National Architecture for the Intelligent Transportation System A Workshop on Rural Issues

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EXECUTIVE SUMMARY

The National ITS Architecture should address both urban and rural needs as a single, seamless system. The motivation for this is far more than parity between different political constituencies. Many of the economic drivers that will determine the degree of success of ITS implementation require an ability to function in either environment and to make transitions as transparent as possible.

The purpose of this workshop was to explore this issue from a rural stakeholders perspective, and provide useful information to the National Architecture Development team on priorities and implementation strategies. To accomplish this, a diverse group of over 75 transportation professionals met in Idaho Falls, Idaho at the Idaho National Engineering Laboratory on June 15 and 16, 1995. After first examining the history and current status of the National ITS Architecture effort, the group then analyzed which user service areas were of highest priority from a rural perspective, and how obstacles to implementation could be addressed.

While this effort reinforced previous findings of the need for improved communication links, the importance of jurisdictional coordination, outreach and education, standards, and safety, several key points stood out:

1. In many cases, rural ITS needs are an extension of urban needs, and indeed the user is the same in both cases. For example, commercial vehicle operations, tourists, and regional emergency medical centers all require both urban and rural functionality.

2. There is no identified political analog to Metropolitan Planning Organizations (MPOs) that is responsible for planning and implementing ITS in rural areas. This is a serious impediment to creating a single seamless system and assembling scarce resources for ITS deployment. Rural stakeholders must identify how to assemble multi-jurisdictional constituencies that can function as rural MPOs.

3. There is a need to identify a rural ITS corridor as part of the national program so that obstacles to a seamless urban/rural system can be addressed. A number of such potential corridors can be identified - many with significant traffic and economic impact that link urban centers through sparsely populated wild areas.

4. Real time and accurate traveler information systems are as important, if not more so, to the rural traveler as they are to an urban commuter. While the emphasis may shift to roadway icing, severe storms, and service availability, rural use can be heavy and highly visible in corridors that see concentrations of recreational facilities and commercial traffic.

5. Integration of rural stakeholder perspectives into the architecture process is incomplete, Many key players in emergency management, the tourist industry, and local jurisdictions have an inadequate knowledge of how their operations can be affected and improved by application of ITS technology.

In summary, perhaps the most significant output from the workshop was that rural ITS needs are not really separate from urban ITS needs. More attention should be directed by the architecture team to visibly address required rural-urban interfaces. If this is to happen, it is critical that an effort be undertaken to show how deployment of ITS technology in rural areas has economic benefit and how such a deployment is closely integrated into a seamless national system.

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1. WORKSHOP DESCRIPTION

1.1 Objectives

The primary objective of the workshop was to assist the ITS architecture development process in the development of a single, seamless architecture that serves both urban and rural needs. For the purposes of this workshop, the input is from a rural user's perspective, but with consideration of urban scenarios and the need for a single system.

In order to accomplish this, the workshop was organized around three distinct subordinate objectives:

1. Achievement of a general understanding of the National Architecture and its relevance to rural transportation needs.

2. Development of perspectives from a broad subset of stakeholders to stimulate discussion and focus on rural ITS priorities and issues.

3. Development of a concise set of prioritized rural needs in a form that can be represented to the National Architecture Development Team for consideration.

1.2 Workshop Structure

The workshop was held over a 2-day period. Day 1 was devoted to familiarization with the National ITS Architecture effort and identification of issues through open panel discussion and a review of a prototypical rural corridor.

The second day was dedicated to smaller work sessions that focused on specific user service areas and prioritized rural needs and action plans. A summary of the results of these sessions are reported in Section 4 of this document. Additional detail of the work session discussions is contained in Appendix A.

The first day's orientation and overview drew on key speakers from the ITS National Architecture Development Program and rural issues identified in prior efforts.

Panel discussion on the first day enabled a sharing of perspectives from a diverse group of experts from academia, state transportation agencies, transportation consultants, and emergency service providers.

Preparation for facilitated work sessions concluded the first day. A prototypical rural corridor that extends from Idaho Falls, Idaho to Bozeman, Montana was examined for this purpose.

1.3 Demographics

Figure 1 is an approximate breakdown of the demographics of the participants into three major categories. These proportions appeared to present a good cross-section of transportation professionals. The mix provided for good discussion activity with the speakers and the panel. Academia includes many principals involved with Transportation Technology Centers including the University of Minnesota, the University of Utah, Utah State University, Montana State University, the University of Wyoming, and the University of Idaho. The Public Sector category included all the representatives from federal, state, and county transportation and emergency management organizations. Technology Suppliers is a term to describe those organizations representing technology development or products that are a part of the ITS. These included the Department of Energy national laboratory representation, private sector equipment and service vendors, and transportation consultants and contractors.

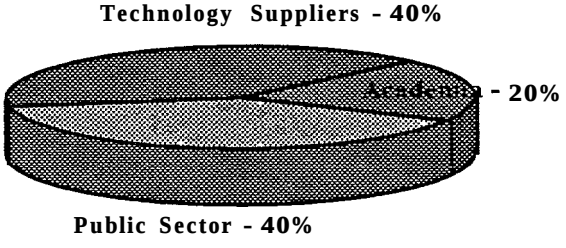


Figure 1: Workshop Demographics

2. SUMMARIES OF DAY 1 PRESENTATIONS AND DISCUSSIONS

Morning sessions provided a group of speakers selected to give an overview of the rural ITS and the National Architecture Development Programs.

Dennis Foderberg, Director of the ITS Institute, University of Minnesota and Chair of the Advanced Rural Transportation Subcommittee (ARTS) of ITS America, provided a message that the ITS user services need to be compatible and accessible to everyone in the country. Urban congestion is the problem focus in most programs, but the statistics on road usage, accidents, and future trends indicate that the needs of rural areas should be a priority. Rural users are a significant component of the ITS user base, and this forum **is** an opportunity to provide important stakeholder input into the process. The ITS user service bundles were reviewed with rural emphasis. Emergency Management Services are particularly important to the rural stakeholder since response times are longer and it is important to reach injured victims within the golden hour.

Ron Heft, Architecture Manager from the Jet Propulsion Laboratory, presented the ITS Architecture Development Program. The definition of the architecture **is** that it is a framework describing the major system elements and the relationships among them. ITS architecture will be developed at a national level and through consensus with technical and stakeholder communities. Architecture development is a public-private initiative funded by the Department of Transportation.

National compatibility will be promoted by the architecture for ITS services, acceleration of ITS markets, and ensuring that

public funds are wisely spent. The program is in phase 2 with effort to achieve a single open architecture by approximately August or September 1996. The program is in consensus building stage that includes efforts to define and integrate the rural environment. Most of the services in the ITS bundled services a relevant to the rural environment. Dr. Heft presented a hierarchy of architecture relationships in which the logical and physical aspects of the architecture are represented as time and location independent. The deployment phases would be time and location dependent. Loral and Rockwell were selected as the team for phase 2 development on an accelerated schedule.

Richard Barber, Project Manager for the Rockwell Team, presented a summary of the Loral Rockwell teams' technical work in the approach to development of an open architecture for ITS. He represented the members of the Loral and Rockwell development team.

Phase 1 analysis that resulted in the team selection was reviewed. He discussed the approach toward the development process in which the result would be an architecture framework providing for an open, flexible, modular, and expandable system. Several examples were presented such as Emergency Management. The issue of standards for interoperability, data exchange, and economies of scale was presented using roadside interfaces for a number of user services as an example. Communication technology and standards are significant factors in the architecture implementation. The availability of good wireless options for rural areas is of particular importance. The architecture will define the framework with local/regional agencies providing the design. It will build on existing infrastructure and define the interfaces and required standards. Mr. Barber also presented his rural issues for discussion relevant to the architecture. These issues included what standards were most important to rural scenarios, characterization of rural communications infrastructure, and consideration for emergency management response.

Moe Zarean, Principal Investigator for JHK & Associates, presented a study that addressed the rural issues associated with a specific user service - the traveler information system. This study was a 30-month effort funded by the Federal Highway Administration to determine the user needs and technology available for rural traveler information systems. The study indicated that safety-related information was of prime importance. Survey questions asked respondents to consider the information needed for three phases of a trip: pretrip planning; route with no problem, and enroute with a problem. The most important priority for information needs was enroute with safety problems. These needs included the ability to mayday or call for help, alerting to approaching hazards, and waking a drowsy driver. Technology for implementation was investigated with conclusions that the basic ATIS functions can be supported; however, communications in rural areas will be a challenge.

Russell Steele, TRW Inc., discussed the results of an ARTS task force subcommittee effort to review the national architecture proposals and define some concerns from a rural perspective. This review was presented at the recent ARTS committee meeting in March. Issues presented were the following: communications coverage and standards, maintenance/operations and bullet proofing of rural ITS hardware, jurisdictional resolution processes for architectural conflicts, maximum use of existing infrastructure to include common gateways for legacy systems and use of sensor vehicles for assessment of road conditions, and integration of the rural architecture with other initiatives.

Panel Discussion - A panel of transportation and emergency management professionals was assembled to respond to a challenge question and to participant's issues.

The question was how their roles and priorities lay with the goal of seamless access to ITS user services for rural stakeholders.

Represented on the panel were Dr. Moe Zarean, Principal Investigator, JHK Associates; Dr. Sarath Joshua, Arizona DOT ITS R&D Program Manager; Dr. Chris Hill, CEO, Castle Rock Consultants; Tony Busom, Oregon Emergency Management Services - Enhanced 911 Program; Bill Lawrence, Utah DOT, Urban Planning /ITS Programs; Dan Landon, Executive Director, Transportation Board, Nevada County, California; Tom Griffith, Assistant Director, Clark County, Washington, Emergency Services; Ray Mickelson, Planning Administrator, Idaho Transportation Department; and Dr. Joe Armijo, Professor, Montana State University and member of the Rockwell Architecture Team. The panel was introduced by Dennis Foderberg and moderated by Dr. Donna Nelson, ITS America.

Each panel member brought a different perspective to the challenge question and the subsequent question and answer period. Dr. Zarean emphasized that rural needs are different from urban and education of local agencies is needed to quantify the benefits of ITS to get their support.

Dr. Joshua stated that it is important to ensure compatible communications between local and regional ITS systems. Thus, efforts to develop standards and open systems are crucial. He feels that regional cooperation is needed to get ITS deployment in rural areas. This would provide the incentive for public-private partnerships to support deployment.

Dr. Hill had six challenges for rural ITS implementation. It is important to determine the stakeholders, increase the awareness of the benefits of ITS, address the diversity of the needs of stakeholders, identify common elements of these needs, provide for a common system, and identify funding options.

Tony Busom related his concerns with ITS and emerging technology, particularly emergency management services in rural settings. Wireless technology has provided a means to increase access to 911 services. Position and Location information in an efficient data format is essential for appropriate service response. Information to define the nature of the problem and required response is needed. An automated mayday call into a 911 service without this kind of information will not be acceptable.

The Utah DOT is studying ITS user needs and has expectations of plug and play compatibility for mayday technology. Rural priorities are in traveler information and hazard/weather notification. Standards for Commercial Vehicle Operations transponders and sensors for determining road conditions are also Utah ITS interests.

Dan Landon agreed that the ITS architecture needs to be modular and build on existing infrastructure to maintain investment. He stated that federal support is needed for rural planning through regional agencies similar to the metropolitan planning organizations.

Tom Griffith stated that rural emergency service providers are resource limited and depend on volunteers or a few paid professionals that do not have the training or special equipment for the emerging technology

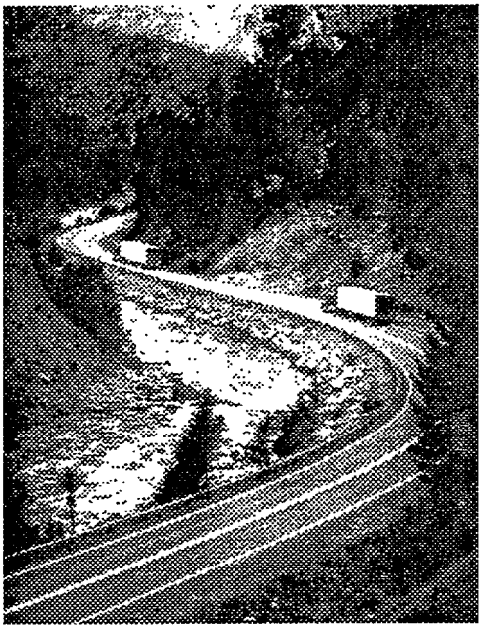
Ray Mickelson Idaho Transportation Department, saw his role as coordinator for the multijurisdictional planning for ITS. This planning needs to include the architecture and the forward thinking required to accommodate ITS services. In Idaho, regional planning and cooperation in consortiums is also being undertaken as a part of ITS deployment.

Dr. Joe Armijo described the effort to get a two-lane, rural corridor designated for ITS. He expressed the need for those involved in rural ITS to stay proactive and involved to **make** the rural needs visible.

A number of questions were posed to the panel from the participants. There was discussion on the use of public-private partnerships to provide the critical mass needed for funding deployment. Missouri, Nevada City, and California had examples of public-private partnership successes, A concern of the private sector is how to make profit in an open architecture. Funding options were also discussed with several examples of the user service fees including percentages of revenue designated to the local rural provider for support of infrastructure in these areas. The issue of automated response was raised. There was agreement that additional in-vehicle sensors and logic to identify the nature of an emergency response problem would be required. Richard Barber indicated that this would be a subject for discussion with Dr. Christine Johnson, Director, Joint ITS Program Office as a policy issue. The focus of ITS as service versus user oriented was discussed. The ITS Program Plan was crafted by transportation professionals, and future revisions should reflect the user-stakeholder input. Dr. Donna Nelson, ITS America, agreed and invited the participants to be active in the process.

Rural Corridor - As preparation for the work sessions, an overview of a rural corridor was provided. The purpose of this was to lend substance to the definition of the rural environment and to stimulate thinking of how this environment would affect implementation of services.

Through slides and detailed maps distributed to each participant, Basil Bama provided a **virtual** tour of the scenic 200-mile stretch of U.S. Highways 20 and 191 between Idaho Falls, Idaho and Bozeman, Montana. This rural corridor **is** a major economic and recreational link between the three states of Idaho, Montana, and Wyoming. Dominated by the Greater Yellowstone Ecosystem, the corridor traverses a treasure of National resources that demand wise public access without detracting from the unique and wild character of the region.



Population is sparse throughout the corridor. Idaho Falls and Bozeman are the largest cities along the route with populations of 43,929 and 22,660, respectively (1990 census). Between these two endpoints, there are long stretches of roadway with no services and only four significant population centers. Rexburg, Idaho is the only one of these with a population greater than 5,000.

In spite of the low population density, the corridor is heavily used by farmers, commercial vehicles, tourists, and local residents. As the only access to Yellowstone National Park's west entrance and as numerous recreational facilities in the Targhee and Gallatin National Forests, there are few, if any, alternative routes for the typical traveler.

To put this in perspective, only one stop light is encountered along the corridor before reaching the outskirts of Bozeman some 192 miles away. Along this route two National Parks, several major ski areas, and hundreds of campgrounds, resorts, and trail heads are passed.

3. WORK SESSIONS

3.1 Structure

Facilitated work sessions were conducted on the second day of the workshop. Each session targeted one or more of the user service bundles (see Appendix B).

The purpose of the work sessions was to examine ITS user services with respect to rural implementation. Specifically, the issues and barriers pertaining to deployment were discussed as well as recommendations for the architecture development team and ITS planners.

As a way to provide focus and stimulus for these breakout sessions, each participant was provided on the first day with a package of detailed information on the corridor linking Idaho Falls, Idaho and Bozeman, Montana. While the focus on this corridor is meant as a starting point, workshop participants were encouraged to introduce concepts and problems from other rural areas and corridors they are familiar with.

During the second day's work sessions, each team was assigned a facilitator and technical resource person to stimulate and focus discussion.

3.2 Summary Results

Recurring themes were evident from the work sessions and are summarized below:

1. More outreach is needed to educate rural stakeholders and to generate a grass roots constituency for ITS in rural communities. This outreach must clearly define the benefits of rural participation in the nation's ITS program.

2. Standards are needed to facilitate the development of rural ITS. The need ranges from common language used on variable message signs to the development of equipment module interfaces. Perhaps the most difficult "standards" are jurisdictional conflict resolution methods. A means of resolving conflict between stakeholder interests must be found.

3. Coordination and planning is a major hurdle for rural ITS. The creation and development of rural planning agencies will help. These agencies would coordinate outreach, resolve local stakeholder issues, and promote rural ITS funding at the state and national level.

4. Every workshop subgroup identified funding as an important implementation issue. Rural communities have limited resources and many rely on volunteers to perform public safety functions. The operation and maintenance of a rural ITS may be a problem. While federal funding is available for installation, states and communities must fund operation and maintenance. Benefits must be clearly demonstrated to the rural stakeholders. Without this support, additional taxation for ITS technologies, at the national, state, or local level, will not be forthcoming. Nor will stakeholders buy in vehicle systems without clearly demonstrated benefits.

5. While mayday was highlighted as a prime service for rural applications, much work must be done to ensure that the system will work in rural communities. The

interface between E-91 1 response in rural communities is often volunteer and resource limited. To institute automated mayday will require closer cooperation between the ITS and E-91 1 stakeholder communities.

4. RECOMMENDATIONS AND ACTION ITEMS

While each work session developed its own priorities and recommendations, the overall action items distilled from the notes and recordings of the sessions are as follows:

1. Report the results to the National Architecture Workshop in Denver, August 10-11, 1995.

2. Encourage development of a rural ITS corridor project that could create a concrete example of how rural and urban ITS can be integrated.

3. Form an ARTS subcommittee to draft a charter for a proposed rural planning agency and submit to ITS America and DOT.

4. Request the Outreach Committee to include specific goals for rural outreach with focus on regional transportation groups and agencies. Extend ITS outreach to organizations attended by county administrators, and request that state chapters seek out and include rural political constituents in their activities.

5. Request that the ARTS Committee draft a rural ITS benefits pamphlet or brochure that can be distributed at non-ITS functions.

RURAL-ITS DISCUSSION LIST

As a part of outreach for rural stakeholders, an Internet discussion list for rural ITS issues was created and is operational. Please refer to Appendix C for details on access and operation.

Appendix A

Detailed Comments from Work Sessions on June 16, 1995

A.1 Travel and Transportation Management and Traffic Demand Management (Two Sessions)

A.l.l Key Points and Issues

All of the bundled services apply to rural use. There are, however, significant differences in the needed level of service in rural areas. Services need to be expressed in terms of rural use, and the architecture should be expressed in terms of the rural environment in addition to urban applications.

- Information standards that allow people to translate from local to global need to be put in place. These standards should address flow of key information. Examples of where standards are needed are in presentation of information (e.g., ATM-type user interface) and the storage, prioritization, and currency/reliability of this information.

- Standards for radio, satellite, cellular, and human language communications are needed.

- Also needed are international compatibility standards (focus on border crossing needs).

- "People" standards for public/private partnerships and jurisdictional standards for providing information and services will need to be addressed.

- Rural areas will need to implement only portions of a particular service. Therefore, the services will need to be modular and low cost. As long as the design can be deployed in stages, the actual implementation should not be an issue.

- Barriers include lack of infrastructure. Examples of infrastructure that is lacking are communications and electrical power. Systems will likely be in remote areas without readily available access for repairs. A high mean time between failure and low mean time to complete repairs is essential.

- Most barriers are institutional barriers such as jurisdiction, legislation, funding, issues of privacy, and legality.

- The architecture must be built so that it can support implementation of systems that provide a return on investment to service providers.

- Fear of the unknown and change are prevalent. The stakeholders need to be brought to the table early.

- Standards development must be coordinated and consistent. There is a potential for many organizations to develop standards.

- Information sources, not just sensors, must be identified. The system must use information from many sources, and those sources must be coordinated.

- Funding strategies are an issue. The approach for funding rural implementation of ITS should be evaluated by identifying the end user population. In many cases, people traveling rural areas are not rural residents, but urban-to-urban commuters. Perhaps the funding source is the urban customer who uses the rural roads into the city.

- The need for weather information is different in rural areas compared to urban settings. Demands on timeliness and accuracy may be very different.

- It is important that ways to protect individual privacy be identified and available.

A.1.2 Actions Recommended

- Increase outreach of ITS education to rural areas. In particular, organizations that will have to provide and fund services should be more involved in the early stages.

- Work to build a core political infrastructure in key rural areas to be advisory bodies providing guidance for the ITS architecture development.

- Develop rural pilot program(s) that will implement the ITS architecture in rural settings to address technical concerns and demonstrate feasibility.

A.2 Vehicle Safety Control Systems

A.2.1 Key Points and Issues

- All of the bundled services for Vehicle Safety Control Systems can be applied to the rural environment. The real concern is that the importance of these benefits is not clear for potential stakeholders. These stakeholders were defined as individuals affected by the results of ITS or those persons that can impact the results. Under this definition, it was agreed that consensus was paramount for rural ITS implementation. The Workgroup felt that outreach and education would help simplify this process. Stakeholders need to understand the true benefits and why priorities may change from potholes in the road to information technology.

- A primary goal of rural ITS is to promote driver safety. To accomplish this, the rural traveler must have accurate and timely information. It was recognized that timely and accurate information does not have to be done through HIGH Technology solutions. ITS application can offer a spectrum of services that fall into the LOW technology area (such as an AM Radio), or a NO technology solutions (signage). As these less expensive methods are used, stakeholder acceptance is broadened. In addition, a key item missing for increasing ITS acceptance is the lack of grass roots support organizations to pull ITS technology into the rural use.

- The work group acknowledged that many states currently have existing sensors that collect a variety of road/site information (such as weather). A simple implementation could be to incorporate existing sensor information for rural ITS. Although simple, there is not a mechanism (or funding) in place for the collection and distribution of existing transportation data that has benefit to the public.

- Existing Policy Barriers: To help facilitate ITS, it was felt that a need existed for incorporation of the Manual of Uniform Traffic Control Devices (MUTCD) and the American Association of

State Highway Transportation Officials (AASHTO) stakeholders into the process. Members were needed up front to generate compliance and ownership. ITS needs to be incorporated into existing processes and not be a user service that is displayed as an afterthought.

- Institutional Barriers: The work group recognized several institutional barriers that need to be addressed. These include driver/state liability issues, funding, and regulatory issues from the EPA, related to increased traffic and emissions.

A.2.2 Actions Recommended

- Establish a rural corridor so that stakeholders can identify with ITS and see results. This will allow development of a successful strategy for rural ITS. In addition, this would provide a testbed for technologies for future implementation.

- Get started on low technologies (or no tech solutions), that are low cost and show ITS rural use.

- Establish a standard language and communication terminology/protocol.

- Establish standard testing of communication protocols to evaluate interoperability between systems.

- Incorporate new ITS requirements into existing standards. Some areas of concern were: vision enhancement (for seeing around comers, night, etc.), symbols for the rural use, and road marking standards compatible with standards for automated systems.

- Create an organization to perform the same functions as an MPO for the rural stakeholders. Therefore, development of Rural Planning Organization (RPO) to address rural concerns would be beneficial to success. This organization would function in the same capacity as an MPO, but would address the much larger issues that may cross state boundaries.

A.3 Commercial Vehicle Operations, Electronic Payment, Public Transportation Operations

A.3.1 Key Points and Issues

- From the presentations given during the first day of the workshop, it appeared that the architecture teams should devote more time to understanding commercial vehicle operations.

- There is a concern among commercial vehicle operators that ITS will lead to the implementation of a national weight distance tax. These fears need to be addressed if ITS is to be embraced by commercial vehicle operators. This implies two things: (a) there is a greater need for outreach to commercial vehicle operations, (b) there is a privacy issue involved with implementing ITS. These issues can be considered barriers to the success of ITS in commercial vehicle operations.

- Public transportation is a rural issue. Statistics show that a large fraction of expenses for rural citizens goes to private transportation. Therefore, lack of public transportation affects the quality of life for rural citizens.

- The bundling of user services presents an unnecessary and artificial barrier. This barrier has a negative affect on discussing implementation of ITS.

- A principal barrier identified was the lack of coordination and communication between various agencies. This is partly a result of the large number of jurisdictional boundaries crossed and the fact that the population is widely dispersed.

- Lack of a significant tax base was also identified as a problem. This is most acute when discussing public transportation. Along this line, there is a general lack of understanding by the public sector of the profit motive importance to the private sector.

- A perceived barrier is that there is no "super agency" to champion ITS in rural areas.

- Multiple rural corridors for ITS demonstration projects would allow the different characteristics of various rural areas to be incorporated into ITS solutions for rural use.

A.3.2 Actions Recommended

- In general, place more emphasis on outreach. Include commercial vehicle operators in the dialogue. There are multiple partners in public transportation; therefore, educate communities. For example, bring bankers and chambers of commerce into the outreach process.

- Remove barriers between the bundled services.

- Determine the costs and benefits of ITS and communicate them to the public.

A.4 Emergency Management Services

A.4.1 Key Points and Issues

- Safety is the highest priority.

- Wireless communications are not consistently available in rural areas. Communications modes and frequencies for ITS need to be selected and acquired to minimize problems with rural access to ITS services.[a]

- There are many stakeholder groups with standards relevant to seamless access to the architecture. Communication standards for links with other modes (air, rail, water) are essential for the architecture. In rural areas, this is important due to response times required to handle incidents or life-threatening accidents.

- Information exchange standards and data access between user services is essential.

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a. This sentence was added from comments provided by the INEL representative to the ITS Spectrum committee.

- Services like automated mayday MUST have enough information transmitted from sensors to allow authentication and to determine the nature of the incident or accident. Manual trouble call buttons will not be responded to through the "9 11" system. Messaging standards and response/notification need to be coordinated through the ITS architecture.

- Another user service bundle, infrastructure detection, may be appropriate that would include sensors and information exchange with ITS. This would assist rural emergency management response and accident prevention by alerting users of roadway/bridge conditions, inclement weather, and incidents.

- Has enough outreach been done? Some key stakeholders and contributors for the emergency management system are in organizations with weak ties to ITS: the Federal Railway Agency, Federal Aviation Agency, Barge operators, U.S. Coast Guard, Federal Communications Commission, federal intelligence and law enforcement (FBI/DEA/CIA), Federal Emergency Management Agency, Association of Public Safety Communications Officers, National Emergency Number Association, insurance, and others. Funding of outreach efforts is needed to include these groups as well as the public.

- The institutional and jurisdictional issues with respect to rural emergency management services are amplified because of geographic size, diversity, and response resources. How these services are funded and the response and coordination of agencies varies.

- Related user services to emergency management are hazardous material management, automated roadside safety, incident management, and traveler information.

- The data quality of the geographical information system (GIS) for location and response to calls needs standards and graphical interfaces for users. The lack of good data is considered a barrier to the implementation of these services in rural areas, particularly in those with geographic and jurisdictional diversity.

- A perceived barrier is the acceptance of technology by the service provider such as removal of the voice call for an automated system. The fear of false positives, consequences of errors, and the burden on response agencies are a part of the issue.

Appendix B
User Service Bundles

Transportation and Transportation Management

- **En-Route Driver Information**
- **Route Guidance**
- **Traveler Services Information]**
- **Traffic Control**
- **Incident Management**
- **Emissions Testing and Mitigation**

Travel Demand Management

- **Demand Management and Operations**
- **Pre-Trip Travel Information**
- **Ride Matching and Reservation**

Public Transportation

- **Public Transportation Management**
- **En-Route Transit Information**
- **Personalized Public Transit**
- **Public Travel Security**

Electronic Payment

- **Electronic Payment Services**

Commercial Vehicle Operations

- **Commercial Vehicle Electronic Clearance**
- **Automated Roadside Safety Inspection**
- **On-Board Safety Monitoring**
- **Commercial Vehicle Administrative Processes**
- **Hazardous Materials Incident Response**
- **Freight Mobility**

Appendix B
User Service Bundles (Continued)

Emergency Management

- **Emergency Notification and Personal Security**
- **Emergency Vehicle Management**

Advanced Vehicle Control and Safety Systems

- **Longitudinal Collision Avoidance**
- **Lateral Collision Avoidance**
- **Intersection Collision Avoidance**
- **Vision Enhancement for Crash Avoidance**
- **Safety Readiness**
- **Pre-Crash Restraint Deployment**
- **Automated Highway System**

Appendix C

Rural-ITS: An Internet Discussion List

Introduction

It was recognized during the workshop that the rural constituency is a large but diffuse group without a clear voice in the ITS process. Therefore, an Internet discussion list has been formed. The name chosen for this list is Rural-ITS. Rural-ITS has the objective of providing a consensus building mechanism and enhancing outreach to rural stakeholders.

Given below is a vision statement for the list. Instructions for subscribing to the list are also provided. The list operates via E-mail and is a free service made available by the Idaho National Engineering Laboratory. This E-mail list provides an open forum for discussion of concepts and ideas among people with diverse backgrounds and perspectives.

Vision for RURAL-ITS Discussion List

The Rural-ITS discussion list is intended to establish a forum for discussion of ITS as it applies to rural settings. This forum will bring together rural stakeholders and ITS professionals to discuss all aspects of ITS in rural areas. Stakeholders are any individuals interested in the development of ITS as it applies to rural situations. These stakeholders include entities such as commercial vehicle operators, emergency management professionals, and state police. The overall intent of this list is to educate those unfamiliar with ITS and give stakeholders a place to express concerns. Discussions among transportation professionals on the use of ITS technologies are also desirable.

This list will be monitored by those developing the ITS architecture and parties wishing to carry out ITS in rural environments. The content of the discussions will serve **to** influence the direction of ITS as applied in rural settings. These discussions will also help to produce a seamless ITS system from the urban to the rural environment.

How to Subscribe

Subscribing to the list consists of sending an E-mail message. This message should be addressed to MAJORDOMO@SIXMILE.INEL.GOV with the subject field left blank. In the body of the message enter the following: *subscribe rural_its your* E-mail *address*
Once your message has been received, the listserver will add your E-mail address to the list and send a confirmation notice to you. The confirmation notice contains important information and should be saved. If you encounter any problems, the list administrator is Randy Allemeier. He can be reached at rta@inel.gov or (208)526-7895.