



State of Texas
Regional ITS Architectures and Deployment Plans

Beaumont Region

Regional ITS Deployment Plan

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LIST OF ACRONYMS

| | |
|--------|--|
| ATIS | Advanced Travel Information System |
| ATMS | Advanced Traffic Management System |
| AVL | Automated Vehicle Location |
| BMT | Beaumont Municipal Transit |
| C2C | Center-to-Center |
| CAD | Computer-Aided Dispatch |
| CCTV | Closed-Circuit Television |
| CV | Commercial Vehicle |
| CVO | Commercial Vehicle Operations |
| DMS | Dynamic Message Sign |
| DMS | Dynamic Message Sign |
| DPS | Department of Public Safety |
| EMS | Emergency Medical Services |
| EOC | Emergency Operations Center |
| FHWA | Federal Highway Administration |
| FMS | Freeway Management System |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| HAR | Highway Advisory Radio |
| HAZMAT | Hazardous Materials |
| HCRS | Highway Condition Reporting System |
| HRI | Highway-Rail Intersections |
| ISP | Information Service Provider |
| ITS | Intelligent Transportation System |
| LADOTD | Louisiana Department of Transportation and Development |
| MAMB | Mutual Aid Mont Belvieu |



LIST OF ACRONYMS

| | |
|--------|---|
| MDT | Mobile Data Terminal |
| NTCIP | National Transportation Communications for ITS Protocol |
| PAT | Port Arthur Transit |
| PTZ | Pan/Tilt/Zoom |
| RFID | Radio Frequency Identification |
| SETRPC | Southeast Texas Regional Planning Commission |
| TCEQ | Texas Commission on Environmental Quality |
| TDM | Transportation Demand Management |
| TEA-21 | Transportation Equity Act for the 21st Century |
| TIP | Transportation Improvements Program |
| TOC | Traffic Operations Center Transit Operations Center |
| TxDOT | Texas Department of Transportation |
| USDOT | United States Department of Transportation |
| VIVDS | Video Image Vehicle Detector System |

SUMMARY

In January 2001, the Federal Highway Administration (FHWA) issued a final rule to implement Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA-21) requiring that Intelligent Transportation System (ITS) projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards.

To meet these requirements the Texas Department of Transportation (TxDOT) initiated the development of regional ITS architectures throughout the State of Texas. Although not required by the FHWA final rule, TxDOT took the opportunity to also develop an ITS deployment plan for each Region. The Beaumont Region was the eighth in the series of regional ITS architectures and deployment plans to be prepared as part of this initiative.

The Beaumont Regional ITS Deployment Plan outlines a vision for ITS deployment, and identifies and prioritizes projects that are needed to implement the ITS architecture on a short-, medium-, and long-term basis. In doing so, this plan also helps the Region to prioritize funding decisions. As infrastructure is incrementally built-out over a 20-year horizon, integration among key foundation systems in the Region can occur as the system grows and expands.

Stakeholders from throughout the Region participated in the development of the Regional ITS Deployment Plan. Participants included representatives from TxDOT, the Texas Department of Public Safety (DPS), Southeast Texas Regional Planning Commission (SETRPC), Louisiana Department of Transportation and Development (LADOTD), Kansas City Southern Railway, cities, counties, and transit agencies.

Building on the dialogue, consensus, and vision outlined in the Regional ITS Architecture, stakeholders in the Beaumont Region prioritized market packages and potential ITS projects for deployment in the Region. Projects were identified to correspond to the needs and priorities identified by the regional stakeholders, and were categorized into 5-year, 10-year, and 20-year timeframes.

The majority of ITS projects recommended for the Beaumont Region were identified in the following key areas:

- Travel and Traffic Management;
- Maintenance and Construction Management;
- Emergency Management; and
- Public Transportation Management.

Recommended ITS projects in the 5-year, 10-year, and 20-year deployment timeframes were summarized in tables for each deployment horizon. This summary included the project name and a brief description, primary responsible agency, a planning level estimate of probable cost, an indication of whether or not funding had been identified for that project, as well as an estimated duration for implementation. For each recommended ITS project, more detailed project descriptions were developed which mapped each project back to applicable market packages and also identified any prerequisite project requirements.

With the substantial amount of effort invested by stakeholders in the Beaumont Region to develop both the Regional ITS Architecture and the Deployment Plan, developing a plan for maintaining these important tools was a key component of the process. Section 4 of this Deployment Plan provides a strategy for reviewing and updating the architecture and deployment plan on a regular basis.

1. INTRODUCTION

1.1 Project Overview

The FHWA final rule to implement Section 5206(e) of the TEA-21 requires that ITS projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards. The rule requests that the National ITS Architecture be used to develop a local implementation of the National ITS Architecture, which is referred to as a “Regional ITS Architecture.”

In order to meet these requirements, TxDOT initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. Although not required by the FHWA final rule, TxDOT sought to have an ITS deployment plan developed for each Region. The ITS deployment plan outlines a vision for ITS deployment in the Region, and identifies and prioritizes projects that are needed to implement the ITS architecture on a short, medium, and long-term basis. In doing so, this plan also helps the Region to prioritize funding decisions by having a comprehensive, phased approach to the Regional ITS programs, so that the infrastructure can be incrementally built-out over a 20-year horizon, and integration among key foundation systems in the Region can occur as the system grows and expands.

The Beaumont Regional ITS Deployment Plan was developed using the Regional ITS Architecture developed in 2003. Through the architecture development process, stakeholders reached consensus on the transportation needs in the Region that could be addressed with ITS, worked with the architecture team to customize and prioritize market packages that formed the basis for the deployment plan, and identified the required interfaces to provide the desired level of integration of systems and agencies within the Beaumont Region.

The Beaumont Regional ITS Architecture provided the framework and prioritized the key functions and services desired by stakeholders in the Region. The Beaumont Regional ITS Deployment Plan builds on the architecture by outlining specific ITS project recommendations and strategies for the Region, and identifying deployment timeframes so that the recommended projects and strategies can be implemented over time. Agency responsibilities for implementing and operating the systems also are a key component of the ITS Deployment Plan.

1.2 Document Overview

The Beaumont Regional ITS Deployment Plan is organized into four key sections:

Section 1 – Introduction

This section provides a brief overview of the State of Texas Regional ITS Architectures and Deployment Plans Program, the ITS Deployment Plan for the Beaumont Region, as well as an overview of some of the key features and stakeholders in the Beaumont Region.

Section 2 – Prioritization of Market Packages

Section 2 contains the prioritized market packages for the Beaumont Region. Included in this section is an overview of the prioritization process, and detailed descriptions of the high, medium and low priority market packages.

Section 3 – Prioritization of Planned Projects

Project recommendations have been developed for the Beaumont Region to provide an incremental, phased build-out of the Region’s ITS. These projects are categorized into five, ten and twenty year deployment timeframes.

Section 4 – Maintaining the Regional ITS Architecture and Deployment Plan

A procedure for maintaining the Regional ITS Architecture and Deployment Plan and submitting new projects to add to the plan is recommended in this section.

1.3 The Beaumont Region

1.3.1 Geography and Regional Characteristics

The Beaumont Region is bordered by the TxDOT Lufkin District to the north, the TxDOT Houston District to the west, Louisiana to the east, and the Gulf of Mexico to the south. For the Beaumont Regional ITS Architecture and Deployment Plan, the study area included all eight counties that comprise the TxDOT Beaumont District. The TxDOT Beaumont District was used as a basis for the project Region; however, the City of Baytown, which is not a part of the TxDOT Beaumont District, was also included in the Regional boundaries.

The counties included in the Beaumont Region area:

- Chambers;
- Hardin;
- Jasper;
- Jefferson;
- Liberty;
- Newton;
- Orange; and
- Tyler.

TxDOT partners with local governments for roadway construction, maintenance, and traffic operations support, and serves as the responsible agency for on-system roadways in cities with populations less than 50,000. The Cities of Beaumont, Port Arthur and Baytown are the only cities in the project Region with populations that exceed the 50,000 threshold.

1.3.2 Transportation Infrastructure

The primary facilities in the Beaumont Region include I-10, US-90, US-96, US-69, US-190, US-287, SH-87, SH-61, SH-65, and SH-105.

I-10 is an east-west, four-lane divided interstate highway. The effective operation of this highway is critical to the movement of goods and people across the United States. I-10 extends from Florida in the east to California in the west. Within the Beaumont Region, the frontage roads are not always continuous. Blockages along I-10 can have serious implications for drive-time for commercial vehicles and motorists alike due to the lack of obvious alternate routes. Knowing the road and travel conditions within this transportation corridor and having the ability to disseminate this information to motorists

are important elements for this project. For example, if I-10 has been closed due to a major incident or weather, and motorists are informed of the closure in advance, they can alter their travel plans with an alternate route or wait to begin their travels.

In addition to roadway infrastructure, the Beaumont Region has a commercial airport, the Southeast Texas Regional Airport and three major ports. The Port of Beaumont, the Port of Orange, and the Port of Port Arthur all serve local and national shipping needs.

1.3.3 Existing ITS in the Beaumont Region

Within the Beaumont Region there are currently several ITS programs that are underway or are planned for deployment. The TxDOT Beaumont District Office has video detection at several intersections. Emergency vehicle signal preemption is operational at intersections in the City of Beaumont and several counties in the Region are in the process of installing signal preemption for fire vehicles as part of a program led by the SETRPC.

The TxDOT Beaumont District Office also operates DMS signs along I-10 and SH-69 and Highway Advisory Radio (HAR) around the City of Beaumont. Flood detection equipment is in place at several low water crossings to alert motorists of crossings that become too flooded to safely cross.

1.3.4 Beaumont Stakeholders

Stakeholder coordination and involvement is one of the key elements to the development of a regional ITS architecture and deployment plan. Because ITS often transcends traditional transportation infrastructure, it is important to involve non-traditional stakeholders in the architecture development and visioning process. Input from these stakeholders, both public and private, is a critical part of defining the interfaces, integration needs, and overall vision for ITS in the Beaumont Region.

The following is a list of stakeholders in the Beaumont Region who have participated in the project workshops or provided input to the study team as to the needs and issues that should be considered as part of the Beaumont Regional ITS Architecture:

- Beaumont Municipal Transit;
- Chambers County;
- City of Beaumont;
- City of Pinehurst;
- City of Port Arthur;
- City of Port Neches;
- City of West Orange;
- City of Vidor;
- Department of Public Safety;
- Jefferson County;
- Kansas City Southern Railway;
- Louisiana Department of Transportation and Development;
- Port Arthur Transit;



- Southeast Texas Regional Planning Commission;
- TxDOT Beaumont District; and
- TxDOT Traffic Operations Division (Austin).

Key stakeholder agencies that are participating in the development of the Beaumont Regional ITS Deployment Plan are listed in **Table 1**.

Table 1 – Beaumont Stakeholder Agencies and Contacts

| Stakeholder Agency | Contact | Address | Phone Number | E-Mail |
|--|----------------------|---|--------------|-------------------------------|
| Beaumont Municipal Transit | William Munson | 550 Milam Street Beaumont, Texas 77701 | 409-835-7895 | bmunson@beaumonttransit.com |
| Chambers County | Don Brandon | P.O. Box H Anahuac, Texas 77514 | 409-267-8379 | dbrandon@chambers.lib.tx.us |
| City of Beaumont | David Redmon | 801 Main, Suite 200 Beaumont, Texas 77701 | 409-880-3725 | davidredmon@yahoo.com |
| City of Beaumont | Tom Warner | P.O. Box 3827 Beaumont, Texas 77704 | 409-880-3725 | twarner@ci.beaumont.tx.us |
| City of Pinehurst | Ricky Trevino | 3640 Mockingbird Orange, Texas 77630 | 409-886-3873 | r_trevino@cityofpinehurst.com |
| City of Port Arthur | Leslie McMahan | PO Box 1089 Port Arthur, Texas 77640 | 409-983-8182 | atsflem@portarthur.net |
| City of Port Arthur Transit | Tom Kestranek | PO Box 1089 Port Arthur, Texas 77640 | 409-983-8767 | N/A |
| City of Port Neches | Taylor Shelton | PO Box 758 Port Neches, Texas 77651 | 409-719-4204 | t.shelton@portnechestx.us |
| City of West Orange | Chris Boone | 2700 Western Avenue West Orange, Texas 77630 | 409-883-3468 | cboone@cityofwestorange.com |
| City of Vidor | Michael Decker | 170 North Main Vidor, Texas 77662 | 409-769-5473 | mdecker@cityofvidor.com |
| City of Vidor | Mike Harris | 170 North Main Vidor, Texas 77662 | 409-769-5473 | N/A |
| DPS | Doug Heigley | 7200 Eastex Freeway Beaumont, Texas 77708 | 409-924-5400 | N/A |
| Jefferson County | Bart Burrell | 1149 Pearl Street Beaumont, Texas 77701 | 409-835-8584 | bgkb@IH2000.net |
| Kansas City Southern Railway | M.C. "Mike" Van Tiem | 4601 Blanchard Rd Shreveport, LA 71107 | 318-676-6269 | mike.van.tiem@kcsr.com |
| Louisiana Department of Transportation and Development | Steve Jiles | P.O. Box 1430 Lake Charles, LA 70602 | 337-437-9105 | sjiles@dotd.state.la.us |
| Orange County Emergency Management | Tim Courville | 106 Border Street Orange, Texas 77630 | 409-882-7905 | N/A |



Table 1 – Beaumont Stakeholder Agencies and Contacts (continued)

| Stakeholder Agency | Contact | Address | Phone Number | E-Mail |
|---|----------------|--|----------------------------|-------------------------|
| S.E. Texas Regional Planning Commission | Bob Dickinson | 2210 Eastex Freeway Beaumont, Texas 77703 | 409-899-8444 (ext. 251) | bdickinson@setrpc.org |
| S.E. Texas Regional Planning Commission | Paul Tiley | 2210 Eastex Freeway Beaumont, Texas 77703 | 409-899-8444 | ptiley@setrpc.org |
| TxDOT Beaumont District | Lynn Babin | 8350 Eastex Freeway Beaumont, Texas 77708 | 409-892-7311 | lbabin@dot.state.tx.us |
| TxDOT Beaumont District | Chris Hugon | 8350 Eastex Freeway Beaumont, Texas 77708 | 409-898-5765 | chugon@dot.state.tx.us |
| TxDOT Beaumont District | Janet Manley | 8350 Eastex Freeway Beaumont, Texas 77708 | 409-898-5768 | jmanley@dot.state.tx.us |
| TxDOT Beaumont District | Mitch Murrell | 8350 Eastex Freeway Beaumont, Texas 77708 | 409-896-0266 | mmurrel@dot.state.tx.us |
| TxDOT Traffic Operations Division | Janie Light | Attn: TRF-TM 125 East 11th Street Austin, Texas 78701-2483 | 512-416-3258 | jlight@dot.state.tx.us |
| TxDOT Traffic Operations Division | Roland Merz | Attn: TRF-TM 125 E. 11th Street Austin, Texas 78701-2483 | 512-416-3305 | rmerz@dot.state.tx.us |

2. PRIORITIZATION OF MARKET PACKAGES

2.1 Prioritization Process

Of the 75 available market packages in the National ITS Architecture, 33 were selected and customized for deployment in the Beaumont Region. Stakeholders were asked to prioritize the market packages into high, medium, and low priorities, based on regional needs, feasibility and likelihood of deployment, and overall contribution of the market package to the goals and vision for ITS functionality in the Region. A summary of these prioritized market packages is shown in **Table 2**.

Table 2 – Summary of Prioritized Market Packages for the Beaumont Region

| High Priority | Medium Priority | Low Priority |
|---|---|--|
| <ul style="list-style-type: none"> ▪ Network Surveillance ▪ Surface Street Control ▪ Traffic Information Dissemination ▪ Regional Traffic Control ▪ Incident Management System ▪ Standard Railroad Grade Crossing ▪ Railroad Operations Coordination ▪ Roadway Maintenance and Construction ▪ Work Zone Management ▪ Work Zone Safety Monitoring ▪ Maintenance and Construction Activity Coordination ▪ Transit Vehicle Tracking ▪ Transit Fixed-Route Operations ▪ Demand Response Transit Operations ▪ Transit Security ▪ Multimodal Coordination ▪ Transit Traveler Information ▪ Broadcast Traveler Information Systems ▪ HAZMAT Management ▪ Emergency Response ▪ Roadway Service Patrol ▪ ITS Data Mart | <ul style="list-style-type: none"> ▪ Freeway Control ▪ Emissions Monitoring and Management ▪ Transit Passenger and Fare Management ▪ Emergency Routing ▪ Commercial Vehicle Administrative Processes ▪ ITS Data Warehouse | <ul style="list-style-type: none"> ▪ Probe Surveillance ▪ Maintenance and Construction Vehicle Tracking ▪ Maintenance and Construction Vehicle Maintenance ▪ Weather Information Processing and Distribution ▪ ISP Based Route Guidance |

The market package prioritization was a key factor in developing recommendations for ITS deployment and integration in the Beaumont Region. These priorities identified the key needs and services that are desired in the Beaumont Region, as well as the interfaces that need to be established to provide integrated functionality and establish communication between elements.

This section includes detailed descriptions of the prioritized market packages for the Beaumont Region. The market packages are organized into high, medium and low priorities. It is important to note that the high, medium and low prioritization does not necessarily correspond to any specific time frame (such as five, ten or twenty year deployment horizon). For example, a market package can be a high priority, but because of funding or prerequisite project requirements, it might not be feasible for deployment for several years. Maturity and availability of technology were other factors for prioritizing the market packages. Other considerations included whether or not the market package was better suited for private deployment and operations rather than public. As an example, ISP-based Route Guidance might be viewed as a valuable traveler information service for motorists in the Region, but stakeholders felt this market package was best suited for deployment by a private service provider, and as such, deemed it a low priority for agencies in the Region.

Each market package in the following subsections includes:

- A brief definition of the market package (which have been modified from the National ITS Architecture definitions);
- Any existing infrastructure from that market package that is already existing in the Beaumont Region;
- Agencies currently operating or maintaining systems that apply to that market package;
- Planned projects that will address some or all of the services that are contained in the market package; and
- Any additional needs to bring the market package to the desired level of deployment or functionality.

2.2 High Priority Market Packages

Market packages that were selected as high priorities for the Beaumont Region are listed and described in **Table 3**. These market packages typically represent systems or functions that serve as foundations for which to build regional ITS programs. Listed in this section are market packages that address baseline control and monitoring technologies for surface streets and freeways, road/weather conditions data gathering, and for coordinating incident management and emergency response services.

Many of these high priority market packages have components that are in various stages of deployment and operation in the Beaumont Region; that is, there are already systems and technologies deployed to deliver some of these high priority services and functions. For example, the TxDOT Beaumont District already has closed loop signal systems in place which is a key component of the Surface Street Control market package. Although these devices are in place, this market package is still listed as a high priority. There are additional capabilities and functionality as part of this market package that are planned for implementation in the near-term, thus building on the existing infrastructure and expanding the services of this particular market package in the Beaumont Region.



Table 3 – High Priority Market Packages for the Beaumont Region

| | |
|--|--|
| Network Surveillance (ATMS01) | High Priority |
| <p>This market package includes traffic detectors, other surveillance equipment, the supporting field equipment, and wireline communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally or remotely. The data generated by this market package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect equipment faults, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Information Service Provider Subsystem.</p> | |
| <p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT VIVDS ▪ TxDOT Flood Detection ▪ City of Beaumont Loop Detection | <p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Beaumont |
| <p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Advanced Traffic Management System (ATMS) ▪ TxDOT Closed Loop Signal System Upgrades ▪ TxDOT Closed Loop Signal System Expansion Phase 1 | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Beaumont Freeway Management System Phase 1 ▪ TxDOT Beaumont Freeway Management System Phase 2 ▪ TxDOT Beaumont Freeway Management System Additional Phases ▪ TxDOT Ramp Control System ▪ City of Beaumont Rail Crossing Warning System ▪ City of Beaumont Rail Crossing Warning System Expansion ▪ TxDOT Flood Detection Phase 1 ▪ TxDOT Flood Detection Phase 2 ▪ River Authority/TxDOT District Office Connection ▪ TxDOT Closed Loop Signal System Expansion Phase 2 ▪ TxDOT Closed Loop Signal System Expansion Phase 3 ▪ City of Beaumont Traffic Signal System Upgrade/Expansion Phase 1 ▪ City of Beaumont Traffic Signal System Expansion Phase 2 ▪ City of Beaumont Traffic Signal System Expansion Phase 3 ▪ City of Port Arthur Traffic Signal System Upgrade/Expansion Phase 1 ▪ City of Port Arthur Traffic Signal System Expansion Phase 2 ▪ City of Port Arthur Traffic Signal System Expansion Phase 3 ▪ City of Beaumont CCTV ▪ City of Port Arthur CCTV | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| Surface Street Control (ATMS03) | High Priority |
|---|--|
| <p>This market package provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management. A range of traffic signal control systems are represented by this market package ranging from static pre-timed control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This market package is consistent with typical urban traffic signal control systems.</p> | |
| <p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Closed Loop Signal Systems ▪ City of Beaumont Emergency Vehicle Signal Preemption ▪ Regional Signal Preemption for Fire Vehicles | <p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Beaumont ▪ SETRPC |
| <p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Closed Loop Signal System Upgrades ▪ TxDOT Closed Loop Signal System Expansion Phase 1 ▪ Emergency Vehicle Traffic Signal Preemption | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Beaumont Traffic Signal System Upgrade/Expansion Phase 1 ▪ City of Beaumont Traffic Signal System Expansion Phase 2 ▪ City of Beaumont Traffic Signal System Expansion Phase 3 ▪ City of Port Arthur Traffic Signal System Upgrade/Expansion Phase 1 ▪ City of Port Arthur Traffic Signal System Expansion Phase 2 ▪ City of Port Arthur Traffic Signal System Expansion Phase 3 ▪ City of Beaumont Rail Crossing Warning System ▪ City of Beaumont Rail Crossing Warning System Expansion ▪ City of Port Arthur Rail Crossing Warning System Phase 1 ▪ City of Port Arthur Rail Crossing Warning System Phase 2 ▪ TxDOT Closed Loop Signal System Expansion Phase 2 ▪ TxDOT Closed Loop Signal System Expansion Phase 3 ▪ Emergency Vehicle Traffic Signal Preemption Expansion ▪ City of Beaumont CCTV ▪ City of Port Arthur CCTV ▪ City of Beaumont/TxDOT District Office Connection ▪ City of Port Arthur/TxDOT District Office Connection | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|--|--|
| <p>Traffic Information Dissemination (ATMS06)</p> | <p>High Priority</p> |
| <p>This market package allows traffic information and road/bridge closures due to construction, maintenance, and weather, to be disseminated to drivers and vehicles using roadway equipment such as dynamic message signs or highway advisory radio.</p> <p>This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Information Service Providers.</p> | |
| <p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT DMS ▪ TxDOT HAR ▪ TxDOT Portable DMS | <p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT |
| <p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Advanced Traffic Management System (ATMS) ▪ TxDOT HCRS Enhancements ▪ TxDOT Beaumont Remote Workstations | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Beaumont Freeway Management System Phase 1 ▪ TxDOT Beaumont Freeway Management System Phase 2 ▪ TxDOT Beaumont Freeway Management System Additional Phases ▪ TxDOT Highway Advisory Radio Upgrade and Expansion ▪ TxDOT Beaumont District Web Page ▪ City of Beaumont Rail Crossing Warning System ▪ City of Beaumont Rail Crossing Warning System Expansion ▪ City of Port Arthur Rail Crossing Warning System Phase 1 ▪ City of Port Arthur Rail Crossing Warning System Phase 2 ▪ TxDOT Portable Smart Work Zones ▪ TxDOT Portable DMS ▪ County Portable DMS ▪ Regional 511 Advanced Traveler Information System Server ▪ TxDOT Rest Stop/Welcome Center Kiosks ▪ ISP Based Route Guidance | |

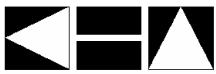


Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|---|----------------------|
| Regional Traffic Control (ATMS07) | High Priority |
| <p>This market package provides for the sharing of traffic information and control among traffic management centers to support a regional control strategy. This package relies on roadside instrumentation supported by the Surface Street Control and Freeway Control Market Packages and adds hardware, software, and communications capabilities to implement traffic management strategies that are coordinated between allied traffic management centers. The extent of information and control sharing is determined through working arrangements between jurisdictions.</p> | |
| Existing Infrastructure | Agency |
| <p>None identified at this time</p> | |
| <p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Advanced Traffic Management System (ATMS) ▪ TxDOT Center-to-Center Communications (Statewide) ▪ TxDOT HCRS Enhancements <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Interstate Coordination ▪ City of Beaumont/TxDOT District Office Connection ▪ City of Port Arthur/TxDOT District Office Connection ▪ City of Beaumont CCTV ▪ City of Port Arthur CCTV ▪ DPS/TxDOT District Office Connection | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| Incident Management System (ATMS08) | High Priority |
|--|---|
| <p>This market package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The market package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as weather service entities and event promoters. Information from these diverse sources are collected and correlated by this market package to detect and verify incidents and implement an appropriate response.</p> <p>The response may include traffic control strategy modifications or resource coordination between center subsystems. The coordination with emergency management might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.</p> <p>Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination, Broadcast Traveler Information or Interactive Traveler Information market packages.</p> | |
| <p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT DMS ▪ TxDOT HAR ▪ TxDOT Portable DMS ▪ District Traffic Management Plan ▪ SETRPC Regional Detour Plans | <p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ DPS ▪ SETRPC |
| <p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Advanced Traffic Management System (ATMS) ▪ TxDOT HCRS Enhancements ▪ Motorist Assistance Patrol ▪ TxDOT Center-to-Center Communications ▪ TxDOT Beaumont Remote Workstations | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Beaumont Freeway Management System Phase 1 ▪ TxDOT Beaumont Freeway Management System Phase 2 ▪ TxDOT Highway Advisory Radio Upgrade and Expansion ▪ TxDOT Beaumont Freeway Management System Additional Phases ▪ Interstate Coordination ▪ Emergency Call-out System ▪ DPS Automated Vehicle Location System ▪ DPS/TxDOT District Office Connection ▪ DPS Computer-Aided Dispatch ▪ Emergency Management Agencies/TxDOT District Office Connection ▪ EOC/TxDOT District Office Connection ▪ TxDOT Portable DMS ▪ County Portable DMS ▪ City of Beaumont/TxDOT District Office Connection ▪ City of Port Arthur/TxDOT District Office Connection ▪ Motorist Assistance Patrol Expansion ▪ TxDOT Portable Smart Work Zones | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|---|-----------------------------|
| <p>Standard Railroad Grade Crossing/ Railroad Operations Coordination (ATMS13/ATMS15)</p> | <p>High Priority</p> |
| <p>This market package manages highway traffic at highway-rail intersections (HRIs) where rail operational speeds are less than 80 miles per hour. Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported.</p> <p>These traditional HRI warning systems may also be augmented with other standard traffic management devices. The warning systems are activated on notification by interfaced wayside equipment of an approaching train. The equipment at the HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the HRI equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the traffic management subsystem.</p> <p>The Railroad Operations Coordination component provides an additional level of strategic coordination between rail operations and traffic management centers. Rail operations provides train schedules, maintenance schedules, and any other forecast events that will result in HRI closures. This information is used to develop forecast HRI closure times and durations that may be used in advanced traffic control strategies or to enhance the quality of traveler information.</p> | |
| <p>Existing Infrastructure None identified at this time</p> | <p>Agency</p> |
| <p>Planned Projects None identified at this time</p> | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ City of Beaumont Rail Crossing Warning System ▪ City of Beaumont Rail Crossing Warning System Expansion ▪ City of Port Arthur Rail Crossing Warning System Phase 1 ▪ City of Port Arthur Rail Crossing Warning System Phase 2 | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|---|----------------------|
| Roadway Maintenance and Construction (MC07) | High Priority |
| This market package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include landscape maintenance, hazard removal, routine maintenance activities, and repair and maintenance of both ITS and non-ITS equipment on the roadway. Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities. | |
| Existing Infrastructure None identified at this time | Agency |
| Planned Projects | |
| <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancements | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ City of Beaumont Municipal Maintenance Vehicle AVL ▪ City of Port Arthur Municipal Maintenance Vehicle AVL Phase 1 ▪ City of Port Arthur Municipal Maintenance Vehicle AVL Phase 2 ▪ County Maintenance Vehicle AVL ▪ TxDOT Regional Maintenance Decision Support System ▪ TxDOT Automated Maintenance Vehicles ▪ TxDOT Maintenance Vehicle AVL and CAD System ▪ TxDOT Portable Smart Work Zones | |

| | |
|---|---|
| Work Zone Management (MC08) | High Priority |
| This market package directs activity in work zones, controlling traffic through portable DMS and informing other groups of activity (e.g., ISP, TM, and other maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones. | |
| Existing Infrastructure | Agency |
| <ul style="list-style-type: none"> ▪ TxDOT DMS ▪ TxDOT HAR ▪ TxDOT Portable DMS ▪ City of Beaumont Portable Speed Trailers | <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Beaumont Police Department |
| Planned Projects | |
| <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancements ▪ TxDOT Beaumont Remote Workstations | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ TxDOT Portable HAR ▪ TxDOT Portable DMS ▪ County Portable DMS ▪ Regional 511 Advanced Traveler Information System Server ▪ TxDOT Regional Maintenance Decision Support System ▪ TxDOT Portable Smart Work Zones | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|---|----------------------|
| Work Zone Safety Monitoring (MC09) | High Priority |
| This market package includes systems and strategies to improve work crew safety and reduce collisions between the motoring public and maintenance vehicles and activities. Included in this market package is detection for vehicle intrusions to the work zone and warning systems to alert workers and drivers of potential safety hazards. This market package supports both stationary and mobile work zones. | |
| Existing Infrastructure None identified at this time | Agency |
| Planned Projects None identified at this time | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ TxDOT Portable Smart Work Zones | |

| | |
|--|----------------------|
| Maintenance and Construction Activity Coordination (MC10) | High Priority |
| This market package supports the dissemination of maintenance and construction activity information to centers which can utilize it as part of their operations, or to the Information Service Providers who can provide the information to travelers. | |
| Existing Infrastructure None identified at this time | Agency |
| Planned Projects | |
| <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancements | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ TxDOT Beaumont District Web Page ▪ TxDOT Center-to-Center Communications ▪ Interstate Coordination ▪ TxDOT Regional Maintenance Decision Support System ▪ TxDOT Maintenance Vehicle AVL and CAD System ▪ City of Beaumont Municipal Maintenance Vehicle AVL ▪ City of Port Arthur Municipal Maintenance Vehicle AVL Phase 1 ▪ City of Port Arthur Municipal Maintenance Vehicle AVL Phase 2 ▪ City of Beaumont/TxDOT District Office Connection ▪ City of Port Arthur/TxDOT District Office Connection ▪ TxDOT Portable Smart Work Zones | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|--|----------------------|
| Transit Vehicle Tracking (APTS01) | High Priority |
| This market package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system’s schedule in real-time. | |
| Existing Infrastructure None identified at this time | Agency |
| Planned Projects None identified at this time | |
| Additional Needs <ul style="list-style-type: none"> ▪ Beaumont Municipal Transit Automated Vehicle Location ▪ Port Arthur Transit Automated Vehicle Location ▪ SETRPC Demand-Response AVL | |

| | |
|---|--|
| Transit Fixed-Route Operations (APTS02) | High Priority |
| This market package performs vehicle routing and scheduling, as well as automatic driver assignment and system monitoring for fixed-route transit services. This service determines current schedule performance using AVL data and provides information displays at the Transit Management Subsystem. Static and real time transit data is exchanged with Information Service Providers where it is integrated with that from other transportation modes (e.g. rail, ferry, air) to provide the public with integrated and personalized dynamic schedules. | |
| Existing Infrastructure <ul style="list-style-type: none"> ▪ On-line Transit Schedules | Agency <ul style="list-style-type: none"> ▪ Beaumont Municipal Transit (BMT) |
| Planned Projects None identified at this time | |
| Additional Needs <ul style="list-style-type: none"> ▪ Beaumont Municipal Transit Automated Vehicle Location ▪ Port Arthur Transit Automated Vehicle Location ▪ Web-based Regional Transit Traveler Information | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|---|----------------------|
| Demand Response Transit Operations (APTS03) | High Priority |
| <p>This market package performs vehicle routing and scheduling as well as automatic driver assignment and monitoring for demand responsive transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Transit Management Subsystem provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the Information Service Provider (ISP) Subsystem.</p> | |
| Existing Infrastructure | Agency |
| None identified at this time | |
| Planned Projects | |
| None identified at this time | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ Beaumont Municipal Transit Automated Vehicle Location ▪ Port Arthur Transit Automated Vehicle Location ▪ Web-based Regional Transit Traveler Information System ▪ SETRPC Computer Aided Dispatch ▪ SETRPC Demand-Response AVL ▪ SETRPC Automated Fare and Passenger Information System ▪ SETRPC Paratransit Web-based Scheduling System and Trip Planner ▪ BMT Paratransit Web-based Scheduling System and Trip Planner ▪ PAT Paratransit Web-based Scheduling System and Trip Planner | |

| | |
|---|----------------------|
| Transit Security (APTS05) | High Priority |
| <p>This market package provides for the physical security of transit passengers. An on-board security system is deployed to perform surveillance and warn of potentially hazardous situations. Public areas (e.g. stops, park and ride lots, stations) are also monitored.</p> <p>Information is communicated to the Transit Management Subsystem using wireless or wireline infrastructure. Security related information is also transmitted to the Emergency Management Subsystem when an emergency is identified that requires an external response. Incident information is communicated to the Information Service Provider.</p> | |
| Existing Infrastructure | Agency |
| None identified at this time | |
| Planned Projects | |
| None identified at this time | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ Beaumont Municipal Transit Security System ▪ Port Arthur Transit Security System ▪ PAT Transit Security Cameras | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|---|----------------------|
| Multi-Modal Coordination (APTS07) | High Priority |
| <p>This market package establishes two way communications between multiple transit and traffic agencies to improve service coordination. Multimodal coordination between transit agencies can increase traveler convenience at transfer points and also improve operating efficiency. Coordination between traffic and transit management is intended to improve on-time performance of the transit system to the extent that this can be accommodated without degrading overall performance of the traffic network. More limited local coordination between the transit vehicle and the individual intersection for signal priority is also supported by this package.</p> | |
| Existing Infrastructure None identified at this time | Agency |
| <p>Planned Projects None identified at this time</p> | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Beaumont Municipal Transit Automated Vehicle Location ▪ Port Arthur Transit Automated Vehicle Location ▪ Web-based Regional Transit Traveler Information System ▪ SETRPC Paratransit Web-based Scheduling System and Trip Planner ▪ BMT Paratransit Web-based Scheduling System and Trip Planner ▪ PAT Paratransit Web-based Scheduling System and Trip Planner ▪ Beaumont Municipal Transit Information Kiosks ▪ Port Arthur Transit Information Kiosks | |

Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|---|---|
| Transit Traveler Information (APTS08) | High Priority |
| <p>This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.</p> | |
| <p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ On-line Transit Schedules | <p>Agency</p> <ul style="list-style-type: none"> ▪ Beaumont Municipal Transit |
| <p>Planned Projects</p> <p>None identified at this time</p> | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Beaumont Municipal Transit Automated Vehicle Location ▪ Port Arthur Transit Automated Vehicle Location ▪ SETRPC Demand-Response AVL ▪ Web-based Regional Transit Traveler Information ▪ Beaumont Municipal Transit Information Kiosks ▪ Port Arthur Transit Information Kiosks ▪ SETRPC Paratransit Web-based Scheduling System and Trip Planner ▪ BMT Paratransit Web-based Scheduling System and Trip Planner ▪ PAT Paratransit Web-based Scheduling System and Trip Planner | |

| | |
|--|----------------------|
| Broadcast Traveler Information (ATIS01) | High Priority |
| <p>This market package collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, air quality and weather information, and broadly disseminates this information through existing infrastructure and low cost user equipment (e.g., FM subcarrier, cellular data broadcast). This market package differs from the Traffic Information Dissemination market package, which provides localized HAR and DMS information capabilities.</p> <p>The information may be provided directly to travelers by an information service provider (ISP) or other traveler service providers so that they can better inform travelers of conditions. Successful deployment of this market package relies on availability of real-time traveler information from roadway instrumentation, probe vehicles or other sources.</p> | |
| <p>Existing Infrastructure</p> <p>None identified at this time</p> | <p>Agency</p> |
| <p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Advanced Traffic Management System (ATMS) ▪ TxDOT HCRS Enhancements | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Regional 511 Advanced Traveler Information System Server ▪ TxDOT Beaumont District Web Page ▪ Emergency Call-out System ▪ ISP-Based Route Guidance | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|--|----------------------|
| HAZMAT Management (CVO10) | High Priority |
| <p>This market package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents. HAZMAT tracking is performed by the Fleet and Freight Management Subsystem. The Emergency Management subsystem is notified by the Commercial Vehicle if an incident occurs and coordinates the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided by the Fleet and Freight Management Subsystem. The latter information can be provided prior to the beginning of the trip or gathered following the incident depending on the selected policy and implementation.</p> | |
| Existing Infrastructure | Agency |
| None identified at this time | |
| Planned Projects | |
| None identified at this time | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ HAZMAT Tracking | |

| | |
|---|--|
| Emergency Response (EM1) | High Priority |
| <p>This market package includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Emergency Management Subsystems supports emergency notification and coordinated response between agencies.</p> | |
| Existing Infrastructure | Agency |
| <ul style="list-style-type: none"> ▪ Automated Call-Out System ▪ 10 County EOC ▪ City of Beaumont Emergency Vehicle AVL | <ul style="list-style-type: none"> ▪ Orange County ▪ DPS ▪ City of Beaumont |
| Planned Projects | |
| <ul style="list-style-type: none"> ▪ Emergency Vehicle Traffic Signal Preemption | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ City of Beaumont Emergency Vehicle Signal Preemption ▪ Emergency Vehicle Traffic Signal Preemption ▪ Emergency Vehicle Traffic Signal Preemption Expansion ▪ DPS/TxDOT District Office Connection ▪ DPS Automated Vehicle Location System ▪ Emergency Management Agencies/TxDOT District Office Connection ▪ DPS Computer Aided Dispatch System ▪ Emergency Call-Out System ▪ EOC/TxDOT District Office Connection ▪ City of Port Arthur Emergency Vehicle AVL ▪ City of Orange Emergency Vehicle AVL | |



Table 3 – High Priority Market Packages for the Beaumont Region (continued)

| | |
|--|---|
| Roadway Service Patrols (EM4) | High Priority |
| This market package supports roadway service patrol vehicles that monitor roads that typically have incidents, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream. If problems are detected, the roadway service patrol vehicles will provide assistance to the motorist (e.g., push a vehicle to the shoulder or median). | |
| Existing Infrastructure None identified at this time | Agency None identified at this time |
| Planned Projects <ul style="list-style-type: none"> ▪ Motorist Assistance Patrol | |
| Additional Needs <ul style="list-style-type: none"> ▪ Motorist Assistance Patrol Expansion | |

| | |
|---|---|
| ITS Data Mart (AD01) | High Priority |
| This market package provides a focused archive that houses data collected and owned by a single agency, district, private sector provider, research institution, or other organization. This focused archive typically includes data covering a single transportation mode and one jurisdiction that is collected from an operational data store and archived for future use. It provides general query and report access to archive data users. | |
| Existing Infrastructure <ul style="list-style-type: none"> ▪ Congestion Management Database ▪ City of Beaumont Traffic Count Database | Agency <ul style="list-style-type: none"> ▪ SETRPC ▪ City of Beaumont |
| Planned Projects <ul style="list-style-type: none"> ▪ TxDOT Advanced Traffic Management System (ATMS) | |
| Additional Needs None identified at this time | |

2.3 Medium Priority Market Packages

Table 4 outlines market packages that were deemed medium priority by stakeholders in the Beaumont Region. These market packages were identified as useful and desirable services and functions for the Region, although very few of these market packages have existing infrastructure in place or planned over the next few years. The feasibility of funding for these market packages also was a factor in the prioritization. Availability and maturity of technology also was a consideration, particularly for the Maintenance and Construction Management market packages; these market packages were recently developed and added to the National ITS Architecture, and are not yet widely deployed. It is recommended that stakeholders in the Beaumont Region review deployments of some of the maintenance and construction technologies in other areas over the next several years to assess how well they have performed, benefits, and cost-effectiveness.

Table 4 – Medium Priority Market Packages for the Beaumont Region

| | |
|--|---|
| Freeway Control (ATMS04) | Medium Priority |
| This market package provides the communications and roadside equipment to support ramp control, lane controls, and interchange control for freeways. This package is consistent with typical urban traffic freeway control systems. This package incorporates the instrumentation included in the Network Surveillance Market Package to support freeway monitoring and adaptive strategies as an option. This market package also includes the capability to utilize surveillance information for detection of incidents. | |
| Existing Infrastructure | Agency |
| <ul style="list-style-type: none"> ▪ SH-69 Ramp Closure Gate at I-10 Interchange | <ul style="list-style-type: none"> ▪ TxDOT |
| Planned Projects | |
| <ul style="list-style-type: none"> ▪ TxDOT Advanced Traffic Management System (ATMS) ▪ TxDOT HCRS Enhancements | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ TxDOT Ramp Control System ▪ TxDOT Beaumont Freeway Management System Phase 1 ▪ TxDOT Beaumont Freeway Management System Phase 2 ▪ TxDOT Beaumont Freeway Management System Additional Phases | |



Table 4 – Medium Priority Market Packages for the Beaumont Region (continued)

| | |
|---|---|
| Emissions Monitoring and Management (ATMS11) | Medium Priority |
| <p>This market package monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data. The collected information is transmitted to the emissions management subsystem for processing. Both area wide air quality monitoring and point emissions monitoring are supported by this market package. For area wide monitoring, this market package measures air quality, identifies sectors that are non-compliant with air quality standards, and collects, stores, and reports supporting statistical data. For point emissions monitoring, this market package measures tail pipe emissions and identifies vehicles that exceed emissions standards. The gathered information can be used to implement environmentally sensitive TDM programs, policies, and regulations.</p> | |
| <p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Air Quality Monitors | <p>Agency</p> <ul style="list-style-type: none"> ▪ TCEQ |
| <p>Planned Projects</p> <p>None identified at this time</p> | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Emissions/Air Quality Management System ▪ Truck Stop Electrification | |

| | |
|---|------------------------|
| Transit Passenger Fare Management (APTS4) | Medium Priority |
| <p>This market package manages passenger loading and fare payments on-board vehicles using electronic means. It allows transit users to use a traveler card or other electronic payment device. Sensors mounted on the vehicle permit the driver and central operations to determine vehicle loads, and readers located either in the infrastructure or on-board the transit vehicle allow electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Transit Management Subsystem.</p> | |
| <p>Existing Infrastructure</p> <p>None identified at this time</p> | <p>Agency</p> |
| <p>Planned Projects</p> <p>None identified at this time</p> | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ BMT/PAT Passenger Fare Card ▪ SETRPC Automated Fare and Passenger Information System | |



Table 4 – Medium Priority Market Packages for the Beaumont Region (continued)

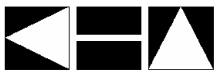
| | |
|---|--|
| Emergency Vehicle Routing (EM2) | Medium Priority |
| <p>This market package supports automated vehicle location and dynamic routing of emergency vehicles. The service also supports coordination with the Traffic Management Subsystem, collecting detailed road network conditions and requesting special priority or other specific emergency traffic control strategies on the selected route(s). The service provides for information exchange between care facilities and both the Emergency Management Subsystem and emergency vehicles.</p> | |
| Existing Infrastructure | Agency |
| <ul style="list-style-type: none"> ▪ City of Beaumont Emergency Vehicle AVL | <ul style="list-style-type: none"> ▪ City of Beaumont |
| Planned Projects | |
| <ul style="list-style-type: none"> ▪ Emergency Vehicle Traffic Signal Preemption | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ DPS/TxDOT District Office Connection ▪ Emergency Management Agencies/TxDOT District Office Connection ▪ EOC/TxDOT District Office Connection ▪ Emergency Vehicle Traffic Signal Preemption Expansion ▪ DPS Computer Aided Dispatch System ▪ DPS Automated Vehicle Location ▪ City of Port Arthur Emergency Vehicle AVL ▪ City of Orange Emergency Vehicle AVL ▪ City of Beaumont/TxDOT District Office Connection ▪ City of Port Arthur/TxDOT District Office Connection | |

| | |
|---|------------------------|
| CV Administrative Processes (CVO04) | Medium Priority |
| <p>This market package provides for electronic application, processing, fee collection, issuance, and distribution of CVO credential and tax filing. Through this process, carriers, drivers, and vehicles, may be enrolled in the electronic clearance program provided by a separate market package which allows commercial vehicles to be screened at mainline speeds at roadside check facilities. Through this enrollment process, current profile databases are maintained in the Commercial Vehicle Administration subsystem and snapshots of this database are made available to the roadside check facilities at the roadside to support the electronic clearance process.</p> | |
| Existing Infrastructure | Agency |
| None identified at this time | |
| Planned Projects | |
| None identified at this time | |
| Additional Needs | |
| <ul style="list-style-type: none"> ▪ Regional HAZMAT Permitting Coordination | |



Table 4 – Medium Priority Market Packages for the Beaumont Region (continued)

| | |
|--|------------------------|
| ITS Data Warehouse (AD2) | Medium Priority |
| <p>This market package includes all of the data collection and management capabilities provided by the ITS Data Mart, and adds the functionality and interface definitions that allow the collection of data from multiple agencies and data sources spanning across modal and jurisdictional boundaries. It performs the additional transformations and provides the additional data management features that are necessary so that all the data can be managed in a single repository. The potential for large volumes of carried data suggests additional on-line analysis and data mining features that are also included in this market package in addition to the basic query and reporting user access features offered by the ITS Data Mart.</p> | |
| <p>Existing Infrastructure None identified at this time</p> | <p>Agency</p> |
| <p>Planned Projects None identified at this time</p> | |
| <p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Regional Accident/Crash Database | |



2.4 Low Priority Market Packages

Five market packages were identified and customized for the Beaumont Region, but were ranked as low priority by stakeholders. These market packages are listed in **Table 5**. The services contained in these lower priority market packages were deemed useful and desirable for the Region, but stakeholders did not feel that public agencies should put a strong focus on these market packages in the near-term. Stakeholders also did not want to preclude these market packages from future deployment in the Region, so it was decided to keep these market packages as part of the Regional ITS Architecture.

Some of these market packages were identified as candidates for private sector deployment and operations, or they will require a public-private partnership for implementation and ongoing operations. For example, ISP-Based Route Guidance will require a partnership between the TxDOT Motor Carrier Division and private commercial trucking fleets. The use of transit fleets as probe vehicles also was discussed as a possibility. While both of these are not high priority needs, Beaumont stakeholders did not want to preclude them from future consideration.

Table 5 – Low Priority Market Packages for the Beaumont Region

| Market Package Name | Description | Comments |
|-----------------------------|---|---|
| Probe Surveillance (ATMS02) | <p>This market package provides an alternative approach for surveillance of the roadway network. Two general implementation paths are supported by this market package: 1) wide-area wireless communications between the vehicle and Information Service and 2) dedicated short range communications between the vehicle and roadside is used to provide equivalent information directly to the Traffic Management Subsystem.</p> <p>It requires either wide area or short-range communications equipment, roadside beacons and wireline communications for the short-range communications option, data reduction software, and utilizes wireline links between the Traffic Management Subsystem and Information Service Provider Subsystem to share the collected information. Both “Opt out” and “Opt in” strategies are available to ensure the user has the ability to turn off the probe functions to ensure individual privacy.</p> | <p>Probe surveillance was not deemed a high priority market package at the time of the initial architecture development in the Beaumont Region. For probe data to be consistent and accurately reflect current conditions there must be a quantifiable amount of vehicles equipped with probes on the roadways at any given time.</p> <p>The Beaumont Region might want to investigate the feasibility of using probe surveillance in the future to assist with determining near-real-time volume information on roads or freeways. A potential probe vehicle candidate could be buses.</p> |



Table 5 – Low Priority Market Packages for the Beaumont Region (continued)

| Market Package Name | Description | Comments |
|---|---|--|
| Maintenance and Construction Vehicle Tracking (MC01) | This market package will track the location of maintenance vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations. | This market package was not identified as needed for the Beaumont Region at this time. However it was expected that the information from Maintenance and Construction Vehicle Tracking may be useful to the Region some time in the future if these activities were to become more automated. Included in this market package would be instrumentation of maintenance vehicles with AVL. |
| Maintenance and Construction Vehicle Maintenance (MC02) | This market package performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities on vehicles and other maintenance equipment. It includes on board sensors capable of automatically performing diagnostics for maintenance vehicles, and the systems that collect this diagnostic information and use it to schedule and manage vehicle maintenance. | The Beaumont Region did not have a need for this market package based on the current state of technology. As technology evolves, the Region may consider implementation in the future. |
| Weather Information Processing and Distribution (MC04) | This market package processes and distributes the environmental information collected from the Road Weather Data Collection market package. This market package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc., so system operators and decision support systems can make decisions on corrective actions to take. The continuing updates of road condition information and current temperatures can be used by system operators to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination market package, and aid operators in scheduling work activity. | Weather Information Processing and Distribution was not deemed a high priority market package at the time of the initial architecture development in the Beaumont Region. |



Table 5 – Low Priority Market Packages for the Beaumont Region (continued)

| Market Package Name | Description | Comments |
|-----------------------------------|---|---|
| ISP-Based Route Guidance (ATIS06) | This market package offers the user pre-trip route planning and turn-by-turn route guidance services, which are generated by an Information Service Provider. Routes may be based on static information or reflect real time network conditions. This approach simplifies the user equipment requirements and can provide the infrastructure better information on which to predict future traffic. The package includes two way data communications and optionally also equips the vehicle with the databases, location determination capability, and display technology to support turn by turn route guidance. | This market package is best suited for deployment and ongoing operations by a private sector ISP. Fee-based subscription services are typically required for delivery of this service. Because this market package is deemed a private sector initiative, it is not recommended that the public sector play a significant role, other than as a data provider to private ISPs. |

3. PRIORITIZATION OF PROJECTS

In order to achieve the vision of the Regional ITS Architecture, a Region must deploy carefully developed projects that provide the functionality and interoperability identified in the architecture. A key step in the deployment of those projects is the development of an ITS Deployment Plan that identifies specific projects, timeframes, and responsible agencies.

Input from all stakeholders is required in order for the stakeholders to have ownership of the ITS Deployment Plan and also to be sure that the plan has realistically identified projects and timeframes for the Region. Cost is another important factor. Cost can vary a great deal for many ITS elements, depending on the level of deployment, maturity of the technology, type of communications, etc. For example, freeway network surveillance could be adequately achieved for one Region by the deployment of still frame CCTV cameras only at freeway interchanges. In another Region, there may be a desire for full motion cameras deployed at every mile to provide complete coverage of the freeway. The infrastructure and telecommunications costs for these two projects would vary a great deal, yet either one could be suitable for a particular Region.

In order to achieve input from stakeholders, a workshop was held in the Beaumont Region on June 10, 2003 to present the draft Regional ITS Deployment Plan and discuss potential projects. Each project recommended for the Regional ITS Deployment Plan was discussed, and consensus was reached by the stakeholders on the project description and the timeframe for implementation.

In the following sections, projects are categorized into short-term projects (5-year deployment timeframe), mid-term projects (10-year deployment timeframe), and long-term projects (20-year deployment timeframe). For each timeframe, a summary table has been included that provides a brief project description, responsible agency, probable cost, an indication as to whether funding has been identified, and an estimated duration for the project to be designed and implemented. The agency identified as the responsible agency will be responsible for implementation, operations and maintenance unless otherwise noted. For example, SETRPC may provide funding for arterial signal preemption within the City of Beaumont, but the City of Beaumont Traffic Operations Group would operate and maintain the signals.

Following each table, a more detailed description of individual projects is included. This section also includes the market packages associated with the project and any pre-requisite projects that are required.

3.1 Short-Term Projects (5-Year)

Table 6 provides a description of projects for the Beaumont Region in the 5-year timeframe. These projects represent the highest priority for the Region and should be strongly considered for implementation in the short-term. Immediately following **Table 6** are project descriptions for each of the short-term recommendations.

3.2 Mid-Term Projects (10-Year)

Table 7 provides a description of projects in the 10-year timeframe. Several of these projects are continuations of projects that will begin in the 5-year timeframe. These projects are important to the Region, but will need further review at the time of their deployment to ensure they are still a priority for the Region. Immediately following **Table 7** are project descriptions for each of the mid-term recommendations.



3.3 Long-Term Projects (20-Year)

Table 8 provides a description of projects in the 20-year timeframe. While these projects represent market packages and anticipated future needs identified for the Region, they will need to be closely reviewed prior to implementation. It is expected that a major update to the Region's ITS Deployment Plan will occur prior to year 10 which would allow stakeholders to reassess these long-term projects to be sure that they are still feasible for the Region. Immediately following **Table 8** are project descriptions for each of the long-term recommendations.



Table 6 – Short-Term Projects (5-Year)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|--|---|---------------------|--|----------------------------|----------------------------|
| Travel and Traffic Management | | | | | |
| TxDOT Beaumont Freeway Management System Phase 1 | Implement CCTV, detectors, and fixed DMS on major freeway corridors in the Beaumont Region | TxDOT | \$2,000,000 | No | 2 years |
| TxDOT Advanced Traffic Management System (ATMS) | Implement TxDOT ATMS in TxDOT Beaumont District Office | TxDOT | N/A | Yes (statewide initiative) | 6 months |
| TxDOT Ramp Control System | Implement an automated lane/gate closure at I-10/US69 | TxDOT | To Be Determined | No | 1 year |
| TxDOT Highway Advisory Radio | Implement 2 additional HAR transmitters | TxDOT | \$40,000 | No | 6 months |
| TxDOT Beaumont Remote Workstations | Procure 2 laptops and a cellular modem for remote ITS operations | TxDOT | To Be Determined | Yes | 1 year |
| TxDOT Closed Loop Signal System Upgrades | Upgrade traffic signals, controllers and install VIVIDS at existing signal locations in the Beaumont Region | TxDOT | \$500,000/year | Yes | 5 years |
| TxDOT Closed Loop Signal System Expansion Phase 1 | Expand closed loop signal system in the Beaumont Region, including signals, controllers and VIVDS | TxDOT | \$1,000,000 – 1,500,000/year | Yes | 5 years |
| TxDOT Beaumont District Web Page | Implement a web page for the Beaumont Region to provide travel information, real-time traffic conditions, hurricane evacuation information/advisories, closures, etc. The site will include TxDOT and local agency information. | TxDOT | \$50,000 plus cost of periodic updates | No | 2 years |
| TxDOT Center-to-Center Communications | Enhance coordination with other TxDOT Districts through implementation of center-to-center communications between the Beaumont District Office and other TxDOT Districts. The Houston TranStar connection will allow joint operations of ferry DMS. | TxDOT | N/A | Yes (statewide initiative) | 1 year |
| City of Beaumont Traffic Signal System Upgrade/Expansion Phase 1 | Upgrade and expand signal system (including loop detectors) in the City of Beaumont | City of Beaumont | To Be Determined | No | 2 years |



Table 6 – Short-Term Projects (5-Year) (continued)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|---|--|--|------------------|--------------------|----------------------------|
| Travel and Traffic Management (continued) | | | | | |
| City of Port Arthur Traffic Signal System Upgrade/Expansion Phase 1 | Upgrade and expand signal system in the City of Port Arthur and provide for additional loop detection | City of Port Arthur | To Be Determined | No | 2 years |
| Interstate Coordination | Establish communications connection and information sharing between TxDOT Beaumont District Office and LADOTD District 7 | TxDOT/LADOTD | To Be Determined | No | 6 months |
| City of Beaumont Rail Crossing Warning System | Implement an enhanced RR crossing system at select HRIs with detection, CCTV cameras, and automated motorist warning devices | City of Beaumont/Rail Operators | To Be Determined | No | 1 year |
| Emergency Management | | | | | |
| DPS/TxDOT District Office Connection | Establish connection to TxDOT District Office for CCTV shared monitoring | TxDOT/DPS | To Be Determined | No | 3 months |
| DPS Computer Aided Dispatch System | Implement a Computer Aided Dispatch for DPS in the Beaumont Region | DPS | \$500,000 | No | 2 years |
| Emergency Management Agencies/TxDOT District Office Connection | Establish connection to TxDOT District Office to allow emergency management agencies (including members of the HAZMAT Alliance and MAMB) to access CCTV images | TxDOT/Emergency Management Agencies | To Be Determined | No | 3 months |
| River Authority/TxDOT District Office Connection | Install connection between TxDOT District Office and Sabine River, Trinity River and Lower Neches Valley Authorities | TxDOT/Sabine River Authority/Trinity River Authority/Lower Neches Valley Authority | To Be Determined | No | 2 years |



Table 6 – Short-Term Projects (5-Year) (continued)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|--|---|----------------------------|------------------------------------|----------------------------|----------------------------|
| Emergency Management (continued) | | | | | |
| Emergency Vehicle Traffic Signal Preemption | Complete preemption program for fire vehicles on approximately 200 traffic signals in Jefferson, Orange, and Hardin Counties. Includes signals, on-board transmitters, and controller upgrades. | SETRPC/TxDOT/Fire | \$1,500,000 | Yes | 2 years |
| Motorist Assistance Patrol | Implement a motorist assistance program with dispatch capability. Initial program is for I-10 and US 69. | SETRPC | To Be Determined | Yes | 2 years |
| Emergency Call-Out System | Expand existing emergency call-out phone system to include additional counties | County Sheriffs | To Be Determined | No | 4 years |
| Maintenance and Construction Management | | | | | |
| TxDOT HCRS Enhancements | Implement enhancements to the Highway Conditions Reporting System (HCRS) | TxDOT | N/A | Yes (statewide initiative) | 1 year |
| TxDOT Portable DMS | Procure 6 additional portable DMS for TxDOT maintenance crews (Chambers, Liberty, and Cleveland area) | TxDOT | \$180,000 | No | 6 months |
| County Portable DMS | Procure portable DMS for county maintenance crews (Jefferson, Orange, Chambers and others as needed) | Counties | \$30,000/sign | No | 6 months |
| Public Transportation Management | | | | | |
| Beaumont Municipal Transit AVL | Install AVL on 16 fixed-route and paratransit vehicles in the BMT fleet to provide real-time bus location information | Beaumont Municipal Transit | \$10,000/vehicle includes software | No | 1 year |
| Port Arthur Transit AVL | Install AVL on 25 fixed route and paratransit vehicles in the PAT fleet to provide real-time bus location information | Port Arthur Transit | \$10,000/vehicle includes software | No | 1 year |
| Web-based Transit Traveler Information | Develop and implement a regional web-based transit travel information resource for fixed-route, paratransit and combined services of BMT and PAT | BMT/PAT | \$100,000 | No | 1 year |



Table 6 – Short-Term Projects (5-Year) (continued)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|---|--|---------------------|-----------------|--------------------|----------------------------|
| Public Transportation Management (continued) | | | | | |
| SETRPC Computer Aided Dispatch | Implement a CAD system for SETRPC's paratransit services | SETRPC | TBD | No | 1 year |
| Information Management | | | | | |
| Regional Accident/Crash Database | Implement system to archive accident data from multiple agencies in the Region, including DPS, local police (in conjunction with SETRPC Congestion Database) | SETRPC | \$100,000 | Yes | 2 years |

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted.

**Probable Cost is not an estimate because no design work has been done.



Beaumont Region Short-Term Projects (5-Year)

Travel and Traffic Management

TxDOT Beaumont Freeway Management System Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Freeway Control (ATMS04)
- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)

Prerequisite Projects: None

Description: Phase 1 of the TxDOT FMS program in the Beaumont Region will include deployment of CCTV cameras, detectors, and additional DMS. The project also will install the communication infrastructure necessary to integrate the field devices with the Beaumont District Office. High priority routes for this first phase will likely focus on I-10 in the metro area.

The cameras will be strategically located at high accident and/or high traffic volume interchanges. Each camera also will be equipped with PTZ capabilities (zoom lenses provide a viewing range of one to one and one-half miles). Video from these CCTV cameras will be routed to the Beaumont District Office.

TxDOT will utilize DMS primarily to alert motorists of roadway conditions, closures/restrictions, and also to display Amber Alert messages. Currently, there are DMS along I-10, but not within the metro area. In addition to conditions within the Beaumont Region, roadway conditions on major evacuation routes will be disseminated to motorists via the DMS and HAR.

The cost of this project will vary based on number of elements deployed. A cost of \$2,000,000 was used for estimating purposes for Phase 1.

TxDOT Advanced Traffic Management System (ATMS)

Associated Market Packages:

- Network Surveillance (ATMS01)
- Freeway Control (ATMS04)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Broadcast Traveler Information (ATIS01)
- Weather Information Processing and Distribution (MC04)
- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: This project involves the implementation of ATMS software to facilitate control of DMS, future CCTV cameras and other TxDOT field equipment.

The TxDOT ATMS is a software and hardware based platform developed by the TxDOT Traffic Operations Division. The function of this software is to provide a platform for the integration of various subsystems. The high level functions of the TxDOT ATMS include:

- Collect traffic information (e.g., speed, incidents, lane closures) through a variety of collection methods such as loops, video image detection, etc.;
- Data archiving;
- Graphical map with traffic information;
- Status information, command and control for DMS, ramp metering and CCTV;
- Video switching; and
- User ID/password provided with each transaction for tracking use and establishing device control authority.

Future development efforts include software modules to provide status information and command/control of HAR and environmental sensors (such as flood detection systems). An integrated maintenance database management module is also under development. Lastly, several modules are currently being upgraded to support recently approved National Transportation Communications for ITS Protocol (NTCIP) standards for CCTV, Center-to-Center (C2C) Communications, and data collection devices.

This ATMS implementation project will include the software and hardware necessary to have an operational central system to routinely poll devices and support archiving of data.

TxDOT Ramp Control System

Associated Market Packages:

- Network Surveillance (ATMS01)
- Freeway Control (ATMS04)

Prerequisite Projects: TxDOT ATMS, TxDOT Beaumont Freeway Management System Phase 1

Description: In several locations in the Beaumont Region freeway geometrics necessitate short accelerations lanes on on-ramps. Currently, one of these locations has a pre-timed gate for closing the ramp during rush hour. This project would replace that system and include instrumentation of additional interchanges possibly with ramp metering, automated closure gates, or another traffic responsive technology that would allow alteration of ramp control based on traffic conditions. Because this system would be traffic response rather than pre-timed, DMS or other motorists information devices would be needed to warn travelers in advance that the ramp control system is active.

TxDOT Highway Advisory Radio Upgrade and Expansion

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)

Prerequisite Projects: None

Description: This project will upgrade the existing HAR transmitter in the Region as well as implement additional transmitters at additional sites throughout the Region for an increased coverage area. HAR will allow operators at the Beaumont District Office to record travel advisory messages related to traffic, incidents, and weather for transmission at the roadside to vehicles traveling in the vicinity of the HAR transmitter(s).

TxDOT Beaumont Remote Workstations

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: Procure two laptops and a cellular modem for remote monitoring and control of ITS elements in the Region. This will allow district personnel to manage dynamic message sign operations, or other devices in the future, from the field or from their homes after hours.

TxDOT Closed Loop Signal System Upgrades

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Upgrade traffic signals and controllers in the Beaumont District that are already part of the closed-loop signal system. Implementation of VIVDS is included as part of these upgrades. TxDOT programs \$500,000 annually for signal system maintenance and improvements in the Beaumont District.

TxDOT Closed Loop Signal System Expansion Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the closed loop signal system by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed loop signal system. TxDOT Beaumont programs \$1-\$1.5 million annually for new traffic signals.

TxDOT Beaumont District Web Page

Associated Market Packages:

- Broadcast Traveler Information (ATIS1)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: TxDOT Beaumont plans to implement a web page that will serve as a traveler information tool for motorists in the Region. This web page will be an enhanced version of what Beaumont-area information is currently available via the statewide TxDOT web page, and is envisioned to include current closures and restrictions, maintenance activities, hazards, real-time weather and pavement conditions, weather emergencies impacting travel, hurricane evacuation information, and motorist alerts and advisories. Additional content and links could include information about traveler services in towns and cities in the Region, or links to Chambers of Commerce. Information on major corridors in neighboring regions as well as Louisiana also could be included. The web page will be managed and updated by the Public Information Officer in the TxDOT Beaumont District Office.

TxDOT Center-to-Center Communication (Statewide)

Associated Market Packages:

- Regional Traffic Control and Coordination (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation

Description: The Center-to-Center Communications project is a logical extension of the TxDOT ATMS and field equipment deployments. The project will enhance coordination with TxDOT Districts (and potentially other agencies) through connection to the statewide C2C core infrastructure. A communication backbone must be developed with sufficient capacity between the TxDOT Beaumont District Office and existing C2C infrastructure. Determination of whether the backbone should be TxDOT owned, leased, or a combination thereof will be at a later date. The software required to support C2C communications is integrated with the TxDOT developed ATMS, so significant software development efforts are not anticipated. Resources will be required to oversee installation of the communications backbone between the TxDOT Beaumont District Office and statewide C2C facilities. As part of connecting to the statewide C2C infrastructure, the Beaumont Region will provide data to the statewide web server and statewide data archiving database. In return, access to information from other TxDOT Districts (and potentially other agencies) will be available to enhance operations throughout the Region.

City of Beaumont Traffic Signal System Upgrade/Expansion Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Upgrade and expand the closed loop signal system in the City of Beaumont through replacement of controllers and by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed loop signal system. Upgrades also include loop detection.

City of Port Arthur Traffic Signal System Upgrade/Expansion Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Upgrade and expand the closed loop signal system in the City of Port Arthur through replacement of controllers and by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed loop signal system. Upgrades also include loop detection.

Interstate Coordination

Associated Market Packages:

- Regional Traffic Control and Coordination (ATMS07)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Implement communication links and information sharing between TxDOT and Louisiana Department of Transportation and Development. The Beaumont Region shares the common corridor of I-10 with Louisiana. Major incidents, weather hazards, closures and restrictions, or evacuations along this corridor in the Beaumont Region or in Louisiana could have significant impacts on interstate travel and commerce. Sharing planned and unplanned incident information is valuable, due to the limited alternate routes and limited resources/facilities in smaller communities positioned along the corridors. The information sharing will require software development to collect data from different systems and sources, convert or translate information (if required) to a common data dictionary, and disseminate packaged information back to partner states. As an alternative, the interstate nature of the project may lend itself to a secure web-based information sharing strategy, rather than direct center-to-center communications among systems in different states.

Initial tasks of the project include meeting with representatives of various partner state agencies and authorities to determine willingness to share data, technical and institutional barriers, data sharing content, transmission frequency, and next steps. Agreements will be required between project partners to clarify: use of data; privacy issues; liability issues; and data quality maintenance.

City of Beaumont Rail Crossing Warning System

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Standard Railroad Grade Crossing (ATMS13)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: None

Description: This project will include highway/rail intersection warning systems that will alert motorists of arriving trains, amount of time the train will occupy the crossing, and the length of time a motorist can expect to be delayed. These alerts could be provided via arterial DMS or other signage, such as a static sign with flashing beacons that are activated when an approaching train is detected. The deployment of instrumentation will be along roadways at railroad grade crossings. Information will be gathered either directly from the railroad operators or from sensors placed along the railroad right-of-way that monitor train length and speed. Data will be transferred from the field sensors to the City of Beaumont TOC where operators can make decisions regarding changes in signal operations to facilitate flow around the closed crossing or to clear traffic once the train has passed the crossing.

Emergency Management

DPS/TxDOT District Office Connection

Associated Market Packages:

- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation, TxDOT Beaumont Freeway Management System Phase 1

Description: Install telecommunications connection and end equipment from the DPS dispatch center to TxDOT Beaumont District Office to share CCTV and incident data/images and provide information on current road conditions that could assist with incident/emergency management. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

DPS Computer Aided Dispatch System

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Implement a CAD system for dispatch of DPS vehicles in the Beaumont Region. Because DPS is a state agency, a CAD system would need to be a statewide initiative. A CAD system for DPS would be most effective in conjunction with AVL units on-board each of the DPS vehicles, to allow for vehicles in the field and their locations to be displayed on a map of the Region. When emergency calls come in through 911 or another agency, dispatchers would create an incident entry in the CAD system, including the incident location and type/nature of the incident. The CAD system would identify the nearest patrol vehicle based on location information from AVL units and then generate an appropriate dispatch. The CAD system would be able to maintain records of all communications and responses between the dispatch center and the responding officer(s), and in effect, 'track' the incident from beginning to end.

Based on specifications created by DPS, there can be functions built in to the CAD to prioritize incidents (or assign priority) based on the type, severity, and other factors. A centralized, automated CAD system will allow DPS to manage multiple incidents, and could potentially interface with other agencies that would need to be contacted with incident details. During a major event that requires a multi-agency response, all involved agencies in the Beaumont Region would be able to work from the same incident data and immediately know what resources have been committed. The records management function of a CAD system allows for all of the incident details to be stored in a consistent format, clearly identifies the dispatcher, responding officer(s), other agencies involved, duration of the incident, actions taken, and other pertinent details.

Emergency Management Agencies/TxDOT District Office Connection

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation, TxDOT Beaumont Freeway Management System Phase 1

Description: Establish telecommunications connections to the TxDOT District Office to allow emergency management agencies such as members of the HAZMAT Alliance and MAMB to access CCTV images. The connection will also provide information on current road conditions that could assist with incident/emergency management and evacuation routing.

River Authority/TxDOT District Office Connection

Associated Market Packages:

- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation

Description: Install a telecommunications connection between the TxDOT District Office and the Sabine, Trinity and Lower Neches Valley River Authorities to share flood sensor data. Cost will vary based on number of connections and communications used to establish connections. With future flood sensor implementation (mid and long-term), TxDOT will also be able to provide its information to the River Authorities.

Emergency Vehicle Traffic Signal Preemption

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: Equip approximately 200 intersections and fire vehicles in Jefferson, Hardin and Orange Counties with traffic signal preemption equipment. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident. This project is currently underway and should be completed within two years. The estimated cost of this project is \$1,500,000 and funding has been secured through the SETRPC using CMAQ funds.

Motorist Assistance Patrol

Associated Market Packages:

- Incident Management System (ATMS08)
- Roadway Service Patrol (EM4)

Prerequisite Projects: None

Description: Establish a motorist assistance patrol to provide emergency roadside service to stranded motorists. This service could include assistance with tire changes, gas, and assistance requesting tow truck service. This patrol also could provide assistance during accident clean up and provide traffic control during incidents depending on the functions the Beaumont Region plans to have the roadside service patrol perform. Assistance in clearing stranded vehicles and in clearing incidents provides a benefit to the traveling public through decreased delay and increased safety. Funding has been identified

by SETRPC for the initial implementation of the motorist assistance patrol in the metro area of Beaumont.

Emergency Call-Out System

Associated Market Packages:

- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: None

Description: Establish an emergency call-out system to notify the public of emergency events in the Region. The system would call every household in an area and play a recorded message with details of action required on the part of the resident. This could be information regarding a prison escapee, hurricane evacuation, hazardous materials spill, or other incidents where a large segment of the community needs to be made aware of an emergency condition. Orange County already has this type of system. This project would expand the system to include the other counties in the Region.

Maintenance and Construction Management

TxDOT HCRS Enhancements

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Broadcast Traveler Information (ATIS01)
- Freeway Control (ATMS04)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Roadway Maintenance and Construction (MC07)
- Maintenance and Construction Activity Coordination (MC010)

Prerequisite Projects: None

Description: TxDOT's HCRS will be enhanced on a statewide basis. The HCRS will use data from the Beaumont District Office, both automated (ATMS) and manually entered. It is envisioned that the ATMS software will enhance the data collection and consolidation processes for automated information. This is a statewide effort; Beaumont will be affected by this project, and will contribute information to the HCRS, but will not be responsible for funding the enhancements or for the implementation schedule.

TxDOT Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The TxDOT Beaumont Region currently has portable DMS that are used throughout the Region. Six additional portable DMS are recommended for use by TxDOT maintenance staff in Chambers and Liberty Counties and the Cleveland Area. The estimated cost is \$180,000.

County Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: This project would procure portable DMS for county maintenance crews in Jefferson, Orange, Chambers, and other counties as needed. Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The estimated cost is \$30,000 per sign.

Public Transportation Management

Beaumont Municipal Transit Automated Vehicle Location (AVL)

Associated Market Packages:

- Transit Vehicle Tracking (APTS01)
- Transit Fixed-Route Operations (APTS02)
- Demand-Response Transit Operations (APTS03)
- Multimodal Coordination (APTS07)
- Transit Traveler Information (APTS08)

Prerequisite Projects: None

Description: Install AVL on Beaumont Municipal Transit (BMT) fixed-route and demand-response vehicles. The AVL system will convey information regarding real-time vehicle location to the Transit Operations/Dispatch Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a geographic information system (GIS) map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with Computer Aided Dispatch, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions). For planning purposes, \$10,000 per vehicle was used for the cost.

Port Arthur Transit Automated Vehicle Location (AVL)

Associated Market Packages:

- Transit Vehicle Tracking (APTS01)
- Transit Fixed-Route Operations (APTS02)
- Demand-Response Transit Operations (APTS03)
- Multimodal Coordination (APTS07)
- Transit Traveler Information (APTS08)

Prerequisite Projects: None

Description: Install AVL on Port Arthur Transit (PAT) fixed-route and demand-response vehicles. The AVL system will convey information regarding real-time vehicle location to the Transit Operations Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as

provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a GIS map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with Computer Aided Dispatch, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions). For planning purposes, \$10,000 per vehicle was used for the cost.

Web-based Regional Transit Traveler Information

Associated Market Packages:

- Transit Fixed Route Operations (APTS02)
- Demand-Response Transit Operations (APTS03)
- Multimodal Coordination (APTS07)
- Transit Traveler Information (APTS08)

Prerequisite Projects: None

Description: Provide up-to-date transit information for BMT and PAT fixed route, paratransit and system to system transfers on the Internet. This project will implement web-based transit traveler information that can be accessed by patrons pre-trip to identify routes, schedules, status (delays, bus arrival times, etc. from AVL data) and other pertinent information. An integrated transit traveler information system will make this information accessible from the Internet, at kiosks or other displays at transfer stations, and via phone. Coordination with TxDOT and the Cities of Beaumont and Port Arthur would allow for current traffic conditions, incidents, closures, special events, and other impacts to the roadway network to be displayed with the transit route and status information.

An on-board element of the transit traveler information system could provide passengers already on the bus with information about bus arrival, name of stop, next bus arrival, and transfer requirements. These on-board enunciators support Americans with Disabilities Act requirements.

SETRPC Computer Aided Dispatch

Associated Market Packages

- Demand Response Transit Operations (APTS03)

Prerequisite Projects: None

Description: Implement a centralized computer-aided (CAD) dispatch system/center that would consolidate dispatch and communications for SETRPC and its paratransit fleet in the Beaumont Region.

Currently, there are three independent subcontractors that provide demand-response service. A CAD system will streamline communications between dispatchers and drivers. Used in conjunction with automated vehicle location (AVL), which is a future recommendation, dispatchers can assess vehicle locations, status, route adherence, as well as communicate with one or several vehicles that are in the field. A CAD system also improves the system reporting functions, by automatically logging all communications between the dispatch center and the driver, including time, vehicle/driver, nature of the communication, and response.

Information Management

Regional Accident/Crash Database

Associated Market Packages:

- ITS Data Warehouse (AD2)

Prerequisite Projects: None

Description: Implement a system to archive accident data from multiple agencies in the Region. A central archived data server will be developed at the SETRPC that will collect, process, store and provide access to historical accident data from throughout the Region, including accident/crash information from DPS and local police. Communications links will be necessary between SETRPC and the other data sources, such as the DPS and local police. This project will design the frequency, quantity, and quality of data to be collected and stored. User interfaces will be required at each “user” agency to be able to access, search, and upload archived data as needed. The interface will likely be web-based and SETRPC plans to develop this project in conjunction with its Congestion Management Database.



Table 7 – Mid-Term Projects (10-Year)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|---|---|---------------------------|------------------|--------------------|----------------------------|
| Travel and Traffic Management | | | | | |
| TxDOT Beaumont Freeway Management System Phase 2 | Implement additional CCTV cameras, DMS, and vehicle detectors in the Beaumont Region | TxDOT | \$5,000,000 | No | 4 years |
| TxDOT Closed Loop Signal System Expansion Phase 2 | Continue expansion and upgrade of closed loop signal system at TxDOT intersections throughout Region | TxDOT | \$1,000,000/year | No | 10 years |
| Regional 511 Advanced Traveler Information System Server | Implement an Advanced Traveler Information System (ATIS) Server in the Beaumont District Office that will collect, consolidate and distribute travel information to 511 phone based system, web, and private Information Service Providers (ISPs) | TxDOT | To Be Determined | No | 1 year |
| TxDOT Rest Stop/Welcome Center Kiosks | Implement TextBox kiosks at rest stops and welcome centers in the Beaumont Region | TxDOT | To Be Determined | No | 2 years |
| City of Beaumont Traffic Signal System Expansion Phase 2 | Continue expansion and upgrade of traffic signal system in City of Beaumont, including expansion of VIVDS and loops | City of Beaumont | To Be Determined | No | 5 years |
| City of Beaumont CCTV | Implement CCTV cameras at key intersections and along key corridors in the City of Beaumont | City of Beaumont | \$25,000/site | No | 2 years |
| City of Port Arthur Traffic Signal System Expansion Phase 2 | Continue expansion and upgrade of traffic signal system in City of Port Arthur, including expansion of VIVIDS and loops | City of Port Arthur | To Be Determined | No | 5 years |
| City of Port Arthur CCTV | Implement CCTV cameras at key intersections and along selected corridors in the City of Port Arthur | City of Port Arthur | \$25,000/site | No | 5 years |
| City of Beaumont/TxDOT District Office Connection | Implement a connection between the City of Beaumont TOC and TxDOT District Office to allow shared video viewing, traffic data sharing, and incident management coordination | TxDOT/City of Beaumont | To Be Determined | No | 3 months |
| City of Port Arthur/TxDOT District Office Connection | Implement a connection between the City of Port Arthur TOC and TxDOT District Office to allow shared video viewing, traffic data sharing, and incident management coordination | TxDOT/City of Port Arthur | To Be Determined | No | 3 months |



Table 7 – Mid-Term Projects (10-Year) (continued)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|---|---|------------------------------------|------------------------------------|--------------------|----------------------------|
| Travel and Traffic Management (continued) | | | | | |
| City of Beaumont Rail Crossing Warning System Expansion | Implement advanced HRI warning systems at additional crossings | City of Beaumont/Rail Operators | To Be Determined | No | 3 years |
| City Port Arthur Rail Crossing Warning System Phase 1 | Implement advanced HRI warning systems at selected intersections | City of Port Arthur/Rail Operators | To Be Determined | No | 3 years |
| Emergency Management | | | | | |
| TxDOT Flood Detection Stations Phase 1 | Implement additional flood monitoring/warning systems throughout the Beaumont Region | TxDOT | \$25,000/site | No | 1 year |
| EOC/TxDOT District Office Connection | Implement a connection from the TxDOT Beaumont District Office to the Beaumont Regional Emergency Operations Center | TxDOT | To Be Determined | No | 3 months |
| Emergency Vehicle Traffic Signal Preemption Expansion | Install additional signal preemption capability at signalized intersections throughout the Region | SETRPC/TxDOT/Fire | To Be Determined | No | 1 year |
| DPS AVL System | Install AVL on DPS Vehicles to provide real-time location information | DPS | \$10,000/vehicle includes software | No | 1 year |
| City of Port Arthur Emergency Vehicle AVL | Implement AVL on fire, EMS, and police vehicles for real-time location information | City of Port Arthur | \$10,000/vehicle includes software | No | 2 years |
| City of Orange Emergency Vehicle AVL | Implement AVL on fire and EMS vehicles for real-time location information | City of Orange | \$10,000/vehicle includes software | No | 2 years |



Table 7 – Mid-Term Projects (10-Year) (continued)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|---|---|---|------------------------------------|---------------------------|-----------------------------------|
| <i>Maintenance and Construction Management</i> | | | | | |
| TxDOT Regional Maintenance Decision Support System | Implement a coordinated maintenance information and decision support system to coordinate maintenance activities among TxDOT, counties and cities in the Region | TxDOT | \$250,000 | No | 3 years |
| TxDOT Maintenance Vehicle AVL and CAD System | Install AVL on TxDOT maintenance vehicles for real-time location and status information and implement CAD capabilities at the TxDOT District Office | TxDOT/Other Maintenance Agencies | \$10,000/vehicle includes software | No | 1 year |
| TxDOT Portable Smart Workzones | Procure portable smart workzone equipment for TxDOT, including speed warning trailers, portable DMS, portable CCTV, portable detection and other systems to enhance workzone safety | TxDOT | \$200,000 | No | 1 year |
| Port Arthur Municipal Vehicle AVL Phase 1 | Install automated vehicle location system on municipal maintenance vehicles (pick-ups, dump trucks, trash trucks) | City of Port Arthur | \$10,000/vehicle includes software | No | 1 year |
| County Maintenance Vehicle AVL | Install AVL on county maintenance vehicles for real time location and status information (Jefferson, Orange, Chambers and others as needed) | Counties | \$10,000/vehicle includes software | No | 1 year |
| <i>Public Transportation</i> | | | | | |
| Beaumont Municipal Transit Security System | Implement on-board security alarms on all BMT fixed route and paratransit vehicles | Beaumont Municipal Transit | To Be Determined | No | 1 year |
| Port Arthur Transit Security System | Implement on-board security alarms on all PAT fixed route and paratransit vehicles | Port Arthur Transit | To Be Determined | No | 1 year |
| BMT/PAT Passenger Fare Card | Implement a standardized fare card that can be used for Beaumont or Port Arthur Transit (fixed-route and paratransit), and install fare collection system on BMT and PAT buses (Link) | Beaumont Municipal Transit, Port Arthur Transit | \$1,500/vehicle | No | 2 years |
| PAT Transit Security Cameras | Install security cameras on-board PAT fixed route and paratransit vehicles | Port Arthur Transit | \$15,000/vehicle | No | 1 year |



Table 7 – Mid-Term Projects (10-Year) (continued)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|--|--|---------------------------------------|------------------------------------|--------------------|----------------------------|
| Public Transportation (continued) | | | | | |
| Beaumont Municipal Transit Information Kiosks | Install kiosks in Beaumont for transit traveler information and include point-of-sale function for advance fare purchase. Kiosks will also provide multimodal information from multiple transit providers, and other regional modes (airport, traffic, etc.). | Beaumont Municipal Transit | \$20,000/kiosk | No | 1 year |
| Port Arthur Transit Information Kiosks | Install kiosks in Port Arthur for transit traveler information and include point-of-sale function for advance fare purchase. Kiosks will also provide multimodal information from multiple transit providers, and other regional modes (airport, traffic, etc.). | Port Arthur Transit | \$20,000/kiosk | No | 1 year |
| SETRPC Automated Fare and Passenger Information System | Implement automated fare collection/passenger information system on demand-response vehicles | SETRPC | To Be Determined | No | 5 years |
| SETRPC Demand-Response AVL | Implement automated vehicle location on independent paratransit vehicles that are part of the SETRPC regional demand-response resources | SETRPC/Private paratransit operators | \$10,000/vehicle includes software | No | 5 years |
| Commercial Vehicle Operations | | | | | |
| HAZMAT Tracking | Implement a coordinated program among private sector transport companies (rail and CVO) and public safety for HAZMAT tracking | Private Transport Companies/DPS/TxDOT | To Be Determined | No | 2 years |
| Regional HAZMAT Permitting Coordination | Implement a coordinated permitting system for TxDOT, DPS, and City of Beaumont for HAZMAT permitting | TxDOT/DPS/City of Beaumont | To Be Determined | No | 3 years |

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted.

**Probable Cost is not an estimate because no design work has been done.



Beaumont Region Mid-Term Projects (10-Year)

Travel and Traffic Management

TxDOT Beaumont Freeway Management System Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Freeway Control (ATMS04)
- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation, TxDOT Beaumont Freeway Management System Phase 1

Description: Phase 2 of the TxDOT Beaumont Freeway Management System will implement additional CCTV cameras and DMS, as well as traffic detectors and additional infrastructure (including communications) in the Beaumont Region.

TxDOT Closed Loop Signal System Expansion Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: TxDOT Closed Loop Signal System Phase 1

Description: Expand the closed loop signal system by integrating additional signals and implementing VIVDS at select TxDOT intersections throughout the Region. TxDOT Beaumont programs \$1-\$1.5 million annually for new traffic signals.

Regional 511 Advanced Travel Information System Server

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Broadcast Traveler Information (ATIS01)
- ISP-Based Route Guidance Support (ATIS06)
- Work Zone Management (MC08)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS), TxDOT Center-to-Center Communications, TxDOT Highway Condition Reporting System Enhancements

Description: Install a server dedicated to travel information in the TxDOT Beaumont District Office. This server would be installed as part of a 511 rollout in Texas and would provide a gateway for public

and private entities to access current conditions, closures, restrictions, weather, and other valuable travel information. Relevant data from the ATMS and HCRS would be sent to the ATIS server where it would be consolidated and ‘packaged’ for distribution via phone (511) and also web and to private partners who desire access to information in the Beaumont Region. These private partners could include local media and information service providers, which would link to the ATIS server to download information, or obtain real-time feeds, depending on the link provided by the private partner. Appropriate security measures and firewalls could be designed into the server to allow or restrict access to registered, authorized users. By fusing various types of data from a variety of sources (traffic management, incident management, and others), this data can be converted to usable information for travelers as well as other agencies.

TxDOT Rest Stop/Welcome Center Kiosks

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)

Prerequisite Projects: TxDOT Beaumont Web Page

Description: Rest areas and welcome centers along highways offer an opportunity to provide static as well as real-time information about travel conditions, travel advisories, or closures in the Region. Kiosks would consist of consoles equipped with a touch-screen interface which would provide requested information to users. The interface could include static data stored on the console (such as maps, nearby attractions, points of interest, etc.) or provide a link to the Beaumont or other web pages for more dynamic information. Communications to facilitate connection to the Internet would be required. Some kiosks also have a print function, although additional maintenance and support is often required to keep the printers in working order. Partnering with the Department of Tourism could help leverage the costs of implementation and ongoing maintenance and upgrades.

City of Beaumont Traffic Signal System Expansion Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Beaumont Traffic Signal System Upgrade/Expansion Phase 1

Description: Continue expansion and implementation of the City of Beaumont closed-loop signal system, including loop detection at selected locations.

City of Beaumont CCTV

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Regional Traffic Control (ATMS07)

Prerequisite Projects: None

Description: This project includes the deployment of CCTV cameras at selected intersections in the City of Beaumont. The CCTV cameras can be used to monitor congestion associated with recurring events and signal control adjusted according to the vehicular demand. The information gathered by the CCTV cameras (video feed) can be shared with the TxDOT District Office for shared or after-hours viewing/monitoring.

City of Port Arthur Traffic Signal System Expansion Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Port Arthur Traffic Signal System Upgrade/Expansion Phase 1

Description: Continue expansion and implementation of the City of Port Arthur closed-loop signal system.

City of Port Arthur CCTV

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Regional Traffic Control (ATMS07)

Prerequisite Projects: None

Description: This project includes the deployment of CCTV cameras at selected intersections in the City of Port Arthur. The CCTV cameras can be used to monitor congestion associated with recurring events and signal control adjusted according to the vehicular demand. The information gathered by the CCTV cameras (video feed) can be shared with the TxDOT District Office for shared or after hours viewing/monitoring.

City of Beaumont/TxDOT District Office Connection

Associated Market Packages:

- Surface Street Control (ATMS03)
- Regional Traffic Control (ATMS07)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)
- Emergency Routing (EM2)

Prerequisite Projects: TxDOT ATMS, TxDOT Beaumont Freeway Management System Phase 1

Description: Implement a connection between the City of Beaumont TOC and the TxDOT District Office to allow shared viewing of video, traffic information, and other mutually beneficial data. Shared monitoring and control capabilities provided through the connection could also allow for joint operations of City equipment (i.e., traffic signals) by TxDOT District Office staff, such as for after-hours or on weekends, if the TxDOT District Office serves as a 24/7 facility in an emergency event. Data/video sharing and other joint operation policies need to be developed and agreed upon between TxDOT and the City of Beaumont, preferably before final design of the systems begins, because some policies may have a direct impact on design strategies.

City of Port Arthur/TxDOT District Office Connection

Associated Market Packages:

- Surface Street Control (ATMS03)
- Regional Traffic Control (ATMS07)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)
- Emergency Routing (EM2)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation, TxDOT Beaumont Freeway Management System Phase 1

Description: Implement a connection between the City of Port Arthur TOC and the TxDOT District Office to allow shared viewing of video, traffic information, and other mutually beneficial data. Shared monitoring and control capabilities provided through the connection could also allow for joint operations of City equipment (i.e., traffic signals) by TxDOT District Office staff, such as for after-hours or on weekends, if the TxDOT District Office serves as a 24/7 facility in an emergency event. Data/video sharing and other joint operation policies need to be developed and agreed upon between TxDOT and the City of Port Arthur, preferably before final design of the systems begins, because some policies may have a direct impact on design strategies.

City of Beaumont Rail Crossing Warning System Expansion

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Standard Railroad Grade Crossing (ATMS13)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: City of Beaumont Rail Crossing Warning System Phase 1

Description: This project will continue to implement highway/rail intersection warning systems that will alert motorists of arriving trains, amount of time the train will occupy the crossing, and the length of time a motorist can expect to be delayed. The deployment of instrumentation will be along roadways at railroad grade crossings. Information will be gathered either directly from the railroad operators or from sensors placed along the railroad right-of-way that monitor train length and speed. Data will be transferred from the field sensors to the City of Beaumont TOC where operators can make decisions regarding changes in signal operations to facilitate flow around the closed crossing or to clear traffic once the train has passed the crossing.

City of Port Arthur Rail Crossing Warning System Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Standard Railroad Grade Crossing (ATMS13)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: None

Description: This project will include implementing highway/rail intersection warning systems at key locations in Port Arthur that will alert motorists of arriving trains, amount of time the train will occupy the crossing, and the length of time a motorist can expect to be delayed. These alerts could be provided via arterial DMS or other signage, such as a static sign with flashing beacons that are activated when an approaching train is detected. The deployment of instrumentation will be along roadways at railroad grade crossings. Information will be gathered either directly from the railroad operators or from sensors placed along the railroad right-of-way that monitor train length and speed. Data will be transferred from the field sensors to the City of Port Arthur Traffic Operations Center where operators can make decisions regarding changes in signal operations to facilitate flow around the closed crossing or to clear traffic once the train has passed the crossing.

Emergency Management

TxDOT Flood Detection Stations Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: Implement flood detection systems on flood-prone segments of Interstates and state routes in the Beaumont Region. This will enable faster response times by maintenance crews to close flooded or near flooded roadway segments as necessary. The typical flood detection station is composed of a stream gauge, a rain gauge, a temperature sensor, a wind speed sensor, and a wind direction sensor and remote communications support. Other upgrades that may support operational decision making include sensors to measure relative humidity, soil moisture content, solar radiation, and air and water quality. The flood detection systems will be monitored from the TxDOT Beaumont District Office. Communications between the flood detection stations and the District Office can be achieved through a variety of wireless and wireline telemetry methods. There is a future module of the ATMS software planned to support environmental sensors, and development of this module could be extended to include the needs of flood detection stations.

Costs for this project will vary based on the number of locations and detection stations installed, as well as communications. For planning purposes, a cost per station was estimated at \$25,000 each (including communications).

EOC/TxDOT District Office Connection

Associated Market Packages:

- Regional Traffic Control and Coordination (ATMS07)
- Incident Management System (ATMS08)
- Emergency Routing (EM2)

Prerequisite Projects: TxDOT ATMS, TxDOT Beaumont FMS Phase 1

Description: Install telecommunications connection and end equipment from the Emergency Operations Center (currently co-located with DPS) to TxDOT Beaumont District Office to share CCTV and current road condition data that could assist with incident/emergency management. The cost for this project will depend on the technology used to implement the connection (i.e., fiber or leased lines).

Emergency Vehicle Traffic Signal Preemption Expansion

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: Emergency Vehicle Traffic Signal Preemption

Description: Install additional signal preemption capability at signalized intersections in the Region. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident.

DPS Automated Vehicle Location System

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM1)
- Emergency Routing (EM2)

Prerequisite Projects: None

Description: The DPS Automated Vehicle Location System project includes equipping DPS patrol and other vehicles with global positioning system (GPS) based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a base map showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage the fleet of vehicles. For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what patrol vehicle is closest to the location. AVL would work in conjunction with the Computer Aided Dispatching, although both could be deployed independently.

City of Port Arthur Emergency Vehicle AVL

Associated Market Packages:

- Emergency Vehicle Routing (EM2)

Prerequisite Projects: None

Description: Install AVL on City of Port Arthur fire, police and EMS vehicles. The AVL system will convey information regarding real-time vehicle location to the dispatch centers, which will allow for enhanced dispatch, routing (or re-routing), as well as provide for precise vehicle location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of vehicles, and relay that information back to a dispatch center, usually via global positioning system.

Costs will vary depending on the number of vehicles equipped with the on-board AVL unit. For planning purposes, it is estimated that the cost per vehicle is approximately \$10,000.

City of Orange Emergency Vehicle AVL

Associated Market Packages:

- Emergency Vehicle Routing (EM2)

Prerequisite Projects: None

Description: Install AVL on City of Orange fire and EMS vehicles. The AVL system will convey information regarding real-time vehicle location to the dispatch centers, which will allow for enhanced dispatch, routing (or re-routing), as well as provide for precise vehicle location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of vehicles, and relay that information back to a dispatch center, usually via global positioning system.

Costs will vary depending on the number of vehicles equipped with the on-board AVL unit. For planning purposes, it is estimated that the cost per vehicle is approximately \$10,000.

Maintenance and Construction Management

TxDOT Regional Maintenance Decision Support System

Associated Market Packages:

- Roadway Maintenance and Construction (MC07)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Implement a decision support system which would allow TxDOT Beaumont District maintenance personnel access to access historic maintenance information, as well as provide tools to predict impacts on road conditions, plan treatment scenarios, and schedule preventive and unplanned maintenance activities. These activities could include ITS-related needs, as well as other maintenance requirements, such as landscape/herbicide, roadway resurfacing, and others. This system is meant to provide the appropriate information to the appropriate personnel so that they can make proactive

maintenance activity and scheduling decisions. This system would need to have connections between the Beaumont District Office and Area maintenance offices within the District for collection and dissemination of current and historic maintenance related information. Maintenance activities from cities or counties also could be included as part of the database to facilitate further regional coordination of maintenance activities and schedules among TxDOT and local agencies. This decision support system would be integrated with the maintenance vehicle automated vehicle location and computer aided dispatch systems.

TxDOT Maintenance Vehicle AVL and CAD System

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Roadway Maintenance and Coordination (MC07)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Equip TxDOT Beaumont District maintenance vehicles with GPS based vehicle locators to track, in real-time, vehicle locations while in the field. It is envisioned that the location of the vehicle would be overlaid on a base map showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage the fleet of vehicles. Included in the project is a computer-aided dispatch system to facilitate dispatch of maintenance vehicles to incidents or work sites. For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what vehicle is closest and best equipped to clean up the spill.

TxDOT Portable Smart Work Zones

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Roadway Maintenance and Construction (MC07)
- Work Zone Management (MC08)
- Work Zone Safety Monitoring (MC09)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Procure smart work zones for use by TxDOT maintenance crews. A smart work zone is comprised of portable speed trailers, portable CCTV and portable DMS to monitor work zones and provide related information to the traveling public. In addition to being useful for work zone management, the smart work zone components, such as DMS or CCTV, could also have valuable application to managing a large, unplanned incidents and emergencies.

City of Port Arthur Municipal Maintenance Vehicle AVL Phase 1

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Roadway Maintenance and Construction (MC07)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Equip selected City of Port Arthur maintenance and public works vehicles (including pickup trucks, dump trucks, garbage trucks, street sweepers, etc.) with GPS based vehicle locators to track, in real-time, vehicle locations while in the field. The location of the vehicle would be overlaid on a base map showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors in better managing their fleets of vehicles.

County Maintenance Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Equip maintenance vehicles in Jefferson, Orange, Chambers and other Counties as needed with GPS based vehicle locators to track, in real-time, vehicle locations while in the field. The location of the vehicle would be overlaid on a base map showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage their fleets of vehicles.

Public Transportation Management

Beaumont Municipal Transit Security System

Associated Market Packages:

- Transit Security (APTS05)

Prerequisite Projects: None

Description: This project will install alarm buttons on the buses. If the driver feels there is a threat on the bus, the bus has been involved in an accident, or any other situation occurs where the driver may need assistance, he or she can activate the alarm. The alarm notifies the dispatch center of the potential problem so that help can be dispatched.



City of Port Arthur Transit Security System

Associated Market Packages:

- Transit Security (APTS05)

Prerequisite Projects: None

Description: This project will install alarm buttons on the buses. If the driver feels there is a threat on the bus, the bus has been involved in an accident, or any other situation occurs where the driver may need assistance, he or she can activate the alarm. The alarm notifies the dispatch center of the potential problem so that help can be dispatched.

BMT/PAT Passenger Fare Card

Associated Market Packages:

- Transit Fixed-Route Operations (APTS02)
- Demand-Response Transit Operations (APTS03)
- Transit Passenger and Fare Management (APTS04)

Prerequisite Projects: None

Description: Continuation and upgrade of existing AVL system to add automated fare payment capabilities to BMT and PAT buses. Using the same fare collection system and one regional fare payment card will allow for seamless transfers between transit systems. There are several benefits of electronic fare collection systems. One is enhanced revenue collection ability. Another is increased security by not having large amounts of cash or tokens on the vehicle. Finally, another very important benefit is the increased convenience and security for the transit patron. The system will build on hardware and software previously provided under the transit AVL projects. Specifically, fare boxes will be upgraded to accept smart cards (i.e., cards with passive radio frequency identification [RFID] technology or a magnetic information strip, such as a credit card) with rider and account information. Electronic fare payment technology is rapidly advancing, and several technological considerations will need to be examined, such as standards for smart cards and interoperability issues.

PAT Transit Security Cameras

Associated Market Packages:

- Transit Security (APTS05)

Prerequisite Projects: None

Description: This project will include the installation of security cameras on PAT fixed route buses and paratransit vehicles. Cameras will be for on-board recording only, and are not envisioned to be monitored remotely from the PAT Dispatch. Video will be stored for a pre-determined amount of time via video tape or emerging digital video recording technology. While the main objective of on-board surveillance projects has been to identify individuals committing criminal acts or creating disturbances on buses, there have been noticeable maintenance benefits such as a reduction of litter and debris.

Beaumont Municipal Transit Information Kiosks

Associated Market Packages:

- Multimodal Coordination (APTS07)
- Transit Traveler Information (APTS08)

Prerequisite Projects: Beaumont Municipal Transit Automated Vehicle Location (AVL)

Description: Install static and real-time transit and traveler information devices at transit transfer stations, major shopping centers and the regional airport in Beaumont. The project will build on information available from the transit AVL project. Based on the patron's request, kiosks will provide information on current bus operating conditions (e.g., Next bus – 5 minutes, on schedule, delayed 10 minutes, etc.). Displays at transit transfer centers or hubs would also provide current schedule information. Communications from the kiosks or other traveler information devices to the BMT dispatch center will also need to be included as part of this project.

Port Arthur Transit Information Kiosks

Associated Market Packages:

- Multimodal Coordination (APTS07)
- Transit Traveler Information (APTS08)

Prerequisite Projects: Port Arthur Transit Automated Vehicle Location (AVL)

Description: Install static and real-time transit and traveler information devices at transit transfer stations, major shopping centers and the regional airport in Port Arthur. The project will build on information available from the transit AVL project. Based on the patron's request, kiosks will provide information on current bus operating conditions (e.g., Next bus – 5 minutes, on schedule, delayed 10 minutes, etc.). Displays at transit transfer centers or hubs would also provide current schedule information. Communications from the kiosks or other traveler information devices to the PAT dispatch center will also need to be included as part of this project.

SETRPC Demand-Response AVL

Associated Market Packages:

- Transit Vehicle Tracking (APTS01)
- Demand-Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: None

Description: Install AVL on independent paratransit vehicles that are part of the SETRPC regional demand-response resources. The AVL system will convey information regarding real-time vehicle location, which will allow for enhanced monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a GIS map, bus locations can be

displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with Computer Aided Dispatch, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. These functions are particularly desirable for the above listed counties transit operations, due to the large, rural geographic area that is covered by these transit providers, as well as the demand-response nature of the transportation services provided. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions). For planning purposes, \$10,000 per vehicle was used for the cost.

SETRPC Automated Fare and Passenger Information Collection System

Associated Market Packages

- Demand Response Transit Operations (APTS3)
- Transit Passenger and Fare Management (APTS4)

Prerequisite Projects: None

Description: Implement automated fare payment systems and/or passenger information collection system on SETRPC demand-response fleet. There are three primary benefits of these collection systems. The first is enhanced revenue collection ability. The second is increased security by not having large amounts of cash or tokens on the vehicle. The third is the increased convenience and security for the transit patron. These systems are often implemented in conjunction with AVL or mobile data terminals, or are implemented as an add-on to those systems. To enable automated fare collection, fare boxes would need to be upgraded to accept smart cards (i.e., cards with passive RFID technology or a magnetic information strip, such as a credit card) with rider and account information. Electronic fare payment and passenger information technology is rapidly advancing, and there will be several technological considerations will need to be examined, such as standards for smart cards and interoperability issues.

Commercial Vehicle Operations

Regional HAZMAT Permitting Coordination

Associated Market Packages:

- Commercial Vehicle Administrative Processes (CVO04)
- HAZMAT Management (CVO10)

Prerequisite Projects: None

Description: Implement a coordinated program among local jurisdictions for HAZMAT permitting. Having a coordinated program will enable uniform standards throughout the Region for transport



requirements and provide a database of registered HAZMAT vehicles, facilitating vehicle identification in the event of an incident.

HAZMAT Tracking

Associated Market Packages:

- HAZMAT Management (CVO10)

Prerequisite Projects: Regional HAZMAT Permitting Coordination

Description: Implement a coordinated program among rail and CVO private sector transport companies and public safety for HAZMAT tracking. Knowing what hazardous materials are in the Region will make content identification more streamlined, thus minimizing exposure to HAZMAT spills for both the general public and emergency responders. Appropriate mitigation plans can be put in to effect in shorter periods of time thereby minimizing risks.



Table 8 – Long-Term Projects (20-Year)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|---|---|--------------------------------|------------------------|---------------------------|-----------------------------------|
| <i>Travel and Traffic Management</i> | | | | | |
| TxDOT Beaumont Freeway Management System Additional Phases | Implement/upgrade CCTV cameras, DMS, vehicle detectors, and HARs in the Beaumont Region as needed | TxDOT | \$4,000,000 | No | 5 years |
| TxDOT Closed Loop Signal System Expansion Phase 3 | Continue expansion and upgrade of closed loop signal system for TxDOT operated signals (including VIVIDS) | TxDOT | \$500,000 annual | No | 5 years |
| City of Beaumont Traffic Signal System Expansion Phase 3 | Continue implementation, expansion, and upgrade of traffic control system in the City of Beaumont | City of Beaumont | To Be Determined | No | 5 years |
| City of Port Arthur Traffic Signal System Expansion Phase 3 | Continue implementation, expansion, and upgrade of traffic control system in the City of Port Arthur | City of Port Arthur | To Be Determined | No | 5 years |
| Emissions/Air Quality Management System | Implement a regional air quality management and mitigation program | SETRPC/TCEQ | To Be Determined | No | 3 years |
| ISP-based Route Guidance | Provide direct support to ISP-based route guidance systems through sharing of traveler information | Public Agencies/Private Sector | Public: \$100,000 | No | 1 year |
| <i>Emergency Management</i> | | | | | |
| TxDOT Flood Detection Phase 2 | Install additional flood detection systems at key locations in the Region | TxDOT | \$25,000/site | No | 6 months |
| Motorist Assistance Patrol Expansion | Expand the service area for the motorist assistance patrol in the Region | SETRPC, TxDOT | To Be Determined | No | 2 years |



Table 8 – Long-Term Projects (20-Year) (continued)

| Program Area/Project | Description | Responsible Agency* | Probable Cost** | Funding Identified | Estimated Project Duration |
|---|---|----------------------------|------------------------------------|---------------------------|-----------------------------------|
| <i>Maintenance and Construction Management</i> | | | | | |
| TxDOT Automated Maintenance Vehicles | Add technology to maintenance vehicles to automate driving during herbicide applications | TxDOT | To Be Determined | No | 5 years |
| Port Arthur Municipal Vehicle AVL Phase 2 | Expand automated vehicle location system on municipal maintenance vehicles (pick-ups, dump trucks, trash trucks) | City of Port Arthur | \$10,000/vehicle includes software | No | 1 year |
| Beaumont Municipal Maintenance Vehicle AVL | Install automated vehicle location system on municipal maintenance vehicles | City of Beaumont | \$10,000/vehicle includes software | No | 1 year |
| <i>Public Transportation Management</i> | | | | | |
| SETRPC Paratransit Web-Based Scheduling System and Trip Planner | Implement web-based dial-a-ride and travel information systems to provide automated access to schedule, status and reservation capabilities for transit patrons | SETRPC | \$100,000 | No | 2 years |
| BMT Paratransit Web-Based Scheduling System and Trip Planner | Implement web-based dial-a-ride and travel information systems to provide automated access to schedule, status and reservation capabilities for transit patrons | BMT | \$100,000 | No | 2 years |
| PAT Paratransit Web-Based Scheduling System and Trip Planner | Implement web-based dial-a-ride and travel information systems to provide automated access to schedule, status and reservation capabilities for transit patrons | PAT | \$100,000 | No | 2 years |
| <i>Commercial Vehicle Operations</i> | | | | | |
| Truck Stop Electrification | Implement equipment as a pilot program at 3 major truck stops along I-10 | SETRPC | To Be Determined | No | 2 years |

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted

**Probable Cost is not an estimate because no design work has been done.



Beaumont Region Long-Term Projects (20-Year)

Travel and Traffic Management

TxDOT Beaumont Freeway Management System Additional Phases

Associated Market Packages:

- Network Surveillance (ATMS01)
- Freeway Control (ATMS04)
- Traffic Information Dissemination (ATMS06)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation, TxDOT Beaumont Freeway Management System Phases 1 and 2

Description: Next phases of the Beaumont Freeway Management System will implement additional CCTV cameras and DMS, as well as traffic detectors and potentially additional HAR transmitters in the Beaumont Region.

TxDOT Closed Loop Signal System Expansion Phase 3

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: TxDOT Closed Loop Signal System Phase 1, TxDOT Closed Loop Signal System Phase 2

Description: Expand the closed loop signal system by integrating additional signals and implementing VIVDS at selected TxDOT intersections throughout the Region.

City of Beaumont Traffic Signal System Expansion Phase 3

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Beaumont Traffic Signal System Upgrade/Expansion Phase 1, City of Beaumont Traffic Signal System Expansion Phase 2

Description: Continue expansion and implementation of the City of Beaumont closed-loop signal system, including loop detection at selected locations.

City of Port Arthur Traffic Signal System Expansion Phase 3

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Port Arthur Traffic Signal System Upgrade/Expansion Phase 1, City of Port Arthur Traffic Signal System Phase 2

Description: Continue expansion and implementation of the City of Port Arthur closed-loop signal system.

Emissions/Air Quality Management System

Associated Market Packages:

- Emissions Monitoring and Management (ATMS11)

Prerequisite Projects: None

Description: This project would include the deployment of field sensors to monitor emissions of individual vehicles and the area as a whole. The data collected by the field sensors will be transmitted to the TxDOT Beaumont District Office and SETRPC. The data will then be processed and measured against established air quality standards to determine the Region's status on air quality.

ISP-Based Route Guidance

Associated Market Packages:

- Broadcast Traveler Information (ATIS01)
- ISP-Based Route Guidance (ATIS06)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation

Description: Provide Information Service Providers (ISPs) with data relative to current travel conditions. The project extends current static capabilities of the OnStar, in-vehicle route guidance systems (or equivalent) currently being equipped in new vehicles (OnStar is equipped on some GM, Acura, Audi, Saab, and Subaru models). Currently, the OnStar system will help guide a motorist to a location based on static information. By providing real-time traveler information to ISPs, the guidance systems could modify the recommended route based on dynamic roadway conditions (e.g., variation on congestion levels, accidents, roadwork, etc.). The project will require a public/private sector partnership, because route guidance and navigation services are typically subscription services.

Emergency Management

TxDOT Flood Detection Stations Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: TxDOT Flood Detection Stations Phase 1

Description: Continue to implement flood detection systems on flood-prone segments of Interstates and state routes in the Beaumont Region. This will enable faster response times by maintenance crews to close flooded or near flooded roadway segments as necessary. The typical flood detection station is composed of a stream gauge, a rain gauge, a temperature sensor, a wind speed sensor, and a wind direction sensor and remote communications support. Other upgrades that may support operational decision making include sensors to measure relative humidity, soil moisture content, solar radiation, and air and water quality. The flood detection systems will be monitored from the TxDOT Beaumont District Office. Communications between the flood detection stations and the District Office can be achieved through a variety of wireless and wireline telemetry methods. Information also could be shared with River Authorities in the Region. There is a future module of the ATMS software planned to support environmental sensors, and development of this module could be extended to include the needs of flood detection stations.

Costs for this project will vary based on the number of locations and detection stations installed, as well as communications. For planning purposes, a cost per station was estimated at \$25,000 each (including communications).

Motorist Assistance Patrol Expansion

Associated Market Packages:

- Incident Management System (ATMS08)

Prerequisite Projects: Motorist Assistance Patrol

Description: Expand the coverage area and hours of operation for the roadway service patrol.

Maintenance and Construction Management

TxDOT Automated Maintenance Vehicles

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Roadway Maintenance and Construction (MC07)

Prerequisite Projects: TxDOT Maintenance Vehicle AVL

Description: Provide lateral guidance and warnings to drivers of herbicide application trucks. The system improves efficiency for the operator by providing the necessary cues for where to apply

herbicides and in what quantities. The technology to be used in the project will likely include a combination of GPS, magnetic pavement marking tape, radar detection, a windshield heads-up display, and several types of warning devices. Automated vehicles for certain types of applications would reduce the risks of having human operators within the vehicle during herbicide/pesticide applications.

City of Beaumont Municipal Maintenance Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Roadway Maintenance and Construction (MC07)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Equip City of Beaumont maintenance vehicles with GPS based vehicle locators to track, in real-time, vehicle locations while in the field. The location of the vehicle would be overlaid on a base map showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors in better managing their fleets of vehicles.

City of Port Arthur Municipal Maintenance Vehicle AVL Phase 2

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Roadway Maintenance and Construction (MC07)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: City of Port Arthur Municipal Maintenance Vehicle AVL Phase 1

Description: Expand the AVL program for the City of Port Arthur to include additional maintenance and public works vehicles, including pickup trucks, sweepers, dump trucks, etc. Based on the performance of the initial phase, an enhancement to the tracking or system software component may be warranted.

Public Transportation Management

SETRPC Demand-Response AVL

Associated Market Packages:

- Transit Vehicle Tracking (APTS01)
- Demand-Response Transit Operations (APTS03)
- Transit Traveler Information (APTS08)

Prerequisite Projects: None

Description: Install AVL on independent paratransit vehicles that are part of the SETRPC regional demand-response resources. The AVL system will convey information regarding real-time vehicle location, which will allow for enhanced monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a GIS map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with Computer Aided Dispatch, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and automatic passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. These functions are particularly desirable for the above listed counties transit operations, due to the large, rural geographic area that is covered by these transit providers, as well as the demand-response nature of the transportation services provided. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Cost will vary depending on the number of vehicles equipped with AVL systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions). For planning purposes, \$10,000 per vehicle was used for the cost.

SETRPC Paratransit Web-Based Scheduling System and Trip Planner

Associated Market Packages:

- Demand-Response Transit Operations (APTS03)
- Multimodal Coordination (APTS07)
- Transit Traveler Information (APTS08)

Prerequisite Projects: SETRPC Demand-Response AVL

Description: Provide enhanced transit related traveler information to SETRPC paratransit network customers. The on-demand nature of the transit services requires that up-to-the minute information about pick-ups, drop-offs, vehicle location, and any disruptions in service be available not only to the dispatch staff, but also to transit passengers pre-trip. General (static) and near-real-time information about dial-a-ride services and status, as well as interactive trip scheduling and reservations could be made available to patrons via Internet-based travel information systems. Web-based maps could show locations of the vehicles in near-real-time. This real-time information also would be available at the

dispatch/call center for passengers who do not have access to the Internet. Coordination with TxDOT and the local cities would allow for current traffic conditions, incidents, closures and other impacts to the roadway network to be displayed with the transit route and status information.

BMT Paratransit Web-Based Scheduling System and Trip Planner

Associated Market Packages:

- Demand-Response Transit Operations (APTS03)
- Multimodal Coordination (APTS07)
- Transit Traveler Information (APTS08)

Prerequisite Projects: Beaumont Municipal Transit Automated Vehicle Location (AVL)

Description: Provide enhanced transit related traveler information to BMT paratransit customers. The on-demand nature of the transit services requires that up-to-the minute information about pick-ups, drop-offs, vehicle location, and any disruptions in service be available not only to the dispatch staff, but also to transit passengers pre-trip. General (static) and near-real-time information about dial-a-ride services and status, as well as interactive trip scheduling and reservations could be made available to patrons via Internet-based travel information systems. Web-based maps could show locations of the vehicles in near-real-time. This real-time information also would be available at the dispatch/call center for passengers who do not have access to the Internet. Coordination with TxDOT and the City of Beaumont would allow for current traffic conditions, incidents, closures and other impacts to the roadway network to be displayed with the transit route and status information.

PAT Paratransit Web-Based Scheduling System and Trip Planner

Associated Market Packages:

- Demand-Response Transit Operations (APTS03)
- Multimodal Coordination (APTS07)
- Transit Traveler Information (APTS08)

Prerequisite Projects: Port Arthur Transit AVL

Description: Provide enhanced transit related traveler information to PAT paratransit customers. The on-demand nature of the transit services requires that up-to-the minute information about pick-ups, drop-offs, vehicle location, and any disruptions in service be available not only to the dispatch staff, but also to transit passengers pre-trip. General (static) and near-real-time information about dial-a-ride services and status, as well as interactive trip scheduling and reservations could be made available to patrons via Internet-based travel information systems. Web-based maps could show locations of the vehicles in near-real-time. This real-time information also would be available at the dispatch/call center for passengers who do not have access to the Internet. Coordination with TxDOT and the City of Port Arthur would allow for current traffic conditions, incidents, closures and other impacts to the roadway network to be displayed with the transit route and status information.

Commercial Vehicle Operations

Truck Stop Electrification Initiative

Associated Market Packages:

- Emissions Monitoring and Management (ATMS11)

Prerequisite Projects: None

Description: This project involves the electrification of truck stops and rest areas along I-10 to allow trucks staying overnight or taking an extended rest break in a stop to pay a fee and hook up to electricity to run air conditioning, refrigerators or any other devices rather than idling their truck. This will improve air quality at these stops. This project will be a public/private partnership.

4. MAINTAINING THE REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

The Beaumont Regional ITS Deployment Plan is a living document. The recommended projects and their timeframes for implementation reflect the needs of the Region at the time the plan was developed. It is expected that the needs of the Region will change as ITS deployments are put into place, population and travel patterns change, and as new technology is developed. In order for the ITS Deployment Plan to remain a useful document for Regional stakeholders, the plan must be updated over time.

TxDOT will serve as the lead agency for maintaining both the Beaumont Regional ITS Architecture and the ITS Deployment Plan, however, these plans will continue to be driven by stakeholder consensus rather than a single stakeholder.

At the Comment Resolution Meeting in October 2003, stakeholders recommended that a meeting be held on an annual basis to review the existing Regional ITS Architecture and ITS Deployment Plan. At these annual meetings, stakeholders should identify which projects in the ITS Deployment Plan have been deployed. New projects that are recommended by a stakeholder for inclusion in the ITS Deployment Plan should also be discussed to ensure that the Region as a whole feels that the project agrees with regional needs and priorities. This same type of consensus building should also be used should the geographic scope of the Region need to change or should additional stakeholders need to be added to the Regional ITS Architecture and ITS Deployment Plan.

Stakeholders also recommended that the Beaumont Regional ITS Architecture and ITS Deployment Plan be updated every two years to correspond with the TIP update. At this time, input and changes agreed upon at the annual review meeting will be incorporated into the document. Any new market packages that have been added to the National Architecture should be reviewed to see if they are applicable to the Beaumont Region. Data flows in existing market packages should also be reviewed to determine if any planned/future flows are now existing. The Deployment Plan will be updated to reflect projects that have been deployed, new projects that are necessary, and to reprioritize projects currently shown in the plan. Projects that are added to the ITS Deployment Plan should also be reviewed closely to determine if they fit into the current ITS Architecture for the Beaumont Region. If a new project does not fit into the ITS Architecture, then the ITS Architecture will need to be revised to include the necessary links and data flows for the project.

Both the Beaumont Regional ITS Architecture and the ITS Deployment Plan were developed with a consensus approach from the stakeholders. In order for these documents to continue to reflect the needs of the Region, changes in the documents will need to be driven by consensus of all of the stakeholders.