TASK V

AUSTIN ITS

STRATEGIC DEPLOYMENT PLAN

Table of Contents

List of Figures

List of Tables

This page intentionally left blank.

IMPEDIMENTS TO SUCCESS

An ITS strategic deployment plan involves much more than a simple list of projects and date to execute them. A specific project and a date to deploy it are the easiest features of a strategic deployment plan. Much research has been done to identify and resolve technical constraints to deployment. The major constraint to ITS deployment are institutional barriers. Overcoming institutional constraints must be a part of any ITS strategic deployment plan.

The institutional constraints in the Austin area are related to the fragmentation of responsibility. The Austin area must integrate the transportation goals of the local state DOT, city public works, transit agency, public safety agencies, private enterprise, and public expectation. This integration must constantly take place at many levels for Austin to realize the promise of ITS. ITS deployment must move from a discrete transportation improvement to an integrated part of any transportation improvement. The "I" in ITS stands for "intelligent" not "independent". Specific impediments in the Austin area include lack of integrated improvement projects, lack of personnel expertise, lack of common standards, lack of evaluation data, and lack of public knowledge.

Integrated Projects

A recent review of proposed projects reveals just how disjointed ITS deployment is in the Austin area. TxDOT proposes freeway traffic management systems (FTMS) designed to manage freeway traffic with little or no consideration for the parallel frontage roads or intersecting arterial. Unless origination and destination lie immediately off the freeway local users will see little overall benefit to the millions invested in the system. Public safety agencies generally originate off the freeway system and considerable response time is spent on arterial. Transit agencies exhibit similar characteristics. Fragmented FTMS will mostly benefit travelers passing through the city and will have little local cost benefit ratio. Signals timed without consideration given to the size of the platoon being released to a freeway entrance ramp is another example of an unintegrated transportation system. A public transportation system that only provides transit information will not attract travelers if it does not provide the same level of information about other modes of transportation for comparison. Although these example projects may be promoted under the guise of ITS, in reality, the lack of integration results in little local community benefit.

Improvement projects, especially ITS projects, should receive an integrated, multi-agency review, regardless of agency responsibility, prior to deployment. The problems encountered when traveling from point A to point B in Austin are integrated between freeway, arterial, and mode of transportation. A solution must be equally integrated. Recently, TxDOT began including a duct bank for FTMS communications in freeway reconstruction plans. This needs to be taken a step further to include communication needs for city signalized intersection control and transit

communication needs. Likewise, city signal communication trunks along arterial also should consider accommodating transit communication needs.

Personnel Expertise

Now that the need for multi-agency review has arisen, these agencies must find competent staff to identify and review technical areas pertaining to their respective agency. Technical areas that transportation agencies often lack expertise in are telecommunications, computer electronics, and video systems. These areas must be understood if agencies are to integrate services. Personnel familiar with these technical areas are needed during design, operation, and maintenance of projects deployed. Although the private sector can provide assistance in these areas, agencies must obtain some expertise in order to seek out appropriate assistance.

In the current era of downsizing and "doing more with less", obtaining a staff of expertise for each agency is unlikely. While an agency can train a few individuals, the burden of integrated ITS, is likely too great to be borne by a single agency. Local agencies in Austin, public and private, must rely on one another, in some integrated form or fashion, to design, operate, and maintain ITS. Partnership arrangements must be made allowing expertise to flow seamlessly from one agency to another. Partnerships could also be formed to hire expertise from outside to service all agencies.

Finally, agency personnel should have access to a multitude of information. The more

information personnel have access to, the better the chances of making "intelligent" decisions. The Internet provides agency personnel with information from around the world. More importantly, the Internet provides for the "exchange" of information.

Common Standards

Lack of common standards will also prevent successful ITS deployment. This can be most easily seen in Austin's signal control systems. During TxDOT roadway reconstruction inside the city limits, TxDOT will assume liability of signal operation utilizing NEMA controllers within the limits of reconstruction. Outside these limits the City of Austin will retain liability of signal operation utilizing Type 170 controllers. A once seamless coordinated signal system has now been dissected into three distinct systems. It isn't so much that one agency uses NEMA and the other uses Type 170, rather, it is the lack of a common communication standard between the NEMA and Type 170. If an operator only had to know what information to give a controller and did not have to know how to give it, a single agency might be more likely to retain signal control along a route during construction.

The National Transportation Communications/ITS Protocol (NTCIP) has recently been formulated to address the problem described above. NTCIP is a standard communications protocol. NTCIP will define how traffic management systems will communicate with each other and field devices such as signal controllers.

NTCIP is immediately aimed at traffic management systems and selected field devices such as signal controllers, variable message signs (VMS), and highway advisory radio (HAR). Automatic vehicle location/identification (AVL/AVI) systems are not yet addressed. AVL receives information from global positioning satellites (GPS) orbiting the earth to determine precise location. The communication protocol from GPS to receiver is a standard developed by the military. The communications protocol from GPS receiver to the management center is currently proprietary to each vendor. Without a communications standard, GPS receivers on a transit bus can not be understood by an emergency services center.

Additionally, NTCIP will not define how a traffic management system communicates with a transit or emergency services management system. To integrate these systems a standard communications protocol will have to be defined. The National ITS Architecture Project, sponsored by the U.S. DOT, will come close to, but will not define protocols. An architecture describes the system operation, what each component of the system does, and what information is exchanged. The architecture does not define standards or protocols, but rather, identifies where they are needed.

Common standards are not just needed between management systems. Installation standards for field devices will also facilitate seamless integration. Inductive loops, for instance, are installed by both TxDOT and the City. The way inductive loops need to be installed for an actuated signal are different from adaptive or even responsive signal control. To facilitate a smooth transition to integration, commonly installed field devices should conform to a standard. This would facilitate

multi-agency, as well as, contracted design operations, and maintenance.

Evaluation Data

ITS will not be successful if public expectations are not met. Every ITS project deployed should have provisions for evaluation. Sometimes public expectation demands quantified results. Not only should standard measures of effectiveness be employed, but how the information is stored and presented should be integrated among agencies.

Information or data management systems should also be standardized. For example, consider traffic accident databases. This information is important to all agencies, including DOT, public works, transit, and emergency services. None, neither collect nor store, accident data the same way. The TxDOT and the City almost never produce an identical accident analysis. Geographic information systems (GIS) also lack standardization among local agencies. GIS uses large databases to display information graphically onto geographic maps. If the transit agency's GIS system, indicating demand, can not be integrated with the GIS system used by emergency services, indicating crime, it will be difficult to gauge the safety of proposed routes. To evaluate and measure the effectiveness of ITS these information systems must be integrated.

Public Knowledge

The degree of effectiveness of ITS deployment may well hinge on how much of it the public is able to understand. Deployment of ITS will almost always necessitate some degree of public education. ITS involves complex technical and institutional issues. The media can be a powerful and effective tool in educating the public about ITS deployment projects. Project deployment could be more effective if integrated with media coverage.

DEPLOYMENT PREREQUISITES

Integrated ITS will involve the active participation of multiple agencies. These agencies must have a clear understanding of their role in each project. This role may change from project to project as experience dictates. Careful and well documented project planning will increase chances of successful deployment. A project proposal should include detailed descriptions communicating the role of involved agencies. Prior to deployment, a project proposal should be circulated among Austin agencies for input and comments. As a minimum, the proposal should include a technical plan, financial plan, operation plan, and an evaluation plan. These plans can also be used to educate the public about a specific ITS project.

Technical Plan

A technical plan describes how the project is intended to work and why it is necessary. The plan should describe the functions and capabilities achieved with project deployment. How the project

is integrated or will provide integration of multiple systems or services is important. Part of this integration will usually include how it is compatible with the existing infrastructure. In addition to describing the technical theory of design, the plan should also describe any partnership arrangements. Multi-agency and public/private partnerships are encouraged. The plan should clearly describe responsibilities, authority, and communication among partners.

Financial Plan

A financial plan will illustrate how the project will be funded. Funding of the design, construction, operations, and maintenance of the project should be clearly identified. Funding responsibilities of each partner should also be clearly identified. Innovative financing is encouraged. This plan should describe how the project is integrated into the existing local planning process.

Operation Plan

An operation plan describes how the project will function from day to day. The operation plan should also include a management and staffing plan. This plan would describe roles of existing personnel and an approach for obtaining and training new personnel. Personnel provided by partner agencies should be clearly identified. The operation plan should also describe how equipment involved in the project will be upgraded and maintained. It is desirable to include

participation by the private sector in the operation plan. The financial plan is an integral part of the operation plan. One will not be successful without the other.

Evaluation Plan

The evaluation plan should describe how the project will be periodically evaluated during its entire life. Specific benefits of the project deployment should be identified. The evaluation plan should identify specific measures of effectiveness. The plan should describe the data that will be collected, who will collect it, and where it will be stored. The evaluation plan should contain provisions to correct situations resulting in unacceptable evaluations.

DEPLOYMENT INITIATIVES

Agencies involved in this study have developed specific deployment initiatives for their agency. In addition, this study identified specific user service area initiatives meeting a user service plan and supported by certain functional areas. The initiatives of each agency should support the user service plan. Initiatives for the TXDOT Austin District and the City of Austin Transportation Division have been included in Appendix V. Initiatives for transit, emergency services, and Travis County are encouraged. The agency initiatives developed have four distinct similarities. These similarities include surveillance, incident management, a centralized and multi-agency service center, and traveler information.

Surveillance

Surveillance is the foundation of ITS User Services. If surveillance is not directly needed to implement a strategy it will most certainly by needed to efficiently complete an evaluation. Detection is the most common form of surveillance. As an example, surveillance includes having someone use a video camera to actively scan conditions. Detection might use that same camera, employing video image detection, to detect the passage of vehicles and report it to a control system. Pneumatic tubes, inductive loops, magnetic sensors, radar, sonar, and video images are all forms of detection. Surveillance also includes reviewing events. Travel time, response times, delivery and pick-up times, arrival and departure times are events. Austin must deploy more surveillance to implement and manage ITS projects.

Incident Management

Incident management provides for quick and often easily perceived benefits. Extensive surveillance is often not necessary to deploy this service. Often good incident management principles, adhered to by all agencies, will result in easily perceived benefits by the public. Surveillance is often needed to collect event data associated with incident management to measure the effectiveness of the service. Although incident management is very cost effective, it may involve overcoming many institutional barriers. The sooner Austin agencies confront these barriers, the sooner the public will realize the benefits.

Centralized and Multi-Agency Service Center

Centralized and multi-agency service centers are appropriate in every metropolitan are. However, Austin is uniquely poised to develop such a center. Core transportation agencies in the Austin area including DOT, public works, transit, and emergency services are all replacing and upgrading infrastructure at the same time. The timing is nearly perfect for these agencies to centralize. Centralization allows agencies to combine funds, perhaps affording the opportunity to acquire and utilize more enhanced equipment. Centralization also addresses many institutional issues not solved by technology alone. Services provided in a centralized facility include traffic, transit, emergency, and information. A centralized and multi-agency service center would improve the communications among Austin agencies. Incident management may provide the

impetus necessary to bring these agencies together.

Traveler Information

Traveler information is one of the information services made available with a centralized and multi-agency service center. Many of the benefits of integrated ITS services hinge on information being efficiently delivered to the public. Traveler information includes information on different modes of travel. Modes of travel include car, bus, airplane, bicycle, and foot.

REGIONAL PERSPECTIVES

Now that some ITS operational tests have been completed across the country, the concept of regional centers has developed. This concept may have developed in an effort to reduce costs of ITS deployment and also to include rural areas in ITS deployment. While the concept of deploying ITS in a regional fashion can be explained technically, exactly what constitutes a "region" is difficult to define. Part of ITS deployment includes determining how big of an area will be affected by the deployment. As more technically advanced centers are constructed, many are struggling to justify their existence after construction.

The TxDOT San Antonio District completed construction of a management center in 1995. Since that time the center has aggressively pursued "regional" transportation management. The

TransGuide Center has embarked on a mission to manage transportation in congested border areas such as Laredo. Laredo is some 154 miles from San Antonio. Austin, by contrast, is only 79 miles from the "Alamo City", yet a TransGuide “regionally” controlled roadway facility does not exist in the corridor between these two metropolitan areas.

It is, perhaps, difficult to understand how integrated and responsive management can take place over the information superhighway. While there may be no technical boundaries to regional centers, there would certainly appear to be political and institutional boundaries.

However, Austin isn't really selfish either. Plans for a new 911, radio, and computer aided dispatch center include Travis County and smaller, surrounding cities such as West Lake Hills and Pflugerville. The TxDOT Austin District executes maintenance agreements with the City of Austin to maintain many signalized locations in the Austin area. However, the Austin District retains the maintenance and liability of numerous signalized locations in its 11 county region outside the Austin area, including growing metropolitan areas such as Round Rock, Georgetown, and San Marcos. These cities could greatly benefit from a centrally controlled real-time adaptive signal system. This is important because the economies of these areas are integrated. They are tied together by a network of roadways much like the blood vessels of your hand.

TxDOT grappled with regional issues in 1991 when the Texas legislature mandated the Department consolidate from twenty-four districts to just eighteen. Many regional political and institutional issues were confronted in this reorganization attempt. However, compromise

prevailed and, as **Figure V-1** indicates, acceptable "regional" boundaries were defined. This could be a starting point for metropolitan areas in Texas to begin defining regional information service centers. On the other hand, it should be noted, to no one's real surprise in Texas politics, TxDOT later reorganized into no less than the current twenty-five regional areas as shown in **Figure V-2**. This is one more than they originally started with when reorganization began.

Whether Austin develops its own centralized and multi-agency service center or not, local ITS deployment must somehow relate to the larger transportation picture of regional deployment initiatives. This definitely needs to take place with information services. Agencies in San Antonio need to know the conditions in Austin in order to efficiently move people and goods to Dallas/Ft. Worth, for instance.

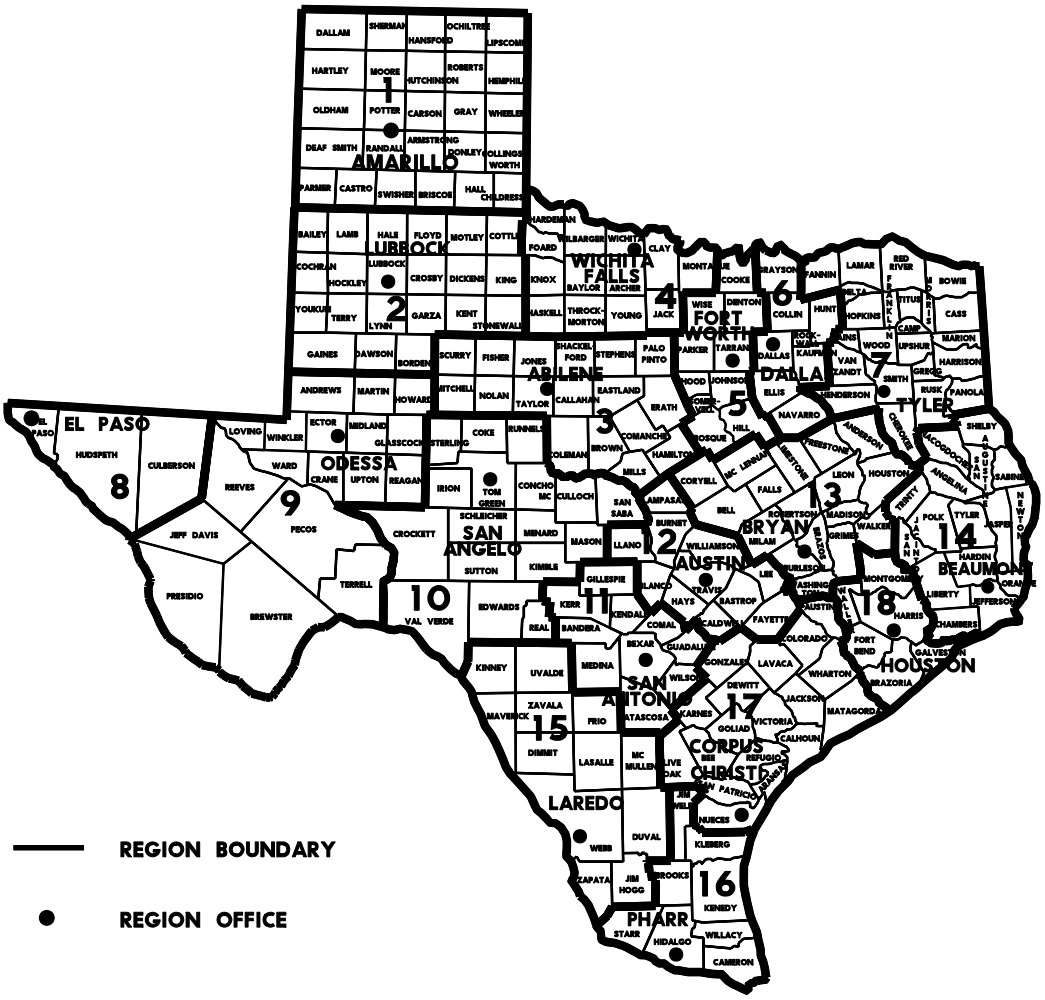
DEPLOYMENT SCHEDULE

This report has identified several issues relating to ITS deployment in the Austin area. For integrated ITS deployment to be realized in Austin, institutional issues must be resolved. **Table V-1** illustrates a recommended deployment schedule to realize full ITS benefits within 10 years. However, there is also a need to begin deployment of agency initiatives. It is assumed that agencies will continue to deploy initiatives meeting the User Service Plan while working to integrate projects. The schedule has been formulated considering existing agency staff resources.

The table focuses on deployment over the next 5 years. After this time it is anticipated any ITS service can be easily implemented.

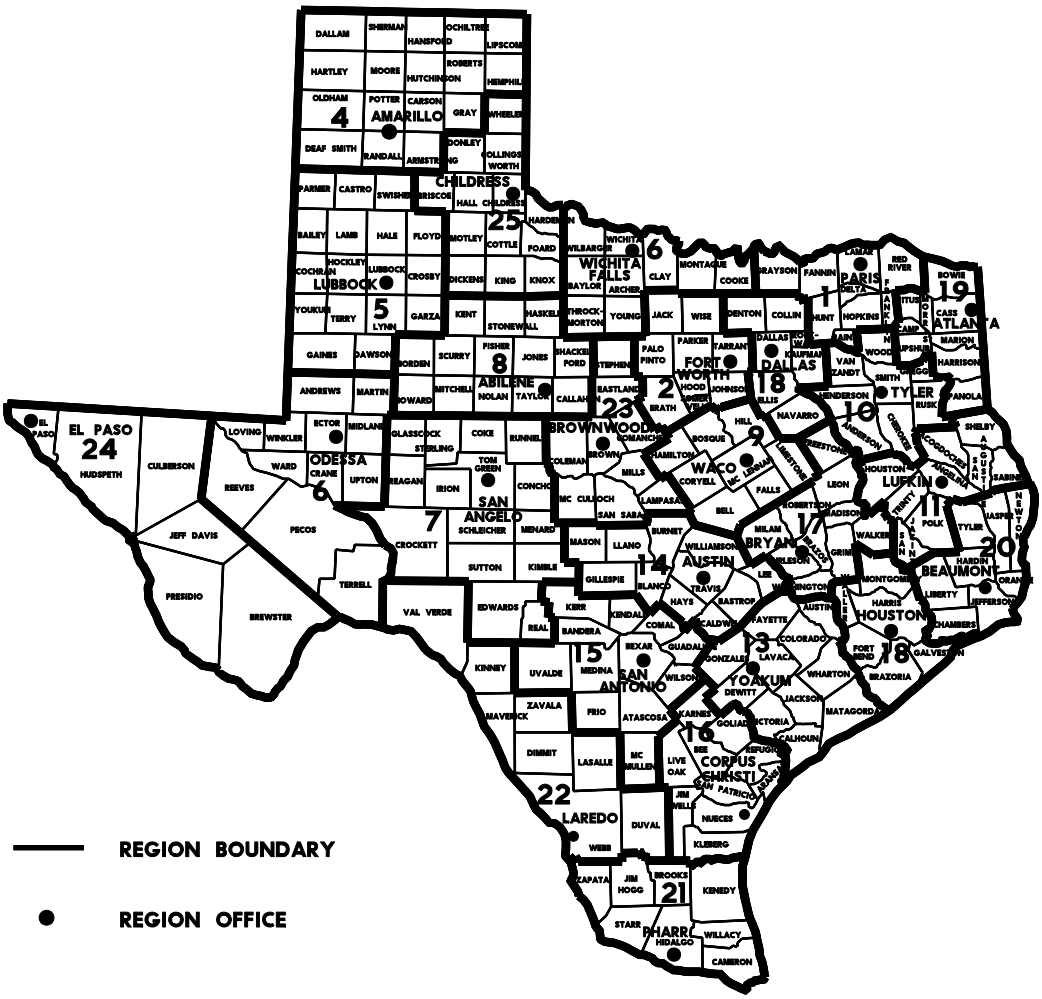
TEXAS
DEPARTMENT OF TRANSPORTATION

PROPOSED REGIONAL ALIGNMENTS

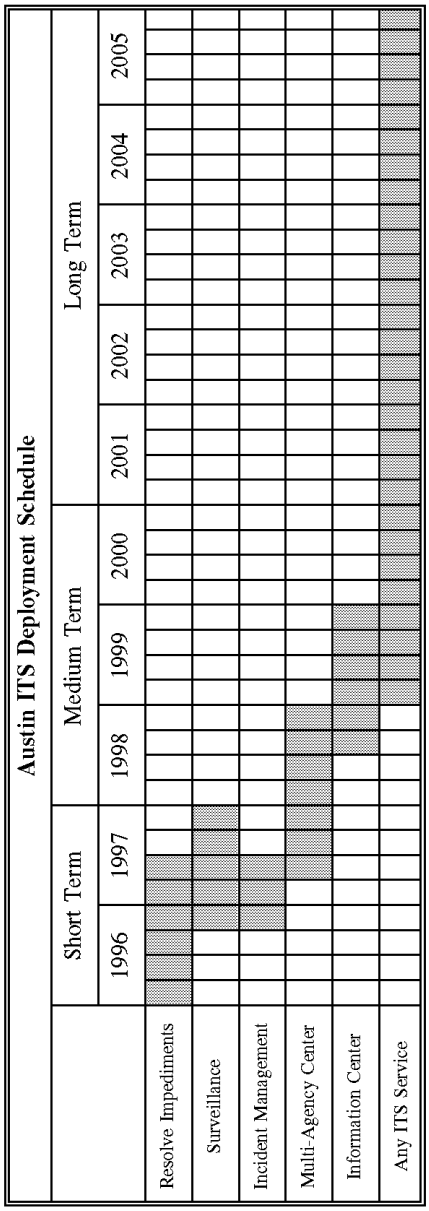


Proposed TxDOT Regional Alignments_Figure V-1

TEXAS
DEPARTMENT OF TRANSPORTATION
EXISTING REGIONAL ALIGNMENTS



Existing TxDOT Regional Alignments_Figure V-2



Austin Its Deployment Schedule_Table V-1

This page intentionally left blank.