DEPARTMENT OF THE NAVY
SBIR/STTR TRANSITION PROGRAM

# SUCCESS STORY

**TOPIC NUMBER:** AF151-041

**SBIR INVESTMENT:** $854,636

**PHASE III FUNDING:** $3,784,854

## ENVIRONMENTAL INTELLIGENCE RESEARCH AND DEVELOPMENT

*Blue Storm Associates, Inc., dba PEMDAS Technologies & Innovations, develops environmental intelligence technologies that transform weather data into actionable insights enhancing Naval maritime operations.*

**Blue Storm Associates, Inc. dba PEMDAS Technologies & Innovations**

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## THE CHALLENGE

Adverse maritime weather poses significant challenges to intelligence, surveillance, reconnaissance, and targeting (ISR&T) operations. To maintain superiority the world's vast oceans and skies, the U.S. Navy requires timely, accurate environmental intelligence. This information is critical for maximizing unmanned aircraft system (UAS) capabilities, enhancing electromagnetic spectrum operations (EMSO), and supporting forward deployed warfighters, especially in data-sparse regions such as the Indo-Pacific.

## THE TECHNOLOGY

PEMDAS Technologies & Innovations (PEMDAS) developed the Atmospheric Sensing and Prediction System (ASAPS) and NOWcasting system to address these maritime weather challenges. ASAPS delivers real-time adverse weather warnings to UAS operators, ensuring safer and more effective mission execution. NOWcasting generates high fidelity, immediate weather threat avoidance decision products, equipping Naval personnel with the critical information needed to make informed mission decisions in dynamic maritime environments.

## THE TRANSITION

The Office of Naval Research (ONR) awarded PEMDAS a Phase III contract (N00014-22-C-2015), titled "Environmental Intelligence Research and Development," to enhance UAS operations in extreme environments. As part of this effort, PEMDAS supported the deployments of a long endurance UAS operating in Greenland and the challenging Arctic conditions of Alaska. With ASAPS, UAS operators successfully navigated hazardous weather near 80°N latitude, providing critical support for both scientific objectives and real-time situational awareness. Operators reported that ASAPS was invaluable in assessing actual flight conditions and increasing confidence in operational decision-making. PEMDAS is also executing an ONR SBIR Phase II contract (N68335-23-C-0190) to demonstrate ASAPS mission capability on the Marine MQ-9A Reapers.

The integration of ASAPS hardware and software has been successfully completed, with multiple flight tests already accomplished. PEMDAS aims to secure Naval acquisition support to transition ASAPS onto all Marine MQ-9s and additional Naval platforms.

## THE NAVAL BENEFIT

PEMDAS technologies—ASAPS and NOWcasting—operate independently or as an integrated environmental intelligence suite. ASAPS provides real-time alerts on adverse weather conditions such as clouds, icing and turbulence while simultaneously collecting critical environmental data to improve Navy weather models. NOWcasting generates rapid-refresh, high resolution weather predictions that enhance maritime flight planning, in-flight navigation, weapons employment, and real-time mission adjustments. These technologies can be integrated into manned and unmanned platforms, providing enhanced situational awareness over open water and remote land locations, reducing risk, improving efficiency, and optimizing mission success. Additionally, forward observing platforms equipped with advanced meteorological collections capabilities contribute to more precise Navy and Air Force weather models, benefiting DoD forecasters across all service branches.

## THE FUTURE

PEMDAS is advancing next-generation capabilities, including machine-to-machine predictive 3D weather intelligence and GPS-denied positioning for autonomous aircraft rerouting. Under contracts with the Navy, SOCOM, and DARPA, these cutting-edge technologies will enhance multi-domain operations, ensuring mission success in the most challenging operational scenarios.

> **"Developing a forecast for a flight over an area with no weather information is dangerous. ASAPS fills this critical gap, improving weather models and reducing risk for aircrews."**
>
> Steven Favretto, Director, Regional METOC Center, West (MCAS Miramar)

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