

Department of the Navy SBIR/STTR Transition Program

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ONR Approval #2024-12-16-456

Topic # A19-071

Distributed Maritime Operations - Environmental Intelligence (DMO-EI)

Blue Storm Associates, Inc.

WHO

SYSCOM: ONR

Sponsoring Program: Marine Meteorology and Space Weather

Transition Target: USMC MQ-9A

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Other Transition Opportunities: PEO (U&W) programs/systems; military platforms supporting multi-domain operations air/land/sea; commercial emergency response vehicles and large-scale delivery fleets.

Notes: PEMDAS Environmental Intelligence (EI) technologies include key capabilities: atmospheric sensing, data processing, threat prediction, data exploitation, and visualization.

Atmospheric Sensing and Prediction System (ASAPS) provides operators "right now" warnings of adverse weather such as clouds, icing and turbulence and gathers critical environmental data for mission exploitation.

NOWcasting, a robust machine-to-machine automated expert system, generates high resolution actionable weather predictive threat information to increase situational awareness (SA) before and during mission operations.

Time-on-Station (TOS) exploits NOWcasting and airborne platform high fidelity winds to calculate, in real time, predicted fuel states and estimated loiter and transit times across entire navigation routes. TOS delivers invaluable fuel performance data directly to an operator's Tactical Situational Display (TacSit) during long duration flights under varying wind conditions, enabling operators to optimize mission needs.

ASAPS is a proven asset on over twenty government, DoD, and civil platforms. Along with intuitive, timely, operationally tailored displays and user interface (UI), PEMDAS hardware and software systems provide decision making tools and enhanced situational awareness (SA) leading to mission success.



Courtesy of Proposals to Go and PEMDAS Technologies & Innovations

WHAT

Operational Need and Improvement: USN and USMC Intelligence, Surveillance, Reconnaissance, and Targeting (ISR-T) missions are critical national security interests. INDOPACOM and Arctic operations are especially challenging and at risk from adverse weather threats such as thunderstorms, icing, and turbulence. Alerts and accurate forecasts informed by real-time atmospheric data minimize these risks and optimize mission success across the vast battlespace domain.

Specifications Required: Systems must gather and rapidly process atmospheric data, then present it to the user to facilitate decision making. The EI system is designed with adaptable data link capability and small data bandwidths to ensure interoperability with mission planning and execution systems. ASAPS hardware has a modular design with variants that have an entire system weight of just 2 to 15 ounces depending on platform and mission needs. Robust construction ensures survivability and performance in challenging weather situations. ASAPS, NOWcasting, and Time-on-Station system products are visualized using Open Geospatial Consortium (OGC) standards.

Technology Developed: ASAPS is an EI system providing operators with first-ever real-time "in the air" warnings of adverse weather conditions. ASAPS is a platform agnostic, low size, weight, and power (SWaP) system which passively measures and processes in situ pressure, temperature, relative humidity, and atmospheric turbulence. ASAPS atmospheric data collected in flight is delivered in near real time to Navy weather models to improve fidelity in data-limited / data-void areas.

NOWcasting delivers highly enhanced EI decision support products that provide improved support for military operations through rapid refresh rates, high resolution, low latency, and superior fidelity. These 4D (time and space) products can be integrated into existing mission planning tools and tailored to customer needs and requirements. The system is also fully automated, leveraging machine-to-machine communication to execute all aspects of the NOWcasting process.

Warfighter Value: High fidelity data and decision products correlate directly to improved safety and mission effectiveness. Positive mission impacts include extending weapon sensor acquisition and targeting ranges by avoiding clouds and using pressure measurements to enhance vertical placement for weaponeering in denied-GPS environments. In turn, collateral damage is minimized and survivability enhanced against enemy threats. Longer on-station mission times and lower risk from unexpected weather situations across the vast over-ocean domain are also delivered.

WHEN

Contract Number: N68335-23-C-0190

Ending on: Apr 07, 2025

| Milestone | Risk Level | Measure of Success | Ending TRL | Date |
|--|------------|--|------------|--------------|
| Initial ASAPS Development / Integration with SOCOM MQ-1C/ER | N/A | Delivery/acceptance of 26 ASAPS prototypes for MQ-1C/ER | 7 | 4th QTR FY19 |
| Time-on-Station initial development | N/A | NOWcasting winds increased accuracy of mission fuel estimates | 6 | 3rd QTR FY23 |
| Army SBIR Phase II for Weather Collaborative Operating Picture (WxCOP) | N/A | NOWcasting capabilities integrated into WxCOP providing increased situational awareness "SA" | 6 | 4th QTR FY23 |
| PEMDAS weather decision-support technologies integrated | Low | ASAPS prototype for Marine MQ-9A successfully installed / passes integration tests; turbulence algorithms verified; fleet operators confirm decision | 8 | 3rd QTR FY25 |

HOW

Projected Business Model: PEMDAS plans a two-year business model. Year 1: Enhanced Phase II - six months - to prepare the technology for operations, secure any security credentials, and develop a two-year plan for manufacture and delivery; Phase III - six months to enter Low Rate Initial Production (LRIP) and perform Quality Assurance (QA). Year 2: Phase III Follow-On to enter full rate production and delivery.

Company Objectives: Manufacture and sell suites of technologies at the forefront of atmospheric sensing and environmental SA, including mission-relevant combinations of ASAPS, NOWcasting, and Time-on-Station, to provide optimal, actionable weather decision support for air, land, and sea operational deployment.

Potential Commercial Applications: Target commercial companies include those performing high risk operations in degraded weather such as medical evacuation (e.g., Life Flight), remote emergency supply delivery, or helicopter wildfire support. Additionally, businesses that employ large-scale fleets of delivery vehicles for normal operations (such as the trucking industry) can apply weather SA to save costs with more efficient planning and avoidance of accidents.

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