



## NATMEC

# Improving Traffic Data Collection, Analysis, and Use

*Held in Conjunction with the 6th International Conference on Weigh-in-Motion (ICWIM6)*

June 4–7, 2012

The Fairmont Dallas  
Dallas, Texas

*Organized by*

Transportation Research Board

*Supported by*

Federal Highway Administration  
Office of Highway Policy Information

*Hosted by*

Texas Department of Transportation

*Cosponsored by*

American Association of State Highway and Transportation Officials  
North Central Texas Council of Governments

[www.NATMEC.org](http://www.NATMEC.org)  
<http://iswim.free.fr>

# CONFERENCE AT A GLANCE

	Monday, June 4	Tuesday, June 5	Wednesday, June 6	Thursday, June 7
7:00 a.m.		TRB WIM Sub-committee	TRB ADUS Sub-committee	Pooled Fund Loop & Length
8:00 a.m.	ISWIM* Board Meeting			
9:00 a.m.		Plenary Session	Breakout Sessions No. 4	Breakout Sessions No. 8
10:00 a.m.	ICWIM6 Session 1A	Breakout Sessions No. 1	Breakout Sessions No. 5	Closing Session
11:00 a.m.		ICWIM6 Session 3A	ICWIM6 Session 4B ICWIM6 Panel Discussion 1	
Noon	Long Distance Passenger Travel O-D Panel	Lunch In Exhibit Hall	Lunch In Exhibit Hall	Planning Team Meeting
1:00 p.m.			TRB Bike & Ped Sub-committee	
2:00 p.m.	ICWIM6 Session 1B	Breakout Sessions No. 2	Breakout Sessions No. 6	Tour de NATMEC Bike Ride
3:00 p.m.		ICWIM6 Poster Session ICWIM6 Session 3B	ICWIM6 Session 5A	
4:00 p.m.	ICWIM6 Session 2	Breakout Sessions No. 3	Breakout Sessions No. 7	
5:00 p.m.			ICWIM6 Panel Discussion 2	
6:00 p.m.	Opening Reception for Exhibits and Posters		ISWIM General Assembly	
7:00 p.m.			TAC LTPP Pooled-Fund Study	
8:00 p.m.		Conference Dinner Hosted by ICWIM6 **		

Note:   = TRB committees;   = TRB subcommittees;   = ISWIM meetings and sessions;   = panels;   = opening, closing, and breakout sessions;   = exhibits and posters.

\*Restricted to invited members.

\*\*Open to all registered attendees. Tickets for sale on site (ICWIM6 registration deck) until 4:00 p.m. Monday.

June 4-7, 2012



## TRB Conference Planning Committee

Catherine McGhee, Associate Director, Virginia Center for Transportation Innovation and Research, *Chair*  
Yinhai Wang, Professor, University of Washington, *Vice-Chair*  
Natalie Bettger, Senior Program Manager, North Central Texas Council of Governments  
Bernard Jacob, Deputy Scientific Director for Transports, Infrastructures and Safety; Institut Français des Sciences et Technologies pour les Transports, l'Aménagement et les Réseaux  
Daniel Jenkins, Transportation Specialist, Federal Highway Administration  
Steven Jessberger, Transportation Specialist, Federal Highway Administration  
William Knowles, Traffic Analysis Engineer, Texas Department of Transportation  
Anne-Marie McDonnell, Transportation Engineer, Connecticut Department of Transportation  
Dan Middleton, Program Manager, Texas Transportation Institute  
Chade Saghir, Senior Transportation Planner, Southeast Michigan Council of Governments  
Eileen Singleton, Senior Transportation Engineer, Baltimore Metropolitan Council  
Elizabeth Stolz, Business Development Manager, Chaparral Systems Corporation  
Benjamin Timerson, Weight Data and Engineering Coordinator, Minnesota Department of Transportation

### *TRB Staff*

Thomas M. Palmerlee, Associate Division Director  
Matthew A. Miller, Senior Program Associate

## ICWIM6 Conference Organizing Committee

Anne-Marie McDonnell, Connecticut Department of Transportation, United States, *Chair*  
Mark Gardner, Applied Pavement Technology, Inc., United States  
Bernard Jacob, IFSTTAR, France  
David Jones, FHWA, United States  
Tom Kearney, FHWA, United States

Eugene O'Brien, UCD, Ireland  
Lily Poulidakos, EMPA, Switzerland  
Franziska Schmidt, IFSTTAR, France  
Deborah Walker, FHWA, United States

### *TRB Staff*

Thomas M. Palmerlee, Associate Division Director  
Matthew A. Miller, Senior Program Associate

## International WIM Scientific Committee

Bernard Jacob, IFSTTAR, France, *Chair*  
Anne-Marie McDonnell, Connecticut Department of Transportation, United States, *Vice-Chair*  
Eugene O'Brien, UCD, Ireland, *Vice-Chair*  
Chia-Pei Chou, NTU, Taiwan (ROC)  
Wiley Cunagin, PBS&J, United States  
Morris De Beer, CSIR, South Africa  
John De Pont, TERNZ, New Zealand  
Victor Dolcemasclo, MEDDTL/DGITM, France  
Mark Gardner, Applied Pavement Technology, Inc., United States  
Ralph Gillmann, FHWA, United States  
Jerry Hajek, RRI, Canada

Tom Kearney, FHWA, United States  
Chulwoo Kim, Kyoto University, Japan  
Chris Koniditsiotis, TCA, Australia  
Jesus Leal, CEDEX, Spain  
Hans van Loo, DWW/AVV, The Netherlands  
Ralph Meschede, BAST, Germany  
Marcio Paiva, FUSC, Brazil  
Lily Poulidakos, EMPA, Switzerland  
Aleš Žnidaric, ZAG, Slovenia

### *With the participation of*

Sio-Song Leng and Franziska Schmidt, IFSTTAR, France

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## ICWIM WELCOME

The International Conference on Weigh-In-Motion (ICWIM) returns to North America to join with NATMEC 2012, North American Travel Monitoring Exhibition and Conference. The Transportation Research Board (TRB), in charge of NATMEC, has brought strong support to the International Society for Weigh-In-Motion (ISWIM) to join the efforts of the two organizing committees in preparing for a successful event.

For the field of travel monitoring in the United States, NATMEC is the premier forum. It began with a focus on weigh-in-motion (WIM) and has continued to bring together the WIM community for more than 40 years. The 2012 theme, Improving Traffic Data Collection, Analysis, and Use, frames the shared conferences' goals. Bringing together the international WIM community with NATMEC provides an excellent opportunity for assessing state of the practice, identifying future research needs, and strengthening the WIM community for future progress.

This conference promises to be more successful than ever, with almost 70 abstracts submitted and reviewed by the International scientific committee, and 50 papers accepted from 20 countries. The conference is organised into six oral sessions, one poster session, and two panel discussions. All sessions are open to registered delegates to the ICWIM6 or NATMEC2012 conferences and will cover a variety of topics including the following:

1. WIM algorithms, technology, and testing;
2. WIM for enforcement;
3. WIM standard, calibration, data quality, and management;
4. WIM implementation, ITS, traffic monitoring, safety, and environment;
5. Application of WIM to bridges; and
6. Application of WIM to pavements.

An industry exhibition has been organized by NATMEC to facilitate the meeting of delegates with manufacturers and users of traffic data and monitoring systems, WIM, and related technologies. The conference is supported by International organizations such as the OECD/JTRC (Joint Transport Research Centre) and the Forum of European Highway Research Laboratories, the U.S. Federal Highway Administration, and the Transportation Research Board of the National Academies. We greatly appreciate the major sponsors of the conference: International Road Dynamics, TDC Systems, Traffic Data Systems, Kistler and Indra Esteio Sistemas, and Sterela (the regular sponsor) for their support.

We welcome all delegates to Dallas and to the 6th International Conference on Weigh-In-Motion.

—Anne-Marie McDonnell, Connecticut Department of Transportation, United States; and  
—Bernard Jacob, IFSTTAR, France  
*International Conference Cochairs*



*McDonnell*



*Jacob*



## WELCOME

**W**elcome to Dallas, Texas, and NATMEC 2012! Over the next few days, you will have the opportunity to hear the latest developments in traffic data collection, management, analysis, and use from your peers across the country and around the world. We are excited to be collaborating with ICWIM this year, bringing focused attention to WIM data collection and management as well as valuable international participation to the conference. We are also excited to include a session in our agenda highlighting international experiences in traffic data.

As always, our exhibit hall will be full of vendors with the latest in technology and solutions for your traffic data programs. Be sure to spend time visiting with them, learning about their innovations, and providing feedback to them (that's how innovation happens!). The exhibit hall is also the site of our poster sessions on Tuesday and Wednesday, so plan on spending time there as well.

Although we have developed a strong technical program, we also recognize that your participation is what will make it truly meaningful. I encourage you to be active participants in the technical sessions—ask questions, provide examples from your own experiences that others can learn from, suggest topics that need further research or development. We'll be listening and compiling your comments into a list of future actions that can be carried from the conference to be built upon in the coming year.

Thank you again for bringing your interest and enthusiasm to NATMEC 2012. I look forward to visiting with you in the exhibit hall, listening to your comments and questions in the technical sessions, and perhaps exploring Dallas with you on a bike!

—Cathy McGhee, P.E.

*Virginia Center for Transportation Innovation and Research  
Planning Committee Chair*



McGhee

### 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)

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## TRB COMMITTEE MEETINGS

All conference attendees are encouraged to attend the TRB committee and subcommittee meetings. The committees are communities of interest that identify research needs; stimulate needed research; facilitate the adoption of appropriate research findings into practice; and provide a mechanism for mutual exchange of information on social, economic, and technological developments.

### Monday, June 4

11:00 a.m.–1:30 p.m.

**TRB Information Systems and Technology Committee (ABJ50)**

Frances D. Harrison, Spy Pond Partners, Inc., *presiding*

1:00 p.m.–3:00 p.m.

**TRB Highway Traffic Monitoring Committee (ABJ35)**

Peter Keen, Digital Traffic Systems, Inc., *presiding*

3:30 p.m.–5:30 p.m.

**TRB Urban Transportation Data and Information Systems Committee (ABJ30)**

Catherine T. Lawson, State University of New York, Albany, *presiding*

### Tuesday, June 5

7:15 a.m.–8:15 a.m.

**TRB Weigh-in-Motion Subcommittee, [ABJ35(2)]**

Anne-Marie H. McDonnell, Connecticut Department of Transportation, *presiding*

12:15 p.m.–1:45 p.m.

**TRB Statewide Transportation Data and Information Systems Committee (ABJ20)**

Jack Stickel, Alaska Department of Transportation and Public Facilities, *presiding*

### Wednesday, June 6

7:15 a.m.–8:15 a.m.

**TRB ADUS Joint Subcommittee [ABJ35(1)]**

Kristin A. Tufte, Portland State University, *presiding*

12:15 p.m.–1:45 p.m.

**TRB Bicycle and Pedestrian Data Joint Subcommittee [ABJ35(3)]**

Elizabeth Stolz, Chaparral Systems Corporation, *presiding*



## OTHER MEETINGS

### Monday, June 4

7:00 a.m.–1:00 p.m.

**Traffic Monitoring Guide Update Panel** (by invitation)

8:00 a.m.–9:30 a.m.

**ISWIM Board Meeting** (by invitation)

8:00 a.m.–5:30 p.m.

**Long-Distance Passenger Travel Origin–Destination Panel** (by invitation)

### Tuesday, June 5

6:30 p.m.–8:30 p.m.

**ICWIM6 Conference Dinner** (advance tickets only)

### Wednesday, June 6

7:00 p.m.–8:00 p.m.

**TAC Meeting for LTPP SPS Traffic Data Collection Pooled-Fund Study** (by invitation)

### Thursday, June 7

7:15 a.m.–8:15 a.m.

**Loop- and Length-Based Classification Pooled-Fund Meeting** (by invitation)

12:30 p.m.–2:00 p.m.

**NATMEC Planning Committee** (by invitation)

Catherine McGhee, Virginia Center for Transportation Innovation and Research, *presiding*

12:30 p.m.–2:00 p.m.

**ISWIM Board Meeting** (by invitation)

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## CONFERENCE SESSIONS

### Monday, June 4

7:00 a.m.–12:30 p.m., *Oak*

**Traffic Monitoring Guide Update Panel** (by invitation)

7:30 a.m.–5:30 p.m., *Regency Ballroom Foyer*

**Registration Opens**

8:00 a.m.–9:30 a.m., *Pyramid Restaurant PDR*

**ISWIM Board Meeting** (by invitation)

10:00 a.m.–noon, *Gold Room*

#### **ICWIM6 Session 1A: WIM Algorithms, Technology, and Testing**

Anne-Marie McDonnell, Connecticut Department of Transportation; and Jesus Leal, CEDEX, *presiding*

##### **An Experimental Wireless Accelerometer–Based Sensor System for Applications to WIM and Vehicle Classification**

Pravin Varaiya, University of California, Berkeley

##### **Hidden Markov Modeling for Weigh-In-Motion Estimation**

Robert Abercrombie, Oak Ridge National Laboratory, Oak Ridge, Tennessee

##### **Automatic Vehicle Classification for WIM Systems**

Piotr Burnos, AGH University of Science and Technology, Cracow, Poland

##### **Experimental Bridge WIM System in France and Applications to Bridge Monitoring and Overload Screening**

Franziska Schmidt, IFSTTAR, France

##### **Analysis of B-WIM Signals by Statistical Tools**

Leng Sio-Song, IFSTTAR, France

11:00 a.m.–1:30 p.m., *Continental*

#### **TRB Information Systems and Technology Committee (ABJ50)**

Frances D. Harrison, Spy Pond Partners, Inc., *presiding*

Noon–1:30 p.m., *Parisian*

**ICWIM6 Lunch**

1:30 p.m.–3:30 p.m., *Gold Room*

#### **ICWIM6 Session 1B: WIM Algorithms, Technology, and Testing**

Bernard Jacob, IFFSTAR; and Jesus Leal, CEDEX, *presiding*

##### **Bridge Weigh-In-Motion by Strain Measurement of Transverse Stiffeners**

Eiki Yamaguchi, Kyushu Institute of Technology, Japan

##### **Field Verification of a Filtered, Measured Moment Strain Approach to the Bridge Weigh-in-Motion Algorithm**

Nasim Uddin, University of Alabama at Birmingham

Monday, June 4, 2012





### **Strategies for Axle Detection in Bridge Weigh-in-Motion Systems**

Susan Taylor, Queen's University of Belfast, Ireland

### **Using Strips to Mitigate the Multiple-Presence Problem of BWIM Systems**

Ales Znidaric, Slovenian National Building and Civil Engineering Institute, Slovenia

### **Experimental Testing of a Multiple-Sensor Bridge Weigh-In-Motion Algorithm in an Integral Bridge**

Eugene O'Brien, UCD, Ireland

1:00 p.m.–3:00 p.m., *Oak*

#### **TRB Highway Traffic Monitoring Committee (ABJ35)**

Peter Keen, Digital Traffic Systems, Inc., *presiding*

3:30 p.m.–5:30 p.m., *Oak*

#### **TRB Urban Transportation Data and Information Systems Committee (ABJ30)**

Catherine T. Lawson, State University of New York, Albany, *presiding*

4:00 p.m.–5:30 p.m., *Gold Room*

#### **ICWIM6 Session 2: WIM for Enforcement**

Chia-Pei Chou, National Taiwan University; and Victor Dolcemascolo, Ministry of Transport, France, *presiding*

##### **WIM Systems in Chile: A Successful Experience**

Raul Diaz, Highway Administration, Chile

##### **ANPR-MMR and WIM for Detection of Overloaded Vehicles**

Janusz Wrobel, Neurosoft Sp. z o.o., Wroclaw, Poland

##### **One-Year Experience with Use of Certified HS-WIM Systems Intended for Direct Enforcement in the Czech Republic**

Emil Doupal, RTS GmbH, Switzerland

##### **Integration of WIM technology into National Institute of Standards and Technology's Handbook 44, 2012 Edition**

Dan Middleton, Texas Transportation Institute, College Station

5:30 p.m.–7:30 p.m., *Regency Ballroom*

**Opening Reception with Posters and Exhibits** (see page 27 for exhibitor information)

#### **NATMEC Poster Presentations**

##### **1. Public Versus Private: The Future of Data Collection for the San Francisco Bay Area 511 System**

Janet Banner, Metropolitan Transportation Commission

##### **2. Using Video Detection for Traffic Field Data Collection**

John Cukjati, Kansas Department of Transportation

##### **3. Weigh-In-Motion: A Practical Usage**

Douglas Deckert, Washington State Department of Transportation Dynamic, Real-Time Congestion

##### **4. Deploying Intelligent Transportation Systems to Reduce Greenhouse Gas Emissions**

Randy Hanson, International Road Dynamics, Inc., Canada

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**5. Length-Based Vehicle Classification**

Erik Minge, SRF Consulting Group, Inc.

**6. A Framework for Multimodal Arterial Data Archiving**

Christopher M. Monsere, Portland State University

**7. Generalizing FHWA's Ramp Counting Procedure for Arbitrary Network Topologies: Some Examples of How to Count More with Less**

Manwo Ng, Old Dominion University

**8. Validating the Consistent Count Accuracy of Wireless Magnetometers for Data Collection**

Ricky Parker, Sensys Networks, Inc.

**9. Comparison Testing of Video, Surface-Mounted Magnetic Sensors, and Tube Data Collectors**

Art Penn and Bruce Strake, Gewalt Hamilton Associates, Inc.

**10. Integrating Open Source TMC Software with an Archive Data Management System**

Karl Petty and Michael Darter, Iteris, Inc.

**11. Anonymous Wireless Address Matching for Travel Time Data Collection**

Darryl Puckett, Texas Transportation Institute, College Station

**12. Evaluating Oregon's Innovative ITS Grant Program**

Shaun Quayle, Kittelson & Associates, Inc.

**13. Clustering of Vehicle Classification Data to Support Regional Implementation of the Mechanistic-Empirical Pavement Design Guide**

Jonathan D. Regehr, University of Manitoba, Canada

**14. Detection Using In-Vehicle GPS Sensors**

Steve Herskovitz, SQLstream

**15. Using GPS Data to Estimate Pavement Damage and Fuel Consumption**

Jose Antonio Romero, Universidad Autonoma de Queretaro, Mexico

**16. Methodology for Calculating VMT Using the SEMCOG's Regional Traffic Count Database in Conjunction with the Travel-Demand Forecast Model**

Chade Saghir, Southeast Michigan Council of Governments

**17. Using WIM Data and Reports to Increase the Effectiveness of Weight Enforcement at a Fracture-Critical Bridge**

Benjamin Timerson, Minnesota Department of Transportation

**18. Wavetronix in Minnesota**

Chu Wei, Minnesota DOT

**19. Adapting Technology for Gains in Efficiency**

Lawrence Whiteside, Michigan Department of Transportation

**ICWIM6 Poster Presentations**

**20. Designing WIM Data Aggregating Systems**

Victor Dolcemasclo, Ministry of Transport, France



**21. Checking WIM Axle-Spacing Measurements**

Gerhard de Wet, BKS (Pty) Ltd., Pretoria, South Africa

**22. Appraisal of Mass Differences Among Individual Tires, Axles, and Axle Groups of a Selection of Heavy Vehicles in South Africa**

Morris de Beer, CSIR Built Environment, South Africa

**23. WIM System Approved for Direct Enforcement**

Otto Fucik, CAMEA; and Emil Doupal, RTS Consulting

**24. Traffic-1: User-Tailored Measuring System for Road Traffic Parameters**

Janusz Gajda, AGH University of Science and Technology, Cracow, Poland

**25. Applications from a Centralized System of WIM**

Antoine Jaureguiberry and Benoit Geroudet, STERELA, France

**26. Assessing Validity of Classification Data**

David Jones, FHWA

**27. Statistical Study of MS-WIM Data Acquired in Maulan Experimental Site**

Eric Klein, CETE de l'Est, France

**28. Assessment of Weigh-in-Motion Systems: A Nationwide Survey**

Athanassios Papagiannakis, University of Texas at San Antonio

**29. Early Experience with a Commercial BWIM System for Enforcement**

Nasim Uddin, University of Alabama Birmingham

**30. WIM in Brazil**

Helio Goltsman, Consultant, Brazil

7:00 p.m.–10:00 p.m., *Continental*

**Data Section Executive Board Meeting** (by invitation)



## Tuesday, June 5

7:15 a.m.–8:15 a.m., *Continental*

**TRB Weigh-in-Motion Subcommittee, ABJ35(2)** (all Conference participants welcome)  
Anne-Marie H. McDonnell, Connecticut Department of Transportation, *presiding*

7:30 a.m.–8:30 a.m., *Regency Ballroom Foyer*

### Breakfast

8:30 a.m.–10:00 a.m., *Gold Room*

### Opening Session

Catherine McGhee, Virginia Center for Transportation Innovation and Research, *presiding*

#### Welcome and Conference Objectives

Catherine McGhee, Virginia Center for Transportation Innovation and Research

#### ICWIM6

Bernard A Jacob, French Institute of Sciences and Technologies for Transportation, Development, and Networks; and Anne-Marie H. McDonnell, Connecticut Department of Transportation

#### Join the Team and Work Better Together to Deliver

David Winter, Federal Highway Administration

#### Improving MPO Decisions with Better Traffic Data

Michael R. Morris, North Central Texas Council of Governments

#### The Importance of Quality Traffic Data Within Texas DOT

Marc Williams, Texas Department of Transportation

10:00 a.m.–10:30 a.m., *Regency Ballroom*

### Morning Break

10:00 a.m.–4:00 p.m., *Regency Ballroom*

### NATMEC Exhibits and Poster Session

Authors will be in attendance during breaks and lunch. For a complete listing of the poster presentations in this session, please view the listing in the Opening Reception with Exhibits and Posters.

10:30 a.m.–noon, *Oak*

### ICWIM6 Session 3A: WIM Standard, Calibration, Data Quality, and Management Section

David Jones, FHWA; and Marcio Paiva, UFSC, Brazil, *presiding*

#### Standardization of Weigh-In-Motion in Europe

Bernard Jacob, IFSTTAR, France

#### Testing and Certification of WIM Systems

David Cornu, Kistler Instrumente AG, Switzerland; and Christian Wuethrich, METAS, Switzerland

#### Modern Calibration and Verification Techniques of WIM Data

Rob Sik, Mikros Systems, South Africa

#### Enhanced Auto-Calibration of WIM Systems

Piotr Burnos, AGH University of Science and Technology, Cracow, Poland



10:30 a.m.–noon, *Far East*

**Section 1201: Meeting Federal Requirements AND Leveraging Resources**

James S. Pol, U.S. DOT Intelligent Transportation Systems Joint Program Office, *presiding*

Section 1201 of SAFETEA-LU requires all states to establish a real-time information management system. As states strive to meet the requirements of Section 1201, they are also finding ways to integrate the data into their processes and procedures. Hear how others have used this federal requirement to enhance existing processes.

**Real-Time System Management Information Programs: Making Them Work to Your Advantage**

Jack R. Stickel, Alaska Department of Transportation and Public Facilities

**Real-Time Traffic Monitoring System**

Hazem H. Refai, University of Oklahoma

**The “Perfect World”: Measuring Congestion and Reliability for Performance Management**

Richard V. Taylor, Federal Highway Administration

10:30 a.m.–noon, *Gold Room*

**Data for Decision Making**

Reginald R. Souleyrette, University of Kentucky, *presiding*

The complexity of transportation decisions facing state, regional, and local agencies is growing as both demands and constraints on transportation systems expand. Busy decision makers rely on their support teams to provide concise and timely answers to tough questions on the basis of available data. In this session, participants of a recent TRB conference on critical data needs for decision making discuss key findings and implications for future collection and presentation of travel information.

**Wakeup Call or Business as Usual?**

Ed Christopher, Federal Highway Administration

**FHWA Data Programs in a Time of Change**

Tianjia Tang, Federal Highway Administration

**Paradigm Shifts for Data Capture and Integration**

Peter Keen, Digital Traffic Systems, Inc.

**Delivering Data for Decision Making: Plotting the Future**

Frances D. Harrison, Spy Pond Partners

10:30 a.m.–noon, *Parisian*

**Freight Data: An Untapped Resource**

Chade Saghir, Southeast Michigan Council of Governments; and Mark E. Hallenbeck, University of Washington, *presiding*

A considerable amount of effort has been expended to define and evaluate freight movement on U.S. roadways. This information, when combined with more traditional traffic flow data, could provide a more robust picture of our transportation system. Unfortunately, these data sets are not linked in any way in most areas. This session explores the potential for creating these linkages and the benefits that could result.

**Compiling Aggregate Freight Flows and Origin–Destination Information Using GPS Data**

Jeffrey Bradford Short, American Transportation Research Institute

**Advances in Freight Probe Data in Support of National Transportation System Performance Management**

Tom Kearney, Federal Highway Administration

Tuesday, June 5, 2012



**Linking Travel Monitoring and Goods Movement Planning at Delaware Valley Regional Planning Commission**

Scott Brady, Delaware Valley Regional Planning Commission

**Connecting Freight Data and Traditional Traffic Data Programs**

Mark E. Hallenbeck, University of Washington

Noon–1:30 p.m., *Regency Ballroom*

**Lunch**

12:15 p.m.–1:45 p.m., *Continental*

**TRB Statewide Transportation Data and Information Systems Committee (ABJ20)**

Jack Stickle, Alaska Department of Transportation and Public Facilities, *presiding*

1:30 p.m.–2:45 p.m., *Regency Ballroom*

**ICWIM6 Poster Session**

*These posters will be on display throughout the conference, with authors in attendance at breaks, lunch, and the designated 1:30 p.m.–2:45 p.m. time.*

**Designing WIM Data Aggregating Systems**

Victor Dolcemascolo, Ministry of Transport, France

**Checking WIM Axle-Spacing Measurements**

Gerhard de Wet, BKS (Pty) Ltd., Pretoria, South Africa

**An Appraisal of Mass Differences Among Individual Tires, Axles, and Axle Groups of a Selection of Heavy Vehicles in South Africa**

Morris de Beer, CSIR Built Environment, South Africa

**WIM System Approved for Direct Enforcement**

Otto Fucik, CAMEA; and Emil Doupal, RTS Consulting

**Traffic-1: User-Tailored Measuring System for Road Traffic Parameters**

Janusz Gajda, AGH University of Science and Technology, Cracow, Poland

**Applications from a Centralized System of WIM**

Antoine Jaureguiberry and Benoit Geroudet, STERELA, France

**Assessing Validity of Classification Data**

David Jones, FHWA

**Statistical Study of MS-WIM Data Acquired in Maulan Experimental Site**

Eric Klein, CETE de l'Est, France

**Assessment of Weigh-in-Motion (WIM) Systems: A Nationwide Survey**

Athanasios Papagiannakis, University of Texas San Antonio, Texas

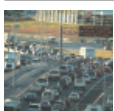
**Early Experience with a Commercial BWIM System for Enforcement**

Nasim Uddin, University of Alabama Birmingham

**WIM in Brazil**

Helio Goltsman, Consultant, Brazil

Tuesday, June 5, 2012



2:00 p.m.–3:30 p.m., *Gold Room*

**Motorcycle Data Collection**

David W. Gardner, Ohio Department of Transportation, *presiding*

Motorcycle detection has become more important with the FHWA requirement to include them in HPMS reporting. This session provides information on promising cutting edge technologies and an ongoing NCHRP research project on motorcycle detection that looks at both technologies and methods to locate data collection sites.

**Improving the Quality of Motorcycle Travel Data Collection**

Dan Middleton, Texas Transportation Institute

**Accurate Vehicle Classification Including Motorcycles Using Mezeoelectric Sensors**

Hazem H. Refai, University of Oklahoma

**Stand-Alone Motorcycle Detection and Counting System Using Microphone Array, Stereo, and Infrared Cameras**

Bo Ling, Migma Systems, Inc.

2:00 p.m.–3:30 p.m., *Parisian*

**Making the Most of Data Collection Efforts**

Jennifer Anderson, Alaska Department of Transportation and Public Facilities, *presiding*

Doing more with less has become mandatory in many aspects of data collection. This session offers ways to expand the uses of current data collection devices without a lot of additional effort or cost.

**Dual-Use Continuous Count Stations for Data Collection and Traffic Monitoring**

Sudhir Murthy, TrafInfo Communications, Inc.

**An Unexpected Data Bonus**

Carie Lynn Frederick, City of Calgary, Canada

**Simple Matching to Extract Travel Time from Single Loops**

Karl Petty and Jaimyoung Kwon, Iteris, Inc.

**Traffic Monitoring Guide Update: Meeting Current Needs**

Anita Vandervalk-Ostrander, Cambridge Systematics, Inc.

2:00 p.m.–3:30 p.m., *Far East*

**Leveraging Data to Increase Information**

Natalie Bettger, North Central Texas Council of Governments, *presiding*

Public agencies are seeking diligently to leverage data collection efforts to extend the reach of each dollar spent on data collection and expand the covered network where necessary. This session offers information on probe data from commercial providers and an innovative way to leverage existing inductive loop count data.

**Investigating Relationships Between Intersection Delay and Private-Sector Speed Data on an Arterial Street Network**

Jothan Samuelson, Maricopa Association of Governments

**HD Traffic**

Nicholas D. Cohn, TomTom International, Netherlands

**Traffic Flow Data Collection Using Inductive Loop Detectors at Signalized Intersections**

KoSok Chae, City of Durham/Durham–Chapel Hill–Carrboro Metropolitan Planning Organization

Tuesday, June 5, 2012



2:45 p.m.–3:30 p.m., *Oak*

**ICWIM6 Session 3B: WIM Standard, Calibration, Data Quality, and Management Section**

David Jones, FHWA; and Marcio Paiva, UFSC, Brazil, *presiding*

**Data-Based WIM Calibration and Data Quality Assessment in South Africa**

Gerhard de Wet, BKS (Pty) Ltd., Pretoria, South Africa

**Evaluation of Several Piezoelectric WIM Systems**

Jesus Leal, CEDEX–Ministry of Fomento, Spain

**Improvement of Weigh-in-Motion Accuracy by Taking into Account Vehicle Lateral Position**

Eric Klein, CETE de l'EST, France

**Findings from LTPP SPS WIM Systems Validation Study**

Dean Wolf, Applied Research Associates, Inc.

3:30 p.m.–4:00 p.m., *Regency Ballroom*

**Afternoon Break**

4:00 p.m.–5:30 p.m., *Oak*

**ICWIM6 Session 3C: WIM Standard, Calibration, Data Quality, and Management Section**

David Jones, FHWA; and Marcio Paiva, UFSC, Brazil, *presiding*

**Weigh-in-Motion Data: Quality Control, Axle Load Spectra, and Influence on Pavement Design**

Rafiqul Alam Tarefder, University of New Mexico

**Quality Control of Alabama Weigh-In-Motion Data from Data User Perspective and Development of MPEDG Traffic Inputs**

Derong Mai, Auburn University, Alabama

**The Metamorphosis of LTPP Traffic Data**

Deborah Walker, Federal Highway Administration

4:00 p.m.–5:30 p.m., *Gold Room*

**Managing State Traffic Data Programs**

Timothy J. Lomax, Texas Transportation Institute, *presiding*

Managing a state data program in these times of decreasing budgets and increasing pressures to outsource can be challenging. This session describes how three states have met that challenge. Learn from their experiences and share your own during the interactive panel discussion.

**Overview and Evaluation of Outsourced Data Collection in Support of the New Hampshire DOT Traffic Monitoring System**

Robert Bollinger, New Hampshire Department of Transportation

**17-Year History and Experiences of an Ever-Growing Outsourced State Traffic Data Collection Program**

Rob E. Robinson, Illinois Department of Transportation

**Traffic Data Programs at Virginia DOT: 10 Years of Innovation**

Peter Keen, Digital Traffic Systems, Inc.

**Panel Discussion**

Tuesday, June 5, 2012





4:00 p.m.–5:30 p.m., *Parisian*

**Using Geographic Referencing to Enhance the Value of Data**

Chade Saghir, Southeast Michigan Council of Governments, *presiding*

This is a highly technical session on using geographic technologies that will inspire you to evaluate the use of geographic tools to enhance traffic data collection and reporting. Geographic technologies have become more and more powerful over the years and provide a visual interpretation of traffic data that allows professionals to make more informed and precise decisions. Learn how you can transform your data to take advantage of geographic technologies.

**Traffic Data in HPMS 8.0**

Steven Jessberger, Federal Highway Administration

**A GIS-Based Collision Analysis Methodology to Identify Black Spots on Icy Road Surfaces**

Wendy Pan, City of Calgary, Canada

**Geospatial Alignment of Wisconsin Department of Transportation Planning and Operations Traffic Data**

Steven Parker, University of Wisconsin–Madison

**Referencing Traffic Data on a Linear Referencing System**

Kent Taylor, North Carolina Department of Transportation

4:00 p.m.–5:30 p.m., *Far East*

**Using Data to Improve Transportation Operations**

Eileen Singleton, Baltimore Metropolitan Council, *presiding*

As the emphasis on transportation operations becomes a reality, the support of transportation traffic data becomes more relevant. The use and reporting of traffic data to support transportation operations is a recipe for success in your agency. Stay ahead of the curve and become a leader in using traffic data to support operations.

**Design of a Fault-Tolerant, Real-Time Traffic Statistics Reporting System**

Charles Lattimer, Atkins North America

**Measuring Recurring and Nonrecurring Congestion on Freeways and Arterials Within the Phoenix Metropolitan Region**

Jody Short, LEE Engineering; and Minh Le, Texas Transportation Institute

**Show Operational Data on High-Occupancy Vehicles Facilities to the General Public**

Francisco Javier Torres, North Central Texas Council of Governments

6:30 p.m.–8:30 p.m., *Offsite Restaurant (advance tickets only)*

**ICWIM6 Conference Dinner**

ICWIM6 Conference Dinner is scheduled from 6:30 p.m. to 8:30 p.m., Tuesday, June 5, at the Avanti Fountain Place, 1445 Ross Avenue at Field Street, Dallas, Texas. This is one block south of the Fairmont Hotel. Seating is limited and must have been reserved in advance as a purchase option on the ICWIM web page.

Tuesday, June 5, 2012



## Wednesday, June 6

7:15 a.m.–8:15 a.m., *Continental*

**TRB ADUS Joint Subcommittee ABJ35(1)** (all conference participants welcome)

Kristin A. Tufte, Portland State University, *presiding*

7:30 a.m.–8:30 a.m., *Regency Ballroom Foyer*

### Breakfast

8:30 a.m.–10:00 a.m., *Oak*

**ICWIM6 Session 4A: WIM Implementation, ITS, Traffic Monitoring, Safety and Environment**

Chris Koniditsiotis, TCA, Australia; and Lily Poulidakos, EMPA, Switzerland, *presiding*

#### High-Speed Weigh-in-Motion in the UK

Andy Lees, TDC Systems Ltd., United Kingdom

#### Trends in HGV Performance in the Main Greek Road Network: Lessons to Learn

George Mintsis, Aristotle University of Thessaloniki, Greece

#### Environmental Impact of Heavy Vehicles Based on Noise, Axle Load, and Gaseous Emissions

Lily Poulidakos, Empa, Switzerland

8:30 a.m.–10:00 a.m., *Gold Room*

### Learning from Our Peers: Country Reports

Tianjia Tang, Federal Highway Administration, *presiding*

Issues in data collection, management, and use are not unique to the United States. In this session, the experiences of traffic data professionals from around the world will be shared. Come to this interactive session, learn from international experience, and share your thoughts.

#### Heavy Vehicle Weight and Dimension Data Collection and Applications in the European Union

Bernard Jacob, IFFSTAR

#### Present and Future of Weigh-in-Motion in Brazil

Helio Goltsman, Fundação de Amparo a Pesquisa e Extensão Universitaria–FAPEU/UFSC

#### Traffic Data and the State of the Practice in Canada

Jeanette Montufar and Jonathan Regehr, University of Manitoba Transport Information Group

#### Urban Traffic Data Status in Chinese Cities

Jifu Guo, Beijing Transportation Research Center

10:00 a.m.–10:30 a.m., *Regency Ballroom*

### Morning Break

10:30 a.m.–11:15 a.m., *Oak*

**ICWIM6 Session 4B: WIM Implementation, ITS, Traffic Monitoring, Safety and Environment**

Chris Koniditsiotis, TCA, Australia; and Lily Poulidakos, EMPA, Switzerland, *presiding*

#### Bringing Heavy Vehicle Onboard Mass Monitoring to Market

Chris Koniditsiotis, Transport Certification Australia, Ltd.



## Application of the Center of Gravity Measurement Based on the Dynamic Wheel Loads Measurements of Vehicles

Kimio Someya, Kyowa Electronic Instruments Company, Ltd., Japan

## Sensors Test at Their Possible Failure in the Array and Its Reduced Topologies for the Accurate WIM Methods

Anna Cerovska, Betamont, Ltd., Slovakia

10:00 a.m.–2:00 p.m., Regency Ballroom

### NATMEC Exhibits and Poster Session

*Authors will be in attendance during breaks and lunch. For a complete listing of the poster presentations in this session, please view the listing in the Opening Reception with Exhibits and Posters.*

10:30 a.m.–noon, Gold Room

### Data-Driven Decisions and Establishing Bicycle and Pedestrian Policies and Procedures: An Interactive Discussion

Betsy Jacobsen, Colorado Department of Transportation, *presiding*

Organizational funding typically follows an agency's established policies. Agencies with established bicycle and pedestrian data programs are in a better position to make informed decisions related to nonmotorized facility design, maintenance, operations, and safety. Participants in this session will learn how data is helping to drive agency policies, which, in turn, can affect funding, design, implementation, and allocation of resources for bicycle and pedestrian data programs.

10:30 a.m.–noon, Parisian

### Diagnosing Detector Conditions for Data Quality Assurance

Andrea Bahoric, Pennsylvania Department of Transportation, *presiding*

Data quality is an issue that plagues all traffic data programs. In response, significant work has been done by both the agencies charged with data collection responsibility and supporting universities. This session examines data quality issues specifically with point detectors and is sure to provide information that will aid participants in ensuring quality in their own data programs.

#### Detector Data Quality Control Texas DOT Austin District

Brian Burk, Texas Department of Transportation

#### Detection and Correction of Loop Detector Sensitivity Level Errors

Jonathan Corey, University of Washington

#### Extending a Detector Diagnostic Program to Detector Type

Karl Petty, Iteris, Inc.

#### Data Quality Visualization Tools on Archived Historical Freeway Traffic Data

Jothan Samuelson, Maricopa Association of Governments

10:30 a.m.–noon, Far East

### Traffic Data Visualization: A Tool for Evaluation and Communication

Steve Piotrowski, North Carolina Department of Transportation, *presiding*

Traffic-related data, by its very nature, has an underlying visual aspect to it—flow data refers to a point or segment of roadway. Crash data also has associated location information. Tools that allow users to “see” data and illustrate the relationships between data elements can be very powerful, particularly in communicating information to others. Several examples of how data visualizations can enhance the value of data will be shared.



### **Truck Activity Visualizations in the “Cloud”**

Catherine Theresa Lawson, State University of New York, Albany

### **AVID System: How Traffic Data can be Analyzed, Visualized, Integrated, and Disseminated**

Aaron Moss, Colorado Department of Transportation

### **A Low-Maintenance Integrated Repository and Visualization for Traffic Counts**

Francisco Javier Torres, North Central Texas Council of Governments

### **New Online Platform for Transportation Data Management, Visualization, and Decision Support**

Yinhai Wang, University of Washington

11:15 a.m.–12:00 a.m., *Oak*

#### **ICWIM6 Panel Discussion 1: Enforcement Using WIM**

Bernard Jacob, IFSTTAR, France; and Tom Kearney, FHWA, United States, *presiding*

Panelists: Joe Crabtree (United States), Chris Koniditsiotis (Australia), Hans Van Loo (Netherlands), and Chia-Pei Chou (NTU, Taiwan)

Around the world, the challenge that commercial motor vehicle safety program enforcement officials increasingly face is the ability to maintain current levels of enforcement capable of delivering an effective level of truck weight enforcement. The introduction of advanced technologies at the roadside has been identified in many countries as an important opportunity to increase the effectiveness of truck enforcement activities without increasing manpower. This session presents examples of how WIM can be and is being used as an automated enforcement tool. The benefits that can be generated through the inclusion of WIM technology in automated enforcement frameworks will also be presented.

Noon–1:30 p.m., *Regency Ballroom Foyer*

#### **Lunch**

1:30 p.m.–3:30 p.m., *Oak*

#### **ICWIM6 Session 5A: Application of WIM to Bridges**

Ales Znidaric, Slovenian National Building and Civil Engineering Institute, ZAG, Slovenia; and Andrew Nichols, Marshall University, United States, *presiding*

##### **A Dual Purpose Bridge Health-Monitoring and Weigh-In-Motion System for a Steel Girder Bridge**

Richard Christenson, University of Connecticut

##### **WIM-Based Simulation Model of Site-Specific, Live-Load Effect on Bridges**

Przemyslaw Rakoczy, University of Nebraska

##### **Modeling Traffic Loads on Bridges: A Simplified Approach Using Bridge–WIM Measurements**

Ales Znidaric, Slovenian National Building and Civil Engineering Institute (ZAG), Slovenia

##### **Use of Weigh-In-Motion Data for Site-Specific LRFR Bridge Rating**

Nasim Uddin, University of Alabama at Birmingham

12:15 p.m.–1:45 p.m., *Continental*

#### **TRB Bicycle and Pedestrian Data Joint Subcommittee ABJ35(3)**

Elizabeth Stolz, Chaparral Systems Corporation, *presiding*

2:00 p.m.–3:30 p.m., *Parisian*

#### **Methods for Collecting and Using Bicycle and Pedestrian Data**

Elizabeth Stolz, Chaparral Systems Corporation, *presiding*



Many agencies are adopting a multimodal approach to addressing the ever-increasing demands on the transportation network. This approach requires data on modes that have not been part of traditional traffic monitoring programs. Bicycle and pedestrian data are difficult to collect but necessary to adequately assess and address the needs of these system users. Several efforts to collect bicycle and pedestrian data will be discussed in this session.

### **Alternative Data-Record Options for Continuous Pedestrian and Bicycle Counts**

Barbara Katherine Ostrom, AMEC E&I, Inc.

### **Understanding Pedestrian Flows and Their Characteristics**

Rob Poapst, University of Manitoba

### **Bike Count Methods Using Standard Traffic Counters**

Robert Joseph Benz, Texas Transportation Institute

### **Toward Automated Bicycle and Pedestrian Data Collection**

Chris Monsere and Sirisha Murthy Kothuri, Portland State University

2:00 p.m.–3:30 p.m., *Far East*

### **Weigh-in-Motion Data: Improving Collection and Use**

David L. Jones, Federal Highway Administration, *presiding*

Weigh-in-motion data has become a critical element in agency efforts to design and maintain thousands of miles of roadway. Collecting this data in an efficient and effective way is the focus of this session.

### **Development of a Weigh-Pad–Based Portable WIM System at Minnesota DOT**

Taek M. Kwon, University of Minnesota, Duluth

### **Integration of Weigh-in-Motion Technology into NIST’s Handbook 44**

Dan Middleton, Texas Transportation Institute

### **Using Image Data to Enhance Traffic Data Collection Systems**

Roy Czinku, International Road Dynamics, Inc., Canada

### **Traffic Data Quality Verification and Sensor Calibration for Weight-In-Motion Systems**

Chen-Fu Liao, University of Minnesota, Twin Cities

2:00 p.m.–3:30 p.m., *Gold Room*

### **Nontraditional Data Collection Methods**

Daniel Jenkins, Federal Highway Administration, *presiding*

Traditionally, traffic data programs were built almost exclusively on embedded loop detectors. Over time, more and more collection technologies have been developed and deployed to address shortcomings in their predecessors. This session highlights several newer methods of data collection and the advantages that they provide.

### **Floating Car Data for Transportation Planning**

Nicholas D. Cohn, TomTom International, Netherlands

### **The Trials and Tribulations of Video Data Collection in the City of Calgary**

Lindsay O’Reilly and Carie Lynn Frederick, City of Calgary, Canada

### **Using Video for Economically Collecting 24- and 48-Hour Volume and Classification Counts on High-AADT Routes**

Rob E. Robinson, Illinois Department of Transportation



3:30 p.m.–4:00 p.m., *Regency Ballroom Foyer*

**Afternoon Break**

4:00 p.m.–4:45 p.m., *Oak*

**ICWIM6 Session 5B: Application of WIM to Bridges**

Ales Znidaric, Slovenian National Building and Civil Engineering Institute, ZAG, Slovenia; and Andrew Nichols, Marshall University, United States, *presiding*

WIM data used for bridge load assessment and for the development of bridge loading standards has made possible “long run” simulation of traffic loading on bridges where lifetimes of traffic loading are simulated on computer. Use of WIM data on bridges allows what-if questions to be answered—such as “what would be the implications for bridges if the allowable legal weight limit were increased.” This session covers the topic of the use of specific WIM applications on bridges.

**A Combined Weigh-in-Motion and Structural Health Monitoring System on a Wisconsin–Michigan Border Bridge**

David E. Kosnik, Northwestern University

**Weigh in Motion on the Köhlbrand Bridge in the Port of Hamburg**

Thomas Spindler, ESG Workstation, Germany

**Assessing Confidence Intervals on the Extreme Traffic Loads**

Franziska Schmidt, IFSTTAR, Paris

**Portable Bridge WIM Data-Collection Strategy for Secondary Roads**

Cathal Leahy, UCD, Dublin, Ireland

4:00 p.m.–5:30 p.m., *Parisian*

**Data Storage, Management, and Analysis: Getting the Most from Our Data Investment**

Ken Lakey, Washington State Department of Transportation, *presiding*

Data collection, a complicated business in its own right, is only the beginning of the story for traffic monitoring programs. To be truly valuable to an agency, data must be stored and maintained in a way that protects data integrity and provides the analysis capabilities to create actionable information. This session describes several database systems and the tools within them that enhance agency data.

**Colorado DOT’s Travel Monitoring Program Data Warehouse Evaluation Project**

Aaron Moss, Colorado Department of Transportation

**Lesson Learned: Understanding, Processing, and Using Archived Traffic Speed Data from Private-Sector Providers**

Wang Zhang, Maricopa Association of Governments

**Phoenix’s Regional Archived Data System**

Jeffrey H. Jenq, Oz Engineering

4:00 p.m.–5:30 p.m., *Far East*

**Travel Time Data Collection and Quality Control**

Shawn M. Turner, Texas Transportation Institute, *presiding*

Travel time data is becoming an increasingly important element for both operations and performance management in transportation agencies. The methods of collecting this data are often quite different from traditional count program techniques, and, as a result, data must be evaluated and managed differently. This session shares three examples.



**Evaluating Travel Time Data Quality from a Private-Sector Data Provider:  
A Case Study of I-66 in Northern Virginia**

Michael Daniel Fontaine, Virginia Center for Transportation Innovation and Research

**Processing and Evaluation of Toll Data for Travel Time Estimation on Chinese Tollways**

Tongbin Teresa Qu, Texas Transportation Institute

**City of Chandler Automated Travel Time System**

Tomas Guerra, Oz Engineering

4:00 p.m.–5:30 p.m., *Gold Room*

**Performance Measures**

William Knowles, Texas Department of Transportation, *presiding*

States across the country are becoming more performance based with respect to operations and maintenance investments. This focus has given rise to new systems and methods for measuring and reporting performance across functions and facility types. A few such systems will be highlighted to further the discussion.

**Performance Reporting Using the PORTAL Transportation Data Archive**

Kristin A. Tufte, Portland State University

**Estimating Arterial Free-Flow Speeds from Private-Sector Speed Datasets for Inclusion in the Urban Mobility Report**

David Lynn Schrank, Texas Transportation Institute

**Standardized Performance Reporting via the Web: TomTom Traffic Stats**

Nicholas D. Cohn, TomTom International, Netherlands

4:45 p.m.–5:30 p.m., *Oak*

**ICWIM6 Panel Discussion 2: WIM for Infrastructures**

Eugene O'Brien, University College, Dublin, Ireland; and Mike Moravec, FHWA, United States, *presiding*  
Panelists: Mark Hallenbeck (U.S.), Lily Poulikakos (Switzerland), Valter Tani (Brazil), and Eiki Yamaguchi (Japan)

This session discusses the impact of the use of WIM applications on infrastructure management. WIM has been used for many years to assess the sensitivity of pavements to different types of tire. In ICWIM5, South African research was reported that showed measured tire pressure “footprints” from different tire types. This shows the potential of WIM to be used to assess the road friendliness of tires. Sophisticated approaches include the University of Nottingham’s general framework for pavement life assessment, in which they have made their model freely available for download and are encouraging other researchers to participate in a worldwide comparison of the most sophisticated approaches. WIM data, also used for bridge load assessment and for the development of bridge loading standards, has made possible “long run” simulation of traffic loading on bridges where lifetimes of traffic loading are simulated on computer.

5:30 p.m.–6:30 p.m., *Oak*

**ISWIM General Assembly**

7:00 p.m.–8:00 p.m., *Continental*

**TAC Meeting for LTPP SPS Traffic Data Collection Pooled-Fund Study** (by invitation)

Wednesday, June 6, 2012



## Thursday, June 7

7:15 a.m.–8:15 a.m., *Continental*

**Loop- and Length-Based Classification Pooled-Fund Meeting** (by invitation)

*Pick up continental breakfast in the Regency Ballroom.*

7:30 a.m.–8:30 a.m., *Regency Ballroom Foyer*

**Breakfast**

8:30 a.m.–10:00 a.m., *Oak*

**ICWIM6 Session 6: Application of WIM to Pavements**

Morris de Beer, CSIR, South Africa; and Deborah Walker, FHWA, United States, *presiding*

**Applications of Weigh-in-Motion in Pavement Engineering**

Lily Poulikakos, Empa, Switzerland

**Pavement Damage Due to Dynamic Load: Brazilian Road Deterioration Test with MS-WIM**

Gustavo Otto, Federal University of Santa Catarina, Brazil

**Evaluating the Role of Weigh-in-Motion in Mechanistic Pavement Analysis**

Randy Hanson, IRD, Inc., Canada

8:30 a.m.–10:00 a.m., *Gold Room*

**Traffic Data Requirements: Meeting the Needs of Multiple Users**

Benjamin Timerson, Minnesota Department of Transportation, *presiding*

Traffic data programs are experiencing increasing demands for information to fulfill the requirements of a variety of users. This session focuses on different traffic data requirements and how agencies respond to increasing needs for traffic data beyond the reasons for original collection activities. Several specific uses of data and how those uses impact data collection requirements will be discussed.

**Evaluating Current Weigh-in-Motion Sensors and Traffic Data Requirements for Now and the Future**

Roy Czinku, International Road Dynamics, Inc., Canada

**Traffic Data and Its Uses in Air Quality Analysis**

Sue Kimbrough, Environmental Protection Agency

**The Value of Roadway and Traffic Data for Safety: An FHWA Perspective**

Bob Pollack, FHWA, Office of Safety–Analysis and Evaluation Team

**Data Quality and Innovation in the North Carolina Seat Belt Survey**

Larry Campbell, RTI International

8:30 a.m.–10:00 a.m., *Far East*

**Research and Evaluation**

Catherine Wolff, Texas Department of Transportation, *presiding*

Research and evaluation activities can be both data sources and data customers. Research conducted in the last several years has mainstreamed data collection with mobile devices such as Bluetooth readers. Continuing research is evaluating additional uses of this data and improved processing methods. Improved operational strategies such as ICM promise significant returns on investment, but little actual data exists to back up these claims. This session highlights activities in both areas.

**Case Study: Application of Bluetooth Detection Technology for an Origin–Destination Study on Crowchild TR in Calgary**

Wanyong Zhong, City of Calgary, Canada





**Sensing with Ubiquitous Mobile Devices: Travel Pattern Discovery**

Yegor Malinovskiy, University of Washington

**Assessing the Performance of Integrated Corridor Management Strategies**

Matthew Wesley Burt, Battelle Memorial Institute

**Intersection Operational Test to Evaluate the Performance of Vehicle Detection Technologies**

Maryam Moshiri, University of Manitoba Transport Information Group

**Predicting the Future of ITS Deployment Based on Past Deployment Evidence**

James S. Pol, U.S. Department of Transportation, ITS Joint Program Office

8:30 a.m.–10:00 a.m., *Parisian*

**Quality Control Software Solutions and Discussion**

Steven Jessberger, Federal Highway Administration, *presiding*

This session focuses on major software providers in the United States who assist states and local agencies in quality control of their traffic data. Discussion of quality control procedures and innovations will also be part of this panel discussion. Presentations for 20 minutes on each software vendor will be provided.

**TRADAS Quality Control Software**

L. J. Wilkinson, Chaparral Systems Corporation

**MS2 Quality Control Software**

Ben Chen, Midwestern Software Solutions

**Transmetric Quality Control Software**

Stephen Cropley, Transmetric America, Inc.

10:00 a.m.–10:30 a.m., *Regency Ballroom Foyer*

**Morning Break**

10:30 a.m.–noon, *Gold Room*

**Closing Session**

Catherine McGhee, Virginia Center for Transportation Innovation and Research, *presiding*

**An Elected Official's View on the Importance of Quality Traffic Information**

Sandy Greyson, Member of NCTCOG Regional Transportation Council and Council member, City of Dallas

**Moving NATMEC Initiatives Forward**

Catherine McGhee, Virginia Center for Transportation Innovation and Research

**Traffic Data Initiatives at FHWA**

Steven Jessberger, Federal Highway Administration

**ICWIM6 Awards**

Bernard Jacob, Anne-Marie McDonnell, and Eugene O'Brien, ISWIM

**Conclusions of ICWIM6**

Eugene O'Brien, ISWIM

12:30 p.m.–2:00 p.m., *Continental*

**NATMEC Planning Committee** (by invitation)

Catherine McGhee, Virginia Center for Transportation Innovation and Research, *presiding*

12:30 p.m.–2:00 p.m., *Pyramid Restaurant PDR*

**ISWIM Board Meeting** (by invitation)

Thursday, June 7, 2012



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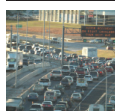
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June 4-7, 2012



# EXHIBITS

## Exhibitor Advisory Council

NATMEC established an Exhibitor Advisory Council (EAC) in 2006. The purpose of EAC is to provide advice and guidance to TRB and the Program Committee on the traffic monitoring industry as it relates to the products and services for the collection, management, and use of monitored traffic data in all applications.

If you are interested in learning more about the EAC or would like to become a member, contact one of the following current members:

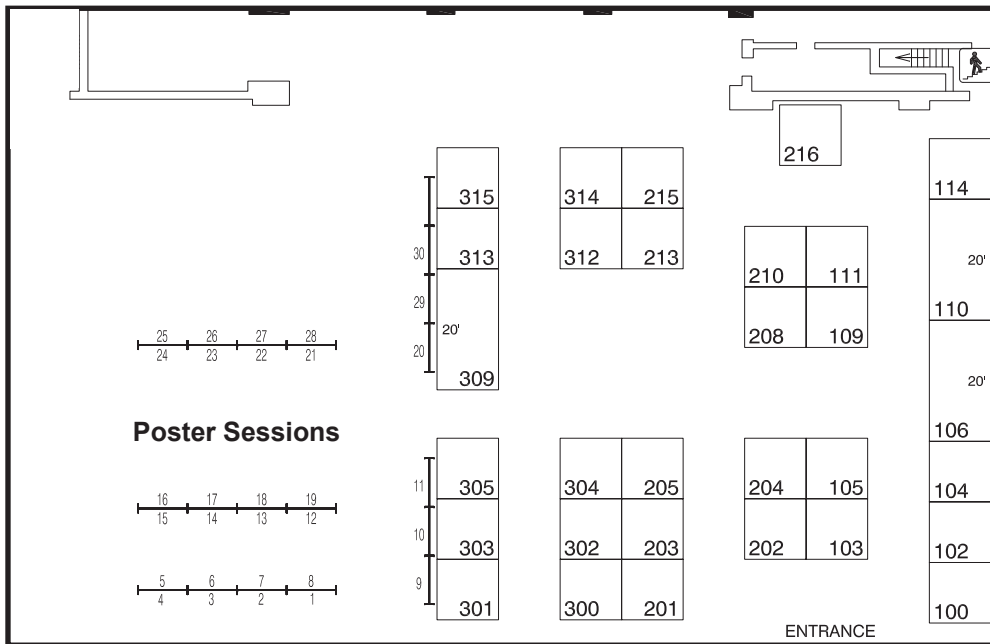
- L. J. Wilkinson, **Chaparral Systems Corporation**, Booth 104
- Ronald White, **North American Operations, Electronique Controle Mesure**, Booth 113
- Steven Perone, **PTV America, Inc.**
- Renata M. Haberkam, **The Traffic Group**, Booth 204
- Daniel Gossack, **TimeMark, Inc.**, Booth 102

Catherine McGhee, **Virginia Center for Transportation Innovation and Research**, Ex Officio

## TRB Staff

- Julie A. Miller, Staff
- Thomas M. Palmerlee, Staff

# REGENCY BALLROOM



June 4-7, 2012



## EXHIBITORS

### **Booth 312 CAMEA**

Tomas Bia  
Brno, Czech Republic  
t.bia@camea.cz  
Phone: 4-20605E+11

CAMEA is a complete turnkey solution of high-speed weigh-in-motion systems, developed and made by CAMEA, Ltd.

### **Booth 114 Cestel**

Matija Mavric  
Ljubljana, Slovenia  
matija.mavric@cestel.si  
Phone: 00386-1-568-17-19

SiWIM is a fully portable, very accurate and reliable bridge weigh-in-motion system that is installed on the superstructure of an existing bridge and does not damage the pavement. SiWIM results are used for preselection of overloaded vehicles, for traffic analyses, and for studies needed for efficient design and assessment of road infrastructure assets (pavements and bridges).

### **Booth 104 Chaparral Systems Corporation**

L. J. Wilkinson  
Santa Fe, NM  
LJ@chapsys.com  
Phone: 505-438-7353

Chaparral Systems Corporation specializes in the development and implementation of its flagship traffic data processing system, TRADAS. With TRADAS installed in its customer base, Chaparral strives to maintain a significant lead in both software technology and traffic data processing requirements.

### **Booth 300 CountingCars.com**

Mike Spack  
St. Louis Park, MN  
mspack@countingcars.com  
Phone: 952-926-0916

CountingCars.com has created products that simplify the entire traffic counting process. From video collection with the COUNTcam to the PC-TAS software for viewing videos and counting cars using the COUNTpad, you get complete control of your video and data.

### **Booth 105 CROSS Zlín, a.s.**

Jitka Svobodová  
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svobodova@cross.cz  
Phone: 4.20577E+11

CROSS has experience in development, delivery, installation and maintenance of top technological components for road traffic since 1994. Cross mainly concentrates on its own products and solutions in the following fields: intelligent traffic control, weigh-in-motion and telematics, parking systems, and universal payment terminals. CrossWIM, an advanced system for high-precision weigh-in-motion measurement, provides extraordinary multilane free-flow capabilities and customizable vehicle classification.

### **Booth 304 Diamond Traffic Products**

Colin Gibson  
Oakridge, OR  
colin@diamondtraffic.com  
Phone: 541-782-3903

As a leading supplier of traffic data recording equipment,

Diamond Traffic has been designing, manufacturing, and selling equipment for the industry for more than 35 years and is committed to providing value to customers through quality products and services that are proven and reliable.

### **Booth 213 Digital Traffic Systems, Inc.**

David Newman  
Richmond, VA  
David.Newman@dtsits.com  
Phone: 804-833-6767

Agencies and engineering firms across the country depend on high-quality traffic data from industry leader DTS. We combine nationally recognized transportation management experts with best-of-breed technical solutions to achieve your goals and exceed your expectations. [www.dtsits.com](http://www.dtsits.com)

### **Booth 113 ECM Inc.**

Ronald White  
Buda, TX  
info@ecmusa.com  
Phone: 512-295-9752

ECM Inc. is a global company that manufactures and supplies traffic data collection equipment, including advanced weigh-in-motion systems and integrated systems. ECM's integrated system capabilities include VWIM, Bridge Weight Enforcement, Rollover Warning, and Over-Height Protection. ECM's offices in the United States, France, and South Korea and its numerous worldwide distributors work together to provide customers with exceptional and responsive solutions and technical support.



**Booth 201  
Eco-Counter**

Jean-Francois Rheault  
Montreal, QC Canada  
jfr@eco-counter.com  
Phone: 1-866-518-4404

Eco-Counter is a world leader in providing solutions to count pedestrians and cyclists. The company works in both urban and rural environments to provide counting solutions for a wide variety of pedestrian and cyclist configurations. Eco-Counter currently has more than 6,000 systems installed in more than 35 countries worldwide.

**Booth 305  
Econolite Group, Inc.**

Scott Robinson  
Anaheim, CA  
jedgar@econolite.com  
Phone: 714-630-3700

Econolite Group, Inc., (EGI) was formed as the umbrella organization to a group of privately held companies that serve the traffic management, aerospace, medical, and broadcasting industries. The EGI companies include Aegis ITS, California Chassis (Cal Chassis), Econolite, Econolite Canada, and Safetran Traffic Systems, Inc. (Safetran).

**Booth 303  
Federal Highway Administration**

David Jones  
Washington, DC  
djones@dot.gov  
Phone: 202-366-5053

FHWA's goal is to provide innovative, timely, customer-responsive guidance, products, and publications to inform the public and appointed and elected officials on the U.S. travel condition, travel trend, travel demand, travel behaviors, licensed drivers, registered vehicles, roadway performance

and condition, highway finance, motor fuel usage, and other related environmental, revenue, and investment need issues.

**Booth 202  
Greater Traffic Company**

Gary Carter  
Buford, GA  
gcart58@charter.net  
Phone: 678-524-8489

Greater Traffic Company is in the data collection business but also sells various data collection products. A new product is being introduced: the Portable Video Digital Recorder provides many benefits and is a convenient and easy way to collect traffic counts.

**Booth 103  
Intercomp**

Liz Young  
Medina, MN  
lizy@intercompcompany.com  
Phone: 763-476-2531

Intercomp is the world's largest manufacturer of portable weighing solutions and has been serving the industry for more than 30 years. Intercomp manufactures weigh-in-motion, wheel load, and axle load scales to weigh and classify vehicles. For more information, contact Intercomp at info@intercompcompany.com, visit online at www.intercompcompany.com, call toll free at 800-328-3336, or call worldwide at 763-476-2531.

**Booth 309  
International Road Dynamics, Inc.**

Donna Bergan  
Saskatoon, SK Canada  
donna.bergan@irdinc.com  
Phone: 306-653-6600

IRD is a highway traffic-management products and systems-technology company operating in the ITS industry, offering experts in advanced

technologies to detect and weigh vehicles at highway speeds, the integration of these and other complementary ITS technologies into systems designed to solve traffic problems, and supplying custom designed systems.

**Booth 301  
International Society on Weigh-In-Motion**

Bernard Jacob  
PARIS Cedex 15, France  
bernard.jacob@ifsttar.fr  
Phone: +33-1-40-43-53-12

ISWIM is an international network of and for people and organizations active in the weigh-in-motion field. The purpose of ISWIM is to support the advances and more widespread use of WIM technologies and the application of WIM data. ISWIM originates from the International WIMUSERS e-mail network.

**Booth 106  
JAMAR Technologies, Inc.**

Kelly Cupps  
Hatfield, PA  
sales@jamartech.com  
Phone: 1-800-776-0940

JAMAR Technologies continues to lead the industry with the most technologically advanced traffic data collection equipment and comprehensive analysis software. JAMAR's product range continues to expand from its class-leading Trax series pneumatic tube counters and handheld intersection boards to now include the best noninvasive radar recorder and permanent count equipment to provide the most well-rounded lineup available. JAMAR has more than 35 years of experience and an unsurpassed support staff to ensure your data collection needs are met with ease and accuracy.

**Booth 203****Kistler Instrument Corporation**

Christine Portik  
Amherst, NY  
christine.portik@kistler.com  
Phone: 716-691-5100

Kistler Instrument Corporation's core competence is the development and production of sensors for measuring pressure, force, torque, and acceleration for vehicle weigh-in motion. Kistler offers the Lineas sensor with Quartz Technology. The sensor operates on the piezoelectric effect and provides maintenance-free operation for a variety of weigh-in-motion applications.

**Booth 302****Measurement Specialties, Inc.**

Jesse Hauck  
Hampton, VA  
jesse.hauck@meas-spec.com  
Phone: 757-766-4367

Measurement Specialties, Inc., is the world leader in piezoelectric sensors for WIM, speed and red light camera triggers, and vehicle classification. The Roadtrax BL sensor is easily installed into a narrow cut in the road and returns an electrical signal that gives highly accurate information on individual vehicles.

**Booth 100****MetroCount**

Sean Heaney  
Fulton, MD  
sheaney@metrocount.com  
Phone: 800-576-5692

Founded in 1987, with international offices: Maryland (U.S.), London, and Perth (Australia), MetroCount is an electronics design and manufacturing company. It has specialized in data logging devices for more than 20 years. Its primary focus is equipment and software for road traffic

monitoring, a field in which it is a global leader. With thousands of units supplied to more than 85 countries, MetroCount's popular vehicle counters and classifiers, combined with its sophisticated software, give traffic and municipal engineers unmatched versatility with invaluable road statistics for all ITS, road safety, and planning projects.

**Booth 315****Mikros Systems (Pty) Ltd.**

Rob Sik  
Pretoria, South Africa  
rob@mikros.co.za  
Phone: +27-86-111-5393

Mikros Systems is a South African company that specializes in the manufacture and development of traffic monitoring products and services. Mikros produces traffic data loggers for the complete spectrum of weigh-in-motion applications. Its support software covers all aspects from complete telematics interfaces to comprehensive data verification, reporting, and archiving.

**Booth 205****Miovision Technologies**

Andrew Wilgar Kitchener  
Ontario, Canada  
awilgar@miovision.com  
Phone: 519-513-2407, extension 252

Miovision Technologies, Inc., creates intelligent solutions to address the challenges facing today's global transportation networks. With its video and web-based technologies, it helps data collectors, traffic consultants, and municipal governments reduce the cost of collecting, analyzing, and reporting accurate traffic data. Its products and services help reduce traffic congestion, minimize environmental impacts, and improve the overall safety of roads.

**Booth 214****MS2**

Lev Wood  
Ann Arbor, MI  
clw@ms2soft.com  
Phone: 734-995-0200

MS2 specializes in the design and hosting of web-based transportation database applications used by public-sector transportation engineers and planners.

**Booth 110****Peek Traffic Corporation**

Vance Williams  
Palmetto, FL  
vance.williams@peektraffic.com  
Phone: 941-809-6670

Automated data recording devices and software. Demonstrations of new product releases, technologies, and techniques.

**Booth 313****Quality Counts**

Gerald Wegehaupt  
Tigard, OR  
jrw@qualitycounts.net  
Phone: 503-620-4242

Quality Counts is a transportation data collection company that will be exhibiting samples of its delivery formats, with data collection products on display.

**Booth 314****Sensys Networks**

Ray Scheiber  
Berkeley, CA  
rschreiber@sensysnetworks.com  
Phone: 415-971-3603

Sensys Networks is the world's leading provider of wireless traffic detection and integrated traffic data systems. Our universal platform delivers the most dependable, flexible, and cost-effective solution on the market today. Our patented wireless magnetic sensors, with an



unprecedented 10-year battery life, install in a fraction of the time, with far less disruption to traffic than traditional detection technologies. Deployed in more than 40 U.S. states and 10 countries, the Sensys Networks' wireless vehicle detection system is the technology standard for the world's largest traffic data systems.

**Booth 115**  
**Southern Traffic Services, Inc.**

Jim Neidigh  
Georgetown, TX  
jneidigh@southerntrafficservices.com  
Phone: 512-818-3804

Traffic data collection service, installation of inductance loops, axle sensors, weigh-in-motion, turning movements, time-delay studies, and vehicle classification methods.

**Booth 212**  
**TDC Systems Ltd**

Andy Lees  
Weston Super Mare, United Kingdom  
andy.lees@tdcsystems.co.uk  
Phone: +44(0)-1934-644299

TDC Systems specializes in the design and manufacture of a complete range of traffic monitoring systems, comprised of high-speed weigh-in-motion systems, vehicle counter classifiers with real-time monitoring applications, products for maximizing UTC systems, journey time, and OD systems using Bluetooth technologies, and air-quality monitoring equipment.

**Booth 204**  
**The Traffic Group, Inc.**

John Blair  
Baltimore, MD  
jblair@trafficgroup.com  
Phone: 410-931-6600

With more than 3,000 pieces of traffic data collection equipment, The Traffic Group conducts nearly 100,000 counts annually, providing data for license plate survey/origin and destination studies; manual turning movement counts; parking lot occupancy and turnover studies; pedestrian/vehicle classification counts; portable machine counts; queuing studies; and speed, travel time, and delay studies.

**Booth 102**  
**TimeMark Incorporated**

Daniel Gossack  
Salem, OR  
danielg@timemarkinc.com  
Phone: 503-363-2012

The TimeMark NT series of portable and manual counters along with the latest software, VIAS2, will be on display.

**Booth 215**  
**Transmetric America Inc**

Karin Lin  
Austin, TX  
sales@transmetric.com  
Phone: 512-977-1822

Traffic Server 6 is a comprehensive, web-based, traffic data management solution that transforms raw traffic data into decision support information. Used by transportation agencies large and small, it manages the full life cycle of traffic data—from scheduling counts to managing permanent devices to interactive end-user reports delivered via GIS.

**Booth 216**  
**Vaisala**

Bert Murillo  
Saint Louis, MO  
Bert.murillo@vaisala.com  
Phone: 314-872-0509

Vaisala is a global weather and portable traffic solutions provider with nearly 40 years of experience in providing the highest quality road sensors available. Vaisala is a true innovator of road weather technology, from our nonintrusive pavement sensors and pioneering mobile technology to our portable traffic counters.



## OVERVIEW OF INTERNATIONAL CONFERENCE ON WEIGH-IN-MOTION

ICWIM has a rich history—first held in Zürich (1995), followed by Lisbon (1998), Orlando (2002), Taipei (2005), and Paris (2008). ICWIM has covered WIM technologies, standards, testing, and applications of WIM to traffic monitoring, infrastructure engineering, enforcement, and road pricing.

Freight transport delivered on road by commercial heavy vehicles is a key factor for development, trade, and economical growth. However, society faces important challenges: avoiding environmental deterioration from carbon dioxide and noxious emissions, encouraging energy savings, and ensuring harmonized and balanced development of all transport modes. Therefore, it is crucial that all heavy goods vehicles comply with legal limits and regulations, wherever they are traveling, to be operated at fair cost, to facilitate intermodality, and to ensure a fair competition in freight transport. The issue has become timelier in many parts of the world where longer and heavier (higher capacity) vehicles are being introduced to improve freight transport efficiency and to reduce congestion and carbon dioxide emission. Road safety remains one of the priorities in all countries, but is of highest concern in the developing and emerging countries, where almost one million people are killed on roads every year. Overloaded trucks contribute to unsafe conditions and severe accidents, above all for vulnerable users. With the financial crisis, governments, public authorities, road owners, and vehicle operators have encountered difficulties in financing the construction and maintenance of road infrastructures. Thus, the general trend is to increase infrastructure lifetimes and cut maintenance budgets. To maintain satisfactory quality, it becomes necessary to avoid overload and efficiently enforce weight limits. WIM systems and technology is necessary to screen all heavy vehicles and to help, if not to perform, enforcement operations.

To optimize road infrastructure design and maintenance and minimize related costs, it is necessary to get extensive and accurate data on weights and flows of axles and vehicles on each road section, as well as time based trends. Advanced bridge and pavement calculation models require more and more accurate data, as well as innovative road operation and pricing tools. Therefore, WIM becomes part of a global ITS trend for heavy traffic management, as developed in Australia with the Intelligent Access Programme (IAP).

The conference addresses the broad range of technical issues related to weight measurement sensors, technologies and systems, weight data management and quality assurance, enforcement, road operation and pricing, and infrastructure-related issues. It provides access to current research, best practice, and related policy issues. It is a multidisciplinary, interagency supported event. It provides an international forum for WIM technology, WIM standards, research, policy and applications, and it reviews developments that have taken place since the last International conference (ICWIM5).

June 4–7, 2012





## INTERNATIONAL SOCIETY FOR WEIGH-IN-MOTION (ISWIM)

This is the Sixth International Conference on Weigh-in-Motion, and enthusiasm abounds for delegates to travel to the farthest corners of the world to share experiences of WIM and hear about the latest developments. The International Society for Weigh-In-Motion, an international not-for-profit organization based in Switzerland, was born in 2007 and officially launched in 2008, to welcome all with a common interest in WIM. It supports advances in WIM technologies and promotes more widespread use of WIM and its widespread applications.

Organizing WIM conferences and seminars is a major objective. ISWIM successfully held the 5th International conference, ICWIM5, in Paris in May 2008, with the support of the French Laboratoire Central des Ponts et Chaussées (now IFSTTAR). In April 2011, with the support of the DNIT (Department of Transport of Brazil) and the Federal University of Santa Catarina, a very successful International Seminar was organized in Florianopolis (Santa Catarina, Brazil). Additionally, the Latin American regional group of ISWIM was initiated. Furthermore, in North America, the TRB subcommittee on WIM is forming a regional group of ISWIM, and the European community of WIM carried out in the 1990s and 2000s important European cooperative projects (COST323, WAVE, REMOVE, FiWi).

ISWIM is active on the Internet through its website (<http://iswim.free.fr>). This website offers an international portal for WIM, with many resources, such as scientific and technical publications, links to WIM websites, and facilitates exchanges of WIM experiences. The website also has details of affiliated vendors (i.e., The Vendor College). ISWIM has a scientific interest in WIM standardization and in promoting common tests and assessment of WIM systems and an application interest in exposing end-users to the myriad of uses.

ISWIM consists of individual and corporate members. The Vendors College comprises 15 commercial enterprises, mainly WIM system manufacturers and vendors. The Board consists of 15 members who are elected by the General Assembly of all members. There is a membership fee for companies and organizations, but no membership fee for individuals..

So, please join us and become an active member of the ISWIM community by signing up on the ISWIM website: <http://iswim.free.fr>.

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**TRB** 92nd Annual Meeting

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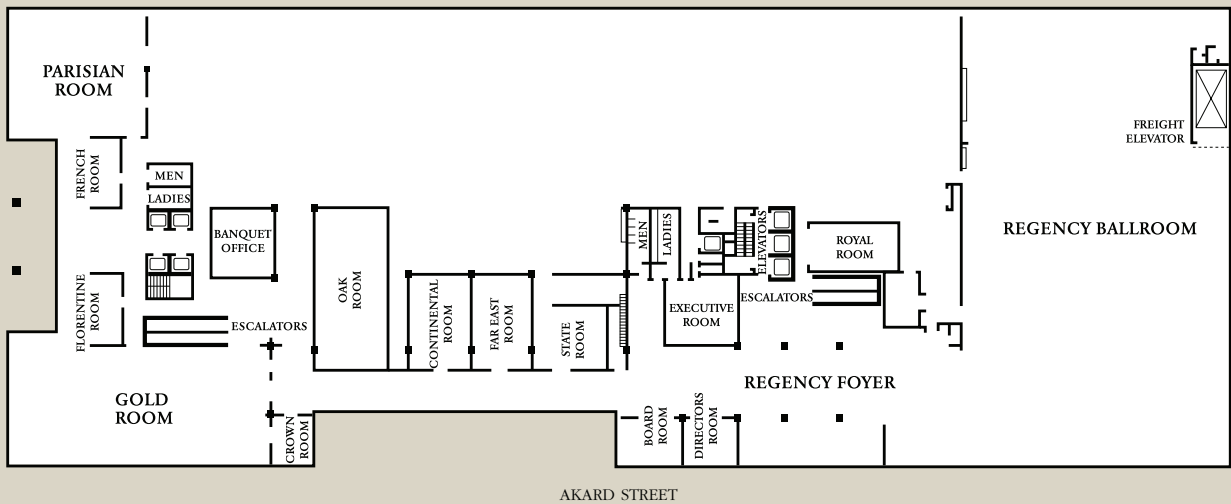
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