

Chairman's Remarks

Joseph M. Sussman, *Massachusetts Institute of Technology*

The development of a transportation research and development (R&D) agenda for the 21st century was the topic of this forum. As the forum steering committee began its important task, we did so realizing the context of a world facing unprecedented changes.

The United States truly operates in a global economy, with new records in world trade being set every year. There is a critical need to enhance overall productivity so that the United States can compete in the global marketplace, and the linkage of this productivity to transportation system performance is strong. At the same time, environmental issues are increasingly placing limitations on the ability to deploy and operate the transportation enterprise. Balancing economic development and quality of life with transportation-related environmental impact is a major responsibility shared by government and the private sector.

Safety is of increasing concern as transportation systems provide ever faster travel, while experiencing a higher utilization of facilities. The latter often leads to congestion, with a corresponding decrease in productivity. The traditional answer to congestion—building more facilities—is often no longer an option, particularly in urban areas.

Although facing these unprecedented challenges, the transportation community has tremendous opportunities as well. New technologies in areas such as information, communication, advanced materials, and sensors provide more sophisticated and cost-effective tools for deploying a new generation of transportation systems. New methods of systems analysis and mathematical modeling make it possible to abstract complex systems and predict their performance on many dimensions.

Furthermore, an “unfreezing” of institutional relationships is taking place. With the U.S. Department of Transportation reorganizing, the development of public-private partnerships and new types of relationships among various levels of government, as well as a redefinition of the regulatory posture of the federal government, may allow the research, development, and deployment of a new generation of transportation systems to proceed more effectively and expeditiously.

The question is, How do we use these opportunities in technology, systems, and institutions to effectively address the challenges facing the transportation community? A key

part of the answer is research that can help shape and develop the transportation system of the 21st century. This research would be broad-based, concerned with the following:

- Application of new technologies to transportation enterprises,
- Development of new tools for system design and analysis, and
- Better understanding of the institutional relationships that both enable and constrain the transportation enterprise.

A strategic view of research is needed, incorporating a vision of a transportation system for the 21st century that is detailed enough to define the research program needed to achieve that vision.

As many have noted before, research leading to technological innovation and deployment and enhanced productivity is a critical factor in economic growth. In transportation, this is leveraged by the impact of improved transportation on productivity in many other sectors. Therefore, in these fluid and difficult times, thinking about what type of transportation research is needed is a serious responsibility for all concerned.

Change in the transportation enterprise requires research. Federal transportation R&D is a critical part of this picture. This forum was convened in an environment in which the federal establishment, through the National Science and Technology Council (NSTC), chaired by President Clinton, is reevaluating the scope and organization of federal research in nine areas, including the transportation field. Through the Transportation Research Board (TRB), which represents a broad constituency in the transportation community, the transportation community at large was invited to participate in this early stage to help develop and shape the federal transportation R&D program. It is a once-in-a-generation opportunity to provide input and to build a continuing process.

Forum participants examined the research needs of various transportation constituency groups and what these groups believe is the appropriate federal role in transportation R&D. The forum also was concerned with identifying methodologies for evaluating transportation R&D agendas. Participants were asked, How do we know whether a research agenda meets the future needs of our transportation enterprise? Given the perspectives of the various constituency groups and a methodology for evaluating transportation R&D, forum participants were prepared to review and critique the current federal transportation R&D program.

This forum brought the transportation community together in a unique way. The forum included representatives from the public and private sectors, people with operational and research responsibilities in transportation, and stakeholders and customers of the transportation system. This broad group is uniquely qualified to address the critical questions outlined here.

Forum participants began this task in an environment in which the fundamental role of transportation in society is appreciated more than at any other time in recent history. The transportation community is front and center on the national and international stages.

The role of transportation in economic growth, quality of life, and development of a sustainable society is well appreciated. There are several reasons for this. The Interstate system in the United States is essentially complete. The extraordinary impact of this \$130 billion program on the social, economic, and political fabric of the United States is becoming increasingly clear. The growing globalization of the economy and the need for long distance movement of people, goods, and information around the country and around the world—usually on trips that can be characterized as intermodal—accentuates the importance of transportation. The increasingly high profile of safety in all modes gives the transportation field a good deal of exposure, albeit unfortunately often in a negative light.

There really is a spotlight on the transportation community—for better or for worse. What better time is there for launching a transportation research program to address the critical needs of the 21st century transportation system?

FUNDAMENTAL POINTS

As the federal transportation R&D agenda for the 21st century is shaped, several fundamental points should be noted.

1. *Federal transportation R&D is part of a broader picture.* The federal budget for transportation R&D is about \$3 billion. This is a modest sum when compared with the annual total federal research budget of about \$75 billion and when compared with industry research programs directed to transportation. This suggests the following:

- The federal transportation R&D program should include technology scanning, in which research activities both inside and outside the federal establishment are reviewed to evaluate whether advances made in other fields might be applied to transportation, and
- The federal transportation R&D program should be thought of as a constructive partner with private industry and other government research directed to the transportation field.

It also should be recognized that research is part of a broader process, which includes invention, innovation, market development, product testing, deployment, organizational change, and education. Thinking of research in a vacuum is an exercise designed to fail. Other elements of the process must be kept in mind when developing research programs.

2. *It is important to tie federal transportation research to national goals.* The federal transportation R&D program addresses two kinds of goals. First, the program has transportation goals, such as improving the safety, productivity, and environmental impact of transportation systems envisioned for the 21st century. The United States needs to become more productive and competitive through effective, efficient, safe, and sustainable transportation of people and goods.

Second, the program has market-related goals. Federal transportation R&D should help make the United States a major provider of transportation infrastructure, vehicles, control systems, software, management, and maintenance in worldwide markets. U.S. industry should compete effectively in the domestic and world markets as a provider of transportation goods and services, providing quality jobs and economic development here at home.

3. *The transportation community is facing complex institutional questions.* The development of public-private partnerships and new types of intergovernmental relationships is fundamental to improving transportation. Many people have expressed concern about the readiness of transportation agencies, firms, and institutions to effectively use modern research in the transportation area and have articulated the related need to educate the new transportation professional.

The development of a federal transportation R&D agenda that is cognizant of risk sharing and cost sharing with the private sector is an important institutional question. In addition, how transportation goods and services are procured, particularly by public-sector organizations, requires rethinking.

Let us not be naive. These institutional questions are, by definition, difficult. The point here is to emphasize that these are “researchable” questions and that funds should be allocated to study and advance our understanding of these issues.

4. *The federal role in a variety of activities in the United States is being redefined.* This forum was an important step toward articulating the federal role in transportation and, in particular, transportation research, performed against a complex backdrop of fundamental changes in the role of the federal establishment.

THE CHALLENGE

This forum was characterized by a great deal of openness between the federal research establishment and its constituencies. This was an important first step; however, this initiative

will fail if this step is the only step. An ongoing process that leads to the transportation vision for the 21st century is needed.

The challenge is to keep this process organized, regularized, and democratic. But at the same time, the dynamism of this kind of group, composed of an extraordinarily broad and articulate set of participants, is essential to the process. The objective is to have a creative "ad hocism" that will provide a healthy and creative, but not bureaucratic, process.

All concerned parties should continue to work together to ensure continuation of these important efforts.

Joseph M. Sussman served as Chairman of the TRB Steering Committee for the Forum on Future Directions in Transportation R&D.