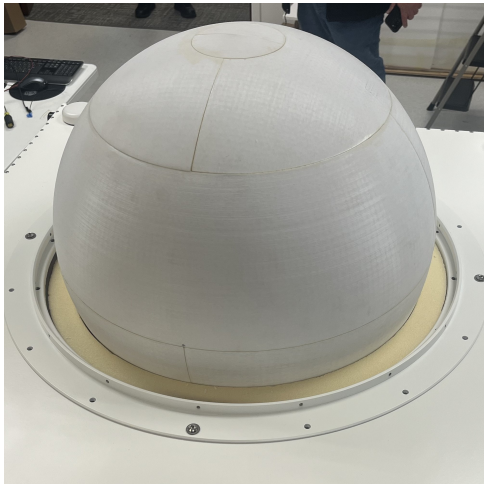

Image courtesy of Apothym Technologies Group, LLC

WHAT

Operational Need and Improvement: Environmental Satellite Receiver systems provide real-time organic Direct Read Out (DRO) capability for ships and shore stations to receive, process and disseminate environmental data from both polar orbiting and geostationary satellite families to the Meteorology and Oceanography (METOC) community in support of war-fighter mission planning and execution in all warfare areas. The lens-based, electronically steered antenna increases the number of simultaneous beams and system reliability.

Specifications Required: The objective is to develop an innovative multiband antenna whose directionality is governed by a virtual gimbal to help reduce incidences of mechanical failure and broaden the pool of available data. The antenna should have no moving parts, be reasonably maintainable with off-the-shelf parts, and be capable of operating in a seaborne environment. This includes accounting for reasonable size, weight, and power requirements and operating on a moving vessel subject to wind and waves. The antenna should receive at a reasonable subset of microwave downlink bands to receive meteorological satellite data broadcasts. A data rate of up to 40 Mbps is required to facilitate representative Joint Polar Satellite System (JPSS) direct broadcast and Geostationary Operational Environmental Satellites (GOES) Rebroadcast capabilities. The antenna should receive Level 0 satellite data in its native format which can then be processed onboard by existing software into a human readable format. Reception of [Advanced] High-resolution Picture Transmission data ([A]HRPT) from the National Oceanic and Atmospheric Administration (NOAA) and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) is encouraged. Design and specifications should also consider direct downlink of novel and future capabilities, such as from commercial weather data vendors and National Aeronautics and Space Administration (NASA) satellites.

Technology Developed: Multi-band (L/S/X), multi-beam, lens-based, electronically steered antenna system.

Warfighter Value: Increased system availability and simultaneous acquisition of environmental data from multiple satellites.

WHEN

Contract Number: N68335-25-C-0054 **Ending on:** Dec 15, 2026

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Ph I - model analysis demonstrates lens based antenna benefits	N/A	Ph I Final report issued	2	3rd QTR FY24
Ph II - 3D Model analysis advances Gradient Index (GRIN) lens	Medium	Ph II 2026Q1 report issued	3	2nd QTR FY26
Ph II - Selection of lens shape and fabrication of small prototype lens	Medium	Small prototype lens & partial feed fabrication and integration completed	3	4th QTR FY26
Ph II - Small prototype lens & partial feed subsystems lab / bench testing completed	Medium	Small prototype lens and partial feed integrated in lab with bench test results	4	1st QTR FY27
If option exercised: Ph II Opt - Full size lens & improved partial feed subsystems testing against satellites in optimal environment completed	Medium	Full size lens & improved partial feed subsystem component performance test results	5	3rd QTR FY28

HOW

Projected Business Model: ATG Solutions aims to develop and sell products utilizing partners for manufacturing under either a licensed OEM or white label model.

Company Objectives: Through this SBIR development, ATG Solutions aims to mature antenna feed and lens shaping techniques to accommodate multiple simultaneous frequencies from a single multi-beam electronically steered antenna, enabling consolidation of multiple existing antennas into a single terminal.

Potential Commercial Applications: This lens-based antenna technology has direct commercial application in both gateway and distant end SATCOM terminals.

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