

Market packages define ITS building blocks for meeting user needs within the guidelines defined by the National Architecture. A Market Package is a group of technologies that work together as an ITS application to address an identified, ITS related need or opportunity.

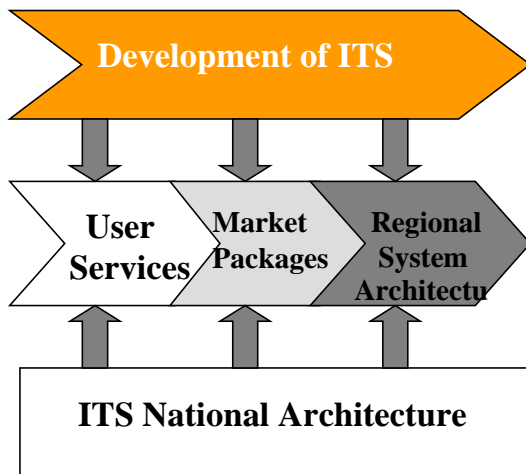


Figure 4.1: Market Package Process

4.0 Market Packages and Functional Requirements

This Section serves to define and identify the high priority or near term market packages for the San Joaquin Valley Intelligent Transportation System (ITS) Strategic Deployment Plan (SDP). As shown in Figure 4.1, market packages play an important role in linking the needs of transportation system managers and users with the regional and national system frameworks or architectures.

The San Joaquin Valley Region ITS TAC determined to take a course of action that paralleled the development of ITS projects with the identification and prioritization of user services and market packages. This document links previously defined high priority user services and preliminary project concepts with market packages as defined in the National Architecture, Version 3.0.

4.1 General Definition of Market Packages

Market Packages provide an accessible, deployment oriented perspective to the National ITS Architecture. They are tailored to fit, separately or in combination, real world transportation problems and needs. Market Packages bring together one or more Equipment Packages that must work together to deliver a given transportation service as well as the Architecture Flows that connect them to other important external systems. In other words, they identify the pieces of the Physical Architecture that are required to implement a particular transportation service. In short a market package is:

- A series of relatively detailed groupings of subsystems, equipment packages, and data flow definitions which can be logically and incrementally deployed over-time to provide increasing capabilities and levels of integration.
- A typical market package contains subsystems, equipment packages, architecture flows and supporting logical architecture elements. The equipment packages were assembled into 63 market packages that are models of what an agency or company might deploy to provide a given user service.



4.1.1 Additional Terminology Defined

A series of relatively detailed groups of subsystems, equipment packages, and data flow definitions which can be logical and incrementally deployed overtime to provide increasing capabilities and levels of integration.

The Market Package definition includes three concepts that require further definition for a complete understanding of Market Packages.

1. Subsystem – For purposes of this document, subsystems are not always “brick and mortar” entities. Each Subsystem is a cohesive set of functional definitions with required interfaces to other Subsystems. Subsystems are functionally, not physically, defined.

Example – A regional implementation may include a single physical “brick and mortar” center that collocates the capabilities from several Subsystems. For instance, a single Transportation Management Center (TMC) may include Traffic Management Subsystem, Transit Management Subsystem, Emergency Management Subsystem, and Information Service Provider Subsystem functionalities. On the other hand, a single Subsystem may be replicated in many different physical “brick and mortar” TMCs in a complex metropolitan area system. For instance, multiple traffic management Subsystems may be implemented in a region reflecting distinct State freeway and local arterial management centers.

2. Equipment Package – A Market Package is implemented with a combination of interrelated equipment. An Equipment Package represents a set of equipment/capabilities that are likely to be purchased by an end-user as a component to an overall system. This equipment often resides in several different Subsystems within the Architecture Framework and may be operated by different stakeholders. Since Equipment Packages are both the most detailed elements of the Physical Architecture and associated with specific Market Packages, there is clear traceability between the interface-oriented Architecture Framework and the deployment-oriented Market Packages.

Example – The Transit Vehicle Tracking Market Package includes vehicle location equipment in the Transit Vehicle Subsystem and a base station element in the Transit Management Subsystem. In this example, all Market Package elements are owned and operated by the same transit stakeholder. In other cases, the Market Package elements are owned and operated by different stakeholders. Many of the ATIS Market Packages require equipment in the Information Service Provider Subsystem that is owned and operated by a public or private information provider and equipment that is acquired and operated by the consumer as part of the Vehicle Subsystem or Personal Information Access Subsystem. Since equipment in different Subsystems may be purchased and operated by different end-users, these Subsystem-specific components may encounter varied deployment.



3. Architecture Flows – Architecture Flows are simply defined as the information and data exchange between and among various Equipment Packages and Subsystems. The Architecture Flows allow for a coordinated overall system operation by following pre-defined interfaces between equipment and subsystems, which may be deployed by different procuring and operating sectors.

To give a more visual understanding of a Market Package, Figure 4.2 shows a Market Package diagram, along with a legend to assist in understanding the diagram. In general, only the most salient elements from the Architecture definition (e.g., directly involved Subsystems, system terminators, and the highest level data flows) are depicted in each graphic to ensure clarity.

4.1.2 Market Packages Summary

Several different Market Packages are defined in each major area of ITS, which provide a palette of service options at various costs. Market Packages are also structured to segregate services that are likely to encounter technical or non-technical challenges from lower risk services. This approach allows the identification of a subset of the Market Packages that are likely early deployments, projects that make sense to develop in the near term. At the other end of the spectrum, several of the Market Packages represent advanced products or services that will not be available for some time. Many of the Market Packages are also incremental so that more advanced packages can be efficiently implemented by building on common elements that were deployed earlier with more basic packages. The complete list of market packages from The National ITS Architecture version 3.0 is identified in Table 4.1.

4.1.3 Market Package Descriptions

Because the complete list of Market Package descriptions is quite lengthy, only two Market Packages will be described in the body of this document, Figures 4.3 and 4.4. The complete list of Market Package descriptions is included as Appendix A of Working Paper No. 3. This information is also available in the National ITS Architecture Version 3.0; available on CD-ROM and on the Internet at <http://www.odetics.com/itsarch/>.



Figure 4.2: Example Market Package Diagram

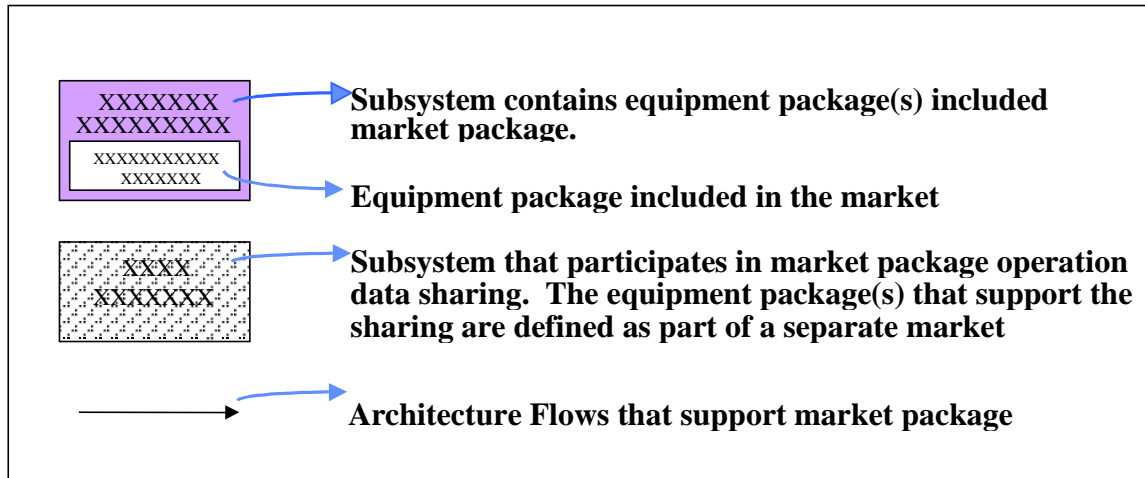
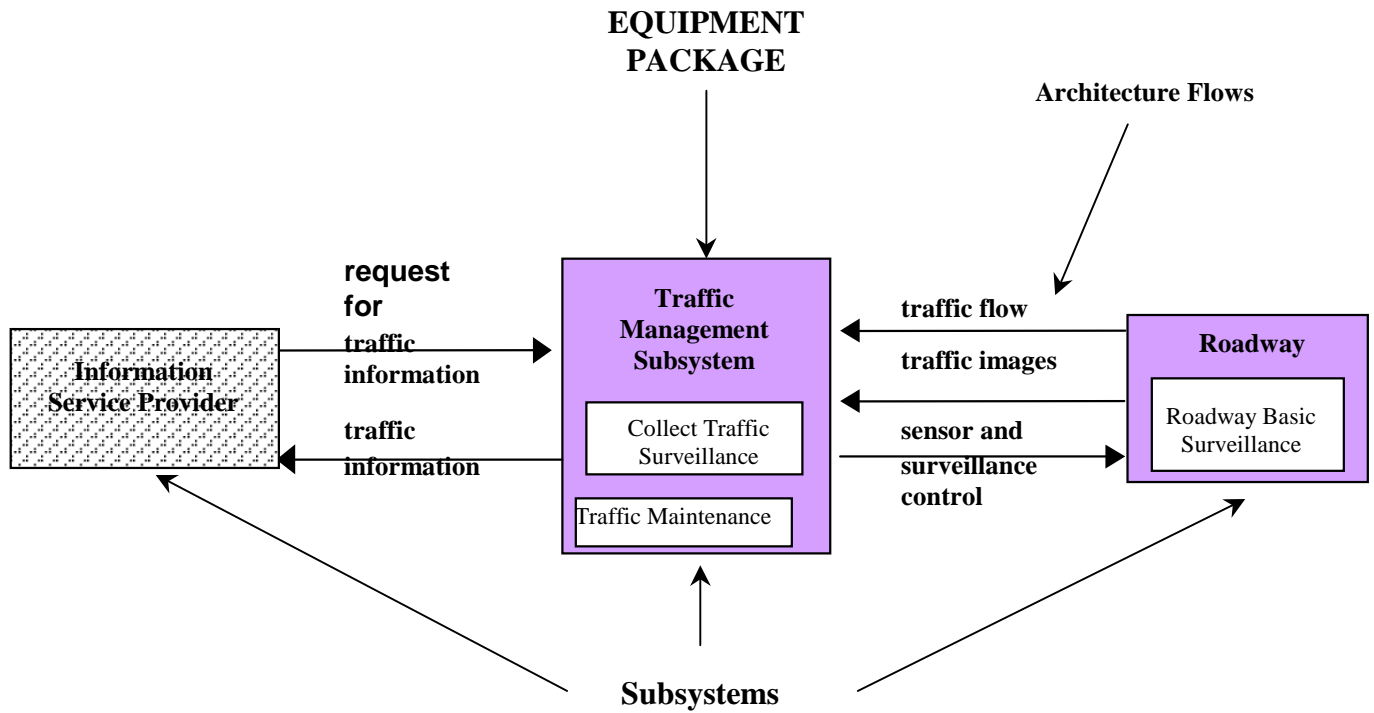
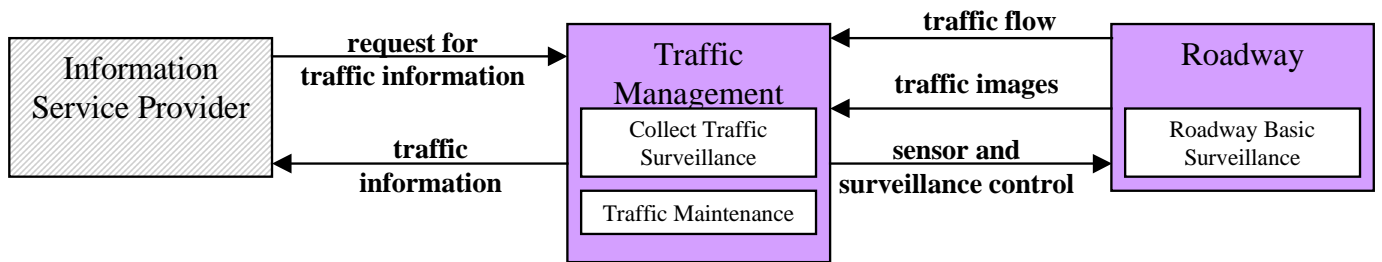


Table 4.1: List of National ITS Market Packages*

Traffic Management (ATMS)			
ATMS1	Network Surveillance	AVCSS1	Vehicle Safety Monitoring
ATMS2	Probe Surveillance	AVCSS2	Driver Safety Monitoring
ATMS3	Surface Street Control	AVCSS3	Longitudinal Safety Warning
ATMS4	Freeway Control	AVCSS4	Lateral Safety Warning
ATMS5	HOV Lane Management	AVCSS5	Intersection Safety Warning
ATMS6	Traffic Information Dissemination	AVCSS6	Pre-Crash Restraint Deployment
ATMS7	Regional Traffic Control	AVCSS7	Driver Visibility Improvement
ATMS8	Incident Management System	AVCSS8	Advanced Vehicle Longitudinal Control
ATMS9	Traffic Forecast and Demand Management	AVCSS9	Advanced Vehicle Lateral Control
ATMS10	Electronic Toll Collection	AVCSS10	Intersection Collision Avoidance
ATMS11	Emissions Monitoring and Management	AVCSS11	Automated Highway System
ATMS12	Virtual TMC and Smart Probe		
ATMS13	Data Standard Railroad Grade Crossing		
ATMS14		Advanced Railroad Grade Crossing	
Commercial Vehicles (CVO)			
ATMS15	Railroad Operations Coordination	CVO1	Fleet Administration
ATMS16	Parking Facility Management	CVO2	Freight Administration
ATMS17	Reversible Lane Management	CVO3	Electronic Clearance
ATMS18	Road Weather Information System	CVO4	CV Administrative Process
ATMS19	Regional Parking Management	CVO5	International Border Electronic Clearance
		CVO6	Weigh-In-Motion
		CVO7	Roadside CVO Safety
		CVO8	On-board CVO Safety
Transit Management (APTS)			
APTS1	Transit Vehicle Tracking	CVO9	CVO Fleet Maintenance
APTS2	Transit Fixed-Route Operations	CVO10	HAZMAT Management
APTS3	Demand Response Transit Operations		
APTS4	Transit Passenger and Fare Management		
APTS5		Transit Security	
Emergency Management (EM)			
APTS6	Transit Maintenance	EM1	Emergency Response
APTS7	Multi-modal Coordination	EM2	Emergency Routing
APTS8	Transit Traveler Information	EM3	Mayday Support
Traveler Information (ATIS)			
ATIS1	Broadcast Traveler Information	AD1	ITS Planning
ATIS2	Interactive Traveler Information	AD2	ITS Data Mart
ATIS3	Autonomous Route Guidance	AD3	ITS Data Warehouse
ATIS4	Dynamic Route Guidance		ITS Virtual Data Warehouse
ATIS5	ISP Based Route Guidance		
ATIS6	Integrated Transportation Management/Route Guidance		
ATIS7	Yellow Pages and Reservation		
ATIS8	Dynamic Ridesharing		*From National Architecture version 3.0
ATIS9	In Vehicle Signing		



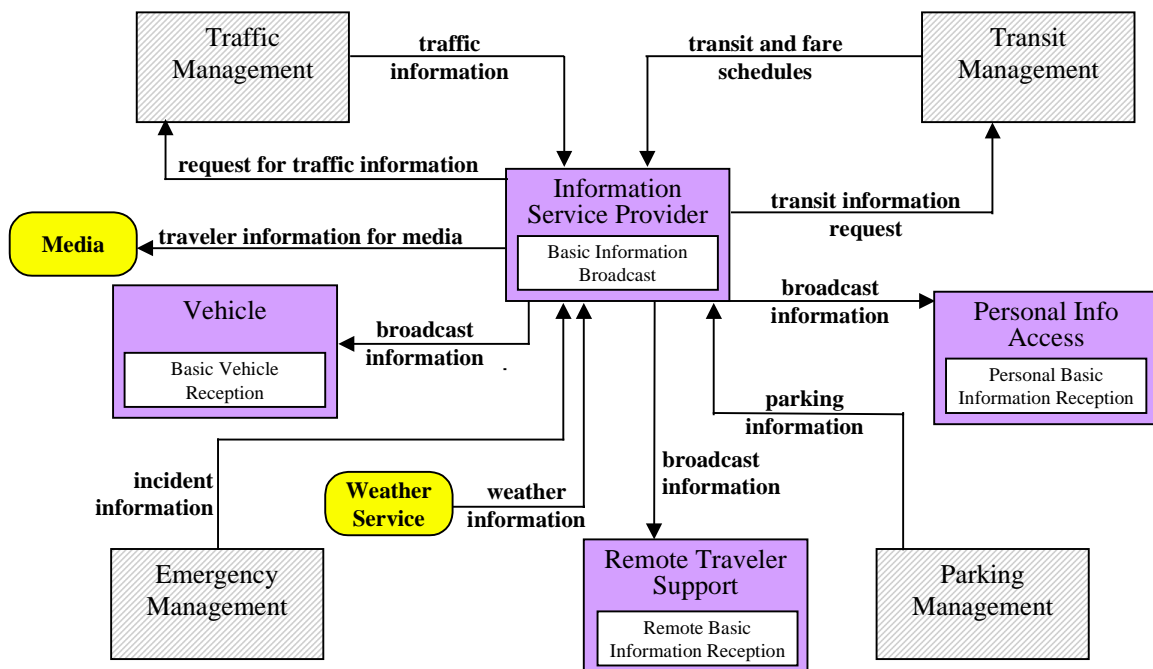
Figure 4.3: Network Surveillance (ATMS1)



*Note: Graphic shows key market package elements. Some elements are omitted for clarity

This Market Package includes traffic detectors, environmental sensors, 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 such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Traffic Management Subsystem). The data generated by this Market Package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, 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.

Figure 4.4: Broadcast Traveler Information (ATIS1)



*Note: Graphic shows key market package elements. Some elements are omitted for clarity

This market package provides the user with a basic set of ATIS services; its objective is early acceptance. It involves the collection of traffic conditions, advisories, general public transportation, toll and parking information, incident information, air quality and weather information, and the near real time dissemination of this information over a wide area through existing infrastructures and low cost user equipment (e.g., FM subcarrier, cellular data broadcast). Different from the market package ATMS6--Traffic Information Dissemination--which provides the more basic HAR and DMS information capabilities, ATIS1 provides the more sophisticated digital broadcast service. Successful deployment of this market package relies on availability of real-time traveler information from roadway instrumentation, probe vehicles or other sources.

4.2 Market Packages and User Services

The Market Packages are directly traceable to the User Services and often include capabilities that span more than one user service. Conversely, a single User Service sometimes includes a range of incremental capabilities that are segregated into separate Market Packages so that they may be considered separately from a deployment perspective. As a result, there is often a many-to-many relationship between the Market Packages and the User Services.



To illustrate these relationships, consider the following examples:

- **Single User Services to Multiple Market Packages** – The Traffic Control user service requires distinct surveillance, freeway and surface street traffic control, integrated area-wide traffic control, HOV lane control, and traffic information dissemination capabilities. Since each of these capabilities may be deployed individually by a local jurisdiction, they are allocated to distinct Market Packages. The Market Packages also distinguish between different traffic surveillance approaches. Roadside instrumentation (i.e., the Network Surveillance Market Package) and vehicle probes (i.e. the Probe Surveillance Market Package) are separated due to fundamentally different technical and institutional issues for the two approaches. In total, eleven separate Market Packages provide different mechanisms and levels of support for satisfying the Traffic Control User Service Requirements.
- **Single Market Package to Multiple User Services** – The HOV and Reversible Lane Management Market Package supports both the Traffic Control and Travel Demand Management User Services since both services could include HOV lane management capabilities. This single deployable package satisfies portions of the requirements associated with both of these user services.

The baseline relationships between User Services and Market Packages as identified in the National ITS Architecture version 3.0 is presented in Table 4.2. As shown in the table, the identified Market Packages support all required User Services.

Only one baseline relationship is identified between the Incident Management User Service and the ATIS Market Packages (ATIS4 – Dynamic Route Guidance). Emergency Services or Public Safety agencies involved in incident management often depend on the same traveler information outlets as the general public. However, those Emergency Services providers could subscribe to a Dynamic Route Guidance service provided by a private sector company to improve incident response times. Therefore, by analogy, implementation of any or all of the other ATIS Market Packages could create a relationship between the Incident Management User Service and the other ATIS Market Packages.



Of all the market packages displayed in Table 4.2, those relating to freeway and surface street control are already being partially deployed in various portions of the San Joaquin Valley Region. Some emergency management services have deployed vehicle tracking and dispatch integration, but not yet at the regional level.

4.3 Market Package Selection

This section describes the process to identify and loosely prioritize Market Packages for the San Joaquin Valley.

Market Package Selection Process:

- Identify Candidate Market Packages
 - Initial Prioritization at Market Packages
 - Development of Additional MP's
 - Screening for Candidates
 - Final Market Package Selection
-

The process, as was the case with the selection of San Joaquin Valley User Services began with assemblage of a “master list” of candidate Market Packages. Next, an initial selection and loose prioritization of Market Packages was performed based on the relationship between the previously identified San Joaquin Valley ITS User Services and Market Packages (a relationship documented in the National ITS Architecture; see Section 3.0).

Then the need for development of additional Market Packages was considered; that is, it was determined whether or not the selected Market Packages were sufficient to fully implement the selected User Services. Finally, a screening analysis was performed on the candidate Market Packages, considering issues including the maturity of the technologies imbedded in the various packages, and the ability of the San Joaquin Valley ITS coalition to influence/control the deployment of the various packages. Based on the results of this screening, the initial Market Package selection and loose, relative prioritization was revisited and adjusted. As explained in the Introduction, the prioritization of Market Package merely acknowledges the relative obvious relationship between some packages and the identified high priority needs/problems and User Services. The Market Package priorities do not dictate ultimate project phasing, which considers many additional factors beyond the priority of the Market Packages involved in the projects.

It is at this same step in the process that Market Packages that are of special importance in rural areas are highlighted, a treatment that mirrors the approach currently taken to the urban/rural Market Package distinction in the current version (3.0) of the National ITS Architecture. The logic for such an approach is, generally, that Market Packages are flexible enough to accommodate both their rural and urban deployment, and that additional partitioning of the National ITS Architecture is therefore unnecessary, and to be avoided since it could to some extent impede the very integration that is at the heart of the National ITS Architecture. In the case of the San Joaquin Valley, which includes both heavily urbanized and very rural areas, both with distinct needs and circumstances, it does seem appropriate to highlight Market Packages that may be of particular importance to rural areas. Later, in the development and phasing of



specific projects, these distinctions may provide part of the basis for phasing distinctions for projects in urban and rural areas.

The product of the Market Package selection process is the identified list of San Joaquin Valley ITS Market Packages, loosely prioritized. As described in the Introduction, this list of Market Packages, combined with the identified San Joaquin Valley ITS User Services, become important components and building blocks of the San Joaquin Valley ITS System Architecture. Each of the steps in the Market Package process are described in the subsections which follow.

4.3.1 Development of the Candidate Market Package Master List

A total of 68 Market Packages are included in the Candidate Market Package Master List. These Market Packages represent the 63 National ITS Architecture standard packages, plus six “customized” packages arising from a review of other relevant California SDP Market Packages.

Nationally, and within California, very few custom Market Packages have been developed. In nearly all cases, the National ITS Market Packages are found to be sufficiently broad and flexible to implement identified User Services and address identified needs. However, the COATS project has developed five custom Market Packages that may have relevance to the San Joaquin Valley and which therefore were added to the 63 National ITS Market Packages for consideration:

- Animal-vehicle Collision Countermeasures
- Emergency Vehicle Maintenance
- Dynamic Warning System
- Safe Speed Advisory
- Mobile Traffic Management/Enforcement

The candidate list of Market Packages for the San Joaquin Valley therefore consisted of the 63 Market Packages from the National ITS Architecture shown in Table 4.2 plus five custom packages developed in the COATS project.

4.3.2 Initial Market Package Selection and Relative Prioritization

The initial selection and relative prioritization of San Joaquin Valley ITS Market Packages was made strictly based on the relationship between Market Packages and User Services, and the previously defined relative priorities of the San Joaquin Valley ITS User Services. Specifically, any Market Package that is needed to implement a San



Joaquin Valley User Service was selected, and the relative priority of that Market Package was determined based on the relative priority of the highest priority User Service that package supports. For example, a Market Package that supports two “priority 1” User Services and two “priority 2” User Services was identified as a “priority 1” Market Package.

Table 4.3 identifies the relationship between selected San Joaquin Valley ITS User Services and the candidate Market Packages. For those User Services and Market Packages from the National ITS Architecture, the relationship is taken from the National ITS Architecture (as shown Table 4.2). For the six User Services and five Market packages that did not come from the National ITS Architecture, the assumed relationships have been identified as part of this effort.

Based on the relationships and User Service Priorities shown in Table 4.3, the initial selection and prioritization of San Joaquin Valley Market Packages was determined, and is shown in Table 4.4

As has been the approach used in the National ITS Architecture, no urban/rural distinctions have been made in the selection of User Services for the San Joaquin Valley. The Market Package selection and relative priorities shown in Table 4.4, being based solely on Market Package relationships to San Joaquin Valley User Services, therefore also do not reflect urban/rural distinctions. Market Packages and their priority are only one consideration that will be taken into account in the identification of projects for implementation in the various portions of the San Joaquin Valley. The process to identify and prioritize specific projects in specific locations will be based on local considerations, including rural/urban distinctions.



	NEW	AD
Market Packages	IITS Data Mart	
	IITS Data Warehouse	
	IITS Virtual Data Warehouse	
	Animal-vehicle Collision Countermeasures	
	Emergency Vehicle Maintenance	
	Dynamic Warning System	
	Safe Speed Advisory	
	Mobile Traffic Management/Enforcement	

	= Priority 1 San Joaquin Valley User Service
	= Priority 2 San Joaquin Valley User Service
	= Priority 3 San Joaquin Valley User Service



Table 4.4: Initial Prioritization of Market Packages

Priority 1 Market Packages		Priority 1 Market Packages (cont'd)	
ATMS1	Network Surveillance	AVSS11	Automated Highway System
ATMS2	Probe Surveillance	CVO1	Fleet Administration
ATMS3	Surface Street Control	CVO10	HAZMAT Management
ATMS4	Freeway Control	EM1	Emergency Response
ATMS5	HOV Lane Management	EM2	Emergency Routing
ATMS6	Traffic Information Dissemination	EM3	Mayday Support
ATMS7	Regional Traffic Control	AD1	ITS Data Mart
ATMS8	Incident Management System	AD2	ITS Data Warehouse
ATMS9	Traffic Forecast and Demand Management	AD3	ITS Virtual Data Warehouse
ATMS12	Virtual TMC and Smart Probe Data	New	Emergency Vehicle Maintenance
ATMS17	Reversible Lane Management	New	Dynamic Warning System
ATMS18	Road Weather Information System	New	Safe Speed Advisory
APTS1	Transit Vehicle Tracking	New	Mobile Traffic Management/Enforcement
APTS2	Transit Fixed-Route Operations	Priority 2 Market Packages	
APTS3	Demand Response Transit Operations	ATMS10	Electronic Toll Collection
APTS4	Transit Passenger and Fare Management	ATMS11	Emissions Monitoring and Management
APTS7	Multi-modal Coordination	ATMS13	Standard Railroad Grade Crossing
APTS8	Transit Traveler Information	ATMS14	Advanced Railroad Grade Crossing
ATIS1	Broadcast Traveler Information	ATMS15	Railroad Operations Coordination
ATIS2	Interactive Traveler Information	ATMS16	Parking Facility Management
ATIS3	Autonomous Route Guidance	ATMS19	Regional Parking Management
ATIS4	Dynamic Route Guidance	APTS5	Transit Security
ATIS5	ISP Based Route Guidance	APTS6	Transit Maintenance
ATIS6	Integrated Transportation Management/Route Guidance	CVO2	Freight Administration
ATIS7	Yellow Pages and Reservation	CVO3	Electronic Clearance
ATIS8	Dynamic Ridesharing	CVO4	CV Administrative Processes
ATIS9	In Vehicle Signing	CVO5	International Border Electronic Clearance
AVSS1	Vehicle Safety Monitoring	CVO6	Weigh-In-Motion
AVSS2	Driver Safety Monitoring	CVO7	Roadside CVO Safety
AVSS3	Longitudinal Safety Warning	CVO9	CVO Fleet Maintenance
AVSS4	Lateral Safety Warning	Priority 3 Market Packages	
AVSS5	Intersection Safety Warning	CVO8	On-board CVO Safety
AVSS6	Pre-Crash Restraint Deployment	New	Animal-vehicle Collision Countermeasures
AVSS7	Driver Visibility Improvement		
AVSS8	Advanced Vehicle Longitudinal Control		
AVSS9	Advanced Vehicle Lateral Control		
AVSS10	Intersection Collision Avoidance		

“New” = Custom (i.e., not included in the National ITS Architecture) Market Packages developed in the California/Oregon Advanced Transportation Systems (COATS) project.



4.3.3 Assessment of the Need for Additional Market Packages

The Market Packages that were initially selected and prioritized through the activity described in Section 4.2 were compared to the list of San Joaquin Valley User Services. The purpose of the comparison was to determine whether all of the User Services can be fully implemented using the selected Market Packages, or whether additional Market Packages are needed. It was determined that at this time, the development of additional Market Packages are not warranted, and that all of the selected User Services can be realized through development of the selected Market Packages.

4.3.4 Market Package Screening Evaluation

Although the relative priority of the User Services they support provides a logical basis for prioritization of Market Packages, other factors do impact prioritization within a given study area, such as the San Joaquin Valley. A screening-level evaluation of the candidate San Joaquin Valley ITS Market Packages was performed focusing on three of these study-area-specific factors: “deployability”, “maturity of technology”, and “opportunity”.

“Deployability” relates to the ability of San Joaquin Valley public agencies to sufficiently influence or control the deployment of the Market Package. For example, the “Surface Street Control” Market Package would be considered highly deployable because it deals primarily with infrastructure owned and operated by public transportation agencies, principally traffic signal systems. On the other hand, the Market Package “In Vehicle Signing” would be considered not very deployable since it relies heavily on privately owned, in-vehicle equipment that is developed by private companies and purchased by private consumers.

“Maturity of technology” describes the extent to which the technology associated with a Market Package is commonly available and proven through real-world deployments. Since traffic signal technologies are relatively proven and widely available, the Market Package “Surface Street Control” would score high on this factor. The “In Vehicle Signing” Market Package, on the other hand, utilizes much less mature technology that, although functional, has not been proven through extensive deployment, and would therefore score lower on this factor.

“Opportunity” describes the extent to which the infrastructure and institutional components required to implement a given Market Package are currently present in the San Joaquin Valley. For example, there are a large number of traffic signals in the San Joaquin Valley, including many which could benefit from more sophisticated technology applications, and there exists a well-established institutional structure for implementing and operating traffic signals.



Therefore the “Surface Street Control” Market Package would score well on this factor. On the other hand, the “In Vehicle Signing” Market Package would score much lower, since practically none of the vehicles operated in the San Joaquin Valley are equipped with the devices necessary to support in-vehicle signing.

Each of the candidate San Joaquin Valley ITS Market Packages were scored on these three criteria on a scale of 1 to 5, with 5 being the best score in each case. A total score was calculated for each candidate package by summing the scores on the three evaluation criteria. Table 4.4 presents the results of the screening level evaluation, with Market Packages listed in descending order based on their total score.



Table 4.5: Market Package Screening Level Evaluation Results

Market Packages Screening Level Evaluation Scoring		Evaluation Criteria	Deployability	Maturity of Technology	Opportunity	Total Score
Scale: 1 (Low) through 5 (High)						
MARKET PACKAGES – scored						
ATMS3	Surface Street Control		5	5	5	15
New	Emergency Vehicle Maintenance		5	5	5	15
New	Dynamic Warning System		5	4	5	14
New	Safe Speed Advisory		4	4	5	13
ATMS1	Network Surveillance		4	5	4	13
ATMS4	Freeway Control		4	5	4	13
ATMS13	Standard Railroad Grade Crossing		4	4	4	12
APTS2	Transit Fixed-Route Operations		4	4	4	12
ATIS1	Broadcast Traveler Information		4	4	4	12
AD1	ITS Data Mart		4	4	4	12
ATMS6	Traffic Information Dissemination		3	4	4	11
ATMS18	Road Weather Information System		3	5	3	11
APTS4	Transit Passenger and Fare Management		4	4	3	11
APTS8	Transit Traveler Information		4	4	3	11
ATIS3	Autonomous Route Guidance		4	4	3	11
CVO1	Fleet Administration		4	4	3	11
CVO2	Freight Administration		3	5	3	11
CVO3	Electronic Clearance		3	4	4	11
EM2	Emergency Routing		3	4	4	11
ATMS5	HOV Lane Management		4	3	3	10
APTS1	Transit Vehicle Tracking		3	4	3	10
ATIS2	Interactive Traveler Information		3	3	4	10
ATIS7	Yellow Pages and Reservation		3	4	3	10
CVO6	Weigh-In-Motion		3	3	4	10
ATMS7	Regional Traffic Control		3	3	3	9
ATMS8	Incident Management System		3	3	3	9
ATMS10	Electronic Toll Collection		3	4	2	9
ATIS4	Dynamic Route Guidance		3	3	3	9
CVO9	CVO Fleet Maintenance		3	3	3	9
EM1	Emergency Response		3	3	3	9
EM3	Mayday Support		3	3	3	9
AD2	ITS Data Warehouse		3	3	3	9
AD3	ITS Virtual Data Warehouse		3	3	3	9
ATMS2	Probe Surveillance		2	3	3	8
ATMS9	Traffic Forecast and Demand Management		3	3	2	8
ATMS12	Virtual TMC and Smart Probe Data		3	2	3	8
ATMS14	Advanced Railroad Grade Crossing		3	2	3	8



Market Packages Screening Level Evaluation Scoring		Evaluation Criteria			
Scale: 1 (Low) through 5 (High)		Deployability	Maturity of Technology	Opportunity	Total Score
ATMS16	Parking Facility Management	3	3	2	8
APTS3	Demand Response Transit Operations	3	3	2	8
APTS5	Transit Security	3	3	2	8
APTS6	Transit Maintenance	3	3	2	8
AVSS1	Vehicle Safety Monitoring	2	5	1	8
AVSS7	Driver Visibility Improvement	2	4	2	8
CVO4	CV Administrative Processes	2	3	3	8
CVO5	International Border Electronic Clearance	2	3	3	8
APTS7	Multi-modal Coordination	3	2	2	7
ATIS5	ISP Based Route Guidance	2	2	3	7
ATIS8	Dynamic Ridesharing	2	3	2	7
CVO7	Roadside CVO Safety	2	3	2	7
CVO8	On-board CVO Safety	2	3	2	7
New	Mobile Traffic Management/Enforcement	3	2	1	6
ATMS11	Emissions Monitoring and Management	2	2	2	6
ATMS15	Railroad Operations Coordination	2	2	2	6
ATMS19	Regional Parking Management	2	2	2	6
ATIS6	Integrated Transportation Management/Route Guidance	2	2	2	6
ATIS9	In Vehicle Signing	1	3	2	6
AVSS4	Lateral Safety Warning	2	2	2	6
AVSS6	Pre-Crash Restraint Deployment	2	2	2	6
AVSS9	Advanced Vehicle Lateral Control	2	2	2	6
CVO10	HAZMAT Management	2	2	2	6
New	Animal-vehicle Collision Countermeasures	2	2	1	5
ATMS17	Reversible Lane Management	2	2	1	5
AVSS3	Longitudinal Safety Warning	2	2	1	5
AVSS8	Advanced Vehicle Longitudinal Control	2	2	1	5
AVSS11	Automated Highway System	1	2	1	4
AVSS2	Driver Safety Monitoring	1	1	1	3
AVSS5	Intersection Safety Warning	1	1	1	3
AVSS10	Intersection Collision Avoidance	1	1	1	3



4.3.5 Adjustments to Initial Market Package Prioritization

Table 4.6 compares the results of the Market Package screening evaluation with the initial prioritization based strictly on relationships between Market Packages and the relative priorities of the User Services they support (see Section 4.2). The Market Packages are listed according to the priorities established in the initial selection/prioritization process, with the relative priority of the each Market Package noted based on the screening level evaluation. For example, Market Packages that scored roughly in the upper third in the screening evaluation—those in Table 4.5 with a total score of 10 or higher—have been highlighted in black. Those that scored in the middle third—scores of 7, 8 or 9—are shown highlighted in gray. Those that scored in the lower third—scores of 6 or lower—have no shading.

In assessing the comparisons shown in Table 4.6, the focus was placed on discrepancies between priority 1 and priority 3 rankings. That is, on Market Packages that were priority 1 based on their relationship to priority 1 User Services, but which were priority 3 based on the screening level evaluation of their potential for deployment in the San Joaquin Valley, and vice versa. Distinctions between priority 1 and priority 2, and between priority 2 and priority 3 were dismissed, given that the priorities are loose, relative, and as described previously, do not determine the priority or ultimate phasing of specific projects.

Referring to Table 4.6, it can be seen that there are no examples of Market Packages that scored high in the screening evaluation, but which had been prioritized low (priority 3) based on the User Service relationships. Turning to the reverse case, it can be seen that 14 Market Packages prioritized high based on the User Service relationships scored low in the screening evaluation. In all cases, these 14 Market Packages, although necessary to implement User Services that can help address identified San Joaquin Valley ITS needs/problems, were found to either: be beyond the scope and control of the public agencies in the San Joaquin Valley, reliant on immature technologies, or based on infrastructure and/or institutional structures that are not present in the Valley. These 14 Market Packages were therefore down-graded in the final prioritization; 12 of them to priority 3 status and two of them (“HAZMAT Management” and “Mobile Traffic Management/Enforcement”) were down-graded only to priority 2 status, given their strong relationship to identified San Joaquin Valley ITS needs/problems.



Table 4.6: Comparison of Market Package Screening Level Evaluation Results to Initial Prioritization

Priority 1 Market Packages		Priority 1 Market Packages (cont'd)	
ATMS1	Network Surveillance	AVSS11	Automated Highway System
ATMS2	Probe Surveillance	CVO1	Fleet Administration
ATMS3	Surface Street Control	CVO10	HAZMAT Management
ATMS4	Freeway Control	EM1	Emergency Response
ATMS5	HOV Lane Management	EM2	Emergency Routing
ATMS6	Traffic Information Dissemination	EM3	Mayday Support
ATMS7	Regional Traffic Control	AD1	ITS Data Mart
ATMS8	Incident Management System	AD2	ITS Data Warehouse
ATMS9	Traffic Forecast and Demand Management	AD3	ITS Virtual Data Warehouse
ATMS12	Virtual TMC and Smart Probe Data	New	Emergency Vehicle Maintenance
ATMS17	Reversible Lane Management	New	Dynamic Warning System
ATMS18	Road Weather Information System	New	Safe Speed Advisory
APTS1	Transit Vehicle Tracking	New	Mobile Traffic Management/Enforcement
APTS2	Transit Fixed-Route Operations	Priority 2 Market Packages	
APTS3	Demand Response Transit Operations	ATMS10	Electronic Toll Collection
APTS4	Transit Passenger and Fare Management	ATMS11	Emissions Monitoring and Management
APTS7	Multi-modal Coordination	ATMS13	Standard Railroad Grade Crossing
APTS8	Transit Traveler Information	ATMS14	Advanced Railroad Grade Crossing
ATIS1	Broadcast Traveler Information	ATMS15	Railroad Operations Coordination
ATIS2	Interactive Traveler Information	ATMS16	Parking Facility Management
ATIS3	Autonomous Route Guidance	ATMS19	Regional Parking Management
ATIS4	Dynamic Route Guidance	APTS5	Transit Security
ATIS5	ISP Based Route Guidance	APTS6	Transit Maintenance
ATIS6	Integrated Transportation Management/Route Guidance	CVO2	Freight Administration
ATIS7	Yellow Pages and Reservation	CVO3	Electronic Clearance
ATIS8	Dynamic Ridesharing	CVO4	CV Administrative Processes
ATIS9	In Vehicle Signing	CVO5	International Border Electronic Clearance
AVSS1	Vehicle Safety Monitoring	CVO6	Weigh-In-Motion
AVSS2	Driver Safety Monitoring	CVO7	Roadside CVO Safety
AVSS3	Longitudinal Safety Warning	CVO9	CVO Fleet Maintenance
AVSS4	Lateral Safety Warning	Priority 3 Market Packages	
AVSS5	Intersection Safety Warning	CVO8	On-board CVO Safety
AVSS6	Pre-Crash Restraint Deployment	New	Animal-vehicle Collision Countermeasures
AVSS7	Driver Visibility Improvement		
AVSS8	Advanced Vehicle Longitudinal Control		
AVSS9	Advanced Vehicle Lateral Control		
AVSS10	Intersection Collision Avoidance		

	= Scored high in Market Package Evaluation (e.g., score of 10 or higher)
	= Scored medium in Market Package Evaluation (e.g., score from 7 to 9)
	= Scored low in Market Package Evaluation (e.g., score less than 7)



4.3.6 Final San Joaquin Valley ITS Market Packages

Table 4.7 presents the San Joaquin Valley ITS Market Packages. The relative priorities reflect the adjustments made based on the screening level evaluation.

As noted in the introduction to this section, consistent with the approach taken to date in the National ITS Architecture, separate rural User Services or Market Packages are not being developed for the San Joaquin Valley. However, some Market Packages are particularly relevant to the rural environment and it is useful to identify them, as has been done in Table 4.7. This identification is not definitive, but represents a basis for possible future delineation of urban/rural distinctions in the San Joaquin Valley ITS system architecture and/or in program and project recommendations.

As noted in Table 4.7, the identification of Market Packages as particularly applicable to the rural environment is based on information in version 3.0 of the National ITS Architecture, specifically, pages 89 through 98 of the December 1999 “Market Packages” document. That document identifies 19 of the National ITS Market Packages as “highly applicable to rural user needs and suitable for the rural environment”. These 19 packages are identified in Table 4.7 and additionally, two of the San Joaquin Valley Market Packages that were developed through the COATS effort have been identified as being particularly applicable to the rural environment.

Table 4.8 summarizes issues that should be considered for the prioritized Market Packages in terms of deployment of these priorities.



Table 4.7: Revised (Final) San Joaquin Valley ITS Market Packages

Priority 1 Market Packages		Priority 2 Market Packages	
ATMS1	Network Surveillance	ATMS10	Electronic Toll Collection
ATMS2	Probe Surveillance	ATMS11	Emissions Monitoring and Management
ATMS3	Surface Street Control	ATMS13	Standard Railroad Grade Crossing
ATMS4	Freeway Control	ATMS14	Advanced Railroad Grade Crossing
ATMS5	HOV Lane Management	ATMS15	Railroad Operations Coordination
ATMS6	Traffic Information Dissemination	ATMS16	Parking Facility Management
ATMS7	Regional Traffic Control	ATMS19	Regional Parking Management
ATMS8	Incident Management System	APTS5	Transit Security
ATMS9	Traffic Forecast and Demand Management	APTS6	Transit Maintenance
ATMS12	Virtual TMC and Smart Probe Data	CVO2	Freight Administration
ATMS18	Road Weather Information System	CVO3	Electronic Clearance
APTS1	Transit Vehicle Tracking	CVO4	CV Administrative Processes
APTS2	Transit Fixed-Route Operations	CVO5	International Border Electronic Clearance
APTS3	Demand Response Transit Operations	CVO6	Weigh-In-Motion
APTS4	Transit Passenger and Fare Management	CVO7	Roadside CVO Safety
APTS7	Multi-modal Coordination	CVO9	CVO Fleet Maintenance
APTS8	Transit Traveler Information	CVO10	HAZMAT Management
ATIS1	Broadcast Traveler Information	New	Mobile Traffic Management/Enforcement
ATIS2	Interactive Traveler Information	Priority 3 Market Packages	
ATIS3	Autonomous Route Guidance	CVO8	On-board CVO Safety
ATIS4	Dynamic Route Guidance	New	Animal-vehicle Collision Countermeasures
ATIS5	ISP Based Route Guidance	ATMS17	Reversible Lane Management
ATIS7	Yellow Pages and Reservation	ATIS6	Integrated Transportation Management/Route Guidance
ATIS8	Dynamic Ridesharing	ATIS9	In Vehicle Signing
AVSS1	Vehicle Safety Monitoring	AVSS2	Driver Safety Monitoring
AVSS7	Driver Visibility Improvement	AVSS3	Longitudinal Safety Warning
CVO1	Fleet Administration	AVSS4	Lateral Safety Warning
EM1	Emergency Response	AVSS5	Intersection Safety Warning
EM2	Emergency Routing	AVSS6	Pre-Crash Restraint Deployment
EM3	Mayday Support	AVSS8	Advanced Vehicle Longitudinal Control
AD1	ITS Data Mart	AVSS9	Advanced Vehicle Lateral Control
AD2	ITS Data Warehouse	AVSS10	Intersection Collision Avoidance
AD3	ITS Virtual Data Warehouse	AVSS11	Automated Highway System
New	Emergency Vehicle Maintenance		
New	Dynamic Warning System		
New	Safe Speed Advisory		

= Particularly applicable to rural/intercity areas (identified as “highly applicable to rural needs and suitable for the rural environment) in the National ITS Architecture)



Table 4.8: Priority Market Package Considerations

ID	Market Packages	Regional Considerations	Other Considerations
ATMS	Advanced Transportation Management Systems		
ATMS01	Network Surveillance*	<ul style="list-style-type: none"> ➤ Existing deployments by Caltrans & Large Cities ➤ Near-term expansion along new freeway and existing routes ➤ Previous lack of common standards 	<ul style="list-style-type: none"> ➤ Status of NTCIP Class B ➤ Caltrans standardization plans/specs ➤ Potential of 2070
ATMS03	Surface Street Control*	<ul style="list-style-type: none"> ➤ Existing City of Fresno Implementation Plan ➤ Planned Cities of Fresno/Clovis & County coordination ➤ Some local cities have QN4 deployment 	<ul style="list-style-type: none"> ➤ Status of NTCIP Class B ➤ Potential of 2070
ATMS04	Freeway Control*	<ul style="list-style-type: none"> ➤ Existing freeway surveillance/ramp metering deployments + RWIS deployments ➤ Current lack of integrated ATMS software for Caltrans ➤ Desire to share data/info. ➤ Need to coordinate surface streets w/freeways ➤ Expanding infrastructure 	<ul style="list-style-type: none"> ➤ Statuses of NTCIP Class B/E ➤ Caltrans standards ➤ Potential for 2070 ➤ Caltrans TMC Standardization Plan
ATMS06	Traffic Information Dissemination	<ul style="list-style-type: none"> ➤ Co-location of CHP MIO & Caltrans TMC ➤ Extensive CMS deployment ➤ Problems w/mobile CMS ➤ Lack of communications ➤ Disconnect between collection & dissemination of traffic information 	<ul style="list-style-type: none"> ➤ Status of NTCIP Class B ➤ Relationships with neighboring regions
ATMS07	Regional Traffic Control	<ul style="list-style-type: none"> ➤ Builds on surface street & freeway control ➤ Desire to create inter-jurisdictional links exist ➤ Institutional arrangements lacking ➤ Common standards lacking ➤ Likely to be longer term deployment 	<ul style="list-style-type: none"> ➤ Status of NTCIP Class B (Maybe something simpler) ➤ Caltrans TOPP Policies on information sharing ➤ Examples of shared control exist within the State ➤ Potentially follow another Region's architecture
ATMS08	Incident Management System	<ul style="list-style-type: none"> ➤ Caltrans lack of complete ATMS software ➤ Creation of Incident Mgmt. Task Force ➤ May be slightly longer term deployment 	<ul style="list-style-type: none"> ➤ Caltrans TMC Standardization Plan ➤ Most of the basic functionality available in ATMS v2.0
APTS	Advanced Public Transportation Systems		
APTS01	Transit Vehicle Tracking*	<ul style="list-style-type: none"> ➤ Some systems already deployed ➤ Need to expand existing deployment ➤ Radio system lacking for smaller transit agencies ➤ Possibility to deploy Regions on common system 	<ul style="list-style-type: none"> ➤ J1708 – Region is not compliant ➤ Instability of vendor market a concern
APTS02	Transit Fixed Route Operations*	<ul style="list-style-type: none"> ➤ A few systems deployed 	<ul style="list-style-type: none"> ➤ Costs



Table 4.8: Priority Market Package Considerations

ID	Market Packages	Regional Considerations	Other Considerations
		<ul style="list-style-type: none"> ➤ Small services operates separately ➤ Institutional considerations need to be resolved to allow better coordination ➤ Need to expand the system and add transit information linkage 	<ul style="list-style-type: none"> ➤ Market options somewhat limited
APTS03	Demand Responsive Transit Operations	<ul style="list-style-type: none"> ➤ Paratransit radio systems inadequate/diverse ➤ Lack of AVL ➤ Need for equipment that matches regional standards 	<ul style="list-style-type: none"> ➤ Costs ➤ Several comprehensive packages on the market
APTS04	Transit Passenger & Fare Management	<ul style="list-style-type: none"> ➤ Existing GFI systems in place ➤ Desire for upgrades ➤ Desire for commonality among various transit services ➤ Same standards/different equipment ➤ Institutional arrangements would require adjustment. 	<ul style="list-style-type: none"> ➤ Status of national payment instrument standards
APTS08	Transit Traveler Information	<ul style="list-style-type: none"> ➤ Existing TrMS to serve as basis ➤ Focus on transit stations/en-route real-time information ➤ Lack of communications a consideration 	<ul style="list-style-type: none"> ➤ Many deployments to serve as examples (SmartTrek/TravelTIP/etc.) ➤ NTCIP should be considered ➤ Web interface (ala SmartTrek should be considered)
ATIS	Advanced Traveler Information Services		
ATIS01	Broadcast Traveler Information*	<ul style="list-style-type: none"> ➤ Need to enhance traffic info., availability accuracy, timeliness ➤ CHP does current traffic spots (some) ➤ Potential lack of broad market for near-term ➤ Only existing dissemination method 	<ul style="list-style-type: none"> ➤ Comm. standards/ATMS deployment would assist ➤ RF Subcarrier possibilities should be reviewed ➤ Potential coordinated deployment with neighboring regions/State
ATIS02	Interactive Traveler Information	<ul style="list-style-type: none"> ➤ Even greater need for accurate and complete traffic data ➤ Ability to promote intermodal options 	<ul style="list-style-type: none"> ➤ Possible coordination with neighboring regions/State
ATIS05	ISP Based Route Guidance	<ul style="list-style-type: none"> ➤ Limited ability to attract private ISP ➤ Possibility to link with neighboring regions/State 	<ul style="list-style-type: none"> ➤ Potential use of TravelTIP/TravInfo architecture ➤ Ties to YATI ➤ Need linkage with the State
ATIS07	Yellow Pages and Reservations	<ul style="list-style-type: none"> ➤ Market may be limited ➤ Location/extent of recreational travel a positive 	
EM	Emergency Services		
EM01	Emergency Response*	<ul style="list-style-type: none"> ➤ Incident Mgmt. Task Force a positive ➤ New/additional inter-agency agreements required. ➤ Improved integration of traffic/emergency response systems needed 	<ul style="list-style-type: none"> ➤ Framework for cooperation established by FHWA, ITE, and other orgs ➤ Proven in other regions that institutional issues can be overcome



Table 4.8: Priority Market Package Considerations

ID	Market Packages	Regional Considerations	Other Considerations
EM02	Emergency Routing	<ul style="list-style-type: none"> ➤ Accurate/timely data critical ➤ May be appropriate to run as semi-manual system with human interface to traffic data ➤ Emergency services have expressed desire for traffic data 	<ul style="list-style-type: none"> ➤ Improved algorithms needed to enhance real-time response
ITS01	ITS Planning	<ul style="list-style-type: none"> ➤ Need for data accurate for modeling & air quality purposes ➤ Gaps in freeway/street sensor infrastructure ➤ Linkage to planners needed 	<ul style="list-style-type: none"> ➤ Improvements are being made to many existing software titles to allow simplified report functions

