



August 2, 2006

Joel Szabat
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Office of the Secretary
U.S. Department of Transportation
Room 10200
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Mr. Szabat:

The entire Research and Technology Coordinating Committee (RTCC) appreciates your presentation on June 15, 2006, inviting comments on the draft *Strategic Research, Development and Technology Plan, 2006–2010* of the U.S. Department of Transportation (USDOT). During your presentation, you invited our review of the plan and additionally requested comments on any possible gaps in research, areas where USDOT should be investing, possible sources of duplication, and the “emerging research priorities” included in the draft plan. In this letter report we offer comments on highway research, specifically the Federal Highway Administration RD&T research program, discussed in the RD&T strategic plan, because that is the area of expertise of this committee.

After your presentation, the committee met in closed session to deliberate on its findings and begin preparing this report, which it completed through correspondence. The enclosed roster lists the members of the committee who participated in the meeting.

Research Policy for Highways

To provide a context for our comments, it will be useful to step back and consider the role of the Federal Highway Administration (FHWA) in highway research, and how the public role in highway research differs from other areas of federal R&D.

The draft plan discusses elements of the FHWA program without acknowledging some of its unique aspects. In the highway sector, FHWA has a unique set of customers because of the federal structure of the national highway program and the strong public-sector role in highway transportation. States, counties, and cities own and operate the highway system. Perhaps for this reason, Congress long ago chose not to fund a single, central federal research laboratory and instead provided funds for the state departments of transportation. As a result, the highway research enterprise is highly decentralized. There are benefits from this arrangement, however, because the funding for this research is in the hands of those who are directly responsible for highways and thus understand the specific problems that research must solve. FHWA has played a leadership and collaborative role in the research the states conduct with these funds; this role also influences the nature of the research that FHWA should conduct, as we describe in more

detail below in the discussion of research gaps. FHWA's role also has implications for R&D strategic planning because so much of the FHWA portfolio is responsive to the needs of other levels of government providing highways rather than simply supportive of federal policy and regulation.

Highway research is also unique among areas of federal R&D because the public sector is the owner and the operator of the infrastructure. In many other sectors, the federal role is to fund basic, precompetitive research. The assumption is that the private sector has adequate incentives to conduct the applied research and development that turns scientific breakthroughs into products and services that directly benefit society and the economy. Private incentives in highway research are quite different. Federal and state laws governing procurement, especially requirements for low-bid contracting based on detailed specifications, largely eliminate private incentives to conduct research because there is little or no opportunity to reap the gains of the private investment (TRB 1996, 18; TRB 2001, 36–38). Equipment manufacturers who supply contractors, in contrast, have strong incentives to make their equipment more productive to help contractors win low-bid competitions, and equipment productivity has steadily improved over the years. However, a strong public R&D role in highway construction, maintenance, and operations is essential to ensure that new concepts and technologies being developed elsewhere in the economy are applied to benefit the public in these areas.

Gaps in Research and Areas of Opportunity

RTCC has reviewed the FHWA research portfolio since 1991 and has offered recommendations on a variety of potential research topics, many of which have been incorporated by FHWA over the years.

In its most recent report, RTCC recommends that FHWA's program "should undertake research aimed at significant highway research gaps not addressed in other highway R&T programs and emerging issues with national implications" and that this research should represent about one-half of FHWA's research portfolio (TRB 2001, 7). The challenge to FHWA is to be knowledgeable about the research under way and to identify those gaps where the federal role is appropriate. The committee believes, however, that the greatest area of opportunity for FHWA is to conduct advanced or "fundamental, long-term" research (TRB 2001, 6–7). Such research would complement the applied research and demonstration activities of the states. The committee is pleased that Congress endorsed this recommendation in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) by authorizing \$14 million per year over the life of the bill. Although it is less than the one-quarter of the FHWA portfolio the committee recommended, this authorization is a wonderful new opportunity for FHWA to serve its customers.

Areas of Duplication

It is not obvious from the committee's review of FHWA programs and its familiarity with the programs of state departments of transportation that research is being duplicated. FHWA specifically requires states to enter all research projects into the Research-in-Progress database and to consult this database before embarking on new projects. On the basis of the committee's previous reviews of private highway research programs and the lack of incentives for private

investment in the kinds of research FHWA funds, we do not believe FHWA is duplicating private efforts.

Constraints

The document is largely silent about impediments to strategic planning for research. The increasingly extensive earmarks to recipients in the research title of SAFETEA-LU, however, combined with specific designations of programs in SAFETEA-LU, have eliminated any flexibility FHWA might have to shift priorities among areas through 2009. Indeed, FHWA is unable to fully fund all earmarks. Earmarking of research to specific institutions bypasses normal scientific processes for ensuring quality. The draft should be forthright in acknowledging such constraints because they inhibit DOT from strategic choices about research investments. Even given these constraints, the document could do more to develop a compelling research agenda that would at least indicate the opportunities being missed by suboptimal allocation of RD&T funds.

Goals

Congress identified several research area priorities that do not match up one-to-one with the goals of USDOT's draft document. System preservation and improvements in durability, for example, are identified as priority areas by Congress in Section 5208 of SAFETEA-LU but are subcategories of USDOT's "reducing congestion" goal in the draft plan. Reducing congestion is certainly a worthy topic for RD&T, but FHWA's investment in infrastructure that is directly targeted to system preservation and improvements in durability during the life of SAFETEA-LU will probably average about \$55.6 million annually, about one-third of the research funding provided in Title V. Moreover, the federal government will invest roughly \$200 billion in highway infrastructure during SAFETEA-LU. Extending the life of infrastructure assets, reducing their cost, and delivering them more quickly to serve passengers and freight are important goals for USDOT's strategic research plan, and should be recognized as such in the draft. We realize that the draft contains discussion of infrastructure durability and preservation and a table summarizing the department's programs in these areas. The committee's concerns are that those who read only the executive summary, including Table 1, could misinterpret the scope and nature of the federal investment or, even more worrisome, that those responsible for strategic RD&T within the department discount the value of FHWA's investment in these areas.

Technology Transfer

FHWA funding is supporting the work of 50 states, thousands of counties, and tens of thousands of cities and towns that are public owners and operators of highways. States, metropolitan planning organizations, counties, and cities are primary customers of FHWA. As indicated above, innovation must be pushed deliberately in public infrastructure rather than assuming that the private sector has incentives or opportunities to introduce new products and services. Moreover, the public sector tends to be risk averse and unwilling to introduce new concepts and technologies. FHWA has long supported technology transfer as part of its research budget for just this reason (TRB 1999). Although comparable programs for the modes that are private or for the parts of other modes that are private (privately owned vehicles operating on public infrastructure) may be unnecessary, technology transfer is an important part of the FHWA program that is not reflected in the draft. The benefits of the federal R&D investment in

highways depend upon the results being implemented. For this to occur, FHWA must work with and through its public-sector partners.

Emerging Research Priorities

In response to your request, the committee examined the list of emerging research priorities. Your presentation indicated that these topics are intended to have greater return on investment than some of the research areas USDOT is already investing in. The text of the plan, however, does not describe the research that would be done in any detail, nor does it demonstrate that these areas would have greater benefits than research under way. Identifying promising new areas of research in the strategic plan is certainly a good idea; adding detail to the draft could help justify the topics selected.

Again, I thank you for traveling to the meeting and requesting our comments on the draft plan. I hope you and your staff find them useful.

Sincerely,



Dean Carlson
Chairman
Research and Technology Coordinating Committee (FHWA)

References

- TRB. 1996. *Special Report 249: Building Momentum for Change: Creating a Strategic Forum for Innovation in Highway Infrastructure*. National Research Council, Washington, D.C.
- TRB. 1999. *Special Report 256: Managing Technology Transfer: A Strategy for the Federal Highway Administration*. National Research Council, Washington, D.C.
- TRB. 2001. *Special Report 261: The Federal Role in Highway Research and Technology*. National Research Council, Washington, D.C.

Committee Members in Attendance
June 14-15, 2006

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