



Senior Design Project in Electrical & Computer Engineering



Maritime Domain Awareness over IPv6

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Project Background

Prudent mariners are called to use all available means of information to develop a complete understanding of the situation around them. Ship drivers need to be constantly aware of the positions and intentions of other vessels. This Maritime Domain Awareness (MDA) is the picture that mariners have of their surroundings. Some common tools that help provide MDA are Vessel Traffic Service (VTS), Automated Mutual Vessel Assist Vessel Rescue System (AMVER) and Automatic Identification System (AIS)

Automatic Identification System (AIS) is a shipboard system that broadcasts identifying information over the VHF maritime band to other nearby vessels. This information can be shown on the vessel's electronic chart displays and works as a situational awareness tool to increase maritime safety.

Internet Protocol version Six (IPv6) is an internet communications protocol designed to replace the current Internet standard, IPv4. This updated protocol provides robust solutions to the limited internet addresses available. IPv6 also integrates cryptographic authentication and encryption and provides for Quality of Service priority packet routing.



Problem Statement

A high volume of information is continually being passed via AIS through VHF channels. There are limited Coast Guard resources for analyzing, processing, retrieving, and developing this data into useful reports for the operational fleet. Our intention is to answer whether IPV6 provides useful capabilities for transmitting AIS data in a way that would further AIS information dissemination. A new, simplified, vessel traffic protocol will also be developed to provide an alternative to AIS if desired by the maritime community.

Project Plan

We plan to explore the differences between IPv4 and IPv6 and utilize the new features provided by IPv6. Specifically, we will look at the built in information security (IPSec) and quality of service (QoS) features and produce a procedure to implement these capabilities on the current MDA communications setup. Also, we are developing a new protocol that converges AIS and AMVER into a single communication standard.



Project Goals

- Transmit AIS over IPv6
- Harness the integrated Internet Security (IPSec) feature of IPv6
- Demonstrate the use of QoS priority routing in AIS traffic.
- Develop a protocol that integrates the features of AIS and AMVER.

Image Sources: <http://www.coaa.co.uk/> <http://www.uscg.mil>