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Testimony

Before the Subcommittee on Technology
and Innovation, Committee on Science
and Technology, House of Representatives

For Release on Delivery
Expected at time 10 a.m. EST
Thursday, February 12, 2009

TRANSPORTATION RESEARCH

The Department of Transportation Has Made Progress in Coordinating and Reviewing Its Research Activities

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Physical Infrastructure Issues



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Highlights of [GAO-09-361T](#), a testimony before the Subcommittee on Technology and Innovation, Committee on Science and Technology, House of Representatives

Why GAO Did This Study

Research, development, and technology (RD&T) activities are vital to meeting the Department of Transportation's (DOT) priorities, such as increasing safety, enhancing mobility, and supporting the nation's economic growth. In fiscal year 2008, the department's RD&T budget totaled over \$1.1 billion, primarily for highway and aviation projects.

Over the years, concerns have been raised about DOT's capabilities to improve RD&T coordination and evaluation efforts across the agency. In 2004, Congress created DOT's Research and Innovative Technology Administration (RITA) to coordinate and review the department's RD&T programs and activities for the purposes of reducing research duplication, enhancing opportunities for joint efforts, and ensuring RD&T activities are meeting goals. In 2006 GAO reported that RITA had made progress toward these ends, but needed to do more.

GAO's testimony focuses on (1) the importance of coordinating and evaluating RD&T activities and (2) RITA's progress in implementing GAO's 2006 recommendations. GAO's statement is based on its 2006 report, a review of best practices for coordination and evaluation, and follow-up discussions with RITA officials on actions to implement GAO's recommendations. GAO did not assess whether RITA's actions have improved the effectiveness of the department's RD&T investment.

To view the full product, including the scope and methodology, click on [GAO-09-361T](#). For more information, contact David Wise at (202) 512-2834 or wised@gao.gov.

TRANSPORTATION RESEARCH

The Department of Transportation Has Made Progress in Coordinating and Reviewing Its Research Activities

What GAO Found

Coordinating and evaluating research are important elements in ensuring that federal dollars are used efficiently and effectively. Coordinating research enhances collaboration, ensures that questions are explored, and reduces inefficiencies, such as from duplication of research. Evaluating research activities entails comparing research with established performance measures in agency strategic plans and using expert reviews to assess the quality of the research. With DOT's large RD&T budget—over \$1.1 billion—coordination and evaluation are critical to making cost-effective investment choices in today's climate of expected trillion-dollar deficits.

RITA has fully implemented five recommendations that GAO made in 2006 aimed at enhancing RITA's ability to manage and determine the effectiveness of RD&T activities, and partially implemented the remaining two. (See table below.) Regarding implemented recommendations, most notably, RITA has implemented a strategy to coordinate RD&T activities and look for areas where joint efforts would be appropriate. Results of its coordination efforts have identified a number of areas for cross-modal collaboration, including the areas of climate change and freight capacity. RITA has also developed a strategy to ensure that the results of DOT's research activities are evaluated against best practices, using governmentwide guidance and external stakeholder reviews. Regarding partially implemented recommendations, RITA has not yet developed an overall strategy, evaluation plan, or performance measures that delineate how its activities ensure the effectiveness of the department's RD&T investment. However, it has developed a process for doing so. In this regard, RITA plans to use an existing departmentwide strategic planning and budget process and collaborative meetings to develop an overall strategy and performance measures. RITA officials expect that it will fully implement activities related to this recommendation by 2012. GAO will continue to monitor RITA's activities.

Status of RITA's Implementation of GAO's 2006 Recommendations

Recommendations	Status
• Develop a strategy for identifying and reviewing all of DOT's RD&T projects to determine areas of unnecessary duplication, overlap, and opportunities for joint efforts	Implemented
• Develop a strategy to ensure that the results of all of DOT's RD&T activities are evaluated according to established best practices	Implemented
• Develop a DOT-wide database of all of DOT's RD&T projects	Implemented
• Develop a summary of all of DOT's RD&T program evaluations	Implemented
• Develop a description of RITA's process for systematically evaluating the results of its own multimodal research programs and how this process will be applied to future multimodal research programs that RITA conducts	Implemented
• Develop performance goals, an overall implementing strategy, and an evaluation plan that delineate how the activities and results of its coordination, facilitation, and review practices will further DOT's mission and ensure the effectiveness of the department's RD&T investment	Partially implemented
• Develop common performance measures related to DOT's RD&T activities in consultation with the operating administrations	Partially implemented

Source: GAO analysis of RITA information.

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to participate in this hearing on the Department of Transportation's (DOT) research, development, and technology (RD&T) activities. RD&T activities are vital to meeting DOT's transportation priorities, such as increasing safety, enhancing mobility, and supporting the nation's economic growth. In fiscal year 2008, the department's RD&T budget totaled over \$1.1 billion, primarily for projects undertaken by DOT's Federal Highway Administration and Federal Aviation Administration. Coordinating RD&T throughout DOT and reviewing it to make sure that it is evaluated is important to ensure the efficiency and effectiveness of RD&T investment.

Over the years, we and others have raised concerns about DOT's capabilities for improving RD&T coordination and evaluation across the agency.¹ In part to ameliorate those concerns, in 2004 Congress created the Research and Innovative Technology Administration (RITA).² RITA is responsible for coordinating, facilitating, and reviewing the department's RD&T programs and activities to identify research duplication and opportunities for joint efforts and to ensure RD&T activities are meeting intended or other goals. These include activities conducted by DOT's operating administrations as well as other RD&T and statistical programs managed by RITA (e.g., the Bureau of Transportation Statistics and University Transportation Centers). RITA carries out its responsibilities through multiple groups and actions, including its two coordinating bodies—the RD&T Planning Council and Planning Team—and budget reviews. While RITA has DOT-wide responsibilities, it does not have the authority to direct changes in the operating administrations' RD&T activities. In 2006, we reported on RITA's progress in overseeing RD&T activities and made seven recommendations to enhance RITA's ability to manage and ensure the effectiveness of these activities.³

¹GAO, *Transportation Research: Actions Needed to Improve Coordination and Evaluation of Research*, [GAO-03-500](#) (Washington, D.C.: May 1, 2003).

²The Norman Y. Mineta Research and Special Programs Improvement Act of 2004, which also dissolved RITA's predecessor administration, the Research and Special Programs Administration.

³GAO, *Transportation Research: Opportunities for Improving the Oversight of DOT's Research Programs and User Satisfaction with Transportation Statistics*, [GAO-06-917](#) (Washington, D.C.: Aug. 15, 2006).

My testimony today addresses the importance of coordinating and evaluating RD&T so that federal dollars are used efficiently and effectively, as well as RITA's progress in implementing our 2006 recommendations. It is based primarily on our 2006 report, a review of best practices for coordination and evaluation, and follow-up discussions with RITA officials on actions taken on our recommendations. We have not assessed whether RITA's actions have improved the effectiveness of the department's RD&T investment since our 2006 report. We conducted this work in January and February 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Coordination and Evaluation of RD&T Activities Help Promote Efficient and Effective Use of Federal Research Funds

Coordinating and evaluating research are important elements in ensuring federal dollars are used efficiently and effectively. RITA is responsible for coordinating and reviewing the DOT operating administrations' RD&T activities so that (1) no unnecessary duplication takes place and (2) the activities have been evaluated in accordance with best practices. The Committee on Science, Engineering, and Public Policy—a joint committee of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine—has emphasized the importance of careful coordination and focused evaluation of federal research and developed principles to help agencies evaluate their research programs.⁴ The committee recommended establishing a formal process to coordinate research across agencies. While this recommendation is focused on cross-agency research, the goals—enhancing collaboration, ensuring that questions are explored, and reducing inefficiencies—are important and applicable within agencies as well. Coordination of research ensures that information is shared so that, if necessary, research can be adjusted to ensure a field is appropriately covered and understood. In addition, the committee noted that evaluating research against established performance measures in agency strategic plans, developing

⁴Committee on Science, Engineering, and Public Policy, *Evaluating Federal Research Programs: Research and the Government Performance and Results Act* (Washington, D.C.: February 1999).

measures that are appropriate for the type of research being developed, and using expert reviews aid in assessing the quality of the research.

Relatedly, the Government Performance and Results Act of 1993 (GPRA) requires federal agencies to set performance goals and measure performance against those goals to ensure the effectiveness of federal investments. GPRA's emphasis on results implies that federal programs contributing to the same or similar outcomes should be closely coordinated to ensure that goals are consistent and complementary, and that program efforts are mutually reinforcing.

Making appropriate and cost-effective investment choices is an essential aspect of responsible fiscal stewardship. Such choices are even more important in today's climate of expected trillion-dollar deficits. Careful decisions will need to be made to ensure that RD&T activities achieve their intended (or other) purposes and do so efficiently and economically.

RITA Has Made Progress in Improving Its Coordination, Review, and Performance Measurement of DOT's RD&T Programs

In 2006, we made seven recommendations to enhance RITA's ability to manage and ensure the effectiveness of RD&T activities, including developing strategies for coordinating and reviewing RD&T activities and developing performance goals and measures. (See table 1.) RITA has implemented five of our recommendations and is making progress on implementing the remaining two.

Table 1: Status of RITA's Implementation of GAO's 2006 Recommendations

Recommendations	Status
Develop and incorporate into RITA's annual budget process and the RD&T strategic plan:	
<ul style="list-style-type: none"> a strategy for identifying and reviewing all of DOT's RD&T projects to determine areas of unnecessary duplication, overlap, and opportunities for joint efforts 	Implemented
<ul style="list-style-type: none"> a strategy to ensure that the results of all of DOT's RD&T activities are evaluated according to established best practices 	Implemented
<ul style="list-style-type: none"> a DOT-wide database of all of DOT's RD&T projects that will support RITA's coordination, facilitation, and review efforts and will assist in the implementation of the strategies discussed above 	Implemented
<ul style="list-style-type: none"> a summary of all of DOT's RD&T program evaluations, including ongoing and completed evaluations, and a schedule of future evaluations 	Implemented
<ul style="list-style-type: none"> a description of RITA's process for systematically evaluating the results of its own multimodal research programs and how this process will be applied to future multimodal research programs that RITA conducts 	Implemented

Recommendations	Status
Develop and incorporate the following into RITA's year annual budget process:	
<ul style="list-style-type: none"> performance goals, an overall implementing strategy, and an evaluation plan that delineate how the activities and results of its coordination, facilitation, and review practices will further DOT's mission and ensure the effectiveness of the department's RD&T investment 	Partially implemented
<ul style="list-style-type: none"> common performance measures related to DOT's RD&T activities, which should be developed in consultation with the operating administrations 	Partially implemented

Source: GAO analysis of RITA information.

RITA Implemented a Coordination and Review Strategy, Developed a DOT-wide Database of RD&T Activities, and Communicated Results of Evaluations

Preventing duplication of effort. In response to our recommendation, RITA developed a strategy to ensure that no unnecessary duplication of research programs occurs within the department, incorporated the results into various high-level DOT planning documents, and reported the results in its strategic plan. RITA's strategy consists of ongoing internal reviews of all of DOT's research programs. These reviews are conducted by (1) convening meetings in which officials from each of the operating administrations share information about areas of ongoing and planned research, seeking opportunities for joint effort, and (2) conducting annual reviews of each operating administration's research plans, looking for research duplication, among other things. In addition, RITA has formed eight working groups, in concert with DOT's operating administrations, to foster collaboration on cross-modal issues. According to a RITA official, results of these reviews have identified several areas for cross-modal collaboration, including climate change, freight capacity, security, alternative energy technologies, and advanced materials and sensors. According to RITA officials, as a result of these actions, RITA is better able to meet legislative and DOT requirements for coordinating its research, leverage resources for cross-modal research initiatives, and prevent unnecessary research duplication.

Following best practices. RITA also developed a strategy to ensure that the results of all DOT's research activities are evaluated according to established best practices. The strategy includes three primary mechanisms: (1) ensuring systematic application of the Office of Management and Budget's Research and Development Investment Criteria (relevance, quality, and performance) and the Program Assessment Rating

Tool by the operating administrations;⁵ (2) annual internal program reviews with self-reporting by the operating administrations; and (3) documenting the operating administrations' external stakeholder coordination and review. According to RITA, reviews conducted in fiscal years 2007 and 2008 focused on how well the operating administrations are implementing best practices, including external stakeholder involvement, merit review of competitive proposals, independent expert review, research performance measures, and external research coordination. RITA reports the results of its reviews to the department's RD&T Planning Council, which consists of administrators from each of the operating administrations, including RITA, and officials from DOT's Office of the Secretary. According to RITA officials, as a result of these efforts, RITA is better able to determine the quality and effectiveness of its research activities and investments and determine whether they are achieving their intended (or other) goals.

Establishing RD&T project databases. RITA created two database systems to inventory and track all of DOT's research activities and provide tools for querying and searching individual projects to identify potential duplication and areas where operating administrations could collaborate. The first database, the RITA Research Notification System, captures research investments at the transaction level, allowing users to search by activity, contracts and grants, and contractor names, enabling identification of funded programs for coordination, collaboration and review. The second database is part of the annual Research Planning and Investment Coordination (RPIC) process, which captures research at the budget request level, allowing for departmentwide transparency and coordination of proposed programs and projects. According to a RITA official, eventual combination of the two databases will offer a mechanism for measuring and tracking investments from request through funding and execution.

Communicating evaluation efforts. To communicate its efforts in evaluating DOT's research to Congress, senior DOT officials, and the transportation community, RITA and its predecessor organization

⁵According to the Office of Management and Budget, these criteria are rooted in best practices and include peer review as a mechanism for assessing program quality. The Program Assessment Rating Tool was developed to assess and improve program performance to inform funding and management decisions. It consists of a series of questions covering program purpose and design; performance measurement, evaluations, and strategic planning; program management; and program results.

published a summary of all research program evaluations for 2004 through 2006 and included that summary in a high-level DOT planning document and in a report to Congress. First, RITA's predecessor published what was essentially a summary of all research program evaluations conducted in fiscal year 2004—in the form of a summary of the results of its review of the operating administrations' application of the Office of Management and Budget's Research and Development Investment Criteria—in its 2005 annual RD&T plan. Secondly, RITA developed a summary of the results of its fiscal year 2005 and 2006 research program reviews, and a schedule of RITA's planned fiscal year 2007 reviews, and included it in DOT's "Research, Development and Technology Annual Funding Fiscal Years 2006-2008, A Report to Congress." This report also includes summaries of research program evaluations conducted by modal research advisory committees, the Transportation Research Board, and key modal stakeholders in fiscal years 2006 and 2007. According to RITA officials, as a result of this reporting, RITA has provided better continuity and context to Congress and the transportation community about the results of its research evaluations.

Documenting processes. RITA has also acted to document its process for systematically evaluating the results of its own multimodal research programs, such as the Hydrogen Safety Program and various grant programs. RITA evaluates the results of its RD&T activities by ensuring they align with DOT goals, meet the research and development investment criteria, and are subject to an annual peer review process. RITA has documented this process in its strategic plan.

RITA Has Not Yet Developed an Overall Implementing Strategy, Evaluation Plan, or Performance Measures

Establishing performance goals. In 2006, we found that RITA lacked performance goals and an implementing strategy and evaluation plan to delineate how the activities and results of its coordination, facilitation, and review practices will further DOT's mission and ensure the effectiveness of the department's RD&T investment. RITA has partially implemented our recommendation that it develop these elements. Setting meaningful goals for performance, and using performance information to measure performance against those goals, is consistent with requirements in GPRA. Developing an evaluation plan and analyzing performance information against set goals for its own coordination, facilitation, and review practices could assist RITA in identifying any problem areas and taking

corrective actions.⁶ Linking performance goals with the planning and budget process, such as DOT's annual budget process, can also help RITA determine where to target its resources to improve performance.⁷ Guidance provided by the Committee on Science, Engineering, and Public Policy notes that evaluating the performance of research in the context of the strategic planning process ensures the research is relevant to the agency's mission.⁸ Without such goals and an evaluation plan, it is difficult for RITA to determine its success in overseeing the effectiveness of DOT's RD&T activities.

According to RITA officials, while an overall implementing strategy and evaluation plan has not yet been established, RITA has created performance goals. A RITA official told us that the RPIC process—a relatively new process that integrates the budget and strategic planning processes—will help in creating an implementing strategy. The RPIC process is meant to provide information to the Planning Council and Planning Team, which is responsible for defining the department's overall RD&T strategic objectives. The RPIC process assesses the department's RD&T activities in terms of the following performance goals: (1) balanced portfolio (e.g., mix of basic, applied, developmental, and high risk RD&T), (2) alignment of RD&T programs with DOT goals and each operating administration's mission, and (3) return on investment. The RPIC process has been in place only for fiscal year 2009, and as a result, the Planning Council does not yet have the information needed to make decisions about a strategy. In addition, RITA does not yet have an evaluation plan to monitor and evaluate whether it is achieving its goals. A RITA official told us that the RPIC process needs to be in place for 2 or 3 fiscal years before it can provide enough information for RITA to establish a strategy or evaluation plan.

⁶Use of performance goals can help ensure that programs are meeting their intended goals, allows programs to assess the efficiency of their processes, and promotes continuous improvement. Where activities may be fragmented or overlap, performance information can also help identify performance variations and redundancies and lay the foundation for improved coordination, program consolidation, or elimination of unneeded programs. GAO, *Managing for Results: Using the Results Act to Address Mission Fragmentation and Program Overlap*, AIMD-97-146 (Washington, D.C.: Aug. 29, 1997).

⁷GAO, *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making*, GAO-05-927 (Washington, D.C.: Sept. 9, 2005).

⁸Committee on Science, Engineering, and Public Policy, *Evaluating Federal Research Programs: Research and the Government Performance and Results Act* (Washington, D.C.: February 1999), 37-38.

Developing performance measures. In 2006, we also found that RITA did not work with the operating administrations to develop common performance measures for DOT's RD&T activities. According to RITA officials, RITA has partially implemented our recommendation that it do so. Without common performance measures for the RD&T activities of the operating administrations, RITA and the operating administrations lack the means to monitor and evaluate the collective results of those activities and determine that they are achieving their intended (or other) results and furthering DOT-wide priorities. In response to our recommendation, RITA officials told us that they are working with the operating administrations through the RD&T Planning Team—made up of senior officials in RITA and each of the operating administrations. During Planning Team meetings, representatives from each of the operating administrations share information about how RD&T projects are measured and prioritized. For example, according to a RITA official, the Federal Railroad Administration measures how frequently its RD&T projects are used in real-world applications. Once representatives from each operating administration have had the chance to share information, RITA officials will then look for commonalities and determine whether any of the measures could be adopted for the department's RD&T activities.

In closing, since it became operational in 2005, RITA has taken a number of positive steps to meet its vision of becoming a DOT-wide resource for managing and ensuring the effectiveness of RD&T activities. While we have not assessed the effectiveness of these efforts since our 2006 report, we believe that RITA has made progress. We will continue to monitor RITA's performance in implementing our recommendations. As reauthorization approaches, we look forward to assisting Congress as it considers RITA's management of DOT's research program, to better ensure that taxpayers receive the maximum value for DOT's RD&T investment.

Mr. Chairman, this concludes my prepared statement. I would be pleased to respond to any questions that you or other members of the subcommittee might have.

Contact and Acknowledgments

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