Charting a New Course for Transportation Research and Technology

Research and Special Programs Administration

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The Research and Special Programs Administration is charged with fostering innovation through science and technology, both within and outside the U.S. Department of Transportation, to support achievement of the five national transportation goals of safety, mobility, economic growth and trade, protection of the human and natural environment, and national security. To achieve these goals, it is essential to encourage innovative solutions to surface transportation problems and stimulate the deployment of new technology. This in turn can best be accomplished collaboratively through a strategic planning process aimed at determining national transportation research and development priorities, an enabling research agenda, needed technology deployment initiatives, and an education and training program.

The landmark Transportation Equity Act for the 21st Century provides U.S. DOT with an unprecedented opportunity to facilitate and foster innovation within all elements of the transportation community through the development of a more comprehensive, relevant, and integrated surface transportation agenda than has existed in the past.

Need for R&D Collaboration

The collaborative process that led to TEA-21 demonstrated that a national–state–regional–local partnership was needed to build a transportation system with multiple yet interconnected modes—a system focused on moving people and goods safely, efficiently, and with less environmental impact than has previously been possible. Public and private efforts designed to bring about innovation in transportation systems must be based on a solid understanding of the system and its elements, operations, and societal impacts. Central to these efforts is the need for an intermodal perspective that promotes interconnectivity and interoperability.

Transportation decisions, whether made in the public or private sector, must address a steadily widening range of considerations resulting both from rapid changes in technology and from expanding outreach to individuals and institutions with an interest in transportation issues. Transportation-related environmental issues, such as noise and air pollution, merit a more aggressive and innovative response than has been the case to date. Increasing awareness and comprehension of total transportation system performance will enhance the ability of national, state, regional, and local authorities to set resource-allocation priorities.

As the authority for spending available R&D dollars is shifted away from U.S. DOT to state and local governments, the concept of leveraging scarce R&D dollars through collaborative mechanisms becomes vital. In an era of limited research budgets there is, in addition, a need to form fragmented surface transportation research into a cohesive program. Without collaboration, it will not be possible to tackle the nation's pressing transportation problems.

Strategic Planning

TEA-21 requires U.S. DOT to strengthen its strategic planning process to ensure that its surface transportation R&D program meets emerging needs, integrates the enabling research and technology deployment activities of the operating agencies, and does not duplicate other research efforts either within or outside of the federal government. The legislation's R&D funding is heavily targeted to specific projects and modes. In response to this fragmentation, the strategic planning process must consider the feasibility of connecting the separate

projects to ensure that intermodal connections are supported, thus contributing to the goal of a national transportation system. The key is that U.S. DOT must foster collaborative enabling research and technology deployment efforts with federal, state, and local governments; industry; and academia.

Enabling Research

The current limited understanding of the wide array of technical, economic, social, and institutional factors associated with transportation, as well as of the interactions among these factors, necessitates a more comprehensive, more challenging, and more profound research agenda. To provide the groundwork for transportation system innovation, more emphasis is needed on long-term, high-risk transportation research.

TEA-21 responds to this need. The following are areas of collaborative enabling research that can provide a basis for future transportation innovation:

- Human performance and behavior
- Advanced materials
- Computer, information, and communications technology
- Energy, propulsion, and environmental engineering
- Sensing and measurement
- Tools for transportation modeling, design, and construction
- Social and economic policy issues

Technology Innovation

Collaboration is crucial to bringing about innovation in the transportation system. Innovation depends on the successful deployment of technology, and all parties involved must take a leading role in removing the obstacles to adequate support for deployment. Collaborative technology deployment initiatives include the following:

- Application of biometric technologies at selected airport gateways and border crossings to improve the identification and processing of immigration credentials for frequent travelers. These efforts signal the future of international travel and even international commerce.
- The ALERT™ Data Exchange Platform, an intelligent transportation system being developed to enhance law-enforcement officer safety, improve data collection and dissemination, and optimize incident response and management.
- Nonelectric high-speed locomotives for improved intercity passenger service.
- A new advanced-technology highway–rail crossing gate system that alerts locomotive engineers to slow down or stop if there is a disabled vehicle or other obstruction on the track.
- An Integrated Weather Information System to make highway users and operators more aware of atmospheric and road surface conditions.
- Positive train control to enhance railroad safety for collision avoidance.
- The Advanced Vehicle Technologies Program, to be administered jointly by U.S. DOT and the U.S. Department of Energy, aimed at developing advanced medium- and heavy-duty vehicles, components, and infrastructure for the commercial market.
- Application of nondestructive test and evaluation technologies and smart sensors for inspection, monitoring, and maintenance of existing and advanced transportation infrastructure.

Education

A critical TEA-21 initiative, essential for facilitating collaborative research, is the expanded University Transportation Centers Program. This program focuses on the transfer of knowledge relevant to national, state, and local transportation issues and builds the professional capacity of the transportation workforce. Preparation of the next generation of transportation professionals through a multidisciplinary education and the creation of public awareness of the benefits of transportation are key to the future of the nation's transportation system.

Conclusion

Collaboration is the key to achieving the vision, embodied in TEA-21, of an integrated transportation system helping to ensure America's prosperity and quality of life into the next century. RSPA will be working with its partners in state and local government, the private sector, and academia to strengthen our existing R&D partnerships, to forge new partnerships, and to make TEA-21 a success.

Key Changes for RSPA Under TEA-21

- New leadership role for RSPA in the Advanced Vehicle Technologies Program.
- University Transportation Centers Program doubled in size and budget.