U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

Improving and Reforming our Nation's Surface Transportation Programs:
Beckley, West Virginia Field Hearing

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One Tamarack Park
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Good morning Chairman Mica, Ranking Member Rahall, and Members of the Committee. I am representing the Nick J. Rahall II, Appalachian Transportation Institute (RTI) at Marshall University in Huntington, WV, where I serve as the Program Director of Intelligent Transportation Systems (ITS) and Assistant Professor of Engineering. I would like to welcome you to our beautiful state and thank you for the opportunity to share our perspective on improving our nation's surface transportation program and how institutions like RTI are part of the solution.

RTI is a national University Transportation Center (UTC) established 12 years ago by the Transportation Equity Act for the 21st Century (TEA-21). Funding and oversight of the UTC program is through the Research and Innovative Technology Administration (RITA) of the USDOT. Under SAFETEA-LU, there are currently 60 UTCs that directly involve approximately 120 universities across the nation. The mission of the UTC program is to advance technology and expertise in all facets of transportation through education, research, and research implementation (i.e., technology transfer). Each UTC has a unique theme that guides their research and educational initiatives, in order to minimize duplication of efforts and expertise. RTI's theme is "Transportation and Economic Development in Mountain Regions".

The American Society of Civil Engineers (ASCE) periodically produces a report card that grades different aspects of our nation's infrastructure, including the transportation components Aviation, Bridges, Inland Waterways, Roads, Rail, and Transit. In 2009, the most recent report card graded these six in the C to D-minus range. Bridges were rated C ("mediocre") because more than 26% of the nation's bridges are either structurally deficient or functionally obsolete and an

annual investment of approximately $17 billion is needed to substantially improve the current conditions. These conditions are even worse for most states in the Appalachian region. In West Virginia, approximately 39% of the bridges are structurally deficient or functionally obsolete. Roads were rated D-minus ("poor/failing") based on an estimate that Americans spend 4.2 billion hours per year stuck in traffic at a cost of $78.2 billion and 45% of major urban highways are congested. The report card also states that the current spending of $70.3 billion per year is well below the estimated $186 billion needed annually to substantially improve roadway conditions. From 1980 to 2006, the total number of miles traveled by automobiles increased 97 percent and the miles traveled by trucks increased 106 percent. Over that same period, the total number of highway lane miles only grew 4.4 percent, meaning that over twice the traffic was traveling on roadways that had unchanged capacities.

Since funding for capital improvements to alleviate congestion will continue to be scarce, innovation is essential to improve these poor conditions. UTCs are constantly developing and evaluating technologies and strategies that will help design, build, and operate systems more cost-effectively, and improve the safety of those systems.

RTI: Economic Development, Accountability and Cost-Effective Design. RTI has conducted a significant amount of work in the area of Geographic Information Systems (GIS), which serve as the primary information sharing and analysis environment for all aspects of transportation. One of our projects funded by the Appalachian Regional Commission (ARC) was to develop a GIS tool that could be used to facilitate the efficient estimation of the construction costs needed to complete the 13-state Appalachian Development Highway System, which was the first highway system authorized by Congress for the purpose of stimulating economic development. This tool developed by a UTC helped the ARC reduce the cost to generate these construction estimates by 42% and facilitated the analysis of the economic impact of completing the system. That analysis estimated the total economic benefit-cost ratio to be 3.6 for the Appalachian Region and 3.1 for the entire United States through improved connectivity and accessibility.

RTI is currently working on and has completed a number of economic impact, economic development, and alternative financing projects related to transportation. RTI worked on the Heartland Corridor double-stack train initiative to examine the benefits of modifying railroad trackage and tunnels to accommodate rail cars with double-stacked containers. It was estimated that the track modifications and the construction of an intermodal facility could provide 2.0 to 5.1 benefit-cost ratio. The required track modifications to allow double-stacking were completed in 2010.

RTI: Safety, Performance, Liveability and Cost-Effective Operation. RTI is the lead on an active research and deployment project in Morgantown, WV, in collaboration with four other universities that are affiliated with UTCs. This project is focused on improving the traffic signal timings along an extremely congested corridor using adaptive traffic signal control, because constructing additional lanes or alternative routes is not financially feasible. This project is unique from any other adaptive signal control deployment because we are developing a methodology to predict the adaptive system performance prior to deployment to determine if the investment is justifiable based on the anticipated benefits. We are also installing a variety of sensors that will allow continuous monitoring of system performance to maintain optimal

operation after the research project is complete. The evaluation methodology developed in this research will allow other agencies to evaluate and cost effectively deploy adaptive control systems, which aren't always necessary to achieve optimal traffic flow.

Another critical aspect of improving the system is education, ranging from science, technology, engineering, and math (STEM) recruitment in K-12, to undergraduate education and workforce training. The U.S. lags behind nations like China and India in investing in research, education and training of the next generation of engineers, technicians, scientists who will lead the development and operations of our nation's transportation systems. The presence of UTCs across the nation ensures that students and professionals have access to advanced educational and training opportunities; and that widespread recruitment efforts focused on transportation professions will be carried out.

RTI: Education and Workforce Development. RTI has been active in all facets of education and workforce development. We deliver K-12 programs aimed at recruiting students into transportation, such as First LEGO League and LEGO Robotics. Due in part to support and justification from RTI, Marshall University started a Bachelor of Science in Engineering degree that gained accreditation from ABET (Accreditation Board for Engineering and Technology) in 2010. RTI has delivered training and workshops to approximately 738 professionals in GIS and other transportation areas. Last year, RTI hosted the National Rural Intelligent Transportation Systems conference in Huntington, WV, which was attended by 250 professionals from all over North America. This year, RTI is hosting the International Transportation and Economic Development conference in Charleston, WV, which will attract attendees from all over the world.

By integrating research, research implementation, education and training under one roof, the unique UTC model leverages academic resources and provides the stability to expedite the development of the national transportation system. Without RTI and other institutions in the UTC program, there would be large voids in all aspects of the current transportation system and future innovation will be severely inhibited. During my senior year at West Virginia University, I chose to enter the field of transportation engineering and intelligent transportation systems because the transportation problems are very complex and they directly affect the public on a day-to-day basis. The UTC program has given me, and many others, the opportunity to solve these problems on both a local and national level.

Congress had the vision to create the UTC program approximately 23 years ago, which was integral in achieving the transportation system we have today. Now, the future of the transportation system and the route we will take to get there is in your hands.

References

"2009 Report Card for America's Infrastructure." American Society of Civil Engineers. March 2009. http://www.infrastructurereportcard.org/sites/default/files/RC2009_full_report.pdf

"Economic Impact Study of Completing the Appalachian Development Highway System: Final Report." Appalachian Regional Commission. June 2008. http://www.arc.gov/assets/research_reports/EconomicImpactStudyofCompletingADHS.pdf

Introduction

The Rahall Appalachian Transportation Institute (RTI) is a National University Transportation Center (UTC) funded by the United States Department of Transportation's Research and Innovative Technology Administration (RITA) and based at Marshall University. The UTC system has developed internationally recognized centers of excellence and leadership that help ensure the safe, efficient and environmentally sound movement of people and goods through research and innovation.

RTI's theme of "Transportation and Economic Development in Mountain Regions", is embodied via the Institute's efforts to advance transportation technology and economic development through its research, education and technology transfer activities. RTI cultivates relationships with private industry and public agencies to leverage resources, reduce costs, improve safety and mobility, and stimulate economic development.

RTI's headquarters are located in the heart of the Appalachian Region featuring the largest inland river port in the nation (and 4th in the world) as well as the intersection of two major rail lines and a variety of intermodal facilities in the area. These unique resources position RTI as an ideal resource for conducting site-specific research, supporting intermodal planning and analyzing economic data that will improve mobility and global connectivity.

Research, Implementations, and Technology Transfer Deployments

Transportation research, such as that performed through the UTC system, attracts new business, creates high-paying jobs, and improves the overall strength and stability of the nation. Private industry, public agencies, educational institutions, and research facilities must partner to maximize resources, foster the exchange of information, and promote emerging technologies.

Categories of RTI's collaborative research on multimodal transportation issues include:

- Civil and Material Science Engineering
- Technology / Product Development
- Geotechnical / Environmental
- Socio-Economical / Demographic

The technology transfer component of RTI's mission provides that research results be made available to the marketplace for the greater public benefit. The implementation of research results and practical applications is crucial to answering the transportation-related problems facing both the public and private spheres. Through such activities, RTI has become recognized beyond the Appalachian Region as a source of essential technical knowledge that enhances the development of new transportation products and systems.

Heartland Corridor Double Stack Train Initiative:
(Improving Efficiency of Truck/Rail Intermodal Transportation - The Case of WV)

- This multi-year project examined simulated routings under modified railroad trackage and the removal of restrictions designed to accommodate double-stack container equipment.
- The authors concluded that the modification to existing track clearances and the introduction of an intermodal facility could provide a 2.0 to 5.1 benefit-to-cost ratio even under the most conservative set of assumptions.
- The use of double stacked trains will reduce highway congestion and fuel consumption while improving safety.

Appalachian Development Highway System – Cost Estimation and Planning Application

- This GIS-based application facilitates the estimation of construction costs necessary to complete the Appalachian Development Highway System.
- The project provides streamlined cost estimate workflow, improved mapping applications and state-level cost monitoring functions.
- The tool has aided the Appalachian Regional Commission in reducing the costs of generating construction-based cost estimates by 42% and greatly facilitated the economic impact of completing the system.

Electronic Commercial Driver's License (eCDL)

- The project takes the traditional Commercial Driver's License (CDL) testing practice from a paper-based system into a fully automated computer based platform with GPS capabilities.
- As a result of the eCDL project, CDL test subjectivity has been reduced and data tracking aids in eliminating fraudulent tests.
- The project also has increased the speed involved in reporting required federal statistics while also reducing human error.
- If deployed nationally, the eCDL process could result in both cost and time reductions across the board while holding everyone to the same high standards.

Morgantown Traffic Flow Improvement Project

- This project seeks to improve the overall flow of traffic in the Morgantown, WV area within the downtown central business district and along the 705 Corridor.
- An important component of this project is the development of a methodology to predict the performance of adaptive traffic signal control prior to deployment. This methodology can be used by other agencies to evaluate and cost effectively deploy adaptive control systems, which aren't always necessary to achieve optimal traffic flow.
- The sensors that will be installed as part of this project will be used to continually monitor and improve the traffic signal timings and traffic flows over time.

In addition to the four projects highlighted above, several on-going projects promise to provide similar substantive results. Projects such as these highlight efforts at RTI to implement research findings toward practical technology initiatives that can successfully leverage regional and federal resources. Current projects include:

- Potential Economic Benefits of Public Private Partnerships on Reclaimed Mine Sites in the Construction of the King Coal Highway
- Estimating Short Term Lock Traffic Forecasts for Ohio River System (ORS) Navigation Lock and Dam Projects
- West Virginia 511 Feasibility Study
- West Virginia State High-Speed and Intercity Passenger Rail Plan
- Creation of West Virginia Parkways Authority by the WVDOT: 2009 Traffic and Toll Revenue Forecasts

Education, Workforce Development, and Training

RTI supports a comprehensive educational curriculum relating to transportation including undergraduate, graduate, and continuing education coursework. Education activities at RTI are designed to produce the highly-skilled transportation workforce necessary to design, deploy, maintain and operate current and future complex transportation systems.

As a liaison between private business and public agencies, RTI's workforce development program facilitates effective partnerships for training, custom curriculum development, technology transfer, and funding opportunities. Faculty from programs in Business, Engineering, Environmental Science, Geography, Geology and Physics have helped extend transportation course offerings at the University level as well as contributed to a successful continuing education program that reaches more than 1,000 transportation professionals each year.