

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2021-0353

Topic # N193-A01

Aircraft Intent Inference based on Real-Time ADS-B Data Processing
The Innovation Laboratory, Inc.

WHO

SYSCOM: NAVSEA

Sponsoring Program: PEO-IWS 6.0 Command & Control Networking (navigation and networking between platforms)

Transition Target: All CEC Platforms (CVN, DDG, CG, E2D, and Future)

TPOC:
(202) 781-3014

Other transition opportunities: DoD applications requiring the persistent, automated monitoring of air traffic for nominal, off-nominal, and anomalous behavior will benefit from this technology. Additional transition opportunities include: Department of Homeland Security (DHS) applications, Federal Aviation Administration (FAA) applications, or other Air Navigation Service Providers (ANSPs) around the world requiring the monitoring of air traffic in the United States or elsewhere. Commercial Airlines benefit from automated monitoring and flight tracking of their fleets, supporting airline dispatchers.

Notes: Currently slated for CEC Increment II, Future Capability Group in the FY30 timeframe. CEC is enhanced capability; how platforms communicate; brings in data from a variety of sensors, combining that data, and provide that information at the track to the appropriate weapons system; can make decisions based upon that data. The system design includes Intent Inference for Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) traffic.

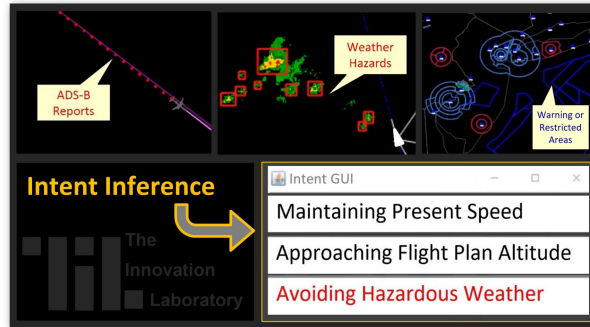


Image Courtesy of The Innovation Laboratory, Inc.

WHAT

Operational Need and Improvement: The Department of the Navy is interested in the development of cutting-edge AI/ML technologies to obtain solutions to the following and related Navy Focus Areas: 1 - Readiness and Sustainment; 2 - Unmanned Aircraft Systems Autonomy and Automation; 3 - Predictive Maintenance; 4 - Cyber; 5 - Counter Artificial Intelligence; 6 - Streamline Business Operations; 7 - Integration of Automatic Dependent Surveillance; 8 - Integration of Automatic Identification System (AIS) Data through AI/ML Applications; 9 - C4ISR (Test/Certify)

Specifications Required: The Navy leverages Automatic Dependent Surveillance - Broadcast (ADS-B) data as a new passively collected surveillance data source. The Navy's goal is to develop behavior models and supporting data based on ADS-B and other data sources that will be used to (1) identify apparent air corridors and (2) detect anomalous behavior in support of determining aircraft intent.

Technology Developed: Artificial Intelligence techniques are implemented to learn from large quantities of historical data to create succinct knowledge representations that enable the real-time identification of anomalous aircraft and to infer pilot intent. Navy and Air Force applications requiring the persistent, automated monitoring of air traffic for nominal, off-nominal, and anomalous behavior will benefit from this technology.

Warfighter Value: This technology can reduce Navy operator workload by autonomously monitoring aircraft ADS-B surveillance data and alerting the user of anomalous or off-nominal events, communicating in a human-interpretable language the likely pilot intent. Users benefit from technology that is real-time, automated, human understandable inferences, and is modular and flexible for adapting to mission needs.

WHEN

Contract Number: N68335-20-F-0566 **Ending on:** November 1, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Derivation of Core Intent Models	N/A	Pilot/Controller/Engineer Approval	3	November 2020
Design Complete for IFR and VFR	Low	Pilot/Controller/Engineer Approval	3	March 2021
Proof of Concept System Developed	Med	Software System T&E	4	June 2021
T&E for IFR and VFR Intent Inference Scenarios	Med	Software System T&E	4	July 2021

HOW

Projected Business Model: The Innovation Laboratory specializes in advancing basic innovations to prototype demonstration systems ready to transition into government and commercial systems. This technology is ready for transition to DoD prime/system integrators. For DoD and DHS customers, there will be no license fees. In this case, The Innovation Laboratory is expected to fit into the Program of Record's (PoR's) funding cycle for installation of new, enhanced versions, or refinements of intent inference models. Life cycle software management is expected to be performed by the DoD prime/system integrator. For commercial customers, the software will be sold for a price dependent on the number of users accessing the software or information provided by the software. Commercial customers are expected to integrate the software into existing dispatcher workstations. Improved software models will be available for purchase on a yearly basis.

Company Objectives: The Innovation Laboratory is interested in meeting DoD prime/system integrators who can transition this technology into a PoR. The goal is to transfer the technology at the TRL5 or TRL6 level and provide guidance on the design, engineering, software, and scenarios so that the prime/system integrator can perform the maturation to higher TRL levels. The long term objective is for The Innovation Laboratory to design, build, and test additional intent models that are suitable for improvements to the deployed system, and repeatedly transfer those models over to the prime/system integrator at the TRL5 or TRL6 level.

Potential Commercial Applications: Airline Dispatch Workstations; Anomaly Detection; Diversion Management; Estimated Time of Arrival

Contact: Jimmy Krozel, Ph.D., Chief Scientist
Jimmy.Krozel@TheInnovationLaboratory.com

(503)863-0012