8th International Visualization in Transportation Symposium: Visualization in Action

July 27-28, 2017

National Academy of Sciences Building, Washington, DC

Organized by
Transportation Research Board

www.trb.org/conferences/visualization2017.aspx

Please note that you can access recordings of the sessions available at the following link:
https://www.youtube.com/channel/UCWMSU2aTW5_kJCWgefmfW5Q

The National Academies of
SCIENCES · ENGINEERING · MEDICINE

TRB
TRANSPORTATION RESEARCH BOARD

Schedule at a Glance

July 27–28, 2017

	Wednesday, July 26	Thursday, July 27	Friday, July 28
7:00am			
7:30am		Breakfast *West Court* 8:00am-9:00am	Breakfast *West Court* 7:15am-8:15am
8:00am			
8:30am			Breakout Session 3A *NAS 125* 8:15am-9:30am / Breakout Session 3B *NAS 120* 8:15am-9:30am / Breakout Session 3C *NAS East Court* 8:15am-9:30am
9:00am		Opening Session *Auditorium* 9:00am-9:45am	Morning Break *Great Hall* 9:30am-10:00am
9:30am		Lightning Talks *Auditorium* 9:45am-10:45am	Journalist Panel Session *Auditorium* 10:00am-11:00am
10:00am			
10:30am		Morning Break *Great Hall* 10:45am-11:15am	
11:00am			Transition Break: 11:00am-11:15am
11:15am		Breakout Session 1A *NAS 125* 11:15am-12:30pm / Breakout Session 1B *NAS 120* 11:15am-12:30pm / Breakout Session 1C *NAS Members' Room* 11:15am-12:30pm	Breakout Session 4A *NAS 125* 11:15am-12:30pm / Breakout Session 4B *NAS 120* 11:15am-12:30pm / Breakout Session 4C *NAS Members' Room* 11:15am-12:30pm / Breakout Session 4D *NAS Lecture Room* 11:15am-12:30pm
12:00pm			
12:30pm		Lunch *West Court* 12:30pm-1:45pm	Planning Committee Debrief (Members Only) *NAS 118* 12:30pm-1:30pm
1:00pm			
1:30pm			
2:00pm	System Performance Measures *NAS Members' Room* 2:00 - 3:00pm / CIM *NAS 118* 2:00-3:00pm / Participatory Simulation *NAS Board Room* 2:00-3:00pm	Breakout Session 2A *NAS 125* 1:45pm-3:00pm / Breakout Session 2B *NAS 120* 1:45pm-3:00pm / Breakout Session 2C *NAS Lecture Room* 1:45pm-3:00pm / Breakout Session 2D *NAS Members' Room* 1:45pm-3:00pm	
2:30pm			
3:00pm	Visualization in Transportation Committee Meeting (ABJ95) *Board Room* 3:00-5:00pm	Afternoon Break *Great Hall* 3:00pm-3:30pm	
3:30pm		Panel: Virtual Reality/Augmented Reality Vendors and Developers *Auditorium* 3:30pm-5:00pm	
4:00pm			
4:30pm			
5:00pm		Reception *Great Hall* 5:00-7:00pm	
5:30pm			
6:00pm			

Registration, Great Hall, 7:30am-5:00pm (Thursday)

Registration, Great Hall, 7:30 -11:00am (Friday)

Patrons

Gold Level

AutoDesk

WSP

CATT Laboratory

Turner–Fairbank FHWA
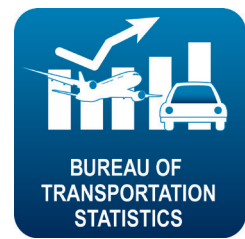
U.S. DOT–BTS

Silver Level

AAA Foundation for Traffice Safety

HP

July 27–28, 2017

In Memorarium: Doug Eberhard

Douglas D. Eberhard
March 24, 1962–February 11, 2017

Doug Eberhard was a pioneer and luminary in the development of digital technologies for the AEC industry. Doug was one of the original founding members of the TRB Task Force on Visualization in Transportation, and an active participant in most of the previous Visualization in Transportation Symposia.

In the late 1980's Doug started a small Denver firm, 4D Imaging, specializing in 3D modeling and animation for the AEC industry. Parsons Brinckerhoff acquired 4D Imaging in 1991, and Doug was a part of PB for 16 years where he helped established many digital delivery best practices used around the world today. Doug left PB in 2007 to join the design software firm Autodesk as an industry evangelist for digital technologies and a leader in development of tools to support 3D model-based design.

Doug was a passionate musician, race-car driver, builder, poet, and father. Doug touched many lives in the visualization community and elsewhere and he will be missed.

An Invitation to Join the Dialogue

8th International Visualization in Transportation Symposium is the place to discover how visualization is revolutionizing the way we deliver solutions to today's transportation challenges. This year, we selected the theme "Visualization in Action." Visualization is no longer a niche approach used only in research environments, but is now entering mainstream use throughout the transportation industry. Today's visualization techniques can reshape the way transportation agencies and companies approach problem solving, make decisions, and communicate with others.

The symposium will explore the opportunities and challenges of visualization in the transportation field while presenting examples of how visualization is transforming the way we work today. From performance management to virtual design and construction, you are sure to discover new and helpful innovations that you can apply to your daily job — whether you are talking to vendors, sharing experiences with colleagues from public and private agencies, or attending one of the many presentations and panels.

Don't miss the 8th International Visualization in Transportation Symposium and the many opportunities to explore Visualization in Action.

—Charles Lattimer
Chair, 2017 Visualization in Transportation Symposium
Atkins North America

Planning Committee

Charles Lattimer, Atkins North America, Chair
EunSu Lee, New Jersey City University School of Business
Bill Buckles, University of North Texas
Praveen Pasumarthy, Cambridge Systematics
Frank Broen, Teach America
Justin Clarke, FHWA
Patricia Hu, Bureau of Transportation Statistics
Michael Pack, CATT Laboratory

TRB Staff

Thomas M. Palmerlee, Associate Division Director
Brittney Gick, Associate Program Officer

July 27–28, 2017

Committee Meetings

Wednesday, July 26, 2017

2:00 p.m.–3:00 p.m.
System Performance Measures Subcommitee, *NAS Members' Room*
Charles Lattimer, Atkins North America, *presiding*

Civil Integrated Management Subcommittee, *NAS 118*
Chuck Hixon, EDGE-Global Technology Solutions; Lance Parve, Wisconsin Department of Transportation, *presiding*

Participatory Simulation Subcommittee, *NAS Board Room*
Jason Williams, Textron Systems Support Solutions, *presiding*

3:00 p.m.–5:00 p.m.
Visualization in Transportation Committee (ABJ95), *NAS Board Room*
Patricia Hu, Bureau of Transportation Statistics; Michael Pack, CATT Laboratory, University of Maryland, *presiding*

Conference Sessions

Thursday, July 27, 2017

7:30 a.m.–5:00 p.m., *Great Hall*
Registration

8:00 a.m.–9:00 a.m., *NAS West Court*
Breakfast

9:00 a.m.–9:45 a.m., *Auditorium*
Opening Session

Workshop Objectives Structure and Report Plans
Charles Lattimer, Atkins North America**,** *Chair*

Keynote Speaker: Telling Compelling Stories with Data
Dona Wong, Federal Reserve Bank of New York

This presentation will demonstrate:

• How to turn data into a compelling, persuasive story
• How to use graphics effectively in your presentations
• The Dos and Don'ts of information graphics — common pitfalls and how to avoid them

9:45 a.m.–10:45 a.m., *Auditorium*
Lightning Talks (1 minute per presentation)

10:45 a.m.–11:15 a.m., *Great Hall*
Morning Break

11:15 a.m.–12:30 p.m.
Session 1A: System Performance Measures/Planning Applications, *NAS 125*
Chris Allen, FHWA**,** *presiding*

This session will look at the role visualization can play in effectively communicating transportation system performance. Presenters will examine system performance from both operational and planning perspectives, showing how visualization tools can generate new insights.

An Interactive Dashboard for MAP-21 System Performance Measures
Scott Perley, Iteris
Technical Tools to Improve Transportation Planning
Zenobia Fields, North Jersey Transportation Planning Authority
GIS-Based Centralized Visualization Tool to Maintain and Operate Local Road Networks
EunSu Lee, New Jersey City University
A Global Perspective on Bike-Sharing Networks and Urban Commuting Patterns
Michael Opperman, University of Vienna

Session 1B: LiDAR and Survey Applications for Visualization, *NAS 120*
Kevin Gilson, WSP, *presiding*

The acquisition of LiDAR point cloud data has become increasingly more common and cost effective for transportation projects. The data can now more easily be converted into accurate 3D model information and provided in real-world coordinate systems to better align with other survey and geospatial data. In this session presenters will cover how this data can be used to support design and planning, capture existing as-built conditions, and support asset assessment and management.

Combined Virtual and Physical 3D Models to Visualize Storm Surge and Sea Level Rise
Ilir Bejleri, University of Florida
Visualizing the Effect of Topography on CV Communications Using LiDAR and Mapping
Leslie Harwood, Virginia Tech Transportation Institute
3D Point Cloud Data Collection and Processing: Pavement Surface Condition Visualization
Ahmad Alhasan, Iowa State University
LiDAR Modeling of Historic River Bridges in London
Kerry Himes, Atkins North America

Session 1C: Freight Data Visualization, *NAS Members' Room*
Ed Strocko, Bureau of Transportation Statistics, *presiding*

In their Beyond Traffic study, the U.S. Department of Transportation projects that freight volume is expected to grow by 45 percent by 2045. This significant increase in freight shipments will present challenges to today's transportation infrastructure. This session will show how visual analytics can highlight trends and promote understanding of our nation's vast freight system and highlight ways to improve efficiency.

Maritime Freight Data
Douglas Scheffler, U.S. Coast Guard
Port Drayage Mobile Applications
Taso Zografos, ZDEVCO - presented by Ed Strocko, BTS
Modeling and Visualizing Changes in Coal Transportation: 2010 to 2016
Ben Blandford, University of Kentucky

12:30 p.m.–1:45 p.m., *NAS West Court*
Lunch

1:45 p.m.–3:00 p.m.
Session 2A: Visualizing Environmental Factors, *NAS 125*
Justin Clarke, FHWA**,** *presiding*

Weather and environmental factors are a constant influence on drivers and on the operation of the highway system. This session will explore how visualization is use to study this interaction and to learn more about how environmental factors influence system performance.

Visualizing the Statewide Impact of Weather on Interstate Traffic Operations
Shuo Wang, Iowa State University

National Transportation Road Map
Justyna Goworowska, BTS; Christopher Roof, Volpe Center
Ontology-Based Visual Exploration of Roadway Asset Data
Tuyen Le, Iowa State University

Session 2B: CIM and 3D Models for Planning, *NAS 120*
Kerry Himes, Atkins North America**,** *presiding*

3D Models and visualization now support transportation projects across the life-cycle. In addition to supporting visual communication for public and stakeholder outreach, 3D modeling now supports project teams with planning, design and construction decision-making. This session, along with the complementary Session 2C, will cover several examples of how visualization can support planning and design, even how 3D models can help UAV operators plan flight missions.

3D Parametric Modeling to Understand the Future Growth of Cities: Simulating 3D Infill
Leilei Duan, University of Florida
Visualization for Decision Support on North Texas Projects
Cameron Schmeits, Center for Transportation Research
Developing Visualized Transportation Models – 3D Linear Method
Alexander Badaoui, TERRA Engineering, LTD

Session 2C: Emerging Technologies/UAV, *NAS Lecture Room*
Mark Yedlin, Greenman-Pedersen, Inc.**,** *presiding*

Technologies, tasks, and tools are rapidly changing transforming the way transportation projects are planned, designed, constructed, maintained, operated and managed. This session focuses on recent trends, emerging tools, and challenges to overcome involving project delivery and visualization, modeling, and reality capture. Topics include advances in UAVs, LiDAR, collaborative data sharing, and interactive visualization.

Emerging Trends and Technologies in Visualization, Modeling and Reality Capture
Chuck Hixon, EDGE GTS; Kevin Gilson, WSP

Latest Advances in UAVs and LiDAR
Qassim Abdullah, Woolpert

Session 2D: System Performance, *NAS Members' Room*
Michael Pack, CATT Laboratory, University of Maryland**,** *presiding*

This session will look at the role visualization can play in transportation operations and system performance. Presenters will focus on visual analytics techniques to understand traffic congestion, bottlenecks, and dynamic traffic analysis.

Visualization Tools for Traffic Bottleneck Analysis
Mark Franz, CATT Laboratory
Highway Corridor Performance Analytics and Visualization
Skylar Knickerbocker, Iowa State University
Dynamic Traffic Analysis for an Agile World
Charles Moran, iSoftStone North America
Increasing Transparency and Accountability through the Use of Dashboards in Virginia
Jay Styles, Virginia Department of Transportation
How Do Your Visualize Performance?
Frank Broen, Teach America

3:00 p.m.–3:30 p.m., *Great Hall*
Afternoon Break

3:30 p.m.–5:00 p.m., *Auditorium*
Panel: Virtual Reality/Augmented Reality Vendors and Developers
Kevin Gilson, WSP, *presiding*

Virtual and augmented reality (VAR) presentations are emerging tools available in the visualization arsenal for transportation agencies and consultants. These tools require a unique approach to 3D modeling and usually require dedicated hardware. This panel of VAR content providers will lead a discussion on different VAR technologies and the particular challenges and opportunities with these types of presentations

- James Wedding, Autodesk
- Sean Young, HP
- Robert McLeod, Neoscape
- Chuck Hixon, EDGE Global Technology Solutions

5:00 p.m.–7:00 p.m., *Great Hall*
Exhibitor Reception

2017 Visualization Symposium

7:15 a.m.–11:00 a.m., *Great Hall*
Registration

7:15 a.m.–8:15 a.m., *NAS West Court*
Breakfast

8:15 a.m.–9:30 a.m.
Session 3A: Visualizing Traffic Operations, *NAS 125*
Michael Schade, University of Maryland**,** *presiding*

Visual analytics can provide a powerful method for monitoring traffic opertions, both in real-time and in after action analysis. This session will demonstrate ways visualization can be used to improve work zone performance, traffic management centers, and other traffic operations activities.

Data Driven Work Zone Performance Monitoring System
Skylar Knickerbocker, Iowa State University
Visualization of Real–Time Work Zone Performance
Michael Pack, CATT Laboratory
Rapid Visual Interactive Incident After Action Reviews for Operations
Michael Pack, CATT Laboratory
Visualizing Mobility and Reliability Performance in Iowa
Skylar Knickerbocker, Iowa State University

Session 3B: CIM and 3D Models for Design and Construction, *NAS 120*
Carl Springer, DKS Associates, *presiding*

Civil Integrated Management (CIM) and 3D Engineered Model processes are being adopted and implemented by DOT's and the FHWA at a rapid pace. The FHWA is promoting CIM and 3D Engineered Models through the Every Day Counts (EDC) initiatives and workshops. These tools and processes include challenges and opportunities from both a technological and a cultural/ process perspective. Presenters in these sessions will cover some of these challenges and opportunities from the perspective of State and Federal Agencies.

The Use of Visualization Tools in the 3-D Engineering Project Design Process and its Contributions to the Agency's Civil Integrated Management Development
Steven Olmsted, Arizona Department of Transportation
3D Visualization Tools (ConceptStation and LumenRT) for Roadway Design and Planning
Jennifer Steen, WSP
Design Visualization and Public Involvement
James Talley, Federal Highway Administration

Session 3C: Interactive Poster Session, *NAS East Court*

The presenters below will have their interactive research on display with their laptops, tablets, and large-screen monitors. Attendees are encouraged interact with the presenters, explore their research, software, and systems, and engage in discussions with other symposium attendees

Pocket Guide to Transportation Mobile App
Sonya Smith-Pickel, Bureau of Transportation Statistics

Games: An Interactive Visualization Method for Transportation Engineering Education
Qichao Wang, Virginia Tech

Know Texas Transit Districts with Just a Few Clicks–The Power of Data Visualization
Shuman Tan, Texas A&M Transportation Institute

Flight Delays and Cancellations: What's Behind the Numbers?
Ali Rahim, Upper Great Plains Transportation Institute

Harnessing FARS Data to Uncover the Rise in Traffic Fatalities
Danny Langley, Jesse Purdue, Von Mondevergine, Qlik

July 27–28, 2017

9:30 a.m.–10:00 a.m., *Great Hall*
Morning Break

10:00 a.m.–11:00 a.m., *Auditorium*
Journalist Panel Discussion
Charles Lattimer, Atkins North America**,** *presiding*

Good visualization is especially effective when it becomes part of a narrative—a tool that helps us tell the story of the world around us. This panel discussion will feature journalists who are using visualizations to illuminate complex topics in the larger world. Their insights will give us a fresh perspective on how we can use visualization to effectively communicate transportation issues to the people around us.

   Tim Meko, The Washington Post
   Lazaro Gamio, Axios
   Meredith Broussard, NYU Arthur L. Carter Journalism Institute

11:15 a.m.–12:30 p.m.
Session 4A: Visualizing Safety, *NAS 125*
David Yang, AAA Foundation for Traffic Safety, *presiding*

With over 35,000 fatalities occurring on the Nation's highways each year, roadway safety remains one of the most challenging issues facing America. This session focuses on visual strategies, tools, and evaluation methodologies that aim to make roads safer.

Visual Analytics Platform to Quantify the Operational/Societal Impact of Vehicle Crashes
Wei Zhang, U.S. Department of Transportation
Temporal Event Analytics with EventFlow: a Case Study of the Response to Fatal Incidents
Michael VanDaniker, University of Maryland, Jason Dicembre, Maryland Department of Transportation
Visualizing Accident 'Hot Spots' Using MTA's Accident Mapping System
Leo Fothergill, Maryland Transit Administration; Woon Kim, AAA Foundation for Traffic Safety

Session 4B: Virtual Reality, Augmented Reality, and Simulation, *NAS 120*
Michael Schade, University of Maryland, *presiding*

Gaming techniques, real-time applications and innovative new display technologies have made virtual and augmented reality tools more accessible and much more cost effective for transportation projects. Low-cost simulators can be created from 'off-the-shelf' components. These tools provide immersive, participatory experiences and allow users to better assess their surroundings and make informed decisions about the simulated environment. These sessions will cover several approaches to representing projects with real-time virtual and augmented reality tools.

Development of a Mobile Visualization Laboratory to Evaluate Signing
Nicholas Kehoe, Toxcel, LLC
Virtual-Reality / Augmented-Reality Applications for Transportation
Kevin Gilson, WSP
Visualization in Decision Support: Experiencing Complete Streets in Virtual Reality
Mark Yedlin, Greenman-Pedersen, Inc.
Visualizing Waikiki "Integrating GIS into Driving Simulation Scenarios"
Jason Williams, Textron Systems Support Solutions

Session 4C: Visual Analytics, *NAS Members' Room*
EunSu Le, New Jersey University School of Business**,** *presiding*

Presenters in this session will discuss innovative visualization tools and methods which can be used to address the transportation challenges of today.

Implementing Data Quality Assurance with Visualization Tools
Tingting Huang, Iowa State University
Processing and Visualizing Instrumented Vehicle Data Using Open Source Tools
Marcelo Simas, Westat

July 27–28, 2017

Interactive Visualizations of MAP-21 Performance Measures: Multi-State Comparisons and Analytics
Michael Pack, CATT Lab, University of Maryland
Developing an Open-Source, Survey-Specific Visualization Toolkit Using the 2016 National Household Travel Survey
Anthony Fucci, Westat

Session 4D: Data Exploration, *NAS Lecture Room*
Bill Buckles, University of North Texas**,** *presiding*

Visual analytics provide a unique ability to explore large, complex data sets and discover interesting patterns and insights. This session will feature presenter who are using visual analytics to make new discoveries in the world of transportation around us.

From Infographics to Dashboards, FHWA's Data Visualization Center in Action
Brittany Gernhard, Anna Batista, High Street Consulting
Visual Exploration of GPS Traces
Zachary Vander Laan, University of Maryland
Visualization and Analysis Tool for Probe Vehicle-Based Origin-Destination Data
Mark Franz, CATT Lab, University of Maryland
SHRP 2 Roadway Information (RID) Exploration Tool
Skylar Knickerbocker, Iowa State University

12:30 p.m.–1:30 p.m., *NAS 118*
Planning Committee Debriefing (Members Only)

U.S. Department of Transportation
Federal Highway Administration
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, VA 22101

TRB
8th International Visualization in Transportation Symposium: Visualization in Action

Wednesday, July 26, 2017
9:00 AM – 12:15 PM
Room T-104/105

9:00–10:05 AM
Welcome Overview

10:15–1:40 AM
Laboratory Tour

11:45–12:15 PM
Closing Remarks/Q&As

July 27–28, 2017

TRB 97th Annual Meeting

January 7-11, 2018
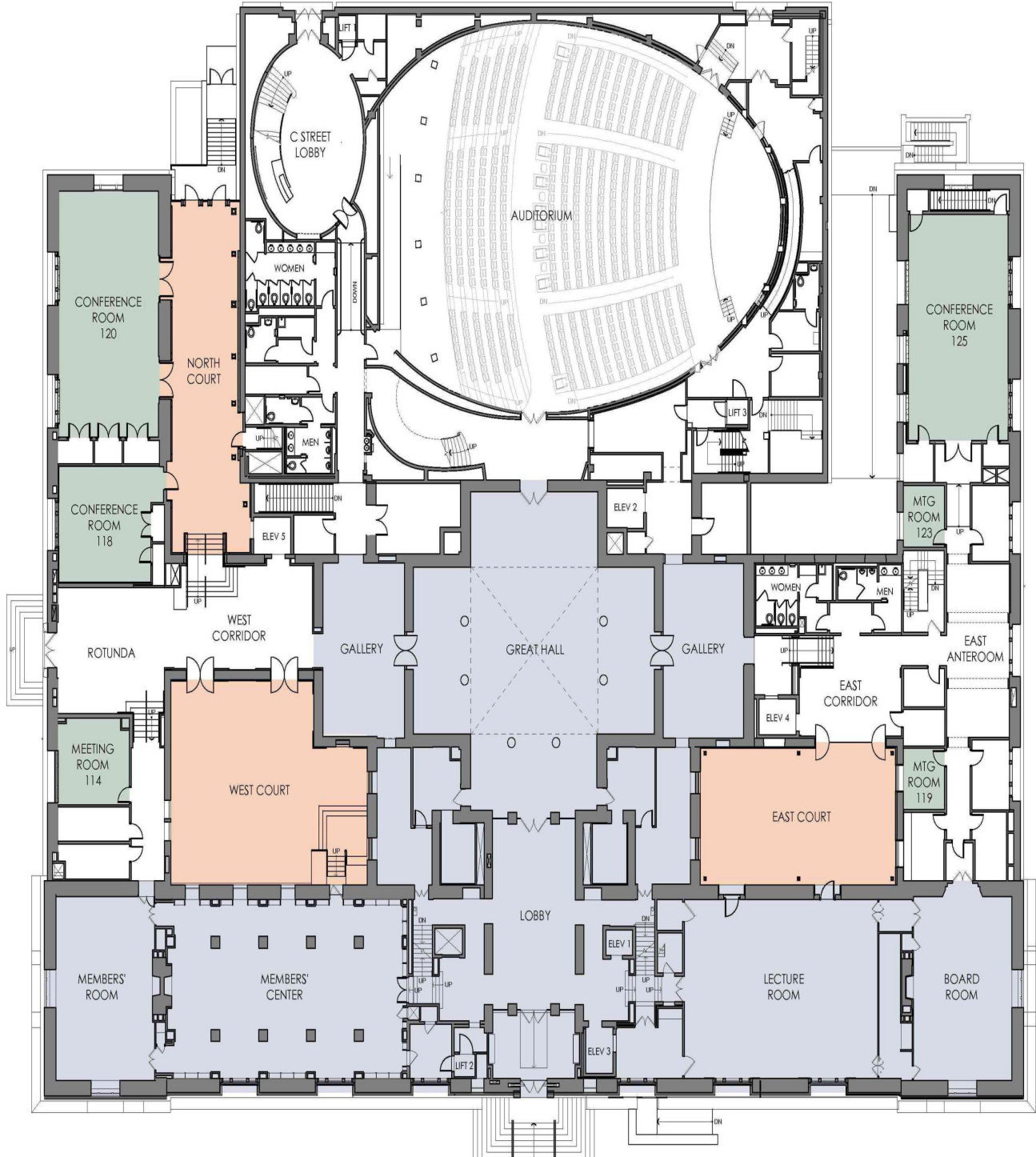
**Walter E. Washington Convention Center
Washington, DC**

12th National Conference on Transportation Asset Management

July 15-17, 2018

**Westin San Diego
San Diego, CA**

National Academy of Sciences Building
First Floor

The National Academies of
SCIENCES · ENGINEERING · MEDICINE

The nation turns to the National Academies
of Sciences, Engineering, and Medicine for
independent, objective advice on issues that
affect people's lives worldwide.
www.national-academies.org

The National Academies of
SCIENCES · ENGINEERING · MEDICINE

TRB
TRANSPORTATION RESEARCH BOARD

500 Fifth Street, NW
Washington, DC 20001
www.TRB.org