

TransGuide

Model Deployment Initiative

Design Report

NOTE TO READER:

THIS IS A LARGE DOCUMENT

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TransGuide

Model Deployment Initiative

Design Report

Model Deployment Partners:
Texas Department of Transportation
City of San Antonio
VIA Metropolitan Transit

Report by:
Southwest Research Institute
P.O. Drawer 28510
San Antonio, Texas 78228-0510
ID# 10-8684



TRANSGUIDE
TECHNOLOGY IN MOTION

Foreword



The model deployments bring increased levels of service to the traveling public through the integration of several key systems: traffic signal control; transit, freeway, and incident management; emergency services management; regional, multimodal traveler information services; and electronic toll collection and fare payment.

To support the deployment of Intelligent Transportation Systems (ITS) using federal, state, and local funding, the U.S. Department of Transportation initiated the Model Deployment Program in 1996. The metropolitan area Model Deployment Initiatives (MDIs) were intended to demonstrate integrated transportation management systems. The MDIs feature a strong, regional, multimodal traveler information services component. These model deployments showcased the benefits of having an integrated, region-wide approach to managing transportation and providing traveler information services. The model deployments bring increased levels of service to the traveling public through the integration of several key systems: traffic signal control; transit, freeway, and incident management; emergency services management; regional, multimodal traveler information services; and electronic toll collection and fare payment. In addition to introducing the public to the benefits of ITS products and services, the sites serve as showcases for local decision makers across the United States. Tours of the sites and seminars focus on the benefits of ITS investment by both the public and private sectors. The model deployment sites also permit rigorous evaluations of the benefits of integrating intelligent transportation infrastructure in a metropolitan area.

TransGuide™, the Advanced Traffic Management System (ATMS) in San Antonio, Texas, is in its third year of operation. The Texas Department of Transportation ATMS uses cameras, fiber optics, and electronic message signs to detect, communicate, and notify drivers of incidents along the highway. In July 1995, TransGuide became operational along 26 miles of highway in central San Antonio. When TransGuide is completed, the \$151 million system will cover 191 miles of

highway in San Antonio. Partners in this massive effort include the Texas Department of Transportation, the City of San Antonio (police, fire, emergency medical service, and public works) and VIA Metropolitan Transit.

Southwest Research Institute served as the prime contractor for the \$13.5 million TransGuide MDI. Programs implemented as part of the MDI include:

- **Data Server:** The Data Server is the central archive of travel information encompassing 600 miles of freeways and arterials in the San Antonio metropolitan area. These data are collected from TransGuide traffic data, traffic accident reports, lane closures, and automated vehicle identification data.
- **Automated Vehicle Identification:** The Automated Vehicle Identification (AVI) sensors detect vehicles that are equipped with AVI tags. The sensors transmit the data to the TransGuide Operations Center, where travel times and speeds are computed for the instrumented roadways.
- **Railroad Grade Crossing System:** The Advanced Warning for Railroad Delays (AWARD) System is designed to help motorists avoid delays caused by railroad operations that cross freeway access or frontage roads. The AWARD System, which monitors four grade crossings using six sensors, alerts drivers to potential delays near freeway exits and entrances.
- **Traveler Information Kiosks:** Kiosks provide current traffic conditions, motorist services, transit and airport information, key areas of interest in the region, weather maps, and other data from touch-screen monitors. Forty Kiosks are deployed as part of the program.
- **In-Vehicle Navigation System:** This system provides drivers with real-time traffic congestion and incident information, vehicle location, and information on regional points of interest. As part of the program, 590 units were distributed to local transportation agencies, law enforcement agencies, emergency response organizations, and various government organizations.
- **Emergency Medical Services Management System (LifeLink™):** This system permits two-way video teleconferencing between emergency medical personnel in a hospital and paramedics in an ambulance en route to the hospital. Additionally, the system transfers vital statistics data from the ambulance to the hospital.

This report documents the high-level design of the TransGuide MDI project and discusses the design trade-off decisions. A detailed, specific project level design is provided in each project's System Design document.

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Acronyms

| | |
|---------|---|
| A/V | Audio/Visual |
| ADP | Automatic Data Processing |
| API | Application Programming Interface |
| ATIS | Advanced Traveler Information System |
| ATMS | Advanced Traffic Management System |
| AVI | Automated Vehicle Identification |
| bps | Bits Per Second |
| CCD | Charge Coupled Device |
| CD | Compact Disc |
| CD-ROM | Compact Disk-Read Only Memory |
| COTS | Commercial Off-the-Shelf |
| CPU | Central Processing Unit |
| DGPS | Differential Global Positioning System |
| DS | Model Deployment Initiative Data Server |
| EMS | Emergency Medical Service |
| ESRI | Environmental Systems Research Institute |
| FCC | Federal Communications Commission |
| FHWA | Federal Highway Administration |
| FM | Frequency Modulation |
| FM STIC | FM Subcarrier Traffic Information Channel |
| GIS | Geographical Information System |
| GPS | Global Positioning System |
| GUI | Graphical User Interface |
| ISDN | Integrated Services Digital Network |
| ITS | Intelligent Transportation Systems |
| IVN | In-Vehicle Navigation |
| IVRT | Intelligent Vehicle Registration Tag |
| K | 1024 |
| LAN | Local Area Network |
| LCD | Liquid Crystal Display |
| LCS | Lane-Control Signal |
| LIDAR | Laser Radar |
| MB | Megabyte |
| Mbps | Million Bits per Second |
| MC | Master Computer |
| MDI | Model Deployment Initiative |
| MHz | Megahertz |
| NavTech | Navigation Technologies |
| NIC | Network Interface Card |
| NTSC | National Television Standards Committee |
| PC | Personal Computer |
| PCB | Printed Circuit Board |
| PCI | Peripheral Component Interconnect |
| PCMCIA | Personal Computer Memory Card International Association |
| POTS | Plain Old Telephone System |
| RAM | Random Access Memory |

Acronyms (Cont'd)

| | |
|--------|---|
| RF | Radio Frequency |
| RFO | Request for Offer |
| ROM | Read Only Memory |
| RR | Railroad |
| SCSI | Small Computer System Interface |
| SNMP | Simple Network Management Protocol |
| STIC | Subcarrier Traffic Information Channel |
| SwRI | Southwest Research Institute |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| TOC | TransGuide Operations Center |
| TxDOT | Texas Department of Transportation |
| V | Volts |
| VAC | Volts Alternating Current |
| VDC | Volts DC |
| WDM | Wave Division Multiplexer |
| WEB | Wireless Ethernet Bridge |
| WWW | World Wide Web |