Research and Technology Coordinating Committee Letter Report: October 2010

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TRB TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

October 4, 2010

Victor Mendez
Administrator
Federal Highway Administration
1200 New Jersey Ave., SE, Room E87-314
Washington, DC 20590

Dear Victor,

Beginning in 2008, FHWA began asking the Research and Technology Coordinating Committee (RTCC) for assistance on an agenda-setting process for highway research and strategies to accelerate the deployment and adoption of innovation. FHWA and RTCC subsequently agreed on a revised statement of task, in which the committee would monitor and review FHWA's research and technology activities and advise the agency on (*a*) a research agenda-setting process for a nationally coordinated program of highway research, (*b*) strategies to accelerate the deployment and adoption of innovation, and (*c*) potential areas where research is needed. In this letter, we report on the committee's recent work on the first of these two topics (the second topic is limited to a discussion of advancing the use of proprietary products) and provide our findings and recommendations. We also provide our response to the latest developments in FHWA's Exploratory Advanced Research Program. The report is organized along the following lines: (*a*) national coordination of highway research, (*b*) proprietary products, and (*c*) advanced research.

At its March 2010 meeting, the committee reviewed an initial draft of a white paper prepared by FHWA staff regarding a nationally coordinated program of highway research. It also received presentations regarding research coordination from a group of research managers at state departments of transportation (DOTs), from current and former directors of university transportation centers (UTCs), and staff of the Research and Innovative Technology Administration (RITA).[1] The committee also received a briefing on a paper on proprietary products prepared for it by Barbara Harder and engaged in a discussion about strategies for overcoming barriers to implementation of proprietary products.[2] A copy of the meeting agenda listing participants is attached.

At its June 2010 meeting, the committee reviewed a revised draft of the FHWA white paper and discussed coordination and research agenda setting at some length with

[1] FHWA staff were unable to participate in this meeting at the last minute because of a lapse in program authorization by Congress that resulted in FHWA employees being required to not report to work.
[2] An initial draft of Harder's paper was provided to FHWA. The final draft will be provided when submitted.

FHWA staff. The committee was also briefed on the current status of the Exploratory Advanced Research Program. A copy of the agenda for the June 2010 meeting listing meeting participants is attached. The committee subsequently met in closed session to deliberate on the results provided in this letter report and completed its discussions through correspondence. This report was reviewed by an independent group of peers in accordance with the policies and procedures of the National Research Council (NRC). The assessment and recommendations of this report represent the committee's best collective judgment based on the information provided and discussed at the meeting. I would like to thank the invited guests, presenters, and FHWA and RITA staff for the productive presentations and subsequent discussions that have informed the development of this report.

NATIONALLY COORDINATED RESEARCH

Background

In *Special Report 295*, the RTCC made the following recommendation:

> Aside from the specific set of vital initiatives undertaken through SHRP 2, the lack of a national prioritized research agenda for highways has been made apparent by the wide variety of research topics being pursued by FHWA, the states, and the UTCs. To some extent, this variety is desirable. Mission agencies have a responsibility for RD&T [research, development, and technology] to support meeting their legal responsibilities. States have their own priorities that they should be encouraged to pursue. Part of the rationale for creating the UTC program was to encourage and allow academic researchers to pursue novel ideas that had not been recognized by FHWA or the states. … Establishment of communitywide consensus on national highway research priorities would help focus all highway research programs on the most important areas. FHWA should be given the resources to take the lead in establishing an ongoing process whereby the highway community can set these priorities.[3]

Some historical context is required to appreciate the significance of the RTCC's recommendation and FHWA's request for assistance. Over the past two decades, highway research programs have expanded beyond those nominally under the direct influence of FHWA, and the agency has also withdrawn from the influence it once exercised over state highway research programs.[4] The State Planning and Research Program (SP&R) has grown with the highway program generally, and new programs have been created, such as the UTC program and the Intelligent Transportation Systems (ITS) program, which are managed by RITA. Although the UTC and ITS programs are

[3] *Special Report 295: The Federal Investment in Highway Research 2006–2009: Strengths and Weaknesses.* Transportation Research Board of the National Academies, Washington, D.C., 2008, p. 99.
[4] For a brief overview of the history of the former Nationally Coordinated Program of Highway Research, see Box 2-2 in *Special Report 292: Safety Research on Highway Infrastructure and Operations: Improving Priorities, Coordination, and Quality*, Transportation Research Board of the National Academies, Washington, D.C., 2008.

broader than highway research, a majority of the research funded through these programs is on highway transportation. In addition, the motor carrier research program, once part of FHWA, was moved to the Federal Motor Carrier Safety Administration (FMCSA) upon its creation. Highway research has become increasingly decentralized, which has many advantages, such as giving agencies that have responsibility for specific problems the authority to manage the research funds available to address those problems. Decentralization, however, also has the disadvantage of making overall highway research activities appear to be overly diffused and complicated to policy makers who allocate funding for the programs. It may also lead to gaps and may not necessarily bring about a strategic focus on national priorities.

In a brief draft white paper dated June 1, 2010, FHWA outlines the need for highway research programs to focus more on national priorities and suggests, at a highly conceptual level, optional approaches for involving stakeholders in the development of priorities.[5] A nationally coordinated program of highway research would encompass all federally funded highway research, spanning highway RD&T programs administered by FHWA as well as highway research funded by other federal agencies and by the states. The paper suggests that stakeholders be involved in developing an agenda, and it identifies the need for strategies that would translate the agenda into specific research projects.

Cautions About Priority Setting

FHWA's white paper proposes "active, inclusive, engagement by all stakeholders in the process" of setting an agenda focused on national priorities and proposes concurrent development of "strategies for promoting and translating national agenda priorities into research." Although extensive stakeholder involvement is highly desirable, expectations about engaging the broad and diverse highway community in a process of priority setting should be tempered by experience. We provide some cautionary comments in turn on both priority setting and translation of these priorities into research.

Stakeholder Involvement

Identifying priorities through a stakeholder process is more difficult than it might first appear, as the National Highway R&T Partnership process of 1998 to 2002 and subsequent experience attest.[6] The Partnership was initiated by FHWA, AASHTO, and TRB following the passage in 1998 of the Transportation Equity Act for the 21st Century, which significantly cut funding for highway research and for FHWA's technology transfer activities.

The Partnership was completely open to interested parties. It engaged hundreds of volunteers from among practitioners and researchers to indentify priority themes for research within the areas of highway infrastructure and operations safety; infrastructure renewal; operations and mobility; policy analysis, planning, and monitoring; and

[5] Options for Creating a Nationally Coordinated Highway Research & Technology (R&T) Agenda. FHWA white paper, June 1, 2010.

[6] Federal Highway Administration, American Association of State Highway and Transportation Officials, and Transportation Research Board, *Highway Research and Technology: The Need for Greater Investment.* A Report of the National Highway R&T Partnership, April 2002.

planning and environment.[7] Individuals from 170 different organizations participated in at least some aspect of the process. The report of the different work groups summarized research needs in about 45 thematic areas, which were combinations of more than 200 emphasis areas. The combination of the working groups' guesstimates of the probable budget needed to support this broad research agenda totaled $700 million annually, considerably more identified need than was funded then or now.[8]

As the Partnership experience illustrates, any process that involves all highway research stakeholders has to be very inclusive and broad to reach the tremendous diversity of interests and perspectives that exists in the highway research community. This community spans many technical fields (such as engineering, materials science, statistics, public administration, law, economics, planning, behavioral sciences, and environmental sciences) and areas of interest (safety, operations, maintenance, policy, planning, and the environment). It also includes the 50 state DOTs, thousands of state and local governments, hundreds of metropolitan planning organizations, tens of thousands of private carriers of passengers and freight, suppliers, contractors, consultants, and more than 100 universities engaged in some facet of highway research.

The overall Partnership effort identified important theme areas but did not attempt to set priorities across areas. Even within categories, however, the priority themes identified covered many, if not most, possible areas of research within each category. This difficulty in setting priorities should not be surprising. The Partnership was an all-volunteer effort with minimal staff support and had no dedicated budget. The individuals participating in the process covered a broad spectrum of interests: practitioners from organizations like state DOTs, metropolitan planning organizations, and federal agencies; representatives from dozens of associations and interest groups; experts from many consulting organizations and private firms; and researchers from more than 40 universities. Each group tried to include within its themes and emphasis areas topics that would include the interests expressed by this very diverse set of stakeholders. Thus, whereas the Partnership experience illustrated the diversity of stakeholders and their willingness to engage in a process of identifying important areas of research, it was unable to move beyond identifying fairly broad emphasis areas within categories.[9]

Defining Specific Research Projects

Translating areas of emphasis into specific research projects is an intellectually challenging exercise, as experience illustrates. The individuals involved in the highway safety group of the Partnership, for example, realized that their priority areas lacked the

[7] Despite this broad set of categories, the Partnership activity did not attempt to cover all aspects of highway research; for example, it did not include certain areas of ITS or highway maintenance and did not include efforts needed to deploy research results through technology transfer activities or training.

[8] In comparison, the annual authorized funding through Titles I and V of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (Public Law 109-59; SAFETEA-LU)—which is broader than highway research—totals $416 million annually. See Table 2-1 in *Special Report 295: The Federal Investment in Highway Research 2006–2009: Strengths and Weaknesses*. Transportation Research Board of the National Academies, Washington, D.C., 2008.

[9] This problem is not unique to this process. Stakeholder processes relied upon in the development of highway research roadmaps have encountered similar difficulties. See *Special Report 292: Safety Research on Highway Infrastructure and Operations: Improving Priorities, Coordination, and Quality*, Transportation Research Board of the National Academies, Washington, D.C., 2008, p. 93.

definition needed to identify research topics. As a result, an ad hoc group continued to meet and ultimately held a workshop to define priority topics and encourage coordination among the various agencies funding research on, or related to, highway safety in infrastructure and operations. They set priorities in particular areas by simple voting, but they also recommended that FHWA fund white papers by individual researchers that would develop research topic priorities within the identified areas. FHWA subsequently commissioned these papers, which were published on the web, and comments on them were requested from the highway research community. Very few comments were received, however, suggesting some limits to this approach to stakeholder input.

Participants in the workshop also recommended that a TRB–NRC committee be formed to prioritize and narrow the list of possible research topics and to develop a process for improved coordination among agencies. FHWA's white paper on a nationally coordinated program of highway research is silent about the specific strategies that would be used to translate a broad agenda into specific research topics. The process that the highway safety group used was inclusive and transparent, but even the group realized it was insufficient to move from priority areas to specific research topics. It was hoped that the recommended committee could accomplish this and that it would serve as a model for other Partnership groups as a way of setting research topic priorities.

FHWA and AASHTO, acting through NCHRP, subsequently provided funding to TRB to form a TRB–NRC committee. An expert group of distinguished researchers and administrators was appointed, but they found elements of their task daunting.[10] Though knowledgeable about the state of research within their own areas of expertise, the individual members were uncomfortable in the role of assessing the merits of suggested research in topics about which they were not knowledgeable. Civil engineers, for example, were uncertain how to weigh the merits of alternative research in human factors. The committee was concerned that any process of setting priorities would need to be clear, quantitative, and transparent in order to establish legitimacy with stakeholders. Any process that was essentially arbitrary—driven by the biases of those making the selection—was viewed as unacceptable. In its report, the committee recommends the development of a methodology that could augment expert judgment in the prioritization of research projects. This methodology is currently under development through NCHRP Project 17-48, which is expected to be complete in October, 2012.[11] Although a noble goal, whether a methodology that would improve upon what is an inherently judgment-based process can be developed remains to be seen.

Pros and Cons of Other Models

Other models exist for priority setting within the highway research community. In NCHRP, for example, problem statements (specific research topics) are solicited from

[10] *Special Report 292: Safety Research on Highway Infrastructure and Operations: Improving Priorities, Coordination, and Quality*. Transportation Research Board of the National Academies, Washington, D.C., 2008.

[11] The objectives of this research are to (*a*) develop a detailed methodology for identifying and evaluating research needs in the area of highway infrastructure and operations safety that, among other things, provides a quantitative analytical approach that examines clearly defined criteria to determine the potential value of the research topics and (*b*) implement the methodology to identify and evaluate research needs in the areas of highway infrastructure and operations safety.

state DOTs, standing committees of AASHTO, and TRB committees. After topics are screened by NCHRP and FHWA staff, the states individually rank the projects. These rankings are then combined; the states then discuss the topics and, acting through AASHTO's Standing Committee on Research (SCOR), reprioritize them and then allocate funding to the prioritized list until available funds are depleted. This decision-making process of collecting the individual judgments of SCOR members has served the NCHRP program well over the years. SCOR's decision-making process, however, may not be applicable to the broadest set of stakeholders. Such a broad, large, and diverse group could not, as a practical matter, meet together and make decisions about priorities. Presumably, therefore, a different, yet still transparent and explicit process, would be needed to ensure the legitimacy of the outcome to the participants. Setting priorities for NCHRP is guided by significant efforts by state DOTs and AASHTO committees to identify the highest priority research projects, and SCOR takes this information into account in determining which projects should be funded. Generally, prioritizing different types of research projects is difficult because they serve different purposes, such as to improve safety or reduce congestion.

There have also been two Strategic Highway Research Programs (SHRPs), whose essential foci were recommended by TRB–NRC committees formed for this purpose.[12] In this model, a small committee of experts, balanced in terms of expertise and perspective, reached consensus on a small number of high-priority areas of research. The first committee that recommended a Strategic Highway Research Program developed its priorities based on finding a small number of areas that promised significant benefits if resources could be scaled appropriately and guaranteed over a specific, but limited, duration. The second committee invited suggestions about priority topics from a broad spectrum of stakeholder groups, but ultimately followed a similar, judgment-based, approach. In both cases, the committees explained their rationales for picking their priorities in detailed reports that were subject to peer review.

Importantly, both of the committees picked a small number of very promising *areas* of research. The research *topics* that would be required to reach for the promise subsequently required extensive follow-up by teams of experts to develop detailed research plans under the guidance of NCHRP project panels. The SHRP model is appropriate for selecting a few priorities on which to concentrate resources in search for new products. It would not be practical for all of highway research, however, because of the time and resources required to support the committees' prioritization processes and the effort and cost required for developing detailed research plans.

Summary

Several lessons may be drawn from the experiences with priority setting in highway research to date:

1. A stakeholder involvement process that attempts to involve all the interested and diverse stakeholders in a deliberative process of some kind can easily become

[12] *Special Report 202: America's Highways: Accelerating the Search for Innovation.* Transportation Research Board, National Research Council, Washington, D.C., 1984. *Special Report 260: Strategic Highway Research: Saving Lives, Reducing Congestion, Improving Quality of Life*. Transportation Research Board of the National Academies, Washington, D.C., 2001.

unwieldy and, without significant support, may not result in a rigorous prioritization process.

2. It is difficult for stakeholders with particular perspectives and interests to agree on priority setting across areas. Research programs like NCHRP can effectively come to resolution on topics through a voting process—one that is made more acceptable because the votes are cast by members of a single constituency (state DOTs, who also fund the program), even though DOTs have considerable diversity of interests across fields of research within them. Attempting to prioritize research across areas for a diverse set of stakeholder groups, through simple voting or a Delphi technique, however, may lack legitimacy.
3. Researchers with deep, but narrow, areas of expertise resist making judgments outside their areas, but whether a more rigorous, quantitative process can be developed to substitute for expert judgment is an open question.
4. The committee processes that led to the two SHRP efforts have been successful but have limited application to all of highway research. Thus, as plans are developed for engaging stakeholders in highway research priority setting, it would be important to decide early on about how to effectively engage stakeholders without the process becoming unwieldy and to define a transparent method or process by which decisions will be made (and by whom) about what research to conduct.

Our bias is that making decisions about what priorities to address is an inherently judgment-based, subjective, process. For this reason, the community often turns to committees of knowledgeable people to make these judgments. The reputations of the members and their balance of perspectives are what grant such processes their legitimacy. These judgments can be enhanced by collecting input from stakeholders.

Decisions about what research to pursue, however, do not depend solely on the importance of the topic or the promise for payoff, as important as these might be. Also important are considerations such as

- Balancing a portfolio across types of research (advanced, applied, demonstration, and evaluation) and across essential subject matter (materials, safety, operations, environment);
- Determining the research needed to update and revise specifications and standards and inform the regulatory process;
- Ensuring the adequacy of resources for data collection and information exchange;
- Maintaining capability for short-term R&D and policy analysis to support understanding of the issues of the day; and
- Deciding whether some topics are best addressed through a SHRP-like approach.

These dimensions of research management indicate the need to maintain a degree of flexibility for resource allocation in the hands of research managers independent of a prioritization process.

Comments About Coordination

The committee's recommendation for a priority-setting process in *Special Report 295* was made in the spirit of encouraging greater focus on important topics across highway

research programs. As noted in the FHWA white paper, coordination on important research topics occurs with some regularity across some programs through mutual information sharing about plans for future research as well as research underway. An example would be the extensive process that the states and FHWA engage in during NCHRP's annual process of identifying and funding research projects. FHWA might improve on the sharing of information about its ongoing research by supporting regional workshops, webinars, videoconferences, and other means of sharing information among state DOTs, other stakeholders, and FHWA research managers.

Coordination with the UTC program is more difficult for FHWA because each UTC has discretion in developing its research topics and because FHWA's funds (with limited exceptions) cannot be used to create the required match for UTC funds. Thus, there is neither an existing process nor a monetary incentive for UTCs to partner with FHWA. (Many state DOTs and UTCs coordinate effectively because of state DOT provision of matching funds to many UTCs.) Some UTCs might be more prone to collaborating with FHWA if they had a much clearer understanding of the specific objectives and the RD&T that FHWA is investing in. Presentation of FHWA's research road maps for individual program areas on FHWA's website, as the agency has committed to do by the end of the year, will, at least, make it more possible for motivated UTCs to more readily identify areas of mutual interest.

Coordination with other agencies within USDOT that also conduct highway research (RITA, FMCSA, and NHTSA) poses additional challenges. Each agency is constrained by its specific mission, legal authorization, separate budgets, and constituencies; moreover, RITA is charged with coordinating research within USDOT. Sharing research roadmaps and participating in merit and peer review across agency lines can improve communication about, and awareness of, ongoing research in other departments. Efforts underway by RITA to facilitate greater awareness among research managers working in similar areas across DOT agencies will also help. In addition, many FHWA, RITA, FMCSA, and NHTSA staff are active in TRB standing committees, which have a primary mission of information sharing about ongoing and needed research.

Thus, mechanisms are in place to provide for some coordination across the various programs conducting research directly on, or related to, highway research. Presumably, coordination mechanisms could be improved without necessarily requiring an agenda-setting process to achieve agreement across the community about what the research priorities should be. This suggests that opportunities for improved coordination be pursued independently of developing a process to foster greater agreement about priorities.

Conclusions and Recommendations

The committee is pleased with the progress that FHWA is making in developing a process for creating a nationally coordinated highway research agenda, but urges that expectations remain modest about what can be accomplished given the diversity of programs and interests. **The committee recommends that FHWA begin giving serious consideration to the appropriate process to follow in (*a*) translating stakeholder input into priority areas and (*b*) translating priority areas into specific areas of research. It is important that these processes be transparent to ensure legitimacy to**

stakeholders. In the interim, the committee recommends that FHWA staff meet with staff from AASHTO and TRB to discuss a more detailed proposal.

As a proposal is developed, we suggest that consideration be given to organizing the activity along the lines traditionally used in categorizing highway research (infrastructure, safety, operations, planning/environment, and policy) and that a pilot process be tested first in one or two areas before making a large commitment. Consideration should also be given to cross-cutting activities that may not be a priority for a particular function, but are, nonetheless, very important for the transportation community.

The committee also suggests that when stakeholders are solicited for input, they be asked to identify priority areas appropriate for advanced research, applied research, demonstrations, and technology transfer. It would also be useful to determine whether stakeholders believe there are areas of research that demand a process that concentrates resources on a few topics in search of breakthroughs or new products. Finally, in soliciting input from various stakeholders, traditional face-to-face discussions in regional or national workshops or conferences would be valuable in addition to experimenting with opportunities for provision of input through websites and other electronic media. Although the kinds of web tools mentioned in the FHWA white paper (on-line collaboration tools such as TWiki) have some promise, whether the highway research community is prepared to participate in such a process in a meaningful way needs to be determined.

PROPRIETARY PRODUCTS

Under the heading of accelerating deployment and the adoption of innovation, FHWA requested in 2009 that the RTCC focus its work on strategies for reducing barriers to the use of proprietary products. This request appealed to the committee because, as a society, we depend heavily on the private sector to identify, market, and sell innovative products. It is often private entrepreneurs and inventors who translate findings from basic and applied research into marketable products. For transportation infrastructure, however, which is almost exclusively delivered in the public sector, there are many barriers to innovation as a result of low tolerance for risk, uncertainty about the long-term performance and life cycle cost of new products, and a procurement process driven by low-bid requirements.[13] For proprietary products, the barriers are even higher because of federal legal requirements for competitive bidding (with limited exceptions) for use of proprietary products on projects funded with federal aid.[14]

In cases where there are equivalents to existing proprietary products, there is no issue because a competitive bid is possible; however, new products that do not have equivalents are of particular concern. Such innovations may provide better value for the public, but are unique and often promise to exceed existing standards and specifications.

[13] *Special Report 256: Managing Technology Transfer: A Strategy for the Federal Highway Administration*. Transportation Research Board of the National Academies, Washington, D.C., 1999, pp. 33–36.
[14] Title 23 CFR 635.411.

They are allowed to be used on projects funded with federal aid if state or local agencies certify (*a*) that the product is needed for synchronization with other aspects of a project or (*b*) that it is unique with no suitable alternative. When alternatives exist, a state division office can make a public interest finding (PIF) when use of a specific product is in the public interest. Proprietary products can also be used for research and on short segments of roadway for experimental purposes. (Presumably, new contracting methods that place more of the risk, funding, and discretion in the hands of private contractors could facilitate adoption of innovative technologies, including proprietary products. Determining whether this is so would be a worthwhile research project.)

Although there is legitimate concern that a vendor with a unique product could create a monopoly and charge excessive prices for a successful proprietary product, the committee observes that many innovations, once proven, ultimately spawn the development of competitive products by other entrepreneurs. This has been the case with a wide variety of products now in common use around the country.[15] Once alternatives exist, the public gets the benefit of superior products at a competitive price, which would not have occurred unless a product was allowed to be proven in the marketplace.

Achieving certification or a PIF for an innovative proprietary product is often a cumbersome and time-consuming process, with no guarantee of a positive outcome. States typically insist that a new product be proven through a field test of some sort, and each state tends to require its own test. Division office PIFs only apply to the state covered by that division office. The highway community should be rewarding entrepreneurs when they develop successful new products if it is to reap the benefits of the private sector's capacity to innovate. Given that innovative new products must be marketed to every individual state, however, the added cost and risk to recouping the investment needed to develop new products may dissuade inventors. With high barriers to entry, entrepreneurs and inventors may well look to other sectors for opportunities for profit. In its consideration of this issue, the committee has looked for ways to lower these barriers.

The need for a new product to be demonstrated in each state is a significant barrier to innovation; what is needed is a well-defined test, the results of which could be transferable across states. Such a test, if a product proved successful, could result more readily in state certification and, when warranted, in a nationwide PIF. The option discussed by the committee in most detail would be a test that would be agreed on by a small number of states and that could be supported through the pooled-fund research program administered by FHWA. If these states were regionally distributed, then the results of the test could be used in support of a national PIF. States within a region with similar climate and other relevant factors might benefit from a test of a product most suited to their region.

AASHTO's National Transportation Product Evaluation Program (NTPEP) exists for sharing state resources for the conduct of product tests. NTPEP works for instances when a test has been developed and the primary concern is to avoid duplicating the same

[15] Examples include prestretched cable median barriers, fast-setting patching materials for concrete repair, polymer concrete thin overlays for bridge decks, higher intensity reflective sheeting, longer-lasting road striping materials, permanent crash cushions and truck-mounted attenuators, asphalt recycling equipment, carbon fiber reinforcing systems for concrete bridge beams, and a whole host of ITS equipment.

test in many states. For a few years, the gap for testing new products without tests was filled by HITECH, which was an effort organized through ASCE to develop and conduct tests for new products. This effort waned, however, in part because of the cost of maintaining the capability and the difficulty of getting developers of new products, often individual entrepreneurs, to provide the significant funding needed to develop and apply appropriate product tests. For many years, the states have supported the work of AASHTO's Technology Implementation Group (TIG). TIG's main mission is to identify promising new products and technologies and to encourage their adoption by state DOTs. Its work is supported by voluntary contributions from states of $6,000 each. As resources have become increasingly constrained, however, TIG's support has waned, as has its influence. Nonetheless, a revitalized TIG could serve as a group to weigh the potential for proposed proprietary products to be tested. TIG might serve as a gatekeeper and the pooled fund mechanism might serve as a funding mechanism to develop and apply tests of new proprietary products.

The committee offers the following recommendations of actions to reduce the barriers to proprietary products:

1. **The FHWA guidance on proprietary products should be more expansive about what is permitted and under what circumstances**. The current guidance is clear about what is not permitted and provides criteria for what is allowed, but should also provide more examples of what is permitted to reduce uncertainty in the minds of state and division office officials. The committee is encouraged that top officials in FHWA are already working on revising the agency's official guidance on proprietary products.

2. **FHWA should explore strategies to make it easier for PIFs to transfer from one state to another**. Doing so would be facilitated by state and division offices' greater willingness to accept the results of another state's tests of the product, which in turn would more be likely if the tests and the results of the tests were written up and distributed. For states to accept the results of tests, it might be more effective if states with similar conditions (climate, soils, traffic) formed consortia, which could be arranged through the pooled fund program. The committee was pleased to learn that FHWA is already considering this option.

3. **FHWA should support more national PIFs**. Rather than relying, as today, on a state-by-state process, FHWA should consider developing a process for a multistate, multiyear test of a product, which, if successful, would result in a national PIF issued by FHWA headquarters. From the committee's discussions about this issue, it is clear that resources are needed to support the development of appropriate tests and for the preparation of reports on the results. Pooled fund projects are one way to finance such efforts; the committee's concluding recommendation in this section also addresses the resource issue.

4. **FHWA should review and possibly replicate the South Dakota model, in which the division office has allowed the state, through its stewardship agreement, to make a PIF on projects not covered by full federal oversight.**

5. **The states, working through AASHTO, should strengthen the Technology Implementation Group (TIG)** and encourage TIG to allow vendors of proprietary products to bring them to TIG for consideration directly with the support of at least one state. AASHTO should also consider adding the cost of TIG support to states' annual payments to support the work of this group.

6. Finally, as the agency's reauthorization proposal for the surface transportation program is developed, **FHWA should develop a proposal to Congress for dedicated funding and activities to facilitate technology transfer and the introduction of new products.** During the authorization period for the Transportation Equity Act for the 21st Century (TEA-21), for example, FHWA had $40 million in annual funding to support technology transfer. Loss of these funds has hampered the agency's ability to mount an effective technology transfer program. The agency also had authorization to allow 100-percent federal funding of projects through a demonstration program for evaluating experimental products and technologies. This program reduced the risk to the states and facilitated introduction of new products.

ADVANCED RESEARCH

The RTCC has a long history with the topic of advanced research, including recommendations in previous reports that helped lead to the authorization of the Exploratory Advanced Research Program (EARP) in SAFETEA-LU.[16] As a result, the committee has been observing this program with great interest and, occasionally, with some anxiety about how it is progressing.

The committee received a full briefing on the program as part of its June 2010 meeting. I am pleased to report that the committee is very satisfied with the progress made to date. It is appreciative of the efforts that the EARP staff has made to reach out to experts and peers beyond the traditional highway research community to gain useful insights and perspectives. Also of value has been the solicitation and receipt of proposals from firms and teams that are bringing new expertise to the highway field. The use of expert stakeholders to point to promising areas of investment is also encouraging.

The committee is excited about the opportunities that the program represents and is looking forward to the results of the program. In this regard, we note that advanced research projects themselves are unlikely to yield specific products or solutions, but seeking and developing expertise in the understanding emerging from basic research conducted in other fields will allow EARP to better position the highway community for the future development of solutions and products.

Special Report 261: The Federal Role in Highway Research and Technology. Transportation Research Board of the National Academies, Washington, D.C., 2001.

In closing, I would like to thank you for the excellent support of Michael Trentacoste, Debra Elston, Jack Jernigan, David Kuehn, and John Moulden and for their involvement and participation in our meetings. We also very much appreciate the involvement and participation in our March 2010 meeting by Robert Bertini and Curt Tompkins of RITA.

With the delivery of this letter report, I am concluding 6 years of service as chairman of the RTCC. It has been an enjoyable task because of the excellent committee members, the cooperation of the outstanding FHWA staff, and the wonderful support of the TRB staff. I believe we have made a difference, and I believe the RTCC will continue to provide excellent advice to the FHWA under the new chairman, Mike Meyer.

Sincerely,

E. Dean Carlson,
Chairman

Attachments
Agenda and Participants, March 2010 Meeting
Agenda and Participants, June 2010 Meeting

Research and Technology Coordination Committee
March 2-3, 2010,
Beckman Center, Irvine, CA
AGENDA

Meeting Objectives

- Hear from a variety of perspectives on the goals and objectives of a nationally coordinated program of highway research and FHWA's role in it.
- Identify (a) barriers to achieving improved coordination among state, FHWA, and university programs and (b) strategies for how they might be overcome.
- Review revised draft of commissioned paper on barriers and opportunities for use of proprietary products and develop agreement on advice to FHWA and state DOTs.

March 2, 2010
7:30 Breakfast at Study Center
8:30 Review of Agenda

Nationally Coordinated Program of Highway Research
8:35 a.m. Introduction and background to discussion Chairman/staff

- RTCC recommendation in SR 295
- Motivation for recommendation – growing complexity and appearance of fragmentation of program with expansion of UTC program
- Overview of current scale of highway research – FHWA, SP&R, UTC
- Recap of discussion at November 2009 RTCC meeting about coordination: a process for collaboration vs. a specific research agenda
- Goals for and structure of day's discussion

8:55 Current state DOT research coordination and priority setting activities
Panel of state research directors (Larry Orcutt, Sandra Larson, Dave Huft, Skip Paul, and Dale Peabody), each speaking for 5 minutes about their own state and states within their regions
9:45 Questions and discussion
10:15 Break
10:35 FHWA thoughts on national research coordination FHWA staff

- Goals and objectives
- Possible approaches

10:55 Questions and discussion
11:30 Comments from UTC and RITA perspective --
Panel including Joe Sussman, Kumares Sinha, Curt Tompkins, Rob Bertini, and Larry Sutter, each speaking for 5 minutes in response to state DOT and FHWA remarks and commenting on transportation vs. highway research and workforce development

goals of UTC program, as well as constraints on coordination from university perspective.

12:00 Questions and discussion

12:30 Lunch at study center

1:30 p.m. Recap of issues raised in morning session — Chairman/staff

- Identification of opportunities, barriers, and issues

1:45 General Discussion:

- What are purposes and measures of success for a nationally coordinated program?
  - Goals and objectives
  - Outputs and outcomes
  - Relationship to USDOT R&D strategic plan
- What would a program look like?
  - Agreed upon agenda within topic areas?
  - A set of processes to ensure collaboration/avoid duplication?
  - What specific role for FHWA?

3:00 Break

3:20 Continue discussion

- What new processes are needed to achieve goals and objectives that incorporate federal, state, and UTC programs?
  - Regular regional or national meetings, either face-to-face or virtual?
  - Posting and updating of research road maps by all parties?
  - More extensive use of TRIS, RIP, and RNS databases?
  - Other?

4:00 Synthesis of discussion -- A proposed nationally coordinated program of highway research

- Goals and objectives
- Essential elements
- FHWA role
- Barriers to achieving goals/Outstanding issues to be resolved
- Next steps

5:00 Adjourn for day

March 3, 2009

7:30 Breakfast at study center

8:30 Review of agenda — Chairman

Proprietary Products

8:35 Recap of Nov 2009 discussion — Staff

8:45 Updates to commissioned paper — Barbara Harder

9:15 Discussion — All

10:00 Break

10:20 Plans for June 2010 Meeting

10:45 Closed session for RTCC to develop recommendations for letter report on proprietary products

Noon Adjourn

Participants (bold face indicates individuals in attendance)

RTCC members
E. Dean Carlson, *chairman*, Carlson and Assoc.
Frances Banerjee, Banerjee and Assoc.
Arthur Dinitz, Transpo-Industries, Inc.
Kevin Keith, Missouri DOT
Michael Morris, North Central Texas Council of Governments
Dan Murray, American Transportation Research Institute
Larry Orcutt, Caltrans
Wayne Kittleson, Kittleson and Assoc.
R. Scott Rawlins, Nevada DOT
David Roessner, SRI
Robert Sack, New York DOT
Kumares Sinha, Purdue University
Joseph Sussman, MIT
Larry Tibbits, Michigan DOT (ret.)

FHWA
Michael Trentacoste, Debra Elston, Jack Jernigan, John Moulden

State DOT Panel
Sandra Larson,* Research & Technology Bureau Director, Iowa DOT and Chair, Research Advisory Committee (RAC) to AASHTO's Standing Committee on Research
Dave Huft, Research Program Manager and ITS Coordinator, South Dakota DOT
Skip Paul, Director, Louisiana Transportation Research Center, Louisiana DOT
Dale Peabody*, Transportation Research Engineer, Maine DOT

UTC Panel
Robert Bertini, Deputy Administrator, RITA
Curtis Tompkins,* Director, University Transportation Centers Program, RITA
Lawrence Sutter, Professor and Director, Michigan Technological University, Transportation Institute

White Paper Author
Barbara Harder, Barbara Harder, Inc.

TRB staff
Stephen Godwin

*Participating by teleconference

Research and Technology Coordinating Committee
June 9-10, 2010
Woods Hole, MA

June 9, 2010
7:30 Breakfast at study center

CLOSED SESSION
8:30 Review bias and conflict

OPEN SESSION
9:00 Self introductions/Review of Agenda

9:10 Proprietary products – outcomes from March meeting — Godwin

9:30 FHWA Update on Innovation Delivery — Trentacoste
- Proprietary Products
- Every Day Counts Initiative

10:00 Break

NATIONALLY COORDINATED PROGRAM OF HIGHWAY RESEARCH

10:20 Importance of having a highway research program with clear direction in terms of national priorities and improved coordination — Trentacoste/ Skinner

10:40 Overview and Status: USDOT R&D Strategic Plan — Trentacoste

11:10 TRB Policy Study on International Models for Multimodal Research Strategic Planning and Implementation — Godwin

11:20 Potential Roles for FHWA in a Nationally Coordinated Program of Highway Research — Trentacoste/ Moulden
- Definitions of terms – nationally coordinated program, frameworks, agenda, national R&T strategies, collaboration, coordination
- Desirability of a blend of "Top down" and "Bottoms up" processes for a nationally coordinated program.

Noon Lunch at study center

1:00 Continued discussion
- Outline of vision, objectives, strategy/approach, R&T strategies, performance metrics, methods of collaboration
- Options for stakeholder involvement in the development of national priorities (the "top down" portion of the process)

2:30 Break

2:50 Continued discussion
- Options to improve coordination in the "bottoms up" portion of the process.
- Methods to evaluate performance of national R&T strategies.

4:00 Closed Session for Committee Deliberations

5:00 Adjourn

June 9, 2010
7:30 Breakfast at study center
8:30 FHWA Update: Exploratory Advanced Research Program
9:30 Recap of Nationally Coordinated Research Program Discussion
11:00 Closed Session for Committee Deliberations
Open Session
Noon Lunch at study Center
1:00 Closed Session for Committee Deliberations
2:00 Adjourn

Participants (bold face indicates individual in attendance)

RTCC members
E. Dean Carlson, *chairman*, Carlson and Assoc.
Frances Banerjee, Banerjee and Assoc.
Arthur Dinitz, Transpo-Industries, Inc.
Kevin Keith, Missouri DOT
Michael Meyer, Georgia Institute of Technology
Michael Morris, North Central Texas Council of Governments
Dan Murray, American Transportation Research Institute
Larry Orcutt, Caltrans
Wayne Kittleson, Kittleson and Assoc.
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Michael Trentacoste, Debra Elston, Jack Jernigan, John Moulden

TRB
Robert Skinner, Stephen Godwin