

Topic: N141-075

Modus Operandi, Inc.

POLIS: Pattern of Life Integrated System

Modus Operandi, a company that delivers data discovery, integration, and Big Data analytic solutions for defense organizations is working to develop an activity-based intelligence system that helps spot unusual behavior by adversaries. Modus Operandi combines its expertise in semantic analysis with scalable graph analytic methodologies and information fusion to develop an innovative pattern-of-life (POL) analysis solution, called POLIS (Pattern-Of-Life Integrated System). POLIS analyzes large amounts of intelligence data represented as large graphs to find behavioral patterns that may indicate hostile intent. POLIS combines high-performance computational capabilities with complex graph-matching techniques. Coupled with semantic logic-based graph querying and manipulation, the platform describes POL patterns as inter-related items and provides a means to mathematically align, calculate, and identify statistically relevant observations.

Technology Category Alignment:

Machine Perception, Reasoning and Intelligence

Command, Control, Communications, Computers, & Intelligence (C4I)

Assuring Effective Missions

Modular/Open/Reconfigurable Architectures

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SYSCOM: ONR

Contract: N00014-15-C-0140

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00014-15-C-0140

Department of the Navy SBIR/STTR Transition Program

STATEMENT A. Approved for public release; distribution is unlimited.

ONR Approval # 43-2203-16

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WHO

SYSCOM: ONR

Sponsoring Program: Office of Naval Research Code 30 Intelligence, Surveillance and Reconnaissance (ISR)

Transition Target: Marine Corps Intelligence Activity (MCIA); Distributed Common Ground System-Navy Inc 2

TPOC:

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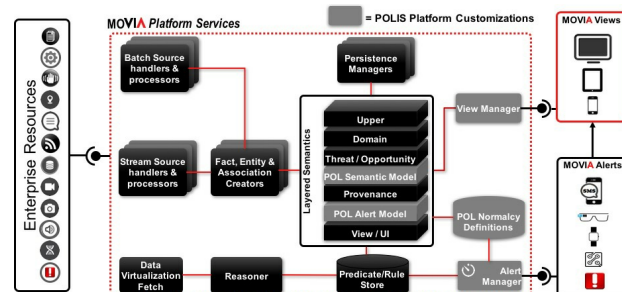
Other transition opportunities: U.S.

Navy Maritime Operation Centers (MOC)

U.S Coast Guard Intelligence Coordination Center (ICC)

U.S. Army Intelligence & Security Command (INSCOM)

U.S. Customs and Border Patrol Intelligence and Operations Coordination Center (IOCC)



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WHAT

Operational Need and Improvement: Sailors and Marines are responsible for conducting missions such as assaults, embassy protection, non-combatant evacuation, and disaster relief. Mission planning involves understanding normal patterns-of-life (POL) so anomalies can be recognized. A new capability to enable POL calculation, based on scalable machine learning (ML) and specialized analytics, is needed. This topic will explore analytics of non-traditional open source data fused with conventional data that can provide insight into anomalous activities.

Specifications Required: Proof-of-concept prototype system that is capable of detecting changes in POL rapidly from dynamic data stores populated by multiple data types. The system will provide mission relevant, early threat indicators, all enabled by big data analytics. The prototype system should be able to automatically process, display and alert on activity discoveries relevant to the specific user location and mission interests, using data sources that are of interest to a transition program. The system should support data acquisition, scalable data storage and analytics, and alert dissemination. It is desired that context and pedigree of information be maintained for operator review.

Technology Developed: The Pattern-of-Life Integrated System (POLIS) software combines soft and hard data analytics to provide POL calculation in near-real time using a scalable and distributed backend. The developed statistics and ML methods are extensible to a variety of data which include tools for time series analysis, spatio-temporal analytics, spatial clustering, similarity ranking, and more.

Warfighter Value: The proposed technology focuses on automating tedious data analytics tasks for analysts, helping them find and focus on POL anomalies hidden within the huge volumes of sensor and open source data. This provides analysts with the ability to focus more quickly on mission critical information that improves decision-making support to commanders.

WHEN

Contract Number: N00014-15-C-0140 **Ending on:** September 27, 2016

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Tracking-based Normalcy Methodology	Low	Accuracy in Identifying Meaningful Patterns	4	September 2016
Sentiment-based Normalcy Methodology	Low	Identification of Sentiment Shifts over Time	4	September 2016
Demonstrate POL Alerting	Med	Precision & Recall of Automated Alerts	4	March 2017
Semi-auto Hard+Soft data Association Methodology	Med	Accuracy of Computed Association	4	March 2017
Demonstration in target environment	Med	POL Demonstration in Operational Environment	5	October 2018

HOW

Projected Business Model: Although overall defense-related spending is expected to flatten, and likely decline, over the next 10 years, the Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) and Cyber markets are projected for continued growth. Within these overall market segments, relevant niche markets for Modus Operandi include big data, data discovery/integration/sharing, unstructured data analytics, multi-source intelligence analysis, cyber intelligence, and situational awareness, with concentration on the needs of U.S. Department of Defense (DoD) and intelligence agencies. Modus Operandi's preliminary estimate of the size of the addressable portion of this market niche comprised of Research and Development (R&D), acquisition, and sustainment programs is \$500-800 million annually.

Company Objectives: Modus Operandi's commercialization strategy consists of two stages. The first stage, establishes Modus Operandi as a premier niche technology solutions provider in the defense/intel C4ISR and Cyber market sectors, then leverages experience to increase market share within the niche. The second stage extends business partnerships developed during the first stage and packages technology for consumption by the broader federal and commercial customers.

Potential Commercial Applications: POLIS possesses a direct tie to Modus Operandi's strategic business focus of providing technologies in four main areas: 1) Semantics, 2) Natural Language Processing, 3) Cyber Security and 4) Big Data Scalability and Cloud Computing. Combining these four areas of emphasis enables Modus Operandi to continue serving the warfighter through innovative technology solutions for discovery, integration and fusion of multi-source information. The proposed application directly addresses challenges faced by the U.S. Navy and Marine Corps as well as other defense/intel sector customers to include the Air Force, Special Operations Command, and Missile Defense Agency.

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