Advanced Rural Transportation System (ARTS) – A Review

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***Abstract*—This Program Plan for the Advanced Rural Transportation Systems (ARTS) implements the goals and objectives established in the U.S. Department of Transportation's (USDOT's) Strategic Plan for the ARTS. This Program Plan proposes five years (FY 97- 01) of USDOT projects and activities to advance the ARTS in partnership with other national, state and local public agencies, and the private sector. The Program Plan receives overall, "strategic" approval within USDOT, and recommends projects that will receive specific approval by incorporation into annual USDOT budgets. The projects and activities so approved are not for direct deployment of the ARTS. Deployment will be by state and local public agencies and the private sector, with federal guidance and according to the National ITS Architecture. Deployment will be funded by existing federal-aid transportation programs, and other public or private funding.**

Index Terms—Advanced rural transportation systems, private sector, public agencies, U.S. Department of Transportation's.

I. Introduction

Intelligent Transportation Systems (ITS) encompass a range of advanced technologies that are applied to surface transportation needs including transit and highway needs. The concept of ITS was introduced in the 1960s when urban areas attempted to deal with increasing traffic congestion.

Two federally supported agencies that work closely together are responsible for oversight of ITS activities in the United States. In 1991, Congress established a public-private organization called the Intelligent Transportation Society of America (ITS America) to coordinate the development and deployment of ITS in the United States among state and local government, and transportation related consumers, industry, owners, operators, and suppliers.

The U.S. Department of Transportation (USDOT) established the Joint Program Office (JPO) in 1994 to manage the USDOT ITS program. JPO objectives include showcasing the benefits of ITS, creating funding incentives to integrate ITS projects, creating technical standards, and advancing research and professional knowledge in ITS.

Intelligent Transportation Systems (ITS) applies advanced communication, information and electronics technology to solve existing transportation problems. Collectively, a broad range of diverse technologies are known as ITS. In its simplest form, ITS is data and information sharing.

II. Goals and Objectives

Goal-1: Improve the safety and security of the region's rural transportation system.

Objectives:

- Provide sustainable traveler information systems that collect and disseminate credible, accurate "real-time" information.
- Provide systems that advise transportation system users of slow-moving vehicles, obstructions, construction, road, weather and speed conditions, services, and the ability to request assistance.
- Coordinate public fleet responses to unsafe conditions (weather, incidents, detour routes).
- Reduce the severity of vehicle collisions and their related fatality rates through improved notification and response times.
- Enhance traveler security through motorist aid devices.
- Provide improved methods for commercial vehicle monitoring and hazardous material identification.

Goal-2: Enhance personal mobility and accessibility to services and enhance convenience and comfort of the system user Northern California and Southern Oregon.

Objectives:

- Increase awareness of public transportation alternatives.
- Encourage and provide incentives for transportation alternatives.
- Expand information availability for tourist areas and services.
- Facilitate transportation options to public lands and other attractions.
- Provide parking information to reduce congestion and aid traveler convenience.

Goal-3: Increase operational efficiency and productivity of system providers.

Objectives:

- Collect, process and share data between local, state, and federal agencies to increase efficiency and resource utilization.
- Provide automated forecasting and notification of conditions that may impact operations and maintenance of regional roadways to improve resource management and allocation.

- Provide means to better manage both private and publicly owned equipment fleets.
- Improve communication system capabilities to provide for increased coordination of services (i.e. radio, wire-line/wireless).

Goal-4: Enhance economic productivity of individuals, businesses and organizations.

Objectives:

- Develop projects that address local needs and provide for national "showcase".
- Provide information about local and regional goods, services, and opportunities.
- Provide mechanism by which tourism industry, transportation and transit services can work more closely together.
- Providing business applications support.
- Promote more efficient movement of commercial vehicles and goods.

Goal-5: Reduce energy consumption and negative environmental impacts.

Objectives:

- Improve response to hazardous material incidents.
- Promote and encourage the use of alternative fuels and transportation options.

Goal-6: Develop and foster long-term partnerships that will result in the demonstration of ITS initiatives and traditional solutions that address rural needs of the region.

Objectives:

- Inform public and private sector decision-makers on initiatives for the Rural COATS Project and gain support for ITS efforts from key stakeholders.
- Facilitate technical and financial groups for the promotion of partnership opportunities.
- Develop opportunities for public-private partnerships.

Goal-7: Ensure compatibility with statewide and national ITS initiatives.

Objectives:

- Coordinate Rural COATS with statewide efforts.
- Provide for technology transfer between state agencies.

Goal-8: Incorporate ITS into the transportation planning and programming process.

Objectives:

- Incorporate advanced technology applications into the transportation planning and programming process.

III. User Services

1) Portable Traffic Management:

The alleviation of traffic congestion, the improvement of safety and the minimization of environmental impact by means of traffic surveillance and control that is flexibly and speedily deployable, for highway and traffic conditions that are accidental, sporadic or seasonal

2) Road Maintenance and Management:

The efficient maintenance and rapid repair of roads, including isolated and low-volume routes, for safe and structurally sound operating condition, especially under conditions of severe weather.

3) Seasonal Harvesting: The coordination and management of intermodal transportation resources and agricultural production for timely and efficient harvesting of agricultural products.

4) Economic Development/Business Viability:

The improvement of transportation efficiency, the reduction of adverse transportation impacts, and the dissemination of information that sustains the viability and desirability of economic production and facility location.

5) Economic Development/Tourism:

The improvement of transportation efficiency, the reduction of adverse transportation impacts, and the dissemination of information that promotes compatible enjoyment of parks other tourist sites, and services to tourists.

4) ITS Planning and Marketing Data:

The collection and processing of information derived from the operation and evaluation of ITS, for purposes of adapting any component of the ITS architecture and promoting deployment of effective ITS solutions to transportation problems.

IV. Challenges

With an ever-increasing number of challenging issues that rural commuters face, reliable and safe transportation is near the top of the list. Eco lane works with rural agencies and repeatedly encounter the pain points which drive their decision making. In our experience, 5 challenges seem to rise above the rest.

1) Sparsely Populated Areas:

This often translates to fewer customers and longer routes. Sparsely populated areas can negatively impact a rural transit's bottom line due to sheer cost in providing this kind of service. Limited numbers of riders may tend to hinder transit services growth.

2) Long Distance Trips:

Customers tend to be widely spread out in rural areas. Large areas directly affect response time and impact operational

costs. Vehicle maintenance, fuel and staffing in rural agencies are notoriously more difficult issues to address.

3) Limited Funding:

Although both urban and rural agencies work on tight budgets, the latter tend to feel them more and their managers are forced to be creative with their operational budgets. Planning agency spending around increasing efficiency and staff productivity is key.

4) The "Aging in Place" Effect:

Since more seniors than ever before are choosing to "age in place", increases in on-call and appointment-based transportation needs have skyrocketed in the past decade. For rural areas and the transit organizations that service them, this increase raises scheduling havoc and more quickly depletes resources. Adjusting and analyzing routes, demographics and areas of increased need help agencies tackle these issues created, in part, by the silver tsunami.

5) Dependent Populations:

In areas where taxis, trains and other modes of transportation aren't available for residents, rural transit is often the only source of getting around. High demand for customized routes and erratic scheduling as well as expectations of efficiency and effectiveness tend to strain rural transit resources.

V. Conclusion

Most efforts in ITS have focused on urbanized metropolitan areas. In 1991, Caltrans inquired into rural concerns dealing with advanced transportation technologies. At that time, it became apparent that those dealing with ITS and other advanced transportation technologies felt that rural areas were not a significant concern and that technologies and systems developed for large city areas could be easily adapted to a rural setting. Fortunately, the needs and priorities of rural customers were recognized and the rural ITS effort began.

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