

## MARITIME SITUATIONAL AWARENESS

### MISSION IN BRIEF

To increase the ability of NATO to detect threats at sea by extracting useful information from a variety of data sources using automated techniques and advanced algorithms.

### OVERVIEW

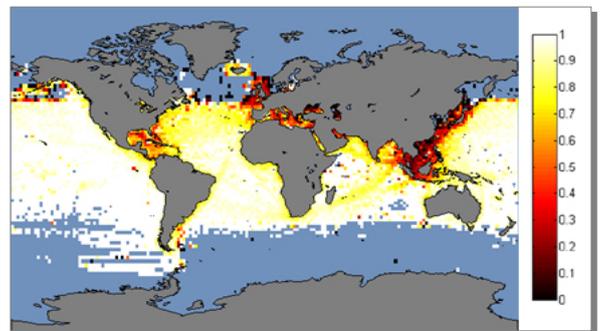
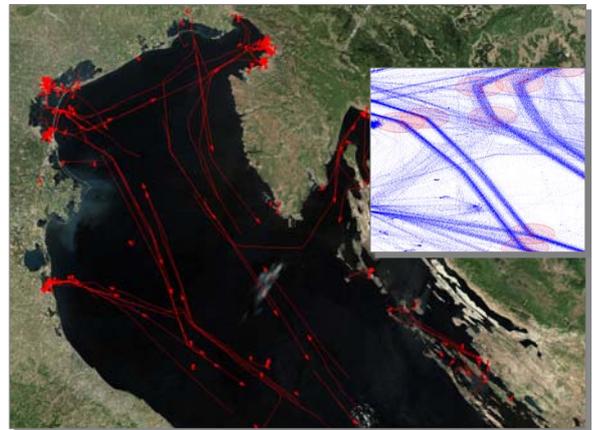
At CMRE, a major component of maritime security is maritime situational awareness (MSA), which ultimately addresses the question: is this ship behaving in a way that requires further investigation? Researchers are trying to answer that question using the Collaborative Multi-Sensor/Source Fusion and Tracking Tool (COMSSOFT), developed at the Centre.

COMSSOFT uses data from the Maritime Safety and Security Information System (MSSIS), which tracks more than 70,000 vessels around the world as part of its freely-shared data collection and distribution network. The challenge for the MSA team at CMRE is (1) to develop complex algorithms in COMSSOFT that merge, or fuse, the raw satellite and radar data, (2) to develop patterns of typical shipping behaviour based on historical data, and (3) to identify anomalous behaviour. The goal is to develop an automated system that could alert operations personnel to unusual behaviours that might require further investigation. The system is being designed so that it could be scaled up to cover areas of interest to all NATO nations.

In addition to working on data fusion and anomaly detection, the MSA team is also developing decision aids; for example, COMSSOFT can show the accuracy of fused data. Knowing the quality of the data, operations personnel can make better decisions regarding the use of NATO resources.

### CONTACT

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*Top: Through machine learning, raw data, such as these ship tracks in the Strait of Gibraltar, are used to define typical behaviour; for example, the waypoints that are circled in red (inset). Bottom: This image from COMSSOFT shows areas with good AIS coverage (0) and bad coverage (1).*