6th Annual Maritime Risk Symposium
Proceedings Summary Report

The Maritime Security Center (MSC) in conjunction with the U.S. Coast Guard (USCG) Research and Development Center (RDC) co-hosted the 6th Annual Maritime Risk Symposium (MRS) on November 16 - 17, 2015, at the Stevens Institute of Technology campus in Hoboken, NJ. The theme of the Symposium was Risk in the Western Hemisphere and Southern Border Approaches. The Commandant of the USCG, Admiral Paul F. Zukunft provided the keynote address discussing growing areas of concern for homeland security and the maritime community, including transnational organized crime, maritime border security and cyber security threats. The Admiral’s talk followed the USCG’s release of its Cyber Strategy earlier in the summer.

The 2015 MRS Chairs included Dr. Julie Pullen, Associate Professor at Stevens Institute, and Dr. Joseph DiRenzo III, Senior Advisor to the Area Commander for Science, Technology and Innovation, USCG Atlantic Area. The Program Co-Chairs were Captain Bruce Clark, Director, Maritime Safety and Security Center, CSU Maritime Academy and Dr. David Boyd, Operations Analysis, USCG Pacific Area.

The two-day event drew close to 150 attendees representing a diverse group of national and international maritime representatives. Panel discussions and keynote speakers led discussions on combating criminal and terrorist networks, safeguarding commerce and the Marine Transportation System (MTS), cyber security threats to the maritime domain, and data sharing across the industry and government maritime enterprise. A copy of the program agenda, together with a list of presenters can be found on the MRS 2015 website.

The 6th Annual Maritime Risk Symposium served as a forum to inspire and generate areas of study and future research projects for the DHS S&T Center of Excellence researchers, students and academic partners. The main objective of the Symposium was to encourage participants to identify critical research areas where academia could help contribute solutions to the maritime risk arena.

Outcomes from the Symposium included a number of research questions that are of particular interest to DHS and its component agencies. The following summary provides a brief overview of the panel discussions and identifies the key research questions that were generated by each panel.
Combatting Networks Panel Summary

Moderator: USCG Deputy Director, National Maritime Intelligence-Integration Office (NMIO)

Panelists:

- Chair, National Intelligence Management, Council, Office of the Director of National Intelligence
- Senior Officer, Technology and Enforcement, Ending Illegal Fishing Project, The Pew Charitable Trusts
- President, IBI Consultants and Senior Fellow at the International Assessment and Strategy Center

The panel on Combatting Networks contained participants from the non-profit, journalism and government realms. All agreed that combatting the evolving web of networks will require information sharing domestically and internationally more than ever.

Unprecedented support to organized crime by various states is changing the face of narco-terrorism. The depth of resources accessed by cartels remains to be fully documented. In particular, cartels rely increasingly on state actors for intelligence and ease of movement (e.g., identity papers). A focus on mapping the trafficking patterns will help map the monetary flows. What are the trafficking patterns and state ties of organized crime and how are they expected to evolve?

An example of a network is illegal fishing. The Pew Trust is piloting a satellite-based AIS vessel detection and activity-tracking tool. It is an example of a technology that can add to situational awareness, but only if the information it generates is actionable. A key aspect of fisheries enforcement is to not disrupt legal fishing. So parsing the data by vessel type and name as well as prior movement history is potentially valuable enabling information. How can we enhance the process of combating networks by flowing more actionable information from diverse sources into decision support tools?

As an example of research partnerships in this arena, ODNI has a program called In-STeP, The Intelligence S&T Partnership. It aligns the Intelligence Community (IC) and partners to inform investment decisions and identify the IC’s future capabilities, technologies and research challenges.
Safeguarding Commerce Panel Summary

Moderator: Assistant Director, Port Commerce Department, Port Authority of New York and New Jersey

Panelists:

- Vice President of Trade, Ports and Logistics, EDR Group
- US DOT Deputy Maritime Administrator
- Commander USCG Sector New York

The panel on Safeguarding Commerce contained government and private-sector participants from MARAD, The Port Authority of NY/NJ, EDR and USCG. The panel explored the implications of fully-integrated security in an industry of increasingly larger ships with fewer ports of call being concentrated at larger ports. With maritime commerce increasing every year, security measures must not impede this growth. Accordingly, ports and surrounding infrastructure need constant repair and modification to keep up with the evolving trends. Trends in security suggest that more attention needs to be devoted at offshore locales, while leveraging critical partnerships for increased detection, reporting, and monitoring.

Research topics that emerged included:

- How can ports share logistics and threats to facilitate anticipation instead of reaction, without compromising their competitive edge?
- Is there a need for new standards for non-containerized cargo, and can industry handle new standards?
- How can we better document supply chain interactions and address institutional barriers to information exchange?

Potential tools to address these questions include process-based models to probe where barriers exist. Also, parsing the threats into on-vessel, waterside, and cyber categories can help sharpen the focus. The role that structural oversight and control play in relation to container standards must also be included in the solution set. To facilitate information sharing, several new initiatives are focused on Key Performance Indicators across port terminals. This is a form of market data that may be more readily gathered and distributed by the industry.
Securing Maritime Borders – Keynote Talk Summary

Introductions/Moderator: Commander, First USCG District

Keynote Speakers:

- CBP – DHS Joint Task Force East
- Deputy Director, JIATF-South
- HSI - DHS Joint Task Force East

The Securing Maritime Borders panel included keynote talks focused on joint homeland security operations and interagency collaborations. Common themes across the speakers included the benefits of interagency communications and collaboration to enhance the nation’s maritime security posture.

Collectively, the speakers addressed the need for DHS and DoD component agencies to sit down in a strategic and operational manner to establish a holistic way of tackling security operations, including intelligence assessment, investigative transnational criminal organization targeting, operational assessment and objectives review, planning framework and regional integrating groups. Differences in organizational language and communications, for example uses of terminology/acronyms (e.g. SAR – search and rescue or synthetic aperture radar) could pose a hurdle.

The speakers also discussed the need to leverage technology across the DHS enterprise to further enhance missions, reduce terrorism risks to the nation, counter illegal flows in maritime approaches and at ports of entry, dis-incentivize illegal border behavior and efficiently manage lawful flows of people and goods.

Interagency and international information sharing is crucial. Additional panel discussions explored the use of open access and social media capabilities to integrate citizens into the information sharing process.

Research topic areas for discussion included:

- What can other countries, like Cuba, do to help counter drug trafficking? How can we work together and both benefit?
Predictive Analysis/Future Trends Panel Summary

Moderator: RAND

Panelists:

• Columbia University
• Office of Naval Intelligence
• RAND

The panel on Predictive Analysis/Future Trends highlighted topics in climate change, fisheries, and immigration. Climate change is expected to impact national security via several mechanisms. General trends in climate suggest that dislocation of people will be a global issue, as will disaster impacts that could enhance regional instability and lead to cascading effects (e.g., violence). For example, hurricane intensities are expected to increase in a changing climate. Likewise, heat, drought, and sea level rise are all expected to have an impact on people and agriculture, even as changing ocean chemistry and temperatures affect key fisheries on which people and wider ecosystems depend. Disasters and long-term resource scarcity can contribute to conflicts between afflicted groups. There is a pressing need for the state-of-the-science predictions to be incorporated into long-term planning by operational agencies, as the U.S. Department of Defense has done.

Climate change is only one of several factors negatively affecting global fisheries. Others include increasing pollution, overfishing, illegal fishing or use of destructive methods of fishing, and damage to habitats by human activity. Many communities around the globe, including the Western Hemisphere, depend heavily on artisanal fishing for their livelihoods. The loss of these livelihoods can contribute to disorder, conflicts, migration, and a shift to criminal maritime behaviors, such as drug-smuggling or human trafficking.

Migration, in turn, is fueled by many factors, including those related to the climate change and fishery issues discussed above. People can be displaced both by chronic problems, such as drought or declining fisheries, or by acute ones, such as hurricanes. Other factors driving migration include crime, violence, and lack of economic opportunity. The fast-growing, youthful populations of the Central American isthmus and the Caribbean islands can also stimulate future migration from those regions.
Research topics that emerged included:

- How can economic development be employed to limit the effects of climate change, fishery damage, and other phenomena that can contribute to future threats?
- What are the ways in which interrelated phenomena (such as climate change and economic shortfalls) may fuel insecurity and subsequent patterns of migration?

Maritime Security Emerging Topics – Summaries of Keynote Addresses

**Topic: Maritime Cyber Security - How does the maritime industry move forward to combat cyber threats?**

**Keynote: Blank Rome LLP**

Underpinning the maritime commerce supply chain is a complex network of computerized logistics management systems that track the global movement of goods from the time they are ordered to the cargo containers that transport them to the series of intermodal connections cargo makes en route to their final destinations.

Cyber Security / Information security is a critical area of concern for the maritime community. The growing dependence of the Marine Transportation System on computerized systems creates unique challenges in securing interconnected computer networks, including shipboard systems, navigation systems and industrial control systems among others.

Recent cyber security incursions have been linked to nation states, rival companies, criminal organizations, pirates/terrorists, independent/freelance hackers, and insiders (corrupt and/or sloppy employees).

Government and homeland security responses have included the release of a USCG Cyber Strategy to conduct risk assessments, risk management, and strategic priority for protecting the maritime community.

Suggested research topics for consideration:

- Research risk assessment of cyber threats.
- Technological advancements for enhanced cyber security protections for the maritime community.
- Exploration of the use of nulling antennas and updated GPS receivers.
Topic: Vulnerabilities and Chokepoints in Global Food Trade

Keynote: Chatham House

Pressures on global food trade and increases in food costs pose threats to national security. The Arab Spring and other similar uprisings can be attributed to poor economic conditions, lack of employment opportunities and the inability of citizens to provide food for their families. Under such circumstances, people are likely to riot, migrate or starve.

Major risks to the food supply include threats to production (harvest shocks, export bans), distribution (local transport networks and food storage capabilities), consumption (economic and physical access), and export, transit and import (acute and chronic threats, ground pressures and resilience of the food system).

While the impacts of energy chokepoints have been well researched and documented, maritime chokepoints to the food supply chain have not received the same level of attention. Disruptions to food supply distribution areas including the Suez Canal, Panama Canal, the Turkish Straits, and Malacca Straits among others, can have cascading effects on the world’s population and global economy.

Suggested areas for research:

- How do cyber risks create new vulnerabilities to food trade?
- How are risks of disruptions correlated along the supply chain?
- Where will climate change multiply risk most?
- What are plausible worst-case scenarios?
Evolutions in Technology Panel Summary

Moderator: Dean of Engineering, Stevens Institute of Technology

Panelists:
- RAND - Cyber and Emerging Tech
- Woods Hole Oceanographic Institute - Marine Robotics
- Sandia - Cargo Security Technology

The panel on Evolutions/Revolutions in Technology included government, think-tank, and academic participants addressing technologies in border, cyber, and underwater security.

In relation to cyber security, the salient points highlighted in the talk concerned targets as well as opportunities. The “Internet of Things” increases the attack surface, enables cyber physical effects and impacts overall security costs. Cyber security is critical to the maritime environment because it is increasingly reliant on critical infrastructure and involves both public and private stakeholders. Moreover, cyber events can potentially have a major impact in the physical world of the MTS. The tools to enable hacking are cheap, discovery can be slow, and attribution can be difficult. The USCG Cyber Strategy document is a step toward unifying the community of private, government, military domains in which the USCG participates and leads. Going forward, priority research areas require both S&T and policy solutions.

There is a whole suite of technologies in marine robotics enabled by optics, micro fiber and cable communications. The technology development and applications is advanced when they are pursued as a joint endeavor. Applications range from exploration and discovery, to oil and gas, and surveillance.

Cargo security screening must navigate the Scylla and Charybdis of, at one extreme, full scanning and inspection of every container entering our borders; and at the other extreme, optimized processing for maximum economic benefit. Current container security technology consists of customs requirement of ISO bolt seal. Other technologies for security include electronic seals and Container Security Devices (CSD).

Technology-related questions to be addressed by research include:

- How can CBP leverage data from commercial technologies to enhance security?
- Can technology help improve both security and commerce flow?
What incentives can be given to commercial industry to adopt new technologies?

**Marine Spatial Planning (Data Sharing) Panel Summary**

Moderator: USCG (ret.)

Panelists:
- DNV GL - The Use of Data in Marine Spatial Planning (MSP)
- Bureau of Ocean Energy Management (BOEM)
- Urban Coast Institute – Mid-Atlantic Ocean Action Plan & Ocean Data Portal

The Marine Spatial Planning panel discussed information and data sharing across the public and private maritime sectors and the need to effectively mitigate risks through public-private partnerships. Shared information regarding maritime commerce and navigation geospatial data is necessary to support coastal ocean and regional planning.

Data sharing portals that include information on navigation and commerce, GIS mapping, ocean aquaculture, and critical undersea infrastructure will assist in effective and efficient multijurisdictional communications and coordination of maritime activities. Needed are best practices for compiling, developing and sharing existing maritime commerce and navigational data resources via the portal and “closing the loop” with real time data and ocean observations.

Suggested areas for research included:
- Maritime and coastal border data gaps.
- The way the data is actually used in terms of maritime decision-making and management.