

## Testimony

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Chairman Wu, Ranking Member Smith, Vice Chairman Lujan, distinguished members of the Subcommittee. My name is Paul Brubaker and I had the honor of serving as the Administrator of the Research and Innovative Technology Administration (RITA) at the U.S. Department of Transportation from August 2007 until January 20<sup>th</sup> of this year and I am pleased to be before you this morning to discuss lessons learned during my tenure; suggestions on how to improve transportation research; ways in which we can deploy the results of that research; and some thinking as it relates to the new surface transportation legislation.

Based on my recent experience, I believe we have a tremendous opportunity to shape a National Transportation Research program that has the potential to transform how we move people and goods across the nation and indeed re-establish our global position as leaders of a new, innovative and efficient transportation paradigm. In order to achieve this lofty goal, we will need to rethink our approach to transportation research; build on a couple of innovations that I attempted to implement during my brief term; and establish structural improvements that can ensure the level of innovation that is often promised but rarely realized.

In your invitation you laid out a series of questions that I will attempt to answer in my testimony but with some additional information that I hope will provide a more complete narrative.

The current transportation research and development investment structure is improving -- but what it really needs is a complete overhaul.

Early in my tenure it was clear that the fundamental legislative requirements of the Mineta Act, which created my office and called on RITA to coordinate the Department's transportation research, were not being met. While the Department established a Research Planning Council and a Research Planning Team – it could best be described as a loose governance process that was only meant to “rubber stamp” the Department's \$1.2 billion in transportation research money was spent – with no enterprise level coordination as the law – as I read it – required.

After conducting a pretty quick assessment of the situation I asked RITA's RD&T staff to establish a framework by which we could prioritize transportation research investments to better reflect and align to the strategic goals of the Department and the Administration. I further requested that this framework be based on the Capital Planning and Investment Control (CPIC) processes mandated by OMB circular A-11 for the government's capital investments because there were a number of similarities and the GAO had established a nice corresponding maturity model for organizations to use in developing and using CPIC for technology investments.

The framework that was initially conceived, originally known as Research Planning and Investment Control (RPIC), can not only prioritize investments, but was designed to monitor and track research outcomes over the life of the project and manage the research in portfolios. However, due to cultural resistance to change, the word "control" in RPIC was changed to "coordination," the investment prioritization activities, the research monitoring plans, and the concept of portfolio management were all scrapped. The RPIC project was relegated to a "pilot" program and today is essentially a data base of existing research programs that can be viewed by multi-modal communities of interest (e.g., human factors; materials; safety systems) and across the modes. While this transparency is good and desirable, RPIC was originally conceived to do considerably more – it was to serve as a decision support, program management and program evaluation tool so that we could select, evaluate and control the underlying research spending in a manner consistent with research investment criteria.

The current incarnation of the RPIC process "buckets" existing spending to communities of interest but the actual decisions to invest in particular research activity are made almost exclusively by the modes. Consequently, the current spending of the Department's research resources is not subject to a systematic Department-wide prioritization. This spending is most often aligned with the wishes of a number of key stakeholders in each of the modes, or in some cases is the result of a Congressional earmark but the Department's portfolio of transportation research does not represent a comprehensive, holistic program that supports an overall National Transportation Research Agenda.

The University Transportation Centers represent approximately \$70M of research spending each year. It is the one program where RITA has complete visibility over the research spending and reviews the strategic plans for consistency with the Department's overall strategic plan. Given the mission of the UTC program – to train the next generation of transportation leadership – there is strong evidence that the program is meeting that goal.

Clearly, we need to improve the current transportation R&D investment structure. My suggestion would be to start over. Begin with the development of a National Transportation Research Agenda. This agenda should take a comprehensive, holistic, multi-modal view of our transportation system and receive input from the Congress, Administration, transportation system user communities and all stakeholders – not just the ones with the deepest pockets – and establish and outline the key objectives and

desired outcomes of our transportation system. It should then clearly map research programs and spending to the outcomes and goals outlined in the plan and clearly describe how these projects will help us achieve our goals and achieve our desired outcomes.

Once that agenda is established, a governance process – much like that originally conceived for the RPIC – explicitly supported by the Secretary and managed on behalf of the Secretary by RITA, should examine all of the research programs and proposals that receive any direct or indirect federal dollars, and only those that are consistent with the goals of the National Transportation Research Agenda should be funded. Those that are funded should be monitored and evaluated. A dedicated office of technology transfer, perhaps within RITA, could help ensure that the relevant, valuable knowledge (for both successful and unsuccessful projects) is shared and when appropriate, that successful innovations are commercialized and/or generate new levels of research.

The Department, through RITA, should also act as a facilitator of knowledge through the use of advanced collaboration capabilities that would allow researchers to self-organize around communities of interest. During my tenure, we attempted the creation of such an environment – think Facebook for the transportation research community – that would make knowledge sharing and technology transfer much more convenient and effective as collaboration and reporting could be accomplished virtually. Those not wishing to share results until the research projects are completed could create password protected work spaces that would restrict access only to those working on the project. While at RITA, we built the first generation of this collaborative capability at [www.transportationresearch.gov](http://www.transportationresearch.gov). It is only the beginning of what could become an interesting new paradigm in research collaboration and ironically may bring the internet back to its roots.

Our ability in the transportation research community to successfully transfer, commercialize and deploy new methods, innovations, and technology must be refocused. Currently, there is no systematic or focused program, process or set of activities that are driving innovations out of the laboratory and onto our Nation's roads, rails, runways or waterways. Most in the community believe that effective technology transfer only involves having researchers share their research by publishing peer reviewed articles in transportation research journals or presenting papers at conferences. Researchers communicating with other researchers is a valuable way to share knowledge – it is also a sure fire way to ensure that these advances or ideas rarely get commercialized.

We must focus on a new model and process to achieve technology transfer that leads to commercialization and deployment of new transportation-related technologies. Unfortunately, we may miss a prime opportunity to drive innovation into the transportation infrastructure through the stimulus spending but it may be an order too difficult to fill in short order.

Only a new approach to technology transfer and commercialization that is focused on transparency, openness, and a systematic way to communicate with a broader set of

industry, entrepreneurs, investors and other interested parties will succeed in fostering innovation and ensuring wider-spread deployment of these innovations. For years, this has largely been an “inside game” managed by a relatively small group – an example of that President Eisenhower foresaw in his farewell speech in January, 1961 – which virtually ensures that an innovator tinkering in the garage has no chance of getting his or her ideas vetted.

We need to look beyond the universe of traditional gatekeepers and work to facilitate the timely testing and standards development that would allow rapid prototyping, piloting and deployment of these new technologies. In short, we must move closer to technology development times versus industrial age development cycles. I have witnessed a great number of good ideas that are available today – but may not be deployed for decades to come because of a variety of cultural, structural and systemic obstacles – mostly related to intolerance of risk and processes that have the effect of stifling innovation. This can change. But it will require a collective commitment and leadership that is willing to deploy a systematic way of improving technology transfer and commercialization.

As the Congress begins drafting the next surface transportation legislation, it will have a unique opportunity to change the focus from strictly “highways” and direct spending and programs that better reflect the way we actually travel. While highways are indeed an integral part of this equation, the view must be significantly expanded to include or at least accommodate alternative modes for people and freight to include rail, high speed passenger rail and transit, and water transportation. We even must integrate air as we consider this holistic picture.

The next surface transportation authorization must ensure that the transportation research budget and that of the Bureau of Transportation Statistics is directly aligned with the National Transportation Research Agenda which should be updated and published every two years by the Research and Innovative Technology Administration in coordination with the Administration, the Departmental leadership, the users of the systems and key stakeholders.

The budget should be aligned and adjusted based on changing priorities and the portfolio of projects should be balanced according to the priorities reflected in the agenda. This portfolio should be transparent both within and outside of the department and the final annual budget and program plan should be public. This way, citizens from anywhere in the country can examine the portfolio and its anticipated outcomes and compare actual results to anticipated results. Such increased transparency may actually improve achievement of these technologies and methods as more people and entrepreneurs will have access to the new ideas being explored by the Department and its research community.

There is also a clear role for the Bureau of Transportation Statistics but it should be much more focused and adequately resourced to monitor the performance of the nation’s transportation system. It must also expand its role and develop forecasting models and simulations that can help us drive research proposals as it will help us better understand

the potential impact of alternative investments and research results as well as ensure that it has the capability to further our understanding of external events that impact our transportation system. For example, with this capability BTS could have been able to model the impact of fluctuating fuel prices on our national logistics system and passenger movement system.

Perhaps not surprisingly, I believe that RITA should remain the Department's focal point for transportation research – but it must be significantly strengthened – this will require a significant and substantial investment in people and money. RITA's first order of business should be to coordinate the formulation of the National Transportation Research Agenda – one that represents a cross-modal and holistic view of our national transportation system. This can only be developed with significant input from the user community and from stakeholders. The research agenda must also be multi or intermodal in nature and not be primarily or disproportionately focused on highways to the exclusion of other modes – the only way to accomplish this is to provide direct funding.

Then, RITA should establish and manage a governance process that can align and direct transportation research resources in a manner that is consistent with the National Transportation Research Agenda. RITA could build on the RPIC process to achieve this goal but most importantly, the research portfolio should be managed and evaluated for its outcomes, results and effectiveness by developing transparent program and project evaluations and lessons learned that can be used to determine appropriate follow on research and serve as a basis for technology transfer and commercialization of the promising research.

RITA should also continue to play an active role in overseeing the University Transportation Research as well as house appropriate multi-modal research activity – such as the Intelligent Transportation System and Alternative Fuels program – and should expand its oversight role to include the approval and oversight of any Department or indirect federal dollars going to any University or not-for-profit research entity for transportation-related research. This includes the coordination, review and approval of any projects directly or indirectly receiving federal funds that are managed by the Transportation Research Board of the National Academies.

Although controversial, the committee should examine the feasibility of consolidating all of the research laboratories within the Department. These could be centrally managed by RITA or at a minimum be subject to strict oversight by RITA to ensure that their activities are consistent with and achieving the objectives of the National Transportation Research agenda. Currently, a number of the modes have research labs dedicated toward performing transportation research. For example, the Turner-Fairbank Highway Research Center in Virginia currently performs a great deal of highway related materials and systems research. In many cases, similar if not identical research is also being conducted at a number of Universities – some of which is funded by the Federal Highway Administration. While it may be appropriate in some cases to validate research results, I believe the resistance to visibility and oversight as well as the failure of the Department

to drive toward better management of the research portfolio continues to encourage research redundancy and waste.

Finally, I would like to suggest that a certain portion of the Department's Transportation Research funding – at least half – go toward advanced systems research – and directed by RITA consistent with the National Transportation Research Agenda. I would propose that the majority of the funding be used to establish a Transportation Advanced Research Projects Agency. The balance of the funds should be used for worthy projects proposed by the Volpe National Transportation Systems Center, Turner-Fairbank, The Transportation Research Board, Universities and other potential worthy and qualified grantees including those who tinker in their garages.

Thank you for the opportunity to present the ideas to you this morning and I look forward to answering any questions you may have.