

# The Center for Maritime, Island and Port Security

*A DHS Center of Excellence*

## CENTER OF EXCELLENCE

The Center for Maritime, Island and Port Security, led by the University of Hawaii in Honolulu for maritime and island security and Stevens Institute of Technology in Hoboken, N.J. for port security, will strengthen maritime domain awareness and safeguard populations and properties unique to U.S. islands, ports, and remote and extreme environments.



### MARITIME & ISLAND NATIONAL CENTER FOR ISLAND, MARITIME, & EXTREME ENVIRONMENT SECURITY (CIMES) - UNIVERSITY OF HAWAII

CIMES is focused on developing robust research and strong educational programs in geographic areas that present significant homeland security challenges in collaboration with its partner institutions, the Universities of Alaska and Puerto Rico. Its goal is to deliver revolutionary advances in maritime domain security capabilities that will allow for the eventual development and fielding of critically needed new capabilities. Guided by informed assessment of the DHS maritime problem suite, CIMES will achieve success in a number of scientific and technical areas of direct relevance to DHS.

#### SCIENCE AND ENGINEERING THEMES

Coastal Radar Detection and Satellite Tracking of Ships in Tropical and Polar Oceans CIMES is conducting an accelerated research program to examine maritime data collection systems including space-based platforms for the detection of shipping and HF Radars for the nearshore monitoring of ships, ocean currents and hazards in island and extreme environments. These studies will determine optimum paths to improve these systems and deliver information for maritime security applications to DHS stakeholders.



#### Harbor Acoustic Monitoring Systems

Research into technologies that will improve our awareness of potential threats on the spatial scales of ports through advances in active and passive acoustics is being conducted. Particular advances are sought in separating, identifying, and tracking a multiplicity of signals in a noisy coastal/harbor environment.

#### Decision Support Systems

CIMES is developing operational prototypes of Decision Support Systems (DSS) based on the fusion of the disparate sensor data described above. This DSS component will link CIMES' technical research projects to an overall Concept of Operations for a Maritime Domain Awareness system in such a way as to guide the center's research investments.

#### Education & Training

By expanding existing educational and training programs at all levels, from K-12 through graduate courses and continuing education programs, CIMES will ensure the development and maintenance of a competent and capable, broad-based constituency that is knowledgeable in the technical approaches necessary to address maritime security risks.



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**PORT SECURITY**  
**NATIONAL CENTER FOR SECURE AND RESILIENT**  
**MARITIME COMMERCE (CSR) - STEVENS INSTITUTE**  
**OF TECHNOLOGY**



Support DHS efforts to secure the nation's maritime borders, promote safe navigation and commerce, protect ocean resources and maritime infrastructure, and provide for the safe and secure use of our coastal and offshore areas, through advancement of the

relevant sciences and development of the new workforce. The CSR team provides the resources and capabilities to achieve the Center's goals of:

- Improving port security and the security of coastal and offshore (EEZ) operations and leveraging security investments to also improve economic performance;
- Improving emergency response to events in the maritime domain; and
- Improving the resiliency of the MTS, offshore operations, and our nation's coastal environments.

**Education, Training, & Outreach**

The goal of CSR is to provide education, training, and outreach in STEM disciplines related to maritime security. This includes K—12, undergraduate, and graduate education, as well as education and training for maritime security professionals and outreach programs for the general public. An intensive Summer Maritime Security Graduate Research Institute is conducted each year at one of the partner university campuses on a rotating basis, creating a unique environment for advanced, multi-university examination of issues having particular significance (determined in consultation with DHS).



**Satellite-Based** ship detection, classification and identification. This research is developing new understanding and new processes for receiving and analyzing large maritime area data from multi-satellite and multi-frequency

sensors such as Synthetic Aperture Radar (SAR) and electro-optical (EO) sensors. Algorithms will be developed to employ these data to detect vessels in harbors, the coastal ocean and the high seas. Algorithms will also be developed to integrate this information with ground-based systems such as AIS.

**HF Radar** coastal over-the-horizon ship detection and tracking using advanced dual-use RADAR technologies. The goal is to develop robust detection algorithms that can recognize ship-associated HF Radar signals above the background noise (e.g., surface waves). Algorithms will be developed to support vessel detection and tracking capabilities using compact HF Radars, demonstrating that ships can be detected and tracked by multi-static HF Radar in a multi-ship environment while simultaneously mapping ocean currents.



**Research in Resiliency**

- Resilient Port Infrastructures
- Collaborative design of resilient extended enterprises
- MTS Recovery and Continuity of Operations