Intelligent Transportation Society of America

National Surface Transportation
Policy and Revenue Study Commission

Policy Concepts for Consideration

<u>**D r a f t**</u>

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In response to a request by U.S. DOT to members of the Blue Ribbon Panel of Experts, I am pleased to provide the following policy concepts for consideration by the National Surface Transportation Policy and Revenue Study Commission. These concepts are centered largely on policy options for which Intelligent Transportation Systems (ITS) can be a powerful enabler.

Intelligent Transportation Systems (ITS) are transforming transportation – how we operate and manage transportation capacity, how we use it and even how we fund it. ITS systems will enable us to make significant improvements in transportation safety and security, mobility, and energy conservation and environmental sustainability.

A variety of ITS technologies, including those in our transportation infrastructure and those in our vehicles and in consumer products, make us better protected and better connected when we are mobile. We can expect continued improvement in safety – both incident response and crash avoidance – and in the information needed to manage transportation systems in real time and to empower travelers to make better travel choices.

Several years ago, ITS America renewed its commitment to improving transportation by adopting a strong Vision for the future – Zero Fatalities, Zero Delays. By implementing the latest in ITS systems and solutions, in combination with effective policies and institutional improvements, we foresee a future where "people and goods are transported without delay, injury, or fatality, by integrated systems that are built and operated to be safe, cost-effective, efficient and secure."

The Challenge

The nation faces a variety of challenges to achieving a safer, more secure, more efficient and more sustainable transportation system. ITS makes possible a number of solutions to these challenges.

Mobility Management. We need to do a better job in managing transportation capacity and improving mobility. The Department's Congestion Initiative is a recognition that congestion has a serious impact on our economy, on safety, on quality of life and on environmental sustainability. ITS holds great potential to improve mobility management

Safety. Transportation safety remains a significant challenge, and while we have made improvements, our progress is often along the margins. ITS enables us to achieve a quantum improvement in safety, which also will reduce the economic impact of transportation accidents, injuries, fatalities and damage to goods. A safer system also will result in a less-congested network.

The Vehicle-Infrastructure Integration initiative, an emerging element of technology deployment for safety and mobility, should be a primary area of focus, engaging the strengths of both the public sector and private sector. ITS programs take into account the needs of emergency services and first responders – including policy, fire and rescue, and ambulance – to enable their improved effectiveness.

Homeland Security. ITS holds great potential for improving transportation security, including the preparedness, prevention, and response to terrorist incidents and natural disasters. The application of transportation technologies to the lessons learned from evacuation during Hurricane Katrina will enable state and local government to put into place systems to provide more effective response.

Energy and the Environment. By reducing congestion and improving safety, ITS technologies result in reduced fuel consumption and reduced impact on the environment. Further study will help identify where ITS can make the most significant improvements in this area.

New Capacity. ITS should be an integral element of all new capacity, including expansion of existing facilities or the construction of new capacity. Technology will allow transportation managers to more effectively operate new capacity as part of the existing network as a result.

Transportation Finance. Solving our transportation challenges – improving safety and security, increasing mobility, enhancing environmental sustainability and adding new capacity – requires a significant increase in transportation investment. ITS enables policy makers and transportation managers to draw from a comprehensive set of revenue sources that are sustainable and reflective of consumer choice.

Funding shortfalls may require that we end the traditional practice of regarding access to highways as free, instead. ITS technologies make possible the effective introduction of reasonable market-based prices for transportation use, whether passenger or freight. Developing net new revenues will allow us to develop a broad range of effective solutions to our current and future challenges.

Two recent books outline finance issues and suggest a series of approaches to funding transportation system into the future. These are:

- **Mobility – America's Transportation Mess and How to Fix It**, Professor Joseph M. Giglio.

- **2010 and Beyond: A Vision of America's Transportation Future,** Hudson Institute

How ITS Enables the Future

In early 2002, we unveiled "The National Intelligent Transportation Systems Program Plan: A Ten-Year Vision," a document prepared by ITS America and its members in cooperation with the U.S. Department of Transportation. In it, and in a supplement on homeland security a few months later, we explained how ITS, through the application of computers, communications, and sensor technology, will improve surface transportation. The Plan prescribes a broad set of policy, program and research activities, including necessary institutional reforms, enabled by ITS technologies.

Five years later – at the Plan's midpoint – it is evident that the policy and technology recommendations contained in the Plan are coming to fruition. The programmatic and enabling themes in the Plan described below reflect a vision for the transformation of surface transportation into an effectively managed, well-integrated, universally available and affordable system that provides for the safe, secure, efficient, and economical movement of people and goods, a system which enhances customer satisfaction and which is compatible with environmental concerns.

The Plan suggests that, through ITS implementations:

- Future transportation systems will be managed and operated to provide seamless, end-to-end intermodal passenger travel regardless of age, disability, or location, and efficient, seamless, end-to-end intermodal freight movement.

- Public policy and private sector decision-makers will seize the opportunity to make ITS a vital driver in achieving the vision of the transportation system for the 21st century.

- Future transportation systems will be secure, customer oriented, performance driven, and institutionally innovative, enabled by information from a fully integrated spectrum of computing, communications, and sensor technologies.

The introduction of ITS technologies into the institutional and funding framework of surface transportation, the current and proposed transportation infrastructure, and future vehicle development offers the opportunity to achieve:

- An electronic information infrastructure that works in concert with the physical infrastructure to maximize the efficiency and utility of the system and encourage modal integration and consumer choice.

- Secure systems that can both detect and respond to regional crises.

- Far fewer and less severe crashes for all types of vehicles and far faster response and recovery when crashes do occur.

- Information for operators and users of the transportation system to help contain congestion and increase the effective capacity of the system while reducing the need for new construction.

- Facilities, technology, and information that help reduce energy consumption and negative environmental impact.

- A vital domestic ITS industry that is able to compete effectively at home and in the international marketplace.

The National Intelligent Transportation Program Plan identifies benefit areas and associated goals against which change and progress can be measured. These goals provide the guideposts for fully realizing the opportunities that ITS technology systems can provide in enhancing the operation of the nation's transportation systems, in improving the quality of life for all citizens, and in increasing user satisfaction, whether for business or personal travel.

Safety – The goal is to reduce annual transportation-related fatalities by 15% overall by 2011, saving 5,000-7,000 lives per year. (Since that time, ITS America's Board adopted the Zero Fatalities, Zero Delays Vision described above.)

Security – The goal is a transportation system which is well protected against attacks and responds effectively to natural and manmade threats and disasters, enabling the continued movement of people and goods even in times of crisis.

Efficiency/Economy – The goal is to save at least $20 billion per year by enhancing through-put and capacity through better information, better system management, and the containment of congestion by providing for the efficient end-to-end movement of people and goods, including quick, seamless intermodal transitions.

Mobility/Access – The goal is universally available information that supports seamless, end-to-end travel choices for all users of the transportation system.

Energy/Environment – The goal is to save a minimum of one billion gallons of gasoline each year and to reduce emissions at least in proportion to this fuel saving.

This Plan develops a series of programmatic and enabling themes to describe the opportunities, benefits and challenges of the transportation system of the future and activities required to realize this system.

Programmatic Themes reflect opportunities to apply technology to the problems and priorities of surface transportation. This is the traditional pursuit of ITS, but with novel approaches to addressing the high profile problems that industry stakeholders have identified. These themes include:

An Integrated Network of Transportation Information. The vision for surface transportation is based on information management and availability, connectivity, and system control and optimization – in short, the creation of an integrated national network of transportation information. The information to be gathered and managed includes real-time information on the physical state of the infrastructure, how it is being built, used, maintained, and kept secure, as well as its environment, including relevant weather conditions and expectations. It also includes information about the operators and users of systems, prospectively and during travel. Realizing this vision depends on forging new partnerships within and between the public sector at all levels and the private sector in its broadest sense, including manufacturers, carriers, service providers, and travelers in all modes.

Advanced Crash Avoidance Technologies. ITS can help to significantly reduce the number and severity of crashes. Unprecedented levels of safety, mobility, and efficiency will be made possible through the development, integration, and deployment of a new generation of in-vehicle electronics, vehicle and highway automation, and selective automated enforcement, including the determination of fitness to drive. This represents a major shift in emphasis from mitigating the consequences of crashes to eliminating many of them altogether and reducing the severity of many others.

Automatic Crash and Incident Detection, Notification, and Response. Getting emergency response teams as quickly as possible to the scene of a crash or other injury-producing incident is critical to saving lives and reducing other adverse consequences of crashes. To achieve this timely medical care, public safety providers must receive timely notice of the incident, be efficiently routed to the scene and to the hospital, and be aware of and able to convey the nature and degree of the injuries. Information is also needed to minimize system disruption and to return traffic conditions to normal.

Advanced Transportation Management. Advanced transportation management intelligently and adaptively manages the flow of vehicles (automobiles, commercial vehicles, public transit vehicles, and trains) through the physical infrastructure, often across multiple jurisdictions and modes. Advanced transportation management relies on systems that enable area-wide surveillance and detection, rapid acquisition of traffic flow data, real-time evaluation of traffic flows, predictive capabilities regarding near-term, real-time operational responses to traffic flow changes, and evaluation of the operational responses to traffic flow changes. Opportunities range from better detection and operational tools to full automation.

Enabling Themes set the stage and lay the groundwork for the application of technology to surface transportation. It has often been observed that the truly difficult issues in ITS are not technical, but social, institutional, and political. These themes include:

A Culture of Transportation Systems Management and Operations. In the past ten years, the ITS program has been focused on technology and systems deployment. The next ten years will focus on customer service and systems performance. The demands of both the external and internal environments are generating changes in the culture of both service providers and users. These changes imply a profound change in culture from an engineering-dominated environment to multidisciplinary staffing; from fragmented jurisdictions to high levels of cooperation; from focus on speed and capacity to a focus on reliability and information; from independent vehicles and infrastructure to a new level of coupling; from a modal focus to a multimodal approach; from arms-length public and private sectors to new forms of cooperation; and from reactive to proactive support of public safety operators.

Public Sector Roles, Relationships, and Funding. While public funding for ITS projects continues to grow and ITS continues to be adopted throughout the United States, the widespread deployment of ITS depends on mainstreaming ITS into the basic funding/planning process and seeking creative alternative funding mechanisms. Over the next decade, increased funding for ITS programs needs to be available to plan and deploy new systems, to support operations of those systems, and to hire and train the skilled personnel to manage the systems. Federal, state, and local governments will provide much of this funding through traditional resources such as the Highway Trust Fund. However, innovative finance techniques including direct funding and user incentives, as well as private sector initiatives will play an important role.

Federal Policies and Initiatives to Achieve Extensive Private Sector Product Deployment. The private sector plays a major role in developing and delivering advanced transportation services and in providing access to the social and economic benefits of these systems to all users, including state and local governments, public and private transportation system operators, other businesses and consumers.

Private sector organizations recognize both the economic opportunity provided by a robust market and the social opportunity to enhance the well-being of citizens. However, for these opportunities to be realized, improvements in public-private cooperation are needed. Traditional business-government relationships need to be redefined to enhance private sector opportunities in the commercial marketplace.

Governments need to help accelerate deployment by encouraging and endorsing the sale of appropriate products and services, providing access to data and services, providing market incentives to users, and removing barriers that impede private sector participation.

Human Factors. While the new information opportunities that ITS creates are clearly valuable – in many cases essential – the sheer volume of information can create potential

problems: overload, distraction, and confusion. This applies to both users of the transportation system – commercial and private drivers, pedestrians, cyclists, public transit and rail passengers, etc. – and to the people who operate the system, including personnel at transportation management and control centers, incident response centers, etc. Human factors does not only mean avoiding overload; it means delivering information in the most effective, most timely way and constructing controls – both in vehicles and at centers – which are intuitive, consistent, and easy to use correctly. Understanding human factors is a fundamental key to the effective delivery of the benefits of ITS.

The Plan was in its final stages of review when the tragic events of September 11 took place. After publishing the plan in January 2002, ITS America crafted a supplement to the Plan, to identify how ITS can improve and support homeland security goals.

The security supplement focuses on five broad areas for the application of ITS to Homeland Security: Preparedness, Prevention, Protection, Response, and Recovery. The remainder of this Supplement expands on the theme of ITS and Homeland Security in terms of these five areas. The following table outlines these areas:

Preparedness	- Data and tools for analyzing the transportation system, identifying vulnerabilities and to plan in advance for contingencies by conducting "what-if" analyses under various scenarios. - Tools and technology to facilitate communication and coordination among transportation agencies and between transportation agencies and other stakeholders including response agencies and the general public. - Basis and framework for training and testing for emergency situations.
Prevention	- Sensors and analysis capabilities to detect and head off threats along roads and rails, at transportation centers (depots and operations/management centers), and for other portions of the infrastructure (bridges, tunnels). - Capabilities to guard against misuse of commercial vehicles and halt deviating vehicles. - Analogous capabilities for transit and rail, including continuous surveillance of the road/rail infrastructure against tampering or misuse.
Protection	- Tools and technology for on-site detection and response to potential threats to facilities and systems. - Tools and technology for hardening and coordinating transportation-related communications and information systems. - Tools and technology for establishing and activating alternate routes in times of emergency for vital personnel and materials, and escape/evacuation routes. - Tools and technology to increase the ability of other agencies to undertake protection activities.

Response	• An architectural framework and technologies to maintain communications and facilitate coordination among responding agencies. • Tools and technology for determining and disseminating accurate, up-to-date information about the state of the transportation system both to responders and to the general public. • The ability to provide information about the status and location of vehicles carrying hazardous materials in the vicinity of a crisis scene. • Tools and technology for rerouting traffic when the system is impaired or under attack.
Recovery	• Tools and technology to create a flexible, reconfigurable transportation system to meet emergency needs. • Enhanced ability to execute plans for alternative modes / alternative routes in emergency situations. • Tools and technology to make maximum use of available capacity through load balancing.