Department of the Navy SBIR/STTR Transition Program

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Topic # N142-122
Opportunistic Real-Time multimodal Sensor Content Exploitation
Systems & Technology Research

WHO

SYSCOM: ONR

Sponsoring Program: ONR Code 31

Transition Target: Autonomous Persistent Tactical Surveillance Distributed Common Ground System-Navy (DCGS-N)

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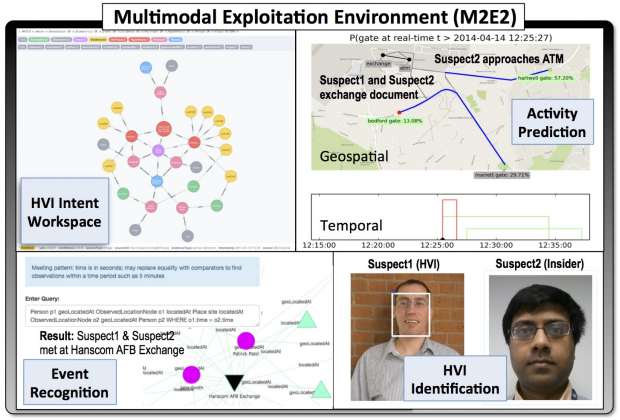
Other transition opportunities: U.S. Navy, Air Force and Special Operations Forces Processing, Exploitation and Dissemination (PED) cells supporting remotely piloted aircraft missions; Air Force Research Laboratory (AFRL) Planning & Direction, Collection, Processing and Exploitation, Analysis and Production, and Dissemination - Experimental (PCPAD-X) initiative; Office of the Director of National Intelligence (ODNI); Interagency Task Forces; Other transition targets include military base security, force protection, and civilian security monitoring needs.



WHAT

Operational Need and Improvement: There is a capability need to perform frame-level contextual query and content tagging of files in multimedia sources including real-time sensor feed or archived files. Specifically, Navy analysts need the ability to annotate, tag, and fully search content in video and voice files at the frame-level matched to the desired attributes of entities of interest in the frame (i.e., biometric signatures, landmark settings, geolocations, etc.) so that objects of interest can be precisely defined, discovered, and tracked with respect to time and space; thus revealing their emerging behaviors, activity patterns, and intent.

Specifications Required: The software application should have an efficient multimedia tagging scheme, content-based parsing and indexing, automatic tagged-content propagation, and query functionality that enables extraction of relevant content automatically from available multimedia files for a distributed, decentralized operational environment. The software application is expected to rapidly search available multimedia sources for specific content of interest, with the results shared and stored on the cloud, and allow the analyst to have control over the entire content of interest being searched, medium for storage, and with whom the content will be shared.

Technology Developed: STR is building a Multi-Modal Exploitation Environment (M2E2) that extracts and fuses information from distributed video and audio sources to track and predict patterns of High Value Individual (HVI) activity. Unique M2E2 features include 1) automated extraction, tracking, and identification of HVI from video and audio feeds, 2) spatiotemporal prediction algorithms to narrow HVI interdiction options and cue future sensor collection, and 3) collaborative analysis tools for event- and frame-level annotation of HVI activities and intent.

Warfighter Value: M2E2's automated HVI detection, tracking, and prediction capabilities, and interactive HVI track timeline and suspicious event alerting will greatly improve situational awareness of DoD security personnel and analysts of HVI activities and intent. Early detection and semi-automated activity tracking will afford more time to focus on response strategies. M2E2 testing against simulated espionage scenario footage has yielded accurate HVI detection/event recognition.

WHEN

Contract Number: N68335-16-C-0039 **Ending on:** December 18, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Development of additional automated plug-ins	Low	Video + audio processing, multi-modal biometrics fusion, & high-level event recognition	4	June 2017
Proof-of-concept M2E2 prototype demo	Med	Repeatable & reliable detection & prediction (unclassified dataset)	4	December 2017
Validate prototype performance	Med	Successful validation at Navy lab	5	September 2018
Integrate M2E2 with DCGS-N	High	Forensically detect, track, & predict (withheld data)	6	June 2019
Improved DCGS-N surveillance analysis performance	High	Improved detection/ prediction ability in real-time, streaming environment	7	March 2020

HOW

Projected Business Model: STR's near-to-mid term business model is to seek contract R&D funding for the maturation and adaptation of M2E2 for the Navy and other DoD or Intelligence Community customers. STR is open to multiple long-term business models, including the transition of the technology to a large prime via a substantial subcontract and/or strategic partnership, or direct sell to government or commercial clients via a fee-based license scheme.

Company Objectives: STR's main objective for the Forum for SBIR/STTR Transition (FST) is to develop a relationship with a government program office or commercial technology integrator for DCGS-N or other programs with a requirement for automated security monitoring assistance over large diverse surveillance networks. Our longer-term company objectives include maturation of an internal product line for multi-INT fusion and analysis tools based on M2E2, with an ultimate expansion to follow-on R&D programs and transition sponsors in the Navy, DoD, Homeland Security, and the Intelligence Community.

Potential Commercial Applications: Long-term transition opportunities are expected in civilian security monitoring in the commercial sector. Commercial applications may include monitoring systems such as airport systems to assist in identifying airline passengers on the No-Fly list; commercial banking systems with respect to money laundering; high-risk locations/facilities for people of interest; and other location perimeters for physical security breaches.

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