Leading Research & Education
PORT SECURITY

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Executive Director

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National Center for Secure and Resilient Maritime Commerce and Coastal Environments
USS Cole – Oct. 12, 2000

Hole extends from Sheer Strake to Tank Top
Maritime Mission

To secure the nation’s maritime borders, promote 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 to promote education and development of the new maritime security workforce.
Ribbon Cutting for a New DHS National Center of Excellence

“Inaugurating the Center for Secure & Resilient Maritime Commerce, 11 July
Mr. Cohen, Dean Bruno, Ms. Borrone, Rep. Rothman, Pres. Raveché >>

“The Center for Secure and Resilient Maritime Commerce (CSR)”
CSR Goals

- **Improving port security** and the security of coastal and offshore (Exclusive Economic Zone or 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.
Spiral Development Process for Research & Development

Students Engaged Throughout

- Multi-Disciplinary
- Tools and Methods
- Deploy
- Requirements and Standards
- New Knowledge
- Discipline-Specific
- Invent
- TEST
Maritime Security Activities

- **Marine Domain Awareness (MDA)**
- **Sensors and Detection Technologies**
  - Passive acoustics
  - Infrared and Visible Light Imaging
- **Systems Research Areas**
  - Hostile Intent
  - Resilience Analysis and Modeling
- **Education, Training and Outreach (ETO)**
“Maritime Domain Awareness is the effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment of the free world.”

CDR Will Kramer (USN ret)
NCOIC Working Document
NCOIC-GMDA-AdHoc-Plen08
Maritime Domain Awareness

Team Responsibilities

- **University of Miami** – CSTARS, satellite-based ship detection, classification and identification to allow monitoring and tracking in global maritime domain;
- **Rutgers University** – coastal over-the-horizon ship detection and tracking using advanced HF RADAR technologies;
- **Stevens Institute of Technology** – near-shore, estuary and harbor surveillance, including underwater, passive acoustic, vision-based, HF-RADAR and sensor placement optimization;
- **University of Puerto Rico** – coastal surveillance in a tropical island environment;
- **Monmouth University** - emergency response with Joint Mobile C2 Center
A Satellite Data Reception and Analysis Facility for Environmental Monitoring and Time Sensitive Tactical Applications in the Southeastern US, Gulf of Mexico, Caribbean Basin and Equatorial Atlantic

Former U.S. Naval Observatory Alternate Time Tracking Station

Sponsors: Office of Naval Research (DoD) and NASA

Goal is to identify suspect vessels.

Vessels and their wakes

Verrazano Narrows Bridge

UI Vessel Identification
?? Container Ship
(Ship length ~256 m)
CODAR Network  
L-Band & X-Band Satellite Systems 
3-D Nowcasts & Forecasts 
Glider Fleet 
Field Communications
Vessel Detection and Tracking

LEGEND

DATA
- LOVELEADIES BACKSCATTER
- SANDY HOOK BACKSCATTER
- LOVELEADIES/SANDY HOOK BISTATIC

TRACKS
- OLEANDER GPS
- CODAR SHIP TRACKER

SYMBOLS
- SHIPPING LANES

OLEANDER INBOUND TO NEW YORK HARBOR

SANDY HOOK

LOVELEADIES

+ 051449.48Z AUG 04
\n× 051852.03Z AUG 04
Maritime Security Laboratory

Laboratory features:
- Real-time command & control
- Systems-level experiments & integration
- Relevant detection technologies

CSR – A Department of Homeland Security National Center of Excellence for Port Security
Hydrophone Experiments June 2008
Comparison of Acoustic Signatures of Ships

![Graph showing spectral density vs. frequency for different ships.]

CSR – A Department of Homeland Security National Center of Excellence for Port Security
Infrared Cameras
Identifying Hostile Intent

Attacker Detection
What is Resilience?

Resilience is the ability of a system to provide and maintain an acceptable level of service in the face of various major faults and challenges to normal operation.
Resilient Maritime Systems

• Supply Chain Enterprise Vulnerability and Resilient Enterprises - Key thrust of MIT’s Integrated Supply Chain Management Program

• Multi-Model Supply Chain Assessments in Multiple Geographies - Conducted by the Mattingly Group

• Dynamic Resilient Enterprise Architecture Management Systems (DREAMS) - Developed by Stevens

• Threat Scenarios for Port Security - Developed by USMMA

• Systems Engineering and Architecting Research (Concept of Operations; Model Based Systems Architecting and Patterns Research; System Readiness Levels); Resilient Systems and Enterprises research at Stevens Institute of Technology
Education, Training, and Outreach (ETO)

CORE PRINCIPLES

**Principle 1:** All consortium partners will contribute significantly to one or more of the components of the ETO.

**Principle 2:** All partners will use their existing ETO platforms to achieve the CSR objectives and maximize impact.

**Principle 3:** All components of the CSR will design and execute their ETO initiatives such that maximum impact to underrepresented and minority populations is ensured.

**Principle 4:** The CSR leadership in each partner organization will do their best to eliminate institutional barriers such that the ETO effort becomes seamless and integrated.
Questions?