

Situational Awareness for Surveillance and Interdiction Operations

Overview

Naval Postgraduate School's Situational Awareness for Surveillance and Interdiction Operations (SASIO) software enables the use of integrated analytic models for generating, maintaining, and enhancing situational awareness for numerous operational contexts. These models include a probabilistic representation of likely target locations in the Area of Operations (AO) as well as a method for integrating new information (e.g., intel injects), a stochastic process model for describing the possible motions of enemy elements in the AO, and also an optimization model for determining the best location(s) to search using limited ISR resources. The operator interface to these SASIO models is through the decision support tool, *SASIO: Command*, which provides visualization of the current situational awareness map (i.e., probabilities of target presence in different locations), Blue Force status and location information, as well as interactive panels for inputting gathered information and generating optimized search routes. Further, the network-capable *SASIO: Command* software facilitates machine-to-machine communication for receiving information, e.g., intelligence reports, from multiple data sources and, if needed, transmitting information, e.g., tasking commands, to consumers.

Applicability to MOC Operations

- Situational Awareness / Persistence
 - Enables the use of integrated analytic models for generating, maintaining, and enhancing situational awareness for numerous operational contexts.
- Enhanced ISR Collection Management
 - Leverages probability, stochastic, and optimization models to determine efficient and effective allocation of Intelligence, Surveillance, and Reconnaissance (ISR) assets.
 - **Reports can be made either by manual detection in full-motion video feeds by human operators or by interface with a complementary initiative by the Johns Hopkins University, Applied Physics Laboratory (JHU/APL) called Upstream Data Fusion (UDF).**
- Reduced Manpower
 - Decision support software streamlines the ISR asset allocation process.

Use During Joint Expeditionary Force Experiment 2010

The Naval Postgraduate School (NPS) developed and deployed the SASIO modeling framework in support of MOC operations during the JEFX 10-3. The decision support software, called *SASIO: Command*, was deployed in the MOC to provide recommendations for unmanned aerial vehicle (UAV) search routes to the Intel Cell in support of numerous Navy operational threads. The need to allocate an available ISR asset in these threads provided opportunities to demonstrate the benefit of decision support generated by the SASIO modeling framework. For JEFX 10-3, automated detections and target tracks were generated by UDF and transmitted to

***SASIO: Command* over the network, enabling automated updates to the situational awareness representation within *SASIO: Command*. After processing these reports, the operator used *SASIO: Command* to generate new recommendations on where to task the UAV asset. These recommendations were to the UAV ground control station for execution. Though future deployments may make use of *SASIO: Command*'s ability to transmit these tasking orders directly over the network, for JEFX 10-3, these recommendations were sent manually over chat between the Intel Cell and the UAV operators.**