

# Transforming the Marine Transportation System *A Vision for Research and Development*

June 29–July 1, 2010

The Beckman Center of the National Academies  
Irvine, California



Photo courtesy of USACE



Photo courtesy of Port of Los Angeles

## Cosponsors



## ACKNOWLEDGMENTS

This conference would not have been possible without the combined efforts of many individuals and agencies. Special acknowledgment is given to the cochairs and members of the Committee on the Marine Transportation System Research and Development Integrated Action Team.

### **Cochairs**

Sandra Knight, Department of Homeland Security  
Jeff Lillycrop, U.S. Army Corps of Engineers

### **Members**

Safra Altman, U.S. Army Corps of Engineers  
Charles Bright, U.S. Coast Guard  
Helen Brohl, Committee on the Marine Transportation System  
Kelly Curtin, U.S. Merchant Marine Academy  
David Damm-Luhr, USDOT Volpe Center  
Marvourneen Dolor, Saint Lawrence Seaway Development Corporation  
David Enabnit, National Oceanic and Atmospheric Administration  
Mary Erickson, National Oceanic and Atmospheric Administration  
Wayne Estabrooks, Office of Naval Research  
M.J. Fiocco, USDOT Research and Innovative Technology Administration  
Virginia Fox-Norse, Environmental Protection Agency  
Albert Hartberger, U.S. Coast Guard  
Robert Henry, National Transportation Safety Board  
Michael Hilliard, Oak Ridge National Laboratory  
David MacFarland, National Oceanic and Atmospheric Administration  
James Rigney, Naval Oceanographic Office  
Todd Ripley, Maritime Administration  
Edmond Russo, U.S. Army Corps of Engineers  
Tina Woehling, U.S. Merchant Marine Academy

### **Acknowledgment also to the following, who helped plan the technical program:**

Jeannie Beckett, The Beckett Group  
Todd Bridges, U.S. Army Corps of Engineers  
Joedy Cambridge, Transportation Research Board–Marine Board  
Gary Magnuson, National Oceanic and Atmospheric Administration  
Thomas Wakeman, Stevens Institute of Technology

**Special THANKS to the  
Port of Long Beach and  
Port of Los Angeles  
for hosting the San Pedro Bay tour!**

# Transforming the Marine Transportation System

## *A Vision for Research and Development*

Welcome and thank you for your help in outlining a research and development strategy for the Nation's marine transportation system (MTS). The goal and objectives of the conference are to

- Explore the progress of scientific and technical solutions to marine transportation and waterway management challenges;
- Examine potential research and technology needs to support a strategic plan for research and development related to the MTS; and
- Encourage and foster partnerships among federal, state, private sector, and academic institutions to address critical issues relating to the MTS.

To accomplish this goal, you are encouraged to consider the following “challenge questions” as you listen to presentations and engage in discussions with the presenters and with one another:

- What are your near-term (less than five years) and long-term (greater than five years) visions of the MTS in the context of the nation's overall transportation system?
- What do you consider to be the drivers that will shape the future of the MTS?
- What near-term and long-term research and development initiatives will support the future of the MTS?
- What are the advantages of having a national CMTS research and development strategy to support the future of the MTS?
- What are the challenges to developing and implementing a national CMTS research and development strategy to support the MTS?

We hope you find the activities over the next 2 1/2 days both informative and challenging.

—Sandra Knight  
*Department of Homeland Security*

—Jeff Lillycrop  
*U.S. Army Corps of Engineers*

Welcome

## **Geraldine Knatz, Executive Director, Port of Los Angeles**

Geraldine Knatz is the first woman executive director of the Port of Los Angeles, having overseen the daily operations and internal management of the nation's largest container port since January 2006. Moving the port forward with an agenda that focuses on responsible growth and environmental leadership is an aggressive goal that Knatz has tackled from day one. Reducing air emissions, eliminating health risks, and expanding capital development programs to accommodate the port's future growth as a premiere Pacific gateway and national economic engine are top priorities.

Knatz was instrumental in the creation and implementation of the San Pedro Bay Ports Clean Air Action Plan to reduce air emissions from port operations by roughly 50% over a period of 5 years. Her efforts facilitated the first joint meeting of the leaders of the two ports since the 1920s and the first-ever public meeting of the two ports' boards on the day the clean air plan was approved. Since then, the plan has paved the way for the Los Angeles Harbor Commission to approve two major container terminal expansion projects and a new deep-draft marine oil terminal on Pier 400.

Knatz previously served as managing director of the neighboring Port of Long Beach. As the number-two executive at the Port of Long Beach, she oversaw a \$2.3 billion capital improvement program and spearheaded a number of environmental initiatives, including development of the Green Port Policy. While her impressive tenure at the Port of Long Beach spans two decades, Knatz actually began her maritime career as an environmental scientist at the Port of Los Angeles in 1977.

A proud alumna of the University of Southern California, where she presently teaches in the Civil Engineering School, Knatz earned two degrees from the University of Southern California: a PhD in biological science and an MS in environmental engineering. She also holds an undergraduate degree in zoology from Rutgers University. Born and raised in New Jersey, Knatz resides in Long Beach with her husband and two sons.

Knatz's take-charge attitude and relentless energy in making "green growth" a top priority at the Port of Los Angeles was a central topic chronicled in *America's Port*, the 2008 National Geographic Channel television series about the Port of Los Angeles.



*Knatz*

## **Peter H. Appel, Administrator, Research and Innovative Technology Administration, U.S. Department of Transportation**

Peter H. Appel was confirmed by the U.S. Senate as administrator of the Research and Innovative Technology Administration (RITA) April 29, 2009, and has since focused on working with U.S. Secretary of Transportation Ray LaHood to advance key U.S. Department of Transportation (USDOT) initiatives by leveraging effective research and cross-modal coordination. These initiatives have included the Distracted Driving Summit, which brought key transportation researchers, advocates, decision makers, and other leaders together to address this growing safety issue; the bolstering of the U.S. DOT Intelligent Transportation Systems Program to best improve safety, efficiency, and environmental sustainability across all modes of surface transportation; and the establishment of U.S. DOT's Safety Council, which brings together all 10 modal administrators to advance transportation safety across the Department.

Before joining RITA, Appel was with the global management consulting firm of A.T. Kearney, Inc. He has led business improvement initiatives for clients in the private and public sectors, with a focus on transportation and infrastructure.

Appel has more than 20 years of experience in the transportation field, and has supported organizations in the railroad, trucking, airline, and ocean shipping industries with growth strategy, supply-chain improvement, post-merger integration, public-private partnerships, and other key business and policy issues. Previously, Appel served as special assistant to the administrator of the Federal Aviation Administration and as assistant director for pricing and yield management at Amtrak. Appel earned his bachelor's degree from Brandeis University in economics and computer science, with highest honors, and received his MS in transportation from the Massachusetts Institute of Technology.



*Appel*

# CONFERENCE AGENDA

## Tuesday, June 29

7:30 a.m.–5:00 p.m.

### Registration

7:45 a.m.–8:45 a.m.

### Breakfast

9:00 a.m.–9:15 a.m.

### Opening Plenary Session Welcome

Robert E. Skinner, Jr., Transportation Research Board

#### Conference Overview and Purpose

Helen Brohl, Committee on the Marine Transportation System

#### Introduction of Keynote Speaker

Robert E. Skinner, Jr., Transportation Research Board

9:15 a.m.–9:45 a.m.

### Keynote Address

#### *Change Monumentally, Not Marginally: The Perspective of the Port of Los Angeles on MTS Critical Research Needs*

Geraldine Knatz, Executive Director, Port of Los Angeles

9:45 a.m.–10:15 a.m.

### Break

10:15 a.m.–11:45 a.m.

### Plenary Session I: Federal Transportation Research and Development Priorities

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

#### Federal Agency Perspectives on Maritime Transportation R&D Priorities

Michael Enschede, U.S. Army Corps of Engineers

Steven Murawski, National Oceanic and Atmospheric Administration (invited)

Matthew Sisson, U.S. Coast Guard Research and Development Center

Orlando Gotay, Jr., U.S. Maritime Administration (invited)

Jared Blumenfeld, Environmental Protection Agency (invited)

11:45 a.m.–12:30 p.m.

### Introduction of Speaker

#### U.S. DOT Strategy for Research and Development

Peter H. Appel, Administrator, Research and Innovative Technology Administration

12:30 p.m.–1:30 p.m.

### Lunch

Tuesday, June 29

1:30 p.m.–3:00 p.m.

## **Technical Breakout Sessions**

### **1A: Resilience and Reliability, Part I**

Joseph Gailani, U.S. Army Corps of Engineers, *presiding*

#### **National Dredging Quality Management: The Next Generation Automated Dredge Monitoring System**

William V. Gwin, U.S. Army Corps of Engineers

#### **Monitoring Completed U.S. Army Corps of Engineers Navigation Projects**

Lyndell Hales, U.S. Army Corps of Engineers

#### **Two-Fluid Simulation Using Higher-Order Methods**

Ido Ackerman, University of California at San Diego

#### **Gulfport Sedimentation Solutions**

William McAnally, Mississippi State University

### **1B: Environmental Stewardship, Part I**

Todd Bridges, U.S. Army Corps of Engineers, *presiding*

#### **Making the Case for Environmental Stewardship within the Marine Transportation System**

L. James Valverde, U.S. Army Corps of Engineers

#### **Sustainable Sediment Management**

Todd Bridges, U.S. Army Corps of Engineers

#### **Ecological Sustainability and the Challenge of Managing Risks Posed by Invasive Species**

Safra Altman, U.S. Army Corps of Engineers

#### **Sustainability in Relation to Port Infrastructure and Operations**

Peggy Lobnitz, Weston Solutions, Inc.

### **1C: Finance and Economics**

Michael Hilliard, Oak Ridge National Laboratory, *presiding*

#### **Dedicated Funding for University Maritime Research: Issues and Opportunities**

Richard Stewart, Great Lakes Maritime Research Institute

#### **Toward Robust Portfolio Management of the National Waterways Infrastructure**

Kenneth Mitchell, U.S. Army Corps of Engineers

#### **The Influence of Oil Price on Maritime Routing of Containerized Imports from Canada**

Joseph Zelasney, Committee on the Marine Transportation System

#### **Inland Navigation Investment Decision Tools—Laying the Foundation for National Application**

David A. Weekly, U.S. Army Corps of Engineers

3:00 p.m.–3:30 p.m.

**Break**

3:30 p.m.–5:00 p.m.

**Technical Breakout Sessions**

**2A: Resilience and Reliability, Part II**

Safra Altman, U.S. Army Corps of Engineers, *presiding*

**Comparison of PIANC, Ankudinov, and CADET Ship Squat Predictions**

Michael Briggs, U.S. Army Corps of Engineers

**Functionality of Coastal Navigation with Rise in Relative Sea Level**

Julie Rosati, U.S. Army Corps of Engineers

**Ocean Observations in Support of Decision Making for Maritime Observations**

Julie Thomas, University of California at San Diego

**2B: Environmental Stewardship, Part II**

Gary Magnuson, National Oceanic and Atmospheric Administration, *presiding*

**A Map-Based Database of Port-Specific Vessel Discharge Regulations**

Mary Wilkinson, University of Maryland Center for Environmental Science

**Predicting Transport and Fate of Constituents from Dredging, Propellers, and Outfalls**

Joseph Gailani, U.S. Army Corps of Engineers

**Diffusion of Innovative Technology (DoIT): Bringing Innovative Dredging Technologies On-Line in the U.S. Army Corps of Engineers**

Timothy Welp, U.S. Army Corps of Engineers

**Submersed Aquatic Vegetation Species Discrimination Using an Airborne Hyperspectral–LIDAR (Light Detecting and Ranging) Sensor System**

Molly Reif, U.S. Army Corps of Engineers

**2C: Safety and Security**

Robert Henry, National Transportation Safety Board, *presiding*

**Deriving MTS Business Intelligence from On-Board Vessel Communications**

Jason Tieman, PortVision

**Marine Transportation System Recovery: Current State of Preparedness Practice**

Wayne Young, U.S. Coast Guard

**MTS Resilience: E-Navigation Best Practices and Potential for Future Advances**

Bahar Barami, Volpe National Transportation Systems Center

**Challenges of Applying Risk Management to Safety and Security Concerns**

Thomas Wakeman, Stevens Institute of Technology

Tuesday, June 29

**2D: Capacity**

Christina Casgar, San Diego Council of Governments, *presiding*

**Comparative Simulation Study of Intermodal Yard Operations  
in Automated Container Terminal**

Alan Zhang, Moffatt & Nichol

**Short Sea Shipping Opportunities: Research Model and Policy Lessons**

James Frost, CPCS Transcom

**Container Port Capacity at the Port of Long Beach: The Relationship between  
Berth Capacity and Vessel Service Performance**

Vaibhav Govil, AECOM

**The Panama Canal Expansion: Implications to U.S. Ports  
and the Army Corps of Engineers**

Kevin Knight, U.S. Army Corps of Engineers

5:45 p.m.–7:30 p.m.

**Welcome Reception**



Photo courtesy of Port of Los Angeles

**Wednesday, June 30**

7:30 a.m.–5:00 p.m.

**Registration**

7:30 a.m.–8:30 a.m.

**Breakfast**

8:30 a.m.–10:30 a.m.

**Plenary Session II: Industry Stakeholder Perspectives on Maritime Transportation R&D Priorities**

Jeff Lillycrop, U.S. Army Corps of Engineers, *presiding*

**Industry Stakeholder Panel**

Stephen M. Carmel, Maersk Line, Limited

James R. McCarville, Port of Pittsburgh Commission

Blaine Collins, Det Norske Veritas (DNV)

Jolene M. Hayes, Port of Long Beach

Bruce Ramsden, Ingram Barge

10:30 a.m.–11:00 a.m.

**Break**

11:00 a.m.–12:30 p.m.

**Technical Breakout Sessions**

**3A: Climate Change and Greening the MTS**

Marvourneen Dolor, St. Lawrence Seaway Development Corporation, *presiding*

**Optimizing Marine Transport through Folding Convertible Containers**

Sheryar Durrani, Design Engineering Services, Inc.

**Hydrokinetic Power Generation and Navigation**

William McAnally, Mississippi State University

**Updated Technical Guidance on Sea Level Rise**

Heidi Moritz, U.S. Army Corps of Engineers

**Climate Change and Marine Transportation: Science and Technology**

Todd Bridges, U.S. Army Corps of Engineers

**3B: Improving Intermodal Linkages**

Jeannie G. Beckett, The Beckett Group, *presiding*

**Truck Drayage Practices (NCFRP Project 14)**

Daniel Smith, The Tioga Group

**Innovation at Marine and Rail Terminals with Automated Guided Vehicles (AGVs)**

Robert Histon, Gottwald

**Current Trends and Developments in Intermodal Linkages**

J. Michael Zachary, Parsons Brinckerhoff, Inc. (invited)

Wednesday, June 30

## **3C: Marine Spatial Planning**

Mary Erickson, National Oceanic and Atmospheric Administration, *presiding*

### **The Framework for Coastal and Marine Spatial Planning**

Malcolm Williams, U.S. Coast Guard Academy  
Member, White House Ocean Policy Task Force

### **The Role of Nautical Charts in Coastal and Marine Spatial Planning**

Meredith Westington, National Oceanic and Atmospheric Administration

### **Report from Fisheries and Oceans Canada**

Dale Nicholson, Fisheries and Oceans Canada

12:30 p.m.–1:30 p.m.

### **Lunch**

1:45 p.m.–3:15 p.m.

### **Plenary Session III: Academic Perspectives on Maritime Transportation R&D Priorities**

Sandra K. Knight, Department of Homeland Security, *presiding*

#### **Academic Panel**

Thomas H. Wakeman, Stevens Institute of Technology  
Richard D. Stewart, University of Wisconsin, Superior  
Carl James Kruse, Texas Transportation Institute  
William H. McAnally, Mississippi State University

3:15 p.m.–7:15 p.m.

### **Tour of the San Pedro Bay Port Facilities (Offsite)**

Hosted by the Port of Long Beach and Port of Los Angeles



Photo courtesy of Port of Long Beach

## Thursday, July 1

7:30 a.m.–8:30 a.m.

### **Breakfast**

8:30 a.m.–9:30 a.m.

### **Plenary Session IV: Mapping the Future for Strategic MTS Research**

Joedy W. Cambridge, Transportation Research Board–Marine Board, *presiding*

#### **Part A: Reports from Breakout Groups**

9:45 a.m.–10:00 a.m.

### **Break**

10:00 a.m.–11:15 a.m.

### **Plenary Session IV: Mapping the Future for Strategic MTS Research**

#### **Part B: Panel Discussion**

Sandra K. Knight, Department of Homeland Security

Jeff Lillycrop, U.S. Army Corps of Engineers

Christopher W. Jenks, Transportation Research Board

Todd Ripley, U.S. Maritime Administration

11:15 a.m.–11:45 a.m.

### **Next Steps**

### **Closing Remarks and Adjournment**



Thursday, July 1

TRANSPORTATION RESEARCH BOARD  
OF THE NATIONAL ACADEMIES

The **Transportation Research Board** is one of six major divisions of the National Research Council, which serves as an independent adviser to the federal government and others on scientific and technical questions of national importance. The National Research Council is jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The mission of the Transportation Research Board is to provide 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 activities 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](http://www.TRB.org)

**THE NATIONAL ACADEMIES™**  
*Advisers to the Nation on Science, Engineering, and Medicine*

The nation turns to the National Academies—National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—for independent, objective advice on issues that affect people's lives worldwide.  
[www.national-academies.org](http://www.national-academies.org)

TRANSPORTATION RESEARCH BOARD  
OF THE NATIONAL ACADEMIES

500 Fifth Street, NW  
Washington, DC 20001  
[www.TRB.org](http://www.TRB.org)

# **Transforming the Marine Transportation System**

## ***A Vision for Research and Development***

### **Program Changes**

Monday, June 29

10:15 a.m. Plenary Session 1 (p. 3)

- Capt. John Lowell will replace Steven Murawski to represent NOAA on this panel
- Maritime Administration will not be represented on this panel

11:45 a.m. Speaker Introduction (p. 3)

- Peter Appel will be introduced via video by David Matsuda, Administrator, Maritime Administration, USDOT

Tuesday, June 30

3:30 p.m. Breakout Session 2C (p. 5)

- Due to extended deployment in the Gulf, Jason Tieman, PortVision, will not be attending. Dean Rosenberg, CEO of PortVision, will present the material.

3:30 p.m. Breakout Session 2D (p. 6)

- Matthew Plezia of the Port of Long Beach will be a co-presenter for "Container Port Capacity at the Port of Long Beach"

Wednesday, July 1

11:00 a.m. Breakout Session 3A (p. 7)

- Sheryar Durrani will not make a presentation

11:00 a.m. Breakout Session 3C: (p. 8)

- Malcolm Williams is a Member, Interagency Ocean Policy Task Force (IOPTF) Working Committee (not the Task Force)