EXECUTIVE SUMMARY

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INTRODUCTION

This document is an Executive Summary that describes the National Intelligent Transportation System (ITS) Architecture. This document covers the following major topics:

- ITS Opportunity – need for the architecture
- Main components of the National ITS Architecture
    - Logical Architecture
    - Physical Architecture
    - Service Packages
- Architecture Documentation
- Deployment of ITS
    - Standards
    - Benefits Resulting from the Architecture

INTELLIGENT TRANSPORTATION SYSTEMS (ITS) OPPORTUNITY

Although the United States has one of the best surface transportation systems in the world, the mobility we as Americans prize so highly is threatened by the continuing growth in travel demand. In many areas of the country, we no longer have the option to build additional roadways to meet this increasing demand, due to the lack of suitable land to build on, limited financial resources, and environmental impact issues.

Congestion on the Nation's highways, particularly in urbanized areas and along heavily traveled inter-city corridors, is exacting a toll on our pocketbooks, our quality of life, and our environment.

Homeland security is exacting new demands on the U.S. surface transportation system after the terrorist events of September 11th, 2001. Potential targets include airports, sea and water ports, nuclear facilities, dams, water and sewer plants, electric power plants, gas pipelines, tunnels and bridges and biological and chemical facilities as well as high profile events like the Super Bowl. A balance will need to be reached between transportation security and the efficiency of the transportation network.

Safety on the nation's surface transportation system is also a concern. In 2010 there were 32,885 people killed and another 2.24 million injured in traffic accidents involving automobiles (statistics from the National Highway Traffic Safety Administration (NHTSA) Website – Traffic Safety Facts for December 2011). While most accidents are urban, over fifty-five percent of all fatal accidents are reported to occur in rural areas. Even though highway fatalities have dropped off in the past few years, it is astounding that we can so blithely accept the loss of so many lives when technology could save many of them.

In addition to the basic problems of congestion, security and safety, there are the "niche" problems of inefficiency and loss of productivity. These range from a frustratingly simple one of finding a parking place, or knowing that none are available without having to look for twenty minutes, to having to stop to pay tolls. Relative to commercial vehicle operations, the productivity of trucking is eaten into by stops for weighing, for inspections, or to verify compliance with regulations. Since transportation is an integral part of nearly all of industry's productive and distributive processes, a penalty to transportation productivity is a penalty to national productivity. We should and can do better.

There is no single answer to the set of complex transportation problems that face the nation. However, new technologies in computing, sensing, and communications, commonly referred to as ITS technologies, are opening up new possibilities that collectively can go a long way. Some of these are better ways of doing old things, like traffic control, but some are entirely new, such as dynamic route guidance. Most are ideas that transportation professionals have had for a long time, but were beyond the available technology or cost too much as individual bits and pieces.

ITS technologies have been encapsulated in a collection of interrelated user services for application to the nation's surface transportation problems. To date, thirty-three user services have been identified. This list of user services is neither exhaustive nor final. The user services have been bundled into eight categories as shown in Table 1.

Table 1. ITS User Services

User Service Bundle	User Service
Travel and Traffic Management	Pre-Trip Travel Information En-Route Driver Information Route Guidance Ride Matching and Reservation Traveler Services Information Traffic Control Incident Management Travel Demand Management Emissions Testing and Mitigation Highway Rail Intersection
Public Transportation Management	Public Transportation Management En-Route Transit Information Personalized Public Transit Public Travel Security
Electronic Payment	Electronic Payment Services
Commercial Vehicle Operations	Commercial Vehicle Electronic Clearance Automated Roadside Safety Inspection On-board Safety and Security Monitoring Commercial Vehicle Administrative Processes Hazardous Material Security and Incident Response Freight Mobility
Emergency Management	Emergency Notification and Personal Security Emergency Vehicle Management Disaster Response and Evacuation

User Service Bundle	User Service
Advanced Vehicle Safety Systems	Longitudinal Collision Avoidance Lateral Collision Avoidance Intersection Collision Avoidance Vision Enhancement for Crash Avoidance Safety Readiness Pre-Crash Restraint Deployment Automated Vehicle Operation
Information Management	Archived Data
Maintenance and Construction Management	Maintenance and Construction Operations

ITS presents stakeholders with a variety of options to address their transportation needs. Left without adequate guidance, stakeholders could easily develop system solutions to their needs that were incompatible with their regional neighbors. Put another way, if City A chooses to implement user services one way, and neighboring City B another, then it is a real possibility that a motorist/traveler would find that none of the ITS vehicle-based equipment or services purchased for use in City A, would work in City B. To fully maximize the potential of ITS technologies, system design solutions must be compatible at the system interface level in order to share data, provide coordinated, area-wide integrated operations, and support interoperable equipment and services where appropriate. The National ITS Architecture provides this overall guidance to ensure system, product, and service compatibility/interoperability, without limiting the design options of the stakeholder.

NATIONAL ITS ARCHITECTURE

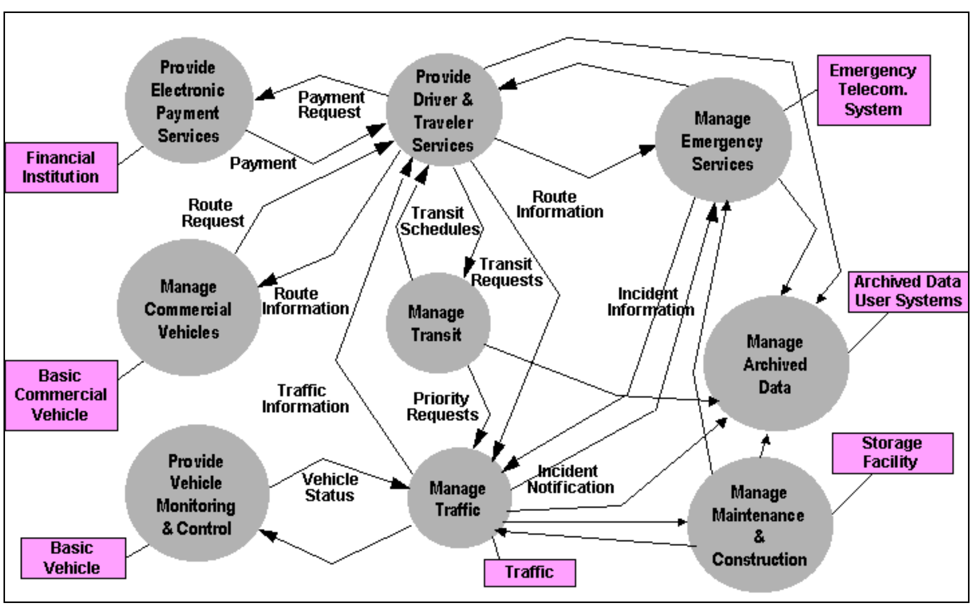
The National ITS Architecture provides a common structure for the design of intelligent transportation systems. It is not a system design nor is it a design concept. It is the framework around which multiple design approaches can be developed, each one specifically tailored to meet the individual needs of the user, while maintaining the benefits of a common architecture noted above. The architecture defines the functions (e.g., gather traffic information or request a route) that must be performed to implement a given user service, the physical entities or subsystems where these functions reside (e.g., the roadside or the vehicle), the interfaces/information flows between the physical subsystems, and the communication requirements for the information flows (e.g., fixed-point to fixed-point or wide area wireless). In addition, it identifies and specifies the requirements for the standards needed to support national and regional interoperability, as well as product standards needed to support economy of scale considerations in deployment.

Model of ITS Functions (Logical Architecture)

The *Logical Architecture* presents a functional view of the ITS user services. This perspective is divorced from likely implementations and physical interface requirements. It defines the functions or process specifications that are required to perform ITS user services, and the data flows that need to be exchanged between these functions. The functional decomposition process begins by defining those elements that are inside the architecture, and those that are not. There are three cases to consider. An element is either inside the architecture (in which case both its functions and interfaces are defined), on the boundary of the architecture (in which case only its interfaces are defined), or outside of the architecture (in which case it has no interfaces into the architecture). For example, travelers are on the boundary of the architecture, but the equipment that they use to obtain information or provide inputs is inside. In other words, the architecture defines the functions ITS must perform in support of a traveler's requirements, not the functions of the traveler. A financial institution that processes tolls is on the boundary of the architecture, whereas the ITS components that detect vehicles and collect tolls are inside. Existing broadcast media are on the boundary of the architecture, but the elements that provide ITS traveler information to the media are inside. An example of an element that is outside the architecture is a freight train. Its communications with the rail infrastructure is not covered at all in the architecture, but railroad wayside equipment can interface with traffic signal systems and as such the railroad wayside equipment is an element on the boundary of the architecture.

ITS functions are depicted using *data flow diagrams*. A simplified top-level data flow diagram is presented in Figure 1. In a data flow diagram, circles represent functions that are broken down into lower levels of detail on subsequent diagrams. The lowest level of decomposition is a *Process Specification*, e.g., *Detect Roadside Pollution Levels*. This process detects pollution levels present in the environment and passes the pollution measurement data on to another process, *Process Pollution Data*, where it is combined with other such detected data. Both process specifications are within the *Manage Traffic* function. Rectangles represent the entities on the boundary, or *terminators*. The lines drawn between the functions (circles), and between the functions and entities on the boundary (rectangles), represent data flows. They are further subdivided on subsequent diagrams and are described in a data dictionary.

Figure 1. Simplified Top Level Logical Architecture



Model of ITS Physical Entities (Physical Architecture)

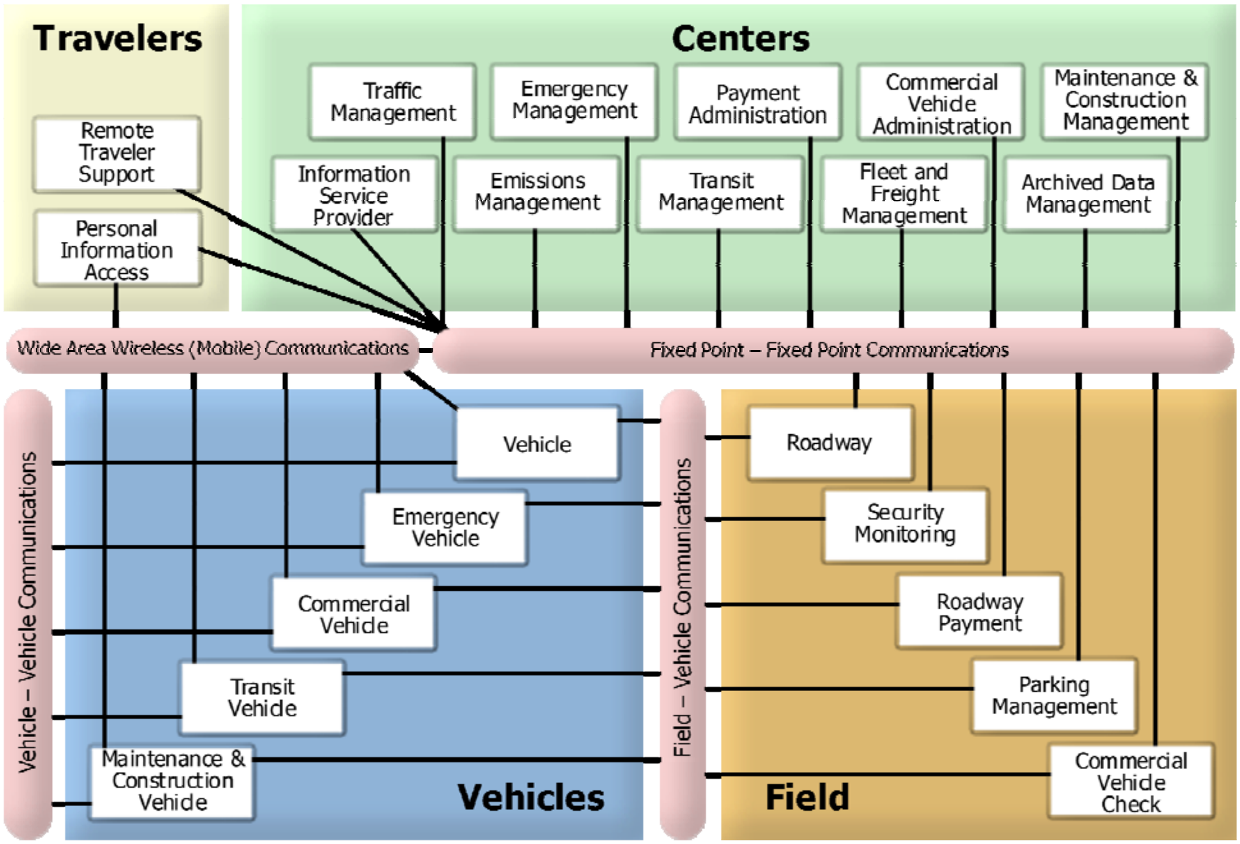
The *Physical Architecture* partitions the functions defined by the Logical Architecture into *classes*, and at a lower level, *subsystems*, based on the functional similarity of the process specifications and the location where the functions are being performed. A top-level diagram of the physical architecture is shown on the following page.

There are 22 subsystems in the physical architecture distributed among four classes: *Traveler*, *Center*, *Field*, and *Vehicle*. The specific choice of 22 subsystems represents a lower level of partitioning of functions that is intended to capture all anticipated subsystem boundaries for the present and 20 years into the future. Figure 2 depicts the 22 subsystems as white rectangles and the classes as larger, colored encompassing rectangles.

Subsystems are composed of *equipment packages* with specific functional attributes. Equipment Packages group similar processes of a particular subsystem together into an "implementable" package.

In deployments, the character of a subsystem deployment is determined by the specific equipment packages chosen. For example, one municipal deployment of a *Traffic Management Subsystem* may select *Collect Traffic Surveillance* and *Basic Signal Control* equipment packages, while a state Traffic Management Center may select *Collect Traffic Surveillance* and *Freeway Control* packages. In addition, subsystems may be deployed individually or in "aggregations" or combinations that will vary by geography and time based on local deployment choices. A Traffic Management Center may include a *Traffic Management Subsystem*, *Information Provider Subsystem*, and *Emergency Management Subsystem*, all within one building, while another Traffic Management Center may concentrate only on the management of traffic with the *Traffic Management Subsystem*. A discussion of the function of each subsystem is provided on the following pages.

Figure 2. High-Level Architecture Diagram



Center Subsystems

Center Subsystems deal with those functions normally assigned to public or private administrative, management, or planning agencies. The ten Center Subsystems are:

- ***Archived Data Management*** - Collects, archives, manages, and distributes data generated from ITS sources for use in transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations, and research applications
- ***Commercial Vehicle Administration*** - Issues credentials and administers taxes, keeps records of safety and credential check data, and participates in information exchange with other commercial vehicle administration subsystems and CVO Information Requesters.
- ***Emergency Management*** - Coordinates response to incidents, including those involving hazardous materials (HAZMAT).
- ***Emissions Management*** - Collects and processes air pollution data and provides demand management input to Traffic Management.
- ***Fleet and Freight Management*** - Monitors and coordinates vehicle fleets including coordination with intermodal freight depots or shippers.
- ***Information Service Provider*** - Collects and processes transportation data from the aforementioned centers, and broadcasts general information products (e.g., speeds or travel times), or delivers personalized information products (e.g., personalized or

optimized routing) in response to individual information requests. This subsystem may be deployed alone (to generally serve drivers and/or travelers) or be combined with Transit Management (to specifically benefit transit travelers) or Traffic Management (to specifically benefit drivers and their passengers) deployments. The Information Service Provider is a key element of pre-trip travel information, infrastructure based route guidance, brokering demand-responsive transit and ridematching, and other traveler information services.

- ***Maintenance and Construction Management*** – Monitors and manages roadway infrastructure construction and maintenance activities. Representing both public agencies and private contractors that provide these functions, this subsystem manages fleets of maintenance, construction, or special service vehicles (e.g., snow and ice control equipment) and performs vehicle dispatch, routing, and resource management for the vehicle fleets and associated equipment.
- ***Payment Administration*** - Provides general payment administration capabilities to support electronic assessment of tolls and other transportation usage fees.
- ***Traffic Management*** - Processes traffic data and provides basic traffic and incident management services through the interactions with the Roadway and other subsystems. The Traffic Management Subsystem may share traffic data with Information Service Providers and other subsystems. Different equipment packages provide a focus on surface streets or highways (freeways and interstates) or both. It also coordinates transit signal priority and emergency vehicle signal preemption.
- ***Transit Management*** - Collects operational data from transit vehicles and performs strategic and tactical planning for transit operations.

Field Subsystems

These subsystems include functions that require convenient access to a location for the deployment of sensors, signals, programmable signs, or other interfaces with travelers and vehicles of all types. The five Field Subsystems are:

- ***Commercial Vehicle Check -*** Collects credential and safety data from vehicle tags, determines conformance to requirements, posts results to the driver (and in some safety exception cases, the carrier), and records the results for the Commercial Vehicle Administration Subsystem.
- ***Parking Management -*** Collects parking fees and manages parking lot occupancy/availability.
- ***Roadway -*** Provides road network surveillance, traffic signals, and signage for traveler information. This subsystem also includes the devices at roadway intersections and multi-modal intersections to control traffic.
- ***Security Monitoring -*** Includes surveillance and sensor equipment used to provide enhanced security and safety for transportation facilities or infrastructure.
- ***Roadway Payment -*** Interacts with vehicle equipment to collect tolls, support road use payment systems, and identify violators.

Vehicle Subsystems

These subsystems are installed in a vehicle. The five Vehicle Subsystems are:

- ***Commercial Vehicle -*** Stores safety data, identification numbers (i.e. driver, vehicle, and carrier), last check event data, and supports in-vehicle signage for driver pass/pull-in messages.

- ***Emergency Vehicle*** **-** Provides the sensory, processing, storage, and communications functions necessary to support safe and efficient incident response. The subsystem represents a range of vehicles including those operated by police, fire, and emergency medical services as well as other incident response vehicles including towing and recovery vehicles and freeway service patrols.
- ***Maintenance and Construction Vehicle*** **-** Provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction. All types of maintenance and construction vehicles are covered, including heavy equipment and supervisory vehicles.
- ***Transit Vehicle*** **-** Includes buses, paratransit vehicles, light rail vehicles, other vehicles designed to carry passengers, and supervisory vehicles. Provides operational data to the Transit Management Center, receives transit network status, provides enroute traveler information to travelers, and provides passenger and driver security functions.
- ***Vehicle*** **-** Functions that may be common across all vehicle types are located here (e.g. navigation, toll transponder, etc.) so that specific vehicle deployments may include aggregations of this subsystem with one of the other four specialized vehicle subsystems types. The Vehicle Subsystem includes the functionality to support the user services of the Advanced Vehicle Control and Safety Systems user services bundle.

Traveler Subsystems

These subsystems represent platforms for ITS functions of interest to travelers or carriers (e.g., commercial vehicle operators) in support of multimodal traveling. They may be fixed (e.g., kiosks or home/office computers) or portable (e.g., a palm-top computer), and may be accessed by the public (e.g., through kiosks) or by individuals (e.g., through cellular phones or personal computers). The two Traveler Subsystems are:

- ***Personal Information Access*** **-** Provides traveler information and supports emergency requests for travelers using personal computers/telecommunication equipment at the home, office, or while on travel.
- ***Remote Traveler Support*** **-** Provides access to traveler information at transit stations, transit stops, other fixed sites along travel routes (e.g., rest stops, merchant locations), and major trip generation locations such as special event centers, hotels, office complexes, amusement parks, and theaters.. This subsystem includes traveler security functions and safety monitoring of public areas.

Communications

The National ITS Architecture provides the framework that ties the transportation and telecommunication worlds together to enable the development and effective implementation of the broad range of ITS user services. There are multiple communications options available to the system designer. The flexibility in choosing between various options allows each implementer the ability to select the specific technology that meets the local, regional, or national needs. The architecture identifies and assesses the capabilities of candidate communications methods, but it does not select or recommend “winning” systems and technologies.

One of the fundamental guiding philosophies in the development of the National ITS Architecture has been to leverage the existing and emerging transportation and communication infrastructures in its design. This minimizes the risk and cost of deployment, and maximizes marketplace acceptance, penetration, and early deployment.

The architecture has identified four communication media types to support the communications requirements between the 22 subsystems. They are *fixed-point to fixed-point*, *wide area wireless*, *field to vehicle*, and *vehicle to vehicle communications*. The four communication types are shown as ovals on the High-Level Architecture diagram (Figure 2).

There are numerous technologies to choose from for fixed-point to-fixed-point communications requirements. For example, the Traffic Management Subsystem can use leased or owned twisted wire pairs, coaxial cable, or fiber optics to gather information and to monitor and control Roadway Subsystem equipment packages (e.g., traffic surveillance sensors, traffic signals, dynamic message signs, etc.). In other applications, it may be more advantageous to use terrestrial microwave links, spread spectrum radio, or an area radio network to provide communications between a Traffic Management Center and remote controllers.

The architecture design links the Center Subsystems together over a fixed-point to fixed-point network. This allows each Center Subsystem to collect, integrate, and disseminate collected information to all other Center Subsystems, resulting in improved interjurisdictional communications and coordination that in turn will directly affect the efficiency and effectiveness of all Center Subsystems operations. The architecture identifies two distinct categories of wireless communications based on range and area of coverage. Wide area wireless (fixed-to-mobile) communications are suited for services and applications where information is disseminated to users who are not located near the source of transmission and who require seamless coverage. Wide area wireless communications are further differentiated based on whether they are one-way or two-way. An example of a one-way, broadcast transmission is the traffic reports we currently receive over smart phones. A mobile traveler, who requests and receives current traffic information from an Information Service Provider, is an example of two-way communications.

The second category, short-range wireless, is concerned with information transfer that is of a localized interest. There are two types of short-range wireless communications identified by the architecture. They are vehicle-to-vehicle and field to vehicle. Vehicle-to-vehicle (mobile-to-mobile) short-range wireless communications are required to support many connected vehicle safety applications, Appropriate applications for field to mobile) include toll collection, parking fee collection, roadside safety inspections, credential checks, and connected vehicle applications involving the infrastructure.

The architecture has been around since 1996, and in that time communication technologies have evolved dramatically, particularly in the area of wireless communications. This evolution has impacted the services that ITS can provide in a cost effective manner, and in some cases allowed the introduction of new or expanded services.

Service Packages

During the course of the early National ITS Architecture program, it became apparent that some of the original user services were too broad in scope to be convenient in planning actual deployments. Accordingly, a finer grained breakdown of ITS services has been defined in what are called *service packages*. These service packages listed below in Table 2 are tailored to fit - separately or in combination - real world transportation problems and needs. For example, the Traffic Control user service has been broken out into *Surface Street Control*, which is typically under the local jurisdiction, and *Traffic Metering*, typically under state transportation agency control. Many service packages are also incremental so advanced packages can be efficiently implemented based on earlier deployments.

Table 2. ITS Service Packages

ID	Service Package Name
AD1	ITS Data Mart
AD2	ITS Data Warehouse
AD3	ITS Virtual Data Warehouse
APTS01	Transit Vehicle Tracking
APTS02	Transit Fixed-Route Operations
APTS03	Demand Response Transit Operations
APTS04	Transit Fare Collection Management
APTS05	Transit Security
APTS06	Transit Fleet Management
APTS07	Multi-modal Coordination
APTS08	Transit Traveler Information
APTS09	Transit Signal Priority
APTS10	Transit Passenger Counting
APTS11	Mulitmodal Connection Protection
ATIS01	Broadcast Traveler Information
ATIS02	Interactive Traveler Information
ATIS03	Autonomous Route Guidance
ATIS04	Dynamic Route Guidance
ATIS05	ISP Based Trip Planning and Route Guidance
ATIS06	Transportation Operations Data Sharing
ATIS07	Travel Services Information and Reservation
ATIS08	Dynamic Ridesharing
ATIS09	In Vehicle Signing
ATIS10	Short Range Communications Traveler Information
ATMS01	Network Surveillance
ATMS02	Traffic Probe Surveillance
ATMS03	Traffic Signal Control
ATMS04	Traffic Metering
ATMS05	HOV Lane Management
ATMS06	Traffic Information Dissemination
ATMS07	Regional Traffic Management
ATMS08	Traffic Incident Management System
ATMS09	Traffic Decision Support and Demand Management
ATMS10	Electronic Toll Collection
ATMS11	Emissions Monitoring and Management
ATMS12	Roadside Lighting System Control
ATMS13	Standard Railroad Grade Crossing
ATMS14	Advanced Railroad Grade Crossing
ATMS15	Railroad Operations Coordination
ATMS16	Parking Facility Management
ATMS17	Regional Parking Management
ATMS18	Reversible Lane Management
ATMS19	Speed Warning and Enforcement
ATMS20	Drawbridge Management
ATMS21	Roadway Closure Management
ATMS22	Variable Speed Limits
ATMS23	Dynamic Lane Management and Shoulder Use
ATMS24	Dynamic Roadway Warning
ATMS25	VMT Road User Payment
ATMS26	Mixed Use Warning Systems
AVSS01	Vehicle Safety Monitoring
AVSS02	Driver Safety Monitoring
AVSS03	Longitudinal Safety Warning

ID	Service Package Name
AVSS04	Lateral Safety Warning
AVSS05	Intersection Safety Warning
AVSS06	Pre-Crash Restraint Deployment
AVSS07	Driver Visibility Improvement
AVSS08	Advanced Vehicle Longitudinal Control
AVSS09	Advanced Vehicle Lateral Control
AVSS10	Intersection Collision Avoidance
AVSS11	Automated Vehicle Operations
AVSS12	Cooperative Vehicle Safety Systems
CVO01	Carrier Operations and Fleet Management
CVO02	Freight Administration
CVO03	Electronic Clearance
CVO04	CV Administrative Processes
CVO05	International Border Electronic Clearance
CVO06	Weigh-In-Motion
CVO07	Roadside CVO Safety
CVO08	On-board CVO Safety
CVO09	CVO Fleet Maintenance
CVO10	HAZMAT Management
CVO11	Roadside HAZMAT Security Detection and Mitigation
CVO12	CV Driver Security Authentication
CVO13	Freight Assignment Tracking
EM01	Emergency Call-Taking and Dispatch

ID	Service Package Name
EM02	Emergency Routing
EM03	Mayday and Alarms Support
EM04	Roadway Service Patrols
EM05	Transportation Infrastructure Protection
EM06	Wide-Area Alert
EM07	Early Warning System
EM08	Disaster Response and Recovery
EM09	Evacuation and Reentry Management
EM10	Disaster Traveler Information
MC01	Maintenance and Construction Vehicle and Equipment Tracking
MC02	Maintenance and Construction Vehicle Maintenance
MC03	Road Weather Data Collection
MC04	Weather Information Processing and Distribution
MC05	Roadway Automated Treatment
MC06	Winter Maintenance
MC07	Roadway Maintenance and Construction
MC08	Work Zone Management
MC09	Work Zone Safety Monitoring
MC10	Maintenance and Construction Activity Coordination
MC11	Environmental Probe Surveillance
MC12	Infrastructure Monitoring

ARCHITECTURE DOCUMENTATION

The architecture, its goals, objectives, definition, evaluation, and deployment are documented in extensive volumes. All of the information is not of equal value to everyone. Information is provided for the casual reader (Vision), implementers (Implementation Strategy/Service Packages), designers (Architecture documents), and standards organizations (Standards documents). The casual reader may be satisfied with the Vision and Service Package documents. Detailed information is available to architects and designers in the various architecture definition documents. Specific sets of documents address architecture objectives, evaluations, and standards. In addition to the documents, information on ITS, the Architecture, and the Standards activities is available at technical forums and on the Internet.

The *Vision* contains a magazine style description of what users can expect to see in the transportation world of the future. The document contains easy to read descriptions addressing each of the major ITS stakeholders. Also presented are vignettes of life using ITS 5 and 10 years out.

The *Logical Architecture* presents a functional view of the ITS user services. This perspective is divorced from likely implementations and physical interface requirements. It presents only the functions (process specifications) that are necessary to perform ITS services and the information (data flows) that need to be exchanged between these functions. The Logical Architecture document contains diagrams showing the processes and data flows between them. The document also contains a complete data dictionary.

The *Physical Architecture* collects related functions together into subsystems based on where the functions are typically performed. This document contains a collection of Architecture Flow Diagrams that show all of the data that passes between subsystems. The characteristics and constraints on the inter-subsystem data flows are also presented.

The *Theory of Operations* provides a simple walk-through of how the architecture supports ITS implementations. This document contains easy-to-read text and diagrams that explain the operational concepts the architecture uses to implement the service packages. Advantages and disadvantages of alternative operational concepts are also presented.

The *Service Package* document provides a comprehensive review of each service package and describes how service packages can be used to plan and implement integrated transportation systems customized to local needs.

Several documents report the results of the numerous evaluations conducted on the architecture. These documents were created during the original development of the architecture and have not been updated so they do not include additions made to the architecture in subsequent versions but may provide the reader with useful background information or analysis to support their own decision making process. Because the architecture is not something that one can directly see or touch, the evaluations are based on possible implementations. The documents in this category include the *Communications Document, Evaluatory Design, Cost Analysis, Performance and Benefits Study, Risk Analysis, and the Evaluation Results documents.*

Two additional documents that have not been updated since the early days of the architecture are the *Mission Definition* and the *Implementation Strategy*. The former explains the original mission of the architecture development effort and contains an operational concept for the original architecture development effort tied to the original categorization of urban, interurban, and rural needs. The second document describes representative ways in which current deployment activities can use the architecture to identify interfaces that need to be standardized. It also presents a process for rolling out ITS services. The process is part of an overall strategy that includes recommendations for future research and development, operational tests, standards activities, and training.

The Overview of Security in the National ITS Architecture is documented in the *National ITS Architecture Security* document which discusses how security is reflected in the National ITS Architecture both in functionality in which ITS can enhance surface transportation security and measures that need to be considered in order to secure ITS itself.

USES OF THE NATIONAL ITS ARCHITECTURE

Regional ITS Architectures

The National ITS Architecture provides a general framework that can be adapted and elaborated for use in planning for the deployment of ITS systems in a region. In January 2001, FHWA published FHWA Rule 940 (23 CFR Part 940), and FTA published a companion policy, to implement section 5206(e) of TEA-21. This Rule/Policy seeks to foster regional integration by requiring that all ITS projects funded from the Highway Trust Fund be in conformance with the National ITS Architecture and officially adopted standards. "Conformance with the National ITS Architecture" is defined in the final Rule/Policy as using the National ITS Architecture to develop a "regional ITS architecture" that would be tailored to address the local situation and ITS investment needs, and the subsequent adherence of ITS projects to the regional ITS architecture. A regional ITS architecture adapts the National ITS Architecture to reflect major service, technology, and interface choices that are most appropriate for the implementing region.

The *Regional ITS Architecture Guidance* document is a guide for transportation professionals who are involved in the development, use, or maintenance of regional ITS architectures. The document describes a process for creating a regional ITS architecture with supporting examples of each architecture product. In its discussion of the uses of the regional ITS architecture, the document presents an approach for mainstreaming ITS into the transportation planning and project development processes.

Standards

The National ITS Architecture provides a framework from which the ITS standards activities can be partitioned and then mapped back to the Architecture as the ITS standards are defined. Over the past decade, many standards have been developed based on the architecture interfaces and data flows of the architecture.

The architecture website (www.iteris.com/itsarch) includes a mapping between the architecture flows and current standards activities that are addressing some of the key standards areas. Certain areas are not currently covered by any standards and are shown on the website as candidates for future standardization.