

Advanced Technology Laboratories

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Technology: Suspicion Vessel Focuser

Early Warning for Maritime Security

The Challenge

Even with today's increased security awareness, our nation's seaports and maritime assets, e.g., Navy, cargo, or cruise vessels, continue to be vulnerable to acts such as terrorism or piracy. For maximum security, naval operators must be able to constantly track thousands of vessels and identify threats. Although extremely high volumes of vessel data are available to the operators, the resulting information overload makes it very difficult to identify the "needle in the haystack" that is a threat vessel.

Lockheed Martin Advanced Technology Laboratories (LM ATL) in cooperation with the U.S. Navy 6th Fleet in Italy, has developed the Suspicion Vessel Focuser (SVF)—a novel software technology that allows naval operators to monitor large numbers of vessels and focus their attention on those vessels that pose the greatest threat.

Innovative Automation

The SVF allows the user to program automated steps that derive and maintain a "live" threat picture of all surface vessels within the operator's Area of Responsibility (AOR).

The SVF combines three powerful innovations to successfully counter maritime threats: (1) user-defined opera-

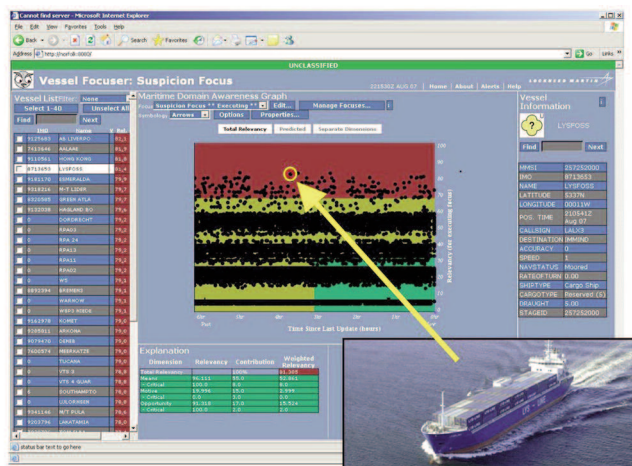
tions—to easily define operational relevancy based on Means, Motive, and Opportunity. Means is an estimate of the

tions—things to be protected—within the AOR. This is the focus of SVF. The SVF Vessel Relevancy Engine algorithm leverages the domain knowledge entered by the operator to maintain an up-to-date measure of current operational relevancy for all vessels within the AOR relative to this focus.

Field experiments have shown that an SVF operator can identify threats from among several thousand vessels in less than a minute. Naval operators confirmed that the SVF greatly improved their ability to: (1) see and understand a threat picture for all vessels in an AOR; (2) identify the most suspicious vessels; (3) get an explanation of a vessel's suspicion/relevancy score; and (4) make more effective allocation of assets to counter potential threats.

Applications

The SVF has been proven effective in field experiments on the operational naval computer network and used by naval operators during naval operations. The SVF technology can be adapted to many applications where it is necessary to track the movements of numerous entities and identify those that deviate from expected or planned behaviors.



The SVF allows the operator to quickly identify and continue to track any vessel that poses a potential threat.

tional relevancy, (2) intelligent inference algorithms that mimic how people infer potential threats; and (3) the ability to fuse inference results from all available types of data into a situational picture. The SVF obtains worldwide vessel tracking data from several sources, including the AISLive World Wide data feed that continuously tracks 40,000+ vessels.

The SVF allows operators

to easily define operational relevancy based on Means, Motive, and Opportunity. Means is an estimate of the innate potential of a vessel to be used for harm i.e., it has the capability to carry a deadly cargo. Motive is an estimate of the predisposition of the vessel's crew to attempt an attack. Opportunity is an estimate of the dynamically changing proximity of a vessel from a protected interest—based on the vessel's position, course, and speed.

The operator designates a set of objects and/or loca-

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