

January 8, 2001

The Honorable Neal Lane  
Assistant to the President for Science and Technology  
Office of Science and Technology Policy  
Washington, D.C. 20500

Dear Dr. Lane:

At the request of Mr. Edward Brigham, Executive Secretary of the National Science and Technology Council (NSTC) Committee on Technology, the National Research Council (NRC), acting through the Transportation Research Board (TRB), convened the Committee for Review of the National Transportation Science and Technology Strategy (see Enclosure 1 for a list of the committee members). This is the third year of the committee's review. In the first year, the committee was asked to review the eleven partnership initiatives included in the strategy at that time. In the second year, the committee was asked to perform a more detailed review of two of those initiatives: Next Generation Surface and Marine Transportation Vehicles; and Monitoring, Maintenance, and Rapid Renewal of Physical Infrastructure. This year the committee's task was to conduct a retrospective review of the progress made on the strategy since its initiation.<sup>1</sup>

The committee carried out this task by reviewing the *National Transportation Science and Technology Strategy* (Strategy) and other NSTC and U.S. Department of Transportation (DOT) strategic planning documents, as well as by holding a meeting in Washington, D.C., on September 20, 2000. During the open session of this meeting, the committee heard from Mortimer Downey (Deputy Secretary of Transportation, DOT) and Richard John (Director of the Volpe National Transportation Systems Center, DOT) about the rationale for and development of the NSTC strategic planning process. In addition, brief presentations were made by other representatives of federal agencies about specific partnership initiatives that are part of the Strategy (see Enclosure 2 for a list of speakers at the meeting).

This report first describes the approach taken by the committee in performing its review and provides an overview of the three partnership initiatives considered by DOT to be the most successful. The committee's overall finding with regard to the structure of the NSTC strategic planning process is then presented, followed by general observations on the Strategy and the partnership initiatives. The report ends with the committee's recommendations for achieving the Strategy's full potential.

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<sup>1</sup> This committee also reviews the Department of Transportation's Government Performance and Results Act documents as a separate task and did so in a letter report dated March 28, 2000.

## REVIEW APPROACH

Given the Strategy's broad scope and the limited time available to the committee, it was not possible to conduct an in-depth review of all aspects of the Strategy. Instead, in consultation with DOT, the committee focused on the rationale behind the Strategy's overall structure and on the partnership initiatives, which play a central role in the Strategy and have been the focus of much of the committee's previous activity.

The Strategy is built around four basic components:

- Strategic planning for research and technology (R&T) to achieve national goals
- Partnership initiatives
- Enabling research
- Education and training

Within this structure, thirteen partnership initiatives have been chosen as mechanisms for pursuing the development and implementation of promising technologies. This structure is not the only conceivable approach to transportation R&T. Other possibilities include choosing fewer partnership initiatives and devoting more resources to each; creating new, temporary organizational structures to focus on particular goals instead of coordinating existing efforts among multiple agencies; and focusing federal resources more on long-term, enabling research, leaving development and deployment to the private sector and state and local governments. The committee did not review any of these alternatives directly. Instead, Mr. Downey was asked to comment on these or other possible alternatives that were considered by the NSTC and to explain the rationale behind the choice of the current structure. A summary of his observations is provided below under "Key Finding."

To review the partnerships, the committee asked DOT to choose the three most successful<sup>2</sup> initiatives and to address the following questions, derived from recommendations in the committee's previous letter reports<sup>3</sup>:

- How have you ensured that a real partnership exists (with common objectives, specific deliverables, timetables, milestones)?
- What are the specific roles and contributions of each partner?
- How are coordination and cooperation effected in practical terms?
- How have budgets reflected the priority of this initiative and the necessary coordination across involved agencies?
- How is progress toward objectives measured, reported, evaluated, and reflected in modifications to plans and activities?

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<sup>2</sup> "Successful" was intended by the committee to indicate that the partnerships met the following criteria: how well the partnership initiatives address the strategic goals in the plan; how well budgets (and other resources, such as personnel) have been aligned to address partnership objectives; the extent to which a real partnership has been established (e.g., agreed-upon objectives, measures of effectiveness, and milestones; specific commitments of resources from all partners); and effectiveness in making substantive progress toward those objectives.

<sup>3</sup> See committee letter reports dated September 4, 1997; September 30, 1998; and September 3, 1999.

These questions were provided in advance to the federal staff who made presentations at the committee meeting.

## OVERVIEW OF MOST SUCCESSFUL PARTNERSHIP INITIATIVES

The following three partnership initiatives were designated by DOT as most successful:

- Next Generation Transportation Vehicles
- Intelligent Vehicle Initiative (IVI)
- Aviation Safety Research Alliance

*Next Generation Transportation Vehicles* is a loose collection of programs<sup>4</sup> aimed at developing “internationally competitive, domestically produced transportation vehicles that achieve unprecedented gains in fuel efficiency and in both environmental and operational performance, including reduced greenhouse gas emissions.”<sup>5</sup> Each program is structured as a partnership, but there appear to be no linkages among the programs themselves. Presentations at the committee meeting addressed three of the programs.<sup>6</sup> The 21st Century Truck Initiative, a newly proposed program, involves the Department of Energy (DOE), DOT, the Army, the Environmental Protection Agency, and industry. Next Generation High Speed Rail, an ongoing initiative of the Federal Railroad Administration, involves a state department of transportation, DOE, the Navy, and industry. The Advanced Vehicle Technology Program, a program of the Defense Advanced Research Projects Agency that was transferred to DOT in the Transportation Equity Act for the 21st Century, involves DOT, state and local agencies, universities, and industry.

The *Intelligent Vehicle Initiative* is sponsored by the Intelligent Transportation Systems (ITS) Joint Program Office, which is located in the Federal Highway Administration but operates as a DOT-wide manager and coordinator of ITS programs. The goals of IVI are to “reduce the number of highway crashes and pedestrian casualties and the resulting injuries and fatalities; [and to] improve the effectiveness of intelligent systems to assure safe vehicle operation.”<sup>7</sup> IVI involves partners from several DOT modal administrations, vehicle manufacturing and supply industries, and state departments of transportation.

The *Aviation Safety Research Alliance*, begun in 1999, is a partnership of the Federal Aviation Administration and the National Aeronautics and Space Administration. Its goal is to “identify

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<sup>4</sup> These programs include the Partnership for a New Generation of Vehicles, the Advanced Technology Transit Bus, MARITECH, the 21st Century Truck Initiative, the Advanced Vehicle Technology Program, and Next Generation High Speed Rail.

<sup>5</sup> National Science and Technology Council, *National Transportation Science and Technology Strategy*, Washington, D.C., April 1999, p. 18.

<sup>6</sup> A fourth program, the Partnership for a New Generation of Vehicles, was held up as an example of the very best partnership effort, but was not specifically reviewed by the committee.

<sup>7</sup> National Science and Technology Council, *National Transportation Science and Technology Strategy*, Washington, D.C., April 1999, p. 20.

methods that, when implemented, would reduce the fatal aviation accident rate by 80 percent by 2007, as compared to the 1990-1996 baseline.”<sup>8</sup>

## **KEY FINDING**

The fundamental issue addressed by the committee is whether the structure being employed by the NSTC Strategy is a sound one that can and should be pursued. The committee’s finding on this issue is based on its previous reviews and on the comments of Mr. Downey during its most recent meeting.

Mr. Downey presented his observations regarding other approaches the NSTC could have taken. With respect to the idea of focusing on a smaller number of partnership initiatives, he indicated that the existing number of initiatives was necessitated by the wide range of national transportation goals and the broad array of R&T that can be pursued to meet these goals. Nevertheless, he acknowledged that not all of the partnership initiatives are equally well developed: four of the thirteen (including IVI, the Partnership for a New Generation of Vehicles [PNGV] component of Next Generation Transportation Vehicles, and the Aviation Safety Research Alliance) are based on well-established research programs, while the other nine (including the three programs within the Next Generation Transportation Vehicles initiative that were presented to the committee) are in an early stage of development but are thought to show promise of evolving into strong partnerships.

As for establishing new organizations to pursue the partnership goals, Mr. Downey indicated that this approach appears to have worked in some cases, such as PNGV and IVI, which are being carried out on the federal side by organizational units specifically established for the purpose. However, there are barriers to more widespread use of this approach. In particular, the fragmentation of congressional committee jurisdiction makes it difficult to align program authorization and budget responsibility for new organizational units whose missions would cover multiple modes, national goals, and stages of R&T.

Regarding the approach of focusing federal efforts more on enabling research, Mr. Downey indicated that one assumption behind the NSTC Strategy is that actual implementation of improvements requires coordination among all stages of the R&T process, from enabling research through innovation. In addition, Mr. Downey explained that the NSTC structure was modeled on an approach that has proven successful for the Department of Defense—involving goal-oriented strategic planning, a basic research plan, and a technology plan—with modifications to fit the transportation sector. For instance, the broad array of stakeholders in transportation (federal, state, and local agencies; private-sector firms; and academic institutions) makes the process more complex than in the defense model. The involvement of all stakeholders is critical for the successful achievement of transportation goals, and the NSTC believes the Strategy’s four-tiered structure (strategic planning for R&T to achieve national goals, partnership initiatives, enabling research, and education and training), with a particular focus on partnership initiatives, provides an effective framework for such involvement.

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<sup>8</sup> Ibid., p. 16.

On the basis of Mr. Downey's comments and the its previous reviews and experience, the committee concluded that the NSTC strategic planning structure is sound in principle and intent. There appear to be some indications of successful outcomes in terms of both strong partnerships (such as the involvement of industry in the IVI program and the Next Generation High Speed Rail program, and the federal partnership in the Aviation Safety Research Alliance) and products (such as the locomotive demonstration assembly in the High Speed Rail program). However, it should be noted, that the DOD model is not entirely applicable to the civil transportation sector. The partnerships that have been developed by DOD over the years depend critically for their success on the implied commitment of the Federal government to purchase the products of the research. Clearly no such commitment exists in most of the broad array of topics included under the NSTC's transportation strategy. Furthermore, DOD benefits greatly from the investments made by DARPA, which assist the transition from research to demonstration. No such Federal program now exists for civilian technology at a sufficiently healthy level, and consequently a key linchpin in the technology strategy is virtually missing. The committee supports the efforts to coordinate research across agencies and to develop partnerships, and encourages NSTC to consider other models that may be more appropriate to transportation. In the following sections the committee offers general observations and recommendations with regard to strengthening and improving the Strategy.

## **GENERAL OBSERVATIONS**

Transportation is part of the foundation of the nation's quality of life, social structure, national and international economy, and defense capability. Historically, research and innovation have made significant contributions to transportation and have helped mitigate some of its safety and environmental impacts. Current developments in various fields of R&T promise continued enhancement of the transportation system. Strategic planning and effective techniques for managing R&T efforts will ensure that limited resources are directed to their most beneficial uses.

This committee has followed the development of the NSTC Strategy from its inception in 1997 and notes continued improvement since that time. The task of coordinating research across federal agencies and developing real partnerships among public agencies and with the private sector is daunting but worthwhile. The committee recognizes the challenges posed by the complexity of the federal budget process, the structure and objectives of the many congressional committees with relevant jurisdiction, and the inertia inevitably faced by any significant change effort. For example, the fact that agencies concerned with transportation issues fall under the jurisdiction of multiple authorizing and appropriating committees and subcommittees in Congress, each with its own set of priorities and constituencies, makes unification of R&T program plans and budgets very difficult. The many layers of budget review and approval, even within the executive branch, make that process long and complex, with relatively narrow windows of opportunity for effective coordination across departments and even across agencies within the same department.<sup>9</sup>

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<sup>9</sup> In 1995, an NRC committee proposed an approach for dealing with the complexity of the federal authorizing and budgeting process. See *Allocating Federal Funds for Science and Technology*, National Research Council, Washington, D.C., 1995.

In addition to the institutional complexity of the federal government, R&T activities are intrinsically risky, so it is difficult to predict the precise benefits that will be derived from the efforts made. At the same time, the committee notes that some of the more successful partnership initiatives, such as PNGV and IVI, took several years to develop and have not necessarily traveled a smooth path. The implication is that effective partnerships are possible but require patience, hard work, and an openness to learning from mistakes as well as successes. The NSTC structure is an attempt to work within a highly complex and fragmented process to achieve the most effective possible outcomes in addressing national transportation goals through R&T.

DOT has quite limited resources available to pursue an ambitious, multimodal R&T agenda with multiple objectives. Thus, partnering with other federal agencies and leveraging resources in the affected industries are important strategies for enhancing the effectiveness of the R&T program. Similarly, DOT needs to be disciplined in its research approaches by taking a realistic view of what will be useful to these highly capitalized industrial sectors. In this context, industry partnerships play an important additional role of helping DOT focus on problems and approaches industry deems relevant. At the same time, the federal government should be somewhat more willing than industry to accept the risks of research and prepared to explore options that industry might find less attractive.

It is apparent from looking at the Strategy's partnership initiatives that there are many different types of partnerships. While there are a number of practices that appear to characterize successful partnerships (see Enclosure 3 for some examples), there is no single prescription for all partnerships. There are inevitably difference in the types of partners involved (federal agencies, state and local agencies, private-sector organizations, academic institutions), the goals pursued (new knowledge, technology implementation), and the constraints faced (financial, legal, political). All these characteristics must be taken into account in structuring and evaluating R&T partnerships. Unfortunately, it is not always apparent to the reader of the Strategy which type of partnership is intended to characterize each initiative.

## RECOMMENDATIONS

The committee finds the intent of the NSTC Strategy to be sound. However, we believe the following recommendations can contribute to realizing the Strategy's full potential.

**Recommendation 1: The Strategy, and even more so its accompanying documents,<sup>10</sup> should be clearer and more specific about participants, levels of effort, activities, and accomplishments.**

The committee has commented frequently in previous letter reports about the need for the NSTC and DOT to be more specific about a number of issues, including how priorities are set; how priorities influence the budget; how "partnership" is defined; who the partners are in each

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<sup>10</sup> The *Transportation Technology Plan* and the *Transportation Strategic Research Plan*.

partnership and what they contribute; what outcomes are expected; who is responsible for which outcomes; what funding schedules, milestones, and accomplishments will be; how partnerships will be evaluated; and how results of evaluations will be used. For example, road maps should be based on an in-depth consensus-building process that involves experts from industry, government, federal laboratories, and academia, and should demonstrate specific technical challenges to be overcome in sufficient detail to guide a real research agenda. The road maps included in the *Transportation Technology Plan* are too vague to indicate what was planned and what is really being done. They do not specify the problems to be solved, the technical milestones to be achieved, or the outcomes expected. Instead of a list of partners with specific roles or contributions, the plan provides a long list of “participants” for each partnership, with no clear sense of how they are participating. Moreover, while it is true, as mentioned earlier, that there are different types of partnerships, it appears that some of the initiatives are not partnerships in any conventional sense of the word, but simply high-priority efforts that have been called partnerships, perhaps to give them more visibility. In addition, each partnership description includes sections entitled “Investment Strategy” and “Funding Requirement”; however, no funding requirements are actually given, nor is there any indication of what investment strategy might meet the funding need.<sup>11</sup>

Recognizing that planning documents are often only general summaries and may go to print before all the details have been worked out, the committee has frequently asked federal agencies to present such particulars in person. This approach was used again for the committee’s September 20 meeting. Some presenters did a good job of answering the questions provided to them in advance, but others appeared unable to do so. This inability to provide details could suggest that some initiatives are not yet well formed enough to be included in the plan, unless they are portrayed as proposed or experimental initiatives. The committee is not prepared to identify which partnerships are real and which are not on the basis of a one-day meeting. Recommendations 4 and 5 and the best practices in Enclosure 3 can be used by the NSTC to make such determination themselves.

Related to the need to be more specific and to ensure that the initiatives in the Strategy are well thought out, the NSTC and participating agencies need to consider the relative benefits and costs involved in extensive coordination and partnering. The benefits and costs associated with the elaborate processes required to overcome some of the institutional constraints mentioned earlier (the budget process, bureaucratic inertia, congressional committee jurisdictions) need to be balanced. The cost of additional coordination (usually measured in time and staff resources) should be weighed against the effectiveness of those efforts in terms of the value they add to the R&T enterprise, as well as their efficiency with regard to savings in other resources (typically R&T budgets). Such balancing of costs and benefits may help in determining how many and which partnership initiatives should be formally included in the Strategy.

**Recommendation 2: The Strategy should take a more systemic and intermodal approach.**

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<sup>11</sup> Two partnerships, the National Intelligent Transportation Infrastructure and IVI, indicate federal funding provided in fiscal years 1999 and 2000.

While it is appropriate for the partnerships to have well-defined goals, it is also important to recognize and take into account the overall system in which the respective technologies will operate. For example, the partnerships within Next Generation Transportation Vehicles are clearly focused on goals related to the environment and emissions, but the specific programs presented to the committee appear to reflect relatively less emphasis on safety, mobility, and economic goals, which are also critical national transportation objectives.<sup>12</sup> Inattention to the complex system in which vehicle technologies are implemented—including environmental, safety, economic, and mobility aspects—could impede the achievement of the Strategy’s goals. In a similar vein, the partnerships should account more explicitly for the increasingly intermodal nature of transportation, including particular issues associated with intermodal transfer points and the potential effects (both positive and negative) of technological developments in one mode on the other modes. For example, consideration should be given to how high speed rail might feed the air transportation network to make intercity transport more efficient, or how the truck-rail system provides more effective freight transportation than either mode could provide alone.

**Recommendation 3: The role of enabling research should be strengthened and more clearly defined. Enabling research and education should be integrated more fully into the partnerships.**

While the Strategy describes enabling research as including longer-term, higher-risk efforts, such research does not appear to play a significant role in the partnerships. In the partnerships presented to the committee, the nonfederal partners are typically engaged in short-term research and technology development oriented toward near-term market introduction. No partners appear to be engaged in longer-term, higher-risk research (such as universities or national laboratories might perform), nor is it always apparent how the pursuit of these partnership initiatives is drawing on or stimulating additional enabling research.

As mentioned earlier, the federal government can play an important role in supporting longer-term, higher-risk research that industry cannot or will not undertake. The federal government typically provides such support to (1) fulfill public purposes such as safety, environmental control, and energy efficiency; (2) strengthen the base of fundamental understanding on which industry can draw in conducting its own R&T efforts; and (3) maintain global leadership.<sup>13</sup> Much of this research may not be carried out formally within a particular partnership. However, the role of the federal government in this area should be more apparent in the Strategy, and mechanisms should exist for gaining access to research being conducted in other federal and university programs that could be beneficial to one or more technology partnerships.

It appears from the way they were described that the four components of the Strategy—strategic planning, partnership initiatives, enabling research, and education and training—which are

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<sup>12</sup> Both the NSTC Strategy (see pages 8–11) and the *U.S. Department of Transportation Strategic Plan 1997–2002* contain national goals in these areas.

<sup>13</sup> The NSTC’s *National Transportation Strategic Research Plan* (May 2000, p. 5) states: “The following characteristics make enabling research appropriate for Federal involvement and funding: supports long-term national transportation goals; has benefits that are too diverse for a single company to recover and profit from its investment; is associated with cost or risk that is beyond the capacity of any individual company; and generates benefits that will begin to be realized too far in the future to pass the threshold of private investment criteria.”



portrayed graphically as four horizontal layers in a pyramid,<sup>14</sup> are in fact separate. The Strategy would benefit greatly from a vertical integration of these layers. Instead of focusing exclusively on near-term technology deployment, for example, partnerships could include an element of strategic planning that would help identify fundamental problems to be addressed by enabling research<sup>15</sup>, which in turn would strengthen transportation education when conducted by academic institutions. Transportation training would also be facilitated through the involvement of practitioners in the deployment stages of a partnership.

The role of longer-term enabling research is not restricted to producing new knowledge for the future. The intellectual capacity-building potential of more advanced types of research should not be underestimated, as it helps develop the mind-set that allows people to consider and accept technological change.

The Strategy should also acknowledge the importance of breakthrough technological improvements. At present, the partnerships appear to be highly focused on incremental technological improvements, which are certainly critical to the achievement of near-term goals. The Strategy would be more balanced and more effective in the longer term, however, if greater attention were given to the role of breakthrough improvements that could set the transportation enterprise on new trajectories of technological development aimed at the achievement of national goals.

**Recommendation 4: A process for establishing and sunseting partnerships should be developed.**

The current set of partnership initiatives does not exhaust the potential areas in which R&T could contribute to national goals. The NSTC should develop a process by which it would regularly consider the introduction of new partnerships, including the development of criteria for screening potential candidates. At the same time, and keeping in mind earlier comments about the need for patience in the development and evaluation of partnerships, it is inevitable that some partnerships will prove ineffective. Of the partnerships presented to the committee during its meeting—which were chosen by DOT as examples of the most successful initiatives—some appear to be yielding modest results at best. For instance, the 21st Century Truck Initiative is still in the formative stage, and the Advanced Vehicle Technology Program appears to be little more than a plan since it has not been funded in recent appropriations. The NSTC needs to develop criteria for determining when a partnership has exhausted its useful life or is not worth pursuing further. These criteria should be established upon the initiation of a program and evaluated periodically.

**Recommendation 5: Periodic program-level assessments, including nonfederal evaluators, should be conducted. Feedback from these**

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<sup>14</sup> See National Science and Technology Council, *National Transportation Science and Technology Strategy*, Washington, D.C., April 1999, p. 13.

<sup>15</sup> For example the industry-led technology road maps developed under the Sematech program influenced the long-term research agendas of agencies such as DOD, NSF, and DOE.

**assessments should be used to increase understanding of and learning from successful practices.**

As noted earlier, the broad scope of the Strategy precludes this committee from reviewing each activity in depth. It appears that some of the partnership initiatives incorporate evaluation procedures that are generally focused on the achievement of interim goals and involve primarily federal managers as evaluators. It would also be helpful to conduct program-level evaluations to assess the overall effectiveness of each partnership in achieving national goals. These evaluations should include knowledgeable persons outside of the federal agencies.<sup>16</sup> The NSTC should use the results of these assessments to identify those partnership practices that are most effective and apply these lessons learned to improve the partnerships as appropriate. The assessment results could also be instrumental in developing guidelines for which types of partnerships are most effective under various circumstances.

## **CONCLUDING REMARKS**

In summary, the committee concludes that the Strategy represents a worthy effort to accomplish strategic transportation goals through R&T, particularly given the formidable barriers to achieving integration across federal agencies. At the same time, we believe greater effort should be made to realize the intent of this approach. The Strategy could be more effective if its principles were put into practice more fully. In particular, the strategic planning documents should be more specific, a more systemic and intermodal approach should be taken to the Strategy's activities, the concept of partnerships should be used to better integrate the four basic components of the Strategy, and objective external evaluation and criteria for initiating and sunseting partnerships should be used to improve the partnerships' effectiveness.

The committee commends the NSTC for the progress made in developing and implementing the Strategy, and looks forward to continued improvement in the strategic use of R&T to advance the nation's transportation goals.

Sincerely,

Joseph Sussman,

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<sup>16</sup> PNGV and IVI both use NRC review committees to conduct this level of evaluation. The Air Force, Army, Navy, and national laboratories use ad hoc and standing committees to review their programs. Universities often have visiting committees or departmental advisory boards of outsiders who comment on university or departmental programs.

Chair, Committee for Review of the National Transportation Science and Technology Strategy

## Enclosure 1

### Committee for Review of the National Transportation Science and Technology Strategy

**Joseph M. Sussman**, *Chairman*, Japan Rail East Professor and Professor of Civil and Environmental Engineering and Engineering Systems, Massachusetts Institute of Technology (MIT), and Director of MIT's Association of American Railroads Affiliated Laboratory

**H. Norman Abramson** [NAE], *Vice Chairman*, Executive Vice President (retired), Southwest Research Institute

**A Ray Chamberlain**, Vice President and Area Manager, Parsons Brinckerhoff

**Irwin Feller**, Director and Professor of Economics, Pennsylvania State University Institute for Policy Research and Evaluation

**Robert E. Gallamore**, Assistant Vice President, Communications Technologies and General Manager of the Positive Train Control Program, Transportation Technology Center, Inc.

**William C. Harris**, Vice President of Research, University of South Carolina

**Christopher T. Hill**, Vice Provost for Research and Professor of Public Policy and Technology, George Mason University

**Margaret T. Jenny**, Vice President, Corporate Business Development, ARINC

**C. Ian MacGillivray**, Director, Research Management Division, Iowa Department of Transportation

**Sue McNeil**, Director, Urban Transportation Center, University of Illinois, Chicago

**Steve T. Scalzo**, Senior Vice President, Operations, Foss Maritime Company

**Dale F. Stein** [NAE], President Emeritus, Michigan Technological University

**Michael S. Townes**, Executive Director, Hampton Roads Transit

**Enclosure 2**

**SPEAKERS AT SEPTEMBER 20, 2000, COMMITTEE MEETING**

**Overall Progress on NSTC Plan**

Mortimer Downey  
Deputy Secretary of Transportation, USDOT

Richard John  
Director, Volpe National Transportation Systems Center, USDOT

**Next Generation Transportation Vehicles**

21<sup>st</sup> Century Truck Initiative

Edward Wall  
Department of Energy (DOE)

Oliver McGee  
USDOT

James Eberhart  
DOE

Next Generation High Speed Rail

Arrigo Mongini  
Federal Railroad Administration (FRA)

Steve Sill  
FRA

Advanced Vehicle Technology Program

Robert Rosenfeld  
Defense Advanced Research Projects  
Agency

Ed Brigham  
Research and Special Programs  
Administration

**Intelligent Vehicle Initiative**

Jeff Paniati  
Federal Highway Administration

**Aviation Safety Research Alliance**

Herman Rediess  
Federal Aviation Administration

Michael Basehore  
National Aeronautics and Space  
Administration

## Enclosure 3

### Best Practices of Partnership Initiatives

The following are examples of practices that appear to characterize the more successful partnerships reviewed by the committee in this and previous meetings. In some cases, a particular partnership is indicated in parentheses as an example of a best practice. This is not intended to imply that these are the only partnerships employing these practices or that these partnerships do not use other successful practices.

- Link partnerships clearly to strategic goals. (IVI)
- Harmonize research goals across agencies. Various agencies (and other partners) may have somewhat different goals, but these must be harmonized in some way to ensure that partners can work together effectively.
- Be realistic about constraints so that energy and resources are not expended in fruitless efforts.
- Employ coordination at various levels: technical, managerial, strategic/top management. (Aviation Safety)
- Involve the right people. (Aviation Safety and IVI)
- Evaluate partnerships at the project and program levels, using both technical and nontechnical criteria.
- Align budgets clearly with goals and priorities.
- Articulate priorities clearly. This is particularly important when unforeseen resource constraints or expenses arise.
- Develop clear technology road maps to facilitate communication among partners and other constituents and to serve as a basis for prioritizing and evaluating progress. (IVI)
- Involve constituents external to federal agencies, even if they are not actual partners. (Next Generation Transportation Vehicles)