

**U.S. HOUSE OF REPRESENTATIVES  
SUBCOMMITTEE ON TECHNOLOGY AND INNOVATION  
COMMITTEE ON SCIENCE AND TECHNOLOGY**

**HEARING CHARTER**

*An Overview of Transportation R&D: Priorities for Reauthorization*

**Thursday, February 12, 2008  
10:00 a.m. – 12:00 p.m.  
2318 Rayburn House Office Building**

**I. Purpose**

On Thursday, February 12, 2009, the Subcommittee on Technology and Innovation will convene a hearing to review the research, development, and deployment activities of the Department of Transportation. The hearing will focus on issues related to the funding, planning, and execution of current research initiatives and how these efforts fulfill the strategic goals of both Federal and State Departments of Transportation, metropolitan transportation organizations, and industry. With the expiration of SAFETEA-LU in FY2009, this hearing will also examine possible ways to improve the current Federal transportation effort.

**II. Witnesses**

**Mr. Paul Brubaker** is a former Administrator of the Research and Innovative Technology Administration of the U.S. Department of Transportation.

**Dr. Elizabeth Deakin** is the Director of the University of California Transportation Center at the University of California, Berkeley.

**Mr. Robert E. Skinner, Jr.** is the Executive Director of the Transportation Research Board.

**Mr. David Wise** is the Acting Director of Physical Infrastructure Issues at the Government Accountability Office.

**Mr. Amadeo Saenz, Jr.** is the Executive Director of Texas Department of Transportation.

**III. Overview**

Signed in 2005, the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (P.L. 109-59) authorized a total of \$2.227 billion through FY2009 for research and related programs under Title V of the bill. This Title authorizes surface transportation research by the Federal Highway Administration (FHWA), training and education

programs, the Bureau of Transportation Statistics, the University Transportation Centers (UTCs), and Intelligent Transportation Systems (ITS) Research. The Science and Technology Committee's jurisdiction over surface transportation research and development is based on House rules which grant the Committee jurisdiction over, "Scientific research, development, and demonstration, and projects therefore" and legislative precedent. Jurisdiction over these programs is shared with the Transportation and Infrastructure Committee. The Science and Technology Committee has a long referral history regarding surface transportation research and development (R&D) bills, including H.R. 860 in the 105<sup>th</sup> Congress and H.R. 242, and H.R. 243 in the 109<sup>th</sup> Congress. Elements of each of these bills were incorporated in the highway reauthorization bills for the respective Congresses.

#### **IV. Issues and Concerns**

##### *Planning, Coordination, and Evaluation of Research, Development, and Technology (RD&T)*

Despite the creation of a specific RD&T coordinating agency within Department of Transportation (DOT) by the Mineta Act of 2004 (P.L. 108-426), and requirements in the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) (P.L. 105-178) and SAFETEA-LU that DOT evaluate and coordinate its research programs, efforts in this regard continue to fall short. In 2003, the Government Accountability Office (GAO) evaluated the coordination and review efforts by the Research and Special Programs Administration (RSPA)<sup>1</sup>. RSPA had been created by the Secretary of Transportation to coordinate and review RD&T activity across the modal agencies. It was dissolved when the Mineta Act created the Research and Innovative Technology Administration (RITA) to fulfill largely the same functions. In the 2003 report, GAO found that efforts to locate duplicative programs and opportunities for cross-collaboration between the modal agencies were hampered by a lack of information on the RD&T activities being pursued across the modal agencies. GAO also found that DOT did not have a systematic method for measuring the results of federal transportation research activities, or a method to show how their research impacted the performance of surface transportation in the U.S. RSPA cited a lack of resources to perform these types of evaluations, and they also stated that each modal agency undertook its own evaluation of its research programs. GAO recommended that RSPA define metrics to evaluate the outcomes of its DOT-wide RD&T coordination efforts. In 2006, GAO did a follow-up evaluation of RD&T coordination and evaluation<sup>2</sup>. They again offered similar recommendations, noting the continuing lack of common performance measures for DOT RD&T activities. However, at the time of that evaluation, RITA had just recently been established. GAO commended the initiative in RITA's FY2007 budget request to devote \$2.5 million to RD&T coordinating activities (an increase of nearly \$2 million over the \$536,000 spent by RSPA in FY06 on coordination).

In November of 2006, RITA submitted the *Transportation Research, Development and Technology Strategic Plan for 2006-2010* to Congress. The Transportation Research Board (TRB), of the National Research Council, evaluated this plan and noted, "The strategic RD&T

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<sup>1</sup> GAO-03-500, *Transportation Research: Actions Needed to Improve Coordination and Evaluation of Research*.

<sup>2</sup> GAO-06-917, *Transportation Research: Opportunities for Improving the Oversight of DOT's Research Programs and User Satisfaction with Transportation Statistics*.

plan for 2006-2010 is a reasonable first effort. It offers useful descriptions of the many RD&T programs within the Department. At the same time, it is more a compendium of individual RD&T activities than a strategic plan that articulates department wide priorities and justifications for RD&T programs and budgets.”<sup>3</sup> According to TRB, the plan lacked stakeholder input and also failed to identify how stakeholder input would be sought for strategic planning in research topic areas. It further failed to articulate the role and value of DOT’s RD&T activities; describe the process used for selecting research topics to ensure their relevance, quality, or performance; describe the expected outcomes from RD&T; and describe the process for monitoring performance. In TRB’s view, the plan, at a minimum should have explained the extent to which quantifiable goals, timetables, and performance measures would be part of RD&T programs.

The major surface transportation RD&T program of the FHWA has received similar criticisms regarding coordination and evaluation as DOT’s overall RD&T program. The program is highly decentralized, with research activities taking place in five out of the thirteen offices within the agency. In 2002, GAO reviewed FHWA’s R&D approach and urged that the agency “develop a systematic process for evaluating significant ongoing and completed research that incorporates peer-review or other best practices in use at Federal agencies that conduct research.”<sup>4</sup> FHWA subsequently developed its *Corporate Master Plan for Research and Deployment of Technology and Innovation*, released in 2003. This document contains many overarching principles, such as measuring the performance of RD&T activities, but does not provide specific mechanisms through which FHWA will implement all of them. It is also unclear from FHWA’s RD&T Performance Plan for 2006/2007 if the many research projects listed have been evaluated for their use by the transportation community. Without such analysis, the information portrayed in these documents establishes outputs, but does not offer any outcomes.

### *Tech-Transfer*

There is general agreement that the transfer of technology and new ideas from the R&D stage to deployment and adoption is slow. In testimony before this Committee in September of 2007, FHWA identified some of the contributing factors that slow the state and local adoption of new transportation technology, including insufficient information on the benefits versus the costs of new technologies; lack of confidence in new technologies or a lack of performance data; and a lack of incentive mechanisms to encourage the deployment of new technology<sup>5</sup>. TRB Special Report 295, *The Federal Investment in Highway Research, 2006-2009: Strengths and Weaknesses*, notes the important role FHWA plays in educating state DOTs about new technologies and encouraging their adoption, noting such efforts as FHWA’s activities to identify, market, and track the deployment of market-ready technologies and incorporate a strategic plan for the deployment of pavement research activities. However, the funding for technology transfer activities at FHWA has suffered in recent years, falling from \$100 million to \$40 million after the passage of TEA-21. The report further notes, “The missing element among

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<sup>3</sup> RITA, *Transportation Research, Development and Technology Strategic Plan: 2006-2010*, Nov. 2006, Appendix A.

<sup>4</sup> GAO 02-573, *Highway Research: Systematic Selection and Evaluation Processes Needed for Research Program*, pg. 19.

<sup>5</sup> House Science and Technology Committee, *Bridge Safety: Next Steps to Protect the Nation’s Critical Infrastructure* September 19, 2007.

all of FHWA's deployment activities appears to be the resources within the agency with explicit expertise in technology transfer and deployment that could provide guidance to the various efforts agency wide [sic]."<sup>6</sup>

The Intelligent Transportation Systems program is a well studied example of transfer and deployment of R&D efforts. In 2005, GAO identified broad issues with DOT's deployment goals for traffic management ITS, finding that the goals did not take into account the level of ITS needed to accomplish local objectives and priorities; did not reflect whether localities were operating the ITS as intended; and did not adequately capture the cost-effectiveness of ITS<sup>7</sup>. Additional studies of ITS deployment have found that local officials are aware of ITS technologies but feel that the benefits are not adequately described.<sup>8</sup>

### *Recommendations from TRB*

With support from FHWA, TRB's Research and Technology Coordinating Committee (RTCC) has periodically assessed the state of highway research and made recommendations to policy makers. In its recent report, TRB Special Report 295, *The Federal Investment in Highway Research, 2006-2009: Strengths and Weaknesses*, the RTCC evaluated the investments in highway R&D made under SAFETEA-LU. According to the report, transportation R&D is significantly under funded when compared with the R&D investments made in other industrial sectors. Also, the report recommended that the matching requirement for UTCs be adjusted from 50-percent to 20-percent. According to the RTCC, if UTCs relied less on state DOTs and others for matching funds, they would be free to pursue longer-term advanced research topics and move away from applied research that could be handled elsewhere. The RTCC recommended that FHWA's Exploratory Advanced Research Program continue as well, and that a larger percentage of the agency's research budget go toward advanced research. Additionally, the report states that all research grants, including those to UTCs, should be made on a competitive, merit-reviewed basis. The RTCC recommended that FHWA be given more resources to engage stakeholders and carry out technology transfer activities. FHWA should be given the resources to take the lead in establishing an ongoing process whereby the highway community can set these priorities. Finally, the RTCC noted that the Strategic Highway Research Program 2 (SHRP 2) was funded significantly less than stakeholders had requested, and recommended that it continue to receive funding for another two years. TRB states many recommendations but does not provide specific mechanisms to accomplish them.

## **V. Background**

### **Federal Highway Administration (FHWA)**

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<sup>6</sup> TRB Special Report 295, page 68

<sup>7</sup> GAO-05-943, *Highway Congestion: Intelligent Transportation Systems' Promise for Managing Congestion Falls Short, and DOT Could Better Facilitate Their Strategic Use*.

<sup>8</sup> Deakin, B. *Mainstreaming Intelligent Transportation Systems: Findings from a Survey of California Leaders*, 2004

The Federal Highway Administration oversees surface transportation infrastructure planning, construction, and maintenance; develops educational and training programs for transportation workers; and funds research efforts in surface transportation fields. Within FHWA, the Office of Research, Development, and Technology directs the Administration's transportation research efforts.

### **Office of Research, Development, and Technology**

The Office of Research, Development, and Technology funds research into pavements, structures, safety initiatives, highway operations, and environmental interests. The Office of Research, Development, and Technology directs most of the research funds for DOT and operates the Turner-Fairbank Highway Research Center.

- **Turner-Fairbank Highway Research Center (TFHRC)**  
TFHRC operates as the hub for highway research by developing research plans in support of FHWA strategic goals; managing policy, budget, and administrative services for its research customers; and initiating strategic marketing plans to ensure the utilization of highway research.
- **Exploratory Advanced Research Program (EARP)**  
EARP manages longer-term, higher-risk research aimed at addressing mission-oriented technology and knowledge gaps as mandated in SAFETEA-LU. Intending to react to the call for more long-term research, this program seeks out projects not directed to solve specific current problems, but to enable approaches to future transportation questions.

### **Research and Innovative Technology Administration (RITA)**

RITA is mandated to coordinate, facilitate and review the DOT's research and development activities, including those funded through FHWA.

- **Intelligent Transportation Systems Joint Program Office (ITS JPO)**  
ITS JPO was created in the Mineta Act of 2004 to take over coordination of the Intelligent Transportation Systems program. ITS JPO focuses on developing transportation infrastructure and vehicles with integrated communication systems intended to deliver up-to-date information to both drivers and decision makers. This information could be used to coordinate state department of transportation emergency efforts, relieve congestion through metropolitan signal coordination and enable on-the-go planning of efficient driving routes with up-to-date traffic information.
- **University Transportation Research**  
University Transportation Center (UTC) programs support almost 60 university-based centers that conduct transportation research in all disciplines and support educational activities for the next generation of transportation professionals. The centers are funded on a 50/50 matching funds agreement. Generally, the states provide the matching funds, and while the UTCs are intended to jointly operate as a multimodal system focused on the DOT's strategic objectives, these matching funds often provide opportunities for state

departments of transportation to channel efforts towards specific regional transportation issues.

- **Bureau of Transportation Statistics (BTS)**  
BTS is a component of the Research and Innovative Technology Administration (RITA) that collects, compiles, analyzes, and publishes transportation statistics in freight, travel and aviation; transportation economics; and geospatial issues. BTS is utilized by federal, state, and local governments; universities; and the private sector. Data sets made available to customers can include air carrier traffic, border crossing, and national freight movement.
- **John A. Volpe National Transportation Systems Center**  
A fee-for-service organization, the Volpe Center is a center designed to respond to issues brought forth to them by federal, state, and local governments; industry; and academia. The Center assists these clients in a number of areas including human factors research; system design, implementation, and assessment; environmental preservation; and organizational effectiveness. DOT makes up about two-thirds of the Volpe Center's contracted funding.
- **Transportation Safety Institute (TSI)**  
TSI is also a fee-for-service organization utilized by federal, state, and local governments; industry; and the international community; that develops and conducts worldwide safety, security, and environmental training. TSI focuses on education programs developed in collaboration with the client organizations to meet specific situation needs. Training and educational information is disseminated through publications, websites, seminars, and classes.

### **The Transportation Research Board**

TRB is one of five major divisions of the National Research Council; the principal operating agency of the National Research Council. TRB receives federal funding to manage cooperative research efforts and issue published analyses of transportation policy and research strategy. Two of the research efforts managed by TRB are the National Cooperative Highway Research Program and the Strategic Highway Research Program 2.

- **National Cooperative Highway Research Program (NCHRP)**  
NCHRP is a program aimed providing solutions to near-term problems in the transportation industry by tackling an annual list of research topics developed by state departments of transportation. NCHRO is administered by TRB and sponsored by the state departments of transportation in the American Association of State Highway and Transportation Officials.
- **Strategic Highway Research Program 2**  
SHRP 2 is a highway research program designed to advance highway performance and safety for the U.S. highway system. This program focuses on four areas of research that were identified by a TRB-established committee of leaders from the highway

community: safety, infrastructure renewal, reliability, and transportation capacity. Funding is transferred through FHWA for execution by TRB with an expected program completion date of FY2009.

<b>Funding for Surface Transportation Research and Development (\$ millions)</b>		
	<b>FY2007</b>	<b>FY2008</b>
<i>Federal Highway Administration</i>	38731.0	41216.0
<b>Office of Research, Development, and Technology</b>	<b>111.3</b>	<b>124.9</b>
Turner-Fairbank Highway Research Center	100.2	114.4
Exploratory Advanced Research Project	11.1	10.5
	<b>FY2007</b>	<b>FY2008</b>
<b>Research and Innovative Technology Administration</b>	<b>198.9</b>	<b>199.0</b>
Operating Costs	6.0	6.0
Intelligent Transportation Systems	101.3	101.6
University Transportation Research	64.1	64.4
Bureau of Transportation Statistics	27.5	27.0
	<b>FY2007</b>	<b>FY2008</b>
<i>Transportation Research Board**</i>	-	-
<i>National Cooperative Highway Research Program</i>	30.0	30.0
<b>Strategic Highway Research Program II</b>	<b>40.5</b>	<b>38.5</b>

\* - italicized lines are not under the House Subcommittee on Technology and Innovation's jurisdiction

\*\* - historical numbers are not available, FY2009 funds are \$89.5 million