Access to International Transportation Research Information

DETAILS

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Access to International Transportation Research Information

Summary of a Conference

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Texas A&M Transportation Institute
Texas A&M University System

September 12–13, 2012
National Academy of Sciences Building
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Sponsored by
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This report has been reviewed by a group other than the authors according to the procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

This project was sponsored by Texas A&M Transportation Institute, part of the Texas A&M University System, and the Transportation Research Board.

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Preface

Serving as a national clearinghouse for transportation information has been a central focus of the Transportation Research Board (TRB) since its inception as the National Advisory Board on Highway Research in 1920. *Access to International Transportation Research Information: A Conference*, held September 12–13, 2012, at the National Academy of Sciences Building in Washington, D.C., focused on the sharing of transportation research information internationally.

TRB's Transportation Research Information Services (TRIS) database began to include English-language records from countries other than the United States in the 1970s. Most of these records came from the International Transport Research Documentation (ITRD) database. A 2010 agreement increased collaboration by integrating the TRIS and ITRD databases into the Transport Research International Documentation (TRID) database, which contains more than 940,000 bibliographic references to books, technical reports, conference proceedings, and journal articles. Much transportation research from many other countries, however is not well indexed. Some countries have internal databases that are not readily accessible to foreign researchers, and some multinational organizations have developed separate databases.

Access to International Transportation Research Information: A Conference was organized to explore these issues and to identify opportunities to enhance the sharing of information. The conference objectives were to determine new and innovative practices of information sharing that could benefit the U.S. transportation community as well as strategies for the exchange of international research information that could augment the breadth and depth of the TRID database.

To help organize and develop the conference program, TRB assembled a planning committee, appointed by the National Research Council (NRC) and chaired by Brian Ray of Kittelson & Associates, Inc. Committee members provided expertise in international transportation information sharing from various perspectives, including universities, state departments of transportation, consulting firms, and research institutes.

The planning committee was solely responsible for organizing the conference, identifying speakers, and developing topics for the working session discussions. Katherine Turnbull of Texas A&M Transportation Institute served as the conference rapporteur and prepared this document as a factual summary

of discussions at the conference. Responsibility for the published conference summary rests with the rapporteur and the institution.

The conference attracted 38 attendees who were agency and university personnel from the United States and worldwide. Through a series of presentations and working sessions, conference attendees considered opportunities to enhance the sharing of transportation information internationally. Together with expert panels and facilitated discussion, conference attendees identified research needs, potential new partnerships, and collaborative arrangements to expand the TRID database and increase information sharing.

These proceedings follow the conference program and consist of presentation summaries from the general sessions and summaries of key topics discussed in the working sessions. The opening session featured a welcome from TRB and the conference planning committee. Then, speakers explored the benefits to be gained through international information-sharing efforts. The next group of speakers focused on the TRID database, discussing its evolution and current status, the Swedish experience with the ITRD and TRID databases, and the Virginia Department of Transportation's use of the TRID database. The two subsequent sessions featured speakers who addressed information sharing from U.S. and international perspectives. Next, representatives of the ARRB Group, Ltd., and TRB signed of a memorandum of understanding that the ARRB Group will provide records from its Australian Transport Index to the TRID database. The final panel sessions featured case studies on information-sharing practices in four countries that do not currently contribute to the TRID database. Three working sessions provided participants with the opportunity to discuss research needs, outreach activities, technology transfer efforts, and follow-up action steps. Participants focused on strategies to enhance the sharing of transportation information internationally, collaborative opportunities to expand the TRID database, and possible action plans and next steps. In the closing session, conference attendees were informed that the conference proceedings would be published electronically, encouraged to engage in follow-up activities, and thanked for their participation.

The views expressed in this summary are those of the speakers and discussants, as attributed to them, and do not necessarily represent the views of all conference participants, the conference planning committee, TRB, or NRC.

A draft of this report was reviewed by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the NRC Report Review Committee. The purposes of this independent review are to provide candid and critical comments that will assist the institution in making the published report as sound as possible and to ensure that the report meets institutional standards for clarity, objectivity, and responsiveness to the project

charge. Reviewer comments and the draft manuscript remain confidential to protect the integrity of the process.

TRB thanks the following individuals for reviewing this report: Sandy Tucker, Texas A&M University; Roberto Sarmiento, Northwestern University; Sue Sillick, Montana Department of Transportation; and Glenn Roberts, New Hampshire Department of Transportation.

Reviewers of the draft report provided many constructive comments and suggestions, but they did not see the final draft of the conference summary before its release. The review of this report was overseen by Distinguished University Professor Emerita Susan Hanson of the School of Geography at Clark University, Worcester, Massachusetts. Appointed by NRC, Hanson was responsible for ensuring that an independent examination of this summary was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this proceedings rests entirely with the rapporteur and the institution. Karen S. Febey, senior report review officer at TRB, managed the report review process.

The conference planning committee thanks Katherine Turnbull for her work in preparing this conference summary report and extends a special thanks to the National Cooperative Highway Research Program for providing the funding support that made the conference possible.

Welcome and Conference Overview

Stephen R. Godwin, *Transportation Research Board*
Brian L. Ray, *Kittelson & Associates, Inc., Planning Committee Chair (presiding)*

WELCOME

Stephen R. Godwin

Steve Godwin, Director of the Studies and Special Programs Division of Transportation Research Board (TRB), welcomed conference participants to the newly refurbished National Academy of Sciences building on behalf of the Presidents of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, and TRB Executive Director Robert E. Skinner, Jr. He thanked Brian Ray and the other members of the conference planning committee for organizing an interesting and informative conference, then thanked all the attendees for their participation. He remarked that participants hailed from five of the world's seven continents. Godwin covered the following topics in his welcome:

- The focus of the conference is important. Knowledge is power, as the 16th-century scientist and philosopher Francis Bacon is credited with saying. Having knowledge requires access to information, however. Charles Darwin is credited with establishing the scientific basis for the theory of evolution through natural selection in his 1859 book *The Origin of Species*. For the remainder of his life, Darwin searched in vain for the biological basis of inherited characteristics to validate his theory. Apparently, Darwin did not know about an article published in 1866 by a German abbot and part-time scientist, Gregor Mendel, in a fairly obscure scientific journal. Mendel's studies of hybridization in pea plants led him to formulate the existence of dominant and recessive inherited traits. His work would not be discovered until 1900, more or less simultaneously, by biologists from three different nations, and now Mendel is recognized as the father of modern genetics.
- Darwin was fascinated by cross-breeding and practiced it on multiple species throughout his life. However, because he did not know about the work of a contemporary researcher, he missed the opportunity to link natural selection with genetics, which would not occur until 40 years after the publication of *The Origin of Species*.

- In today's world, knowledge cannot be allowed to languish for decades, especially in the field of transportation, which is so central to people's daily lives and the wealth of nations. Every country wants to improve its transportation system and to do so with fewer public resources. This conference focuses on the sharing of research information internationally. So much can be learned from others.
- TRB is committed to making transportation research information available worldwide. In 2010, TRB and the International Transport Forum of the Organisation for Economic Co-operation and Development agreed to integrate TRB's Transportation Research Information Services database with the International Transport Research Documentation database to create the Transport Research International Documentation (TRID) database. In the first year since its release, the TRID database has been used by more than 1 million unique visitors from more than 220 countries.
- An agreement between TRB and the ARRB Group, Ltd., will be signed during the conference, and more ARRB records will be added to the TRID database as a result. This conference can help address the issue that much of the world's transportation research information is either not captured in the TRID database or otherwise inaccessible to the worldwide research community. Results of this conference will benefit researchers, organizations, and countries worldwide.

OVERVIEW

Brian L. Ray

Brian Ray welcomed participants to the conference. He thanked the other members of the conference planning committee and TRB staff for their hard work in organizing an excellent conference; provided an overview, background summary, and objectives of the conference; and reviewed the formats of the different sessions. Ray covered the following topics in his presentation:

- Members of the conference organizing committee and conference liaisons from the Federal Highway Administration, the Research and Innovative Technology Administration, and TRB listed in the conference program were recognized. TRB staff members Jennifer Rosales and Mary Kissi also were recognized and thanked for assistance in organizing and handling logistics for the conference.
- This conference focuses on exploring resources of transportation information and practices in international transportation organizations. The sharing of information always has been a key focus of TRB. The two general objectives of this conference are to identify new and innovative information-sharing practices and to identify strategies for the international exchange of research information, including enhancing the breadth and depth of the TRID database.

- The conference sessions will include speakers and interactive discussions. The first session will highlight the benefits of improving access to international transportation information. Other sessions will address the TRID database, current practices, and case studies for sharing information in the United States and internationally. Three interactive working sessions will focus on strategies to enhance the sharing of transportation information internationally, international collaboration opportunities to expand the TRID database, and potential action items and next steps.
- The conference provides an excellent venue to learn from others and to share ideas. This exchange of information can help foster future activities. Numerous benefits can be realized by enhancing the sharing of transportation information internationally. The active participation of all attendees is key to the success of this conference.

Improving Access to International Transportation Research Information

What Are the Benefits?

Gordon Vala-Webb, *CIKstrategy*
Barbara Post, *Transportation Research Board (retired)*
Damião Chaves, *European Commission, Directorate-General for Mobility and Transport, Research and Innovative Transport Systems*
Frances D. Harrison, *Spy Pond Partners (presiding)*

INTERNATIONAL TRANSPORTATION RESEARCH INFORMATION ACCESS: CHALLENGES AND OPPORTUNITIES

Gordon Vala-Webb

Gordon Vala-Webb discussed rethinking knowledge work. He summarized his background and related work, highlighted possible issues associated with knowledge work, and presented a new approach for networked work. Vala-Webb covered the following topics in his presentation:

- The point of knowledge is not knowledge itself, but using knowledge to help someone change a decision they would otherwise make. People resist change because change is uncomfortable, unknown, and new. A quote from then-U.S. Secretary of Defense Donald Rumsfeld at a news briefing in 2002 illustrates this point: "As we know, there are known knowns. There are things we know we know. We also know there are known unknowns. That is to say, we know there are some things we do not know. But there are also unknown unknowns, the ones we don't know we don't know."
- A quote from Charles Darwin also illustrates the need for change: "It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change." Numerous challenges face society today that influence individuals' ability to learn. Many people have an attention deficit. They do not have time to focus long enough to learn. At the same time, they are bombarded with information, and information overload also contributes to an their inability to focus on key items. Meanwhile, individuals and organizations are under constant pressure to do more with less, and the rapid pace of change in technology increases the complexity of daily activities.

- Some trends, which might be referred to as known known diseases, are important to remember. First, libraritis can be defined as people who like to add information to their collections without doing anything with it. Content–context disassociationism is another issue. Content only makes sense in context, and the more complex the content, the more critical it is to understand the context. The why-ectomy is closely related to libraritis. In the why-ectomy, the question of why people are doing something has been removed; people do not know or have forgotten the purpose behind an action or activity.
- It also is important to remember that size and organizational structure matter. For example, across the world, each time a city's population doubles, each inhabitant is, on average, 15% wealthier, 15% more productive, 15% more innovative, and 15% more likely to be victimized by violent crime. However, bigger is not necessarily better for organizations. In companies with more than 1,000 employees, for example, the average productivity of an employee decreases by more than one-fourth for each order-of-magnitude increase. In cities, people are colocated geographically and are free to interact with others in many ways; in an organization, people may not be colocated and are not free to interact in many ways.
- This conference focuses on sharing information. Knowledge and the use of knowledge to influence the decisions people make is at the heart of information. Figure 1 presents an approach to rethinking knowledge work adapted from Thomas Davenport. On one axis, work can be routine or can require interpretation and judgment. On the other axis, work can be conducted by an individual or a group.

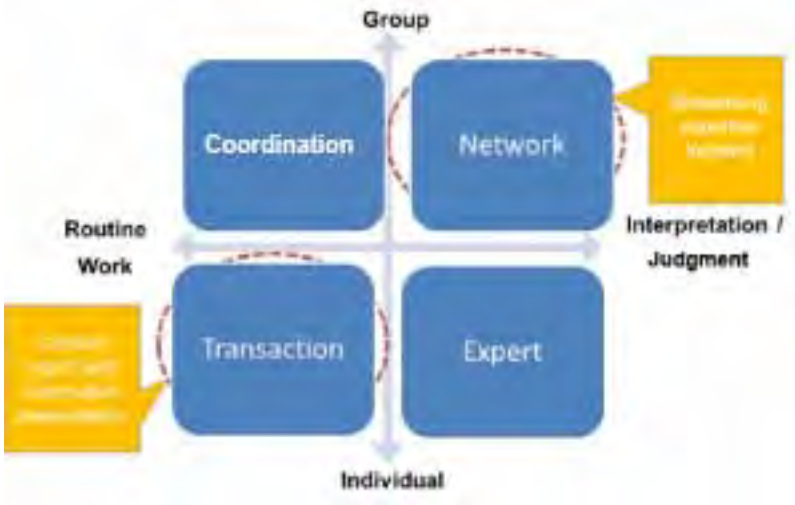

FIGURE 1 Ways to rethink knowledge work. (SOURCE: Davenport, Thomas H. Rethinking Knowledge Work: A Strategic Approach. *McKinsey Quarterly*, February 2011. www.mckinsey.com/insights/organization/rethinking_knowledge_work_a_strategic_approach.)

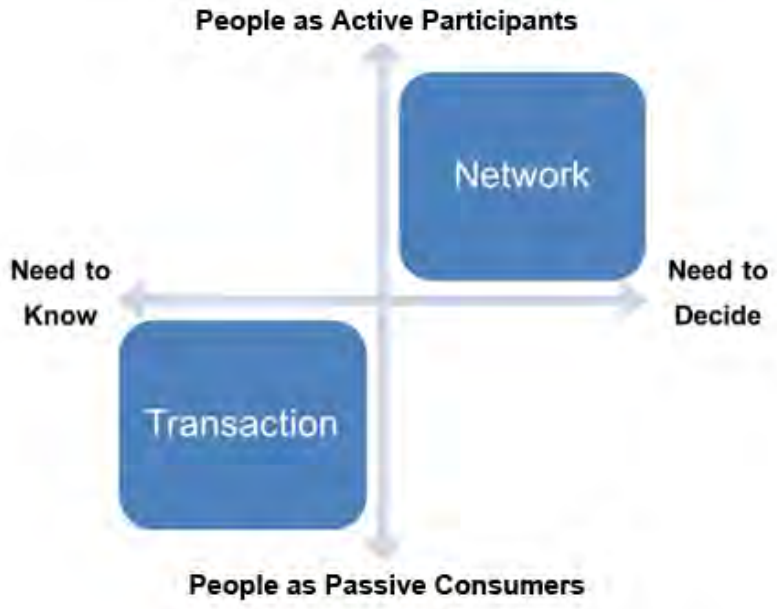

FIGURE 2 Moving toward participation in the decision-making process.

Routine work conducted by an individual tends to be transactional, whereas routine work that involves connecting with other people requires more coordination. Individuals may work alone using interpretation or judgment as experts; they also may work together using interpretation or judgment in a network.

- An understanding of how people work and the nature of the work is important in considering knowledge and information. It also affects the type of support people need to accomplish desired outcomes. Content management and information presentation tend to work best with routine tasks conducted by individuals. Networking, expertise, and location tend to work best with tasks that involve group interpretation and judgment. These situations are not absolute but do provide a useful framework for considering whether a situation is connecting individuals to complete routine work or assisting individuals in applying interpretation and judgment as experts, individually or collectively.
- The role of participation in the decision-making process is illustrated in Figure 2. The perspectives extend from need to know to need to decide, and people are considered on a scale from passive consumers to active participants. Individuals who are asked to work together to apply interpretation and judgment must actively participate in the information systems.

- Networked work requires a fundamental shift in thinking about organization and knowledge management. It requires shifts in focus (*a*) from management of knowledge assets to management of decision making and (*b*) from what staff need to know to what staff need to decide. It also requires changes (*a*) from considering people as passive consumers to considering people as active participants and (*b*) from viewing people as thinking animals who feel to viewing people as feeling animals who think.
- A thought to stimulate discussion in later sessions is to better define the purpose of sharing international research information. Is it to provide access to information or to share information among researchers? Practitioners seek answers to specific questions (e.g., how to design a bicycle lane), whereas researchers wish to analyze the costs and benefits of different designs and applications. Practitioners tend to be more interested in synthesized material related to specific topics and connecting with other practitioners who address similar situations, whereas researchers tend to prefer to explore new areas and issues. Considering how people view the world also is important. Do they focus on data, content, and access or do they focus on decision making? Also important is to consider what people are good at, because getting people to do things they are not good at is a difficult task. Focusing on what people are already good at—and expanding and extending it—is a more successful approach. Building on the strengths of the current information system may be a good approach. Finally, it is important to consider what users want from an information-sharing system.

CHALLENGES, SUCCESSES, NEEDS: OVERVIEW AND VISION FOR FUTURE COLLABORATION

Barbara Post

Barbara Post described the background, challenges, and accomplishments with the merger of the International Transport Research Documentation (ITRD) and Transportation Research Information Services (TRIS) databases as well as the development of the Transport Research International Documentation (TRID) database. She identified challenges related to collaboration, gaps, and needs. Post covered the following topics in her presentation:

- Historically, the TRIS and ITRD databases had an international focus, but the TRIS database contained primarily U.S. records. Even though the TRIS and ITRD databases exchanged records, the availability of ITRD records was limited. The ITRD database traditionally was available only as a fee-based database through commercial providers, and ITRD records were not available in TRIS Online or the TRIS database on the Transportation Research Board (TRB) website.

- Several events over the past 10 years have emphasized the need for increased accessibility to transportation information. In 2005, TRB changed the operating system for the TRIS database to a web-based SQL database to allow the importation and exportation of records in standardized formats. In 2007 and 2008, with the help of numerous volunteers from TRB committees, TRB conducted a survey of and held focus groups with users of the TRIS database. One finding from these efforts was that TRIS users wanted increased access to international information. A 2008 International Scan on Transportation Research Administration in Europe and Asia provided information on collaboration between the Swedish National Road and Transport Research Institute (VTI) and TRB. Also during this period, TRB became involved in international transportation research.
- Several methods were used to increase the number of international records in the TRIS database. One method was exchanging records with international organizations, including VTI in Sweden, the Australian Road Research Board, the Institute for Road Safety Research in the Netherlands, the Transportation Association of Canada, the International Association of Public Transport and the Forum of European National Highway Research Laboratories in Belgium, and the Institution of Civil Engineers in the United Kingdom. A second method was the use of commercial publisher Taylor & Francis to obtain additional internal records.
- In 2010, TRIS World offered English-language ITRD records to TRB sponsors. The TRIS and ITRD databases were merged during 2010 and 2011. All ITRD and TRIS records are available free on TRB's Website as the TRID multilingual database. The ITRD database is managed on the TRIS platform.
- Several challenges are associated with collaboration. All of the cooperative agreements with international organizations (developed primarily through the information professionals at the various organizations) are different. The importation and exportation of records usually is not straightforward, posing technology issues. Languages and indexing represent ongoing challenges; many agencies use the ITRD Thesaurus, which is mapped to the Transportation Research Thesaurus.
- Another challenge is information gaps. International coverage in the TRID database is incomplete, representing fewer than 28 ITRD members in 25 countries. The purpose of ITRD centers generally is to ensure the quality of input to the database in their respective languages and to cover their own organizations' research and development.
- Not all ITRD members submit records, many ITRD members submit only records of their agencies' publications, and ITRD members are entering limited ITRD research-in-progress data. Furthermore, the United Kingdom, Asian countries, Africa, Spain, Italy, Latin America (except Mexico), and the Middle East currently are not contributing.
- Other challenges include (*a*) identifying major organizations that perform and publish transportation research that currently is not accessible to the U.S.

transportation research community, (*b*) locating international databases and electronic information resources of transportation research that could augment TRID and developing a better understanding of the methods and practices of information sharing internationally, and (*c*) facilitating methods to develop the exchange of transportation research information—both research projects and research publications.

- This conference will assist TRB and other organizations in two key ways: it will explore new and innovative practices of information sharing that could benefit the U.S. transportation community, and it will help identify strategies for the exchange of international information that could enhance the coverage and the depth of the TRID database.

RESEARCH INFORMATION: EUROPEAN TRENDS AND WAYS TO MOVE FORWARD

Damião Chaves

Damião Chaves discussed the European experience with collecting, maintaining, and disseminating information on transportation research. He summarized research trends and access to information on transportation research projects in Europe and described the challenges related to accessing research information and the vision for improving the communication and dissemination process in the European Union. Chaves covered the following topics in his presentation:

- The first layer of research in Europe is national, conducted by countries as part of their national research programs. National research, which may be undertaken by public or private groups or through public–private partnerships, accounts for the largest allocation of resources.
- The second layer is European research. Conducting and implementing European research programs is a legal and political obligation from the European Union that resulted from the 1997 Amsterdam Treaty. The European Union dedicates resources for research and development activities focused on increasing the competiveness of companies and employment levels as well as supporting consumer and environmental protection policies and other European Union goals.
- The topics covered by European and national research projects are similar. However, European research is based on its added value in terms of a European perspective rather than a national perspective.
- A majority of the European research is part of the Seventh Framework Programme for Research and Technological Development. This program, which will conclude in 2013, has a budget of approximately $70 billion. The Horizon 2020 research program will follow, from 2014 to 2020. The estimated budget for Horizon 2020 is 45% more than that of the Seventh Framework Programme.

- The Seventh Framework Programme is divided into several programs, each of which covers specific activities and has a separate budget. For instance, the People Programme focuses on human potential and encourages the initial training of researchers, life-long training, and career development.
- Transportation research activities are part of the Cooperation Programme, which accounts for approximately 50% of the total Seventh Framework Programme budget. In addition to transportation research, the Cooperation Programme covers areas including health, energy, and the environment.
- Transportation is one of Europe's strengths, and research contributes to the competiveness of the European transportation sector. A significant amount of the Cooperation Programme was allocated to continuing to develop safer, greener, and smarter European transportation systems for the benefit of all citizens. Research on transportation is even more important because it has a direct effect on areas such as employment, the environment, energy, and security.
- Parallel to the obligation to conduct research in the European Union is the obligation to communicate the information resulting from such research projects. The Amsterdam Treaty makes numerous references to communicating, sharing best practices, and providing access to information. This obligation has been further reinforced in other treaties that have shaped the European Union.
- The obligation in other treaties related to providing access to research results is a means to optimize investments in research. It also helps build on previous research and is a means of reinforcing networks focusing on specific issues. Along with sharing best practices, it contributes to the competiveness of the European research community and to the European economy.
- Communicating and disseminating research information is not only an obligation; it also is in the best interest of the research community. However, to be able to share research information, the European Commission must first find the information. The national and European levels of research, along with the European Programmatic approach to research, provide an organized structure and common procedures for the dissemination of information. It also can result in a dispersion of information.
- The European Commission is aware that even though a significant amount of research information is available, this information is scattered. Finding specific information on a specific project can be difficult because projects and programs are undertaken at both the national and European levels, including those sponsored by the European Union.
- Another challenge relates to the multiple methods available for accessing information, including project websites. Seventh Framework Programme projects are contractually required to create a website to be eligible for funding from the European Union. Such websites must contain a detailed synopsis of the project, including the

scope and research activities. They also may contain other information, including press releases, event calendars, and links to related initiatives. The websites post reports and other documents as projects are completed. Even though this requirement represents a step toward wider dissemination of research results and broader access to information, some of the more than 500 websites currently available for transportation projects contain fairly basic information.

- Specialized portals represent another option for obtaining information. These portals may be related to a program or to an activity and mode. Program-related portals have the advantage of offering a comprehensive overview of research activities but may lack detail on specific topics. Portals related to activity and mode address precise needs (e.g., urban mobility or marine and maritime transport) but typically do not provide cross-references with other relevant research.
- Yet another option, search engines facilitate fast access to information. However, luck is involved in using some search engines due to the absence of specialized filters, and users potentially may be linked to a site that has no relevance whatsoever to the topic of interest.
- To address the counterproductive nature of these challenges and to effectively disseminate and communicate information, the European Commission developed a concept that would allow moving from the dispersion scenario to an integrated approach. Figure 3 illustrates the Transport Research and Innovation Portal (TRIP) established to provide this central focus (www.transport-research.info).
- TRIP is the only portal for all transportation research conducted on European and national levels. It is the result of years of experience in communicating research results, which began with the EXTRA project, initiated during the Fourth Framework Programme in 1997. The concept has been constantly developing to better address the evolution of relevant European Union policies, such as those focusing on transport, energy, and the environment. Previously known as the Transport Research Knowledge Center, TRIP was launched in April 2013 as the result of a new contract signed by the Directorate General for Mobility and Transport 1 year ago.
- TRIP includes information on approximately 7,000 transportation research projects but is much more than just a project database. It contains a country profile section presenting national institutions and organizations responsible for promoting and supporting transportation research as well as the programs for transportation research and innovation at both national and European levels.
- Quarterly brochures are published to highlight research achievements supporting specific policy topics. Each brochure is supplemented by a video of the most important findings. An e-newsletter is issued monthly.
- TRIP projects are classified into 24 themes. The thematic research summaries explain the focus of each theme (which includes modes, sectors, technologies, and policies) and are useful supporting documents for decision making.
- The TRIP website features a news section, which presents the latest information on transport research and innovation, as well as a calendar of high-level national, European, and international transportation conferences and events.

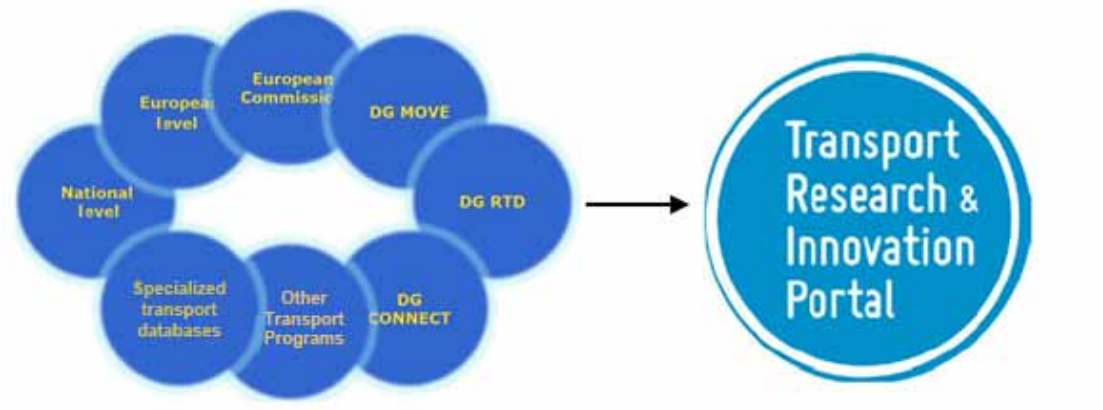

FIGURE 3 Transport Research and Innovation Portal (TRIP). (DG MOVE = Directorate-General for Mobility and Transport; DG RTD = RTD = Directorate-General for Research, Technological Development, and Demonstration; DG CONNECT = European Commission Directorate-General for Communications Networks, Content & Technology.)

- To consolidate and position TRIP as the sole portal for all transportation research, the European Union seeks to cooperate with existing databases. Cooperation may take many forms, including links to other sites, the development of common portals for accessing information, and database integration. Currently, the integration scenario is being developed only at the European level. Cooperation with other groups worldwide may be considered in the future if it is technically and financially feasible and strategically advantageous.
- The recently launched HERMES project, funded by the European Union's Seventh Framework Programme for Research and Technological Development, is one example of the European Union's willingness to enhance cooperation with other regions. This initiative will develop a portal for transportation databases around the world, including cooperation with the TRID database. It will cover past and ongoing research projects as well as databases from Europe and worldwide. The HERMES project will provide access to research information by harmonizing relevant databases.
- Furthermore, the main goals of TRIP remain unchanged: to communicate and disseminate research information activities under way by expanding and updating the web-based service, providing focused, aggregated analysis of transportation research results, and exploring methods to accelerate the application of research results.
- Raising awareness represents a next important step. Improving visibility, expanding the audience, widening geographical coverage, and increasing the number of users are all important components.
- To raise awareness, the European Commission has concentrated efforts on developing a new communication and dissemination strategy that entails creating a new look with a catchy new name, a revised slogan, and a brand-new visual identity.

These elements provide a new beginning for the project, moving away from the previous old-fashioned look. User-friendliness also has been improved, most notably with the search tool.

- Recent surveys indicate that the policy brochures appeal to audiences, so another measure has been to increase the frequency of such publications. Interest in these brochures is anticipated to keep growing, notably with the introduction of supporting videos and translations into French and German. Diversification of the dissemination instruments includes targeting mailing lists and posting paper publications to an exclusive audience. Improving networking and interaction is focused on official participation in conferences and workshops, the sharing of experiences with similar projects, and interaction with relevant stakeholders.
- The new communication and dissemination strategy will help expand information to new users and to regions not yet covered. It also will support policy by reaching out to policy makers and stakeholders. Furthermore, it will help share best practices, identify the most relevant success stories, and disseminate them as case studies. Finally, the new strategy will support the parties interested in participating in future projects.
- European transportation research is one area that is not expected to become a victim of economic circumstances or austerity. The expected increase in financial resources for the next 7-year period is a sign that the European Union is committed to a constructive approach based on the continuity of its policy. This commitment also applies to transportation research and, consequently, to the access to research information. Funding is not the issue, because the cost of inaction is believed to be greater. Much is to be learned from other experiences to better face common challenges. Sharing knowledge and enhancing cooperation on projects with similar objectives continues to be important. The communication and dissemination of transportation research is, and will remain, a top priority of the European Commission.

TRID

Past, Present, and Future

Lisa Loyo, *Transportation Research Board*
Birgitta Sandstedt, *Swedish National Road and Transport Research Institute*
Kenneth A. Winter, *Virginia Department of Transportation*
Andrew J. Meier, *ARRB Group, Ltd. (presiding)*

TRID, THE TRIS AND ITRD DATABASE

Lisa Loyo

Lisa Loyo described the development and evolution of the Transportation Research Information Services (TRIS) and International Transport Research Documentation (ITRD) databases, their integration into the Transport Research International Documentation (TRID) database, and the current status of the TRID database. She discussed the benefits of the TRID database and ongoing operating challenges. Loyo covered the following topics in her presentation:

- One of the original objectives of the Highway Research Board (HRB), the predecessor to the Transportation Research Board (TRB), was to "collect and disseminate completed and current research." The Highway Research Information Service (HRIS) was established in 1930 to help accomplish this objective. By 1967, mainframe computer technology allowed for the development of the HRIS database, which stored both research in progress and published research.
- Many improvements were made to the HRIS database during the 1970s, 1980s, and 1990s. An initial enhancement was to expand the HRIS database to include other modes. Standardized data entry forms were developed and put to use. When HRB became TRB, the name of HRIS was changed to TRIS. In addition, the TRIS database become more collaborative with the participation of the National Safety Council, the Maritime Technical Information Service, the National Technical Information System (NTIS), the ITRD database, and the American Society of Civil Engineers (ASCE). A Transport Library (TLIB) agreement also was established with the Northwestern University Transportation Library and the University of California, Berkeley. The TRIS database became available through the online database vendors Dialog and TRANSPORT on Silver Platter (now OVID) in the 1990s. Also during the 1990s, the Transportation Research Thesaurus was integrated into the TRIS database.

- In the 2000s, TRIS Online became available on the Internet through the U.S. National Transportation Library of the U.S. Department of Transportation (DOT). In 2002, the Research in Progress (RiP) database was released as a separate online database. In 2005, the web-based TRIS data entry system was implemented. Collaboration was expanded worldwide to include content from the Virginia Center for Transportation Innovation and Research, the Virginia DOT, the Transportation Association of Canada, the Swedish National Road and Transport Research Institute (VTI), the Dutch Institute for Road Safety Research, ARRB in Australia, and Taylor & Francis.
- In January 2010, TRIS Online was moved to TRB and released on the TRB website. In addition, TRISWorld was available to TRB sponsors. Functionalities also were added, allowing users to preview abstracts, share results via social media, print and e-mail search results, and subscribe to RSS feeds. Later in 2010, although the databases still were separate, the TRIS interface enabled searching of thr RiP database.
- The International Road Research Documentation database, initiated by the Organisation for Economic Co-operation and Development (OECD) in 1972, was renamed to ITRD to better reflect all modes and aspects of transportation. The ITRD mission is to facilitate the sharing of transportation research and experience worldwide. ITRD is overseen by the Joint Transport Research Centre (JTRC) of the International Transport Forum and OECD; the ITRD Operational Committee reports to the JTRC Steering Committee. A Terminology Subcommittee manages the ITRD Thesaurus. The ITRD database is financed by membership fees and is available via TRANSPORT (OVID).
- The decision to integrate the ITRD and TRIS databases was made in spring 2010. The ITRD files were loaded into the TRIS data entry system. Searching was enabled for the ITRD Thesaurus, codes, and subject areas so the ITRD Thesaurus were mapped to the Transportation Research Thesaurus. Reverse mapping of the Transportation Research Thesaurus to the ITRD Thesaurus is planned. It is possible to search for and access material in English, French, German, and Spanish.
- TRID, the combined TRIS and ITRD database, was released in January 2011. The total number of visits reached 1 million in November 2011, and the number of unique visitors reached 1 million in January 2012.
- Numerous benefits have been realized from the integration of the TRIS and ITRD databases. It has provided TRB with the opportunity to make enhancements, including better indexing in Google and the use of diacritics. It also has focused support through the single infrastructure and has provided a streamlined process for the ITRD database.
- The TRID database offers numerous benefits. It (*a*) provides one location for research and knowledge, (*b*) avoids the duplication of work and saves resources for researchers as well as for library collections and services, (*c*) can be used to identify

areas where research is needed, or practitioners and experts in specific research areas, (*d*) provides long-term access to records, and (*e*) is a strategic tool for organizations such as the JTRC.

- Additional work is needed to maintain and enhance the TRID database. The TRIS data entry system was further developed to accommodate direct indexing by ITRD members. It already has the ability to import files sent from ITRD members, TLIB, and others. TRB indexers enhance records from Taylor & Francis and ASCE with index terms as needed; original abstracting and indexing are undertaken as needed. Requests are received continually from authors and publishers to include their publications in the TRID database due to increased awareness worldwide. Problem areas for further examination include the use of different indexing terms, standards, date formats, and punctuation rules. Duplication of records is an issue that requires further attention.
- The TRID database is a service to the world. It provides a central location for transport research and covers broad content that spans decades and is free to the public. TRB maintains the quality of the TRB records and provides easy access to the full texts of TRB publications. Other content comes from other contributors.
- The TRID database is a shared responsibility, and TRB cannot control all of the elements, including record quality, content availability, and links to full text in records from other contributors to the database. In addition, other groups use different standards and indexing languages.
- Different users probably have different experiences with the TRID database; their experiences depend on their resources. A TRB sponsor, a university student, and a member of the general public each would have different experiences. As such, the TRID user experience is a shared responsibility among TRB, contributors, and users. Ultimately, the responsibility to obtain the full text remains with the user.
- The TRID database currently includes more than 950,000 records. TRB continues to import and edit records from publishers and to import records from other contributors, such as TLIB and the Belgian International Association of Public Transport. The stream of requests and materials submissions to include in the database is steady. At the time of the conference, 2,446,486 total visits to the TRID database had been counted, with 1,782,715 unique visitors from more than 200 countries. Records were available in more than 20 languages. The TRID database accounted for 49% of traffic to TRB websites and 9% of traffic to all of the National Academies websites.
- The contributions of Shirley Morin were recognized. Earlier in the year, she had retired as TRB's TRIS database administrator after working for TRB for more than 40 years. Morin passed away 1 week before the conference.

SUBMITTING CONTENT TO TRID, THE TRIS AND ITRD DATABASE: VTI's EXPERIENCE

Birgitta Sandstedt

Birgitta Sandstedt discussed the Swedish National Road and Transport Research Institute (VTI). She described the VTI Library and Information Centre (BIC), submitting information to the TRID database, and some of the challenges and successes that VTI has encountered. She provided more detail on the BIC and other activities in a second presentation. Sandstedt covered the following topics in this session:

- VTI is a national research institute in Sweden under the Ministry of Industry, Employment and Communications (www.vti.se/en/library). It has a broad competency profile, and applied research and development is conducted in all modes of transportation. Research areas include pavement technology, infrastructure maintenance, vehicle technology, regional and urban transport planning and decision-making processes, transport systems, transport economics, people in the transport system, traffic safety, traffic analyses, and the environment.
- Commissioned by the Swedish Government, BIC is the Swedish information supply center in the transportation and traffic sector. It serves as the national center for international cooperation within the transportation research information area. It became an ITRD center in 1972. BIC developed and operates Transguide (www.transguide.org), the Swedish portal for transportation research. The top quality functions and interface of the TRID database and the reliable information sources were cited.
- Information from BIC is inputted to TRID, the TRIS and ITRD database, for several reasons. The TRID database provides exposure to Swedish transport research, because TRID attracts users are from many different countries; allows Swedish researchers access to research in other countries; enhances cooperation with other member countries and organizations; and is sustainable and free of charge for the users. Annual meetings are held at OECD for ITRD members. The opportunities for interaction are excellent. The BIC information professionals structure and edit information for efficient retrieval using the quadrilingual ITRD Thesaurus and the Transportation Research Thesaurus.
- The information submittal process has evolved over time. At one time, information was typed and mailed. One improvement used an input program to create a file in CF6 format, which was cut and pasted from the in-house database. Information sharing with TRB began by using export and import in XML. A program was developed to convert records from the library catalog in Transguide to the TRIS format and from the TRIS database to Transguide. Next, a program was developed

to convert records from the Swedish library catalog to the TRID database in XML format. The ideal method is to submit the relevant Swedish records to the TRID database by exporting a file from the library catalog database without having to add anything or change the stored information.

- Many activities have been conducted to enhance the process. TRID fields and content have been compared with the fields and content in the Swedish library catalog database. The database structure has been changed to make it more compatible with the TRID database, mainly separating information that has been stored in one field and adding new fields. All of these changes have been made in accordance with machine-readable cataloguing as much as possible. Minor changes also have been made in the BIC cataloguing rules. Search terms in English from the ITRD Thesaurus were already in use, but the codes now are added automatically.
- Many challenges have been encountered with these activities. For example, converting between different languages might cause problems. When creating XML output, the best approach is to use the right character encoding in the header information. For Swedish encoding, ISO 8859-15 seems to be best, but UTF 8 also should work. Equally important is to use the XML entities instead of &, <, >, ‘, and ” because these are used by XML itself. One good practice is to follow the directives from the World Wide Web Consortium (www.w3.org). It also is valuable to have direct contact with the individuals responsible for submitting the data into the remote database, at least in the beginning. Problems are much easier and faster to resolve with one-on-one contact; however, this approach requires competence in information technology. In the beginning, a two-way conversion was considered that resulted in a program approach that became quite abstract and complex. Now a more straightforward, one-way design is used that is easier to maintain. Finally, if anything changes in the database design, possible changes needed in the conversion program must be investigated.
- Even with these challenges, successes have been achieved. An increasing number of published Swedish transportation research records are being submitted to the TRID database in an efficient way without duplication of effort. The next step is to convert records from the national transportation research catalog that was launched in the Transguide portal this spring.

THE VIRGINIA DEPARTMENT OF TRANSPORTATION RESEARCH LIBRARY AND TRID

Kenneth A. Winter

Ken Winter discussed the services offered by the Virginia DOT Research Library (http://69.63.217.27/V92004/OPAC), the changing expectations of library patrons,

and the link between the library and the TRID database. He demonstrated the many online tools available to users. Winter covered the following topics in his presentation:

- When considering online information resources, it is important to begin with the customer in mind. Understanding the needs and preferences of customers or stakeholders is key to developing an online resource that they actually will use.
- The Virginia DOT mission is to plan, deliver, operate, and maintain a transportation system that is safe, enables the easy movement of people and goods, enhances the economy, and improves our quality of life. The focal point of the agency it to deliver the program on time and on budget. Virginia DOT has downsized by 40% since 2009, even though the number of employees has increased slightly of late. Workforce turnover has resulted in a large loss of institutional knowledge. The number of Virginia DOT research reports has been trending down. Employees have new roles and additional responsibilities. Some tasks are going undone, and others are carefully prioritized. Time is everyone's most precious resource. Ensuring that staff members do not duplicate efforts is critical.
- Virginia DOT is a TRB sponsor. A portion of annual TRB membership fees supports the development and ongoing maintenance of the TRID database. As a sponsor, Virginia DOT has access to some TRB resources that are not available to others. The use and impression of the TRID database probably varies among different groups.
- The trends of the Virginia DOT Research Library mirror those of the agency as a whole. The Virginia DOT Research Library was downsized by 60% in 2009; however, it has experienced a slight upward trend recently. Staff turnover resulted in a loss of institutional knowledge. Plans to remodel and expand the library have been permanently shelved. The budget to acquire material has remained strong and even increased. Library staff spend less time on cataloging. The TRID database is being used for state DOT reports, and the NTIS is the primary new resource for obtaining the full texts of state DOT technical reports and articles, rather than collected and cataloged printed copies. At Virginia DOT, the emphasis is more on access to a document than possession of a document in the library. Service excellence at the Virginia DOT Research Library focuses on speed, outreach, anticipation, and follow-up. A recent trend indicates that patrons delegate TRID searches to the library staff.
- The library catalog is one of many knowledge silos available to Virginia DOT Research Library patrons. Library staff continue to seek ways to help patrons search multiple repositories with a single search by automating, aggregating, or federating the process. Some methods that Virginia DOT is experimenting with include the use of a search federation through the vendor Serials Solutions (one example of software as a service), SharePoint federated locations, and RSS daily e-mail alerts.

- The library collection includes 46,000 items that are physically located in the library and 765,000 full-text items accessed via eight databases. Virginia DOT Research Library offers three general categories of services. Research services include literature searches, research support, and synthesizing results; technical services include collection development, cataloging, and acquisitions; and delivery services include interlibrary loans, document delivery, and digitization.
- Like at other libraries, the focal point for holdings and collections at Virginia DOT historically has tended to be the library catalog. This focus is changing because library catalog records still are mostly surrogates for physical objects that can be accessed only on shelves. More holdings have electronic access, and many users prefer self-service access to online content, but access often is subscription based (not free). This approach succeeds if the TRID database helps Virginia DOT users access requested content via URLs that resolve to freely accessible content, a current subscription, or connection with a library service that can provide it. The Virginia DOT Research Library relies on the TRID database for both index holdings and links that resolve properly based on Virginia DOT subscriptions and contracts with publishers such as ASCE and Elsevier.
- The Virginia DOT Research Library can make a case for more funding by focusing on the Virginia DOT mission and justifying the return on investment by consistently meeting or exceeding management expectations. The key questions being asked are how to close the gap between discovery and delivery, how to use automation as a force multiplier, how to reduce duplicated efforts, which past activities can be automated, and which past activities can be eliminated.
- The main expectations of Virginia DOT top management for the research library include conserving department resources; saving employee time; increasing employee productivity; and providing value-added services related to the organization, synthesis, and contextualization of information. Other expectations focus on minimizing or preventing the impact of litigation on Virginia DOT, anticipating the organization's future information needs, providing quality assurances that valuable information has not been overlooked, offering the appropriate quantities of information in the formats that users desire, and ensuring a high-quality user experience. (For example, would patrons recommend the library to a colleague?)
- Because the Virginia DOT Research Library relies on the TRID database and other tools to help meet the expectations of management, the same expectations can be applied to the TRID database. The TRID database should save users time and resources. The customer experience also is important with the TRID database. Two components are especially important for the TRID database. The first component is database content, which includes primarily scope, coverage, quantity, and accuracy but also quality control (e.g., broken links, duplicate records), quantity and quality of bibliographic citations and coverage, desired descriptive fields, desired linkages, and

fulfillment options. The second component is the user interface, which is the look and feel of the database, options for expanding or limiting searches, available features, ability to personalize requests, and ease of use.

- Eight "laws of information value" can be used to assess how well the TRID database is meeting these expectations (adapted from Rosenberger, Joseph L. Answers Are Easy. *Across the Board*, Vol. 34, No. 4, April 1997, p. 41): (*a*) faster information drives out slower information; (*b*) inexpensive information drives out expensive information; (*c*) direct-delivered information drives out indirectly delivered information; (*d*) content-rich information drives out content-lean information; (*e*) customized information drives out mass-produced information; (*f*) timely information drives out untimely information; (*g*) user-friendly information drives out user-unfriendly information; and (*h*) secure, stable information drives out unsecure, unstable information.
- The Virginia DOT Research Library uses the TRID database for many technical services that the library does not provide, often as a result of staffing and space constraints. It relies the database to index periodical literature and to find reports from other state DOTs (approximately 800 to 1,000 of these full-text reports are obtained online each year, free or with a NTIS subscription). The TRID database or the Virginia DOT library catalog is used for FHWA, U.S. DOT, and international reports. The library catalogs Virginia DOT publications, especially research reports; however, the number of research reports has declined over the past few years, with 38 reports published in FY 2009 but only 13 in FY 2012. The Virginia DOT library attempts creates linkages from the TRID database to the Virginia DOT library catalog to connect patrons with library holdings, online access to the full text of Virginia DOT research reports, subscription content, and library services.
- The Virginia DOT Research Library also uses the TRID database for many research services. The database may be used to verify details (e.g., publication date) of a known citation, find a few relevant citations quickly, obtain a snapshot of published literature on a specific topic, or observe trends or patterns in the literature (e.g., key publishers and research centers, major authors, trending topics, new terminology, and research gaps). It also may be used to determine a document's general availability (including Virginia DOT library holdings), locate an abstract, or help a patron connect with peers who have relevant knowledge.
- Virginia DOT library staff conduct literature searches on a wide range of topics, and the results can assist in avoiding or minimizing litigation through highly customized value-added deliverables. The Virginia DOT changed its legal strategy on one recent case in response to information that the library staff provided as a result of a literature search, thereby saving the agency resources.
- Virginia DOT library staff may prepare a research synthesis bibliography (RSB), which contains a detailed summary of available literature and the current state of the practice, on a topic of special interest to the department. Recently, an

RSB was completed after the U.S. Army Corps of Engineers halted a Virginia DOT construction project that involved milling and recycling asphalt, building a new bridge approach, and laying down a new roadway. Rather than paying to remove the asphalt and bring in fill dirt, the Virginia DOT project engineer had proposed moving the reclaimed asphalt pavement from one location to another on the same job site to help build the approach. The U.S. Army Corps of Engineers was concerned about the environmental impact—specifically, leaching—of this approach. A quick search of the TRID database revealed several key citations from a single researcher, providing a body of knowledge that this approach was environmentally sound. Rather than simply providing a few citations, the Virginia DOT library staff completed an RSB to document the research and show due diligence. The U.S. Army Corps of Engineers agreed with the research findings, and work on the project resumed, keeping the project on time and on budget. The same RSB also was used for another Virginia DOT project facing a similar situation. Some recent RSBs completed are illustrated in Figure 4.

- Virginia DOT library staff typically complete a comprehensive literature search in 10 to 35 hours and an RSB in 25 to 45 hours. In both cases, the TRID database typically is searched first but never is the only database searched; depending on the topic, at least two or three databases are used in a literature search. Instances in which the TRID database is not searched perfunctorily (even when the search in question is not related to transportation) are rare.
- The RefWorks citation management tool (www.refworks.com) is a cloud-based application that helps Virginia DOT harvest and manage citations from different databases, including TRID, ASCE, EBSCO Information Services, the Online Computer Library Center (OCLC), and many others. It enables users to copy citations from the TRID database to RefWorks with one or two key strokes. No cutting, pasting, or rekeying of citation data (e.g., author names, titles, or abstracts) is required. The output content can be presented in numerous styles, which can be customized. RefWorks assists the Virginia DOT library staff in quickly organizing, analyzing, and synthesizing citations and creating customized deliverables. Without a citation management tool like RefWorks to automate the process of gathering citations and ensuring quality control (e.g., removing duplicates), the library would be able to serve only a fraction of the need for creating annotated bibliographies agencywide.
- Virginia DOT literature searches and RSBs realize numerous benefits, including allowing research scientists and engineers to use their time more effectively (i.e., less searching for information, more analyzing and acting on it) and integrating library staff into the research process. Other benefits include increased use of library materials, interlibrary loans, and document delivery; less duplication of effort; and

FIGURE 4 Example research synthesis bibliographies recently completed at the Virginia DOT Research Library.

increased innovation. They also save time in the long run as they are referenced again. However, literature searches and RSBs do require time and resources to complete and may become obsolete quickly, depending on the topic.

- A busy knowledge worker at a state DOT office often will decide (due to time constraints) to search the library catalog, the TRID database, or one of eight subscription databases. However, a busy user has the option of searching all of those resources at once with OneSearch, the library's federated search tool. A federated search allows simultaneous searches of multiple resources with one search string; the user's single search request is distributed to multiple online resources, and search results are presented on a simple results screen. Federated searches simplify the search process, save time, and increase productivity for users, who do not have to choose one database or complete one search at a time. The federated search interface features value-added elements that provide further enhancements. Federated searches typically target the TRID database and may not be appropriate for complex searches, because precision may be lost and because of the difficulty establishing and maintaining connections to other databases.
- The Virginia DOT library also offers a daily alert of RSS feeds, e-mailing a unique alert each morning. Any online source that uses RSS for syndication is a potential target. The number of feeds an individual can monitor and the frequency

of results delivery are unlimited, and the service works with any RSS feed. It unifies feeds from multiple sources into a single daily alert. It converts RSS, which may be unfamiliar technology to most users, into a more familiar format: e-mail. With the daily alert, researchers do not have to search the TRID database to stay current on new developments. A saved-search RSS feed ensures that all new content added to the TRID database that matches the search criteria will be delivered to the specific patron requesting it. It can save users time and increase productivity, thereby providing the ultimate proactive library service. Possible limitations including overloading users with too many results and ensuring the correct topics are requested.

- Remembering the conference overview is important: "Much as transportation researchers rely on access to the best available information, information professionals rely on best available practices and research tools to serve those information needs. Tapping those international information sources and practices that are not currently accessible has a huge potential to increase the efficiency, value, and effectiveness of the entire transportation community." Both operational and research needs can benefit from increased access to international information. Consideration of how success is defined also is needed. Success may be measured as the number of records in the TRID database but is related more to outputs than to outcomes. In terms of impact, a record that is included in the TRID database but is inaccessible to patrons because of some barrier is not successful. The Virginia DOT has made an extra effort to ensure that all Virginia DOT research reports (currently approximately 2,000) are indexed in the TRID database, the OCLC, and Google, including robust abstracts to describe each report and links to full-text documents for quick online access. The Virginia DOT does this because research that cannot be found cannot be used. Additionally, information that cannot be used will not be cited, and if not cited, the information will not be relevant. Patrons may initiate literature reviews by using the TRID database rather than the Virginia DOT SharePoint site or by using Google rather than the Virginia DOT library catalog. The TRID database is an important element of the Virginia DOT library services. It is practical, works well, and provides a valuable resource for the department.

Current Practices for Information Sharing, Part 1

U.S. Perspectives

Roberto A. Sarmiento, *Northwestern University Transportation Library*
Anne Caputo, *Special Libraries Association; Dow Jones' Learning and Information Professional Programs*
Bill Nara, *American Society of Civil Engineers*
Kenneth A. Winter, *Virginia Department of Transportation (presiding)*

This session provided three perspectives from the United States on information-sharing practices that could be used to enhance the TRID database. The speakers discussed barriers to information sharing and successful practices for addressing these concerns from the perspectives of the university, the private sector, and a national organization.

LIBRARY PERSPECTIVE: EVOLVING ROLES TO FACILITATE INFORMATION SHARING

Roberto A. Sarmiento

Roberto Sarmiento discussed the Northwestern University Transportation Library (NUTL) from a perspective as both an acquirer and a user of international transportation research information. He presented an overview of NUTL, the development of the partnership between NUTL and the Transport Research International Documentation (TRID) database, and NUTL international acquisitions. He also described the partnership model between NUTL and the Transportation Research Board (TRB) and a possible future model for the acquisition of international information. Sarmiento covered the following topics in his presentation:

- Northwestern University is a private research institution. NUTL is a special library within the Northwestern University Library, which is one of the top 25 academic libraries in the United States. Northwestern currently has a federally funded university transportation center; funding for NUTL comes primarily from centrally allocated moneys, endowments, and grants. NUTL holdings include approximately 500,000 records, most of which are paper copies, but electronic publications are becoming increasingly common.

- The NUTL collection includes all modes of transportation: roads, rail, aviation, maritime, and pipelines. Records are collected in all languages, but English is the primary language. The library places a special emphasis on collecting transportation information from other countries, regardless of language. It is working to digitize historical materials as well as recent technical reports, international reports, environmental impact statements (EISs), and other collections.
- Employing three librarians and four other staff members, NUTL considers itself as a resource to the country and the world. As such, it has a large interlibrary loan department, lending its collections to individuals and agencies nationwide and worldwide. The NUTL reference unit answers thousands of reference questions annually. The library has a fairly substantial acquisition budget to subscribe to many journals and to acquire a significant number of other materials annually. In addition, as part of a major research university library, NUTL can provide access to specialized databases and resources that are unavailable to traditional transportation libraries in the United States.
- NUTL is committed to sharing information with the nation and the world through its Transport Library (TLIB) partnership with TRB, which began in the early 1980s. This partnership has evolved over time. NUTL initially provided only the indexing of journal articles and bibliographic information for conference proceedings but has expanded to include bibliographic citations for EISs, transportation dissertations from the Unites States and abroad, and digitized titles. NUTL currently indexes approximately 250 journal titles, about 40% of which are international; however, NUTL provides TRB with only bibliographic citations. Because of its limited resources, NUTL is unable to provide full-text records or abstracts for the articles or other materials, but some links to full text are provided, if available. As of July 2012, approximately 15% of all TRID records originated from NUTL, illustrating the importance of this contribution.
- Many costs are associated with NUTL's commitment to this partnership. Northwestern pays for the subscription costs and staff time to index records. The TLIB partnership has significant benefits for NUTL (including free TRB subscriptions) as well as for national and international users. The partnership places NUTL's collections in play by providing users throughout the country and the world access to the NUTL collections. This sharing of collections has enhanced development of NUTL and has helped establish NUTL as one of the world's leading transportation libraries.
- The initial TLIB partnership included TRB, NUTL, and the Harmer E. Davis Transportation Library at the University of California, Berkeley. When the partnership began in the 1980s, it was realized that sharing information would benefit all three organizations as well as users. The partnership attempted to index as widely and deeply as possible, on as many transportation information subjects as possible. Expanding into international collections was an ongoing focus for NUTL

and others. NUTL has continued to expand its coverage and sharing of information by including its EIS and other collections. However, the limits of content expansion are approaching, and problems have been encountered in sharing information, partly because full-text records are not provided. A labor-intensive task, the indexing of records is becoming cost-prohibitive when faced with dwindling resources. In addition, commercial companies now are producing resources that provide information similar to what NUTL indexes in a much more cost-effective manner, bringing into question the need to index materials for TLIB.

- Research libraries take great care to preserve information because they are in the business of acquiring and maintaining information for a long time, if not forever. The intent is to provide information for researchers today and in the future. NUTL is working to ensure that materials are available, physically and electronically, for years to come. Although Northwestern's collections include many reports, they also include books, journals, maps, realia, presentations, digital objects, and rare materials. A cost is associated with the acquisition of many such items.
- As a research institution, NUTL is required to acquire international materials. The acquisition of international materials is expensive. Fortunately, language and translation concerns have not been a major issue. As demand has grown among graduate students and faculty, increasing amounts of information in Chinese have been acquired. NUTL acquires all of its international materials by partnering with commercial vendors. Having local vendors acquire unique and hard-to-collect non-U.S. materials separates NUTL from all other transportation collections in the country. Some vendors provide additional services, such as cataloging the titles and then delivering the electronic records for addition to NUTL's catalog.
- The TLIB partnership model has been successful for many reasons. Historically, it was the only source providing comprehensive information about transportation research. International transportation research information has been added over time, and ongoing technical and content improvements have been made. The partnership has served as a model for other research information partnerships in the United States. However, the future of this partnership model appears bleak for a few reasons: the University of California, Berkeley, has drastically reduced its indexing output, Northwestern is running out of new content collections to share, and new library partners are not joining in to increase indexing content. In addition, very little international transportation research information is being acquired by other U.S. universities and state department of transportation libraries (primarily because of costs) and shared with the TRID database. Indexing both domestic and international information requires time and resources, both finite commodities at all institutions. Overall, the partnership model involves high financial costs for the partner institutions. No U.S. transportation libraries have the collections or the staff to support such a partnership because they cannot afford it.

- Looking to the future, some other issues place the TLIB partnership at risk. For the most part, TLIB does not provide the full-text records that users want and must be provided in order to succeed. Technical and copyright issues increasingly are related to acquiring, sharing, and delivering information, making it difficult to index and share materials with the TRID database. The economy is another issue. Even though the ongoing sustainability of NUTL appears good, future changes are certain to affect NUTL's partnership with TRB. All these issues make NUTL believe that the TLIB model may be obsolete and not sustainable in the long term.
- On a more positive note, TRB is expanding its TRID coverage to include more international partners; therefore, its reliance on TLIB is decreasing. Additional benefits should be realized as technologies evolve. One persistent issue is that probably no U.S. library will be able to provide an acceptable amount of international transportation research information due to limited resources. Libraries and U.S.-based information aggregators may be economically and structurally too fragile to develop and deliver a steady stream of quality international transportation information. TRB's current model of international information acquisition—developing agreements between selected organizations—is one approach. These agreements are somewhat limited by mode or geography, selective, and limited by other structural factors. As a result, this approach may be only partially successful in acquiring international information. In addition, this free or almost-free model for TRB may be unrealistic and unsustainable in the long term because the partner assumes all financial responsibilities (as in the TLIB model).
- NUTL's experience with international information providers suggests another possible model for establishing a steady acquisition stream of international documents. This model is based on contracting with local international vendors or information-providing companies to acquire—on behalf of TRB—transportation research information from diverse local, regional, national, or continental sources and make the reports available to TRB. With this approach, TRB would create a collection development policy that specifies the types of materials it wants to acquire, the list of publishers, the years of coverage, the languages, the formats (electronic or hard copy), and other elements. Thanks to its local knowledge, a vendor then would begin to collect materials that fit TRB's scope and make them available. TRB also could train the vendor's staff to enter bibliographic data into the TRID database and provide a hard copy to TRB, if wanted or needed. This approach would ensure more complete coverage of all modes as well as current and historical information because the vendor would cover more agencies over a larger geographical area. This model is scalable because it could be implemented by country or region and could provide better control of the information acquired. However, this model will require funding to contract the vendors as well as time for TRB to create a collection development policy and to manage and train the vendor(s), among other activities.

CORPORATE PERSPECTIVE: BARRIERS TO AND INCENTIVES FOR INFORMATION SHARING

Anne Caputo

Anne Caputo discussed the perspective of publishers and aggregators on information sharing. She described what publishers and aggregators look for in a relationship with content providers, why not all past relationships have been successful, what future relationships might look like, and how to create successful relationships. She highlighted examples from her experience working for publishers and aggregators. Caputo covered the following topics in her presentation:

- Publishers and aggregators want many things. Aggregators can be defined as content acquirers; they do not produce content themselves but collect content from sources such as government agencies, universities, associations, and publishers. Aggregators and publishers have what librarians call collection development policies. The content goal may be thematic (e.g., news, technical areas, or intellectual property). The aggregator most like a supermarket (in that it collects content across many subject areas) is Dialog. The Transportation Research Information Services (TRIS) database used Dialog to fill a content area in its aggregator policy. Aligning with aggregators' and publishers' content goals is important. Aggregators and publishers want high-quality content. Data must be clean and consistent, with high-quality indexing, full-text records, and formatting that can be easily integrated into the publishers' system. Consistent formatting which can be an issue for the TRIS and TRID databases is important, and global coverage is a desired attribute.
- The content must be marketable to an audience that can pay for it and expects to. For publishers, revenue is the bottom line; they do not provide a public service. With Google and other free online information sources, many people do not want to pay for information. The expectation that information is free can create a tension between publishers and consumers. Royalty agreements and cost and revenue plans are key elements in developing a relationship between aggregators or publishers and content providers. One aggregator model is to share profits with the content provider for providing data; a 10% to 15% profit share is typically used. Another aggregator model is to pool the data provided by multiple content providers and to share profits according to access by paying users. This approach can have good results if the pooled information is successful in attracting paying users but bad if it does not.

- Content creators may have numerous goals for distributing their information and partnering with publishers and aggregators. Some goals include reaching a larger, more diverse audience and aligning with complementary content. Many content creators may find it desirable to be able to use the marketing capabilities of a publisher or aggregator and to have access to publishers' sales forces to proactively promote the content creators' information. Revenue may or may not be important to content creators, especially those in the public sector.
- Many issues appear to have affected past relationships between public-sector content providers (e.g., the TRIS and TRID databases) and publishers and aggregators, such as a lack of common goals, problems with content quality, and data inconsistencies. The timeliness of data also may have been an issue. Data from the current day is the most heavily used, followed by data from the current week; usage drops off dramatically for data more than 2 weeks old. The data in the TRIS and TRID databases are archival and historic. Publishers and aggregators now consider access to full text, graphics, charts, and graphs a basic requirement. Other possible issues include inconsistent international content, a lack of indexing, poor-quality indexing and metadata tagging, and incompatible royalty and partnership plans.
- Open and frank discussions about goals, expectations, and potential revenues are good beginning points for developing successful partnerships. Content may need to be made more attractive to establish working partnerships. Test cases may be appropriate to determine whether a market exists for information and data. Flexibility in shared revenue models also may be needed. Even though aggregators bring a lot of added value to the process, the use of an aggregator or publishers may not be needed to disseminate information from many public agencies because of the open access that the Internet provides. Identifying the value that content providers bring to the process is important, as is determining what aggregators and publishers want to buy rather than what you have to sell.

CURRENT BEST PRACTICES IN INFORMATION SHARING: A PUBLISHER'S PERSPECTIVE

Bill Nara

Bill Nara provided a publisher's perspective on information sharing. He described the American Society of Civil Engineers (ASCE) library database, the partnership between ASCE and TRB, and the benefits and limitations of sharing metadata. Nara covered the following topics in his presentation:

- S. R. Ranganathan, considered the father of library science in India, presented the five laws of library science in 1931: (*a*) books are for use, (*b*) every reader his or her book, (*c*) every book its reader, (*d*) save the time of the reader, and (*e*) the library

is a growing organism. These laws are still valid today; however, in the digital age, substituting "content" for "books" may be appropriate. Google has taken the three laws of the reader (every reader his or her book, every book its reader, and save the time of the reader) and run a marathon with them. The scholarly communications arena is a growing organism, which challenges ASCE, TRB, and other organizations.

- The ASCE Library database, the digital repository for online content, currently contains more than 91,250 records (http://ascelibrary.org), and approximately 8,000 new records are uploaded each year. It includes all the disciplines within civil engineering (i.e., transportation, structures, construction, infrastructure, environment, water resources, and geotechnical as well as professional issues) and covers the period from 1983 to the present. The collection currently includes 33 journals and 340 proceedings, and more than 250 e-book titles will be available as of November 2013.
- Establishing the ASCE–TRB partnership took time. TRB approached ASCE about the transfer of metadata from the ASCE Library database to the TRID database several years ago. The initial response from ASCE was not to transfer metadata to the TRID database because of impressions that the TRID database competed with the ASCE Library. That decision was short-sighted in retrospect but reflected the ASCE metadata policy at the time. This policy later changed, and ASCE signed a metadata transfer agreement with TRB in 2010.
- Several factors influenced the change in the ASCE metadata policy, but discoverability was the most important. For publishers, discoverability is imperative. As more and more content is being published every year, publishers must ensure that their content is easily available. Publishers are exposing not only metadata but also full-text records for indexing. Another factor was the changing view that metadata are not only content but tools for marketing and e-commerce. Usage statistics are critical for publishers, because librarians consider these statistics in making decisions about journal selection and renewal. The myth of the publisher portal is another factor. Publishers are aware that they need to be where the users are, especially on specialty websites. Digital object identifiers (DOIs) also allow for the virtual distribution of content. A final factor is standardization; metadata standards make transfers between machines easier.
- ASCE has a history of working with metadata partners. EBSCO and Swets are the main subscription companies that librarians use to order journals. ASCE has had a longstanding agreement with EBSCO to provide ASCE journal content; however, the content is embargoed in that it is not the most recent material. ASCE allows Google Scholar to index the ASCE website, and a large usage increase was realized after the initial indexing. ASCE also uses CrossRef, which is a DOI-based system that provides persistent identification of scholarly content and cross-publisher reference linking. Both CLOCKSS and Portico are third-party vendors that ASCE uses as dark

archives, which limit access to a few individuals or completely restrict access to all. CLOCKSS and Portico provide insurance to libraries so that if ASCE went out of business, they would retain access to ASCE documents.

- Several abstracting and indexing (A&I) services refer users to the ASCE Library, including EBSCO Discovery, Engineering Village, Web of Knowledge, ScienceDirect, Scopus, Serials Solutions, and the TRID database. Approximately 2.2 million ASCE abstracts were viewed in the 8-month period from January to August 2012. Approximately 23% of these views were through A&I services, 27% were through the publisher, and 50% were through Google.
- One question about these views is how long users stay on the ASCE website. Even though Google accounts for 50% of traffic (approximately 1 million visits), the average visit time is only 1 minute, 42 seconds. In comparison, the average visit times are 5 minutes, 17 seconds, through Serials Solutions Summon service, and 3 minutes, 30 seconds, through the TRID database. These differences highlight the importance of having a presence in multiple channels to reach light users and heavy users.
- The use of A&I services and partnerships with other groups have a few potential drawbacks. They include loss of branding (because the publisher is not in control of the message and can become lost as the content provider), content piracy (the risks associated with opening up full-text records to third parties means that partners must be trusted), and competition (in terms of less traffic across the publisher's portal pages).
- The advantages outnumber the potential drawbacks. Discoverability is a key benefit; publishers need to be seen where people are searching. We live in a Web 2.0 environment and must reach the user communities. Marketing exposure "at the long end of the tail" is another benefit, which relates to Ranganathan's "every book its reader" law. Many scholarly books and content may have only a small group of readers. The ability of these readers to find scholarly content is much greater if they can access it through their normal searches. Publishers are interested in e-commerce, increasing sales, and increasing usage statistics. DOI linking pushes users to the publisher's website, which may result in article and subscription sales. The publisher can control the e-commerce experience at that point. Users can search across a cross-publisher database. Finally, metadata can provide an additional revenue stream for publishers.
- ASCE supplies metadata and full-text PDF documents from ASCE journals and proceedings to the TRID database for indexing purposes only. These metadata include XML headers with standard bibliographic data, abstracts, and identifiers, including DOIs that link back to the specific papers on the ASCE website.
- The metadata that ASCE captures include title, author names with honorifics, and author affiliations (with institutions, countries, and e-mail addresses, when provided); index terms and author keywords; submitted, accepted, and published dates; volume, issue, and page numbers; journal name, publisher, and copyright

holder; the numbers of figures, tables, and references; and the DOI, International Standard Serial Number (ISSN), electronic ISSN, and CODEN information. By publication time, an entire manuscript can be considered metadata due to the nature of an XML file.

- The metadata process at ASCE highlights the importance of standardization. Metadata are platform-agnostic and follow the National Library of Medicine Document Type Definition. More than 7,330 records were processed in 2011. Authors enter metadata during online manuscript submission at ASCE, metadata are extracted (machine aided) from the manuscript at the compositor, and the full-time ASCE database manager assigns keywords and other metadata tags.
- ASCE and the TRID database have a win–win partnership. TRB strengthens the reputation of the TRID database as the single destination for discovering and accessing premium content in the transportation research field. ASCE Library content is exposed to a highly specialized, worldwide audience of transportation professionals who have the potential to become ASCE customers.
- The five laws of library science identified by Ranganathan can be modernized as five laws of information sharing in the digital age: (*a*) content is for use (i.e., metadata content serves no one when kept in a silo), (*b*) every reader his or her content (i.e., collections should meet the special interests of the community—specialized databases, for example), (*c*) every content slice its reader (i.e., XML-tagged metadata ensure that discrete content will find an appropriate reader), (*d*) save the time of the reader (i.e., include DOIs in metadata so that readers can efficiently connect to content), and (*e*) the digital library is a growing organism (i.e., information-sharing methods must respond to and accommodate advances in technology).

Current Practices for Information Sharing, Part 2

International Perspectives

Birgitta Sandstedt, *Swedish National Road and Transport Research Institute*
Andrew J. Meier, *ARRB Group, Ltd.*
George Kotsikos, *University of Newcastle upon Tyne*
Geert Smit, *Panteia*
Glenn E. Roberts, *New Hampshire Department of Transportation (presiding)*

SWEDEN: VTI LIBRARY AND INFORMATION CENTRE AND THE TRANSGUIDE INFORMATION PORTAL

Birgitta Sandstedt

Birgitta Sandstedt expanded on her earlier presentation in which she discussed the Swedish National Road and Transport Research Institute (VTI). She provided more detail on the VTI Library and Information Centre (BIC) and described Transguide, the Swedish portal for transportation research information. Sandstedt covered the following topics in her presentation:

- The Swedish government established BIC at VTI in 1920 as the national information supply center in the transportation and communication sector. Financed by grants and commission revenues, BIC is the Swedish center for international cooperation in the area of transportation research information.
- BIC developed the Transguide portal to transportation research information, which was introduced in 1991 (www.transguide.org). Supported and financed by the Swedish government, Transguide covers all modes and disciplines of transport and is continually being improved to provide a comprehensive forum for information on transportation literature, research, conferences, and related topics. The major topics of focus are traffic, road users, vehicles, transport, and infrastructure; related aspects include economics, environment, psychology, politics, planning, safety, and technology. An English version of Transguide is available, and search terms from the International Transport Research Documentation (ITRD) Thesaurus are used.
- The Transguide portal is a tool for analyzing Swedish transportation research, a one-stop shop that avoids duplication of effort and maximizes resources. To ensure quality, information professionals collect, check, and edit the information. BIC is

ISO 9001 certified and facilitates access to quality information to support creative, innovative, competitive, and quality research while promoting cooperation. Other centers, research programs, and groups do not need to develop their own databases. The use of a uniform data structure makes the exportation of information to other information sources, such as the Transport Research International Documentation (TRID) database, easy and efficient. The database contains gray literature—that is, publications not published commercially and other documents that can be difficult to find elsewhere.

- The Transguide website provides access to the national transportation library catalog, the national transportation research catalog, a conference diary database, a collection of links, a periodicals list, and the Dennis database. The library catalog contains more than 130,000 references to electronic documents and items held in the library. The research catalog contains information on ongoing and completed research projects. The conference diary database includes upcoming transportation conferences and workshops worldwide. The links collection includes connections to other Swedish and international transportation websites. The Dennis database contains the infrastructure scheme known as the Dennis Agreement, which was drawn up for the transport system in Stockholm County in 1992.
- BIC promotes cooperation in many ways. TRANSAM is an advisory forum established by the Swedish funding authorities in the area of transportation research to help coordinate national investments and calls for research projects. BIC has taken the initiative to begin a Swedish transportation research network for information professionals at libraries and information centers. VTI is a member of the National Library of Sweden's steering committee for national licenses for electronic resources and the multinational NordBalt Transportation Libraries. VTI has a representative on the ITRD Operational Committee; the ITRD database is a cooperative effort of the International Transport Forum at the Organisation for Economic Co-operation and Development's Joint Transport Research Centre. The VTI terminology group is active in the Forum of European National Highway Research Laboratories' Knowledge Center User Group as well as the Transportation Research Board (TRB) Committee on Library and Information Science for Transportation and the TRB Information Services Committee. VTI personnel participate in the advisory group for the European Union's HERMES project and the Special Libraries Association, Transportation Division. VTI also exchanges literature with Swedish and international organizations.

TRANSPORT INFORMATION COORDINATION IN AUSTRALIA: INITIATIVES, LESSONS, AND FUTURE PLANS

Andrew J. Meier

Andrew Meier provided an overview of the ARRB Group, Ltd. (formerly the Australian Road Research Board), and ARRB transportation research. He described the areas of expertise, the stakeholders, information services, the National Interest Services (NIS), the Transport and Road Update (TARU), and the Road Research Register. Meier covered the following topics in his presentation:

- The Australian Road Research Board was established in 1960, with an initial strong focus on pavements. The ARRB Group, Ltd., is a nonprofit organization with the vision "to be the trusted advisors to road and transport authorities for technical input and solutions." One of the four main strategic goals for the ARRB Group from 2011 to 2015 is "sharing industry knowledge and technical insight."
- The ARRB Group has expertise in a wide range of areas, including materials, pavement, and concrete design and testing; traffic engineering and road design; heavy vehicle testing and simulation; transport policy; operations; economics; infrastructure; asset management; bridge management and evaluation; equipment manufacture; data-collection services; parking; and climate change.
- The ARRB Group has numerous federal, state, and territory stakeholders in Australia and New Zealand. Federal sponsors include the Australian Department of Infrastructure and Transport and the New Zealand Transport Agency. State and territorial stakeholders include the Transport for New South Wales Roads and Maritime Services, the Queensland Department of Transport and Main Roads, and the Northern Territory Department of Transport.
- The ARRB library has been in operation for 50 years and currently employs a staff of 6.4 full-time equivalents. The first computer catalog record was created in 1976, and international involvement began in 1977. The collection currently contains more than 30,000 items, and the Australian Transport Index (ATRI) adds approximately 4,000 records each year. On average, members search the library index 5.5 times day.
- NIS, which began in the 1990s, supports the provision of land transport information services for the national interest. It is maintained by triennial agreements with federal, state, and territory road authorities. Contributions are based on those applied by Austroads, the association of Australian and New Zealand road transport and traffic authorities, in their membership structure.
- National interest initiatives encompass many activities. They include leadership and coordination, supporting services that are hard to produce individually, the distributed national collection concept, providing value from pooled resources, and acting as an international liaison on behalf of others.

- Some services that NIS provides include ATRI, TARU, the Road Research Register, Making News in Transport, the Road Safety Contacts Register, and the Rail Knowledge Bank. NIS also promotes cooperation and provides linkages for stakeholders.
- ATRI is a database of land transport publications that contains more than 170,000 publications, and more than 4,000 are added each year. A specialized thesaurus is provided, and links to full text are provided when available. ATRI helps put Australian and New Zealand material in an international context and now is made available through the TRID database and RMIT Publishing.
- Stakeholder feedback and usage data indicate that members use ATRI regularly. ATRI is available for use directly by staff of member organizations and also is a key resource for member libraries to use on behalf of clients. Use of the RMIT Publishing platform increases exposure at the university level. Opportunities exist for greater promotion of ATRI in member organizations to increase dissemination and awareness. Developing a wider awareness of the existence and possible applications of the ATRI Thesaurus also may be beneficial for the land transportation sector.
- TARU provides users with recent publications organized by key transportation research topic areas. It was relaunched as an RSS feed in August 2010. Users subscribe to e-mail alert notices for the topic areas that they select. Member libraries report a strong relationship between TARU and requests from clients for loans and document delivery. TARU provides a tool that member libraries can promote but do not have to maintain. Libraries play an important role in delivering materials that are not freely available electronically to clients listed in TARU. Wider marketing of the ways to access RSS feeds is needed to encourage even higher usage rates. Access to RSS feeds differs across member organizations. TARU content may be provided in alternative file formats to member libraries.
- The Road Research Register, an online database of research from Australia and New Zealand, supports stakeholder knowledge management and sharing and contains more than 1,400 records (www.roadresearch.com.au).
- Even though usage is not high, the Road Research Register is a strategic service. The degree to which individual jurisdictions submit material to the database governs dissemination, awareness, and usage levels. The Road Research Register needs ongoing promotion that includes highlighting the value of the resource and the importance of receiving a supply of content from members.
- Experience indicates that stakeholders differ in how they view the national interest. Providing different approaches and resources is important to meet the needs of various groups. Also, patience is required, because new ideas take time to become reality. More formalized cooperation, nationally and internationally, would be beneficial to reduce duplicated efforts, freeing resources to fill gaps elsewhere.

HERMES: ESTABLISHING A COMPREHENSIVE TRANSPORT RESEARCH INFORMATION MANAGEMENT AND EXCHANGE SYSTEM

George Kotsikos

George Kotsikos discussed the European Union's HERMES project. He described the different project elements; results to date; and the databases, search filters, and language availability. Kotsikos covered the following topics in his presentation:

- Part of the Seventh Framework Programme for Research and Technological Development, the HERMES project began in November 2011 and will end in February 2014. It was created in response to the European Commission's call for "providing the means of enacting productive international transportation research cooperation in the future," and "encouraging participation and dissemination of research results." Transportation research is a priority area in the European Union because an efficient and effective transport system is a fundamental prerequisite for economic growth. International collaboration in transportation research is the best means of creating fertile conditions for developing research innovations, promoting understanding, and identifying common solutions to common problems.
- The HERMES project contains many individual work packages. The three main activities at the core of the project are (*a*) creating a transportation research database portal to facilitate access to information on transportation research carried out internationally, (*b*) engaging researchers in discussions to address the issues that prevent closer international collaborations in transportation research, and (*c*) comparing studies of transportation research topics worldwide to assess the potential for future research collaboration.
- The major part of the project is the HERMES portal. This work task includes the necessary activities for creating a common portal that allows access to all identified transportation research databases in in the European Union, United States, Australia, Japan, and other countries of interest. Specific activities include identifying transportation research databases worldwide and establishing a dialogue with database managers. Related activities include investigating database accessibility, architecture, and compatibility and identifying the major players and centers of excellence in transportation research worldwide.
- The HERMES project aims to facilitate the creation of an environment for long-term international collaboration in transportation research. A spring 2013 conference is being organized to bring together researchers from around the world with similar research interests to identify obstacles to long-term collaboration and to express their opinions on the policies and measures that need to be taken to eliminate those obstacles. The output from this dialogue will be used to develop a list of enabling policies that need to be in place for long-term collaboration.

- The goal of the comparative studies is to investigate potential synergies in transportation research carried out worldwide by identifying similar projects conducted in the European Union, United States, Australia, and Japan and then to compare and assess their impacts. Four case studies from each of the four transport modes will be selected. Assessments will involve examining the market uptake, new products, processes, policies, economic benefits, and new industry standards. The case studies also will provide recommendations and topics for future international collaborative research projects.
- The HERMES consortium includes Newcastle University in the United Kingdom, Foundation WEGEMT in the Netherlands, European Aeronautics Science Network in Belgium, International Union of Railways in France, and Euromobilita s.r.o. in the Czech Republic. Collaborating organizations outside the European Union are TRB in the United States, the ARRB Group in Australia, and the Institute of Transport Economics in Japan.
- A list of worldwide transportation research databases was compiled by transport mode (currently, 62 aeronautics, 31 marine, 41 rail, and 34 road databases) and categorized as simple, searchable, or full. Approximately 70% of the identified databases are European. A simple database provides project lists with title, project topic description, project manager, and other basic information. Most simple databases are in HTML format and do not have search engines. A searchable database provides detailed research descriptions and information about the research group, contact individuals, and other information; most of these databases are accessible through a simple search engine without the need to use keywords or a thesaurus. The information usually is not translated into English. The full database, which continues to be expanded, is searched via a precise search engine with keywords and a thesaurus and provides detailed project information.
- Currently, no system for categorizing transportation research is universally agreed upon. For example, the different search engines used with the databases may filter by transport mode, publication or project, or region. The use of wildcards to catch additional characters without duplicating search results (e.g., typing “bridge*” to returns results for both “bridge” and “bridges”) also differs.
- Language is another important issue. Not all databases are available in English, and terms may be used differently in various countries and databases. In the TRID database, a search on the keywords “heavy vehicle*” in all fields finds only eight results, whereas a search on “truck” finds 85 results. In the Australian Road Research Register, a search on “truck” finds 50 results, and a search on “heavy vehicle*” finds 144 results. Commercial organizations and other groups also have restricted-access databases.
- Case studies of all transport modes from the European Union, the United States, Australia, and Japan were selected for comparative studies. Road-related projects were searched for the term aerodynamics because it relates to safety,

environmental impacts, and energy efficiency. The results indicated considerable differences in the number of research studies on this topic conducted in the different areas. The search term "aerodynamic*" in all fields brought up 0 results from Australia, 2 results from the United States, and 45 results from the European Union. However, research on this topic is known to be conducted in Australia and Japan as well as in more than two projects the United States.

- The HERMES project has identified many challenges associated with the creation of a research information portal. However, several issues have been resolved, and work to develop a suitable code is ongoing. The HERMES portal is on target to become operational in April 2013. Preparations for the International Conference on Transportation Research Collaboration are under way, and a questionnaire for the scientific community to express their views on policies to facilitate international collaboration is being prepared. The response for international collaboration in transportation research information sharing has been remarkably better than anticipated.

THE TRANSPORT RESEARCH AND INNOVATION PORTAL

Geert Smit

Geert Smit discussed the Transport Research and Innovation Portal (TRIP). He described TRIP scope, goals, and background as well as its components, search mechanisms, and use. He discussed external links and partnerships, including the European Union and national databases, opportunities and challenges, and the TRID database. Smit covered the following topics in his presentation:

- Previously known as the Transport Research Knowledge Center, TRIP is the single portal for all transportation research conducted on national and European Union levels (www.transport-research.info). TRIP has been a strong contributor to the dissemination and promotion of transportation research and innovation since it was established in 1997.
- The three main goals of TRIP are (*a*) increasing awareness of national, European Union, and international transportation research activities and results; (*b*) enhancing the understanding of transportation research projects activities and results; and (*c*) encouraging the active implementation of the transportation research activities and outcomes. To build awareness, TRIP offers easy access to the most up-to-date information in a single portal. To develop understanding, TRIP offers aggregated analysis of transportation research results organized into 24 themes. To facilitate active implementation, TRIP stimulates innovation by accelerating the application of research results through extended networking. Policy makers, researchers,

professionals, service providers, research users, and citizens can benefit from TRIP at local, national, and European Union levels.

- The TRIP database includes more than 7,300 projects related to transportation research. The country profiles highlight the national institutions and organizations responsible for promoting and supporting transportation research. Programs for research and innovation in transport are included. Policy brochures present the highlights of the research results according to policy topics, and research summaries are promoted on 24 transport themes. Videos have been developed for each policy brochure. News on the latest developments in transportation research, policies, and innovation is available through monthly electronic newsletters and other mechanisms. An events calendar of high-level international transport conferences also is maintained.
- Both full-text and database searches can be conducted from the TRIP website. Full-text searches examine the entire portal and related documents, and database searches examine database fields associated with projects (e.g., title, origin, date, and keyword). The project database results include full title, any acronyms, duration, and key themes as well as funding source, contact information, and key project information.
- The country profile section presents the national institutions and organizations responsible for promoting and supporting transportation research. Information is provided on the 30 member countries of the European Research Area, which include the 27 members of the European Union as well as Iceland, Norway, and Switzerland.
- The program section contains information on the different programs providing funding for transportation research at the national, European, and international levels. TRIP publications include policy brochures that present the highlights of research results according to policy topics and research summaries that focus on the 24 transport themes. Monthly electronic newsletters highlight news on recent transportation research, policies, and innovation. The importance the actively contributions of researchers is stressed.
- Linking with other databases and establishing partnerships are important. Figure 5 illustrates one example of positioning TRIP to enhance linkages with other organizations and databases, including TRB and the TRID database as well as several projects and entities under the purview of the European Commission.
- Opportunities and challenges await. Cooperation in covering transportation research funded by the European Union is excellent. Many initiatives are under way at the national and sectoral levels, and parties are to share and exchange information. Fully integrating databases is a challenging task, and various alternatives to best manage this process are being considered.

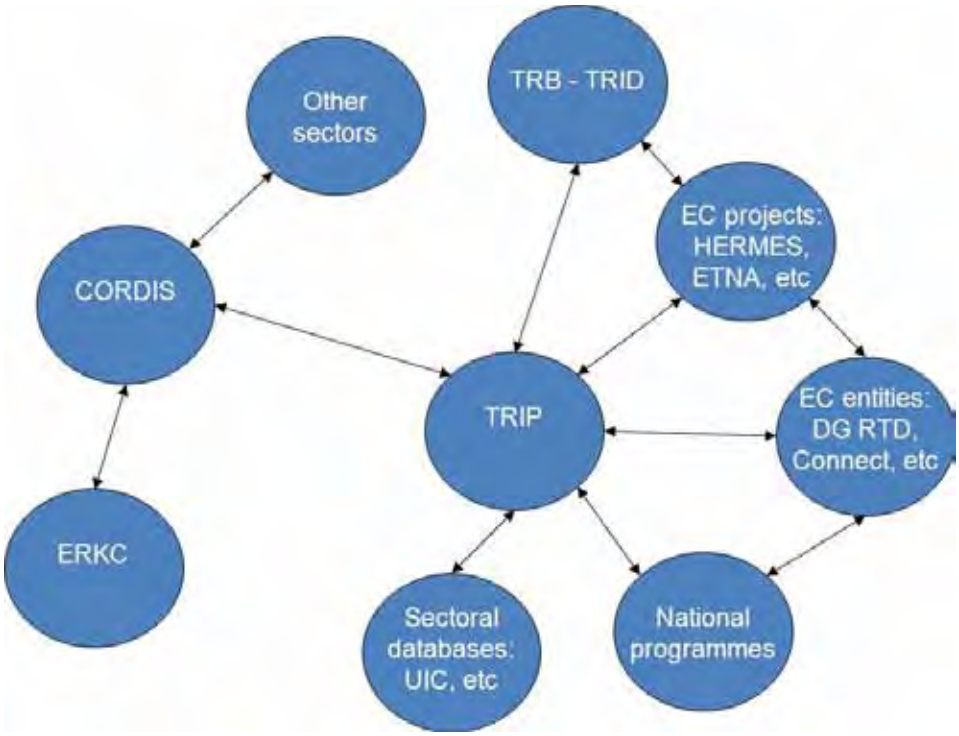

FIGURE 5 One example of how to position TRIP to enhance linkages with other organizations and databases. (ERKC = Energy Research Knowledge Centre; CORDIS = Community Research and Development Service; EC = European Commission; HERMES = Establishing a Comprehensive Transport Research Information Management and Exchange System; ETNA = European Transport National Contact Point Alliance; DG RTD = Directorate-General for Research, Technological Development, and Demonstration; UIC = International Union of Railways.)

- Cooperation with the TRID database fits with TRIP goals and offers mutual benefits. The TRID database provides coverage of transportation research—notably, projects funded by the European Union—and TRIP provides awareness of and access to additional content. This ongoing cooperation is facilitated by a long-term commitment to and funding for TRIP.

Signing of Memorandum of Understanding by ARRB Group, Ltd., and the Transportation Research Board

ARRB Group, Ltd., and the Transportation Research Board (TRB) signed of a memorandum of understanding (MOU) during the conference; Figure 6 shows Stephen Godwin of TRB and Andrew Meier of the ARRB Group shaking hands after the document was signed. According to the MOU, the ARRB Group will provide records of journal articles, monographs, and conference proceedings from its Australian Transport Index (ATRI) for inclusion in the Transport Research International Documentation (TRID) database. Contributions from the ATRI collection will increase the amount of international transportation research information available in TRID, furthering the goal of making TRID an international database.

This MOU reflects the shared intent of the ARRB Group and TRB to ensure that transportation professionals and decision makers have access to reliable, relevant, and timely information to support transportation research, operations, and investments.

FIGURE 6 Stephen Godwin of the Transportation Research Board (*left*) and Andrew Meier of the ARRB Group (*right*) shake hands after the signing of a memorandum of understanding between the organizations. (PHOTO: LEA CAMARDA, TRANSPORTATION RESEARCH BOARD)

Case Studies in International Transportation Research and Information

Youngseong (Harry) Koo, *Korea Institute of Construction and Transportation Technology Evaluation and Planning*
Mohd Rasid Osman, *Malaysian Institute of Road Safety Research*
Dave Ramorulane, *Council for Scientific and Industrial Research*
Fumio Kurosaki, *Institute of Transportation Economics*
Andrew J. Meier, *ARRB Group, Ltd. (presiding)*

TRANSPORTATION RESEARCH IN KOREA: ORGANIZATIONS, PROCESSES, AND OUTPUTS

Youngseong (Harry) Koo

Youngseong Koo introduced the Korea Institute of Construction and Transportation Technology Evaluation and Planning (KICTEP). He described the goals of transportation research in Korea; transportation-related organizations; and the Land, Transportation, and Maritime Knowledge (LandMarK) Center. He also discussed the decision procedure for government projects and other resources and expressed strong interest on the sharing of international research information that might expedite international collaboration. Koo covered the following topics in his presentation:

- KICTEP is a public agency under the Korean Ministry of Land, Transport, and Maritime Affairs (MLTM) that was established in 2003 to focus on research and development management (i.e., planning, monitoring progress, and managing performance) and also introduced the New Excellent Technology certification.

It is organized in four departments (general management, industry promotion, construction research and development, and transportation research and development) and currently has 84 employees. The agency's budget for FY 2012 was approximately $548 million, including $368 million in transportation and construction. The KICTEP project portfolio covers all modes of transportation as well as urban planning and architecture.

- Most transportation research in Korea is funded by the government. The goals of transportation research focus on strengthening national economic growth and global competiveness by improving the efficiency of the transportation system; developing innovative transportation policies and technologies; and upgrading the population's quality of life as related to safety, mobility, the environment, and security. The ultimate goal of national research and development is to improve public welfare and to provide better infrastructure that supports the national economy.
- Transportation-related government organizations in Korea other than MLTM include the Ministry of Knowledge Economy (MKE) and local governments. The Metropolitan Transportation Authority in the Seoul metropolitan area is the largest local government transportation agency.
- The five transportation-related public institutes in Korea other than KICTEP are the Korean Transport Institute (KOTI), the Korea Research Institute for Human Settlements (KRIHS), the Korea Institute of Construction Technology (KICT), the Korea Railroad Research Institute (KRRI), and the Korea Maritime Institute (KMI); the main functions of these institutes are listed in Table 1. Institutes also may exist under local governments, like the Seoul Development Institute.

TABLE 1 Korean Public Institutes Related to Transportation Research and Development

Institute		Function	Area(s)
Name	Acronym		
Korea Institute of Construction and Transportation Technology Evaluation and Planning	KICTEP	Research administration	Research programming and management
Korea Institute of Construction Technology	KICT	Conducting research	Construction and water resources (technology)
Korea Maritime Institute	KMI	Conducting research	Maritime and seaport
Korea Railroad Research Institute	KRRI	Conducting research	Rail (technology)
Korea Research Institute for Human Settlements	KRIHS	Conducting research	Land, housing, and infrastructure (policy and planning)
Korean Transport Institute	KOTI	Conducting research	Road, rail, aviation, urban transport, and logistics (policy, planning, and technology)

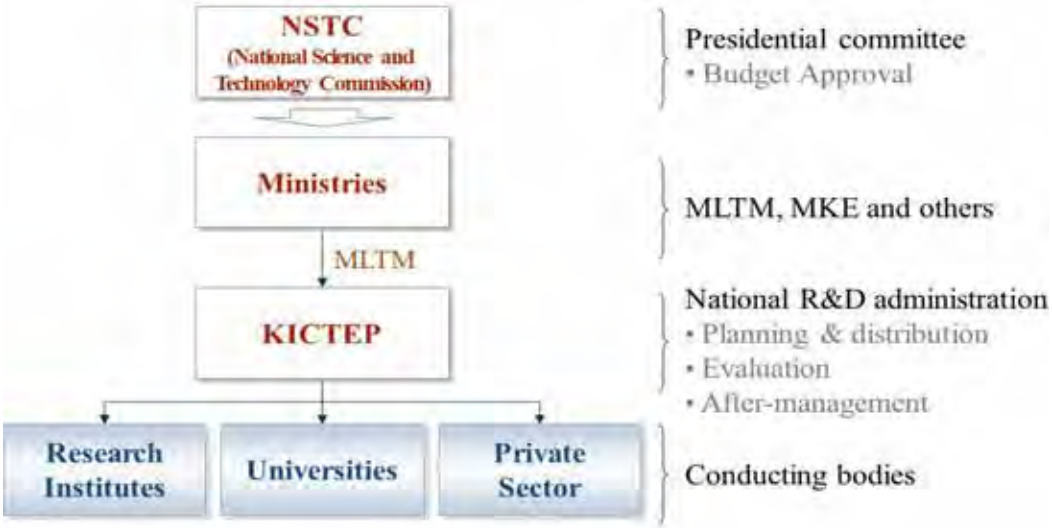

FIGURE 7 Budget stream I: Public research and development (R&D) investment in public institutes, universities, and the private sector by Korean Ministry of Land, Transport, and Maritime Affairs (MLTM) and Korean Ministry of Knowledge Economy (MKE).

- Figure 7 illustrates the flow of government funding for research and development from the ministries to public institutes, universities, the private sector, or any combination of these parties. Figure 8 illustrates another funding flow, directly from the government to public institutes.
- Established in 1985 to focus on transportation policy and transportation system engineering, KOTI conducts research on highways, railroads, aviation, and other related topics (http://english.koti.re.kr). All research reports are provided in Korean, but abstracts are available in English. The *KOTI World Brief* has been published in English since 2009 (http://english.koti.re.kr/board/publication/index.asp?code=regular&cate=22&mCode=040300).
- KRIHS was established in 1978 and focuses on the strategic planning of transportation infrastructure and systems (www.krihs.re.kr/english/main/main.asp). It employs 300 researchers, including more than 30 specialists on transportation. Annual reports, technical papers, and other publications are provided mainly in Korean, but some are available in English. *Space and Environment* has been published in English since 1993, and the full text is available on the website.
- KICT was established in 1983 and focuses on construction technologies associated with highway research and advanced transportation research (www.kict.re.kr/eng). It employs 903 researchers, including more than 200 transportation specialists. Annual reports, technical papers, and other publications are available online in Korean (www.codil.or.kr) and in English (www.springer.com/engineering/civil+engineering/journal/12205); abstracts of major projects in English are available by request (inforsrv@kict.re.kr).

FIGURE 8 Budget stream II: Direct investment into public institutions by Korean ministries.

- KRRI was established in 1996 and focuses on the railroad system, including vehicles and tracks, railway structures, electric power supplies, rail environments, train controls and communications, vehicle dynamics and propulsion systems, and railway transport and logistics (www.krri.re.kr/krri_2008/index.html). It employs 270 researchers. The annual report, *KRRI Technical Papers—Abstracts*, is available in English. Information about publications from other journals and conference is available online (http://library.krri.re.kr).
- The Korean Society of Transportation was established in 1982 and holds a semiannual meeting and conference every year (http://kor-kst.or.kr). The society has published the *Journal of the Korean Society of Transportation* in Korean since 1983 and the *International Journal of Sustainable Transportation* in English since 2007; both journals are available online (www.tandfonline.com/loi/ujst20).
- The Korean Society of Civil Engineering (KSCE) was established in 1952 and holds a semiannual meeting and conference each year. The society has published the *Journal the Korean Society of Civil Engineering* in Korean since 1981 and the KSCE *Journal of Civil Engineering* in English since 1997. These journals are available online (www.ksce.or.kr).
- Initiated in 2011 and funded by MLTM and operated by KICTEP, LandMarK is an online resource center for primarily civil engineering projects, including transportation research (www.landmark.re.kr). The LandMarK Center is used to set up the online and offline resources for research and development project planning for researchers that enable the referencing and sharing of knowledge. It also is used to release research and development reports under KICTEP supervision and to establish or plan for research and development projects on construction and transportation

technologies, policy, new technologies, and other topics.

- Examples of issues to be addressed related to future cooperation include the compatibility of index and classification standards, the database system, language, and operation. However, information sharing is the first step toward collaboration.

MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH

Mohd Rasid Osman

Mohd Rasid Osman discussed the Malaysian Institute of Road Safety Research (MIROS), road safety scenarios in Malaysia, and the sharing of transportation research information in Malaysia. He described the MIROS mission, functions, and centers. Osman covered the following topics in his presentation:

- MIROS was established in 2007 under the Ministry of Transport with the mission to foster the science and art of road safety interventions. It functions as a one-stop center for the generation and dissemination of road safety information through the print media and a concerted training program. It also conducts studies and evaluates current procedures on road safety to generate information for its evidence-based intervention programs to enhance road safety. MIROS initiated the first road safety conference in 2010.
- The main functions of MIROS include conducting high-impact research that translates into road safety policies: developing national objectives, policies, and priorities for the orderly development and administration of road safety research. Other functions include enhancing and increasing knowledge on the basis of new developments in road safety; serving as an audit and accreditation agency for curriculum design and standards on road safety; proposing evidence-based, cost-effective interventions and programs; serving as a repository of knowledge and linkage on road safety; and serving as a center that provides consultation and advice on road safety issues.
- Figure 9 illustrates the organization and basic functions of the MIROS research centers, which report to the office of the director general. These three centers focus on road user behavioral change, vehicle safety and biomechanics, and road engineering and environment.
- The Road User Behavioral Change Research Center is charged with developing the national Road User Assessment Program, researching the effectiveness of road safety campaigns and enforcement, and conducting research on the psychology of road user behavior. It also assesses the effectiveness of road safety education, designs research instruments to improve the effectiveness of behavioral research, investigates the effectiveness of traffic-calming measures on road users, conducts research on the sociology of transport, and creates a national accident costing index.

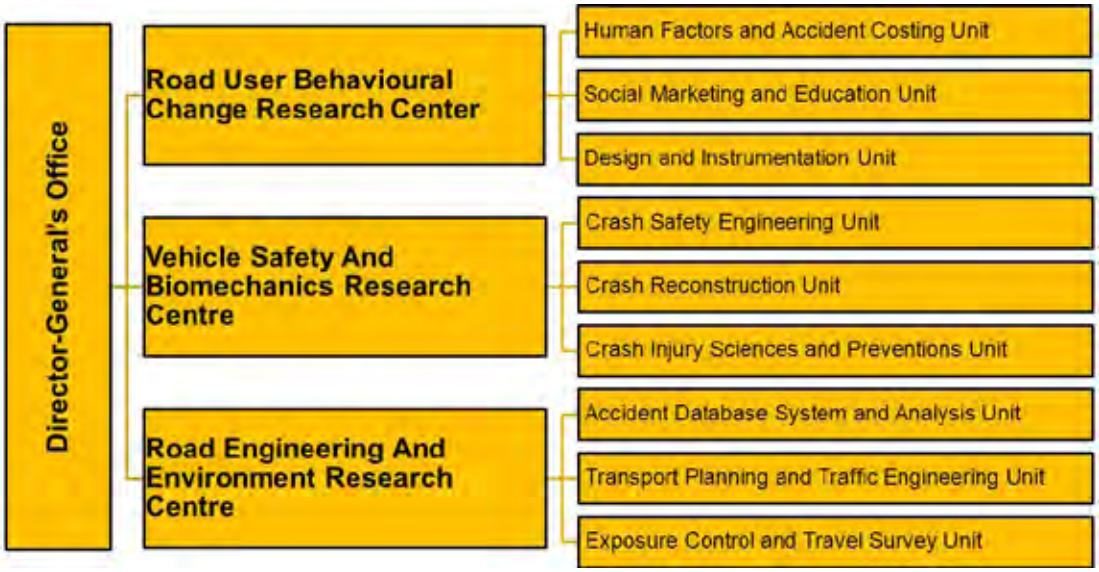

FIGURE 9 Organizational structure of the Malaysian Institute of Road Safety Research (MIROS).

- The Vehicle Safety and Biomechanics Research Center conducts research on trauma care, postinjury treatment, emergency response, and pre- and postcrash medical fitness. The center reviews policies and current approaches for improving standard operating procedures, codes of practice, and industrial standards through technical reports, recommendations, and science and technical publications; carries out crashworthiness investigations related to the mechanics of injury, biomechanics, and human tolerance to crashes; reconstructs injury-related crashes; conducts validation tests on the impact of road accidents; and uses computer-aided engineering analysis. The center initiates safe practice in technical management of transportation; monitors and audits safety, health, and environment implementations; oversees and accredits driving institutes nationwide; and implements new driving curriculum.
- The Road Engineering and Environment Research Center maintains the accident database for the nation, and key duties include continuously updating the national accident and injury database and mapping accident data. Other activities include performing diagnostic analyses on road accidents and assessments of safety interventions, researching safer road designs and road environments, developing models of traffic and transportation facilities, creating a national fatality index, designing suitable methods to control exposure to road accidents, and conducting annual vehicle surveys to assess vehicle kilometers traveled (VKT) and passenger kilometers traveled.
- Translating research into policies is a key element of MIROS, for example, in complying with United Nations Economic Commission for Europe regulations; enhancing guardrail standards; and upholding the code of practice on safety, health,

and environment for the transportation sector. Other examples include implementing new driver training curriculum on the basis of learning outcomes, implementing seatbelts in the rear seats of vehicles, educating about road safety in schools, and conducting community-based programs on safety helmets and electric bicycles.

- Research and development projects include examining the risk factors and benefits of education and training programs for young drivers, assessing the implementation of the Malaysian driving curriculum in driving institutes, exploring aggressive driving and riding in Malaysia, and analyzing the use of child restraint seats in vehicles. Additional focus areas include modeling traffic accident risks, developing a VKT index for commercial vehicles, evaluating nonexclusive motorcycle lanes in Malaysia, and examining VKT traveled by goods movement (freight) vehicles. Other projects include the Provisional CRASE Crash Center, the MyVAP refinement of nondestructive approaches for vehicle safety assessment, a study of seat belt wearing in passenger vehicle fatal crashes in Malaysia, and a feasibility study on the use of unmanned aerial vehicles in crash investigations.
- As illustrated in Figure 10, the number of road fatalities, the population, and the number of registered vehicles all increased from 1998 to 2011. The number of road fatalities increased at a higher rate than the growing population and the number of registered vehicles between 2007 and 2010 before leveling off somewhat in 2011. However, the death rate per 10,000 vehicles, per 100,000 population, and per billion VKT all declined between 1997 and 2011. Approximately 61% of road fatalities in Malaysia involve a motorcycle, compared to 20% for automobiles, 8% for pedestrians, 4% for lorries, and 2.5% for bicycles.
- Many organizations other than MIROS are involved in transportation research in Malaysia. These organizations include the Center of Transportation Research at the University of Malaya, the Malaysian Institute of Transport at the Universiti Teknologi MARA, the Road Safety Research Center at the Universiti Putra Malaysia, the Transport Research Alliance at the Universiti Teknologi Malaysia, and the Transportation Engineering Research Group at the Universiti Kebangsaan Malaysia. Other organizations include the Highway and Traffic Engineering Group at the Universiti Sains Malaysia and the Universiti Teknologi Petronas. These organizations conduct fundamental and applied research in many areas, including intelligent transportation systems, pavements, public transport, transport safety, transport and the environment, vehicle safety, and education.
- Research reports are prepared on projects and studies in all of the previously mentioned research areas. Results also are published in papers, journals, conference proceedings, and special reports. More than 95% of the reports are in English. Some reports are published online. No library in Malaysia currently collects all of the information on university transportation research. MIROS research reports are available in the MIROS library and online. Even though MIROS was intended to be the one-stop depository for transportation research publications, this goal has not yet been achieved.

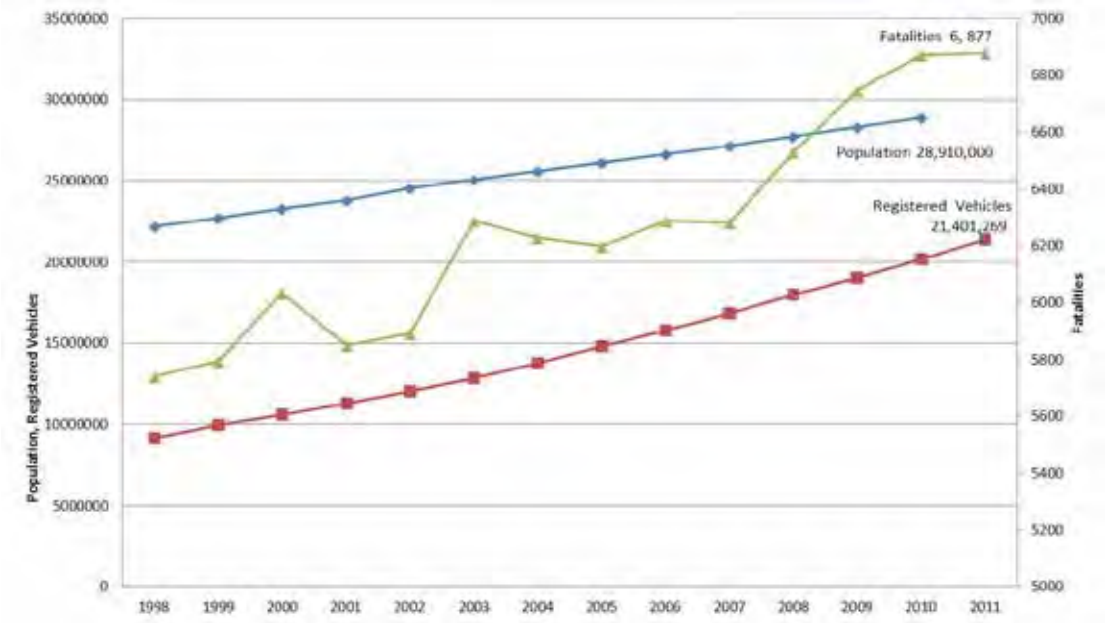

FIGURE 10 Growth in number of road fatalities, population, and number of registered vehicles in Malaysia from 1998 to 2011.

- The domestic society for the East Asian Transportation Society (EASTS) is the Transport Science Society of Malaysia (TSSM), which has organized five Malaysian Universities Transport Research Forums and Conferences. Researchers who wish to participate in EASTS programs first must be TSSM members.
- The sharing of transportation research information could be improved in Malaysia. Transportation research tends to be focused on road transportation, and the research areas must be rebalanced. Publications must be accessible to all researchers. A central agency to coordinate and collate all research outputs would be beneficial. Providing a national one-stop center or multicenter for transportation research output also would be beneficial. The sharing of information must be coordinated nationally before venturing to coordinate with international partners.

TRANSPORT INFORMATION PROVISION: SOUTH AFRICAN SITUATION

Dave Ramorulane

Dave Ramorulane provided an overview of transportation research information in South Africa. He described the organizations and universities involved in transportation research, research themes, and available information. Ramorulane covered the following topics in his presentation:

- The South African National Roads Agency Limited (SANRAL) was established in 1998 by an act of parliament to maintain and develop South Africa's national road network (www.nra.co.za). SANRAL develops specifications related to bridges and culvert inspections, urban transport guidelines, and technical methods and recommendations for highways. Manuals and policies include a construction monitoring manual for bridges and structures, policy design guidelines for single-carriageway national roads, and a code of practice for the planning and design of highway and road structures in South Africa.
- The Gauteng Department of Public Transport, Roads and Works, known as Gautrans, operates a heavy vehicle simulator (www.roadsandtransport.gpg.gov.za). Acknowledged as a worldwide leader in accelerated pavement testing, this heavy vehicle simulator is a fully mobile accelerated pavement testing unit capable of simulating 20 years of traffic in a 3-month period (www.gautrans-hvs.co.za).
- Established in 1979, the Southern African Bitumen Association (SABITA) represents producers and applicators of bituminous products, consulting engineers, and educational institutions (www.sabita.co.za). SABITA focuses on activities to advance best practices in the use and application of bituminous materials, worker safety, environmental conservation, education and training, and education on the value of roads.
- The Southern African Transport Conference (SATC) is an annual transportation research conference organized by theCouncil for Scientific and Industrial Research (CSIR). Initially called the Annual Transport Convention, the conference name was changed to SATC in 1995. The SATC represents the longest running transportation conference in the region. Papers presented at the conference highlight research in the Southern African transport sector. Information about SATC and papers presented at the conferences are available on the SATC website (www.satc.org.za).
- One of the leading scientific and technology research, development, and implementation organizations in South Africa, the CSIR researches themes that include materials, the natural environment, peace and defense, the built environment, biosciences, manufacturing, space and information technology competence, and mining. Research themes addressing the built environment focus on transport systems and operations, and transport infrastructure engineering. Topics within transport systems and operations include transport management, design, and systems; transport network asset management systems; and transport and freight logistics. Topics within the transport infrastructure engineering area include pavement design and construction, advanced materials testing, and accelerated pavement testing.
- Figure 11 illustrates the elements of the CSIR technical output process, which include formal reports, conference papers, and journal articles. The CSIR Researchspace provides access to some of the research generated by CSIR scientists (http://researchspace.csir.co.za/dspace). Information on some CSIR technical reports and other reports from South Africa is available on the Transport Research International Documentation database.

FIGURE 11 How South Africa's Council for Scientific and Industrial Research produces technical output.

- CSIR has conducted research for the South Africa Department of Transport (www.transport.gov.za). Projects conducted for the Department of Transport include conducting an inventory of Southern African natural road construction materials, developing recommended durability tests and specification limits for base course aggregates for road construction, and creating guidelines for the choice of appropriate bus priority measures. Reports on these and other projects are available from CSIR on request.
- Other transport entities in South Africa include Aurecon SA, the Passenger Rail Agency of South Africa, the South African Civil Aviation Authority, the Airports Company of South Africa, and the Road Traffic Management Corporation. South African universities involved in transportation research include the University of Pretoria, the University of the Witwatersrand, and the University of Stellenbosch.
- The Cement and Concrete Institute promotes the interests and the general advancement of the portland cement and concrete industries. Information and reports are available online (www.cnci.org.za).

TRANSPORTATION RESEARCH INFORMATION PRACTICES IN JAPAN

Fumio Kurosaki

Fumio Kurosaki discussed the Japan Institute of Transportation Economics (ITE), transportation modes in Japan, and the organizations conducting research. He also described the Japan Science and Technology Information Aggregator, Electronic, commonly known as J-STAGE, operated by the Japan Science and Technology Agency. Kurosaki covered the following topics in his presentation:

- Japan's ITE is a research institute that specializes in the economics and management of transportation. It collects literature and information about transportation and publishes the monthly *Transportation and Economics Journal* in Japanese. A secretariat of the Japan Society of Transportation Economics, ITE cooperates with the previously described HERMES project as an observer, similar to TRB.
- Transportation modes in Japan include railways, roadways, aviation, and sea or maritime.
- Reformed in 1987, the Japanese National Railways encompass six passenger railways and one freight company, in addition to many private railways and rail passenger services in urban areas.
- Many organizations conduct research on transportation topics in Japan: universities, private companies, industrial organizations, and research institutes. In the railway sector, research covers the fields of civil engineering, mechanical engineering, electrical engineering, and transportation economics.
- In Japan, researchers submit papers to various engineering or academic societies. These societies include the Japan Society of Civil Engineers, the Institute of Electrical Engineers of Japan, the Japan Society of Mechanical Engineers, and the Japan Society of Transportation Economics.
- Many of these academic and engineering societies upload articles and journals to J-STAGE, Japan's largest platform for academic electronic journals (www.jstage.jst.go.jp).

WORKING SESSION 1

Strategies to Enhance International Transportation Information Sharing

Gina Baas, *University of Minnesota (facilitator, presiding)*
Roberto A. Sarmiento, *Northwestern University Transportation Library (facilitator)*
Kenneth A. Winter, *Virginia Department of Transportation (facilitator, presiding)*
Nelda Bravo, *Federal Highway Administration (facilitator)*

This working session was conducted with the use of the World Café discussion technique. Four topics were defined and assigned to four groups: economics and resources, politics and institutions, technical issues, and cultural norms. Participants were assigned to one group and then allowed to self-select two more groups; each participant spent 15 minutes in a total of three groups. The group facilitators summarized the major points discussed in their groups in a general session.

GROUP 1: ECONOMICS AND RESOURCES

Gina Baas, facilitator

What are possible revenue plans and economic models that hold promise to help support and sustain access to international transportation information sharing and collaboration? Group discussion is summarized as follows:

- Researchers, sponsors, and other groups gain value from the information provided through the Transport Research International Documentation (TRID) database and other sources. Access to information is important for researchers to ensure that they are building on—rather than duplicating—the work of other researchers and for sponsors to ensure that they are not funding a study that has already been conducted.
- Information sharing might be used as a marketing tool because it builds the credentials and reputation of both researchers and research organizations. It helps brand areas of expertise and can be used to develop additional research projects.
- The costs associated with information management and information sharing might be built into the overall research budget (e.g., include information sharing as a project work task with a budget).
- Examine the full information production life cycle, from the time transportation information is created to the time it is disseminated. Costs can be assigned to the

different life-cycle work activities, along with who pays and who benefits. This information could be used to identify ways to reduce costs, target funding sources for key activities, and develop revenue-generating strategies.

- Develop information on the costs associated with different approaches to sharing information. The results will benefit countries and organizations that lack existing databases or collection methods, seek support and funding to create databases, or wish to collect transportation information in an effort to establish such systems.
- Explore the potential for organizations to enter their records into the TRID database and use it as a database for their content, rather than maintaining a separate database as well as related hardware and software.

GROUP 2: POLITICS AND INSTITUTIONS

Roberto A. Sarmiento, facilitator

What are the strategies to overcome political and institutional challenges to international transportation information sharing and collaboration? Group discussion is summarized as follows:

- The use of different technologies by various groups is one possible barrier. Suggested approaches include standardizing data entry, data fields, and reporting protocols.
- Discussion centered on methods and techniques to promote the concept of sharing transportation information throughout all parts of an organization as well as across agencies and organizations. One suggested approach is to focus on issues that are common to all groups (e.g., transportation and the environment are common to all countries).
- Branding also was discussed. The need to identify and credit the source of the information is important for both the originators and the users of the information.
- The need for internal promotion is critical; top-level managers and policy makers must understand the benefits of sharing information and the return on investment realized by the agency. The benefits of the Transportation Research Board (TRB) recognizing the participation and assistance of other groups also are important.
- Cost always is an issue for all groups; some groups and countries also are concerned that sharing their information will result in a loss of competitive advantage. One suggested approach is to highlight the potential benefits of obtaining information from others to improve their competitive advantage and solve critical issues.

GROUP 3: TECHNICAL ISSUES

Kenneth A. Winter, facilitator

What are the technical barriers and solutions to enhancing international transportation information sharing and collaboration? Group discussion is summarized as follows:

- Among the many technical issues discussed, one primary issue was the need for standards to ensure quality control. The areas identified and discussed for consistency in format or standards include data, content, metadata, software, encoding and mapping, crosswalks, language options and preferences, data exchange, vocabulary management, and operational and procedural protocols.
- Security issues and concerns are another primary issue. Defined levels of access represent one way to address some security concerns. Site- and record-level access, content-level access, and database security were discussed.
- A third primary issue is the need for ongoing training, education, and support. One suggested action item is to conduct a survey of the different approaches being used and identify best practices; this effort could build on work conducted by the HERMES project. These best practices could be shared with all groups through written summaries, webinars, and workshops.
- Guidance that documents collaboration methods and techniques is needed. One potentially beneficial approach is to develop case studies and testimonials on current methods. The link to branding also was discussed. Engaging the transportation community as equal partners and equal contributors is important.
- The topic of governance—including the shared responsibility of governance on many levels within an organization and across organizations—was discussed. In-person meetings, such as this conference, are important for developing strong working relationships and trust among groups. Issues related to expectations, responsibilities, and database ownership and maintenance were identified. The concept of equal voice and equal vote for equal responsibility was discussed, and the use of existing structures (e.g., the TRIB International Activities Committee) may be one possible approach. The importance of acknowledging contributions by all groups was emphasized.
- The TRID database may be perceived as a U.S. resource rather than an international one; ways to change this perception (which may require significant resources) were discussed.

GROUP 4: CULTURAL NORMS

Nelda Bravo, facilitator

What are the norms in different countries toward sharing information, and what are some strategies to overcome different cultural norms? Group discussion is summarized as follows:

- Researchers, organizations, and countries share similar concerns related to trust, vulnerability, and losing identity when they merge their databases with other databases. Marketing, branding, and intellectual property were discussed. Conferences such as this one can help engage individuals in the value of and gain commitments to information sharing. The development of a charter to address the benefits as and responsibilities to individuals and organizations was suggested as beneficial. A charter could help address concerns related to risks, vulnerabilities, and other issues that might hamper the open exchange of information.
- High-level support for information sharing within agencies and organizations is important for successful programs. The promotion of information exchange by top management and the provision of resources are key to the examples presented at this conference. One way to address these concerns is to provide a mechanism for people to discuss information sharing. Even though language is an issue, it often is not a great concern with the availability of translation software and multiple-language capabilities in many countries. However, the availability of English-language abstracts or executive summaries still is considered important.
- The development of standards, protocols, and guidelines was suggested to address concerns about potential security risks related to different types of information or political situations.

WORKING SESSION 2

Collaboration Opportunities for Expansion of the TRID Database

Andrew J. Meier, *ARRB Group, Ltd. (presiding)*
Birgitta Sandstedt, *Swedish National Road and Transport Research Institute (presiding)*
Nelda Bravo, *Federal Highway Administration (recorder)*

This working session focused on identifying opportunities to expand the Transport Research International Documentation (TRID) database through new partnerships and collaborative arrangements. As a full group, participants discussed five questions about ways to increase collaboration, the support required from the information community to make collaboration easier, information needed from TRID, their visions of an information-sharing community, and examples of collaboration in information sharing. The major points suggested by individual conference participants are summarized in this section, by question.

WHAT IS ONE EASY THING YOU CAN DO TO INCREASE COLLABORATION?

- Distribute links to conference presentations more widely.
- Follow up on contacts made at this conference and continue to exchange information.
- Use the databases that speakers demonstrated throughout the conference.
- In the European Union, survey member states and identify available databases for inclusion with other databases and resources.
- Take ideas discussed at the conference back to the Research and Innovative Technology Administration and other agencies and identify opportunities to leverage existing and future activities.
- The Transportation Research Board (TRB) Library and Information Science in Transportation Committee could encourage domestic and international members to consider methods for integrating the ideas discussed at the conference. The goal of such an effort is to continue to promote international exchanges among members, expand information networking, and build the TRB community to support information sharing internationally.

- Sponsor a poster session on the sharing of transportation information internationally at TRB annual meetings.
- Provide information to organizations interested in becoming International Transport Research Documentation members.
- Share information from the conference with other organizations in the countries represented at the conference.
- Encourage transportation groups to collaborate on information sharing with a more centralized approach.
- Reach out to other public institutes about practical approaches to information sharing.
- Promote volunteer efforts to collect English-language information produced by other institutes and make it available through the Land, Transportation, and Maritime Knowledge (LandMarK) database.
- Expand personal relationships with professionals in other countries to encourage access to information, especially on policies and regulations.

WHAT SUPPORT COULD THE INFORMATION COMMUNITY GIVE YOU TO MAKE IT EASIER TO INCREASE COLLABORATION?

- TRB committees and staff could make information about the conference widely available, develop articles for *TR News* and other publications, monitor plans in progress, and identify future activities. Such activities could be used to encourage management support for institutional participation.
- A *TR News* article could discuss available information and encourage international information sharing.
- The conference planning committee and TRB committees could coordinate a webinar on the major topics covered at the conference.
- TRB committees could continue to build linkages among transportation information professionals, encourage a seamless network, and develop and support an online forum for ongoing discussions and dialogue on international information sharing.

WHAT WOULD YOU LIKE TO GET FROM TRID?

- Create links among funding sources, research projects, products (of which the TRID database is one), and resource impacts to better illustrate the value of the research investments. Provide the research funding source and key results in the research records. Investigate whether it would be possible for the TRID database to include a category for success stories.

- Provide an index to full-text documents to enhance discovery. Investigate enhancing the international image of the TRID database by making it look and feel more international; explore the branding theme discussed at the conference.
- Explore the potential to change the U.S. federal research form to include terms in the Transportation Research Thesaurus.
- Identify ways to make the Transportation Research Thesaurus easier to use by larger audiences.
- Investigate the provision of more database management (e.g., including customized clusters of search terms, especially on hot topics).
- Consider providing a feedback loop for users who cannot find reports that should be available to complement existing feedback on the TRID database.
- Share the schedule of TRID changes and improvements with members so they can promote the database.
- Conduct an analysis of the search terms being used to access different transportation information research databases.
- Use TRB committees as a resource for these suggestions and follow-up activities.
- Investigate the need to declutter the TRID database, especially of electronic holdings.
- Consider developing more marketing information on the TRID database to encourage other countries and groups to contribute, thereby addressing the issue that some noncontributing nations are the heaviest users.

WHAT WOULD YOU LIKE TO SEE IN DEVELOPING A COMMUNITY IN SUPPORT OF INFORMATION ACCESS?

- Promote TRID information to all TRB committees.
- The appropriate TRB committees could foster an international community of users and outreach to get others engaged. Repeat messages may be needed.
- Conduct webinars to encourage ongoing international discussions, even though time differences could be a problem.
- Record TRID webinars to make them widely available across time zones.
- TRB committees could provide leadership to keep the conversation and momentum from this conference going.
- Continue to hold these types of conferences regularly.
- Continue discussions at TRB annual meetings, midyear meetings, and other venues.
- Conduct a TRID train-the-trainer session to hold regional webinars.
- Develop multiple-language resources for the Transportation Research Thesaurus of the TRID database.

WHAT ARE GOOD EXAMPLES OF INFORMATION-SHARING COLLABORATION?

- Good examples include the Swedish National Road and Transport Research Institute (VTI); the Japan Science and Technology Information Aggregator, Electronic; the Transport Research and Innovation Portal (TRIP); the HERMES project; the North American Statistics Transportation Interchange; the Federal Highway Administration's use of electronic media; and organization-to-organization or one-on-one collaboration on specific projects (e.g., the Northwestern University Transportation Library–VTI digitization project).
- The University of Minnesota digital archive project funded the digitization of research reports developed for the Minnesota Department of Transportation.
- TRANLIB discussion group allows information sharing among members of the Special Libraries Association, Transportation Division. The development of a social networking tool to go beyond a Listserv model may be needed.
- The Chasing the Sun service made health library resources available at all times across the globe.

WORKING SESSION 3

Next Steps

Frances D. Harrison, *Spy Pond Partners (presiding)*
Nelda Bravo, *Federal Highway Administration (recorder)*

Conference participants identified possible activities and action steps under four broad categories: making the case for sharing transportation research information, community building, skill development, and sustainable model building. The main activities suggested by individual participants are summarized in this section, by category.

MAKING THE CASE

- Develop a portfolio of success stories to promote the value and benefit of sharing information on transportation research. Quantify and highlight the economic impacts of information sharing for inclusion in the portfolio, and discuss the consequences of not sharing information. Disseminate the portfolio through many mechanisms, such as articles in *TR News* and other publications, information for committee chairs, and presentations at Transportation Research Board (TRB) committee meetings and at conferences.
- Develop a tool or template that organizations and groups can use to create their own success story. Prepare a how-to guide that includes best practices and case studies.
- Establish a social network group for individuals who are interested in sharing their experiences with the dissemination of transportation research information.
- Plan follow-up activities from the conference, such as a *TR News* article, sessions at future TRB annual meetings, and a workshop on international information sharing at the 2014 annual meeting.
- Improve communication about how information can be distributed and shared within the TRB network. Identify a focal point, steward, or venue within TRB to coordinate follow-up activities from the conference and the sharing of international research information. The Library and Information Science in Transportation (LIST) Committee, another existing committee, or a new task force could assume this role.
- Reach out to young researchers and practitioners as future users of the Transport Research International Documentation (TRID) database. Focus outreach activities by using the communications mechanisms that these young professionals prefer.

- Develop articles and communication pieces targeted at decision makers. Summaries could highlight best practices in international transportation information sharing, benefits realized, and examples of successful programs.
- Map existing relevant databases and create a TRID ambassador to reach out to those databases and to explain how to mitigate risks.
- Conduct a research project to examine the advantages of having access and the disadvantages of not having access to information resources, then share the results with practitioners.
- Explore possible methods to increase the appreciation for research conducted in other countries among senior-level decision makers in the United States. Identify and highlight examples of international research that has benefited the United States. Examples include international research that has been applied, has been expanded by additional research, or has assisted in developing new policies or approaches in the United States. Involve senior-level decision makers in meetings or sessions with international researchers.

BUILDING THE COMMUNITY

- Identify activities to maintain the momentum from the conference. For example, to build and maintain a community for the sharing of international research information, participants can report back to their organizations about the conference, maintain contacts made at the conference, and share information learned at the conference with others.
- Develop social networking groups, focus on information sharing, and provide interactive opportunities. Share conference results through articles, sessions at future TRB meetings, and other venues.
- Maintain the momentum by identifying ambassadors at different agencies and organizations and in different parts of the world to help disseminate information.
- Develop and maintain a statistical report on the regional or country records that are being aggregated. Analyze communication flows, similarities, links, and knowledge relationships among members of the transportation community.
- Develop a mentoring program, possibly by using the TRB Young Members Council mentoring program as a model. Reach out to the TRB Young Members Council to help promote international information sharing.
- Identify the parties that could assist with building and maintaining an international information sharing community. Potential TRB committees identified to enlist in this effort include the LIST Committee; the Technology Transfer, Conduct of Research, International Activities, Training and Education Committees; and the Committee Communication Coordinators Council. Also reach out to the American Association of State Highway and Transportation Officials Research Advisory Committee.

DEVELOPING SKILLS

- Identify activities to help develop skills in transportation research information sharing (e.g., training related to sharing information and data).
- Produce a National Cooperative Highway Research Program (NCHRP) synthesis to document the state of the practice in transportation research information sharing. This synthesis could include examples of best practices and solutions for addressing barriers to wider information sharing. Even though focusing on practitioners is important, examining the core competencies and credentials for active participants of all groups would be beneficial. The synthesis also could identify follow-up steps and activities to advance the dissemination and sharing of transportation research information.
- Investigate the potential of translating recorded webinars into different languages, providing summaries of webinars in multiple languages, or providing simultaneous or consecutive interpretation for webinars to promote international information sharing. Webinars have become a widespread method of sharing information on research projects and programs, and most webinars are recorded and archived for access by individuals who are unable to participate in the initial session. Conduct initial pilot studies to test the concept with different approaches. An initial activity could be to translate summaries of previous webinars into multiple languages and make them widely available.
- Develop and maintain operational manuals that support international sharing. These manuals could contain practical information, case studies, and best practices.
- Compile a robust, multilingual vocabulary to assist in ascribing metadata. TRB committees could play a key role in compiling this vocabulary.
- Improve the flow of information from researchers and academicians to policy makers.
- Conduct a research project to develop a template for a basic database containing key information on international transportation research projects. The database could be populated by other information providers, with a copy provided to International Transport Research Documentation (ITRD) database. NCHRP might be a potential funding source for this project. A first step would be to develop a problem statement for submission to NCHRP.
- A multifaceted research project could address many topics related to training and outreach. As a first step, identify skills within core competencies on the diverse disciplines required to build, manage, and access transportation information. Then, train for different competency levels in developing and maintaining databases.
- Conduct a survey to obtain a better perspective of the needs of different groups. Use the survey results to determine the focus of follow-up research.
- Create an integrated framework or architecture for information sharing that considers needs not only today but also anticipated over the next 5 to 10 years.

- Develop and conduct training in the use of this framework.
- Craft a research needs statement that examines the collaborative platforms available with mobile technologies, including games.
- Use GoToMeeting and other video conferencing methods to share information and communicate with researchers and practitioners.

BUILDING SUSTAINABLE MODELS

- Identify and implement sustainable databases and methods for international information sharing. Solicit a corporate sponsor (or multiple corporate sponsors) to address funding issues.
- Develop models for national transportation policy, elevate policy discussions, and build on other National Research Council initiatives. Identify advocates and champions at all levels to build support throughout organizations. Bring these individuals together at different venues to increase visibility and support.
- Contract with organizations to acquire records from noncontributing countries. Other approaches include using a subset of the TRID database as an organizational database, creating charters or formal agreements with different groups, seeking funding for ITRD development from research organizations, and increasing sponsors' awareness (e.g., about the relationship between information availability and research applications or proposals).
- Explore methods to avoid duplication of indexing and other activities. Conduct a research project to examine different approaches and economies of scale in developing and using various methods. The same research also could examine current funding levels for transportation research and transportation information sharing. Integrate information management as part of an overall research budget.

CLOSING SESSION

Conference Wrap-Up

Jennifer Rosales, *Transportation Research Board*
Brian L. Ray, *Kittelson & Associates, Inc. (presiding)*

Brian Ray and Jennifer Rosales provided concluding comments. They announced that the speakers' PowerPoint presentations would be posted on the Transportation Research Board (TRB) website and that the conference proceedings would be published electronically.

Ray and Rosales encouraged participants to engage in follow-up activities. Many follow-up activities discussed during the working sessions focus on TRB committees, developing research problem statements, and reaching out to other groups, but sharing conference information with coworkers and other organizations also is important. They thanked participants for their active involvement throughout the conference.

APPENDIX A

Websites from Speaker Presentations

Speakers at the conference mentioned the following websites.

AUSTRALIA

Road Research Register
www.roadresearch.com.au

EUROPEAN UNION

Transport Research and Innovation Portal (TRIP)
www.transport-research.info

JAPAN

Japan Science and Technology Information Aggregator, Electronic (J-STAGE)
www.jstage.jst.go.jp

KOREA

Korea Institute of Construction Technology (KICT)
www.kict.re.kr/eng www.codil.or.kr (publications in Korean)
www.springer.com/engineering/civil+engineering/journal/12205 (publications in English)
Korea Railroad Research Institute (KRRI)
www.krri.re.kr/krri_2008/index.html
http://library.krri.re.kr
Korea Research Institute for Human Settlements (KRIHS)
www.krihs.re.kr/english/main/main.asp
Korean Society of Civil Engineering (KSCE)
www.ksce.or.kr
Korean Society of Transportation (KST)
http://kor-kst.or.kr
http://www.tandfonline.com/loi/ujst20 (*International Journal of Sustainable Transportation and Journal of the Korean Society of Transportation*)
Korean Transport Institute (KOTI)
http://english.koti.re.kr
http://english.koti.re.kr/board/publication/index.asp?code=regular&cate=22&mCode=040300
LandMarK online resource center, operated by Korea Institute of Construction & Transportation Technology (KICTEP)
www.landmark.re.kr

SOUTH AFRICA

Cement and Concrete Institute (CNCI)
www.cnci.org.za
Council for Scientific and Industrial Research (CSIR) Researchspace
http://researchspace.csir.co.za/dspace
Gauteng Department of Public Transport, Roads and Works (Gautrans)
www.roadsandtransport.gpg.gov.za
www.gautrans-hvs.co.za (heavy vehicle simulator)
South Africa Department of Transport
www.transport.gov.za
South African National Roads Agency Limited (SANRAL)
www.nra.co.za
Southern African Bitumen Association (SABITA)
www.sabita.co.za
Southern African Transport Conference (SATC)
www.satc.org.za

SWEDEN

Swedish National Road and Transport Research Institute (VTI) Library and Information Centre (BIC)
www.vti.se/en/library
Transguide portal
www.transguide.org

UNITED STATES

American Society of Civil Engineers (ASCE)
http://ascelibrary.org
RefWorks citation management tool
www.refworks.com
Transport Research and Innovation Portal (TRIP)
www.transport-research.info
Transport Research International Documentation (TRID) database
http://trid.trb.org
Virginia Department of Transportation Research Library
http://69.63.217.27/V92004/OPAC

WORLDWIDE

World Wide Web Consortium (W3C)
www.w3.org

APPENDIX B

Participants

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Anne Caputo, Anne Caputo Consulting, Alexandria, Virginia
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