State of Texas
ITS Architectures and Deployment Plans

Corpus Christi Region

Executive Summary

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EXECUTIVE SUMMARY

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PROJECT APPROACH

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) in January of 2001. This final rule requires that Intelligent Transportation System (ITS) projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards. FHWA has further established a deadline of April 2005 for regions to have an ITS architecture in place.

To meet these requirements and ensure future federal funding eligibility for ITS, the Texas Department of Transportation (TxDOT) initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. There are several metropolitan Regions in the state that already have ITS architectures in place or under development. The focus of the State of Texas Regional ITS Architectures and Deployment Plans program is to develop architectures in those areas outside of the Austin, Houston, Dallas, Fort Worth, and San Antonio Regions. TxDOT expanded upon the ITS architecture requirements outlined in the FHWA Final Rule, and included an ITS deployment plan as part of the Regional efforts. The regional ITS architecture provides a framework for ITS systems, services, integration, and interoperability, and the regional ITS deployment plan identifies specific projects and timeframes for ITS implementation to support the vision developed by stakeholders in the architecture.

TxDOT's process for developing the regional ITS architectures and deployment plans followed a consensus-based approach to meeting the requirements in the FHWA Final Rule and supporting guidelines. This process was further tailored to meet the specific multi-agency needs of these Regional plans, and was structured around stakeholder input and involvement. The addition of an ITS deployment plan provides for a tangible road map for regional ITS deployment and integration. **Figure 1** shows the development process for each of the State of Texas Regional ITS Architectures and Deployment Plans.

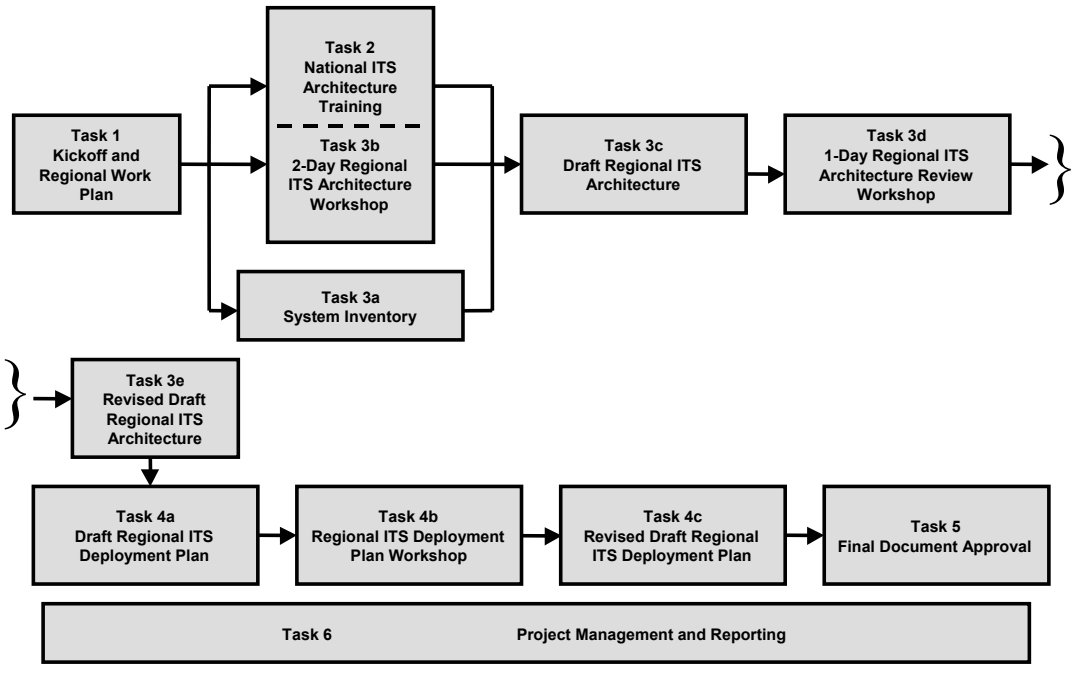


Figure 1 – Corpus Christi Regional ITS Architecture and Deployment Plan Development Process

OVERVIEW OF THE CORPUS CHRISTI REGION

The Corpus Christi Region is bordered by the Gulf of Mexico to the east, the TxDOT Yoakum and San Antonio Districts to the north, the TxDOT Laredo District to the west, and the TxDOT Pharr District to the south. The Region corresponds to the 10-county TxDOT Corpus Christi District and also includes four additional counties that are part of the 12 county Coastal Bend Council of Governments (CBCOG). **Figure 2** illustrates the Regional boundaries.

The Corpus Christi Region is predominantly rural in nature, with the City of Corpus Christi serving as the major population center in the Region. Primary interstate and state routes that traverse the Region include I-37, US 281, US 77, US 183, US 181, and US 59. These corridors are key links for inter- and intra-state movement of people and goods. I-37 is one of the most heavily traveled truck routes in southern Texas. The effective operation of this highway is critical to the movement of goods and people to the City and Port of Corpus Christi from San Antonio. I-37 extends only from San Antonio to Corpus Christi.

Agencies in the Corpus Christi Region have been deploying ITS technologies since 2001. Current ITS elements in the Region include:

- Dynamic message signs (DMS) for motorist information on the JFK Causeway and along US 181 between the JFK Causeway and Portland;
- Closed-circuit television (CCTV) cameras at I-37/US 77, Port Aransas, and rest areas in Live Oak;
- Weather sensors; and
- Automatic vehicle location (AVL) on City of Corpus Christi Public Safety and Regional Transportation Authority (RTA) vehicles.

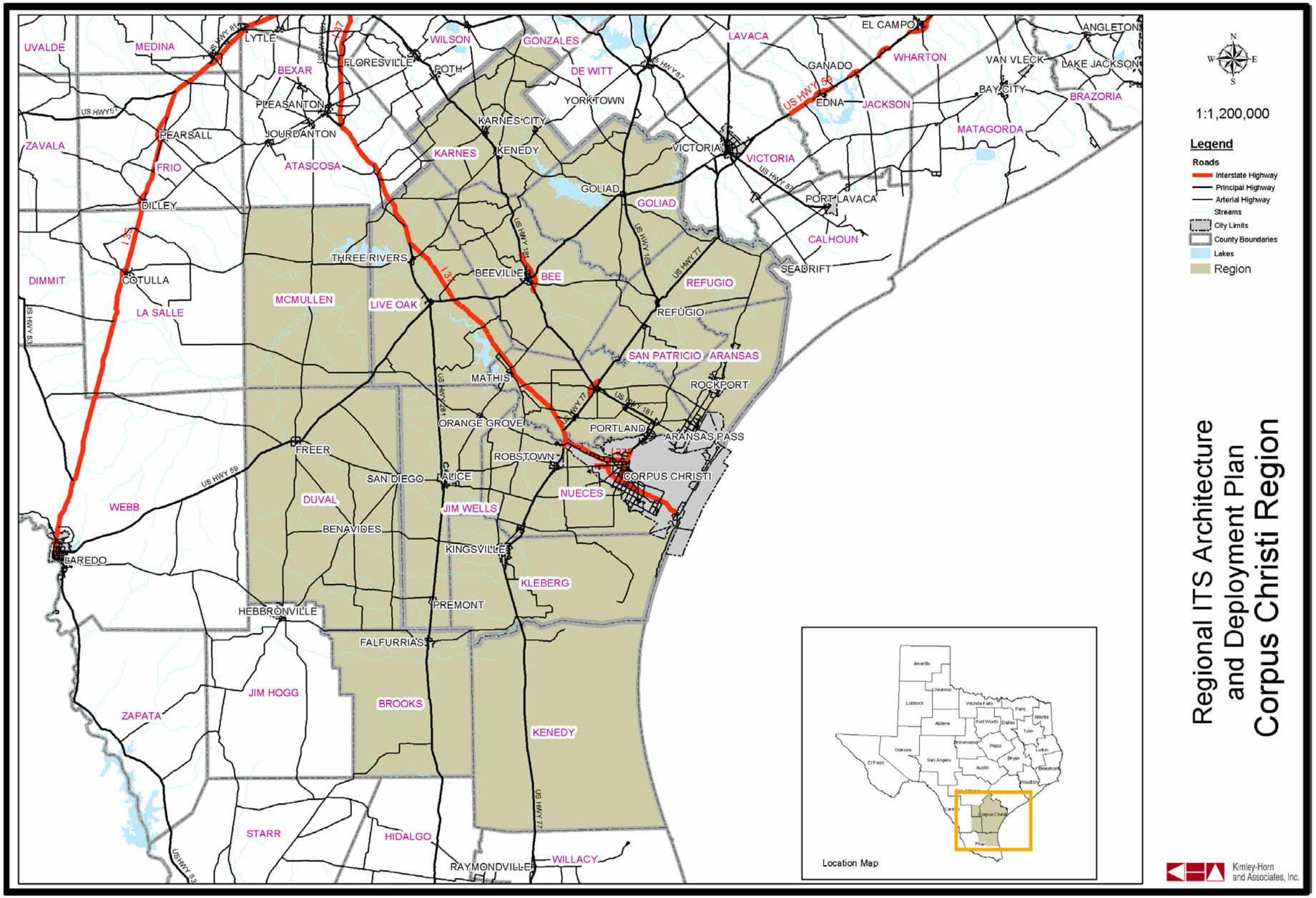


Figure 2 – Corpus Christi Region

CORPUS CHRISTI REGION STAKEHOLDERS

Involving a range of perspectives in the development of a regional ITS architecture and deployment plan, and obtaining consensus on the vision and recommendations are key components to the process. Stakeholders from throughout the Corpus Christi Region participated in the development of the Corpus Christi Regional ITS Architecture and Deployment Plan, including representatives from TxDOT, FHWA, cities, counties, the Texas Department of Public Safety (TxDPS), transit agencies, police, and fire. These stakeholders provided input and review at key steps in the development process, including a project kick-off meeting, architecture development and review workshops, a deployment plan workshop, and review of the final project documentation.

Corpus Christi Region stakeholders included:

- City of Corpus Christi Fire Department;
- City of Corpus Christi Management Information Systems;
- City of Corpus Christi Office of Emergency Management;
- City of Corpus Christi Police Department;
- City of Corpus Christi Street Department;
- Coastal Bend Council of Governments;
- Corpus Christi Chamber of Commerce;
- Corpus Christi Metropolitan Planning Organization (MPO);
- FHWA Southern Resource Center;
- FHWA Texas Division;
- Local Emergency Planning Committee;
- Nueces County Emergency Management;
- Nueces County Public Works;
- Port of Corpus Christi;
- Regional Transportation Authority;
- Texas Department of Public Safety;
- TxDOT Corpus Christi District;
- TxDOT Traffic Operations Division (Austin); and
- US Coast Guard.

CORPUS CHRISTI REGIONAL ITS ARCHITECTURE

The process for developing the Regional ITS Architecture for Corpus Christi included several key steps:

- Preparing an inventory of planned and existing systems in the Region;
- Identifying needs in the Region that could be addressed by ITS deployment or integration;
- Customizing and prioritizing market packages to address the specific needs and services identified by stakeholders;
- Developing interconnects and interfaces for system elements to map out data flows and agency links;
- Preparing an operational concept to illustrate how the systems, components, and agencies will be integrated and function as a result of the architecture framework;
- Identifying high-level functional requirements;
- Identifying standards that could be applicable to the Corpus Christi Region; and
- Outlining potential agreements that would be needed to facilitate information or resource sharing as a result of ITS implementation.

Inventory and Needs in the Region

Corpus Christi's Regional ITS Architecture began with a project kick-off meeting in March of 2002. At that meeting, stakeholders provided information about existing and planned ITS elements in the Region. A diverse range of needs were identified by stakeholders in the Region. The highest priority needs focused on improving traveler information (particularly during hazardous weather and for closures of major routes), incident management, and enhancing coordination and communication among local and state agencies within the Region as well as with neighboring TxDOT Districts. The inventory of planned and existing ITS infrastructure provided the basis for the architecture development. Needs that could be addressed by ITS technologies guided the selection of market packages, data flows, and integration requirements.

The needs identified by the Corpus Christi Region stakeholders were categorized into functional areas, and are shown in **Table 1**.

Table 1 – Corpus Christi Region: Summary of ITS Needs

Corpus Christi Region
Summary of ITS Needs
Corpus Christi Regional ITS Architecture and Deployment Plan Kick-Off Meeting
March 7, 2002

Institutional Issues/Needs

- Need to improve coordination with inland cities during evacuations
- Need to develop agreements for sharing data
- Need to develop agreements on control of equipment
- Need to develop agreements on protocol

Traffic Management Needs

- Need emergency vehicle pre-emption along arterials and at isolated intersections with limited sight distance
- Need speed and volume counters
- Need pan/tilt/zoom camera control on interchange CCTV camera feeds to the City of Corpus Christi

Traveler Information Needs

- Need to collect and disseminate information on traffic flow
- Need more DMS
- Need to provide more information to motorists (emergency and tourist)
- Need to move toward utilizing 511 system for information for tourists and during evacuations
- Need highway advisory radio (HAR)
- Need to distribute weather alerts to public and major employers

Data Needs (Collecting, Sharing)

- Need real-time traffic data at Emergency Operations Center (EOC)
- Need to share video feed from emergency response back to Metrocomm and EOC
- Need to share traffic flow data for routing of emergency vehicles
- Need to integrate data sources
- Need a system to allow agencies to share video
- Need to integrate data from Highway Conditions Reporting System (HCRS) and City of Corpus Christi and disseminate information
- Need weather conditions reports

Public Transportation Management Needs

- Need on-board transit security cameras (Note: This need was identified at a later meeting)
- Need real time bus information (Note: This need was identified at a later meeting)
- Need electronic fare payment systems (Note: This need was identified at a later meeting)

Electronic Payment Needs

None identified

Commercial Vehicle Operations Needs

- Need weigh-in-motion

  Need to integrate TxDOT TransGuide traffic management center (TMC) in San Antonio with the Port of Corpus Christi

Table 1 – Corpus Christi Region: Summary of ITS Needs (continued)

Emergency Management Needs

- Need to expand radio to Kleberg and San Patricio counties for law enforcement
- Need video conferencing between traffic operations/management centers and EOC during evacuations
- Need complete surveillance on highways
- Need Emergency Transportation Information System (ETIS)

Advanced Vehicle Safety Systems Needs

None Identified

Information Management Needs (Data Archiving)

None identified – data needs covered in other categories

Maintenance and Construction Operations Needs

- Need monitoring system for lighting on bridges and causeway
- Need to disseminate road closure information to major employers

Market Packages

A 2-Day ITS Architecture Workshop was held in Corpus Christi in May 2002. At this workshop, stakeholders were provided with architecture training, including background information about the National ITS Architecture, the purpose and benefits of a regional ITS architecture, as well as the process that would be used to develop the Corpus Christi Regional ITS Architecture.

The next step in developing the Corpus Christi Regional ITS Architecture was to identify the services that would be needed to address the stakeholder needs. In the National ITS Architecture, services are referred to as market packages. Market packages may include several stakeholders and elements that work together to provide a service in the Region. Examples of market packages from the National ITS Architecture include Network Surveillance, Traffic Information Dissemination, and Transit Vehicle Tracking. There are currently a total of 75 market packages identified in the National ITS Architecture.

At the 2-Day ITS Architecture Workshop, stakeholders selected the market packages that corresponded to the desired services and functions identified for the Region, and then customized these market packages. They included services and functions such as Network Surveillance, Surface Street Control, Freeway Control, and Road Weather Data Collection, as well as market packages to address coordination needs, including an Incident Management System and Regional Traffic Control and Coordination. Because market packages are groups of services and functions, they can be deployed incrementally and over time.

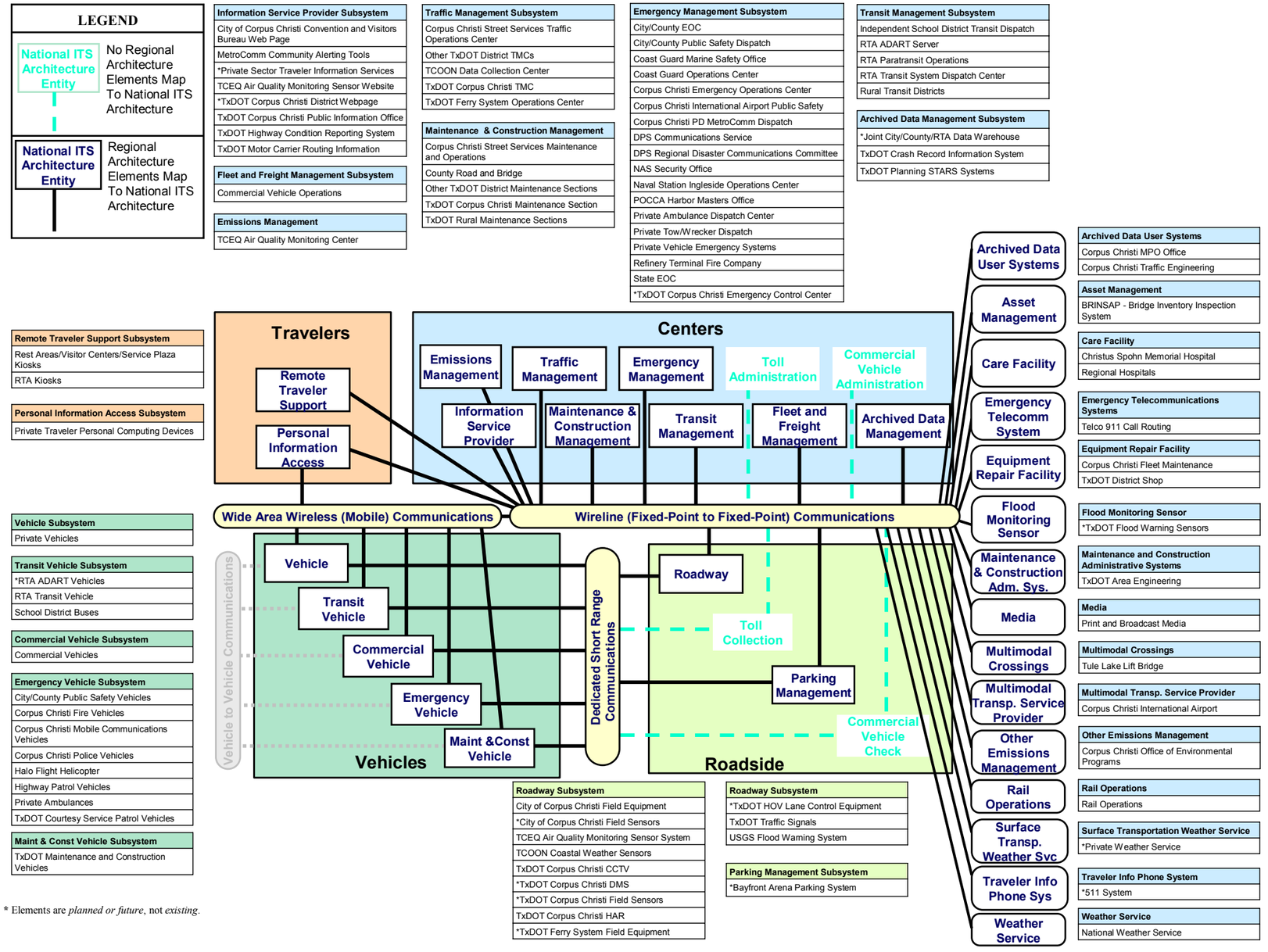
Of the 75 market packages in the National ITS Architecture, stakeholders identified 35 as being applicable to the Corpus Christi Region. A new market package, Emergency Response – Hurricane Preparation and Evacuation Coordination was developed specifically for the Corpus Christi Region to address hurricane evacuations. This market package brings the total to 36 market packages applicable to the Region.

Interconnects, Interfaces, and Standards

Stakeholders also began the process of mapping existing and planned ITS elements in Corpus Christi to the subsystems in the National ITS Architecture. These elements included agencies, systems, and essentially all of the ITS components in the Region. Subsystems are the highest level building blocks of the physical architecture, and the National ITS Architecture groups them into four major classes: Centers, Roadside, Vehicles, and Travelers. This mapping resulted in an interconnect diagram for the Corpus Christi Region, which is shown in **Figure 3**. This architecture diagram, also referred to as the "sausage diagram" shows the relationship of existing, planned, and future systems in the Corpus Christi Region.

The market packages in the National ITS Architecture were customized to reflect the unique systems, subsystems, and terminators in the Corpus Christi Region. Each market package was shown graphically, with the market package name, Corpus Christi specific element, and the unique agency and system identifiers within the subsystems and terminators.

Figure 4 is an example of an ATMS market package for Surface Street Control that has been customized for the Corpus Christi Region. This market package shows the three subsystems, Transit Management, Traffic Management, and Roadway, and the associated entities (Independent School District Transit Dispatch, Corpus Christi Street Services Traffic Operations Center, and City of Corpus Christi Field Equipment respectively) and equipment packages. The equipment packages are the rectangles inside of the subsystems, and represent the functions that deliver a particular service to support the market package. Data flows between the subsystems and the terminators (Other Roadway) indicate what information is being shared. The solid data flow lines in this market package indicate existing information flows and the dashed lines indicate planned or future flows. All of the Corpus Christi Region market package diagrams are included in the Regional ITS Architecture report



* Elements are *planned or future*, not *existing*.

Figure 3 – Corpus Christi Regional System Interconnect Diagram

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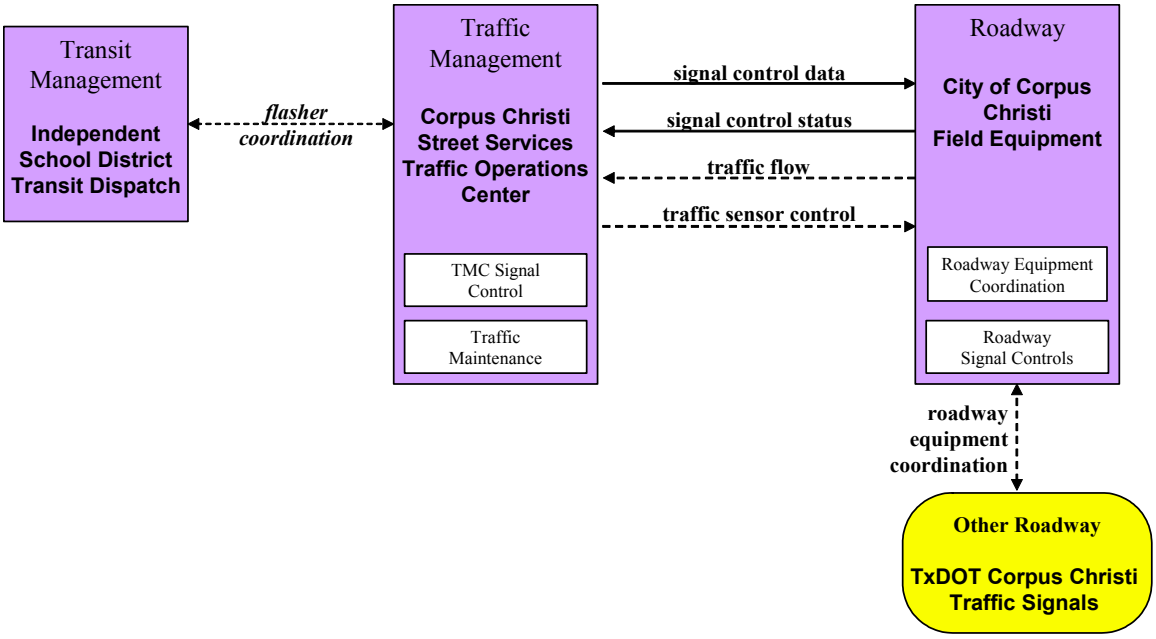

Figure 4 – Customized Market Package for Corpus Christi Surface Street Control

More detailed interfaces were developed which identified the connectivity between the systems and elements. Each element identified in the ITS architecture for the Corpus Christi Region was mapped to the other elements that it must interface with. These interfaces were further defined by architecture data flows between individual elements that specify the information to be exchanged. The data flows include requests for information, alerts and messages, status requests, confirmations, and other information requirements.

While it is important to identify the various systems and stakeholders as part of a regional ITS, a primary purpose of the architecture is to identify the connectivity between transportation systems in the Corpus Christi Region. There are 92 different elements identified as part of the Corpus Christi Regional ITS Architecture. These elements include local and state traffic operations centers, transit vehicles, dispatch systems, emergency management agencies, media outlets, and others – essentially, all of the existing and planned physical components that contribute to a Regional ITS. Interfaces have been identified for each element in the Corpus Christi Regional ITS Architecture, and each element has been mapped to those other elements with which it must interface.

An example of one of the system interfaces is included as **Figure 5** on the following page. This graphic shows the TxDOT Corpus Christi CCTV, and the interfaces with other elements throughout the Region. These interfaces are shown as existing, planned, or future. Interfaces defined as "planned" have funding identified, while "future" interfaces are desired by stakeholders but funding has not yet been identified.

Architecture flows between the subsystems and terminators define the specific information (data) that is exchanged between subsystems and terminators. Each architecture flow has one or more data flows that specify what information is exchanged and the direction of the exchange.

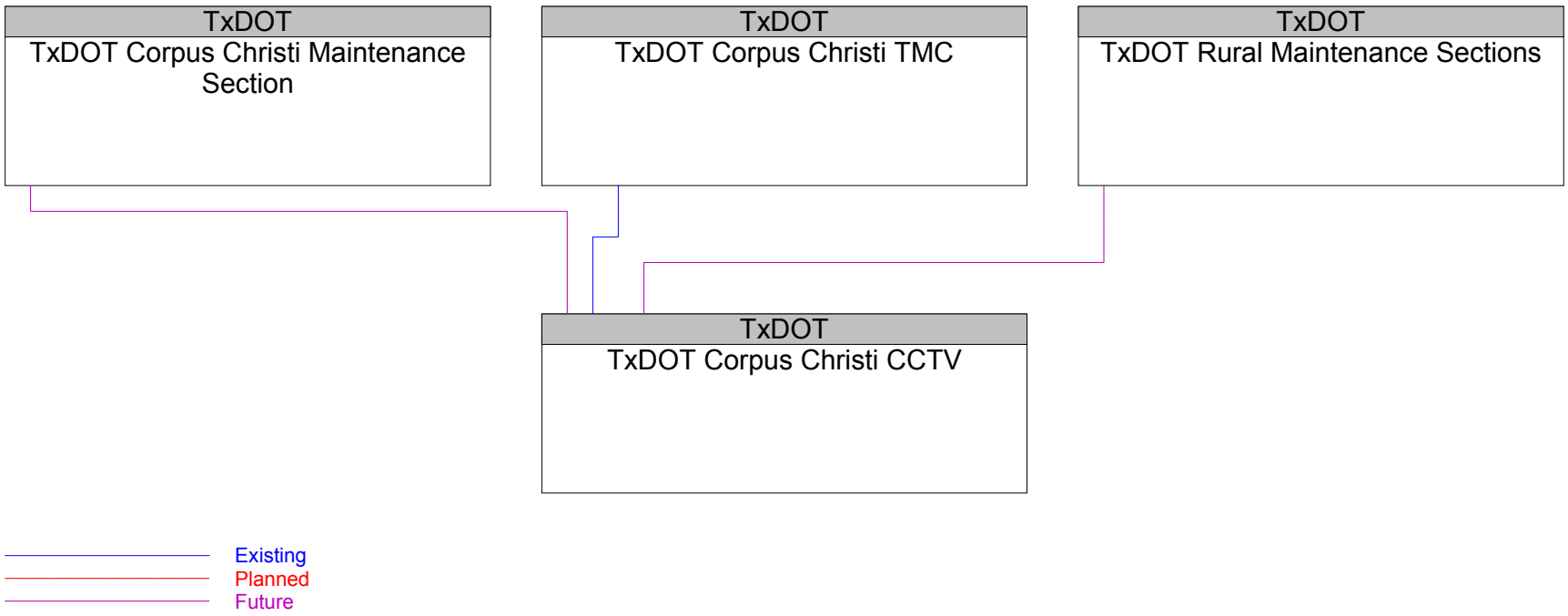

Figure 5 – TxDOT Corpus Christi CCTV Interfaces

An example of the architecture flows between two elements is shown in **Figure 6**. In this interface, the flows between the TxDOT Corpus Christi Traffic Management Center (TMC) and the City/County EOC show information that must go from the TxDOT Corpus Christi TMC to the City/County EOC, as well as information that the TMC needs from the EOC. Similar to the interfaces, architecture flows also are defined as existing, planned, or future. All of the architecture flows between elements have been included on the project website.

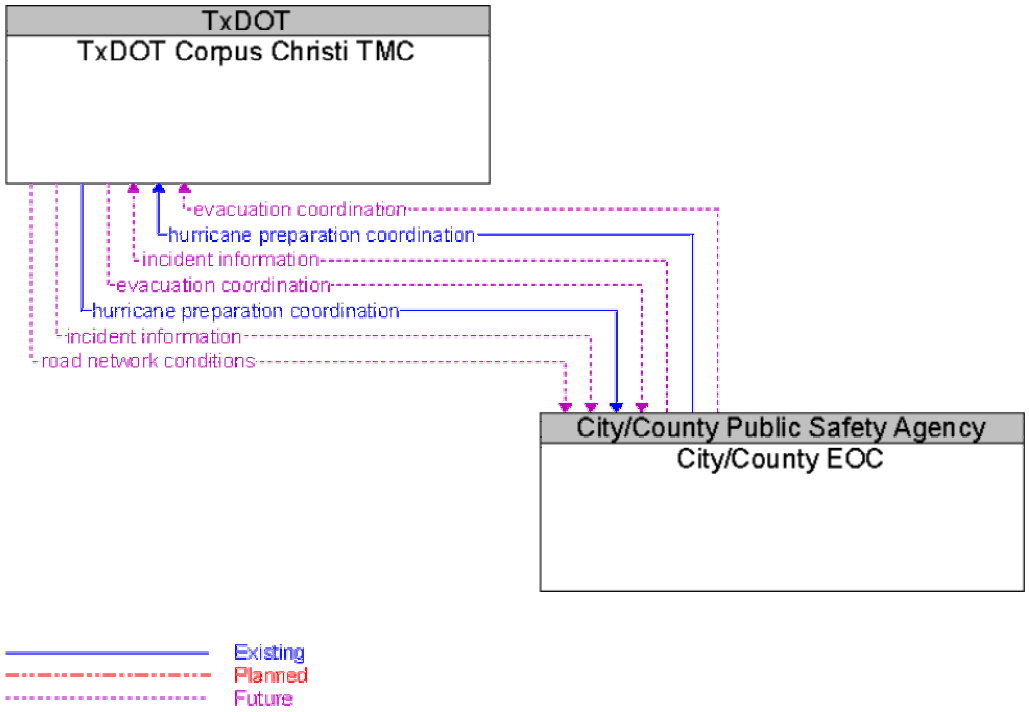

Figure 6 – TxDOT Corpus Christi TMC to City/County EOC Architecture Flows

With the required interfaces and interconnections identified, standards that could potentially be applied to the Corpus Christi Region were identified. Standards are an important tool that will allow efficient implementation of the elements in the Corpus Christi Regional ITS Architecture over time. They facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances, vendors change, and as new approaches evolve.

Operational Concept and Scenarios

An operational concept for the Corpus Christi Region was developed as part of the architecture process to illustrate how systems, components, and agencies will be integrated and function as a result of the framework provided by the Regional ITS Architecture. For the Corpus Christi Region, two concepts were illustrated. The first was a major evacuation due to an approaching hurricane. The operational concept shows through ITS deployment, agency information sharing, and regional connectivity, that agencies are able to work together and benefit from the technologies and systems in place to proactively manage the Region's transportation system in the event of an evacuation. The second concept illustrates a sequence of events during a major incident on South Padre Island Drive just as the afternoon rush hour is about to begin, and how

TxDOT, emergency services, public safety, and other key agencies can put pre-determined strategies into effect as well as utilize technology and communications infrastructure to respond effectively and minimize traffic impacts.

Agreements

Interfaces and data flows among public and private entities in the Corpus Christi Region will require agreements among agencies that establish parameters for sharing agency information to support traffic and incident management, provide traveler information, and perform other functions identified in the Regional ITS Architecture. Recommended projects will result in systems and interfaces that will require inter-agency agreements, both public and private, to facilitate the exchange of information.

Currently, there are few formal agreements in place in the Corpus Christi Region. Stakeholders indicated that while there is a high degree of cooperation among agencies, there hasn't been a need for formal agreements to facilitate multi-jurisdictional resource sharing, cooperation, or mutual aid. With the implementation of ITS technologies, integration of systems from one or more agencies, and the anticipated level of information exchange identified in the architecture, it is likely that more formal agreements will be needed.

The following is a list of potential agreements for the Corpus Christi Region based on the interfaces identified in the Regional ITS Architecture and recommended ITS projects in the Deployment Plan:

- Data sharing and usage agreements among public and private media and information service providers;
- Shared video monitoring agreements between TxDOT and emergency services agencies;
- Mutual aid agreements among public sector agencies, primarily fire, police, emergency services, and TxDOT; and
- Joint operations and shared control agreements between TxDOT and the City of Corpus Christi.

It is important to note that as ITS services and systems are implemented in the Region, part of the planning and review process for those projects should include a review of potential agreements that would be needed for implementation or operations.

ITS Architecture Documentation

The Regional ITS Architecture for the Corpus Christi Region is documented in a final report. Stakeholders were brought together to review the Regional ITS Architecture and provide feedback. The final report was not prepared until after completion of the Corpus Christi Regional ITS Deployment Plan, to allow for modifications based on information and input received for the ITS Deployment Plan recommendations.

A website with all of the Regional ITS Architecture also was maintained. The website allowed stakeholders to review the architecture and provide comments directly to the project team through the website. At the time this report was published, the Corpus Christi Regional ITS Architecture website was being hosted at www.consystec.com. The site can be accessed by selecting the link to Texas, and then the link to Corpus Christi. TxDOT plans to permanently host the site in the future at www.dot.state.tx.us/trf/its.

CORPUS CHRISTI REGIONAL ITS DEPLOYMENT PLAN

Although development of an ITS deployment plan was not required by the FHWA Final Rule for the architecture, the Final Rule does request a sequence of projects required for implementation. Capitalizing on the momentum and interagency dialogue established during the development of the Corpus Christi Regional ITS Architecture, TxDOT chose to expand on the project sequence requirement to develop a formal ITS deployment plan for the Region.

The Corpus Christi Regional ITS Architecture provided the framework and prioritized the key functions and services desired by stakeholders in the Region. The Corpus Christi ITS Deployment Plan builds on the architecture by prioritizing market packages, 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.

Prioritized Market Packages

Market packages for the Corpus Christi Region previously identified as part of the architecture were categorized into high, medium, and low priorities by stakeholders. The market package prioritization was a key factor in developing recommendations for ITS deployment and integration in the Corpus Christi Region. These priorities identified the key needs and services that are desired in the Corpus Christi Region, as well as the interfaces that need to be established to provide integrated functionality and establish communication between elements.

It is important to note that the high, medium, and low priorities were not directly related to anticipated deployment timeframes (such as 5, 10, or 20 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 was another factor for prioritizing the market packages. Because market packages often represent groups of technologies or services to deliver a particular functionality, certain components of the market package could be identified as a high priority or existing capability, while other components would have a lower priority. Other considerations included whether or not the market package was better suited for deployment and operations by the private sector rather than public agencies in the Region.

Table 2 shows the prioritization of the selected market packages for the Corpus Christi Region. The majority of these market packages fall into the high priority category. This category also includes market packages (or portions of market packages) that are already deployed in the Corpus Christi Region, such as network surveillance, surface street control, and traffic information dissemination.

Table 2 – Summary of Prioritized Market Packages for the Corpus Christi Region

High Priority	Medium Priority	Low Priority
▪ Network Surveillance ▪ Surface Street Control ▪ Freeway Control ▪ Traffic Information Dissemination ▪ Regional Traffic Control ▪ Incident Management System ▪ Reversible Lane Management ▪ Road Weather Data Collection ▪ Weather Information Processing and Distribution ▪ Work Zone Management ▪ Maintenance and Construction Activity Coordination ▪ Transit Vehicle Tracking ▪ Transit Fixed-Route Operations ▪ Demand Response Transit Operations ▪ Transit Passenger and Fare Management ▪ Transit Traveler Information ▪ Broadcast Traveler Information ▪ Emergency Response ▪ Emergency Response – Hurricane Preparation and Coordination ▪ ITS Data Warehouse	▪ Standard Railroad Grade Crossing ▪ Railroad Operations Coordination ▪ Work Zone Safety Monitoring ▪ Transit Security ▪ Transit Coordination ▪ Emergency Routing ▪ ITS Data Mart	▪ HOV Lane Management ▪ Emissions Monitoring and Management ▪ Parking Facility Management ▪ Regional Parking Management ▪ Maintenance and Construction Vehicle Tracking ▪ Maintenance and Construction Vehicle Maintenance ▪ Roadway Maintenance and Construction ▪ ISP-based Route Guidance ▪ Mayday Support

Each of the prioritized market packages was assessed from the perspective of deployment status (which components, if any, were already existing in the Region), as well as any planned or additional new needs to bring the market package to the desired level of functionality in the Corpus Christi Region. Each market package analysis included:

- A brief definition of the market package (modified from the National ITS Architecture definitions);
- Any infrastructure from that market package that is already existing in the Corpus Christi 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.

ITS Project Recommendations for the Corpus Christi Region

Using the needs, market package priorities, and any planned projects identified by the stakeholders during the architecture process, a list of recommended ITS projects for the Corpus Christi Region was developed. These projects were refined and additions and deletions were made by the Regional stakeholders at the ITS Deployment Plan Workshop in September of 2002.

Recommended ITS projects for the Corpus Christi Region were categorized into short-, medium-, and long-term timeframes for programming in the 5, 10, and 20 year horizons. This was done based on current status if the project had previously been identified and planned by the Region, market package priority, and dependency on other project completions. The majority of the short term or 5-year recommendations serve as "foundation" projects to implement basic functionality, infrastructure, and interfaces, with the intent of continuing to build out those foundation projects over the 10 and 20 year timeframes. Most projects for the Corpus Christi Region are infrastructure based; however, there are some recommendations, such as enhanced coordination with local media, evacuation and incident detour plans, and others that focus more on planning or institutional practices rather than deploying specific technologies.

Each recommended project for the Corpus Christi Region was included in a short-, medium-, or long-term table. These tables provided the name of the project, primary operating/implementing agency, a planning level estimate of probable cost, an indication of whether or not funding had been identified for that specific project, and an estimated project duration. Following each table, detailed descriptions of each project were developed, which also included associated market packages and any pre-requisite project requirements.

Table 3 summarizes the ITS projects recommended for the Corpus Christi Region. This summary is divided into the major program areas and subdivided by timeframe. As can be seen from this summary, the majority of the project recommendations focus on the Travel and Traffic Management category, which would implement freeway and arterial management, traveler information, and inter-agency coordination elements.

Table 3 – Recommended ITS Projects for the Corpus Christi Region

Project Time Frame	Project Name	Funding Identified (Funding Agency if Applicable)
Travel and Traffic Management		
Short Term Projects 5-year Horizon	TxDOT TMC and ATMS Implementation	Yes (TxDOT)
	TxDOT Phase 1 Freeway Management System Implementation	Yes (TxDOT)
	TxDOT Phase 2 Freeway Management System Implementation	Yes (TxDOT)
	TxDOT Evacuation Route Instrumentation	Yes (TxDOT)
	TxDOT Center-to-Center Communication (Statewide)	Yes (TxDOT)
	Port Aransas Ferry Queue Management	Yes (TxDOT)
	City of Corpus Christi TOC/TxDOT TMC Fiber Connection	Yes (TxDOT)
	City of Corpus Christi Closed Loop Signal System Expansion	No
	City of Corpus Christi VIVDS Expansion	Yes (City of Corpus Christi)
	City of Corpus Christi TOC Expansion	No
	Media Liaison and Coordination	N/A
	TxDOT Highway/Rail Intersection Warnings	No
Mid Term Projects 10-year Horizon	TxDOT Phase 3 Freeway Management System Implementation	Yes (TxDOT)
	TxDOT Additional Phases of Freeway Management System Implementation	No
	TxDOT Closed Loop Signal System Expansion	No
	TxDOT Evacuation Route Instrumentation Expansion	No
	City of Corpus Christi Closed Loop Signal System Expansion	Yes (City of Corpus Christi)
	City of Corpus Christi VIVDS Expansion	Yes (City of Corpus Christi)
	City of Corpus Christi CCTV Camera Deployment	No
	Parking and Event Management System	No
	Regional 511 ATIS Server and TxDOT HCRS Enhancements (Statewide)	N/A

Table 3 – Recommended ITS Projects for the Corpus Christi Region (continued)

Project Time Frame	Project Name	Funding Identified (Funding Agency if Applicable)
Travel and Traffic Management (continued)		
Long Term Projects 20-year Horizon	City of Corpus Christi Closed Loop Signal System Expansion	No
	Parking and Event Management System Expansion	No
	ISP-Based Route Guidance	No
	Emissions Monitoring	No
	City of Corpus Christi Highway/Rail Intersection Warning Systems	No
Emergency Management		
Short Term Projects 5-year Horizon	City of Corpus Christi EOC/TxDOT TMC Connection	No
	City of Corpus Christi Metrocomm/TxDOT TMC Connection	No
	TxDPS/TxDOT TMC Connection	No
	Naval Air Station and Coast Guard/TxDOT TMC Connection	No
	Incident Detour Plans	No
	City of Corpus Christi EOC/Hospitals Communications	No
	Hospital to Hospitals Communications	No
	City of Corpus Christi Intranet Access to Video	No
	Metrocomm Information to Mobile Command Vehicles	No
	Inter-Agency Common Radio Frequency and System Expansion	Partial (San Patricio County has funding)
	TxDPS CAD	No
	Port of Corpus Christi Security Center	Yes (Port of Corpus Christi)
Mid Term Projects 10-year Horizon	Additional Agency Connections to TxDOT TMC	No
	Port of Corpus Christi Harbor Master's Office Traffic Management	No
	Port of Corpus Christi Harbor Master's Office/Port of Corpus Christi Security Center Fiber Connection	No
Long Term Projects 20-year Horizon	Mayday Support	No
	City of Corpus Christi Emergency Vehicle Traffic Signal Preemption	No
	Lifelink System	No

Table 3 – Recommended ITS Projects for the Corpus Christi Region (continued)

Project Time Frame	Project Name	Funding Identified (Funding Agency if Applicable)
Maintenance and Construction Operations		
Short Term Projects 5-year Horizon	TxDOT Work Zone Speed Trailers	No
	City of Corpus Christi Flood Detection Stations	Yes (City of Corpus Christi)
Mid Term Projects 10-year Horizon	TxDOT Work Zone Safety Monitoring	No
	TxDOT Flood Detection Stations	No
Long Term Projects 20-year Horizon	Maintenance and Construction Vehicle Automatic Vehicle Location	No
Public Transportation Management		
Short Term Projects 5-year Horizon	Rural Transit TOC with CAD System	No
	Rural Transit Automatic Vehicle Location and Mobile Data Terminals	No
	RTA On-board Transit Security Cameras	No
	RTA Transfer Station Security Cameras	No
	RTA Real-time Bus Information Travel Kiosks	No
	RTA Web-based Travel Data and Route Guidance	No
	ADART Phase 3	Yes (RTA)
Mid Term Projects 10-year Horizon	RTA On-board Security Cameras Expansion	No
	RTA Electronic Fare Payment System	No
	RTA Connection to City of Corpus Christi TOC	No
	Rural Transit Electronic Fare Collection	No
	Rural Transit On-Board Video Security System	No
Long Term Projects 20-year Horizon	RTA Transit Traveler Information	No
	Rural Transit Automatic Passenger Counters	No
	Rural Transit Traveler Information System/Travel Data and Route Guidance	No
Information Management		
Short Term Projects 5-year Horizon	ITS Data Warehouse	No
Mid Term Projects 10-year Horizon	None Identified	No
Long Term Projects 20-year Horizon	None Identified	No

MAINTAINING THE REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

With the substantial amount of effort invested by stakeholders in the Corpus Christi Region to develop both the Regional ITS Architecture and the ITS Deployment Plan, developing a plan for maintaining these important tools was a key component of the process.

New market packages are added to the National ITS Architecture every few years, and with the increasing emphasis on homeland security issues, it is envisioned that there will be additional market packages focused on addressing homeland security and emergency management. New federal initiatives, such as Amber Alert and 511, could also generate new or updated categories of market packages within the National ITS Architecture. Corpus Christi stakeholders agreed that it would be beneficial to review any modifications to the National ITS Architecture as well as any USDOT/FHWA guidance on an as-needed basis, and identify any additions or modifications that should be considered for the Corpus Christi Regional ITS Architecture.

At the Comment Resolution Meeting held in Corpus Christi in January 2003, stakeholders in the Region placed a strong emphasis on reviewing the Regional ITS Deployment Plan in order to determine which of the short-term projects have the highest priority for the Region, as well as to update the status of short-term projects. The group felt that a quarterly meeting to discuss these changes would be beneficial. Input would be gathered at these meetings by TxDOT and incorporated into the next update of the documents. This review would be particularly beneficial if funding opportunities arise. As part of the review, projects can be removed that are already underway or deployed, and priorities can be assessed again as more ITS infrastructure is put in place.

Stakeholders also agreed that both the Regional ITS Architecture and the ITS Deployment Plan will need to be periodically updated in order to reflect current deployment status as well as re-evaluate priorities. A two-year timeframe was selected by the stakeholders for this update to correspond with the Corpus Christi MPO's Transportation Improvement Plan (TIP) updates. The TxDOT Corpus Christi District was identified as the agency that should take the lead in maintaining and updating the Region's ITS Architecture and Deployment Plan, with support from a multijurisidictional committee in the Region. This group also would provide input to the Corpus Christi MPO TIP planning process.

MEMORANDUM OF UNDERSTANDING

As a final step in the development of the Corpus Christi Regional ITS Architecture and Deployment Plan, a Memorandum of Understanding (MOU) was prepared for the participating stakeholder agencies. The MOU was developed for stakeholders to acknowledge their participation and approval of the plan, and pledge their support in the implementation and operation of intelligent transportation systems in the Corpus Christi Region. Also included in the MOU was a pledge to provide TxDOT with the information necessary to maintain the Regional ITS Architecture and ITS Deployment Plan.

Although there were a number of other very important stakeholders participating in the project, those stakeholders that were asked to sign the MOU represented agencies that will have the greatest impact in the Region in terms of ITS deployments and system operations. These stakeholders had also signed a MOU developed prior to the start of the project that was necessary to obtain the federal funding to complete the Regional ITS Architecture and Deployment Plan. Stakeholder agencies that were asked to sign the MOU for the Corpus Christi Regional ITS Architecture and Deployment Plan included the following:

- City of Corpus Christi;
- County of Nueces;
- Local Emergency Planning Committee;
- Regional Transportation Authority;
- Texas Department of Public Safety; and
- Texas Department of Transportation.