Diagnosing the Marine Transportation System: Measuring Performance and Targeting Improvement

Biennial Research and Development Conference

June 26-28, 2012
National Academy of Sciences
2101 Constitution Avenue, NW
Washington, D.C. 20418

Organized by
Transportation Research Board

Cosponsored by
Committee on the Marine Transportation System

www.TRB.org/Conferences/Metrics2012.aspx
This conference would not have been possible without the combined efforts of many individuals and agencies. Special acknowledgment is given to the members of the Committee on the Marine Transportation System Research and Development Integrated Action Team along with the Organizing Committee.

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

Conference Planning Committee Members
Russ Byington, U.S. Maritime Administration
Scott Drumm, Port of Portland
Greg Edwards, Virginia Port Authority
Dale Heller, Ingram Barge
Bruce Lambert, Institute for Trade and Transportation Studies
Jim McCarville, Port of Pittsburgh Commission
K. Ned Mitchell, U.S. Army Corps of Engineers
Roy Pearson, Federal Maritime Commission
Ted Prince, Ted Prince and Associates, LLC
Randolph Resor, Office of the Secretary of Transportation
William Rogers, Transportation Research Board
CDR Aaron Sanders, U.S. Coast Guard
Edward Strocko, Federal Highway Administration
Marc Thibault, U.S. Coast Guard
Thomas Wakeman, Stevens Institute of Technology

Research and Development Integrated Action Team Members and Other Contributors
Alyson Azzara, Committee on the Marine Transportation System
LCDR Charles Bright, U.S. Coast Guard
Helen Brohl, Committee on the Marine Transportation System
Marvourneen Dolor, St. Lawrence Seaway Development Corporation
Dave Enabnit, National Oceanic and Atmospheric Administration
Mary Erickson, National Oceanic and Atmospheric Administration
Wayne Estabrooks, U.S. Navy
MJ Fiocco, U.S. Department of Transportation
Robert Henry, National Transportation Safety Board
Michael Hilliard, Oak Ridge National Laboratory
John Humphrey, National Oceanic and Atmospheric Administration
Rajiv Khandpur, U.S. Coast Guard
Gary Magnuson, National Oceanic and Atmospheric Administration
CAPT David McFarland, National Oceanic and Atmospheric Administration
Patricia Muttscher, Committee on the Marine Transportation System/U.S. Army Corps of Engineers
Todd Ripley, U.S. Department of Transportation Maritime Administration
Emily Vuxton, U.S. Army Corps of Engineers

TRB Staff
Joedy Cambridge
Jaclyn Hubersberger

Special Thanks to:
Ingram Barge Company
for Hosting and Sponsoring the Wednesday Evening Reception
Welcome to the biennial MTS R&D conference, Diagnosing the Marine Transportation System: Measuring Performance and Targeting Improvement, cosponsored by the Committee on the Marine Transportation System (CMTS), the Transportation Research Board (TRB), and the Marine Board of the National Academies.

Following the great success of the 2010 MTS R&D conference, Transforming the Marine Transportation System: A Vision for Research and Development, in 2010 in Irvine, California, we have gathered here in Washington, D.C. to address one of the key research requirements identified at the 2010 conference—the need for performance indicators in the Nation’s marine transportation system (MTS).

The conference will engage stakeholders in government, academia, and the private sector to examine the use of performance indicators in maritime transportation and waterways management. The goal of the conference is to identify indicators that fully consider the MTS in the context of the overall supply chain. Conference participants will explore how the MTS and multimodal connectors perform through the application of performance metrics.

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

With your participation and involvement, we will create performance indicators for the MTS that will help us measure and ultimately create a more sustainable and successful MTS.

—W. Jeff Lillycrop
U.S. Army Corps of Engineers, Conference Chair
Margaret Spring
Chief of Staff, National Oceanic and Atmospheric Administration (NOAA) U.S. Department of Commerce

Margaret Spring, a graduate of Duke University School of Law and Dartmouth College, joined the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, in June of 2009. In her capacity as Chief of Staff, she reports directly to NOAA Administrator Dr. Jane Lubchenco and serves as the chief advisor on policy, personnel and budget matters in the Office of the Under Secretary. Margaret works with the Administrator, NOAA senior leadership and the Department of Commerce to help integrate policy and budget priorities and align programs in support of the NOAA priorities and budget.

Margaret joined The Nature Conservancy’s California chapter in May 2007 as Director of its Coastal and Marine Program, where she managed and directed one of the largest U.S. marine programs at the Conservancy, focused on scalable, innovative projects designed to address the major threats to coastal and marine biodiversity and related ecosystems.

Prior to joining the Conservancy she served as Senior Counsel, then General Counsel, to the Senate Committee on Commerce, Science, and Transportation. Her areas of responsibility included: fisheries conservation and management; coastal zone management; marine sanctuaries; coastal and atmospheric science; climate change; weather; satellite systems; mapping, and other federal ocean and atmospheric programs.

Margaret’s legislative work included enactment of the Oceans Act of 2000, the Oceans and Human Health Act, the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, the Marine Debris Research, Prevention, and Reduction Act, and the Tsunami Warning and Education Act.

From 1992 to 1999, Margaret was an environmental attorney at Sidley & Austin in Washington, D.C.
Polly Trottenberg
Acting Under Secretary and Assistant Secretary for Transportation Policy
U.S. Department of Transportation

Ms. Trottenberg is currently serving as the Acting Under Secretary, and the Assistant Secretary for Transportation Policy at the U.S. Department of Transportation. Her office focuses on surface transportation reauthorization, livability, high-speed rail, the TIGER program and freight policy development. She oversees the offices of Infrastructure Finance and Innovation, Safety, Energy and the Environment, and Economic and Strategic Analysis.

She was previously the Executive Director of Building America’s Future, a non-profit organization created by former Pennsylvania Governor Edward Rendell, former California Governor Arnold Schwarzenegger, and New York Mayor Michael R. Bloomberg, to promote infrastructure investment.

Ms. Trottenberg also worked in the United States Senate for 12 years, most recently as Deputy Chief of Staff and Legislative Director for California Senator Barbara Boxer, Chairman of the Senate Environment and Public Works Committee. Ms. Trottenberg also served as Legislative Director for New York Senator Charles Schumer and as Legislative Assistant to New York Senator Daniel Patrick Moynihan. She has worked extensively on transportation, public works, energy and environmental issues during her congressional career.

Before starting her career on Capitol Hill, Ms. Trottenberg worked at the Port Authority of New York and New Jersey, the Massachusetts State Senate, and the Massachusetts Port Authority.

Ms. Trottenberg received her undergraduate degree from Barnard College and her Master’s in Public Policy from the Kennedy School of Government.
Major General Michael J. Walsh
Deputy Commanding General, Civil and Emergency Operations
United States Army Corps of Engineers

Major General Michael J. Walsh has been the Deputy Commanding General for Civil and Emergency Operations, United States Army Corps of Engineers since December 2011. General Walsh is responsible for a $10 billion program. He exercises supervision over civil works activities of 8 engineer divisions and 38 districts nationwide employing 294 officers and 23,033 civilian employees who operate and maintain civil infrastructure valued at $125 billion, including more than 693 dams, 4,254 recreation areas, over 12,000 miles of commercial inland waterways, and 926 harbors. He serves as principal advisor to the Chief of Engineers and the Assistant Secretary of the Army for Civil Works and directly interfaces with members of Congress on civil works issues and programs. Major General Walsh is responsible for emergency response missions for civil disasters and Federal Emergency Management Agency (FEMA) support.

Previous assignments include: Commander of the Mississippi Valley Division, Vicksburg, Mississippi, from February 2008 to November 2011; Commander of the South Atlantic Division, Atlanta, Georgia, from June 2004 to September 2006; Chief of Staff at headquarters, Washington, D.C., from May 2003 to June 2004; Executive Director of Civil Works at headquarters, Washington, D.C., from August 2001 to May 2003; District Commander of the Sacramento District, Sacramento, California, from 1998 to 2001; and District Commander of the San Francisco District, San Francisco, California, from 1994 to 1996. His awards include a Distinguished Service Medal, two Bronze Stars, four Legions of Merit, and numerous other awards.

Major General Walsh earned a master's degree in construction management from the University of Florida. He graduated from Polytechnic Institute of New York in 1977 with a bachelor's degree in civil engineering. His military education includes the Engineer Officers Basic and Advanced Courses, U.S. Army Command and General Staff College, and the U.S. Army War College.
## CONFERENCE AT A GLANCE

<table>
<thead>
<tr>
<th>Time</th>
<th>Tuesday, June 26, 2012</th>
<th>Wednesday, June 27, 2012</th>
<th>Thursday, June 28, 2012</th>
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<td>Gateway and Intermodal Connection Performance Indicators</td>
<td>The Role of Technology to Enhance Competitiveness and Reliability</td>
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<td>Evaluating the Return on Infrastructure Investments</td>
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<td>Challenges Measuring the Security and Resiliency of the MTS</td>
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<td>Breakout Sessions 1A-1D</td>
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<td>Carriers, Users and Marketplace Dynamics</td>
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## EXHIBITORS

**PortVision**

**U.S. Army Corps of Engineers**
Diagnosing the Marine Transportation System: Measuring Performance and Targeting Improvement

Tuesday, June 26

7:30 a.m. – 4:00 p.m.
Registration

7:30 a.m. – 8:30 a.m., Great Hall
Exhibits and Breakfast

8:30 a.m. – 10:15 a.m., Auditorium
Opening Session

Welcome and Call to Order
W. Jeff Lillycrop, U.S. Army Corps of Engineers/Committee on the Marine Transportation System R&D Integrated Action Team

Conference Overview and Introduction of Keynote Speakers
Margaret Spring, NOAA Chief of Staff/CMTS Coordinating Board Chair, presiding

National Freight Policy
Polly Trottenberg, Acting Under Secretary, U.S. Department of Transportation

An Integrated Transportation System
Major General Michael J. Walsh, Deputy Commanding General, Civil and Emergency Operations, U.S. Army Corps of Engineers

10:15 a.m. – 10:45 a.m., Great Hall
Morning Break and Exhibits

10:45 a.m. – 12:15 p.m., Auditorium
Highway, Railroad, and Waterway Performance Indicators
Edward Strocko, Federal Highway Administration, presiding

Sean Connaughton, American Association of State Highway Transportation Officials

John Gray, Association of American Railroads

Matt Woodruff, Kirby Corporation

Jim Walker, U.S. Army Corps of Engineers

12:15 p.m. – 12:45 p.m., Auditorium
Evaluating the Return on Infrastructure Investments
Vijay Perincherry, HDR Decision Economics

12:45 p.m. – 2:00 p.m., Great Hall and West Court
Lunch

2:00 p.m. – 3:30 p.m.
Breakout Sessions
Measuring Performance

1A: Capacity, Room 118
Diane Davidson, Oak Ridge National Laboratory, presiding

Measuring the Effect of a Lack of Maintenance Dredging of Ship Channels
C. James Kruse, Texas Transportation Institute

Container Port Capacity and Productivity Metrics
Daniel Smith and Frank Harder, The Tioga Group, Inc.

Baseline Analytics and Automated Reporting Drive Optimal Decision Making in the Maritime Transportation System
Jason Tieman, PortVision

1B: Energy and Environment, Room 120
Patricia Mutschler, Committee on the Marine Transportation System/U.S. Army Corps of Engineers, presiding

Modal Comparision of Domestic Freight Transportation Effects on the General Public: 2001-2009
Annie Protopapas, C. James Kruse, and Leslie E. Olson, Texas Transportation Institute

A PIANC Standard of Practice for Performing Initial Assessments of Environmental Effects for Navigation Infrastructure Projects
Burton C. Suedel, Edmond J. Russo, Todd S. Bridges, and Sandra M. Brasfield, U.S. Army Corps of Engineers

Effects of Energy Efficiency Design Index on the Marine Transportation System
William Hockberger, Consultant

1C: Resilience and Reliability, Room 250
Scott Rainey, Committee on the Marine Transportation System, presiding

Marine System Performance: Implications of Flow Reliability for Waterways Market Development and Industry Sustainability
Ernie Perry and Teresa Adams, University of Wisconsin – Madison

Navigation Strategic Vision’s Contribution to Performance Metrics
James E. Clausner, U.S. Army Corps of Engineers (retired)

National Dredging Quality Management Program Presentation
Vern Gwin, U.S. Army Corps of Engineers

Existing Marine Transportation Performance Metrics in the Federal Government and Industry
Emily Vuxton, U.S. Army Corps of Engineers

1D: Investment, Economics, and Jobs, Room 280
Mary Erickson, National Oceanic and Atmospheric Administration, presiding

Financing the Future: Financial Performance, Modernization and Funding Options for the Port Authority’s Staten Island Bridges
Thomas Brigandi and Jonathan Peters, City University of New York
American Marine Highway Modeling Toolset
Jacek Kawecki, CSC Advanced Marine Center

Navigation Investment Model: Challenges in Measuring Economic Benefits
Ingrid K. Busch and Michael R. Hilliard, Oak Ridge National Laboratory

3:30 p.m. – 4:00 p.m., Great Hall
Afternoon Break and Exhibits

4:00 p.m. – 5:30 p.m.
Breakout Sessions

Targeting Improvement

2A: Capacity, Room 118
Diane Davidson, Oak Ridge National Laboratory, presiding

History of the Automatic Identification System and Future Improvements in Waterway Management
Brandan Scully and Kenneth Ned Mitchell, U.S. Army Corps of Engineers

Combination Marine Highway System (CMH) for Avoiding Recurring Congestion Bottlenecks
K. T. Thirumalai and Michael S. Bronzini, George Mason University

Quantifying the Impacts of Shoaling in Navigation Channels via Historical Waterborne Commerce Data
Kenneth Ned Mitchell, U.S. Army Corps of Engineers and Captain David MacFarland, National Oceanic and Atmospheric Administration

Marine Highway Transport of Toxic Inhalation Hazard (TIH) Materials
Annie Protopapas, C. James Kruse, Leslie E. Olson, Mike Donelan, and Nathan Hutson, Texas Transportation Institute

2B: Safety and Security, Room 120
Robert Henry, National Transportation Safety Board, presiding

Measuring the Safety and Security of the Marine Transportation System: A Coast Guard Perspective
CDR Aaron Sanders, U.S. Coast Guard

Geospatial Tool for Assessing the Importance of Marine Waterways
Shih-Miao Chin, Ho-Ling Hwang, and Francisco Moraes de Oliveira-Neto, Oak Ridge National Laboratory

e-Navigation and Practical Applications
Brian Tetreault, U.S. Army Corps of Engineers

2C: Resilience and Reliability, Room 250
Scott Rainey, Committee on the Marine Transportation System, presiding

Measuring Port Effectiveness in User Service Delivery
Mary R. Brooks and Tony Schellinck, Dalhousie University
Port Commerce and Urban Land Use: Economic Competitiveness in the 21st Century
Adam Davidson, Jonathan Peters, and Rich Flanagan, City University of New York; Cameron Gordon, University of Canberra

Assessing the Feasibility of Inland Waterway Emergency Services
Heather Nachtmann and Edward A. Pohl, University of Arkansas

Improved Resource Allocation for Dredge Scheduling and Procurement
Heather Nachtmann, Edward A. Pohl, and Chase E. Rainwater, University of Arkansas; Kenneth Ned Mitchell, U.S. Army Corps of Engineers

2D: Investment, Economics, and Jobs, Room 280
Mary Erickson, National Oceanic and Atmospheric Administration, presiding

New Approaches for Lock and Dam Maintenance Funding
C. James Kruse and Annie Protopapas, Texas Transportation Institute

Ultimate Economic Measures of Performance
William Hockberger, Consultant

Measuring a Port’s Performance Using the Economic Value of Commodities
Zamira Simkins and Richard Stewart, University of Wisconsin-Superior

Exploring New Metrics for Inland Waterways
Jim McCarville, Port of Pittsburgh

Wednesday, June 27

7:30 a.m. – 4:00 p.m.
Registration

7:30 a.m. – 8:30 a.m., Great Hall
Exhibits and Breakfast

8:30 a.m. – 10:30 a.m., Auditorium
Gateways and Intermodal Connection Performance Indicators
Jean Godwin, American Association of Port Authorities, presiding

CDR Aaron Sanders, U.S. Coast Guard
Buff Byington, U.S. Department of Transportation Maritime Administration
Jim McCarville, Port of Pittsburgh
Greg Edwards, Virginia Port Authority

10:30 a.m. – 11:00 a.m., Great Hall
Morning Break and Exhibits

11:00 a.m. – 12:30 p.m.
Breakout Sessions
Marine Transportation System Integration

3A: Supply Chain Interdependencies, Room 118
Randolph Resor, Office of the Secretary of Transportation, presiding

Concordance of Maritime Performance Measures for Deepwater, Waterway, and Landside Systems
Nathan Hutson and Sophie Hartshorn, Cambridge Systematics, Inc.

Operations and Maintenance Funding Allocation via Navigation Systems Optimization
Kenneth Ned Mitchell, U.S. Army Corps of Engineers; and Adel Khodakarami and Bruce Wang, Texas A&M University

Using Performance Management to “Anchor” the Marine Transportation System and to Facilitate “Managing and Messaging” Performance
Elizabeth Davenport, National Oceanic and Atmospheric Administration

Validation and Integration of Waterway Flows in the Freight Analysis Framework with the Waterborne Commerce of the United States
Shih-Miao Chin, Moraes Oliveira-Neto, and Ho-Ling Hwang, Oak Ridge National Laboratory

3B: Data Framework, Room 120
Emily Vuxton, U.S. Army Corps of Engineers, presiding

Maritime Data and Statistics Support the National Export Initiative
Matthew Chambers and Mindy Liu, U.S. Department of Transportation

Information Sharing and Communication through the Marine Transportation System Data Portal
Alyson Azzara, Committee on the Marine Transportation System

Supporting Secure and Resilient Inland Waterways: Data Frameworks to Improve Emergency Decision Making Capabilities
Henry Mayer, Matt Campo, and Jennifer Rovito, Rutgers University; Heather Nachtmann and Letitia Pohl, University of Arkansas

Federal-Industry Logistics Standardization (FILS): Supporting a Federal Navigation Information Framework and Integration
Douglas McDonald, U.S. Army Corps of Engineers

3C: Asset Management / Risk Management, Room 250
Charles E. Wiggins, U.S. Army Corps of Engineers, presiding

Asset Management Process for Coastal Navigation Structures
George Domurat, U.S. Army Corps of Engineers

Characterizing Risk in the Global Supply Chain
Steven S. Streetman, U.S. Department of Homeland Security; Christopher Toms, and CDR Aaron Sanders, U.S. Coast Guard

Modeling the Effect of Sea-Level Rise on Risks to Coastal Infrastructure Using Bayesian Networks
Martin T. Schultz and Edmond J. Russo, U.S. Army Corps of Engineers
3D: Future and Emerging Capabilities, Room 280
CAPT David McFarland, National Oceanic and Atmospheric Administration, presiding

Port Tomorrow: Envisioning a Resilient Future for Port Communities
Joshua H. Murphy, National Oceanic and Atmospheric Administration

Mobile Devices for Data Collection: Coastal Structure Inspections
James Stinson and Eric Roth, U.S. Army Corps of Engineers

Performance Measurement for Maritime Systems and Beyond
Patrick T. Hester and Thomas J. Meyers, Old Dominion University

12:30 p.m. – 1:30 p.m., Great Hall
Lunch

1:30 p.m. – 2:00 p.m., Auditorium
Challenges Measuring the Security and Resiliency of the Marine Transportation System
Stephen Caldwell, U.S. Government Accountability Office

2:00 p.m. – 4:00 p.m., Auditorium
Carriers, Users and Marketplace Dynamics
Jim Walker, U.S. Army Corps of Engineers, presiding

Jerry Knapper, Ingram Barge
Stephen Carmel, Maersk Line, Limited
Nick Marathon, U.S. Department of Agriculture
Roy Pearson, Federal Maritime Commission

4:00 p.m. – 5:30 p.m., Great Hall
Reception
Reception hosted and sponsored by Ingram Barge Company
Thursday, June 28

7:30 a.m. – 8:30 a.m., Great Hall
Exhibits and Breakfast

8:30 a.m. – 9:00 a.m., Auditorium
The Role of Technology to Enhance Competitiveness and Reliability: Tools, Trends, and the Global Perspective
Thomas Wakeman, Stevens Institute of Technology

9:00 a.m. – noon, Auditorium
Closing Session
W. Jeff Lillycrop and Kenneth Ned Mitchell, U.S. Army Corps of Engineers, presiding

Results from Breakout Sessions
Session Facilitators  1A/2A  1B  1C/2C  1D/2D  2B  3A  3B  3C  3D

Conceptual Framework for Analyzing the Marine Transportation System within the Intermodal System
Michael R. Hilliard, Oak Ridge National Laboratory; and Kenneth Ned Mitchell, U.S. Army Corps of Engineers

Tasks, Milestones, and Next Steps
W. Jeff Lillycrop, U.S. Army Corps of Engineers

Conference Products and Closing Remarks
Margaret Spring, NOAA Chief of Staff/CMTS Coordinating Board Chair