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DESIGN OF AN EXTENSIBLE SHIP DETECTION AND IDENTIFICATION SYSTEM

Abstract

Knowing the position and identity of all ships in a region is crucial to many industrial, leisure and governmental activities and the accuracy and completeness of this information can have far-reaching consequences. Transportation companies optimize the routes used by their fleets to save costs. Port authorities manage marine traffic to ensure safety. National security and enforcement agencies supervise entire coastlines for security threats and illegal activities. Fishing management organizations develop quotas and monitor restricted fishing areas. Environmental monitoring groups detect the source of marine pollution. A complete marine situational awareness allows militaries to manage resources and develop effective strategies. Market traders track marine traffic to forecast commodity prices. A ship detection and identification system (SDIS) is being designed which aims to produce results relevant to all of these industries and stakeholders.

Many methods for detecting ships have been in use and steadily improving for decades. Very close range detection can be performed with underwater passive instruments to limit a ship's awareness of the surveillance activities. Ground and ship based radar provide high resolution detection capabilities with ranges limited by line-of-sight. Optical and radar satellite imagery can scan large expanses of marine areas in a short amount of time.

It is often necessary to not only detect the presence of a ship but to also identify it. Many ships volunteer this information and regularly broadcast it while they are underway. Vessel registries provide an extensive amount of information on both commercial ships and pleasure craft. Despite this, many ships do not self-identify or they actively attempt to prevent their identity from being discovered.

The SDIS will integrate the results of various ship detection methods. This paper/poster will highlight the space-related components of the SDIS including the use of space-based Automatic Identification System (S-AIS) data and the acquisition and analysis of optical and radar imagery for ship detection. The relationship of these components within the larger system architecture and the extensibility of the system to changing requirements and resources will also be discussed.