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Institute of Technology

RUTGERS
School of Environmental
and Biological Sciences

UNIVERSITY OF MIAMI
ROSENSTIEL SCHOOL
OF MARINE & ENVIRONMENTAL SCIENCES

URBAN COAST INSTITUTE
MONMOUTH UNIVERSITY
where leaders look forward

Marine Sciences, UPRM



LOCKHEED MARTIN
We never forget who we're working for™



THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY

MG
THE MATTINGLEY GROUP

MIT CENTER FOR TRANSPORTATION & LOGISTICS

Leading Research & Education

PORT SECURITY

Dr. Thomas H. Wakeman III
Executive Director

17 November 2008

National **C**enter for **S**ecure and **R**esilient
Maritime Commerce and Coastal Environments



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CSR – A Department of Homeland Security National Center of Excellence for Port Security

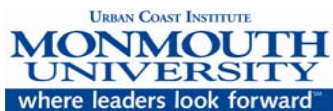
USS Cole – Oct. 12, 2000



Hole extends from Sheer Strake to Tank Top



CSR Partners



MIT CENTER FOR TRANSPORTATION & LOGISTICS



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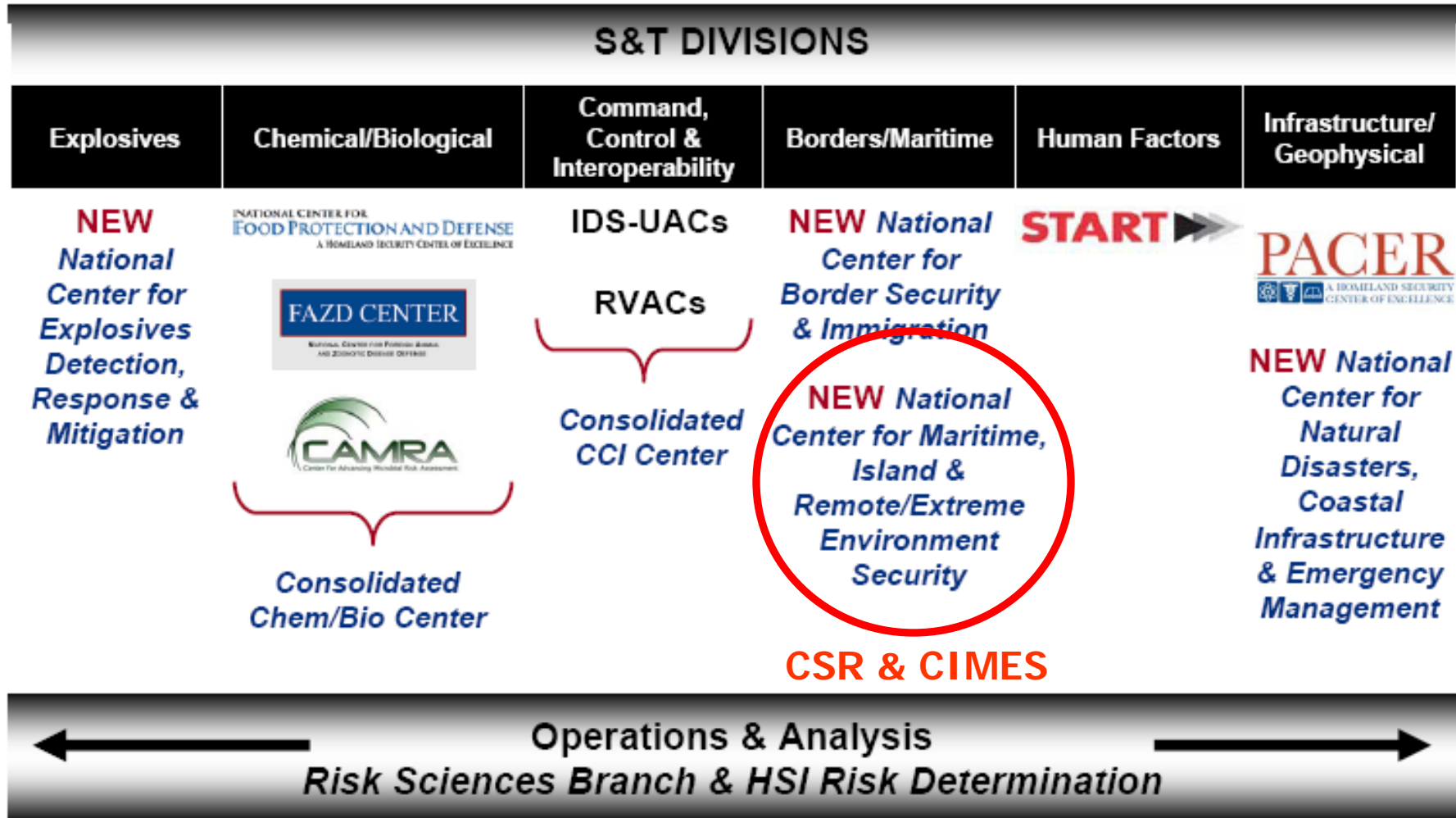


Maritime Mission

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.



DHS Science & Technology



Ribbon Cutting for a New DHS National Center of Excellence

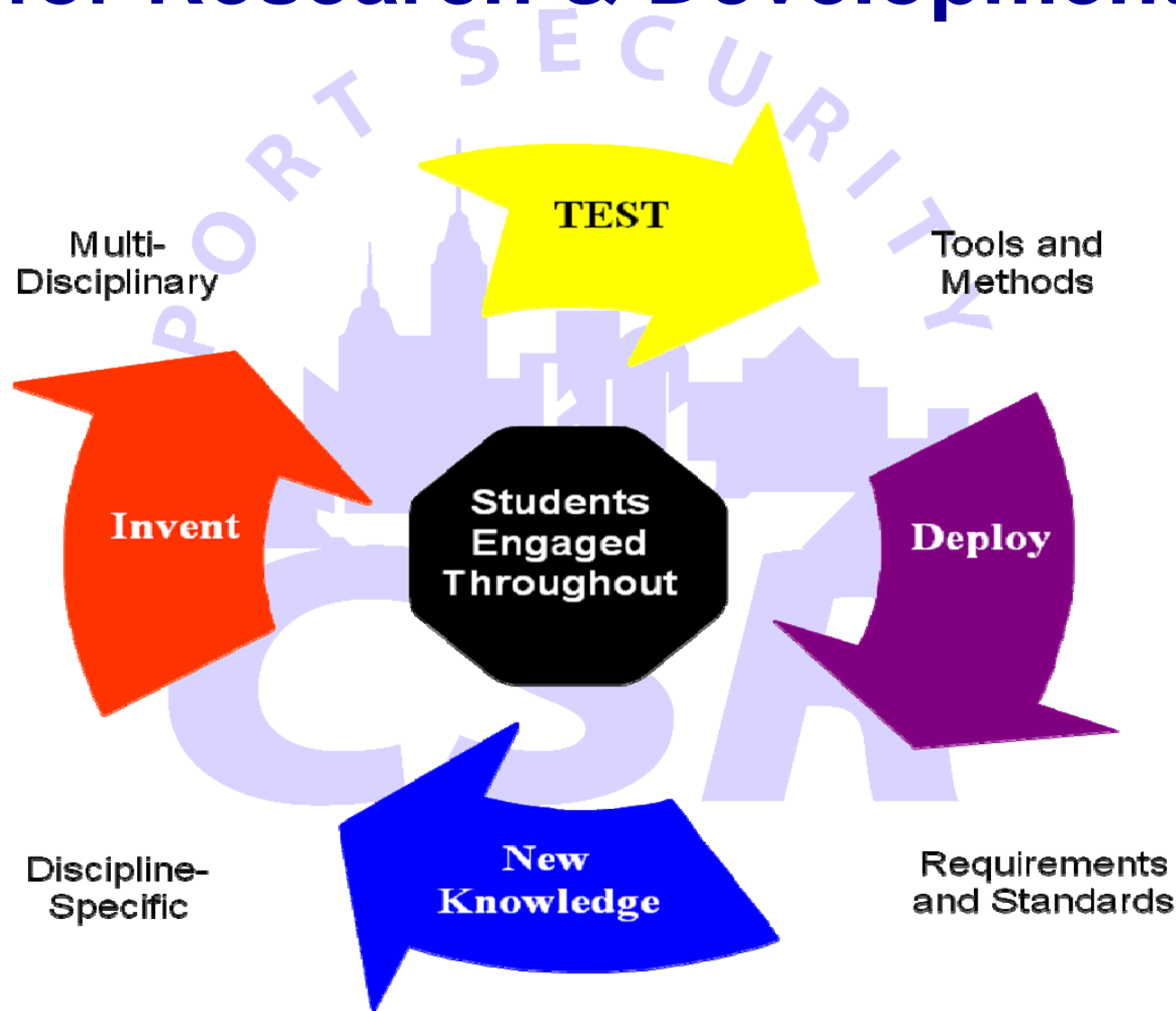


“The Center for Secure and Resilient Maritime Commerce (CSR)”

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



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

Nested MDA Coverage

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SATELLITE

**VIDEO &
ACOUSTIC**

HF RADAR

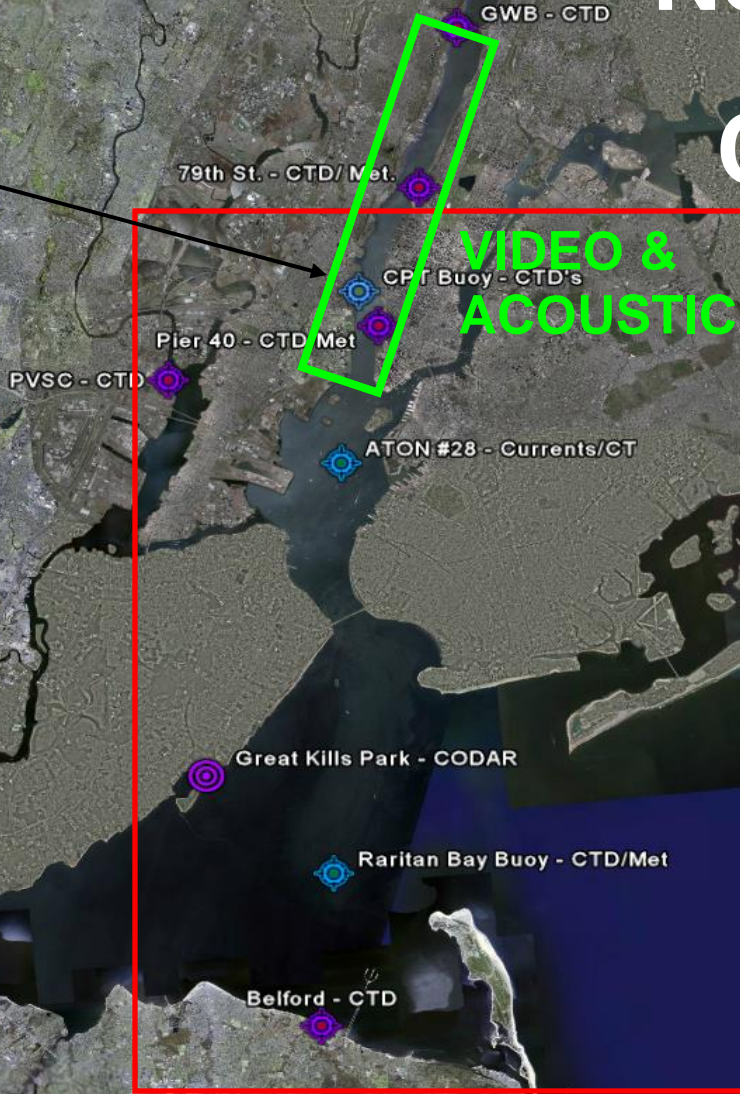
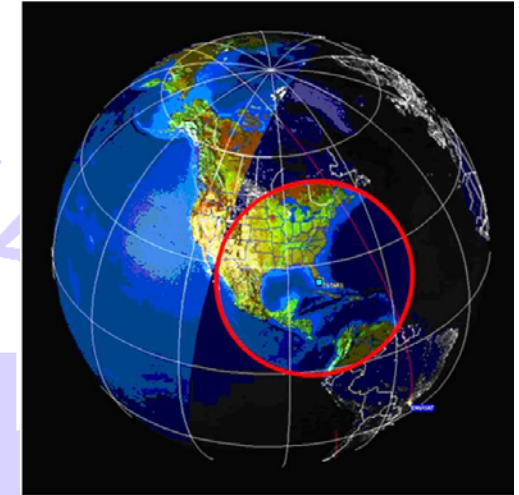


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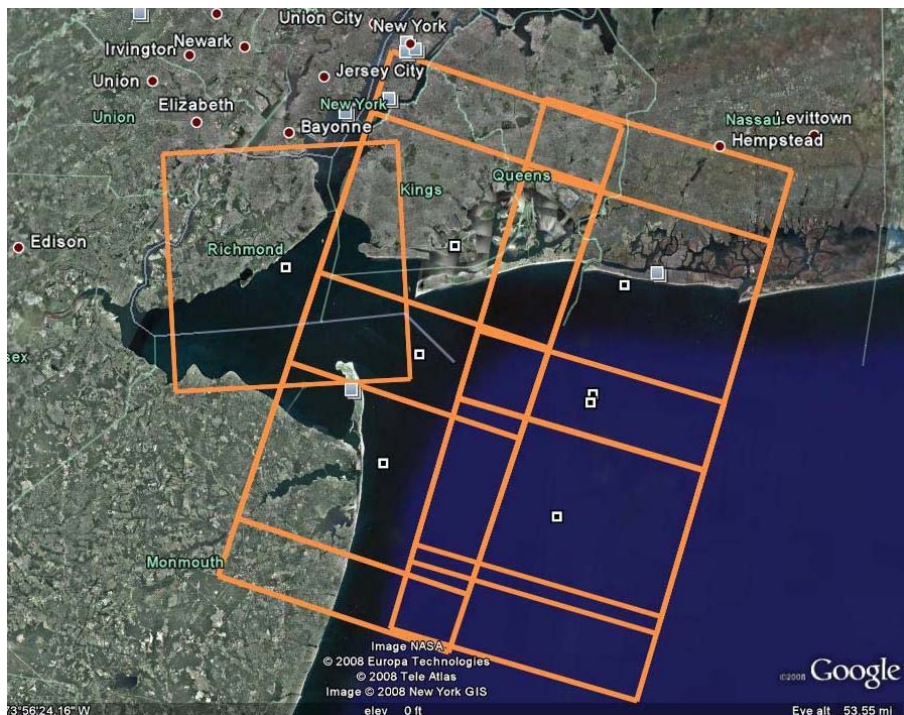
A Satellite Data Reception and Analysis Facility for Environmental Monitoring and Time Sensitive Tactical Applications in the Southeastern US, Gulf of Mexico, Caribbean Basin and Equatorial Atlantic



**Sponsors:
Office of Naval Research
(DoD) and NASA**

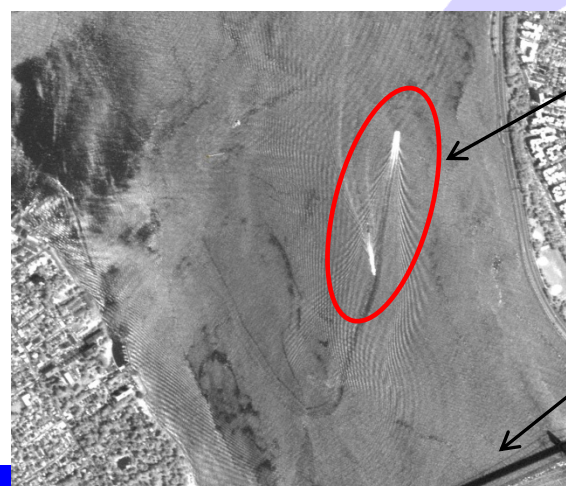


High Resolution Satellite Collections

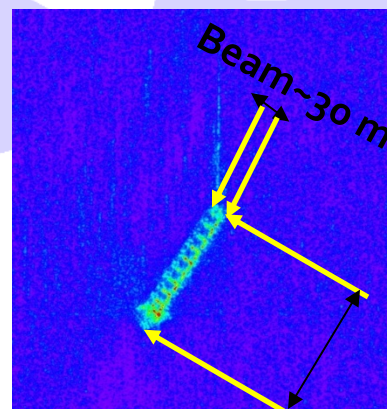


Leveraging USAF and NGA data acquisitions for SAR Utility Assessment Studies of RadarSat-2 and Cosmo-SkyMed satellite data over Port of New York and New Jersey, July 2008.

Goal is to identify suspect vessels.



Vessels and their wakes
Verrazano Narrows Bridge



UI Vessel Identification
?? Container Ship
(Ship length ~256 m)

**Rutgers University - Coastal Ocean Observation Lab
 Operations & Data Fusion Center**



Field Communications



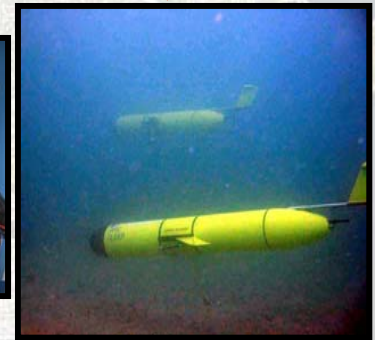
CODAR Network



**L-Band & X-Band
 Satellite Systems**



**3-D Nowcasts
 & Forecasts**

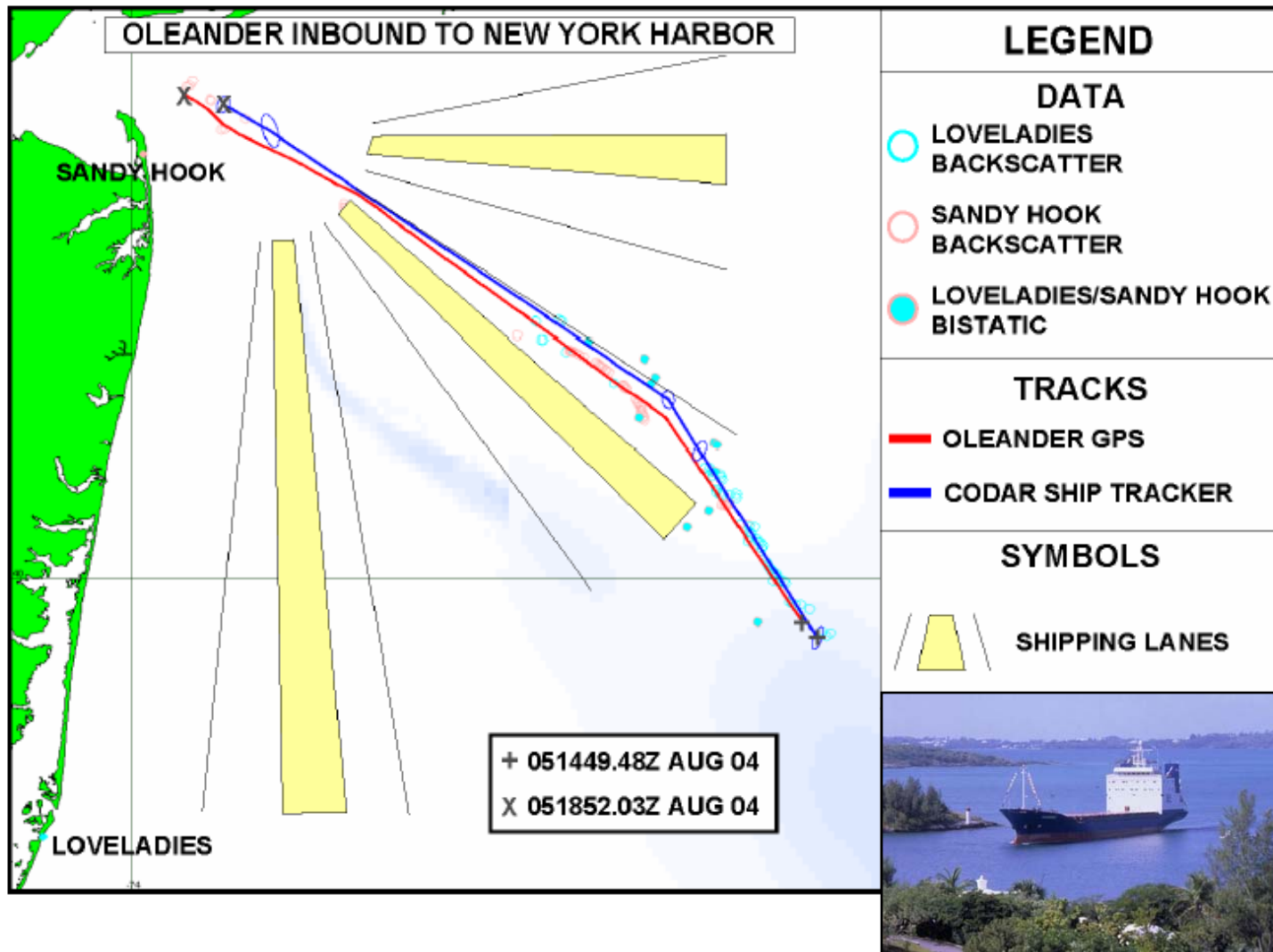


Glider Fleet

Coastal Observation and Prediction Sponsors:



Vessel Detection and Tracking



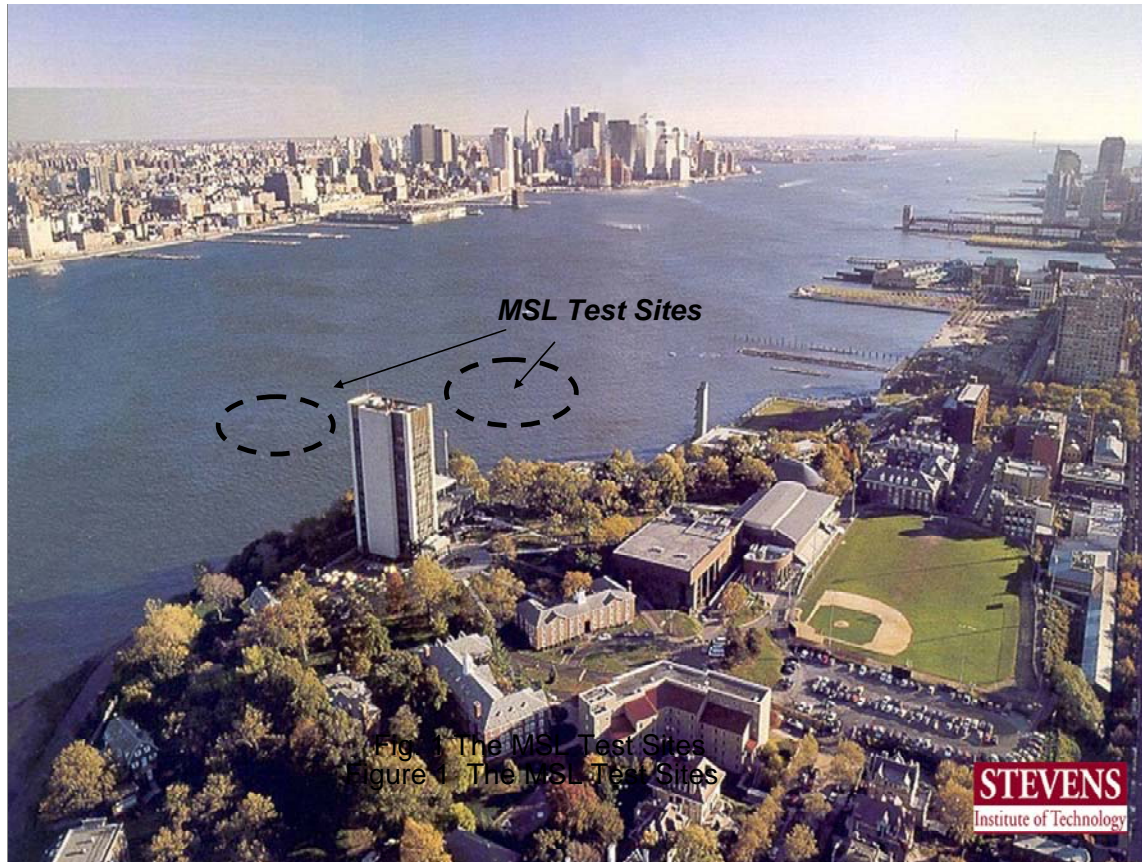
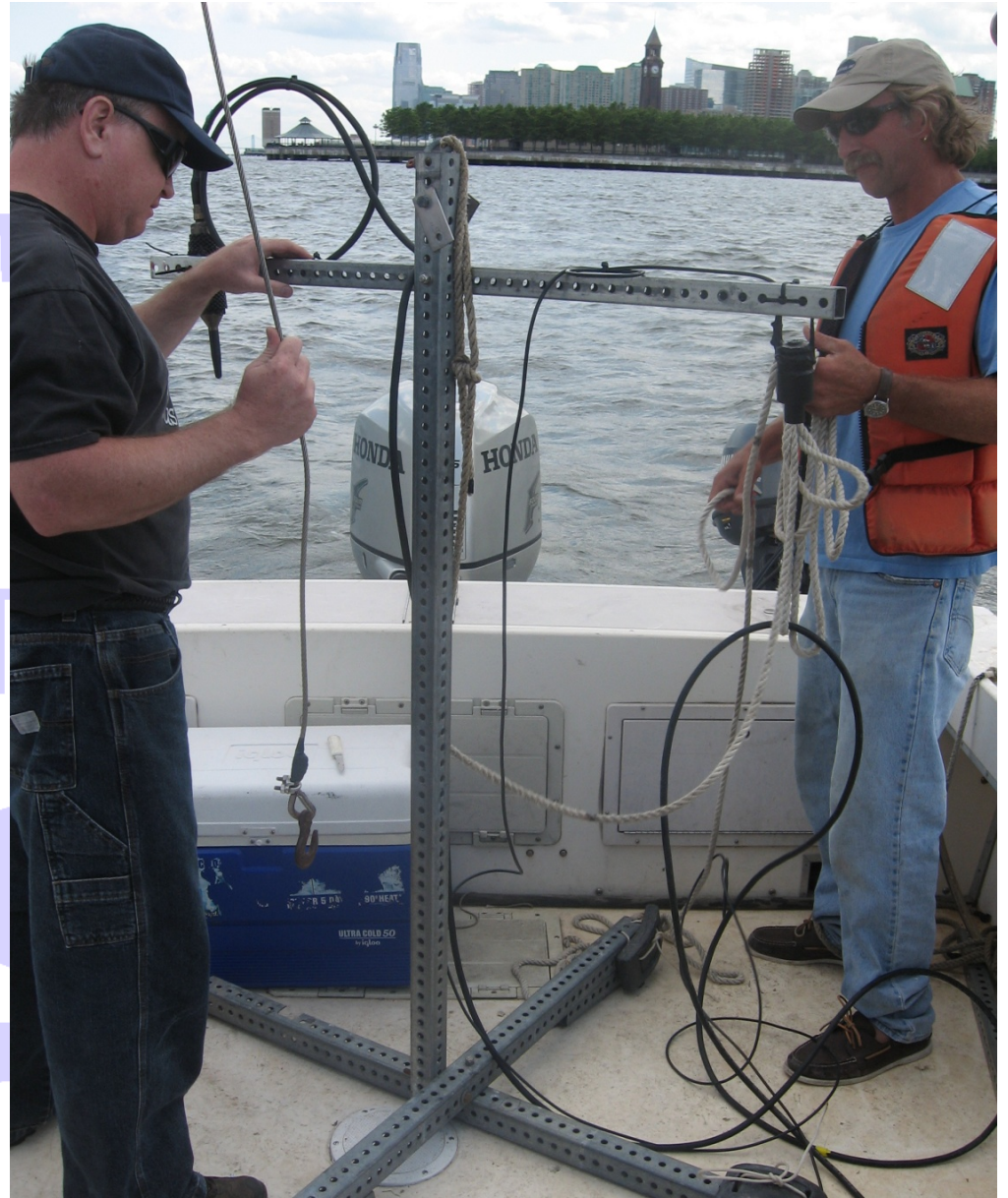


Figure 1 The MSL Test Sites
Figure 1 The MSL Test Sites



Laboratory features:

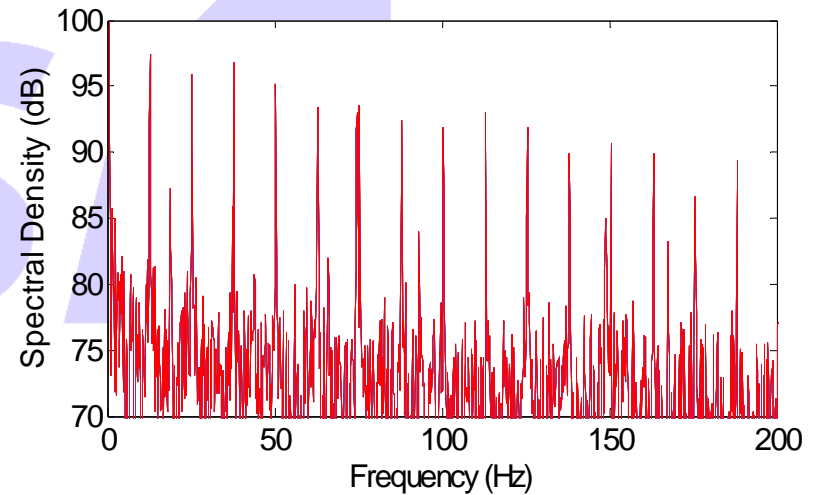
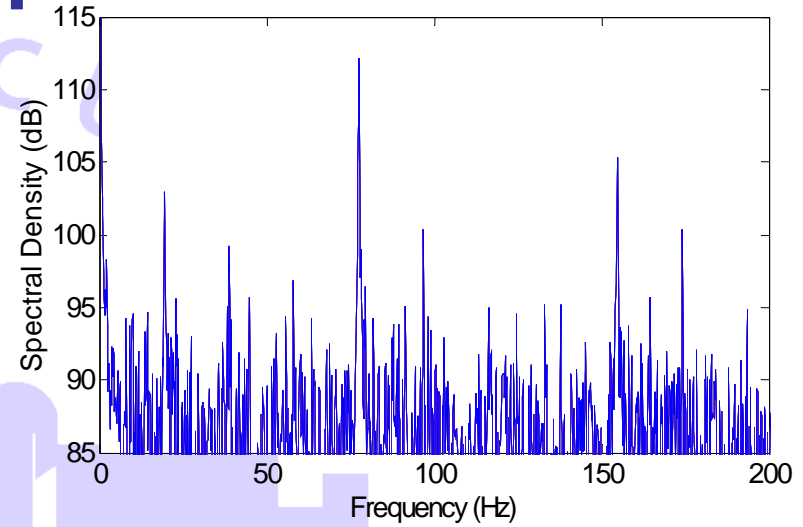
- Real-time command & control
- Systems-level experiments & integration
- Relevant detection technologies



Hydrophone Experiments June 2008

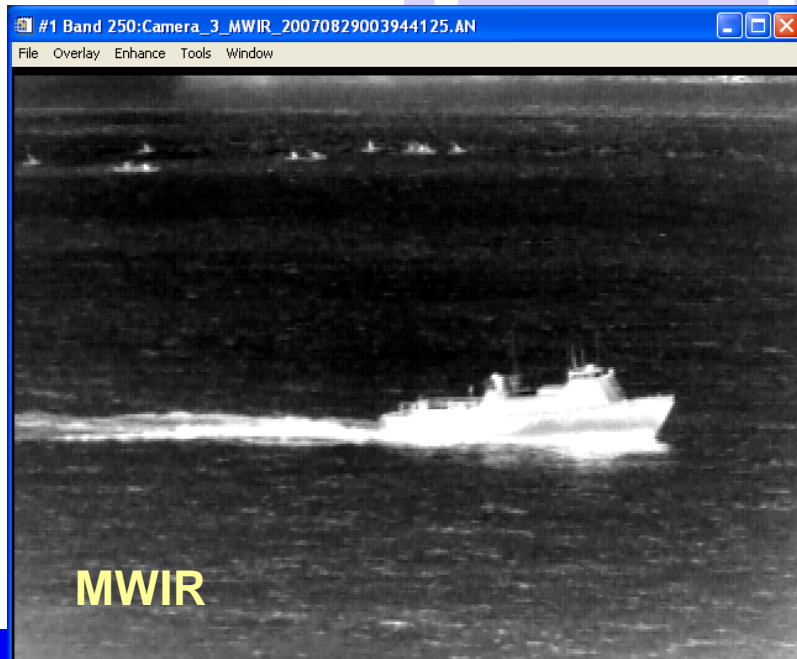
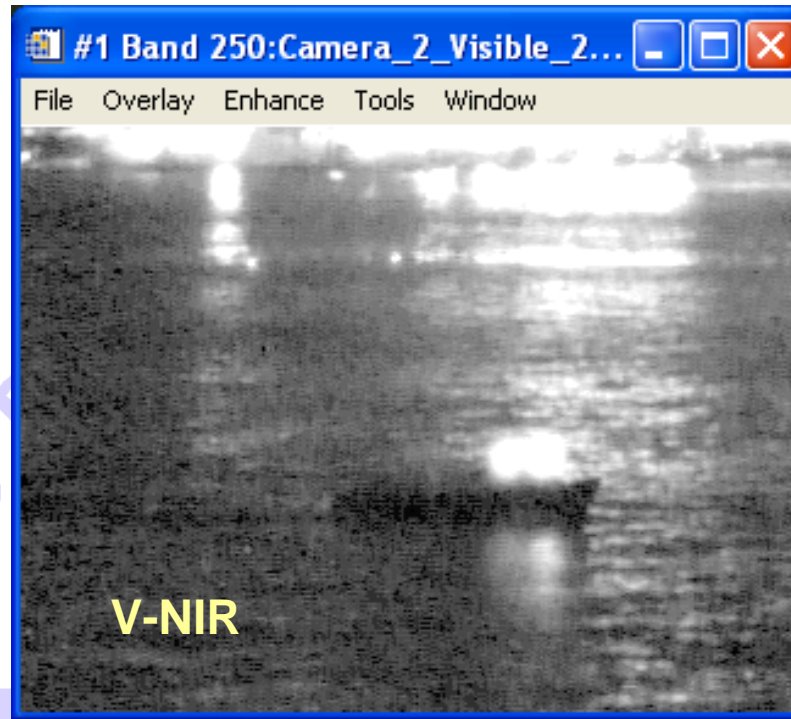
CSR – A Department of Homeland Security National Center of Excellence for Port Security

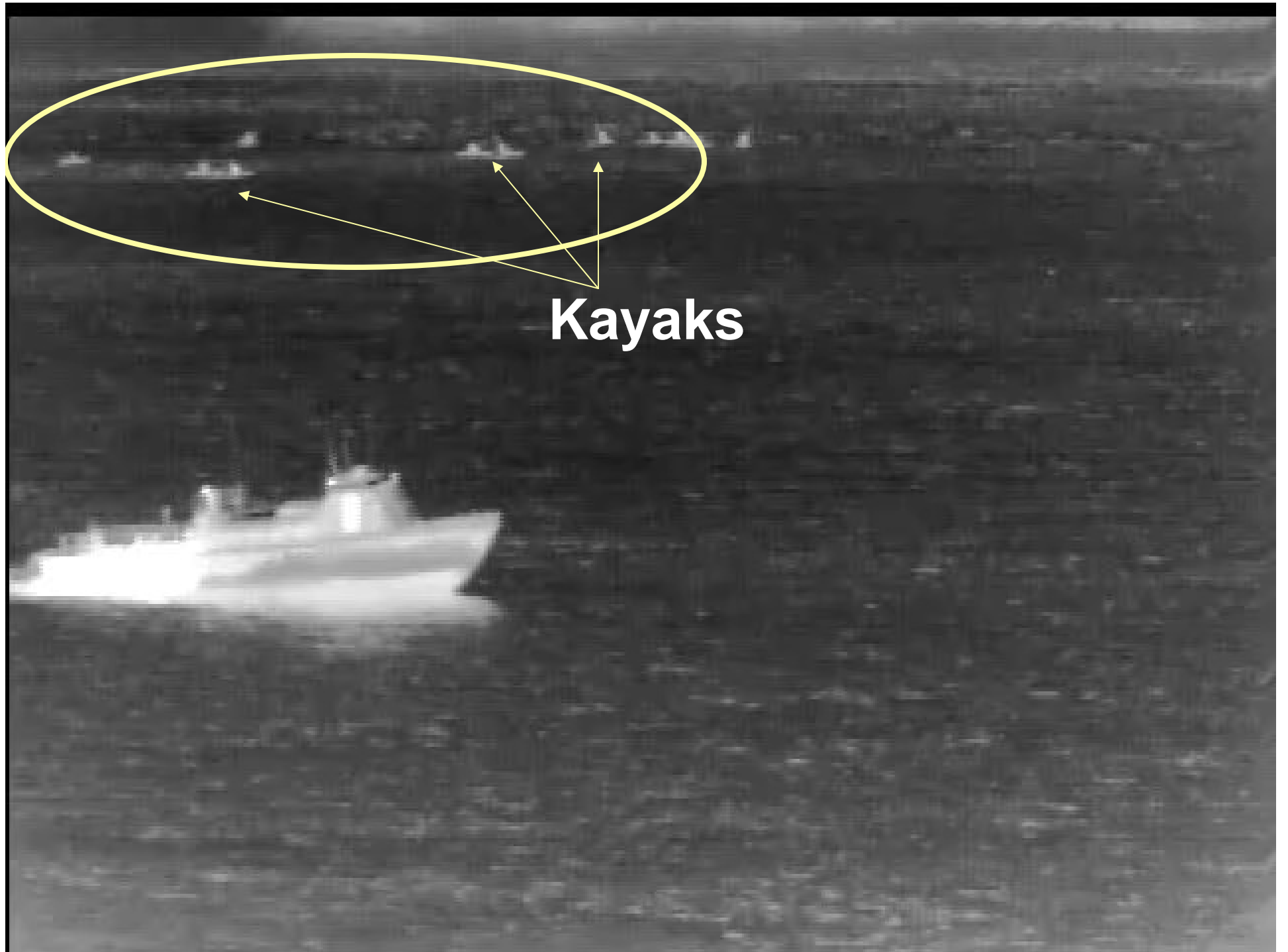
Comparison of Acoustic Signatures of Ships



Infrared Cameras

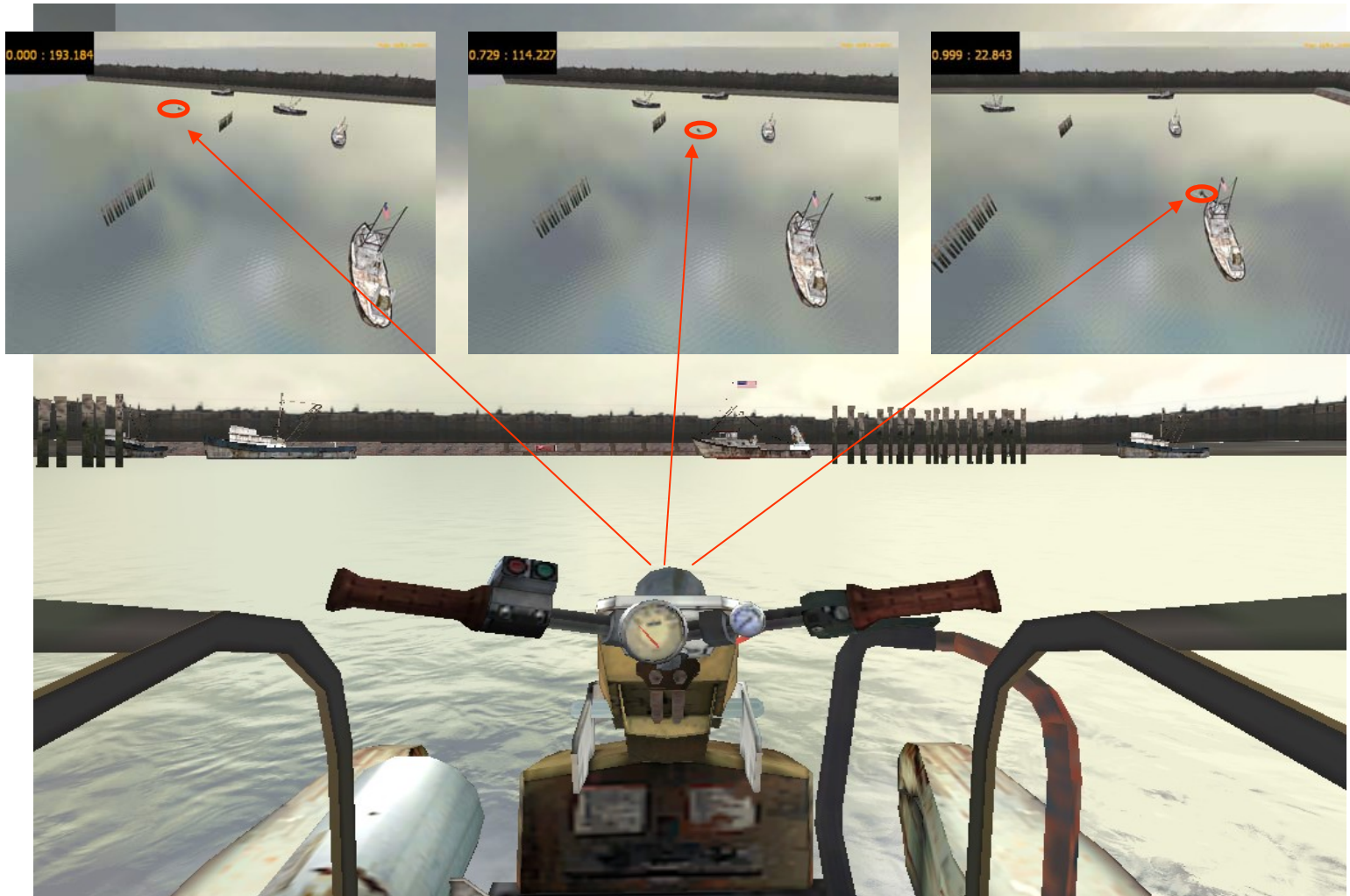






Kayaks

Identifying Hostile Intent



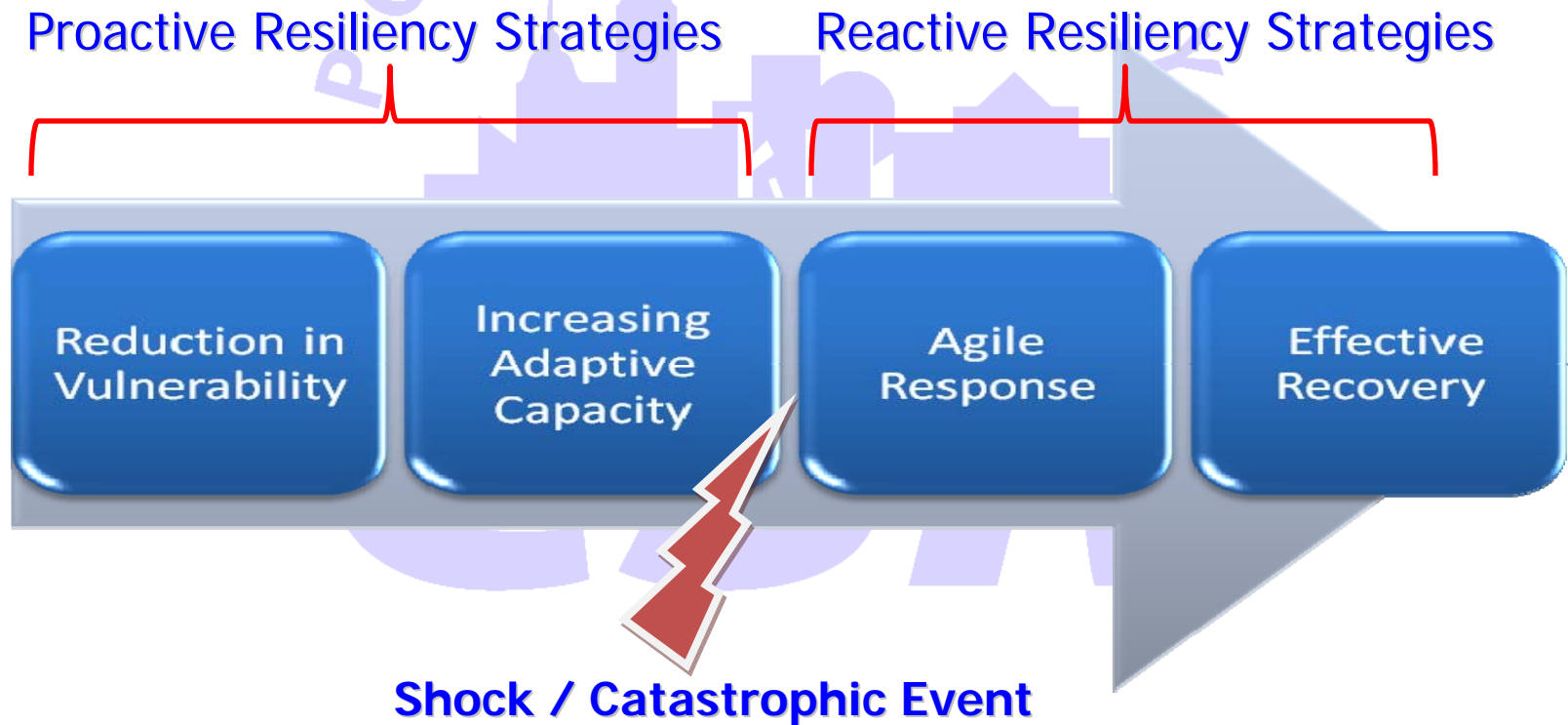
Attacker Detection

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.



Proactive and Reactive Resiliency Strategies



Resilient Maritime Systems

Enterprises

&

Systems

(Products and Processes)

- 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?



CSR – A Department of Homeland Security National Center of Excellence for Port Security