



From Sail to Satellite Delivering Solutions for Tomorrow's Marine Transportation Systems

4th Biennial TRB-CMTS Research and Development Conference

June 21–23, 2016
National Academy of Sciences Building
Washington, D.C.

The National Academies of

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TRANSPORTATION RESEARCH BOARD

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The **Transportation Research Board** is one of seven major programs of the National Academies of Sciences, Engineering, and Medicine. The mission of the Transportation Research Board is to increase the benefits that transportation contributes to society by providing leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied committees, task forces, and panels annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

www.TRB.org

June 21–23, 2016



WELCOME

Welcome to the fourth biennial marine transportation system (MTS) research and development (R&D) conference, "From Sail to Satellite: Delivering Solutions for Tomorrow's Marine Transportation System," cosponsored by TRB and the Committee on the Marine Transportation System (CMTS).

Following the great success of the inaugural TRB-CMTS R&D conference, "Transforming the Marine Transportation System: A Vision for Research and Development in 2010," and the subsequent biennial conferences focused on priority research, we have gathered in the nation's capital once again to look at current and future marine transportation system challenges and to identify a renewed vision for research and development.

The conference will engage stakeholders in government, academia, and the private sector to examine our next-century MTS and what it might look like, to identify technology innovations that may help us, to consider the data and information requirements to inform decisions, and to look at the progress made since the 2010 biennial conference. The goal of the conference is to identify research priorities and a future course for the MTS community.

We appreciate the involvement of our many prestigious panelists, speakers, and participants. We hope this event provides an excellent opportunity to share your experiences and knowledge and to develop mutually beneficial partnerships and collaborations.

With your participation and involvement, we will create a new research and development vision that we all may use as a community roadmap and catalyst for collaboration.

—W. Jeff Lillycrop
U.S. Army Corps of Engineers
Conference Chair

EXHIBITORS



June 21–23, 2016



SPEAKERS

Keynote Speakers

The Honorable Norman Y. Mineta

Past Secretary, U.S. Department of Transportation
Founder, Mineta Transportation Institute



Mineta

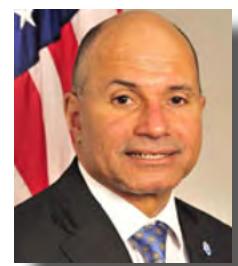
Norman Y. Mineta is well known for his work in transportation, including aviation, surface transportation, infrastructure, and national security. He is recognized for his accomplishments in economic development, science and technology policy, foreign and domestic trade, and budgetary issues and civil rights, as well as his perspective from having served in Congress for more than 20 years and in the cabinets of Republican and Democratic U.S. presidents.

Mineta served as the chairman of the U.S. House Transportation and Public Works Committee from 1992 to 1994. He was the primary author of the groundbreaking Intermodal Surface Transportation Efficiency Act of 1991. In 2000, Mineta was appointed by President Bill Clinton as the U.S. Secretary of Commerce. From 2001 to 2006, Mineta served as Transportation Secretary under President George W. Bush. Following the terrorist acts of September 11, 2001, Mineta guided the creation of the Transportation Security Administration (TSA).

Since 2006, Mineta has worked as vice chairman at Hill & Knowlton's Washington, D.C., office. He has received many awards, including the Presidential Medal of Freedom and the Wright Brothers Memorial Trophy. He is a graduate of the University of California, Berkeley.

The Honorable Manson K. Brown

Assistant Secretary of Commerce for Environmental Observation and Prediction
Deputy Administrator, National Oceanic and Atmospheric Administration
CMTS Coordinating Board Chair



Brown

Vice Admiral Manson K. Brown was sworn in as the Assistant Secretary of Commerce for Environmental Observation and Prediction in March 2015. He strategically drives policy, programming, and investments for all National Oceanic and Atmospheric Administration (NOAA) observing systems and the process of converting observations to predictions for environmental threats related to weather, climate, water, oceans, and space weather. He serves as NOAA Deputy Administrator and chair of NOAA's Observing Systems Council.

The Washington, D.C., native has served the U.S. Coast Guard for 40 years and has commanded operations at every level, culminating as commander of Pacific Area in San Francisco. Brown's last assignment on active duty was as Deputy Commandant for Mission Support in Washington, D.C. His other Coast Guard assignments ranged from engineering officer aboard the icebreaker *Glacier* to Military Assistant to the U.S. Secretary of Transportation. In 2004, he was asked to fill a key leadership gap in Iraq as the Senior Advisor for Transportation for the Coalition Provisional Authority, where he oversaw restoration of Iraq's transportation systems.

Brown holds master's degrees in civil engineering, from the University of Illinois at Urbana-Champaign, and in national resources strategy, from the National Defense University.



SPEAKERS

Panel Speaker

The Honorable Paul N. (Chip) Jaenichen, Sr.

Maritime Administrator

Paul N. (Chip) Jaenichen, Sr., was appointed by President Barack Obama and has served as Maritime Administrator since 25 July 2014. He previously served as both Deputy and Acting Maritime Administrator from July 2012 to July 2014.

Jaenichen retired after 30 years as a nuclear trained submarine officer in the U.S. Navy. His final assignment, from October 2010 to April 2012, was serving as Deputy Chief of Legislative Affairs for the Department of the Navy. He served as commanding officer of the USS *Albany* from 1999 to 2002 and as commander of Submarine Squadron 11 in San Diego, California, from 2007 to 2008. Jaenichen's shore tours included assignments as director of Submarine–Nuclear Officer Distribution and as officer-in-charge of Moored Training Ship 635. He also served as chief of the European and North Atlantic Treaty Organization (NATO) Policy Division on the joint staff, and was responsible for military-to-military engagement with all NATO member nations.

Jaenichen's hometown is Brandenburg, Kentucky. He earned a bachelor's degree in ocean engineering from the U.S. Naval Academy and a master's degree in engineering management from Old Dominion University.



Jaenichen

Keynote Speakers

William Cassidy

Senior Editor, Journal of Commerce, IHS Maritime & Trade Group

William Cassidy is a senior editor of the Journal of Commerce within the IHS Maritime & Trade Group. He joined IHS in December 2014, when the company acquired JOC Group, a premier provider of U.S. seaborne trade intelligence through data, online content, and events. A former senior editor at JOC Group, Cassidy is a leading expert in trucking, logistics, and supply chain technology issues. His reporting provides readers with insights into key trends that affect their bottom lines and shipping choices, and he frequently speaks at industry events. Cassidy is a graduate of the State University of New York at Oneonta.



Cassidy

General Darren W. McDew

Commander, U.S. Transportation Command, Scott Air Force Base

General Darren W. McDew serves as commander of the U.S. Transportation Command on Scott Air Force Base (AFB) in Illinois. The U.S. Transportation Command manages for global air, land, and sea transportation for the U.S. Department of Defense.

McDew was commissioned in 1982 after his graduation from Virginia Military Institute. He began his flying career at Loring AFB in Maine and his staff assignments include serving as a member of the U.S. Air Force Chief of Staff Operations Group, as Air Force aide to the President, as chief of the Air Force Senate Liaison Division, and as director of Air Force Public Affairs. McDew served as vice director for strategic plans and policy for the Chairman of the Joint Chiefs of Staff. He also served as the commander of 18th Air Force at Scott AFB and commanded at the squadron, group, and wing levels as well as at an Air Force direct reporting unit.

McDew deployed in support of ongoing operations in Central and Southwest Asia as an air expeditionary group commander and, later, as the director of mobility forces. Before his current assignment, McDew was the commander of the Air Mobility Command at Scott AFB.



McDew

June 21–23, 2016



COMMITTEE MEETINGS

Monday, June 20

8:00 a.m.–Noon

Standing Committee on Marine Safety and Human Factors (AW040), NAS 125

Standing Committee on Critical Transportation Infrastructure Protection (ABR10), NAS 120

1:00 p.m.–5:00 p.m.

Standing Committee on International Trade and Transportation (AT020), NAS 125

Standing Committee on Military Transportation (AT035), Board Room

Transportation Systems Resilience Section (ABR00), NAS 120

3:00 p.m.–5:00 p.m.

Joint Meeting: Standing Committees on Ports and Channels (AW010), Inland Water Transportation (AW020), and Marine Environment (AW030), Lecture Room

CONFERENCE SESSIONS

Tuesday, June 21

7:30 a.m.–4:30 p.m., *Great Hall*

Registration

7:30 a.m.–8:30 a.m., *Great Hall* (*seating available in West Court*)

Exhibits and Breakfast

8:30 a.m.–10:15 a.m., *Auditorium*

Opening Session

Call to Order and Conference Overview

Jeff Lillycrop, U.S. Army Corps of Engineers (USACE), Conference Chair

Introduction of Keynote Speakers

Helen Brohl, Committee on the Marine Transportation System

Keynote Address

The Honorable Norman Y. Mineta, 14th U.S. Secretary of Transportation

Keynote Address

The Honorable Manson K. Brown, Assistant Secretary of Commerce for Environmental Observation and Prediction and Deputy Administrator, National Oceanic and Atmospheric Administration (NOAA)

10:15 a.m.–10:45 a.m., *Great Hall*

Morning Break and Exhibits



10:45 a.m.–12:15 p.m., *Auditorium*

Plenary 1

Marine Transportation System (MTS) 2100: Our Next-Century Marine Transportation System

Thomas Wakeman, Stevens Institute, *presiding*

This tone-setting session, which includes thought leaders from the public and private sectors, comprises a moderated conversation that fast-forwards the marine transportation system into the future. What might it look like from the perspectives of infrastructure, capacity, human capital, finance, and public-sector stewardship—and what will it take to get there?

- The Honorable Paul N. (Chip) Jaenichen, Sr., U.S. Maritime Administration (MARAD)
- Walter Kemmsies, JLL Ports Airports and Global Infrastructure
- Page Siplon, Team One Logistics
- Michael Christensen, Port of Long Beach
- Steve Steckler, IMG Rebel, LLC

12:15 p.m.–1:15 p.m., *Great Hall (seating available in West Court)*

Lunch and Exhibits

1:15 p.m.–2:00 p.m., *Auditorium*

Keynote Address

Bill Cassidy, *Journal of Commerce*

From congested ports to inland warehouses and distribution centers, importers and goods shippers have struggled to maintain and improve the velocity of their supply chains and to track shipments as they flow from one transportation mode and location to another. Advances in cellular and satellite machine-to-machine communications and mobile technology are facilitating data gathering and freight tracking, but many vertical data silos remain unintegrated. A host of new freight-related systems—modeled on Uber and the sharing economy—aim to help make parts of the supply chain more efficient, but how can the whole be connected? What research challenges for the private and public sectors might be represented in the harmonization and analysis of big data from disparate transportation sources?

2:15 p.m.–3:45 p.m.

Breakout Sessions

1A: Future of Navigation, Lecture Room

Jim McCarville, PIANC USA, *presiding*

Synoptic Risk Assessment for Ship Passage and Hydrographic Uncertainty Representation

Brian Calder, University of New Hampshire

Future of Navigation: How Automatic Identification System (AIS) Is Being Used to Improve Navigation Safety

Michael Winkler, Engineer Research and Development Center, USACE

Global Navigation Satellite System–Based Vertical Control for Hydrographic Survey: NOAA Office of Coast Survey Implementation and Implications for Navigation

Samuel Greenaway, NOAA Office of Coast Survey

The Next Generation of Precision Navigation: Products and Services to Support Real-Time Decision Making for Coastal Marine Transportation

Neil D. Weston, NOAA Office of Coast Survey

Tuesday, June 21, 2016



1B: Infrastructure Investment, NAS 125
Craig Philip, Vanderbilt University, *presiding*

Can Standardized People Transportation Provide the Same Benefits as Standardized Cargo Transportation?
Hendrik van Hemmen, Martin & Ottaway, Inc.

Land Use and Port Infrastructure: Evaluating the Impact of Road Pricing and Congestion Costs on Port Drayage Markets
Jonathan Peters, College of Staten Island, The City University of New York

Study of the McClellan–Kerr Arkansas River Navigation System
Heather Nachtmann, University of Arkansas

Deepwater Expansion in the Gulf of Mexico
Andrea Nehorayoff, ABS Consulting

1C: Emissions Management, NAS 120
Ashley Rose, BCS, Inc., *presiding*

Environmental Performance of Ports: Use of an Emissions Footprint of a Shipping Container as a Metric
Christina Wolfe, Environmental Defense Fund

Innovation for Maritime Environmental Stewardship: The Maritime Environmental and Technical Assistance Program
John Quinn, MARAD

Safety, Security, and Sustainability of the Maritime Supply Chain
Anuj Chopra, RightShip

Shore Power at Ports
Arman Tanman, U.S. Environmental Protection Agency

1D: Resilience—Tools and Needs, Members' Room
Julie Rosati, USACE, *presiding*

Chesapeake Bay Human Scale Vulnerability: Prediction and Evaluation
Alexander Renaud, Coastal and Hydraulics Laboratory, Engineer Research and Development Center, USACE

Inspiring Transformational Thinking for Maritime Systems Resilience: Port of Providence, Rhode Island, Demonstration Project
Austin Becker, University of Rhode Island

Regional Sediment Management (RSM) Optimization Pilot
Clay McCoy, USACE

1E: Innovative Materials, Part 1, Board Room
Hota Gangarao, West Virginia University, *presiding*

Advanced Fiber-Reinforced Polymer (FRP) Composites for Corrosion Mitigation in Waterway Infrastructure
Rufeng Liang, National Science Foundation Center for Integration of Composites into Infrastructure



FRP Composites for Corps of Engineers Hydraulic Structures

John Clarkson, USACE

Glass Fiber-Reinforced Polymer (GFRP) Composite Wicket Gates for Chanoine Type Wicket Dams

Jonathan Trovillion, Engineer Research and Development Center, USACE, and Construction Engineering Research Laboratory

3:45 p.m.–4:15 p.m., *Great Hall*

Afternoon Break and Exhibits

4:15 p.m.–5:45 p.m.

Breakout Sessions

2A: MTS Performance Measures, Part 1, Lecture Room

Mihalis Gkolias, University of Memphis, *presiding*

Assessing the Risks of Collision and Grounding in U.S. Coastal Ports Using Automatic Information System Data

Martin Schultz, Engineer Research and Development Center, USACE

Inland Navigational Locks Travel Delay

Patricia DiJoseph, Engineer Research and Development Center, USACE

Using Historical Data to Quantify Regional Shipping Disruptions from Potential Shoaling

Marin Kress, USACE

2015 West Coast Port Slowdown: Using AIS and Geographic Information Systems to Analyze Container Ship Dwell Times

Jonathan Hsieh, MARAD

2B: Innovative Technologies, Part 1, NAS 125

Sergio Perez, U.S. Merchant Marine Academy, *presiding*

A Study of Absorption Chiller–Heater Application in Marine Engineering

Yongjian Gu, U.S. Merchant Marine Academy

Sub Chapter M: How U.S. Coast Guard Rulemaking Spawned MTS Innovative Technologies

Dean Shoultz, MarineCFO

Improved Effectiveness of Corrosion Prevention and Control Systems for Hydraulic Steel Structures

Thomas Carlson, USACE

Composite Material in U.S. Coast Guard Aids to Navigation

Jon Benvenuto, U.S. Coast Guard

2C: Asset Management, NAS 120

Kenneth (Ned) Mitchell, USACE, *presiding*

Analysis of Multiyear Benefit Window on Dredge Location Selection

Corey Winton, USACE

NCHRP's Foresight Series: Informing Transportation's Future

Mell Henderson, Mid-America Regional Council

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Strategic Asset Management: Opportunities and Constraints in the North American Port Industry
Erik Stromberg, Center for Port Management, Lamar University

Structural Health Monitoring for USACE Operations and Asset Management
Matthew Smith, Coastal and Hydraulics Laboratory, Engineer Research and Development Center, USACE

2D: Arctic Marine Transportation, Members' Room
Patricia Mutschler, Committee on the Marine Transportation System, *presiding*

Arctic Maritime Activity and the Black Carbon Issue: Why It Matters and the Gaps Creating Uncertainty
Alison Azzara, Committee on the Marine Transportation System

Development of a U.S. Arctic Risk Management Framework
Brandon Lee, ABS Consulting

Governing Maritime Transportation in the Arctic
Supriti Jaya Ghosh, Committee on the Marine Transportation System

Ice Navigation in the 21st Century: Developing Basic and Advanced Ice Navigation Certification Classes under the New Polar Code
Susan Hazlett, Maine Maritime Academy

2E: Innovative Materials, Part 2, Board Room
Eddie Wiggins, USACE, *presiding*

Rehabilitation of East Lynn Lake Bridge with FRP Composites
Hota Gangarao, West Virginia University

GFRP Composite Miter Blocks
Jonathan Trovillion, Engineer Research and Development Center, USACE, and Construction Engineering Research Laboratory

GFRP Composite Recess Protection Panels
PV Vijay, West Virginia University

5:45 p.m.–7:00 p.m., *Great Hall (seating available in West Court)*
Reception

Tuesday, June 21, 2016



Wednesday, June 22

7:30 a.m.–4:30 p.m., *Great Hall*

Registration

7:30 a.m.–8:30 a.m., *Great Hall* (*seating available in West Court*)

Exhibits and Breakfast

8:30 a.m.–10:00 a.m., *Auditorium*

Plenary 2

Technology Innovations for a Next-Generation MTS

Jim Kruse, Texas A&M Transportation Institute (TTI), *presiding*

New situational awareness platforms, big data analytics, sensor technologies, automation, and energy innovations are just a few of the many drivers affecting the marine transportation system now and in the future. This session will provide some insights from leading-edge enablers in the areas of automation, navigation, alternative energy, and infrastructure. Concepts that the panelists will address include obstacles related to their areas of innovation, next steps in maintaining progress, and the partnerships and catalysts necessary to fully realize the promise of these innovations.

E-Navigation Infrastructure Technologies

Brian Tetreault, Navigation Systems Specialist, USACE

Hydrogen Fuel Cell Energy Technology for Ferries

Thomas Escher, Red and White Fleet, and Lennie Klebanoff, Sandia National Laboratories

Structural Health Monitoring of Infrastructure

Michael Todd, University of California, San Diego

10:00 a.m.–10:30 a.m., *Great Hall*

Morning Break and Exhibits

10:30 a.m.–Noon

Breakout Sessions

3A: MTS Performance Measures, Part 2, Lecture Room

Jim Kruse, TTI, *presiding*

Connecting Ports with U.S. Customs Entrances and Clearances Data

Patricia DiJoseph, Engineer Research and Development Center, USACE

Estimating Vessel Under-Keel Clearance from AIS Data

Brandan Scully, USACE

Evolution of Emission Inventories as Strategic Management Tools for Ports

Marcelo Norsworthy, Environmental Defense Fund

Port Performance Measures for the Megaship Era

Frank Harder, The Tioga Group, Inc.

Wednesday, June 22, 2016



3B: Innovative Technologies, Part 2, NAS 125
Jon Benvenuto, U.S. Coast Guard, *presiding*

Automating Measurement Process to Improve Inspection of Marine and Offshore Equipment and Facilities

Mahdi Safa, Lamar University

Efficiency of Sail Pumping and Applicability to Merchant Ships

Sergio Perez, U.S. Merchant Marine Academy

Remote Sensing for the Marine Transportation System

Jennifer Wozencraft, Joint Airborne Lidar Bathymetry Technical Center of Expertise, USACE

Simultaneous Lidar, Multibeam Sonar, and Photo Survey of Marine Structures from an Unmanned Surface Vessel

Jonathan Marshall, Coastal and Hydraulics Laboratory, USACE

3C: Systems Management RSM and EWN, NAS 120

Linda Lillycrop and Todd Bridges, USACE, *presiding*

Balancing Benefits and Impacts at the Mouth of the Columbia River

Jarod Norton, USACE

Reestablishment of In-Bay Placement Associated with Mobile Harbor Federal Navigation Project

Nathan Lovelace, USACE

Sustaining the Marine Transportation System Through RSM and Engineering with Nature

Linda Lillycrop, Coastal and Hydraulics Laboratory, Engineer Research and Development Center, USACE

Using Strategic Placement of Dredged Material to Develop Sustainable Navigation Solutions and River Island Habitat

Burton Suedel, Engineer Research and Development Center, USACE

3D: Inland Resilience, Members' Room

Elizabeth Burkhart, Collins Engineers, Inc., *presiding*

Building Institutional and Social Resilience as a Response to Maritime Infrastructure Fragility

Craig Philip, Vanderbilt University

Supporting Secure and Resilient Inland Waterways

Heather Nachtmann, University of Arkansas

The Perils of Efficiency: An Analysis of an Unexpected Closure of the Poe Lock and Its Impact

Craig Gordon, U.S. Department of Homeland Security

Noon–1:00 p.m., Great Hall (seating available in West Court)

Lunch and Exhibits



1:00 p.m.–1:45 p.m., Auditorium

Keynote Address

General Darren McDew, Commander, U.S. Transportation Command, U.S. Air Force

From natural disasters to epidemics to acts of war, when things go wrong in an increasingly complex and uncertain world, the U.S. Transportation Command always answers America's call to deliver national objectives anywhere and at any time. General McDew will discuss the challenges faced by the global combatant command in maintaining the readiness of the country's strategic sealift capability, both commercial and organic, as well as in operating in a contested cyber domain.

1:45 p.m.–3:30 p.m., Auditorium

Plenary 3

Data Requirements for a Next-Generation MTS

Jim Walker, American Association of Port Authorities, *presiding*

Big data can result in everything from a real-time stream of information for informing acute operational decisions to an amalgamated visualization that informs big picture priorities. It can also be an overwhelming mass that can be costly to collect and yield minimal benefits. This session will examine questions associated with future data for decisions applications: What will the data requirements and useful outputs look like for a best case scenario next generation marine transportation system and what are the gaps and research needs to reaching big data nirvana?

Commercial User Perspective, Resilience, and Safety Data

Craig Philip, Vanderbilt University

USACE Data Programs

Kenneth (Ned) Mitchell, USACE

Data Visualization Analytics Applications in Freight Transportation

Michael Pack, University of Maryland

Integrating Public–Private Inland Port and Waterway Information

Jonathan Corey, University of Cincinnati

Best Practices in Data Sharing Through Port Authorities

Rich Roche, Mohawk Global Logistics

3:30 p.m.–4:00 p.m., Great Hall

Afternoon Break and Exhibits

4:00 p.m.–5:30 p.m.

Breakout Sessions

4A: Security, Lecture Room

Todd Ripley, MARAD, *presiding*

Risk Basing Maritime Security Response Operations for the U.S. Coast Guard

Jeff Kuck, ABS Consulting

Strategies for Developing Risk-Based Performance Standards in the MTS: Lessons Learned from the Chemical Facility Anti-Terrorism Standards

Kimberly Young-McLear, U.S. Coast Guard Academy

Marine Transportation System Security

Dean Schoultz, MarineCFO

Wednesday, June 22, 2016



4B: Environmental Stewardship, NAS 125
Alyson Azzara, Committee on the Marine Transportation System, *presiding*

Alternative Fuels: Opportunities for Meeting Low-Sulfur Targets
Scott Eaton, Maine Maritime Academy

Geosensing Ship Activity to Estimate Invasive Species Risk
James Corbett, University of Delaware

Making Sound Infrastructure Investments: Increasing Value on Great Lakes Breakwaters Through the USACE Engineering with Nature Initiative
Burton Suedel, Engineer Research and Development Center, USACE

Optimal Dredge Fleet Scheduling within Environmental Work Windows
Kenneth (Ned) Mitchell, USACE

4C: Data and Data Management, NAS 120
Doug McDonald, MARAD, *presiding*

Commercial Marine Transportation and Ocean Use: Data Needs for Multidisciplinary Long-Term Planning
Matthew Campo, Rutgers University

Creating an AIS Transmit Architecture: Lessons Learned, Requirements Identified, and Research Needed
Brian Tetreault, USACE

Maritime Data Program at MARAD: Using Open Data and Open-Source Software to Determine Container Ship Trends in U.S. Ports
Jonathan Hsieh, MARAD

4D: Resilience—Seaports and Climate, Members' Room
Austin Becker, University of Rhode Island, *presiding*

Marine Transportation System Resilience Factors: A Federal Agency Perspective
Katherine Touzinsky, Coastal and Hydraulics Laboratory, USACE

MTS System Performance Data Sources to Support Resilience Evaluations
Marin Kress, USACE

Toward a Comparative Index of Seaport Climate Risk: Indicator Development from Open Data
Robert McIntosh, University of Rhode Island

6:30 p.m.–9:30 p.m.

Potomac Cruise Excursion

Join us aboard the Potomac Riverboat Company's *Miss Christin* on Wednesday evening for a cruise down the Potomac River. There will be light refreshments and a cash bar. A shuttle will be provided from and returning to the National Academy of Sciences building. Shuttle will depart at 6:30 from the east side of the building, at the parking lot circle.



Cruise: 7:00 p.m.–9:00 p.m.

Vessel Boarding: 6:45 p.m.

Shuttle Pickup and Dropoff: National Academy of Sciences Building, 2101 Constitution Avenue NW, Washington D.C. 20418

Cruise Departure Site: Diamond Teague Park at the Nationals Stadium, 100 Potomac Avenue SE; Washington, D.C. 20003

Nearest Metro Station: Navy Yard–Ballpark

Cost: \$55 per person; option to purchase during registration based on availability. Please limit to one guest per person.



Thursday, June 23

7:30 a.m.–8:30 a.m., *Great Hall*

Exhibits and Breakfast

8:30 a.m.–9:30 a.m., *Auditorium*

Student Honor Panel

Helen Brohl, Committee on the Marine Transportation System, *presiding*

This special session features the work of four student researchers on topics related to this conference's call for presentations. This opportunity was made available to full-time students age 35 or younger. Abstracts were reviewed and chosen based on their quality and relevance to the conference topics. Winning presenters received a \$500 travel stipend to attend the conference and received complimentary registration.

A Navigable Inland Waterway Traffic Model for Evaluation of Tow Operation Procedures During Extreme Weather Events

Katherine Nelson, Vanderbilt University

Coatings for Navigational Steel Structures

Piyush Soti, University of West Virginia

Leadership, Responsibility, and Incentive for Long-Term Hurricane Resilience: Stakeholder Perceptions at the Port of Providence

Eric Kretsch, University of Rhode Island

The Ports Resilience Index: A Qualitative Resilience Assessment Tool for the Gulf Coast

Lauren Morris, Louisiana State University

10:00 a.m.–Noon, *Lecture Room*

Closing Session: Conference Integration and Future Directions for MTS Research and Development

Sandra Knight, Water Wonks LLC, and Jeff Lillycrop, USACE, *presiding*

This session will bring forward the main concepts, research needs and gaps, and lessons learned for MTS research and development future activity. This arguably is the most important session of the conference, as the results of these conversations will directly affect the agendas of the agencies and stakeholders responsible for the stewardship of America's future marine transportation system.

Thursday, June 23, 2016

