The Center for Maritime, Island, and Remote and Extreme Environment Security

A DHS Center of Excellence

CENTER OF EXCELLENCE

The Center for Maritime, Island, and Remote and Extreme Environment 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.

CIMES

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 in the open ocean, and high-frequency radars for the nearshore monitoring of ships and ocean currents 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. The first test site will be at UH's Kilo Nalu field site close to Honolulu Harbor.

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. CIMES, by virtue of our diverse student population, is particularly well placed to bring minority students into the DHS community.

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The National Center for Secure and Resilient Maritime Commerce (CSR)

The CSR supports the Department of Homeland Security's efforts to secure our nation's maritime borders, promote safe navigation and commerce, protect ocean resources and maritime infrastructure, and provide for the safe and secure use of U.S. coastal and offshore areas as well as inland waterways, through the advancement of the relevant sciences and technology and the professional development of our nation's current and future maritime domain workforce.

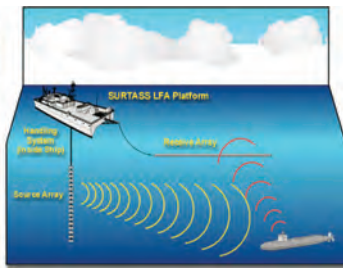
RESEARCH FOCUS

Maritime Domain Awareness (MDA):

CSR's MDA program uses satellite-based wide area surveillance working in association with HF Radar stations providing over-the horizon surveillance and nearshore and harbor multi-sensor and multi-tiered surveillance to achieve vessel detection, classification, identification, and tracking. CSR has been developing algorithms, 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. CSR's High-Frequency Surface Wave Radar (HF Radar) team is developing robust detection and tracking algorithms that recognize ship-associated HF Radar signals above the background noise (e.g., surface waves). CSR is also developing a passive acoustic array that can provide lowcost, highly portable acoustic surveillance capability, including a passive acoustic system, software for signal processing, vessel classification algorithms, underwater threat detection and classification, and ship traffic pattern analyses. The system uses intelligent and efficient algorithms to accurately measure the travel direction and acoustic signature characteristics of underwater objects and vessels in the heavy traffic of an estuary.

System Resilience:

The Center's research in System Resilience emphasizes a broad view of the MTS, the nation's supply chain, and relevant global policies and procedures. Vulnerabilities within the global supply chain are being examined via a collaborative effort to strengthen maritime resiliency and the resiliency of extended enterprises, as well as improving the recovery and continuity of operations. CSR researchers are developing the essential tools and processes necessary to create a capability to "design for MTS resilience". They are also identifying opportunities to make security and maritime resiliency investments leverage improvements in marine transportation business and economic performance.



EDUCATION, TRAINING, & OUTREACH

The CSR provides a robust portfolio of education, training and outreach programs in STEM disciplines related to maritime security, including:

- Undergraduate and Graduate degree programs
- An intensive Summer Research Institute and summer research internship opportunities for undergraduate and graduate students
- Professional development programs for current and aspiring Maritime Security professionals
- K-12 workshops and programs for teachers and students

PARTNERS

Led by Stevens Institute of Technology, the CSR brings together a unique collaboration of academic institutions and industry partners, including:

Rutgers University

University of Miami

Monmouth University

University of Puerto Rico at Mayaguez

Massachusetts Institute of Technology

The Global Maritime Transportation School at the U.S. Merchant Marine Academy

The Port Authority of New York & New Jersey

The Mattingley Group

The Nansen Environmental Remote Sensing Center

The Pacific Basin Development Council

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