

UNITED STATES DEPARTMENT OF TRANSPORTATION
REPORT TO CONGRESS
ON
RECOMMENDATIONS OF THE ITS PROGRAM ADVISORY COMMITTEE
2009

Report to Congress

The Department of Transportation's Responses to the Recommendations of the ITS Program Advisory Committee

Section 5305(h) of the Safe, Accountable, Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, P.L. 109-59) directs the Department to establish an Intelligent Transport Systems (ITS) Program Advisory Committee (ITS PAC). The purpose of the ITS PAC is to provide advice to the Secretary of Transportation on the scope and direction of the Department's ITS Program, by providing input into the development of the ITS aspects of the Department's strategic plan and reviewing the ITS research being considered for funding. The Department is also directed to submit an annual report to Congress in February of each year which includes:

- All recommendations made by the Advisory Committee during the preceding calendar year;
- An explanation of how the Secretary has implemented those recommendations; and
- For recommendations not implemented, the reasons for rejecting the recommendations.

The ITS PAC has met four times since its inception. These meetings have focused on strategic planning activities and program reviews that will be critical for the next phase of the ITS Program. The first meeting of the Committee, on September 25, 2007, was held via web conference and provided basic information to committee members on the role and responsibilities of the ITS PAC (including a review of the SAFETEA-LU legislation and Federal Advisory Committee Act [FACA] procedures), information on conflicts of interest, and an initial overview of the Department's ITS program. The second meeting was held on November 26-27, 2007, at the Department's headquarters. This meeting provided the Committee members with more detailed information on the Department's ITS Program and also presented initial information on the ITS Program's initial strategic planning efforts and processes. After this meeting, the Chair and Vice Chair were nominated; these individuals then presided over the third meeting of the ITS PAC.

The third meeting of the ITS PAC, held on March 13, 2008, provided more detailed information to the Committee on the ITS Joint Program Office's (ITS JPO) strategic planning efforts and solicited specific input on the proposed future mission, goals and focus areas of the ITS JPO. As a result of this meeting, the ITS PAC made its first formal recommendations to guide the future strategic direction of the Department's ITS program (*Advice Memorandum Number 1*, dated May 29, 2008). The fourth meeting of the ITS PAC, held on July 31-August 1, 2008, focused on continued review of the JPO's current ITS research program with the objective of soliciting from the ITS PAC input on the following, which is required under SAFETEA-LU Section 5305(h)(3)(B):

- Whether current research activities are likely to advance either the state-of-the-practice or state-of-the-art in intelligent transportation systems;

- Whether the intelligent transportation system technologies are likely to be deployed by users, and if not, to determine the barriers to deployment; and
- The appropriate roles for government and the private sector in investing in the research and technologies being considered.

Input from this fourth meeting of the ITS PAC resulted in the second set of formal recommendations from the committee (*Advice Memorandum Number 2*, dated October 31, 2008).

Below are the Department's responses to the ITS PAC's suggestions and recommendations.

Response to the ITS Program Advisory Committee (ITS PAC) Advice Memorandum No. 1 (May 29, 2008)

The ITS JPO reviewed the *ITS Program Advisory Committee (ITS PAC) Advice Memorandum Number 1 (May 29, 2008)* and has already taken action on the recommendations of the ITS PAC as presented in this first Advice Memorandum.

Since receiving the first Advice Memorandum from the committee and reviewing the initial set of the recommendations based on results of activities undertaken at the meeting in March, 2008, the ITS JPO worked diligently to address several specific recommendations of the ITS PAC. Many of the recommendations made in this first Memorandum from the ITS PAC reflected specific information requests made by the ITS PAC in order for them to provide informed, sound advice to the Department during subsequent meetings and deliberations. As such, the ITS JPO responded to these information requests made in the first Advice Memorandum by devoting specific agenda items during its July 31-August 1, 2008, meeting to address information needs and issues that the ITS PAC considered critical in order to move forward. These agenda items included:

- Information on Department activities at the ITS World Congress (held in New York City in November 2008), focusing on VII-related activities.
- Information on outreach activities undertaken by the ITS JPO with respect to the University Transportation Centers (UTC) Program.
- Information on how the proposed new goals and focus areas of the ITS JPO's research program link to research initiatives currently underway.
- Detailed budget information.

The ITS PAC also made several recommendations about the future direction of the ITS research program and related ITS JPO activities. In response to these recommendations, the ITS JPO is currently undertaking a strategic revisioning process with respect to areas of research focus in the coming years.

Below are the Department's responses to the ITS PAC recommendations in the first Advice Memorandum.

Rules of Engagement

The ITS PAC proposed to provide independent advice to the ITS JPO via written outputs after each meeting, which will constitute the advice of the ITS PAC. The ITS JPO agreed with this recommendation, and has received two Advice Memoranda from the ITS PAC, both of which are addressed in this Report to Congress. Both Advice Memoranda were transmitted to the RITA Administrator.

The ITS PAC also proposed to take a broad view of ITS, bring a “systems approach” to its deliberations, and focus on the Federal role in the overall ITS area. The ITS PAC proposed to approach the ITS from both individual surface modes and intermodal/multimodal perspectives. The ITS PAC also indicated that it views the goals of the ITS Program as multidimensional and noted that the goals as proposed by the ITS JPO reflect vital national transportation priorities and the wide-ranging nature of ITS with respect to a variety of political, social, and deployment issues. The Department fully supports the manner in which the ITS PAC plans to approach the nature of its counsel and believes such approaches are vital to the success of the ITS Program.

Finally, the ITS PAC suggested adding an additional programmatic goal – *ITS-Enabled Universal Access to the U.S. Transportation System*. This new proposed programmatic goal addresses issues of social equity and sustainability. The Department recognizes this as an important issue and, as the ITS JPO continues to engage in its strategic re-envisioning process, will work with the Modes to address this additional goal for the ITS Program.

Further Cross-Cutting Comments on the Program

The ITS PAC requested more specific information on what activities the Department would be undertaking for the ITS World Congress in New York City in November, 2008. The Department provided this information at the July 2008 ITS PAC meeting.

The ITS PAC suggested that the Department, through the ITS JPO, reach out to the UTCs to suggest ITS-related research. The Department agrees with this recommendation and the ITS JPO has met with the Department’s UTC director. The Department had identified several opportunities for increased cooperation and the JPO staff has begun to coordinate more closely with the UTCs. Also, this topic was made an agenda item at the ITS PAC meeting in July 2008 and the ITS PAC was given an update on the Department’s activities in this area. Additionally, the ITS JPO has a staff vacancy that should be filled in the summer of 2009. Part of this person’s responsibilities will be to ensure increased coordination with UTCs, per the recommendation of the ITS PAC.

The ITS PAC suggested that the Department, through the ITS JPO, provide a better understanding of how the proposed new ITS Program research goals and focus areas linked to current programs. The ITS JPO devoted an agenda item at the ITS PAC meeting in July and provided this information (see attached).

The ITS PAC suggested that ways of creating public acceptance and support for the ITS should be discussed at subsequent meetings. The Department agrees that this is an important topic to

continually revisit. This topic was included in the ITS research reviews during the ITS PAC's July 2008 meeting.

The ITS PAC requested additional, more detailed information on the ITS Program budget elements. The Department provided the ITS PAC with detailed budgetary information at the July 2008 meeting.

The ITS PAC recommended that there be a better balance between supply-side and demand-side research in the ITS Program. The Department believes this balance is important in order for ITS research to benefit the entire nation.

The ITS PAC suggested that the Department engage in broad based technology scanning to yield insight into future research and technology opportunities and collect information on organizational ITS deployment models worldwide. The Department, through the ITS JPO, is initiating a technology scanning effort. This work is planned for award in winter 2009.

Response to the ITS Program Advisory Committee (ITS PAC) Advice Memorandum No. 2 (October 31, 2008)

The fourth meeting of the ITS PAC was held July 31-August 1, 2008. The objectives of the meeting were threefold: 1) respond to the information requests made by the ITS PAC in Advice Memorandum Number 1; 2) specifically address the ITS JPO's revised and changing programmatic goals; and 3) have the ITS JPO provide a status report/update on the ITS Program's current research initiatives.

Therefore, the second Advice Memorandum from the ITS PAC devoted considerable attention to the goals of the program.

Future Research

The ITS PAC recognized that many of the ITS JPO's current research initiatives were moving toward conclusion and that the ITS Program itself was planning to undergo a transition with respect to its research goals and priorities. The ITS PAC indicated its intent to give useful advice on shaping the future of the program and, in particular, address the question of gaps, or what the Committee called "white space," in the research program. The ITS PAC noted some particular examples of "white space," including: system management, the ITS and the environment, transportation network management, the application of an overall engineering systems approach to the ITS, and the development of algorithms for network management. The Department welcomes the ITS PAC's efforts to identify areas of new research and agrees that the above-mentioned examples are strong candidates for further exploration and examination.

The ITS PAC also commented that it will be important for the Department to better understand the institutional barriers to more extensive ITS deployment, and noted that, for example, reducing congestion by using the ITS more extensively and effectively is not necessarily a technology issue but may be, in large part, an issue of overcoming institutional barriers and

hurdles. The Department concurs with this statement, and agrees that the ITS research program should clearly reflect the need to address institutional barriers to the ITS deployment. The ITS JPO has since restructured the office and now provides a clear organizational role for technology transfer of which addressing institutional issues is a key part.

The ITS PAC also pointed out that as the reauthorization of SAFETEA-LU approaches, it is critical to address these issues and have the ITS fit properly into the goals and priorities of the new legislation. The Department concurs, and the ITS JPO has initiated efforts to develop a coordinated set of the ITS principles for reauthorization consideration by the new administration.

USDOT Role in the ITS Research and Development

The ITS PAC is clear in its call for the Department and the ITS JPO to take on critical leadership roles in the future of ITS as facilitators, coordinators, and shapers of the ITS program, working closely with partners in the states and in the private sector. The Department agrees that clear Federal leadership is necessary as we move the ITS research program into the future. To this end, the ITS JPO has accomplished or is currently executing the following:

- Published the ITS Program Plan and summaries of current research results for each of the major research initiatives;
- Developing reauthorization principles for the ITS;
- Developing a charter and processes for internal multi-modal coordination;
- Rebranded the Vehicle Infrastructure Integration (VII) program to IntelliDriveSM; and
- Developing coordinated IntelliDriveSM principles in order to lead and stabilize the working relationship with the key stakeholders.

The Department looks forward to working with the ITS PAC to further cement this leadership role.

The New York City ITS World Congress

The ITS PAC commented on the importance of presenting valuable demonstrations of U.S.-based ITS technologies and systems at global events such as the annual ITS World Congress, and that properly packaging these demonstrations for the media is of great importance. The Department concurs that the U.S. ITS industry needs to be well-represented at any ITS World Congress. ITS America played the lead role in developing demonstrations of the ITS technologies at the New York World Congress. The Department notes, however, the legislative limitation on the expenditure of the ITS funds for displays, outreach and public relations. Consequently, the USDOT participated through displaying a large booth, providing publications and offering numerous presentations.

Linkage to University Transportation Centers Program

The ITS PAC reiterated its interest in having the Department, through the ITS JPO, work more closely with the University Transportation Centers (UTC) program within the Research and Innovative Technology Administration (RITA) and noted that, while the ITS JPO has been

working to build those linkages, it would urge the ITS JPO to expand and extend those efforts. The Department concurs with these recommendations, and the ITS JPO will continue its efforts to build these valuable partnerships, particularly once the position is filled within the JPO, as the role's responsibilities include interacting with the UTCs.

Committee Views on the Goals of the JPO's ITS Research Program

During the July 31-August 1, 2008, ITS PAC meeting, there was extensive discussion about a white paper that articulated the then-RITA Administrator's proposed safety goal for the ITS research program. The ITS PAC agreed that emphasizing a single goal provides programmatic focus and clarity, and that safety appears to the committee to be an appropriate goal on which to focus. However, the ITS PAC also noted that it had previously recommended that the Department employ a systems approach to the ITS, as the ITS research program is multidimensional. The ITS PAC noted that success with other goals will often contribute to safety as well, such as reduction of congestion. The Department concurs that clarity of focus is critical for the implementation of a multidimensional research program, and also concurs that safety is just one appropriate goal on which to focus. The Department notes that the ITS JPO began a strategic planning process in 2007 and engaged the ITS PAC in that process. It resulted in the identification of the following focus areas:

- Safety (Intelligent Vehicle);
- Mobility (Real-Time Data, Integrated Electronic Payments);
- Environment and Energy; and
- 21st Century Partnerships.

Based on the input from the ITS PAC, the ITS JPO intends to revisit the strategic planning process and focus areas in collaboration with the modal administrations, including discussion of the new goal (see below), as recommended by the ITS PAC.

Additional Goal: The ITS-Enables Universal Access to the U.S. Transportation System

In addition to the JPO's stated goals of mobility, safety, the environment, and 21st century partnerships, the ITS PAC recommended an additional programmatic goal: "ITS-Enabled Universal Access to the U.S. Transportation System." The proposed focus area under this goal was to "conduct research on and enable deployment of means by which all citizens can access the full mobility and information benefits of the US transportation system through ITS technologies." The ITS PAC recommended that, while focusing on the safety goal is appropriate, other important program objectives should be acknowledged and treated explicitly, even if within the framework of the safety objectives.

The Department concurs that a clearly-focused ITS research program is critical, and also that the ITS research program must remain multidimensional. While safety is clearly a key area for the Department in which ITS can have a significant impact, the ITS can also have an impact in the Department's goal areas of congestion, environment, and global connectivity. In addition, the Department fully supports multimodal transportation options and services for all citizens through the use of the ITS so that all Americans have a full range of transportation and mobility choices

available to them. The ITS JPO expects to have further discussion with the ITS PAC to more fully understand what work areas are intended to support a goal to enable universal access to the transportation system.

The ITS PAC also specifically recommended that the ITS program establish quantifiable performance metrics for other programmatic research goals and measure research program performance over time. The ITS PAC cited an example of greenhouse gas emissions where goals could be defined, in coordination with other agencies, such as the Department of Energy, and addressed with recent findings in ITS technologies which may yield significant benefits in fuel economy and emissions reductions. In addition, the ITS PAC recommended that RITA validate the achievability of the safety goal by:

- Breaking down the goal into the various ITS technologies with the potential for reducing crashes and their contributions to achieving the overall goal;
- Identifying needed Research and Development (R&D);
- Preparing a timeline for development and field deployment with interim goals to reach the goal;
- Pursuing a top-down systems engineering approach to the analysis of the goal;
- Innovating a package of technologies and research techniques available to attack the goal; and
- Developing individual programs to help move this goal toward reality.

The Department concurs with the need to establish and define quantifiable goals and performance metrics for each dimension of the ITS research program. The ITS JPO intends to prepare a detailed strategic plan for the future of the ITS research program, coordinate this strategic plan with its modal partners and promote leadership through the ITS Strategic Planning Group (SPG) and the ITS Management Council. Additionally, the ITS JPO will work with these groups to develop highly specific, supportable, and quantifiable performance metrics for future goal areas.

Commentary on Reaching the Safety Goal

The ITS PAC recommended that, while pursuing the safety goal, the Department, and the ITS JPO, recognize that a large percentage of crashes are due to driver error, and that driver behavior would need to be addressed as this goal is approached through research. The ITS PAC stressed that a large-scale reduction on highway fatalities would only be truly feasible if research were conducted that addressed the concept of creating a “vehicle that cannot crash.” The ITS PAC described four “domains” to an ITS-enabled 360-degree awareness car:

- Domain 1: within the car (technologies and data sources that help monitor driver behavior);
- Domain 2: line of sight (sensors allowing a vehicle to sense objects and conditions around it);
- Domain 3: static far field (sensors and maps that provide information on the road ahead); and

- Domain 4: dynamic far field (sensors and systems that provide information on changing conditions on the road ahead).

The ITS PAC recommended that these four domains about the car be addressed in a seamless, highly integrated, and complementary fashion in order to accomplish the goal.

The Department concurs that driver behavior in response to events inside and outside of the vehicle is a significant contributor to road crashes. While, as the ITS PAC indicated, the ITS JPO is addressing some, but not all, of these four domains, the Department also recognizes that further work needs to be done in order to address the safety goal in an integrated manner. The National Highway Traffic Safety Administration (NHTSA), the Federal Highway Administration (FHWA), and the Federal Motor Carrier Safety Administration (FMCSA) are currently conducting research into driver behavior issues and the Department, through the ITS JPO, expects to more fully engage the NHTSA, the FHWA, and the FMCSA in order to leverage research activities and results to reduce roadway crashes. The ITS JPO, the NHTSA, the FHWA, and the FMCSA are currently developing a work program for such research as part of the IntelliDriveSM program. It is expected that driver behavior will be a component of that research program.

The Ideal Federal Role in Reaching the Safety Goal

The ITS PAC was very clear in its recommendation that the ITS JPO, and the Department, must provide leadership across all safety domains where ITS could have an impact, regardless of whether the source of the technology is private or public. The ITS PAC emphasized that the Department consider all tools that can maximize the chances of success in developing and deploying the ITS technologies that create “cars that can’t crash” and thereby achieving the bold safety goal articulated by RITA.

The Department concurs with these recommendations. The Department agrees that it must play a leadership role in working with the private and public sectors in developing and executing a research plan that addresses the full range of activities to fulfill the Department’s commitment to safety.

Recommendations on the Current ITS Research Program

On the second day of the meeting, the ITS PAC undertook a high-level review of current programs and projects, fulfilling the requirements of SAFETEA-LU in this area. The ITS JPO asked for the ITS PAC input on the following three questions for each of its research initiatives:

1. Are these current and future activities likely to advance either the state-of-the-practice or state-of-the-art in intelligent transportation systems?
2. Are the technologies being researched and tested likely to be deployed by users? If not, what are the barriers to deployment?

3. What are the appropriate roles for government and the private sector in investing in these existing and future research and technologies being considered?

Below are the ITS PAC comments, suggestions, and recommendations, along with the Department's responses.

Next Generation 9-1-1

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC believes that this project should make significant contributions to upgrading and standardizing the public safety access point (PSAP) infrastructure. The Department concurs.
- Likely to Deploy and Barriers?
 - The ITS PAC commented that deployment will depend heavily on buy-in by the State and local governments. The ITS PAC believes that the requirement for local funding to upgrade PSAPs is a significant barrier and could result in a patchwork, so it may therefore be prudent for the Department to develop some kind of funding and program of Federal grants based on the size of jurisdiction or other criteria. The Enhanced 9-1-1 Act of 2004 authorized the creation of a National 9-1-1 Office with responsibilities for a grant program to benefit local and state 9-1-1 authorities. A total of \$43.5 million has been appropriated to the FHWA, the NHTSA, and the NTIA to date and the National 9-1-1 Office targets summer of 2009 to make awards. The National 9-1-1 Office is a joint program office (NHTSA & NTIA), but is housed within the EMS Office of the National Highway Traffic Safety Administration within the Department. The NG9-1-1 Initiative will transition to the National 9-1-1 Office at its completion.
- Appropriate Government and Private Sector Roles?
 - The ITS PAC commented that achieving standardized interoperability is a key government role and, if possible, the Department should consider funding support for PSAP upgrade and deployment management. The Department agrees (see above).

Emergency Transportation Operations

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC expressed that it had some difficulty assessing this since it only saw a narrow piece of the total program. The ITS PAC believed that it appeared to be application of existing technology, however, and that there may be a need for standardization of technology when implementing these features. The Department concurs. Critical to the effective support of emergency transportation

operations, whether managing a single incident or responding to the needs of a mass evacuation, is the ability to rapidly obtain, assess, and share reliable and accurate real time data. The Department realizes that innovative application of the existing ITS technologies, in addition to the future development of technologies to obtain and appropriately act upon such information is essential to effective transportation management decisions. One recent Emergency Transportation Operations project specifically addressed standardization of information exchange technologies between transportation officials and public safety agencies. However, consideration is being given to further efforts toward standardization of technologies, processes, and performance requirements to allow for the rapid collection and seamless exchange of accurate, reliable information.

- Likely to Deploy and Barriers?
 - The ITS PAC believed that deployment would be likely, but scalability issues may result in very regional deployment and there would not be a high probability of uniform nationwide deployment without additional incentive from the Federal Government and multi-agency collaboration. Budget implications are unknown at this time. The Department concurs. Many states have expanses of rural critical corridor routes which are without instrumentation. This impacts the ability to detect and respond to incidents, monitor evacuations, or hazardous materials incidents, and increases the risk to emergency responders.
- Appropriate Government and Private Sector Roles?
 - The ITS PAC commented that pursuing this technology for emergency operations is a good fit for the government, and achieving interoperability is an important goal that would need Federal Government support. The Department concurs and recognizes to achieve interoperability, it will require a Federal Government as a part of a broad collaborative effort to be able to identify Federal Government stakeholders in an effort to formulate a comprehensive approach for strategic planning and funding in order to reduce duplication of technologies and resources.

Rural Safety

- Advance Either State-of-the-Practice or State-of-the-Art?

The ITS PAC indicates that this program appears to be focused on the application of mature technology, although that application is novel. The Department agrees and would note that, while most of the awarded projects represent “proven technologies,” these technologies have not been applied in rural areas or in the innovative manner identified in the proposals.

- Likely to Deploy and Barriers?
 - The ITS PAC believed that the infrastructure investment required would be a challenge at the local level and for widespread deployment and consistency of implementation, some Federal program would probably be needed. The Department believes that decisions to implement such infrastructure investments should be based on need as supported by data—not perception. Therefore, given the supportive data, such need and application should surface during the annual statewide planning efforts which result in Strategic Highway Safety Plans.

- Appropriate Government and Private Sector Roles?
 - The ITS PAC commented that focusing on rural issues is a good Federal role, but this initiative needs follow-up to encourage or subsidize deployment. The Department agrees with this statement. Follow-up will include wide distribution of results which would provide information for jurisdictions to make better decisions when faced with data that would support interventions similar to those implemented at the award sites. The Department notes that the deployment of all ITS technologies remains a considerable challenge. Per legislation, the ITS investments are eligible for the use of Federal funds. The choice to deploy the ITS remains with the State and local jurisdictions. Therefore, the ITS JPO and modal administrations provide information about the value of ITS and how to effectively deploy it in order to encourage State and local investment.

Integrated Vehicle-Based Safety Systems

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC commented that the contributions of this project to the human interface issue and intersection of multiple warnings is a contribution of technology, but the basic technology for each of the warning systems is being worked on by the automotive industry, and the particular implementation of these subsystems in this project risk obsolescence over the duration of the project. The ITS PAC added that some of this technology is being worked by the OEMs and suppliers, but speed of deployment is the issue that needs emphasis and that this study could accelerate deployment. The Department agrees that many of the capabilities that have been integrated into the IVBSS system are advertised as commercially available or soon to be available in some form in the marketplace. The level of maturity and performance of the IVBSS technologies appears to exceed that of these commercial systems. The 1-year field operational test to begin in early CY2009 is an integral part of the program and will provide data to the automotive industry to support further research and provide additional data to the NHTSA on the potential effectiveness of the IVBSS-like technologies in widespread use.

- Likely to Deploy and Barriers?

- The ITS PAC believes that this technology is highly likely to deploy, but this USDOT project can play an important role in accelerating that deployment and moving toward standard fit on vehicles instead of the usual industry rollout of options on high-class vehicles. The ITS PAC believes that the industry needs guidance and leadership to move from the scattered application implementation that is happening today across automakers to a more consistent deployment for longitudinal and lateral control. Gathering data and statistics for NHTSA for review and support of the NCAP ratings are very important deployment catalysts, as well as rule making if safety improvements can be shown to be significant. The ITS PAC also indicated that these technologies can also support time-distance-place based pricing of road use which promises to reduce accidents, congestion, greenhouse gases, and other pollution. The Department concurs that the IVBSS program may accelerate deployment of similar systems.
- Appropriate Government and Private Sector Roles?
 - The Committee recommended that the Department should provide leadership and “show the way” to inform the public of the advantages of this technology and provide leadership for the auto industry. Current tools of the NCAP ratings and rule-making are very important and effective roles for the government, when appropriate. The ITS PAC also recommended that the JPO should explore with the NHTSA, the potential of adopting the rules to facilitate timely universal deployment of driver feedback and insurance pricing systems to advance national safety, energy conservation, and environmental goals as well as discouraging aggressive driving in favor of calm driving styles. Finally, the ITS PAC indicated that the government may also play a role in reviewing systems, possibly including testing and certification. The Department agrees generally with the Committee’s conclusions and notes that issues related to the NCAP and regulatory actions are within the NHTSA’s purview. The IVBSS initiative will provide data to inform the NHTSA’s decision making.

Vehicle Infrastructure Integration Proof of Concept (IntelliDriveSM)

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC commented that, while this program does not appear to be advancing the state-of-the-art specifically, the Department’s leadership is significant with respect to demonstrating proof-of-concept and dedicating frequency spectrum for this application. However, with the evolution of this concept to involve private telecommunication networks in addition to DSRC, the ITS PAC believes that state-of-the-art is clearly in the private sector. The Department disagrees that the VII program is not advancing the state-of-the-art. From both a hardware and software perspective, the VII program developed the first multi-channel DSRC-based radios for both the vehicle and infrastructure. While the fundamental technology is based upon commercially available Wi-Fi

technology, the integration of the entire package is a new technology that enables the VII capability, including new security algorithms that have no precedent. As a result of program activities (and with program support), new standards are being developed to encourage industry adoption. These standards include the communications protocol (IEEE 802.11p), the security function (IEEE 1609) and the message sets (SAE J2735). From an applications standpoint, the Department believes that the VII is advancing the state-of-the-art as well. The various applications that are being tested and evaluated are not ones that currently exist today, particularly in the area of safety. This evaluation includes both vehicle-to-vehicle safety as well as vehicle-to-infrastructure applications. While these applications are not market ready end-user applications, they have been developed for engineering development and evaluation purposes and do break new ground in demonstrating advanced capability for safety. Similarly, the DSRC technology is a substantial enabler for mobility and pricing based services. Recently completed in Michigan, the proof of concept testing demonstrated the ability of the DSRC technology to support the basic functionality necessary to support safety, mobility, and commercial services. The Department agrees that the state-of-the-art for private telecommunications networks is in the private sector. The government research program is currently examining the potential benefits of moving towards a more open architecture that leverages additional technologies besides just DSRC as commercially available networks.

- Likely to Deploy and Barriers?
 - The ITS PAC commented that while the VII is receiving significant attention by the Department and by industry, it is not clear at this point what the system and infrastructure might look like. The decision on the mix between the government infrastructure (DSRC) and a common, standardized private infrastructure is critical to ensure fluid interaction and access for all. Additionally, the ITS PAC commented that the challenge of investing in sufficient vehicle and roadside beacon penetration for the system to be effective appears daunting, so it is likely that satellite, cellular, Wi-Fi and/or other technologies will be required to play a large role. The ITS PAC recommended that efforts to develop a complete architectural strategy system should be intensified in cooperation with key stakeholders. In addition, the Committee recommends additional work on the combining of on-vehicle, autonomous technology and V2I or V2V; these systems are interrelated and should be addressed in an integrated fashion. The Department (and the ITS JPO) is in the process of working with our key stakeholders to update the VII architecture to leverage additional (non-DSRC) commercially available communication technologies which will address some of the deployment challenges. Clearly defining open communications and data standards through the architecture update will facilitate a more broad-based deployment potential of a variety of supporting technologies through product standards and services to support safety, mobility, and convenience applications. However, for low latency safety applications, the DSRC is the only known technology that can currently support the safety requirements. The Department is still working towards defining a viable business model for deployment and is

examining incentives to increase the likelihood of deployment. Currently, no JPO activity can integrate autonomous and cooperative systems in the vehicle. However, once we have more complete data from the current IVBSS, V2V, and V2I projects, this may be an area for further consideration.

- Appropriate Government and Private Sector Roles?
 - The ITS PAC believes a difficult transition will occur upon moving from a dedicated DSRC system to a hybrid of DSRC and private communications infrastructure, and the government may need to provide leadership once again, possibly with standardization to achieve interoperability with the motivation for deployment. Further, the ITS PAC commented that the United States is facing urgent problems of transportation system financing, greenhouse gas emissions, traffic safety, and congestion which the universal VII system deployment could help address. The ITS PAC recommended that the Department should prioritize a meeting of key stakeholders in this area to develop a national strategy for universal deployment of basic VII systems as needed to support effective time-distance-place based road pricing and system management, smart transit system management, real-time traveler information systems, and other VII applications across the nation in the coming decade. The Department, under the auspices of the VII program, is looking at how to address safety, mobility, payment services, and environmental issues. The Department is working with key stakeholder groups that include vehicle manufacturers and public transportation agencies to define viable deployment models. In addition, the Department is encouraging discussions to include other interested industries such as aftermarket suppliers and telecoms. As part of the architecture update effort, the Department has increased outreach efforts as a part of the research process to ensure adequate engagement of the necessary stakeholders. The Department is also expanding the list of use cases that the architecture structure needs to be able to accommodate both system performance measures and road pricing.

Cooperative Intersection Collision Avoidance Systems

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC believes that this application appears to advance the application of mature technology rather than state-of-the-art technology per se. However, the ITS PAC does also believe that it is an important application and in need of government leadership. As stated with respect to the VII (IntelliDriveSM), the Department believes the CICAS activity is advancing the state-of-the-art in the areas of hardware, software, and applications. Moving forward, the CICAS efforts will be much more tightly integrated with the VII (IntelliDriveSM) program.

- Likely to Deploy and Barriers?
 - The ITS PAC believes that theCICAS could be a significant contributor to road safety. However, the ITS PAC also believes there is a challenge of identifying sufficient local funding for deployment and also of achieving standardization for interoperability across the nation. While the demonstrations of this technology are impressive, the ITS PAC believes that real-world conditions may limit the applications to only the most robust ones. The Department agrees that there is a cost issue and challenge associated with deployment of roadside equipment to support CICAS applications. However, the Department also believes that those agencies responsible for funding deployment of road projects will have to weigh the benefits of investing in theCICAS-type equipment as opposed to other safety improvement options. Finally, the Department would also remarkt that the communication and data standards are currently being developed for both V2V and V2I scenarios at SAE and IEEE and these standards are progressing towards completion.

- Appropriate Government and Private Sector Roles?
 - The ITS PAC believes an appropriate effort for the government because it is involvement in the intersection infrastructure, which is unlikely to have sufficient private sector investment. In addition, the ITS PAC recommends that the Federal Government work with State and local agencies to achieve sufficient density of deployment to make a meaningful contribution to intersection safety. The Department agrees that intersections are a key area to leverage. The Department is currently undertaking a “footprint analysis” that addresses the CICAS, and more broadly VII, in terms of the necessary infrastructure density to provide for meaningful benefits.

Clarus (ITS Road Weather Research Initiative)

- Advance Either State-of-the-Practice or State-of-the-Art?
 - Believing the application is promising, the ITS PAC clarifies that it is an application of mature technology. The Department agrees that technologies for measuring weather and road conditions may be considered mature technologies; however, the Department believes that assimilating and quality checking those observations, and fully utilizing them for traffic and traveler information systems, is ground-breaking. Likewise, the Department believes that the development of the decision-support tools that integrate weather information with transportation-based rules of practice (e.g., the Maintenance Decision Support System (MDSS)) are not yet mature as they have never been developed before the MDSS. Finally, the Department also points to the development of algorithms to convert vehicle data into valid road weather observations reflects revolutionary work that has only ever been done for airplanes; road surface algorithms are new.

- Likely to Deploy and Barriers?
 - The ITS PAC commented that this project faces the challenges of a lack of public awareness of the benefits and the regional deployment model, and if the safety benefits are realized only where weather-related accidents are a significant factor, then the actual number of avoided accidents may not be sufficient to justify local investment. The Department agrees that the Clarus research initiative faces a lack of public awareness, and the Department is actively engaged in raising awareness about the work. The solutions are system-wide, and are not expected to focus only on “black spots.” Weather-related crashes occur everywhere, and more timely, accurate, and relevant road weather information, provided on a system-wide level, will reap system-wide benefits, and hence justify investments. In addition, significant operational benefits have been achieved to date (e.g., significant direct cost savings to State DOTs), which further justify the investments.

- Appropriate Government and Private Sector Roles?
 - The ITS PAC believes that this is an appropriate role for the government, especially with respect to managing the interfaces with the National Weather Service (NWS) and the National Oceanic and Atmospheric Administration. The Department agrees with this assessment and continues to work with NWS to ultimately take ownership for Clarus and fully integrate it into their suite of weather tools. The transitioning of the Clarus system to the NWS will have neither a positive or negative impact on the ITS Program budget. This is because the savings that will be realized from no longer operating Clarus (\$1-2M per year), will be offset by new research in the area of mobile weather sensing. This new research area complements work being done in the IntelliDriveSM program. Also, the NWS has committed to taking over Clarus functions in the coming years and included related costs in their program budget.

Congestion Initiative

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC believes that this project appears to be an application of existing technology with apparently good results. The Department concurs and notes that the individual technologies are existing technologies; however, their deployment in combination with other strategies yields unique opportunities for addressing congestion.

- Likely to Deploy and Barriers?
 - The ITS PAC commented that, as implemented by the Bush Administration, the program primarily has aimed to foster implementation of bundled strategies that

simultaneously better manage, operate, and price existing road capacity while supporting improved public transportation options. By using a competitive incentive funding grant strategy, the initiative has spurred dozens of cities to advance proposals for such activities, with funding awarded to the most promising sites for near-term deployment. The ITS PAC believes this is a useful model to spur innovation and should be replicated in other USDOT program activities. The Department concurs. This approach is used frequently by the ITS program and has been effective in broadening the involvement of jurisdictions. For example, the Integrated Corridor Management (ICM) and the Mobility Services for All Americans (MSAA) programs both used competitive solicitations to engage agencies to become involved in the ITS activities.

- Appropriate Government and Private Sector Roles?
 - The ITS PAC commented that the integration of the Government with the private sector is an appropriate government role but it should be integrated with private sector solutions for components of the problem as well. The ITS PAC believes that USDOT and Congress should consider strategies to foster more performance-based funding and performance-based contracting initiatives that improve upon the model established by the Urban Partnership Program and Congestion Reduction Pilot Program elements of the USDOT Congestion Initiative. The Department concurs.

Integrated Corridor Management (ICM)

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC believes that this project appears to use existing models with some level of integration, user interface, and application. The Department acknowledges that this initiative uses existing models; however, the Department is creating new, more specific capabilities that enable more effective modeling of mode shift, congestion pricing, and multiple scenario analysis across multiple transportation networks (highway, transit, arterial).
- Likely to Deploy and Barriers?
 - The ITS PAC commented that this program is focused on advancing an integrated set of best practice techniques into deployment in a number of regions, documenting performance and lessons retained. The ITS PAC also commented that the general approaches from these pilot sites could be much more widely deployed in the future, with appropriate efforts to encourage and disseminate these approaches. The Department concurs with these comments, and would also add that this initiative is consistent with the ITS PAC's recommendation that the ITS research program focus on systems engineering and network management. The ICM initiative centers on multimodal network management and follows specific systems engineering processes. The initiative began with the creation of

a generic concept of operations and implementation guide, based on systems engineering best practices. The initiative has applied these best practices at eight sites, and placed most of the site-oriented concepts of operation on the ITS JPO's website. At the end of the ICM initiative, there will have been developed sample concepts of operations, lessons learned documents, and specific guidance regarding the implementation of the ICM based on a systems engineering process.

- Appropriate Government and Private Sector Roles?
 - The ITS PAC commented that this is an appropriate project for the government. The Department concurs.

Mobility Services For All Americans (MSAA)

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC believes that this project appears to bring existing technology to these groups who don't have it currently; that it appears to be more of an administrative issue of managing vertical and horizontal activities within government; that there is duplication in transportation services provided by different social service agencies; and that this project seeks to coordinate these services for much higher efficiency of transportation service delivery. The Department agrees with the Committee's assessment.
- Likely to Deploy and Barriers?
 - The ITS PAC commented that there is a possibility for much more widespread deployment beyond the pilot sites, but this is likely only if there are clear requirements for social service transportation agencies to coordinate services. Such requirements could be created by Congressional or executive agency actions. Such coordination would improve the efficiency the of use of limited funds and foster reduced dependence on imported oil, reduce pollution, and reduce greenhouse gas emissions. The Department concurs and notes that other cities are observing the progress of the MSAA sites in the hopes of replicating the results. This step is a positive outcome emphasizing the premise that the MSAA was intended to develop replicable models. In addition, the Federal Interagency United We Ride (UWR) initiative, with which the MSAA initiative collaborates closely and in response to a Presidential executive order, continues to bring all Federal human service transportation agencies together to create favorable regulatory and institutional environments and provide necessary guidance to encourage State and local coordination actions.

- Appropriate Government and Private Sector Roles?
 - The ITS PAC believes that this is an appropriate role, and that it is important to call on various government-funded social service and health agencies to better coordinate services and to hold them accountable for deployment of these coordination technologies and their success. The Department agrees that this is an appropriate role for the Federal government. In the spirit of collaboration and cooperation, the UWR initiative provides a series of tools and useful resources to assist human service transportation stakeholders to conduct performance assessment and planning for service enhancement through coordination and technology integration.

Electronic Freight Management

- Advance Either State-of-the-Practice or State-of-the-Art?
 - The ITS PAC believes that this project appears to be an application of existing technology. The Department concurs; however, while the EFM Initiative was developed using existing technology, the application of this technology was unique and government facilitation was the cornerstone to progress. The private sector identified the information transfer attendant to the physical movement of goods as an area where they had particular difficulty and where public private collaboration could significantly improve the efficiency of goods movement. Also, the EFM Initiative delivered a new non-proprietary, open-platform, web-based tool for freight tracking. Due to the open-platform nature of the EFM system, the tool is accessible to and inexpensive for any businesses and shippers in the United States or abroad to configure and connect with supply chain partners.

- Likely to Deploy and Barriers?
 - The ITS PAC commented that the EFM system deployment is most likely by private industry and that the Federal Government needs a clear exit strategy for this project. The Department concurs and notes that, with the positive results of the deployment test in hand, the project is now poised to advance the adoption and integration of the EFM system and technology applications into supply chain management. The exit strategy is three-pronged. First, the Department intends to utilize a metropolitan region's economic development function to champion the EFM within their community and to improve the efficiencies of freight movement through the region. Second, the Department intends to energize several value-added service providers to advance the EFM. Third, the Department intends to work with a consortium of public-private market leaders, including governmental shippers such as the Department of Defense, Department of Energy, Environmental Protection Agency, U.S. Postal Service, Department of Commerce, and the European Union, to ensure interoperability of transportation

data standards between public and private entities. In addition, this adoption strategy will be worked through numerous case studies that will document the outcome of working with these groups. The case studies will show all startup costs and compare them to traditional information transfer start up costs, demonstrate how improved data sharing efficiency will save money for businesses and the transportation community, and provide the Department with a timeline for how these entities will commercialize the EFM as the final step to the Department's exit.

- Appropriate Government and Private Sector Roles?
 - The ITS PAC indicated that attention to commercial transportation needs is important, so the government's leadership here is warranted. However, the ITS PAC also indicated that the government needs a defined exit strategy. The Department agrees and is providing leadership and pursuing the exit strategy as defined above.

Conclusion

The ITS JPO appreciates the input from the ITS PAC. Their insights provide an important assessment for the current and future direction of the ITS Program.

Attachment: ITS PAC Meeting Agenda July 31-August 1, 2008