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MARITIME INTERDICTION OPERATIONS SMALL CRAFT DETECTION ©

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The Naval Postgraduate School has been conducting Tactical Network Topology (TNT) Maritime Interdiction Operations (MIO) experiments with Lawrence Livermore National Laboratory (LLNL) since early in 2005. In this work, we are investigating cutting edge technology to evaluate use of networks, advanced sensors and collaborative technology for globally-supported maritime interdiction operations. Some examples of our research include communications in harsh environments, between moving ships at sea; small boat drive-by radiation detection; network-centric collaboration with global partners; situational awareness; prototype sensors & biometric instruments. Since 2006, we have studied the concept of using a small vessel with fixed radiation sensors to do initial searches for illicit radioactive materials.

In our work, we continue to evaluate concepts of operation for small boat monitoring. For example, in San Francisco Bay we established a simulated choke point using two RHIBs. Each RHIB had a large sodium iodide radiation sensor on board, mounted on the side nearest to the passing potential target boats. Once detections were made, notification over the network prompted a chase RHIB also equipped with a radiation sensor to further investigate the potential target. We have also used an unmanned surface vessel (USV) carrying a radiation sensor to perform the initial discovery. The USV was controlled remotely and to drive by boats in different configurations. The potential target vessels were arranged in a line, as a choke point and randomly spaced in the water. Search plans were problematic when weather, waves and drift complicated the ability to stay in one place.

A further challenge is to both detect and identify the radioactive materials during the drive-by. Our radiation detection system, ARAM, Adaptable Radiation Area Monitor, is able to detect, alarm and quickly identify plausible radionuclides in real time. We have performed a number of experiments to better understand parameters of vessel speed, time, shielding, and distance in this complex three-dimensional space.

At the NMIOTC in September 2009, we employed a dual detector portal followed by a chase. In this event, the challenge was to maintain communications after a lapse. When the chase went past the line-of sight reach of the Tactical Operational Center's (TOC) antenna, with interference from a fortress island in Suda Bay, Wave Relay extended the network for continued observation. Sodium iodide radiation detectors were mounted on two Hellenic Navy SEAL fast boats. After making the detection one of the portal boats maintained line-of sight while the other pursued the target vessel. Network access via Wave Relay antennas was maintained until the conclusion of the chase scenario.

Summary

Progress has been made in the detection of radioactive materials in the maritime environment. The progression of the TNT MIO experiments has demonstrated the potential of the hardware to solve the problems encountered in this physically challenging environment. There continue to be interesting opportunities for research and development. These experiments provide a variety of platforms and motivated participants to perform real-world testing as solutions are made available.

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