

INTRODUCTION

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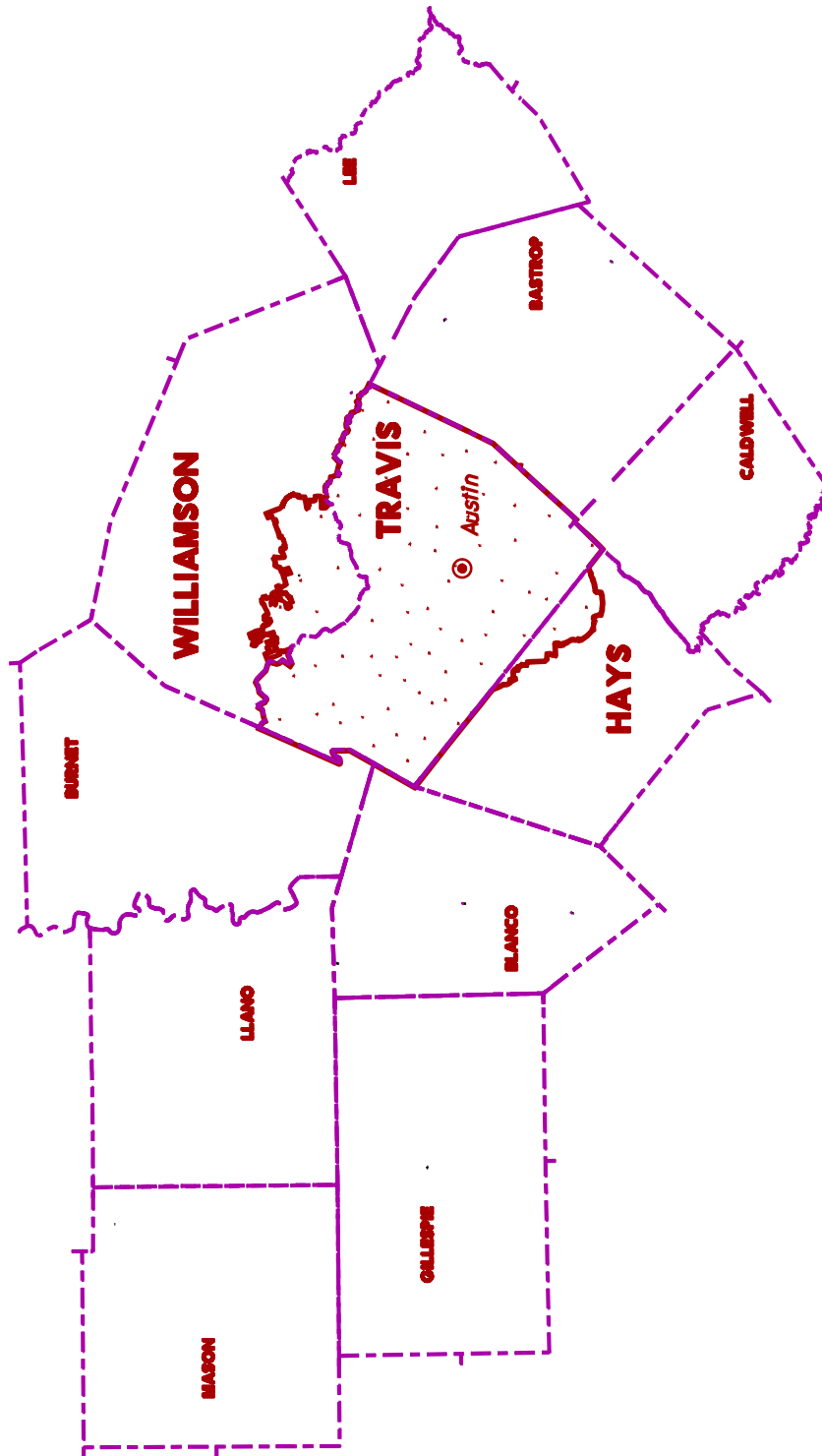
BACKGROUND

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, signed by President Bush in December of 1991, provides funding authorizations for highways, highway safety, and mass transportation for fiscal years 1992-1997. Title VI-Research, Part B-Intelligent Vehicle-Highway Systems Act of ISTEA provides for planning grants to state and local governments to study the feasibility of intelligent vehicle-highway systems (IVHS) development and implementation¹. Since this time, IVHS has evolved to what is now called Intelligent Transportation Systems (ITS).

In April of 1993 an initiative titled, *Proposal for a Planning Study of an Area-Wide Intelligent Vehicle Highway System for the Austin Metropolitan Area and an Early Deployment Plan for the IH-35 Corridor*, was accepted for funding by the Federal Highway Administration (FHWA) under the United States Department of Transportation (USDOT). This proposal was submitted jointly by the Texas Department of Transportation (TxDOT) Austin District and the City of Austin Department of Public Works and Transportation (DPWT).

Metropolitan Area

The Austin District is one of the twenty-five regional TxDOT offices encompassing a ten county area in central Texas. The Austin Transportation Study (ATS) is the local metropolitan planning organization (MPO). The ATS metropolitan area includes parts of three counties and nineteen local jurisdictions with a total population of 687,000 (1990 census). For the purpose of this study, the ATS boundary was selected as the limits of the study area to be considered. Austin, the largest city in the ATS boundary, is near the center of this metropolitan boundary, as shown in **Figure i-1**.



Austin Metropolitan Boundary_Figure i- 1

Austin Area




Austin, the capital of Texas, is divided along its north-south axis by Interstate Highway 35 (IH 35). As illustrated in **Figure i-2**, the southern tip IH 35 is at the U.S.-Mexico border, in Laredo, Texas, and the northern tip terminates in Duluth, Minnesota. The Colorado River also dissects Austin along an east-west axis.

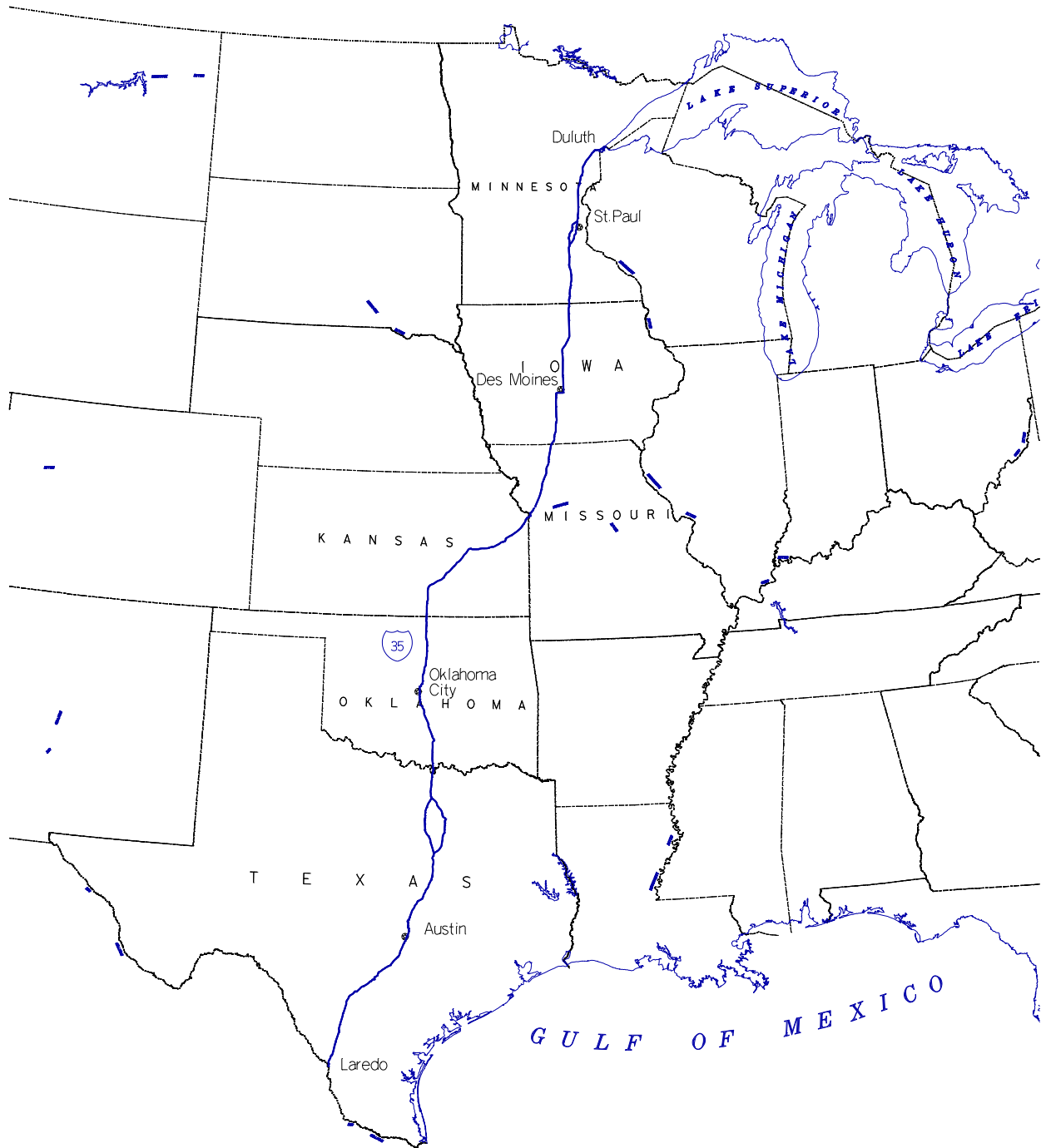
Austin is home to numerous state office complexes and high-tech industries, as well as, the University of Texas (UT). Additional traffic generators in the Austin area are illustrated in **Figure i-3** and include the UT Memorial Football Stadium, UT Frank Erwin Special Events Center, and the City of Austin Convention Center.

Austin, as well as most urban areas of Texas, has witnessed increased auto use and ownership that have exceeded the capacity of the transportation network. This increase has resulted in more urban traffic congestion, excessive air pollution and fuel consumption, higher accident rates, and unacceptable levels of frustration and delay². A population explosion to over one million persons by 2020 is expected to aggravate Austin's transportation network, further reducing transportation safety, mobility, air, and water quality³.

STUDY OBJECTIVES

The objectives of this study are designed to support the future operational tests and implementation of ITS user services by various agencies on corridors in the Austin metropolitan area. Specific objectives for this study are:

-  Develop organizational structure,
-  Develop area wide ITS plan, and
-  Deployment on IH 35 corridor.



IH 35 Corridor_Figure i- 2

ITS PLANNING PROCESS

IVHS, or more recently Intelligent Transportation Systems (ITS), uses modern communication, computer, and electronic technologies to improve the safety and efficiency of the transportation system. These technologies can be combined to provide several capabilities or "user services". To date, 29 user services have been bundled together into six broad service areas⁴. Some user services are still evolving to overcome technological, as well as, institutional barriers. To aid metropolitan areas in prioritizing ITS deployment, the USDOT has identified specific user services comprising a core infrastructure for ITS deployment. The user services in this core infrastructure are indicated in **Table i-1**. Integration of this core infrastructure, which will involve multi-agency cooperation, is needed for successful deployment of ITS into the existing transportation system.

The FHWA developed a guide titled, *IVHS Planning and Project Deployment Process*, for distribution in April of 1993. This process, illustrated in **Figure i-4**, was created to serve as a tool for organizations to systematically plan for, and implement, ITS technologies as a part of an integrated transportation system⁵. The process presented in this guide was used for this study.

Local ITS Planning Methodology

The study proposal submitted by TxDOT and the City of Austin relates to the planning process developed by the FHWA through the completion of seven tasks. An outline of the seven tasks detailed in this study are listed below.

Task I-Austin ITS Organization and Procedures

The Study will contact agencies that may benefit from the implementation of IVHS technologies or are users of the transportation system in the Austin area in order to develop Austin IVHS organization and procedures. Steps involved in this task include:

-  Assessing the local agencies to define existing transportation problems

and develop user service objectives.

- ✎ Review/assessing existing policies/procedures in order to develop a user service plan meeting short, medium, and long term objectives.
- ✎ Developing the organizational structure to provide the institutional framework for cooperation among agencies.
- ✎ Establishing an organizational diagram showing the relationship of various agencies and a report describing this organization.

Task II-Identify/Assess Existing Resources From All Participating Agencies

The Study will identify and assess existing various resources utilized by participating agencies. The Study will concentrate on the City of Austin signal system and the TxDOT freeway traffic management systems deployed in Austin. This task will develop:

- ✎ Facilities summary,
- ✎ Equipment summary,
- ✎ Maintenance summary,
- ✎ Personnel and funding summary, and
- ✎ Report recommending functional requirements to support user services.

Task III-Evaluate State of the Art Traffic Management Techniques and ITS Technologies

The Study will evaluate techniques and technologies which offer the most promising chance of performing system functions. Functional areas identified in this task will be used to:

- ✎ Screen and evaluate techniques and technologies,
- ✎ Recommend training for computer modeling needed to measure the performance and reliability of the techniques used, and
- ✎ Prepare a report identifying standards, system components, and impacts.

Task IV-Identify/Assess Corridors

The Study will identify and assess corridors to further identify problems. This task will:

- ✎ Identify and evaluate roadways by corridor, and
- ✎ Develop maps and a report identifying priority corridors.

Task V-Develop Austin ITS Plan Document

The Study will develop a document which outlines the steps necessary to deploy ITS in the Austin area. The deliverables of this task include:

- ✎ Strategic deployment plan incorporating the user service plan and
- ✎ Plan document suitable for distribution to users.

Task VI-Austin ITS Plan Assessment/Evaluation Criteria

The Study will establish evaluation criteria needed to adequately assess the success of ITS deployment in the Austin area. This task will result in:

- ✎ An implementation assessment methodology including performance criteria involving both quantitative and qualitative measurements and
- ✎ A report identifying performance criteria and data gathering procedures.

Task VII-Prepare IH 35 Action Plan, Plans, Specifications, and Estimates (PS&E) for the Initial Deployment Project

The completion of this task will provide an IH 35 action plan to include:

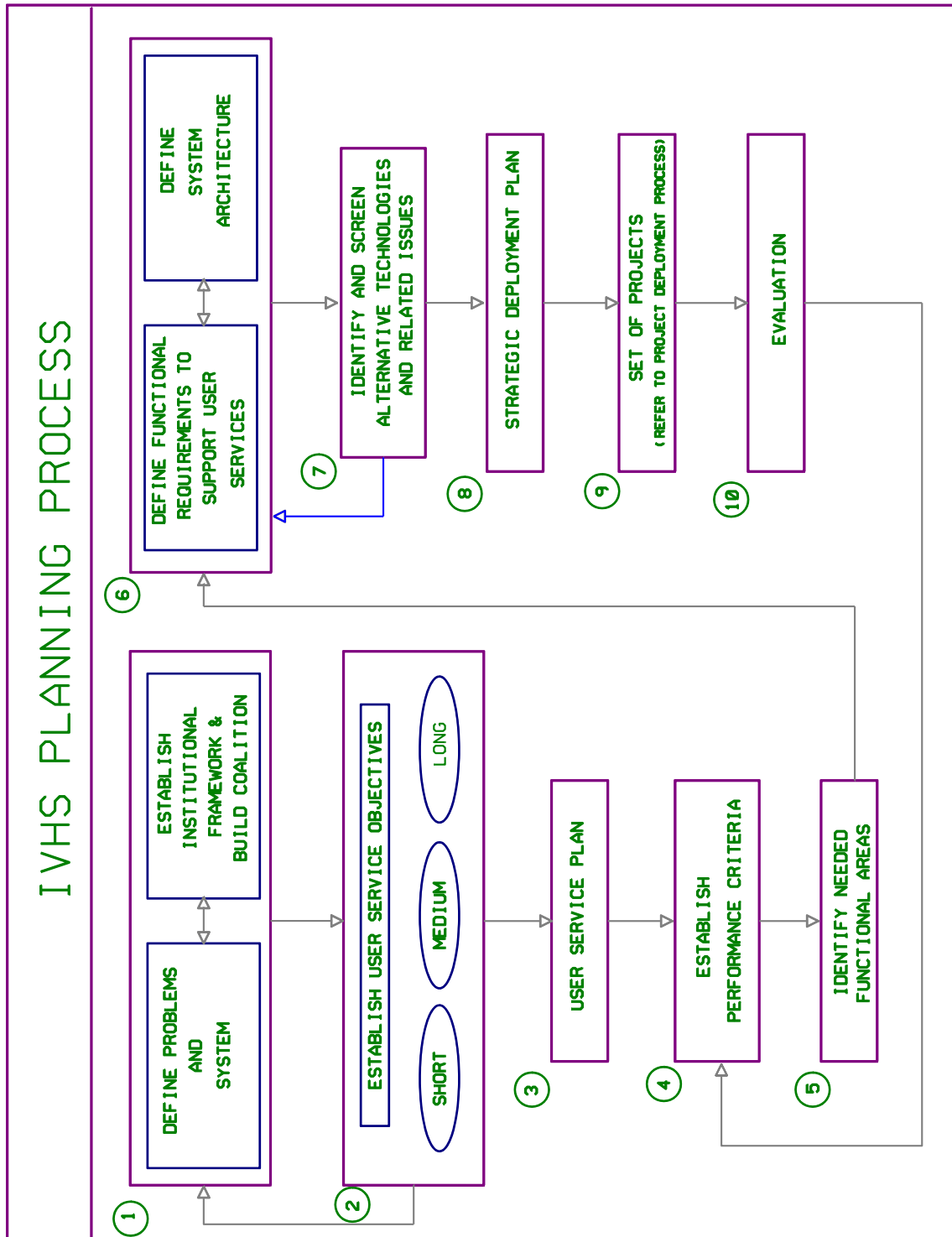
- ✎ Operations and maintenance,
- ✎ Initial project plans, specifications, and estimate (PS&E),
- ✎ An on-going process continuing for the life of the system, and
- ✎ A contracting date for the initial project included in the State Transportation Improvement Plan (STIP).

In June of 1993, an agreement was executed between the FHWA and TxDOT to complete this

study. The Austin District Transportation Operations was responsible for completing the work for TxDOT. The Austin District, in cooperation with the City of Austin, decided to complete the bulk of the work with existing staff. An agreement was executed in March of 1994 between TxDOT and the City of Austin initializing this cooperative effort. The City of Austin Department of Public Works and Transportation, Transportation Division, provided the staff for this project.

ITS User Services	
Travel and Transportation Management	Commercial Vehicle Operations
⌚ En-Route Driver Information ☒	⌚ Commercial Vehicle Electronic Clearance
⌚ Route Guidance	⌚ Automated Roadside Safety Inspection
⌚ Traveler Services Information ☒	⌚ On-Board Safety Monitoring
⌚ Traffic Control ☒	⌚ Commercial Vehicle Administrative Processes
⌚ Incident Management ☒	⌚ Hazardous Materials Incident Response
⌚ Emissions Testing and Mitigation	⌚ Commercial Fleet Management
Travel Demand Management	Emergency Management
⌚ Pre-Trip Travel Information	⌚ Emergency Notification and Personal Security
⌚ Ride Matching and Reservation	⌚ Emergency Vehicle Management
⌚ Demand Management and Operations	
	Advanced Vehicle Control and Safety Systems
Public Transportation Operations	⌚ Longitudinal Collision Avoidance
⌚ Public Transportation Management ☒	⌚ Lateral Collision Avoidance
⌚ En-Route Transit Information ☒	⌚ Intersection Collision Avoidance
⌚ Personalized Public Transit ☒	⌚ Vision Enhancement for Crash Avoidance
⌚ Public Travel Security ☒	⌚ Safety Readiness
	⌚ Pre-Crash Restraint Deployment
Electronic Payment	⌚ Automated Highway Systems
⌚ Electronic Payment Services ☒	
	☒ Core Infrastructure

ITS User Services_Table i-1



FHWA ITS Planning Guide_Figure i- 4

REFERENCES

1. *Intermodal Surface Transportation Efficiency Act of 1991, A Summary*, U.S. Department of Transportation.
2. *Options, An Update on Long-Range Transportation Options for the Austin Area*, Capital Metropolitan Transportation Authority, June 1994.
3. *Transportation Trends, Austin Metropolitan Area, 1960 to Present*, Austin Transportation Study, Draft September 1993.
4. *IVHS Architecture Development Program, Interim Status Report*, IVHS America, April 1994.
5. *IVHS Planning and Project Deployment Process*, Federal Highway Administration, Version 1.0 April 1993.

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