DEPARTMENT OF THE NAVY
SBIR/STTR TRANSITION PROGRAM

SUCCESS STORY

TOPIC NUMBER: N201-022

SBIR INVESTMENT: $1,335,443

PHASE III FUNDING: $13,516,930

MARITIME SITUATIONAL AWARENESS - DEEP LEARNING AGGREGATED REFERENCE KNOWLEDGEBASE (MSA-DARK)

Programs Management Analytics & Technologies, Inc. (PMAT) developed innovative AI/ML techniques to mine big data sources for information to improve maritime situational awareness.

Programs Management Analytics & Technologies, Inc.

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THE CHALLENGE

Naval operators and analysts face the challenge of rapidly processing massive volumes of data related to surface vessel activity to determine intent, relevance, and potential threats. This data is derived from multiple sensors, associated radar and optical imagery and electronic warfare information. The speed and complexity of modern environments exceed human cognitive limits, making timely detection of anomalous behavior and accurate threat prediction both critical and difficult.

THE TECHNOLOGY

Maritime Situational Awareness - Deep Learning Aggregated Reference Knowledgebase (MSA-DARK) employs an ensemble of classic and deep learning Artificial Intelligence/Machine Learning (AI/ML) models to detect complex maritime awareness events. It delivers near real-time data ingestion, analysis, and alerts to support Naval decision making.

THE TRANSITION

In 2020, NAVAIR PMA-290 awarded Programs Management Analytics & Technologies, Inc. (PMAT) an SBIR Phase I contract to design MSA-DARK, applying advanced platforms and AI/ML algorithms to integrate commercial and Navy situational awareness data. A subsequent Phase II award in 2021 enabled further prototyping, resulting in a robust suite of algorithms that automated detection of maritime events of interest and improved tactical awareness.

As MSA-DARK demonstrated both technical maturity and operational value, NAVAIR PMA-290 awarded PMAT a Phase III cost-plus-fixed-fee contract in 2024. This contract not only enables the extension, completion, and transition of MSA-DARK into operational use, it facilitates PMAT's ability to transition the capability across the broader Department of War (DoW).

THE NAVAL BENEFIT

MSA-DARK reduces analyst workload and accelerates the conversion of large volumes of surface vessel data into actionable, time-dominant intelligence. By automating data interpretation, its layered algorithms support aggregation, visualization, and mission-contextualized decision aids. These capabilities enhance Naval operations and mission planning across Intelligence, Surveillance, Reconnaissance, and Targeting (ISR&T), situational awareness, navigation, Command and Control (C2), and humanitarian and disaster recovery missions, ultimately strengthening decision-making and battle management effectiveness.

THE FUTURE

PMAT will continue to advance and expand MSA-DARK, enhancing its AI/ML to exploit big data for improved maritime situational awareness. Leveraging these capabilities, PMAT will drive advancements in C2, ISR&T, and kill chain automation for Naval and DoW missions.