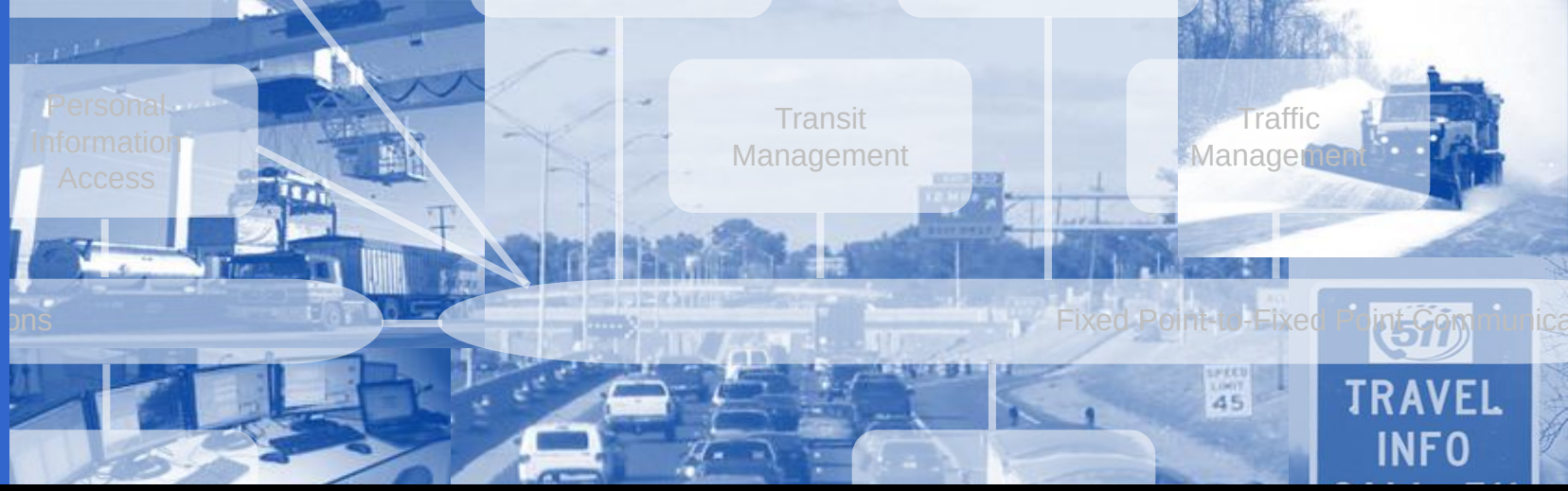


T3 Webinar

New National ITS Architecture's V7 – What's New and How to Use It!

July 10, 2012

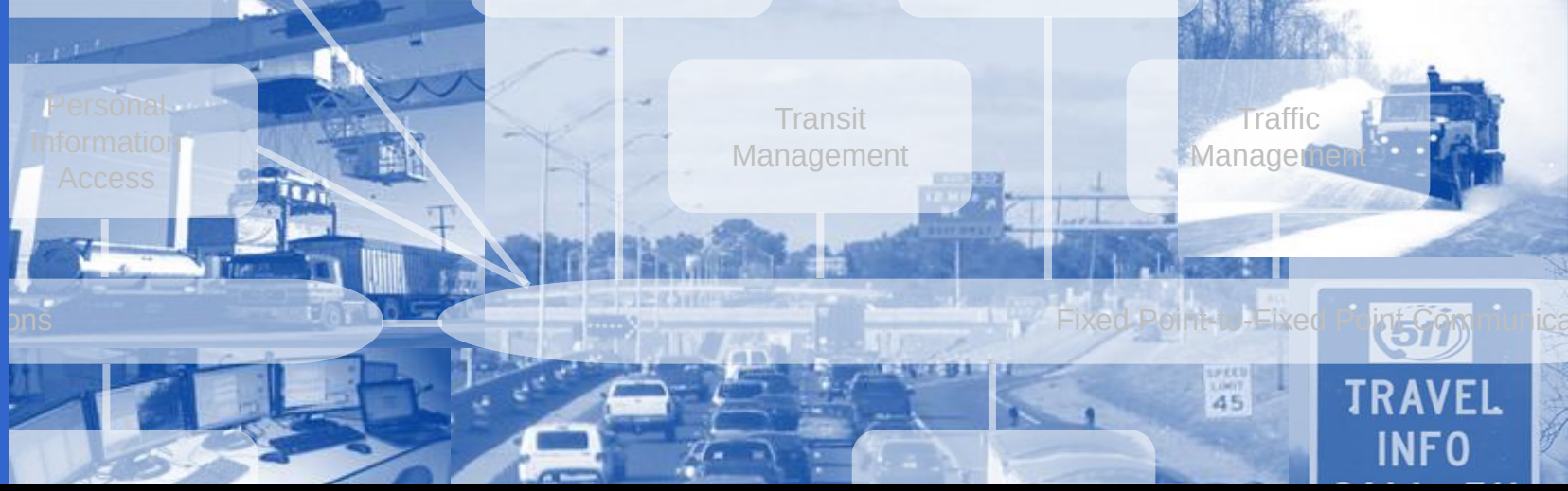
U.S. Department of Transportation
Research and Innovative Technology Administration

U.S. Department of Transportation
Federal Highway Administration

T3 Webinar

Agenda

- National ITS Architecture
  - Overview
  - Version 7.0 update
  - Example Use of Version 7.0
- Turbo Architecture version 7.0



T3
Webinar

New National ITS Architecture's V7 – What's New and How to Use It!

Overview of National Architecture

U.S. Department of Transportation
Research and Innovative Technology Administration

U.S. Department of Transportation
Federal Highway Administration

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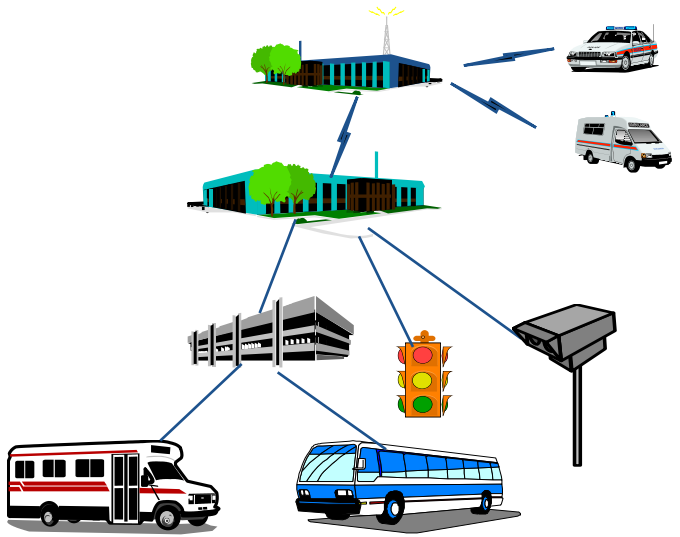
What is ITS?

- Intelligent Transportation Systems (ITS) include the electronics, communications or information processing used singly or integrated to improve the efficiency or safety of surface transportation
- Examples:
  - Traffic signal controllers
  - Traffic Management Centers
  - 511 (traveler information)
  - Electronic toll-tagging



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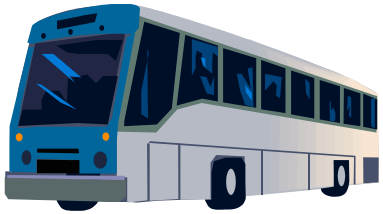
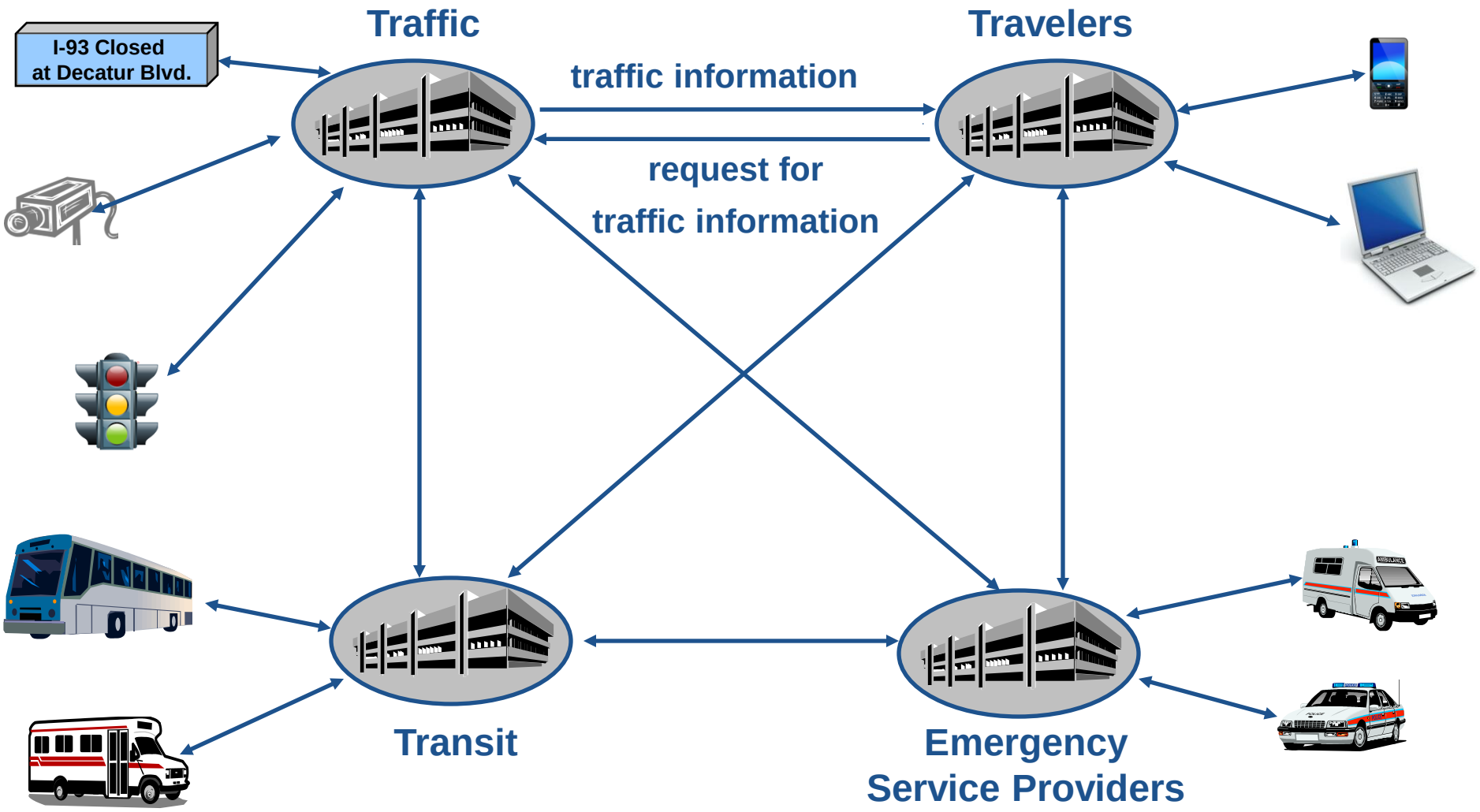
What is an ITS Architecture?

- Framework for developing integrated transportation systems
- Identifies:
  - Organizations
  - Systems operated
  - Functions performed
  - Communications
  - Information exchanged



ITS Architectures Provide a Framework for Integration

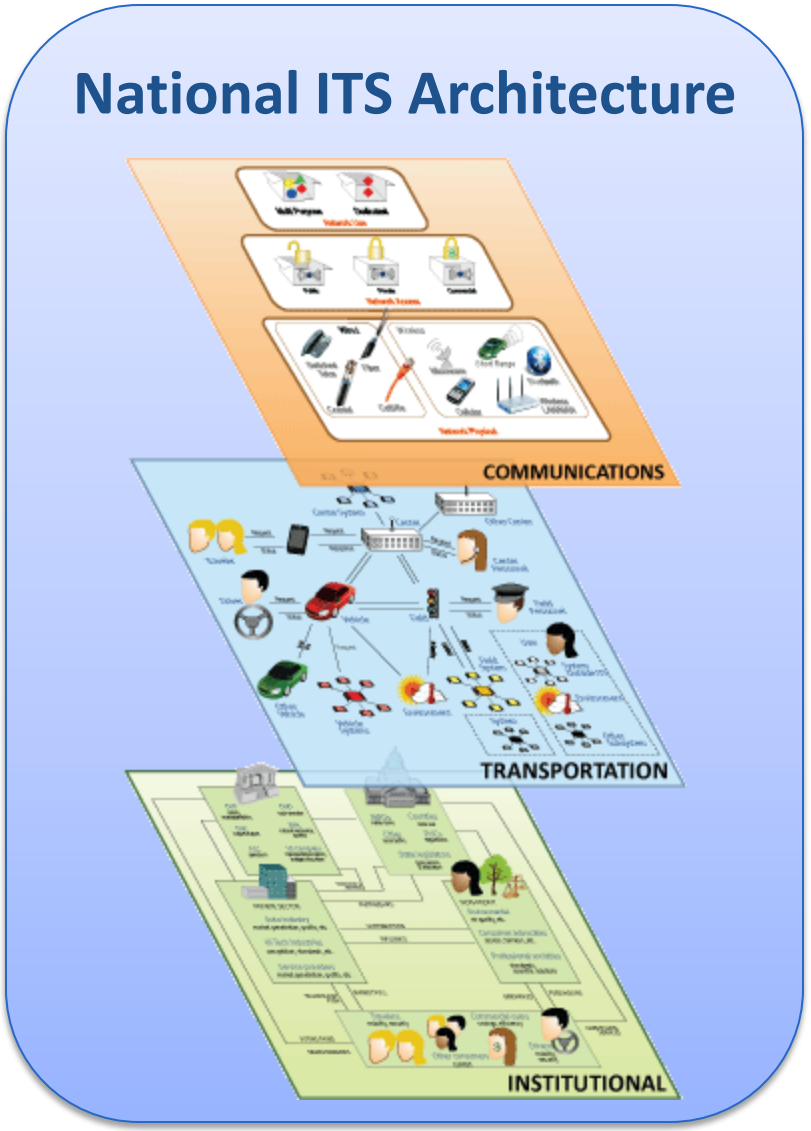


What is the National ITS Architecture?

- High-level national framework, “blueprint”, used to help guide ITS deployment and transportation planning
- Based on 33 transportation related ITS User Services
- Used as a template to create regional and project architectures

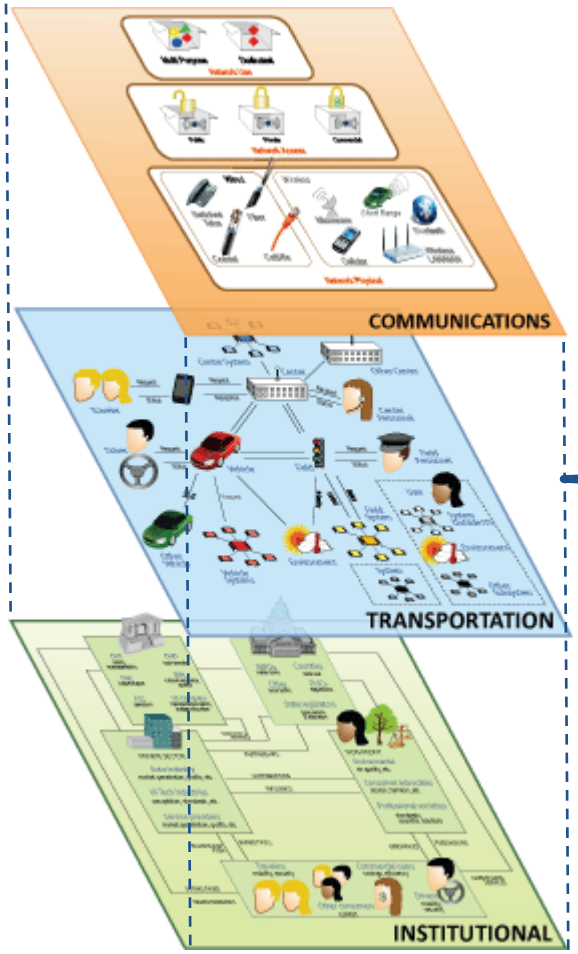
National Architecture Products

- Available on Website
- Can download website and create a CD-ROM
- Contains
  - Hypertext
  - PDF docs
  - Databases



National Architecture Products

Architecture Layers



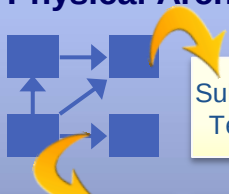
User Services

Standards Mapping

Logical Architecture

- Processes
- Data Flows

Physical Architecture



- Subsystems & Terminators
- Architecture Flows
- Equipment Packages

Security Considerations

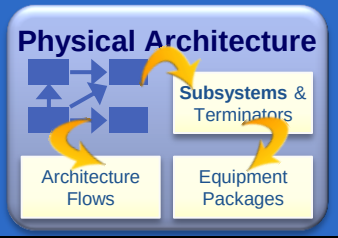
Service Packages

Architecture Use

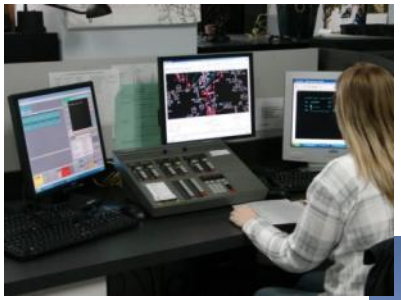
- For Planning
- For Project Development

Theory of Operations

Physical Entities - Subsystems



- Part of the overall Intelligent Transportation System
- Identify major systems, functionality
- Identify major interfaces
- Define key standardization points
- 4 Categories
  - Centers
  - Field
  - Vehicles
  - Travelers



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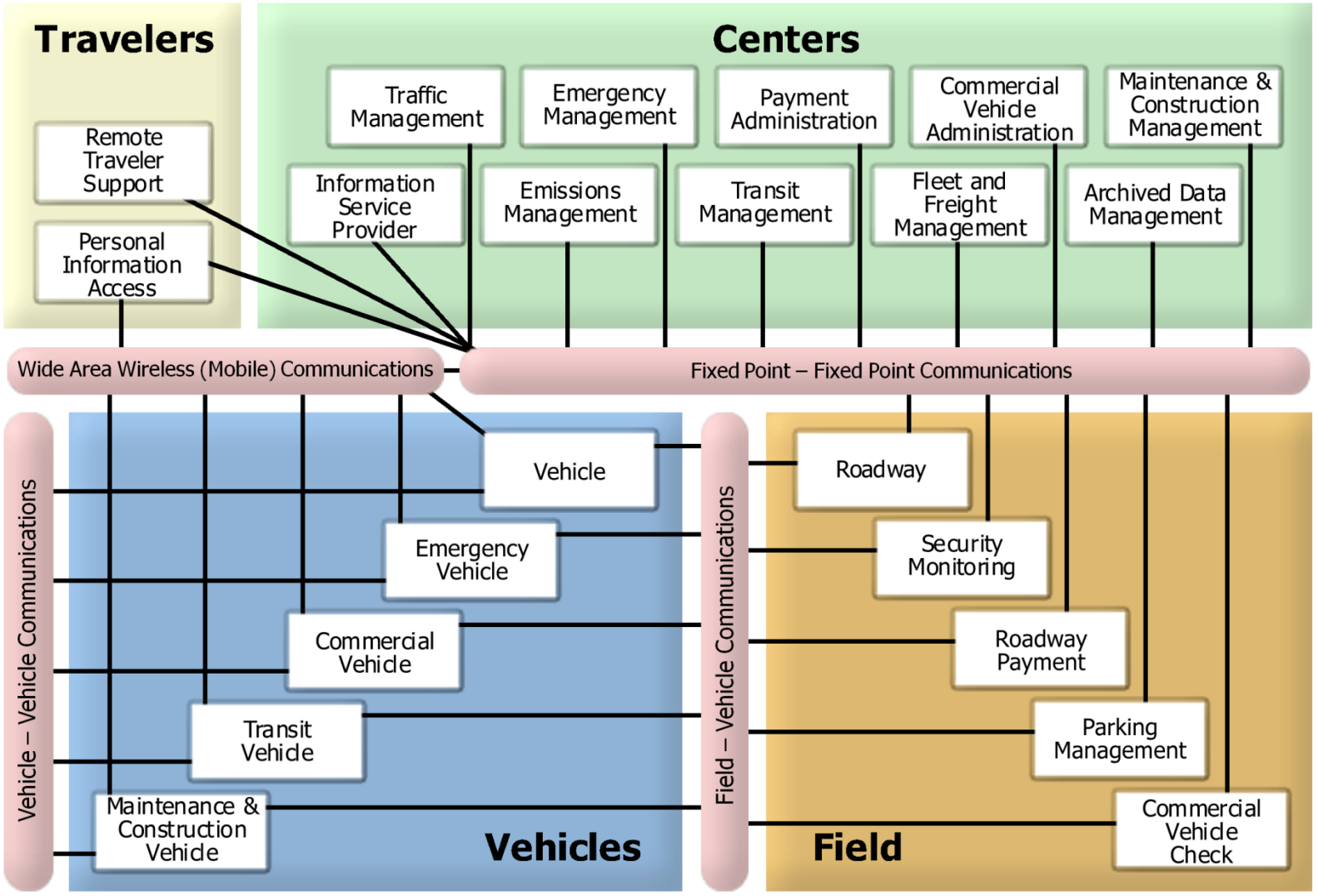
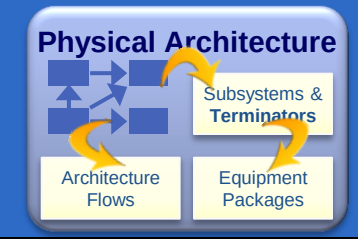
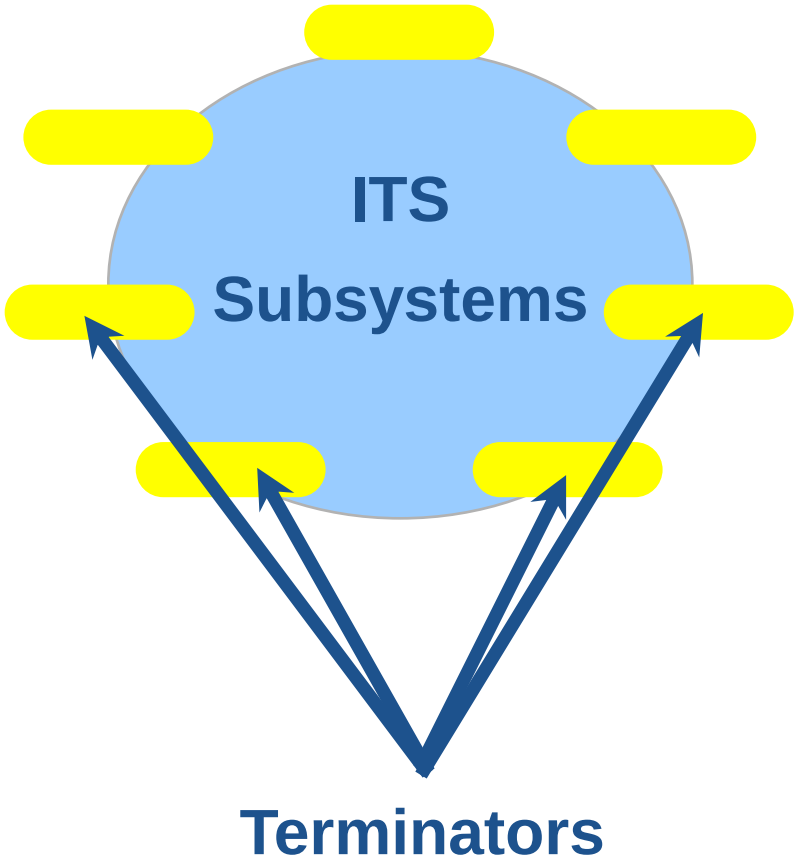
Subsystem Diagram



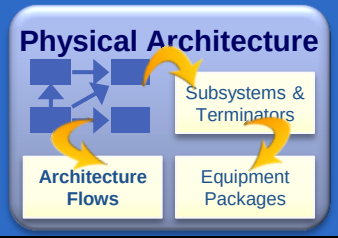
Physical Entities - Terminators



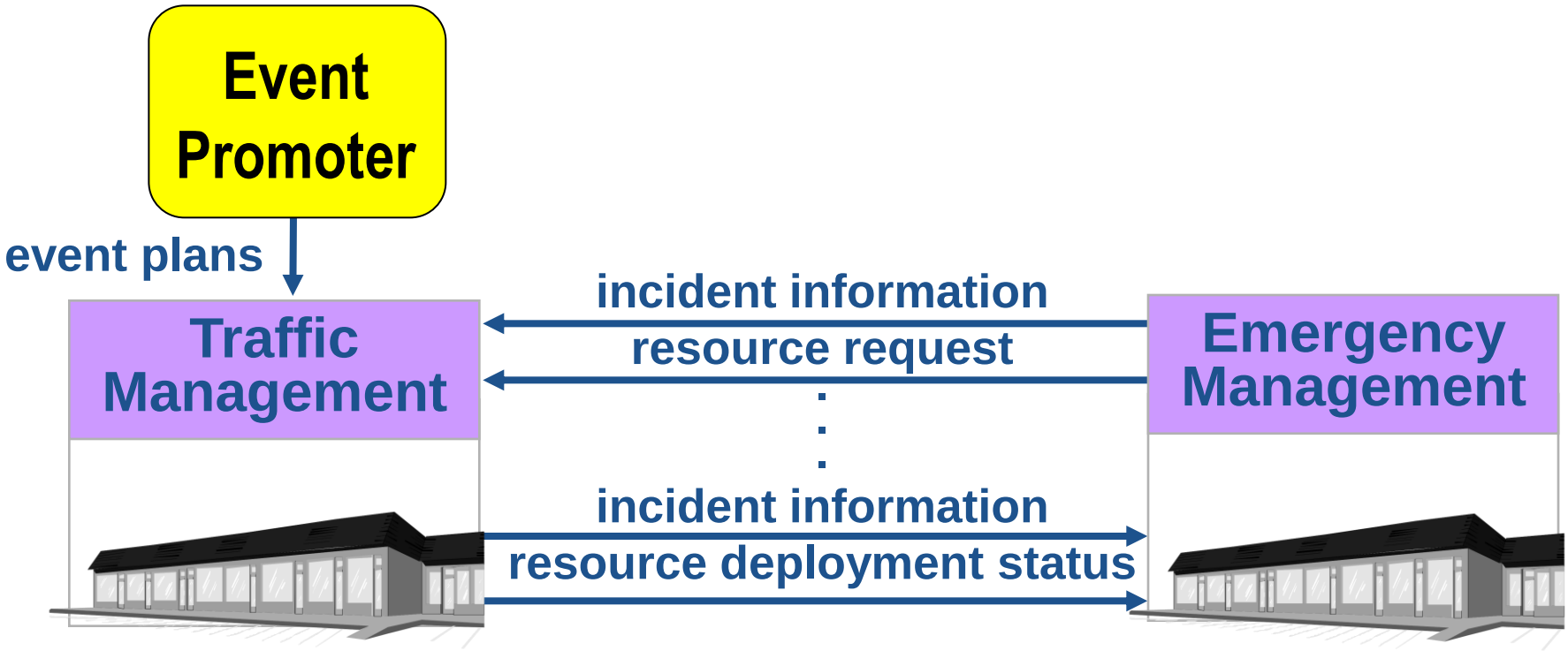


- Entities outside of ITS
- Define the ITS boundary
- Define interfaces but not functionality
- Four types of Terminators
  - Environment
  - Human
  - System
  - Other System

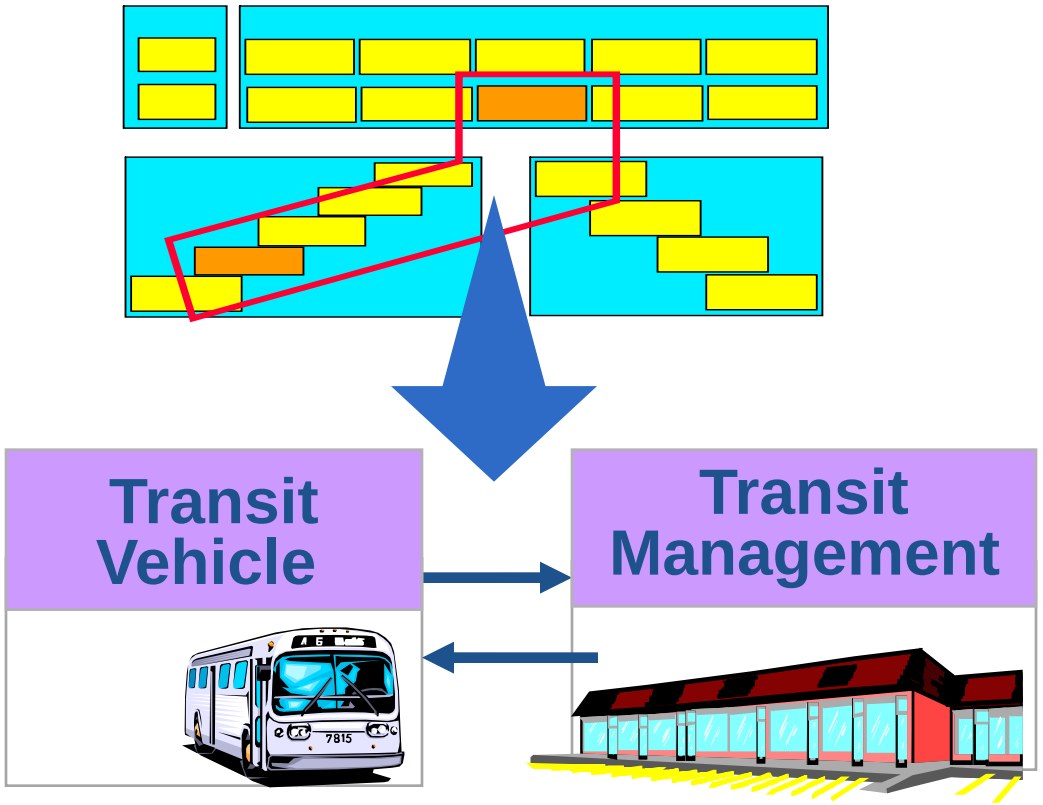
Architecture Flows



- Define information exchanged
- Also known as “information flows”
- ITS standards are mapped to architecture flows



Service Packages



Architecture

Framework spanning all of ITS

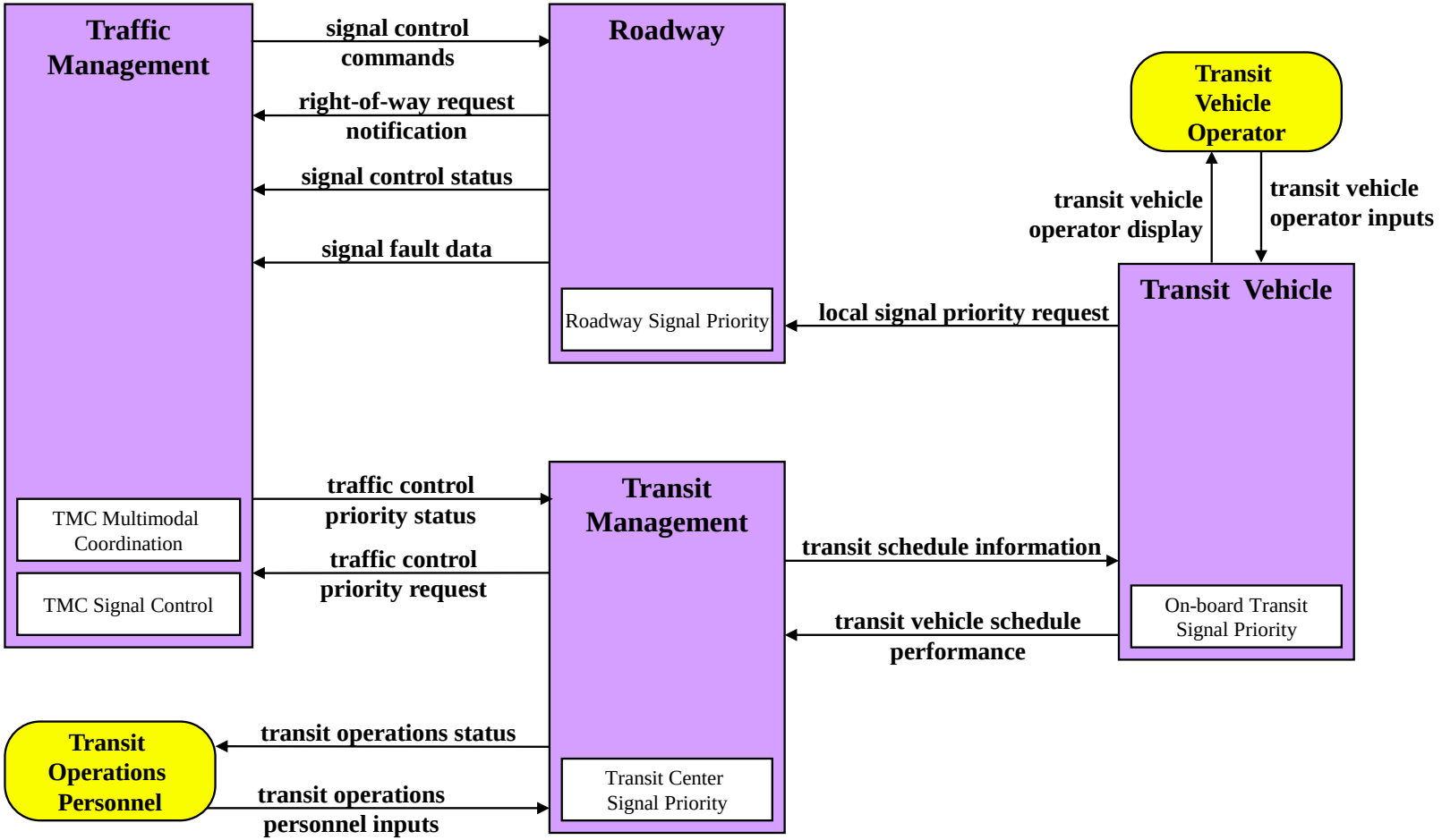
Service Packages

Contain pieces of the architecture that provide a particular ITS service

Service Packages

- Represent ITS services in the National ITS Architecture
- Formerly known as market packages
- Examples:
  - Traffic Incident Management System
  - Broadcast Traveler Information
  - Surface Street Control
  - Transit Vehicle Tracking

APTS09: Transit Signal Priority Service Package



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Service Package Groups

Traffic Management

Traveler Information

Transit Management

Emergency Management

Commercial Vehicle Operations

Maintenance and Construction

Archived Data

Vehicle Safety

New National ITS Architecture's V7 – What's New and How to Use It!

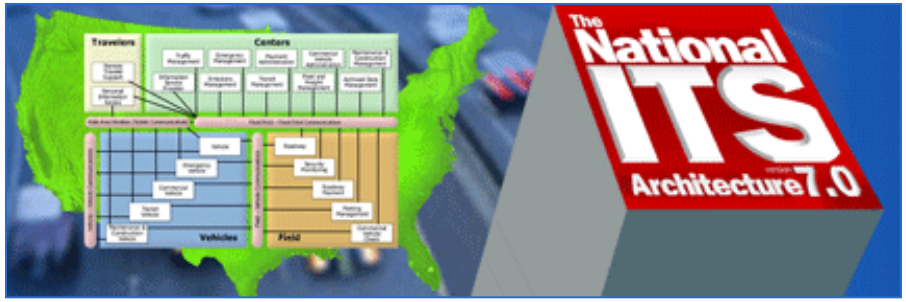
National Architecture Version 7.0 Update

U.S. Department of Transportation
Research and Innovative Technology Administration

U.S. Department of Transportation
Federal Highway Administration

National ITS Architecture is a "Living Document"

- Continuing evolution over 16 years



User Services 1993

Phase I & II Development 1993-6

Architecture Published 1996

HRI 1997

Ver 2.0 1998

ADUS Ver 3.0 1999

MCO Ver 4.0 2002

Transportation Security Ver 5.0 2003

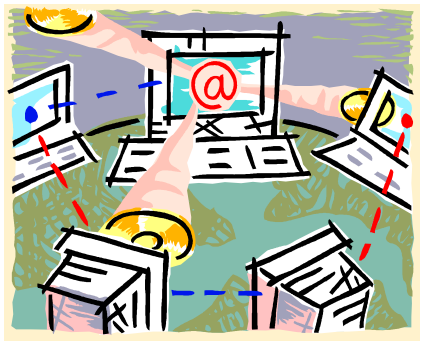
Version 6.0 2007

Version 6.1 2009

Version 7.0 2012

Architecture Evolution in Step with Industry

- Research and Federal Programs
  - DOT Initiatives
  - Commercial Vehicle Information and System Networks (CVISN)
  - Connected Vehicles Program
- ITS Standards
- Deployment Lessons Learned



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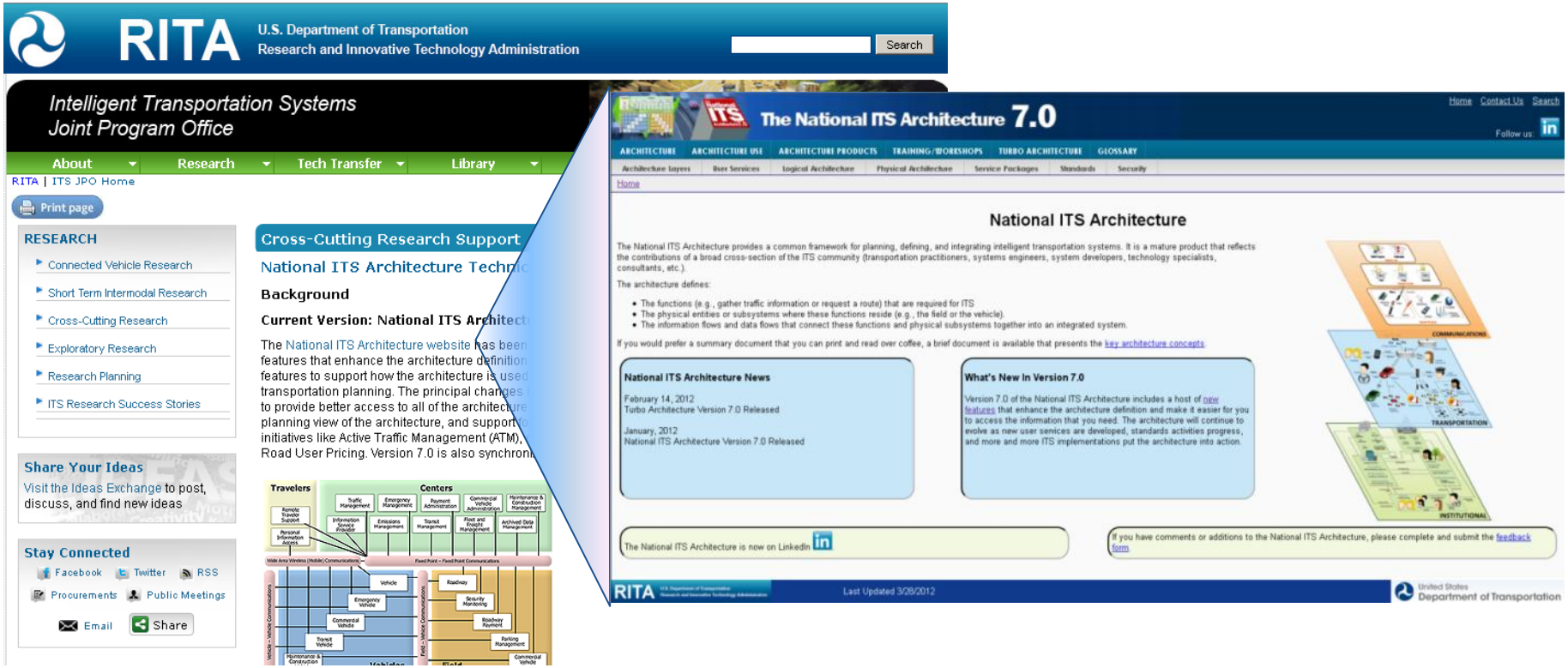
Version 7.0 Availability

http://www.its.dot.gov/arch/index.htm



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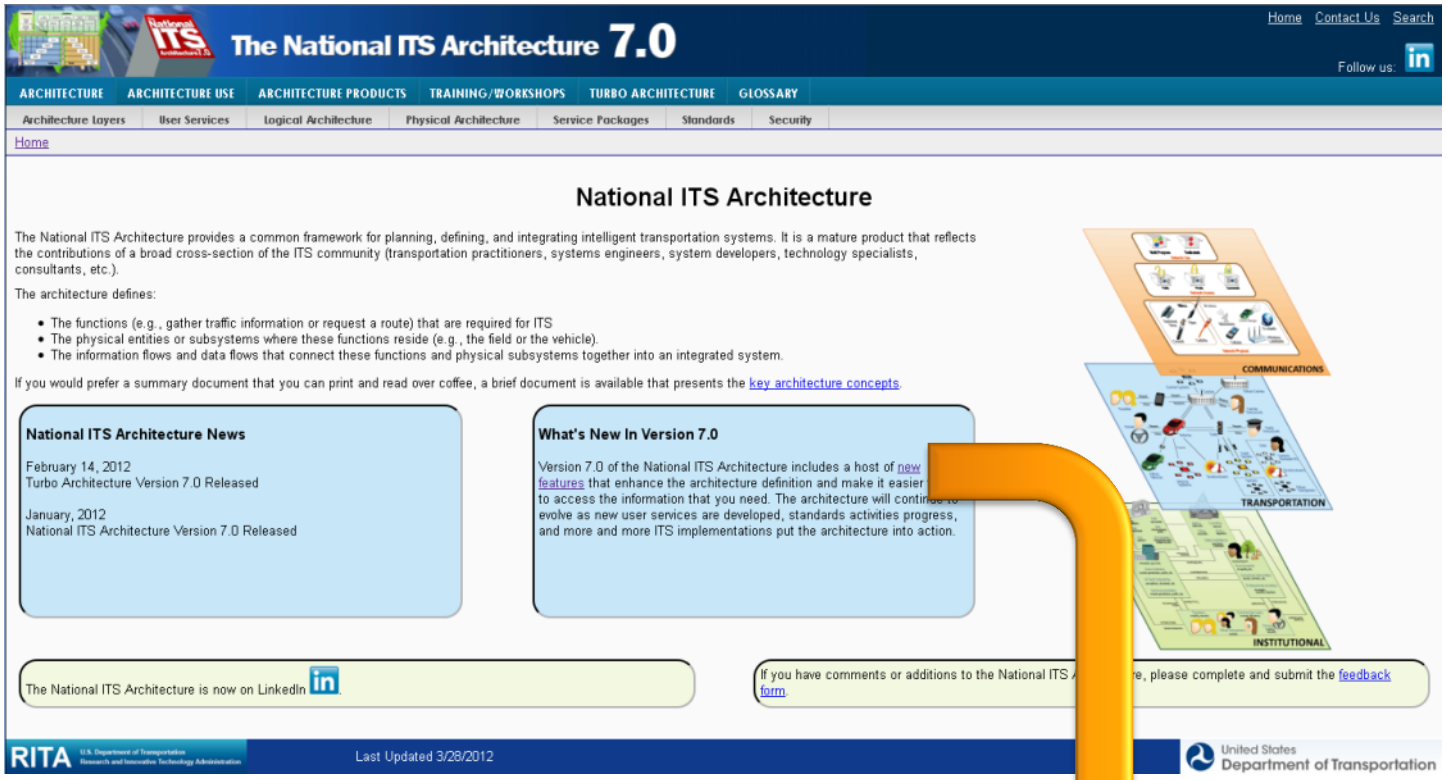
What's New in V7.0



High Level Changes

Detailed Change Log

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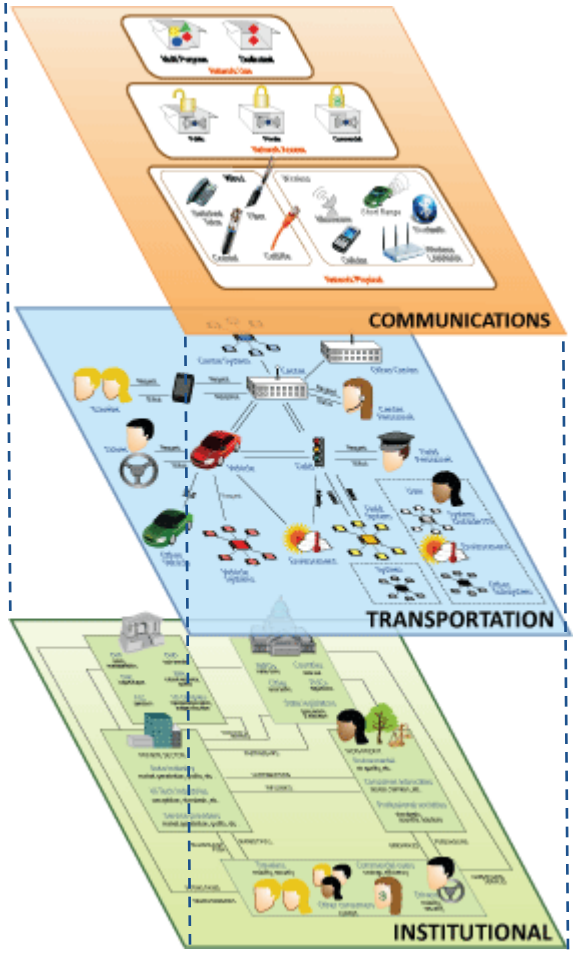
What's New in V7.0

- Updated institutional layer
- Planning view of the architecture
- Synchronization with other initiatives
  - FMCSA Commercial Vehicle Information Systems and Networks (CVISN)
  - Canadian Architecture
- Reflect current ITS standards

What's New in V7.0 (cont.)

- Represent ITS advancements
  - Active Traffic Management (ATM)
  - Connected Vehicle Program
  - Road User Pricing
- Enhanced website

Institutional Layer



- Provides a perspective of the architecture that includes the stakeholders and institutions associated with the surface transportation system
- Available on the website

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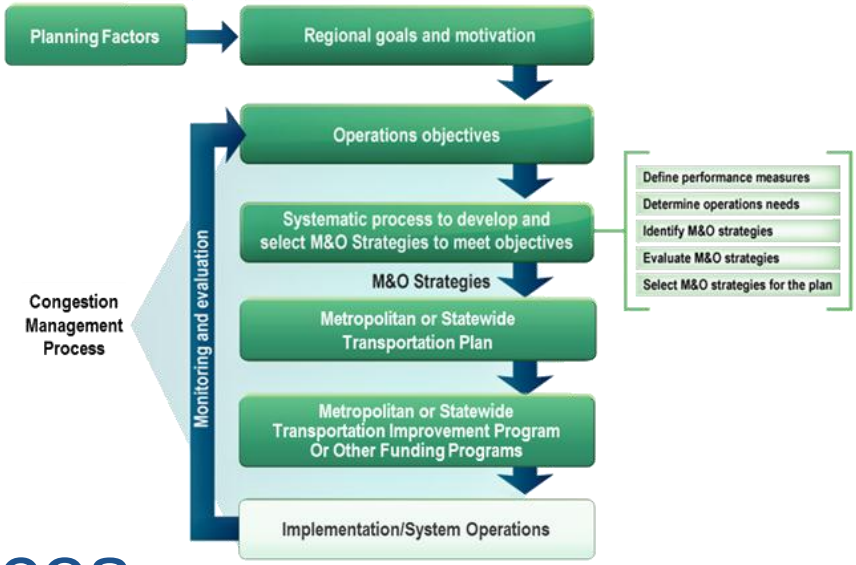
Planning View

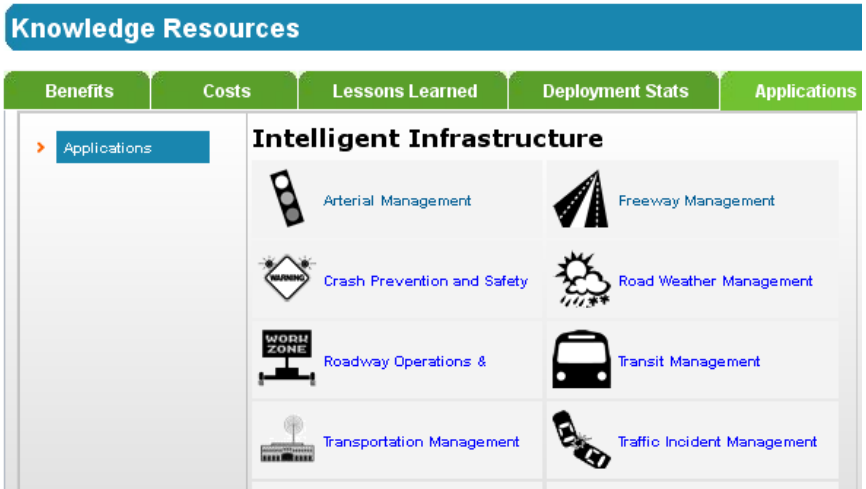
- Provides an entry point to the architecture that is oriented to the transportation planning process
  - Can enter view planning factors, goals or objectives
- Provide support for planning of ITS programs & projects
- Each service package linked to planning items

Planning View

- Planning4Operations



- ITS Knowledge Resources



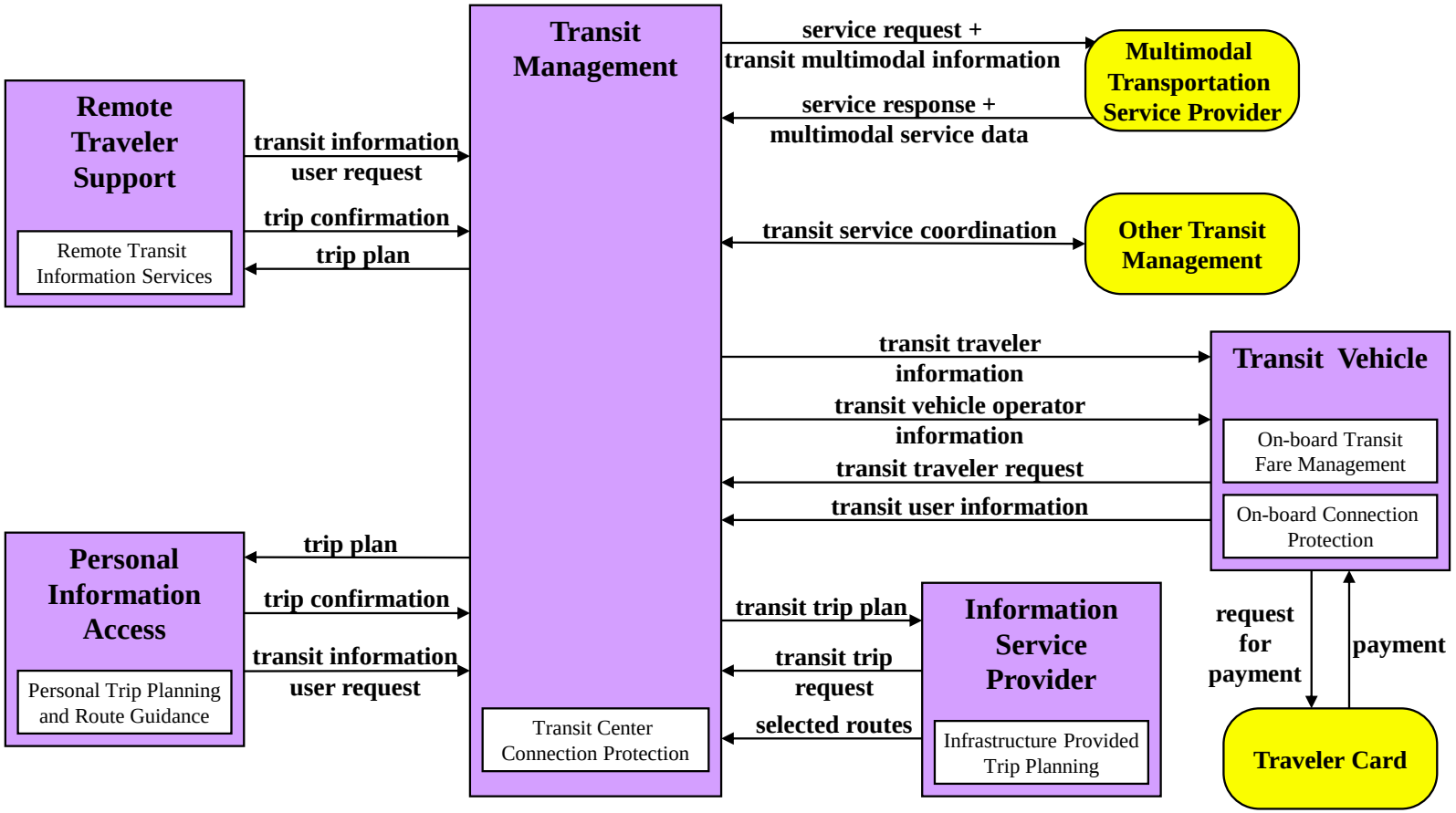
Synchronization with CVISN

- Addition of several architecture flows to support exchange of credentials information to support citations and sharing of border clearance status
- Adds support for Wireless Roadside Inspection (WRI) functions and interfaces

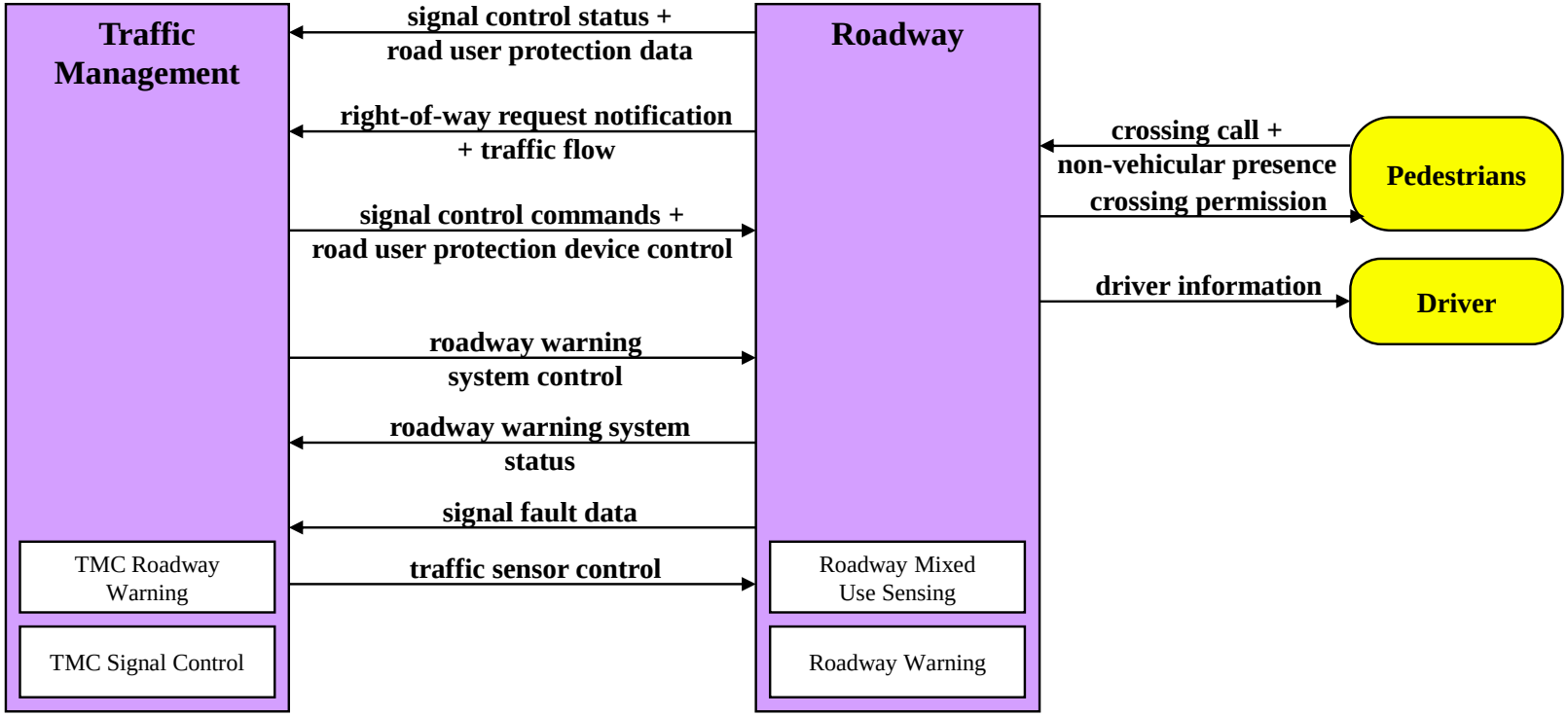
Synchronization with Canadian Architecture

- Replacement of the term "market package" with "service package”
- Adjustment of architecture flows
- Two new service packages
  - APTS11: Multimodal Connection Protection
  - ATMS26: Mixed User Warning Systems

APTS11: Multimodal Connection Protection

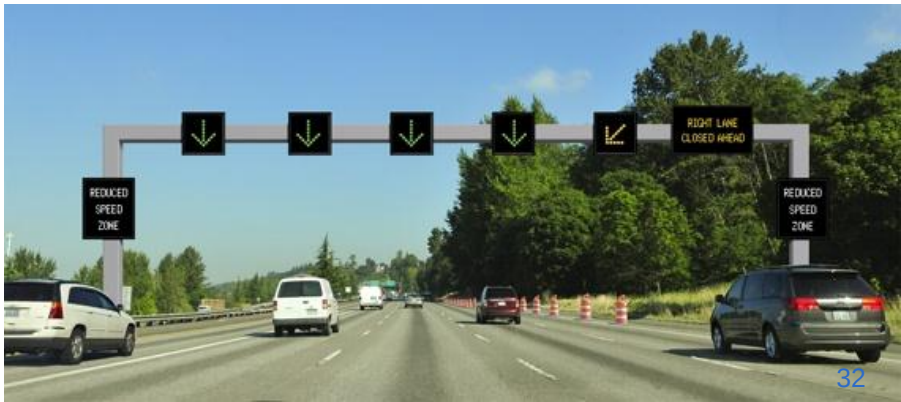


ATMS26: Mixed User Warning Systems



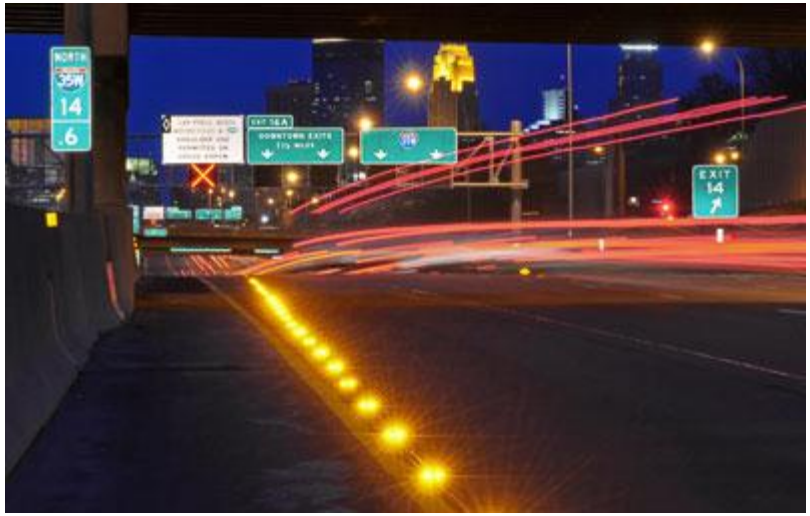
ITS Advancements: Active Traffic Management (ATM)

- "Practice of dynamically managing recurrent and nonrecurrent congestion based on prevailing traffic conditions"
- "Use of integrated systems with new technology, including the automation of dynamic deployment to optimize performance quickly"



ITS Advancements: Active Traffic Management (ATM)

- Strategies:
  - Speed Harmonization
  - Hard Shoulder Running
  - Queue Warning
  - Dynamic Merge Control
  - Dynamic Truck Restriction
  - Dynamic Rerouting and Traveler Info
  - Dynamic Lane Markings
  - Automated Enforcement



ITS Advancements: Active Traffic Management (ATM)

- New service packages
  - ATMS22: Variable Speed Limits
  - ATMS23: Dynamic Lane Management and Shoulder Use
  - ATMS24: Dynamic Roadway Warning
- ATM strategies were removed from
  - ATMS04: Freeway Control → Traffic Metering

ITS Advancements: Connected Vehicle Program

- Continue updates in Version 6.0 and 6.1
- Only minor changes were required to update terminology to match the connected vehicle program

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ITS Advancements: Road User Pricing

- Support for alternative pricing of roadways including road use or vehicle miles traveled (VMT) fee-based systems
- New service package
  - ATMS25: VMT Road User Payment
- Changes to subsystems for methods besides traditional toll collection
  - Toll Collection Administration → Payment Administration
  - Toll Collection → Roadway Payment

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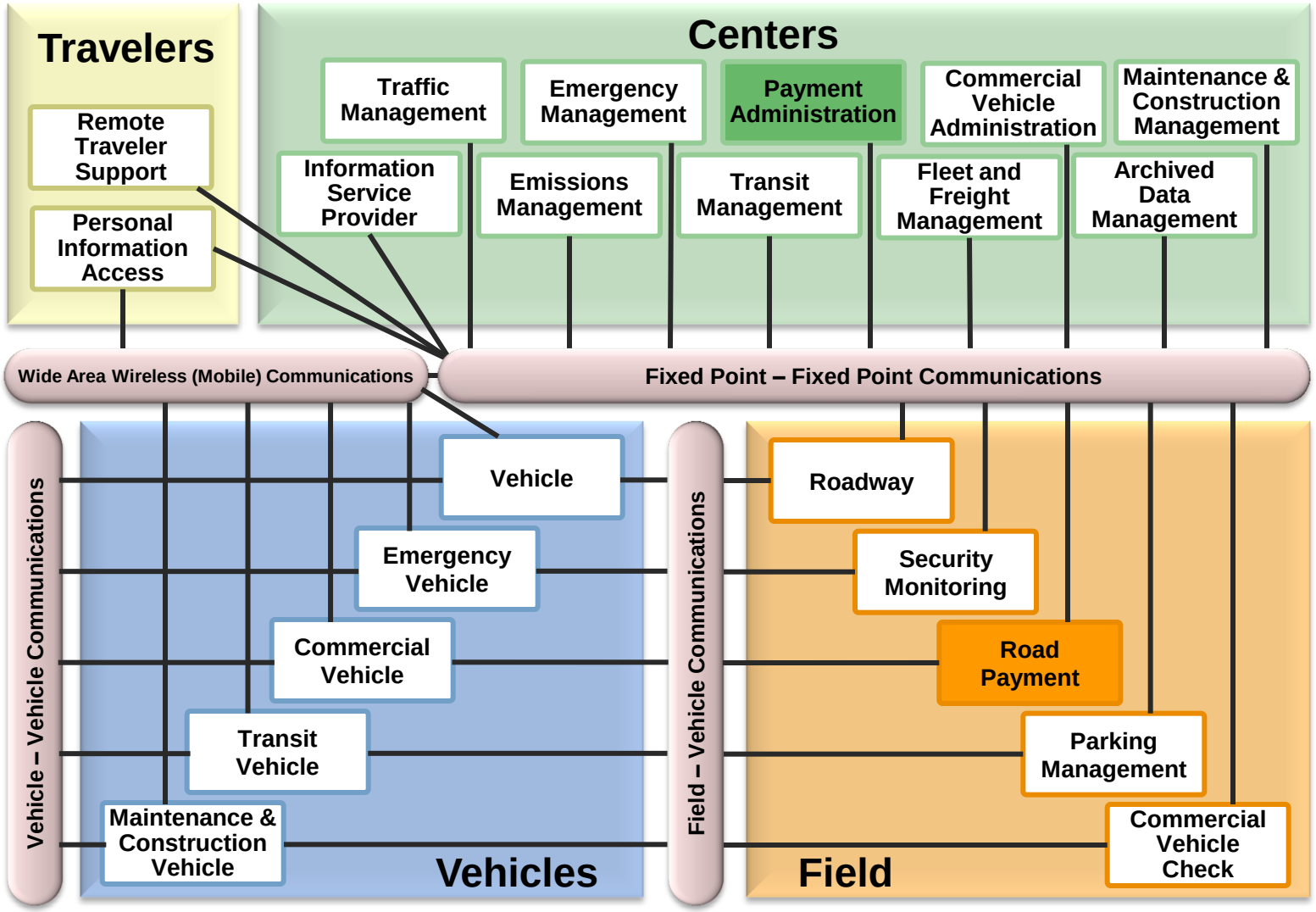
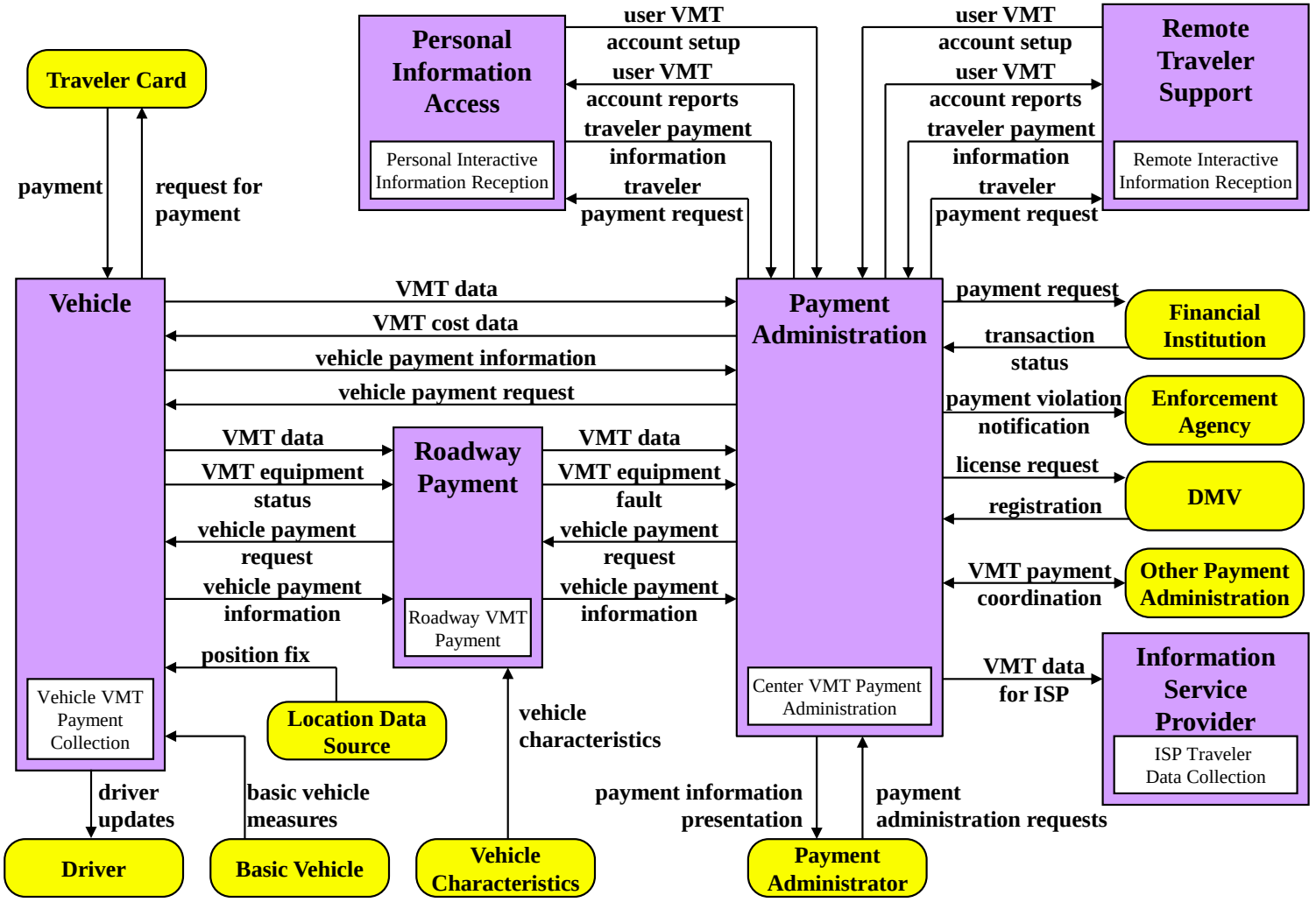
Road User Pricing Subsystem Changes



ATMS25: VMT Road User Payment



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Poll Question

1. **What ITS advancements of Version 7 of the National ITS Architecture are or will become relevant to your region?** ***(You may choose more than one.)***

    a) **Active Traffic Management (ATM)**

    b) **Connected Vehicle Program**

    c) **Road User Pricing**

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Poll Question

2. When do you plan to update your regional/statewide architecture?

a) Within 6 months
b) 6-12 months
c) 1 year
d) 2+ years
e) I don't know

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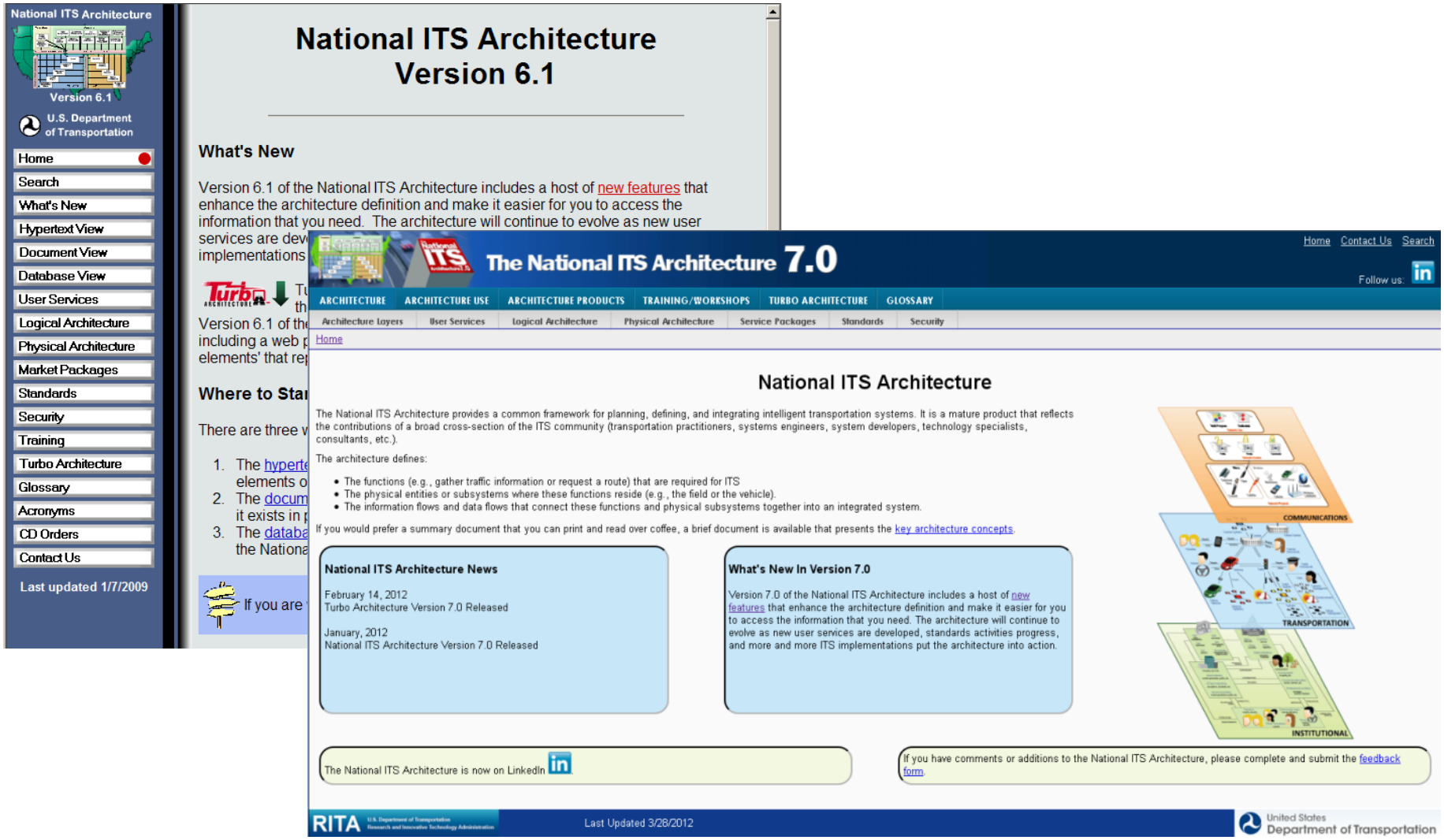
Website Enhancements



Website Enhancements

- Menu structure
- Architecture Use pages
- Hyperlinked service package diagrams and physical architecture diagrams
- Download website options
  - CD-ROM Image
  - ZIP File

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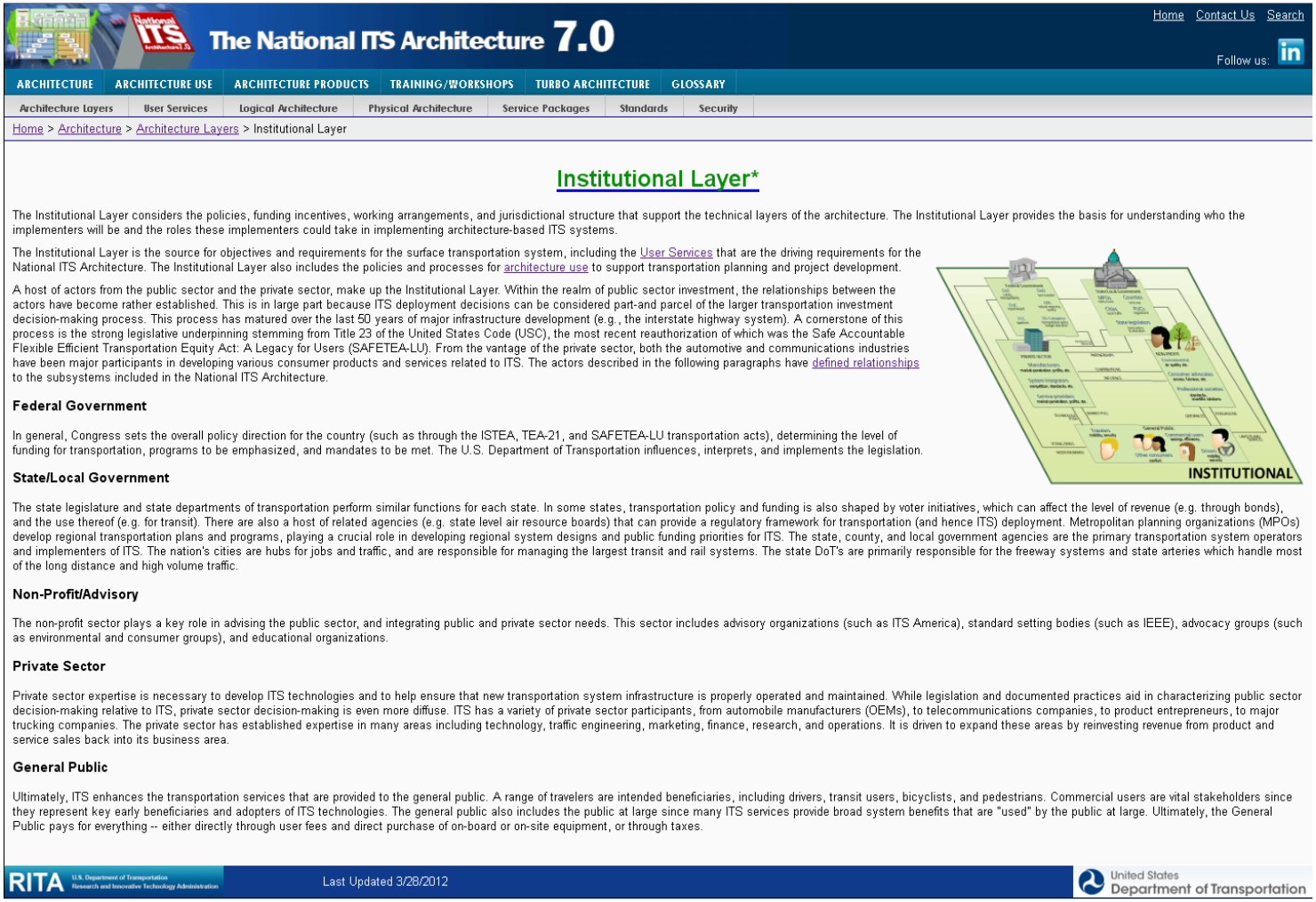
Website Demo

- Menu structure
- Institutional Layer
- Architecture Use pages
  - Use in planning (Planning View entry points)
  - Use in project development
- Service Package pages
- Download website options
  - CD-ROM Image
  - ZIP File

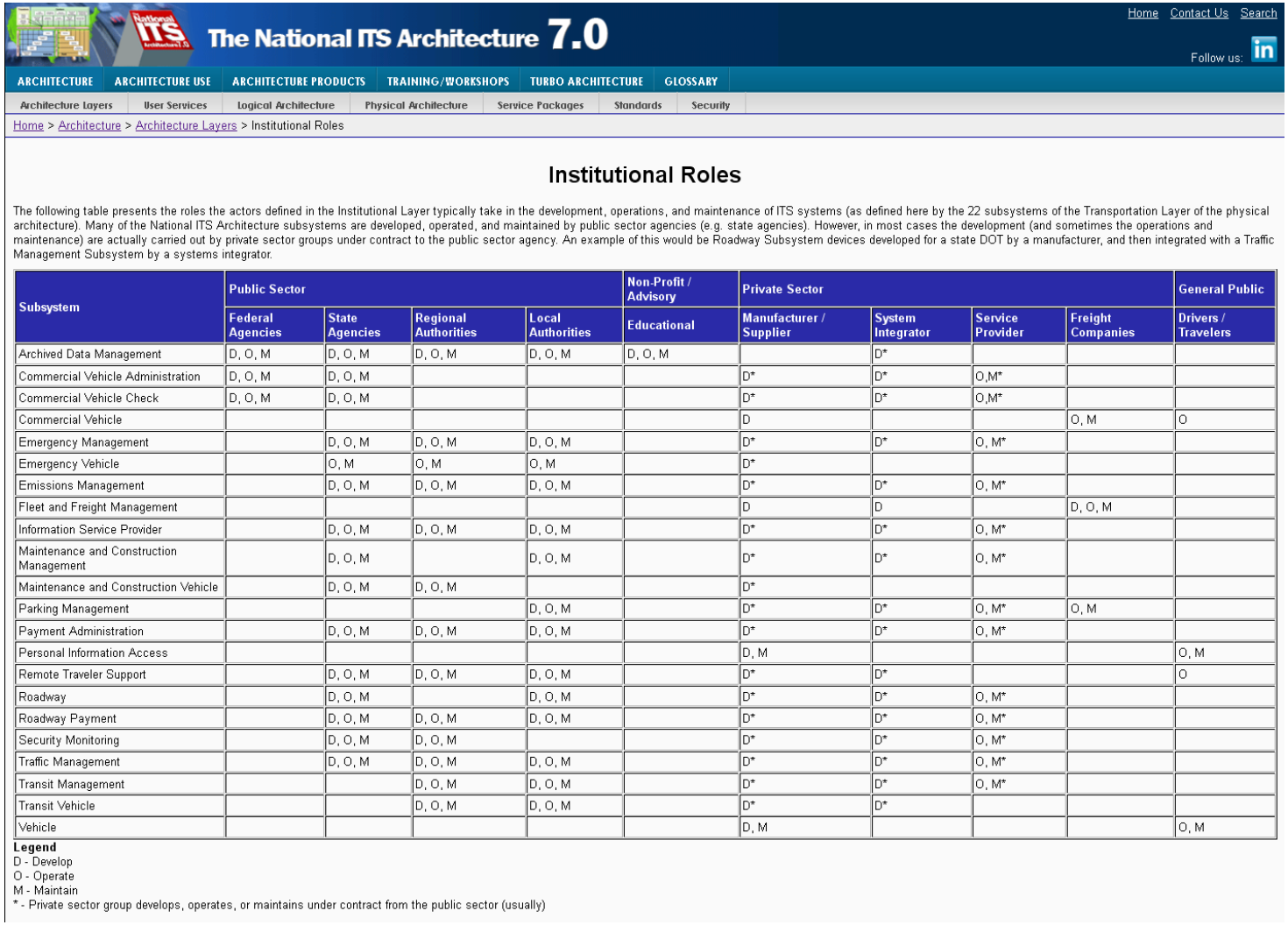
Website Demo – Menu Structure

- Architecture
  - Architecture Layers
  - User Services
  - Logical Architecture
  - Physical Architecture
  - Service Packages
  - Standards
  - Security
- Architecture Use
  - Planning
  - Project Development
- Architecture Products
  - Documents
  - Databases
  - Website Archives
- Training/Workshops
- Turbo Architecture
- Glossary
  - Glossary
  - Acronyms

Website Demo – Institutional Layer



Website Demo – Institutional Layer



The National ITS Architecture 7.0

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Home > Architecture > Architecture Layers > Institutional Roles

Institutional Roles

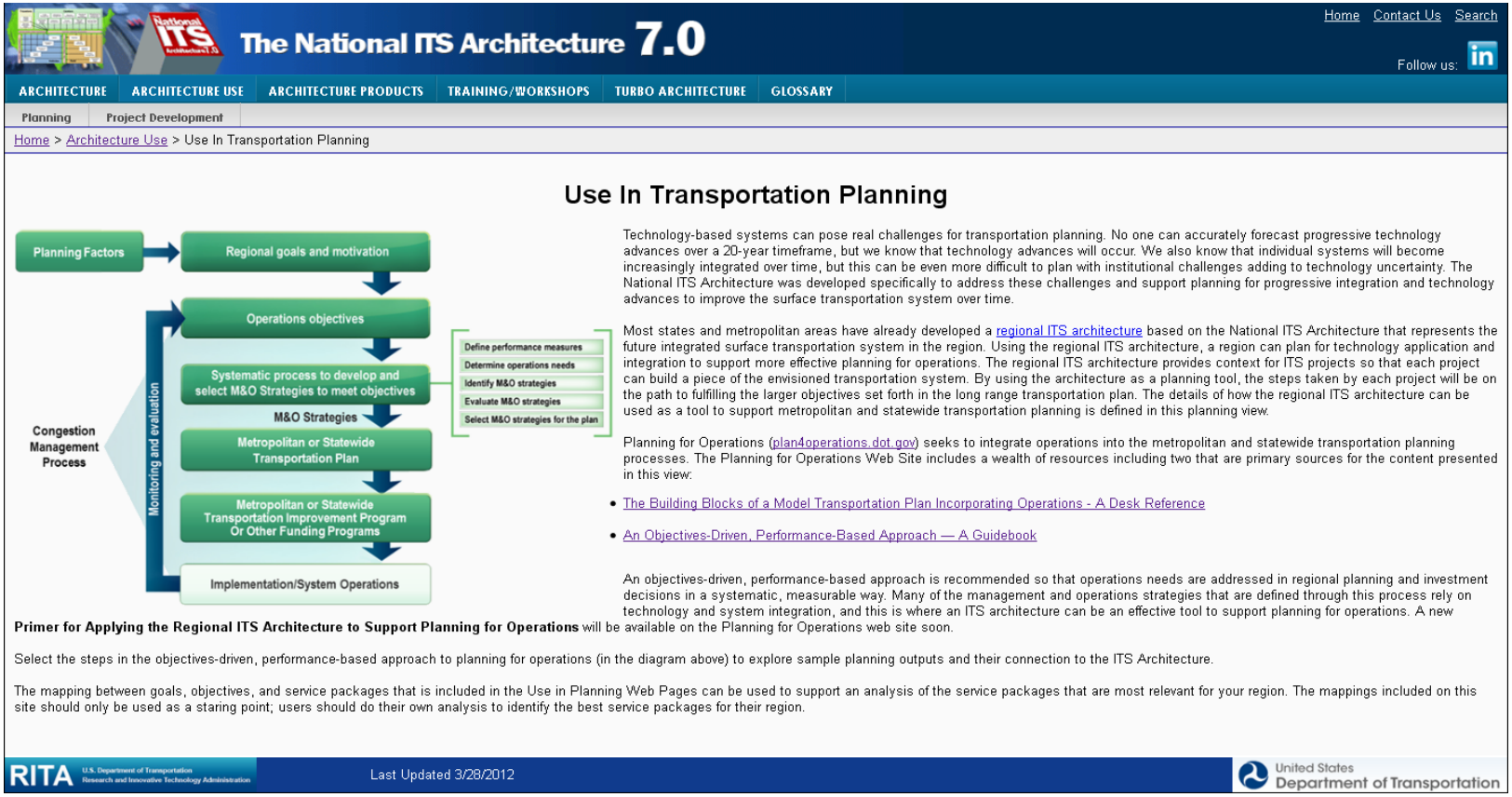
The following table presents the roles the actors defined in the Institutional Layer typically take in the development, operations, and maintenance of ITS systems (as defined here by the 22 subsystems of the Transportation Layer of the physical architecture). Many of the National ITS Architecture subsystems are developed, operated, and maintained by public sector agencies (e.g. state agencies). However, in most cases the development (and sometimes the operations and maintenance) are actually carried out by private sector groups under contract to the public sector agency. An example of this would be Roadway Subsystem devices developed for a state DOT by a manufacturer, and then integrated with a Traffic Management Subsystem by a systems integrator.

Subsystem	Public Sector				Non-Profit / Advisory	Private Sector				General Public
	Federal Agencies	State Agencies	Regional Authorities	Local Authorities	Educational	Manufacturer / Supplier	System Integrator	Service Provider	Freight Companies	Drivers / Travelers
Archived Data Management	D, O, M	D, O, M	D, O, M	D, O, M	D, O, M		D*			
Commercial Vehicle Administration	D, O, M	D, O, M				D*	D*	O,M*		
Commercial Vehicle Check	D, O, M	D, O, M				D*	D*	O,M*		
Commercial Vehicle						D			O, M	O
Emergency Management		D, O, M	D, O, M	D, O, M		D*	D*	O, M*		
Emergency Vehicle		O, M	O, M	O, M		D*				
Emissions Management		D, O, M	D, O, M	D, O, M		D*	D*	O, M*		
Fleet and Freight Management						D	D		D, O, M	
Information Service Provider		D, O, M	D, O, M	D, O, M		D*	D*	O, M*		
Maintenance and Construction Management		D, O, M		D, O, M		D*	D*	O, M*		
Maintenance and Construction Vehicle		D, O, M	D, O, M			D*				
Parking Management				D, O, M		D*	D*	O, M*	O, M	
Payment Administration		D, O, M	D, O, M	D, O, M		D*	D*	O, M*		
Personal Information Access						D, M				O, M
Remote Traveler Support		D, O, M	D, O, M	D, O, M		D*	D*			O
Roadway		D, O, M		D, O, M		D*	D*	O, M*		
Roadway Payment		D, O, M	D, O, M	D, O, M		D*	D*	O, M*		
Security Monitoring		D, O, M	D, O, M			D*	D*	O, M*		
Traffic Management		D, O, M	D, O, M	D, O, M		D*	D*	O, M*		
Transit Management			D, O, M	D, O, M		D*	D*	O, M*		
Transit Vehicle			D, O, M	D, O, M		D*	D*			
Vehicle						D, M				O, M

Legend
D - Develop
O - Operate
M - Maintain
* - Private sector group develops, operates, or maintains under contract from the public sector (usually)

Website Demo – Architecture Use Pages

- **Use in Planning**



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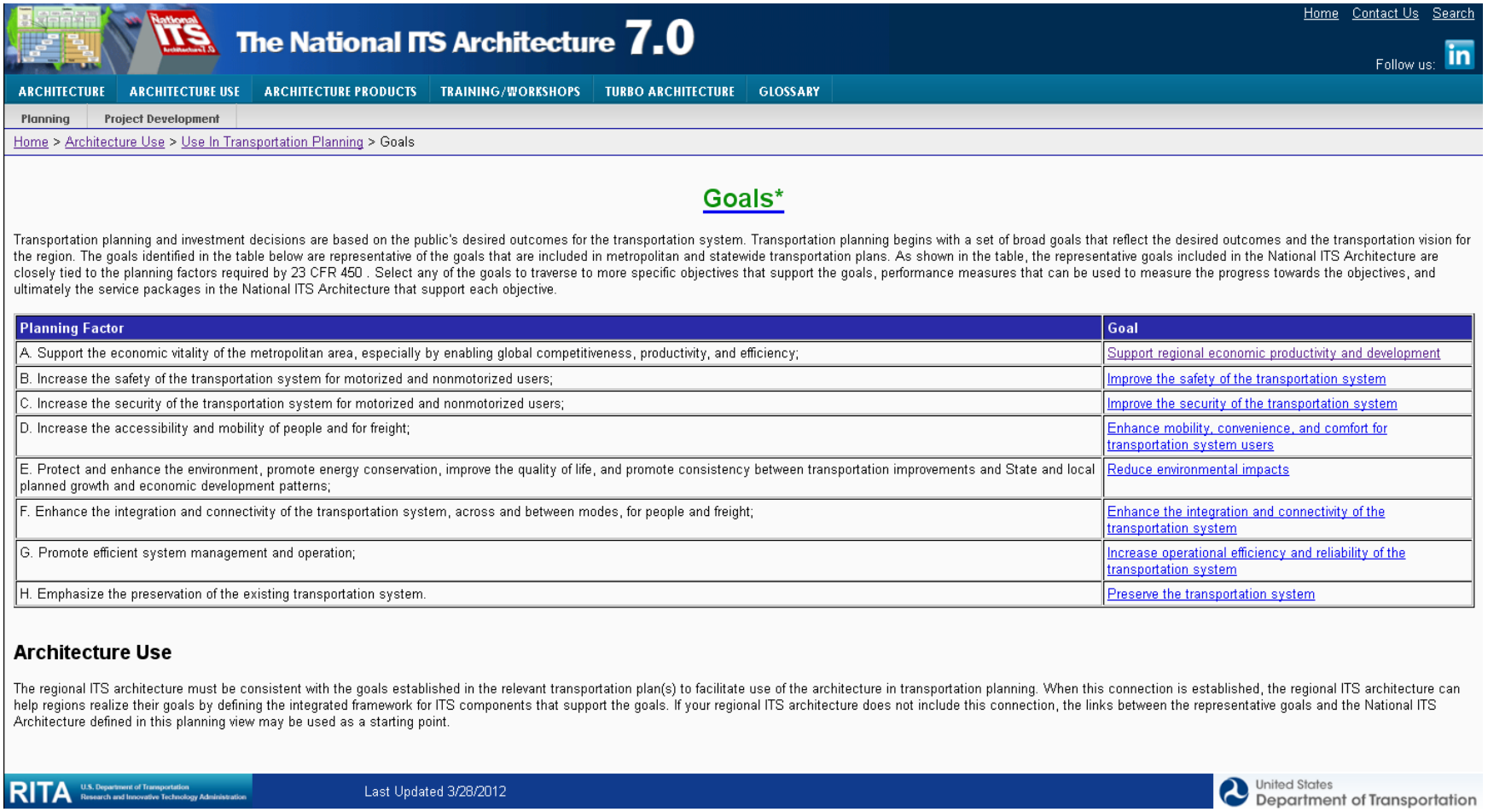
Website Demo – Architecture Use Pages



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Home > Architecture Use > Use In Transportation Planning > Goals

Goals*

Transportation planning and investment decisions are based on the public's desired outcomes for the transportation system. Transportation planning begins with a set of broad goals that reflect the desired outcomes and the transportation vision for the region. The goals identified in the table below are representative of the goals that are included in metropolitan and statewide transportation plans. As shown in the table, the representative goals included in the National ITS Architecture are closely tied to the planning factors required by 23 CFR 450 . Select any of the goals to traverse to more specific objectives that support the goals, performance measures that can be used to measure the progress towards the objectives, and ultimately the service packages in the National ITS Architecture that support each objective.

Planning Factor	Goal
A. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;	Support regional economic productivity and development
B. Increase the safety of the transportation system for motorized and nonmotorized users;	Improve the safety of the transportation system
C. Increase the security of the transportation system for motorized and nonmotorized users;	Improve the security of the transportation system
D. Increase the accessibility and mobility of people and for freight;	Enhance mobility, convenience, and comfort for transportation system users
E. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;	Reduce environmental impacts
F. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;	Enhance the integration and connectivity of the transportation system
G. Promote efficient system management and operation;	Increase operational efficiency and reliability of the transportation system
H. Emphasize the preservation of the existing transportation system.	Preserve the transportation system

Architecture Use

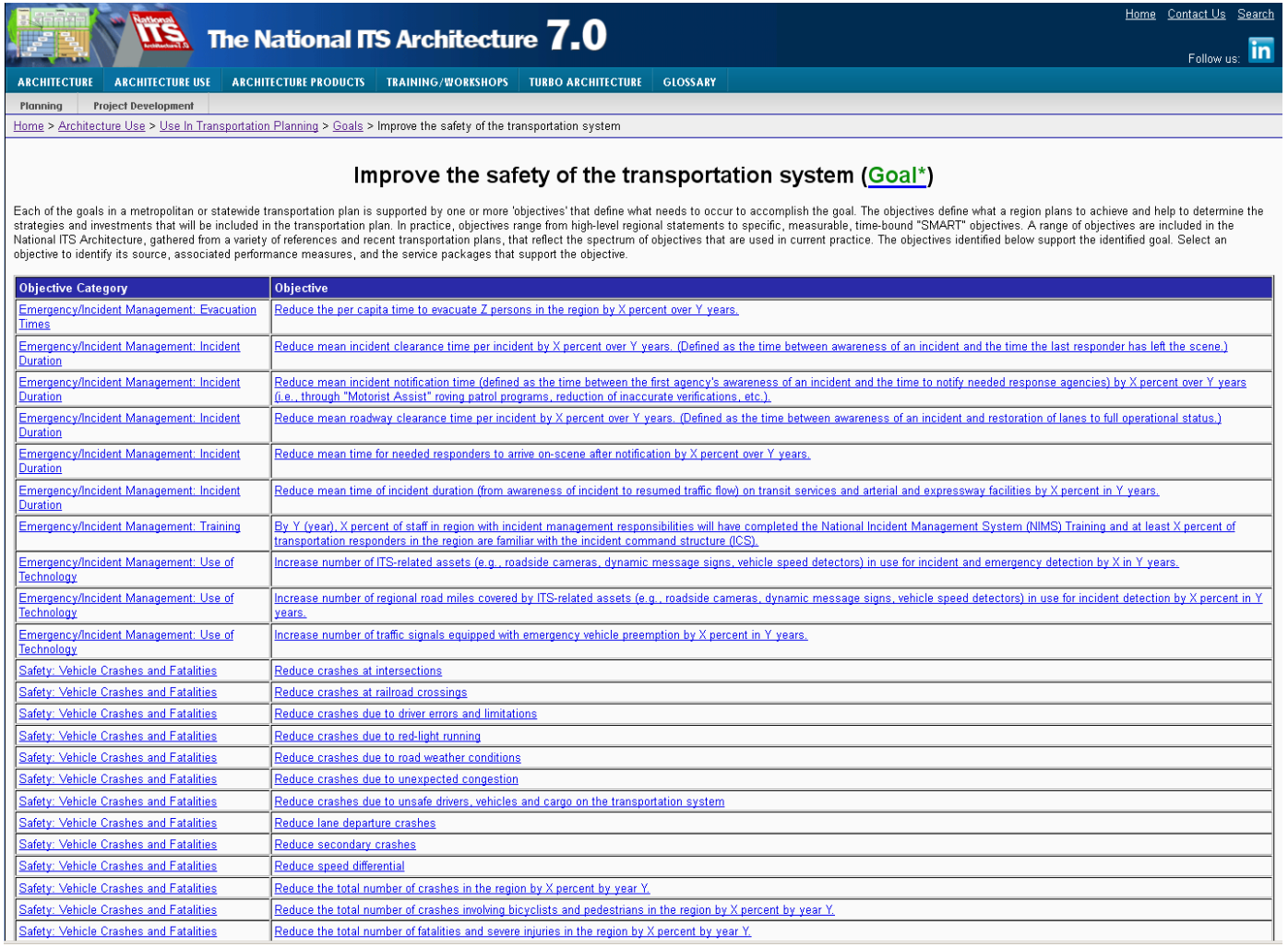
The regional ITS architecture must be consistent with the goals established in the relevant transportation plan(s) to facilitate use of the architecture in transportation planning. When this connection is established, the regional ITS architecture can help regions realize their goals by defining the integrated framework for ITS components that support the goals. If your regional ITS architecture does not include this connection, the links between the representative goals and the National ITS Architecture defined in this planning view may be used as a starting point.

RITA U.S. Department of Transportation Research and Innovative Technology Administration

Last Updated 3/28/2012

United States Department of Transportation

Website Demo – Architecture Use Pages



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Planning | Project Development

Home > Architecture Use > Use In Transportation Planning > Goals > Improve the safety of the transportation system

Improve the safety of the transportation system (Goal*)

Each of the goals in a metropolitan or statewide transportation plan is supported by one or more 'objectives' that define what needs to occur to accomplish the goal. The objectives define what a region plans to achieve and help to determine the strategies and investments that will be included in the transportation plan. In practice, objectives range from high-level regional statements to specific, measurable, time-bound "SMART" objectives. A range of objectives are included in the National ITS Architecture, gathered from a variety of references and recent transportation plans, that reflect the spectrum of objectives that are used in current practice. The objectives identified below support the identified goal. Select an objective to identify its source, associated performance measures, and the service packages that support the objective.

Objective Category	Objective
Emergency/Incident Management: Evacuation Times	Reduce the per capita time to evacuate Z persons in the region by X percent over Y years.
Emergency/Incident Management: Incident Duration	Reduce mean incident clearance time per incident by X percent over Y years. (Defined as the time between awareness of an incident and the time the last responder has left the scene.)
Emergency/Incident Management: Incident Duration	Reduce mean incident notification time (defined as the time between the first agency's awareness of an incident and the time to notify needed response agencies) by X percent over Y years (i.e., through "Motorist Assist" roving patrol programs, reduction of inaccurate verifications, etc.).
Emergency/Incident Management: Incident Duration	Reduce mean roadway clearance time per incident by X percent over Y years. (Defined as the time between awareness of an incident and restoration of lanes to full operational status.)
Emergency/Incident Management: Incident Duration	Reduce mean time for needed responders to arrive on-scene after notification by X percent over Y years.
Emergency/Incident Management: Incident Duration	Reduce mean time of incident duration (from awareness of incident to resumed traffic flow) on transit services and arterial and expressway facilities by X percent in Y years.
Emergency/Incident Management: Training	By Y (year), X percent of staff in region with incident management responsibilities will have completed the National Incident Management System (NIMS) Training and at least X percent of transportation responders in the region are familiar with the incident command structure (ICS).
Emergency/Incident Management: Use of Technology	Increase number of ITS-related assets (e.g., roadside cameras, dynamic message signs, vehicle speed detectors) in use for incident and emergency detection by X in Y years.
Emergency/Incident Management: Use of Technology	Increase number of regional road miles covered by ITS-related assets (e.g., roadside cameras, dynamic message signs, vehicle speed detectors) in use for incident detection by X percent in Y years.
Emergency/Incident Management: Use of Technology	Increase number of traffic signals equipped with emergency vehicle preemption by X percent in Y years.
Safety: Vehicle Crashes and Fatalities	Reduce crashes at intersections
Safety: Vehicle Crashes and Fatalities	Reduce crashes at railroad crossings
Safety: Vehicle Crashes and Fatalities	Reduce crashes due to driver errors and limitations
Safety: Vehicle Crashes and Fatalities	Reduce crashes due to red-light running
Safety: Vehicle Crashes and Fatalities	Reduce crashes due to road weather conditions
Safety: Vehicle Crashes and Fatalities	Reduce crashes due to unexpected congestion
Safety: Vehicle Crashes and Fatalities	Reduce crashes due to unsafe drivers, vehicles and cargo on the transportation system
Safety: Vehicle Crashes and Fatalities	Reduce lane departure crashes
Safety: Vehicle Crashes and Fatalities	Reduce secondary crashes
Safety: Vehicle Crashes and Fatalities	Reduce speed differential
Safety: Vehicle Crashes and Fatalities	Reduce the total number of crashes in the region by X percent by year Y.
Safety: Vehicle Crashes and Fatalities	Reduce the total number of crashes involving bicyclists and pedestrians in the region by X percent by year Y.
Safety: Vehicle Crashes and Fatalities	Reduce the total number of fatalities and severe injuries in the region by X percent by year Y.

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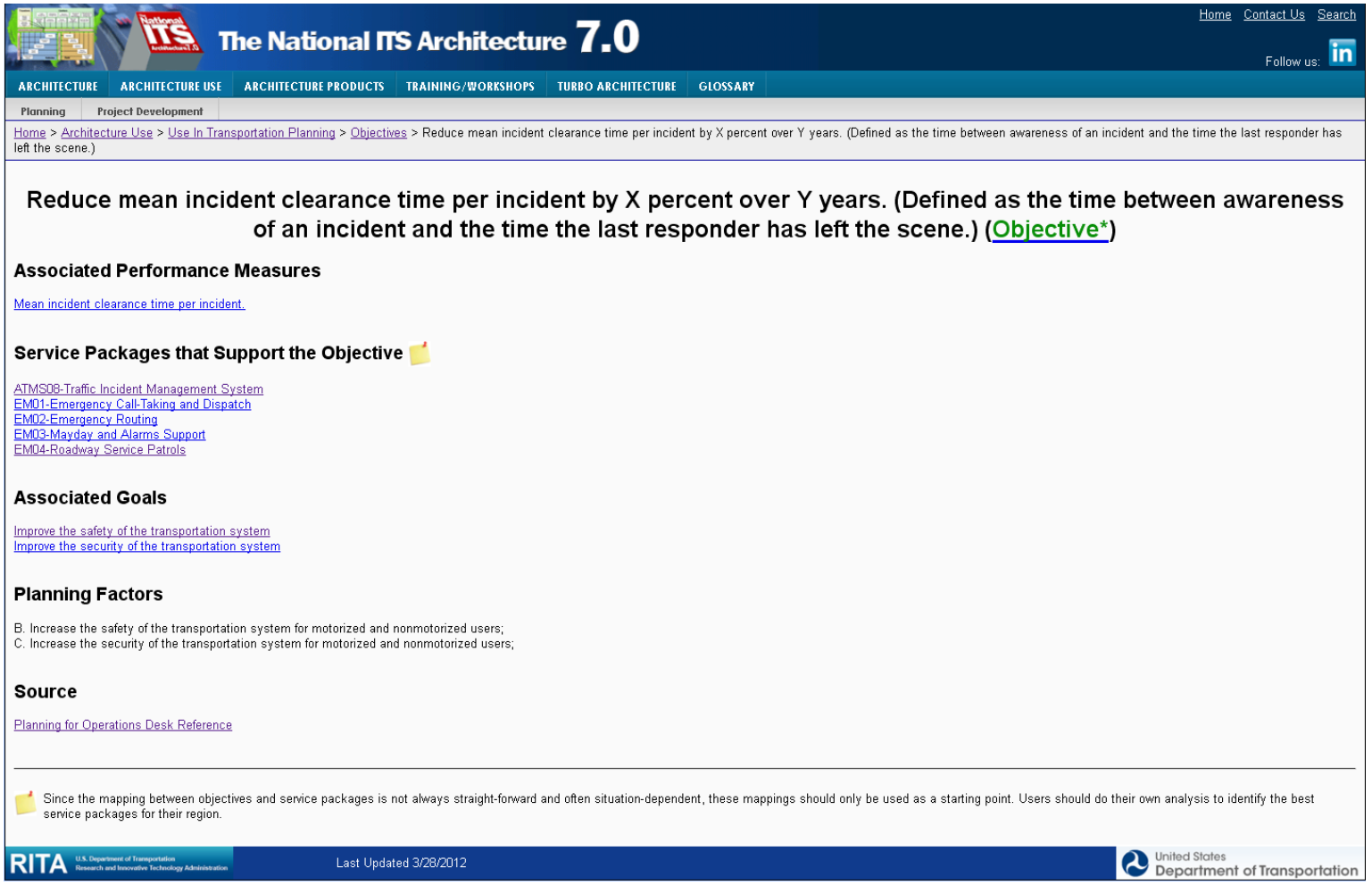
Website Demo – Architecture Use Pages



Website Demo – Architecture Use Pages

- **Use in Project Development**

Website Demo – Service Package Pages

- Planning factors/goals
- Objectives
- Performance measures

- Link to costs, benefits & lessons learned

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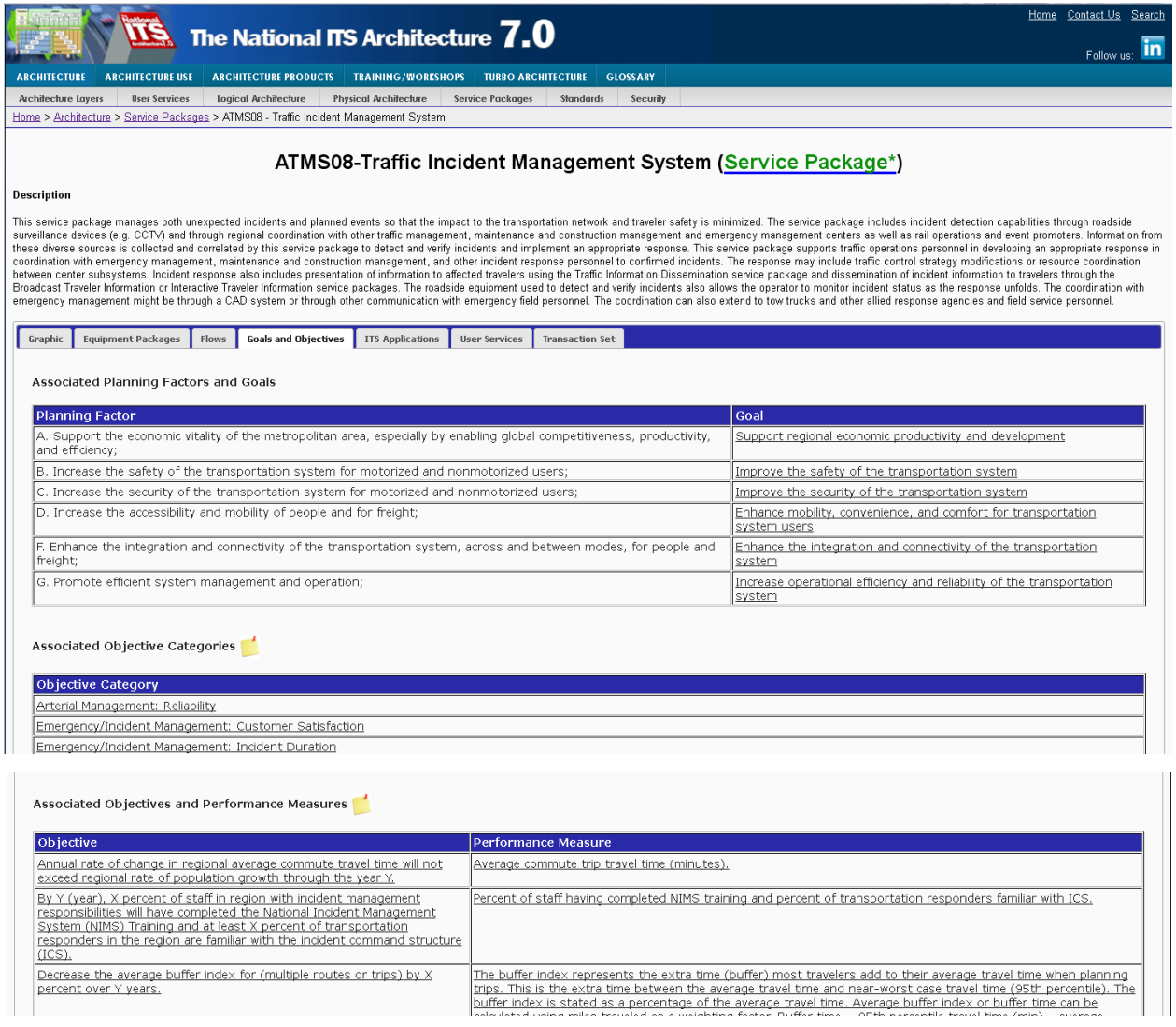
Website Demo – Service Package Pages



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Architecture Layers | User Services | Logical Architecture | Physical Architecture | Service Packages | Standards | Security

Home > Architecture > Service Packages > ATMS08 - Traffic Incident Management System

ATMS08-Traffic Incident Management System (Service Package*)

Description

This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The service package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as rail operations and event promoters. Information from these diverse sources is collected and correlated by this service package to detect and verify incidents and implement an appropriate response. This service package supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between center subsystems. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination service package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information service packages. The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with emergency management might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.

Graphic | Equipment Packages | Flows | Goals and Objectives | ITS Applications | User Services | Transaction Set

Associated Planning Factors and Goals

Planning Factor	Goal
A. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;	Support regional economic productivity and development
B. Increase the safety of the transportation system for motorized and nonmotorized users;	Improve the safety of the transportation system
C. Increase the security of the transportation system for motorized and nonmotorized users;	Improve the security of the transportation system
D. Increase the accessibility and mobility of people and for freight;	Enhance mobility, convenience, and comfort for transportation system users
F. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;	Enhance the integration and connectivity of the transportation system
G. Promote efficient system management and operation;	Increase operational efficiency and reliability of the transportation system

Associated Objective Categories

Objective Category
Arterial Management: Reliability
Emergency/Incident Management: Customer Satisfaction
Emergency/Incident Management: Incident Duration

Associated Objectives and Performance Measures

Objective	Performance Measure
Annual rate of change in regional average commute travel time will not exceed regional rate of population growth through the year Y.	Average commute trip travel time (minutes).
By Y (year), X percent of staff in region with incident management responsibilities will have completed the National Incident Management System (NIMS) Training and at least X percent of transportation responders in the region are familiar with the incident command structure (ICS).	Percent of staff having completed NIMS training and percent of transportation responders familiar with ICS.
Decrease the average buffer index for (multiple routes or trips) by X percent over Y years.	The buffer index represents the extra time (buffer) most travelers add to their average travel time when planning trips. This is the extra time between the average travel time and near-worst case travel time (95th percentile). The buffer index is stated as a percentage of the average travel time. Average buffer index or buffer time can be

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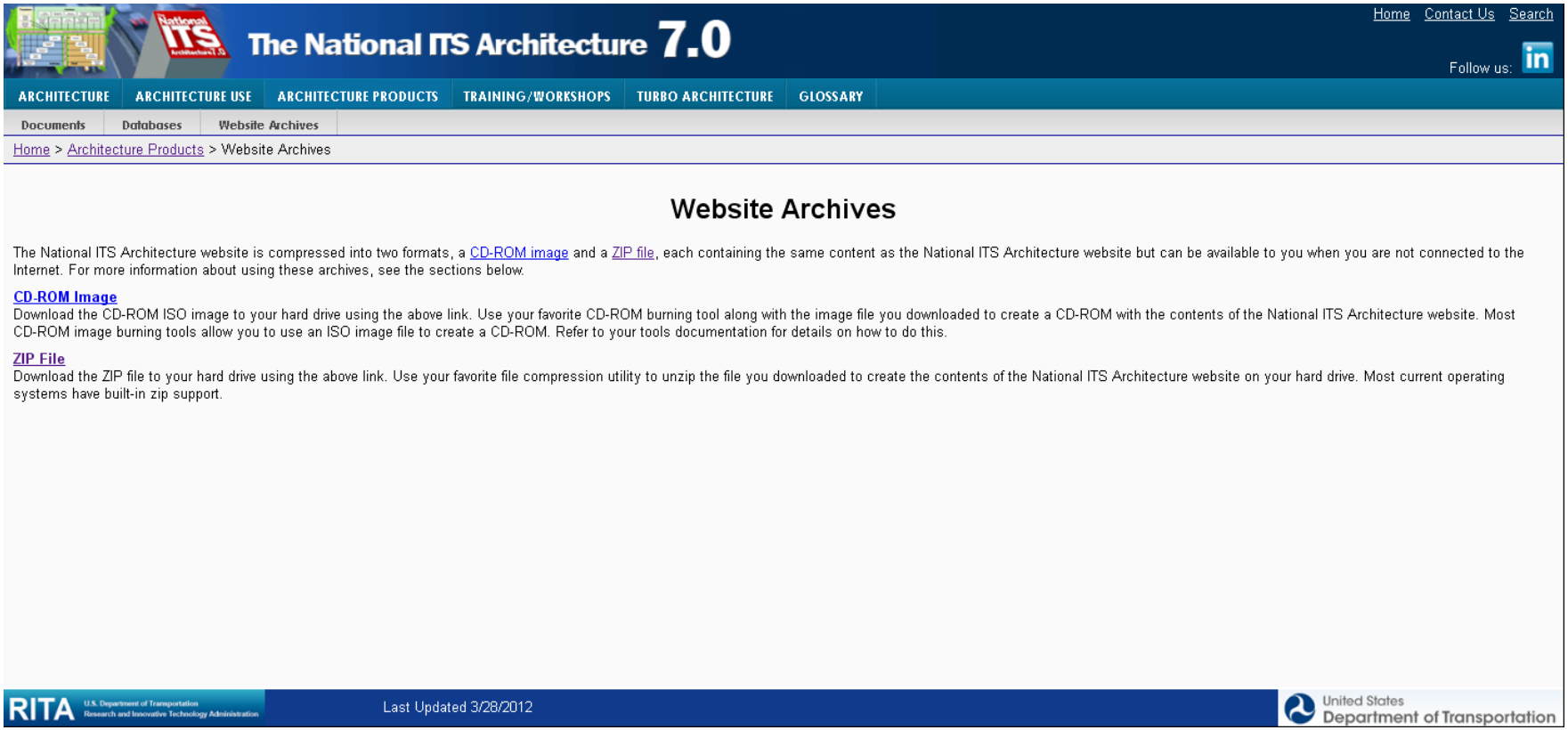
Website Demo – Website Download Options



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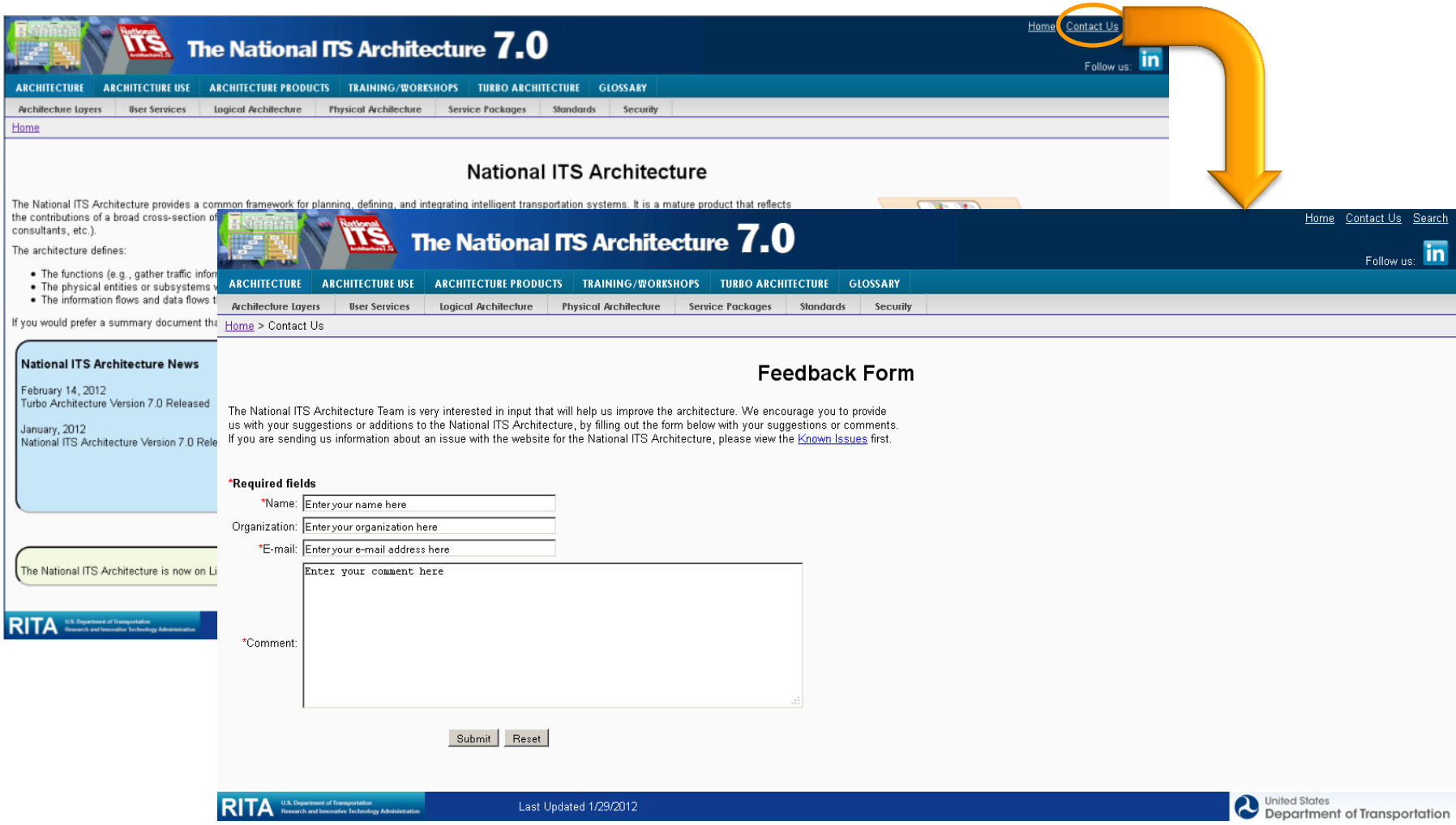

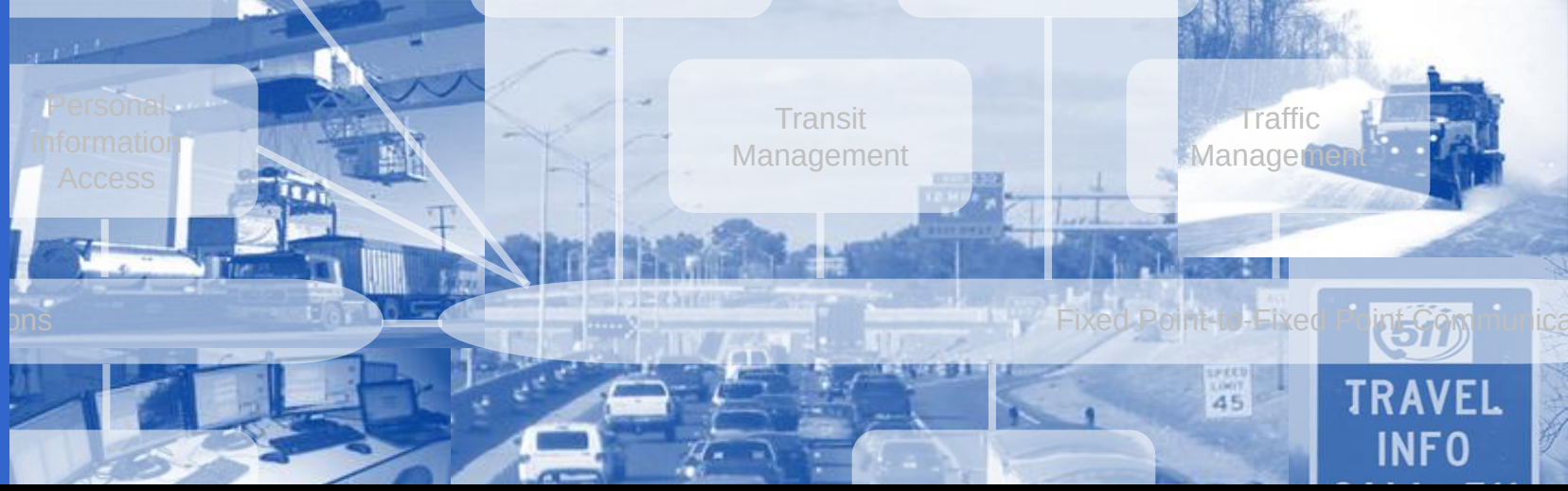

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New National ITS Architecture's V7 – What's New and How to Use It!

Example Use of Version 7.0

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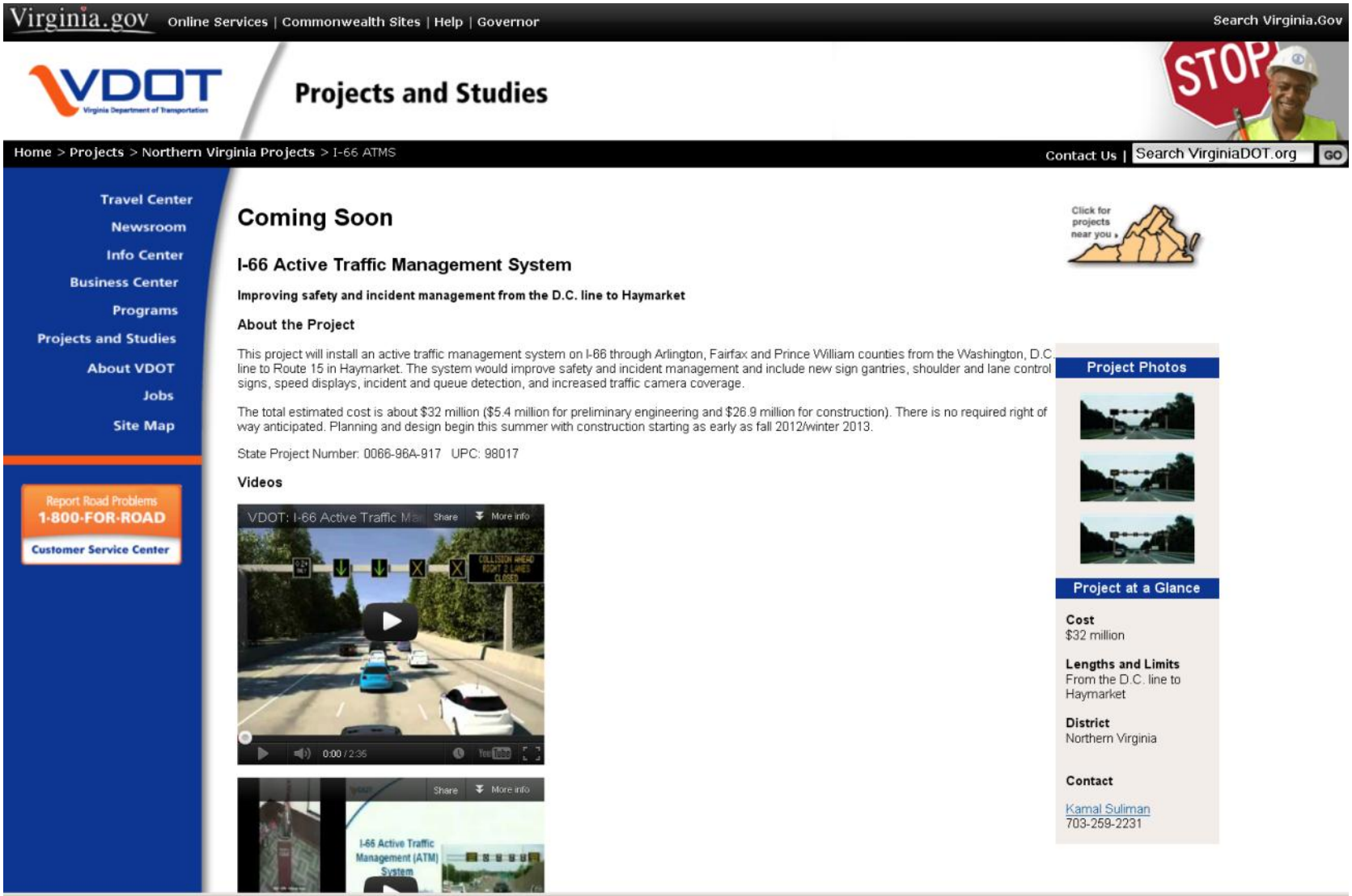
Example Use of Version 7



Example Use of Version 7

ATM Project Consideration

- What ATM strategies are applicable?
- What elements are involved in the strategies?
- What are realistic goals/objectives?
- What benefits can be expect?

Example Use of Version 7

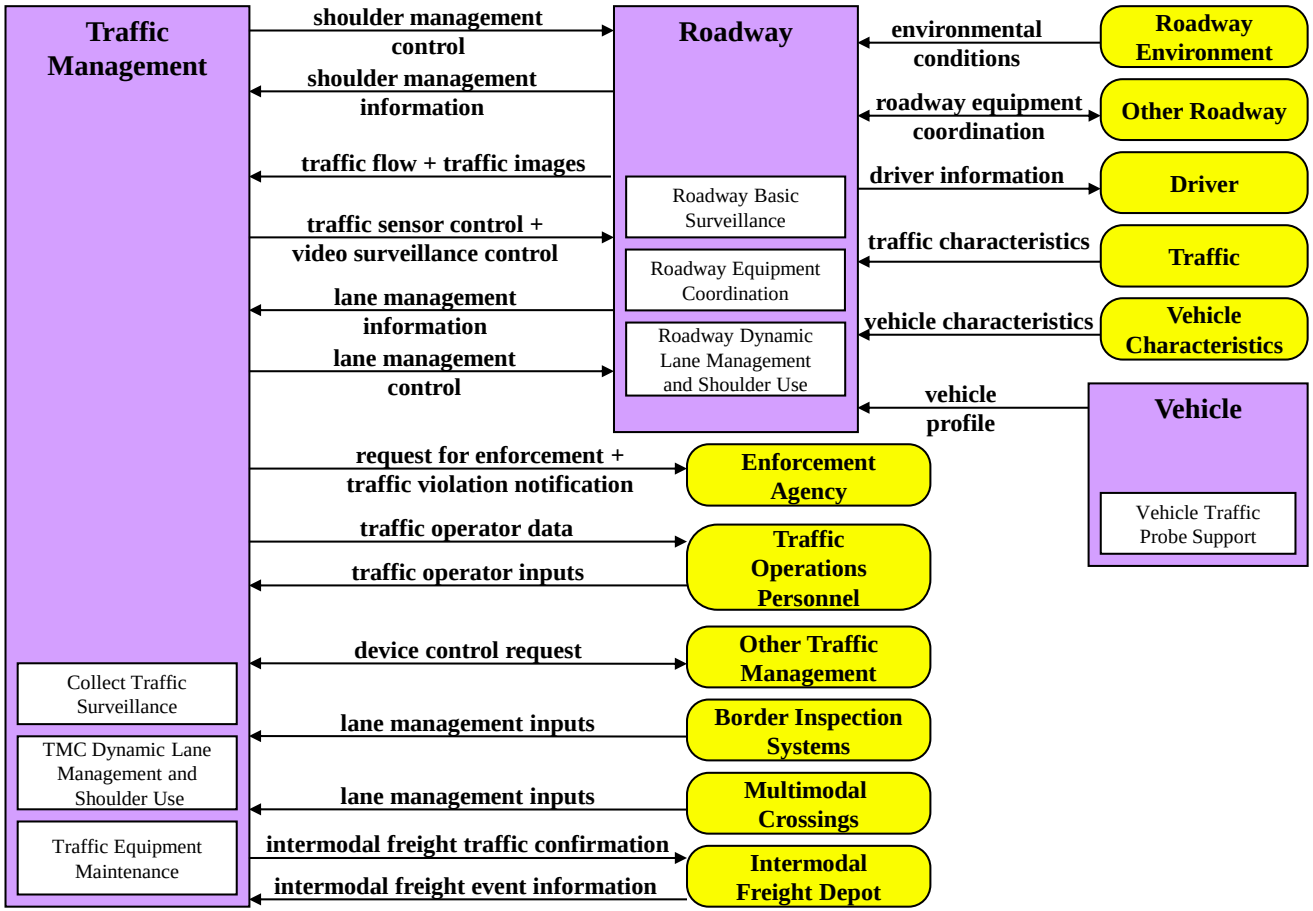
- Identify potential strategies

Service Area	Service Package	Service Package Name
TRAFFIC MANAGEMENT	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	Transportation 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

Example Use of Version 7

- Identify elements (& their stakeholders) potentially involved

ATMS23-Dynamic Lane Management and Shoulder Use



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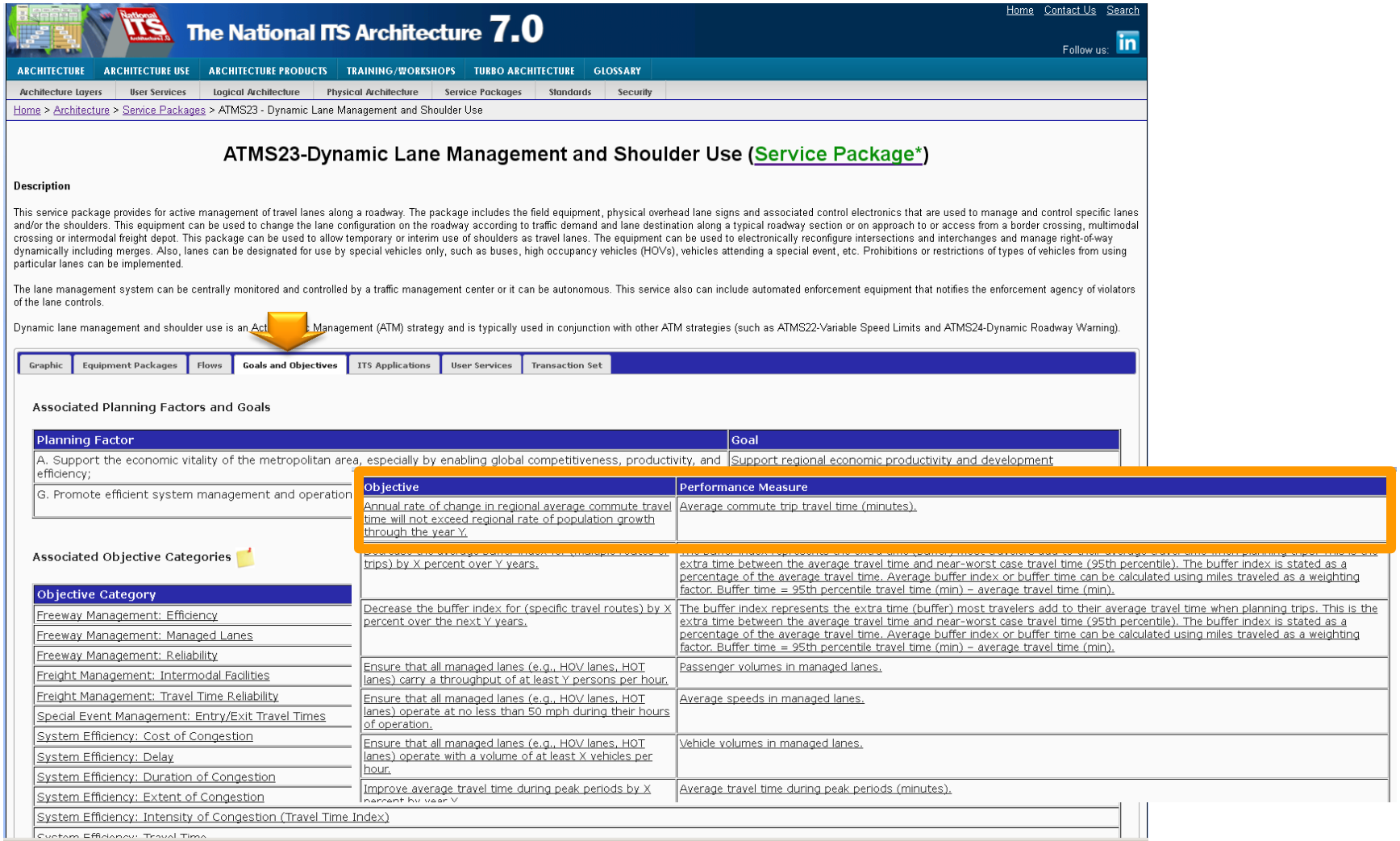
Example Use of Version 7

- Identify goals, objectives & performance measures



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Home > Architecture > Service Packages > ATMS23 - Dynamic Lane Management and Shoulder Use

ATMS23-Dynamic Lane Management and Shoulder Use (Service Package*)

Description

This service package provides for active management of travel lanes along a roadway. The package includes the field equipment, physical overhead lane signs and associated control electronics that are used to manage and control specific lanes and/or the shoulders. This equipment can be used to change the lane configuration on the roadway according to traffic demand and lane destination along a typical roadway section or on approach to or access from a border crossing, multimodal crossing or intermodal freight depot. This package can be used to allow temporary or interim use of shoulders as travel lanes. The equipment can be used to electronically reconfigure intersections and interchanges and manage right-of-way dynamically including merges. Also, lanes can be designated for use by special vehicles only, such as buses, high occupancy vehicles (HOVs), vehicles attending a special event, etc. Prohibitions or restrictions of types of vehicles from using particular lanes can be implemented.

The lane management system can be centrally monitored and controlled by a traffic management center or it can be autonomous. This service also can include automated enforcement equipment that notifies the enforcement agency of violators of the lane controls.

Dynamic lane management and shoulder use is an Act… Management (ATM) strategy and is typically used in conjunction with other ATM strategies (such as ATMS22-Variable Speed Limits and ATMS24-Dynamic Roadway Warning).

Graphic | Equipment Packages | Flows | Goals and Objectives | ITS Applications | User Services | Transaction Set

Associated Planning Factors and Goals

Planning Factor	Goal
A. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;	Support regional economic productivity and development
G. Promote efficient system management and operation	

Objective	Performance Measure
Annual rate of change in regional average commute travel time will not exceed regional rate of population growth through the year Y.	Average commute trip travel time (minutes).
…trips) by X percent over Y years.	…extra time between the average travel time and near-worst case travel time (95th percentile). The buffer index is stated as a percentage of the average travel time. Average buffer index or buffer time can be calculated using miles traveled as a weighting factor. Buffer time = 95th percentile travel time (min) – average travel time (min).
Decrease the buffer index for (specific travel routes) by X percent over the next Y years.	The buffer index represents the extra time (buffer) most travelers add to their average travel time when planning trips. This is the extra time between the average travel time and near-worst case travel time (95th percentile). The buffer index is stated as a percentage of the average travel time. Average buffer index or buffer time can be calculated using miles traveled as a weighting factor. Buffer time = 95th percentile travel time (min) – average travel time (min).
Ensure that all managed lanes (e.g., HOV lanes, HOT lanes) carry a throughput of at least Y persons per hour.	Passenger volumes in managed lanes.
Ensure that all managed lanes (e.g., HOV lanes, HOT lanes) operate at no less than 50 mph during their hours of operation.	Average speeds in managed lanes.
Ensure that all managed lanes (e.g., HOV lanes, HOT lanes) operate with a volume of at least X vehicles per hour.	Vehicle volumes in managed lanes.
Improve average travel time during peak periods by X percent by year Y.	Average travel time during peak periods (minutes).

Associated Objective Categories

Objective Category
Freeway Management: Efficiency
Freeway Management: Managed Lanes
Freeway Management: Reliability
Freight Management: Intermodal Facilities
Freight Management: Travel Time Reliability
Special Event Management: Entry/Exit Travel Times
System Efficiency: Cost of Congestion
System Efficiency: Delay
System Efficiency: Duration of Congestion
System Efficiency: Extent of Congestion
System Efficiency: Intensity of Congestion (Travel Time Index)
System Efficiency: Travel Time

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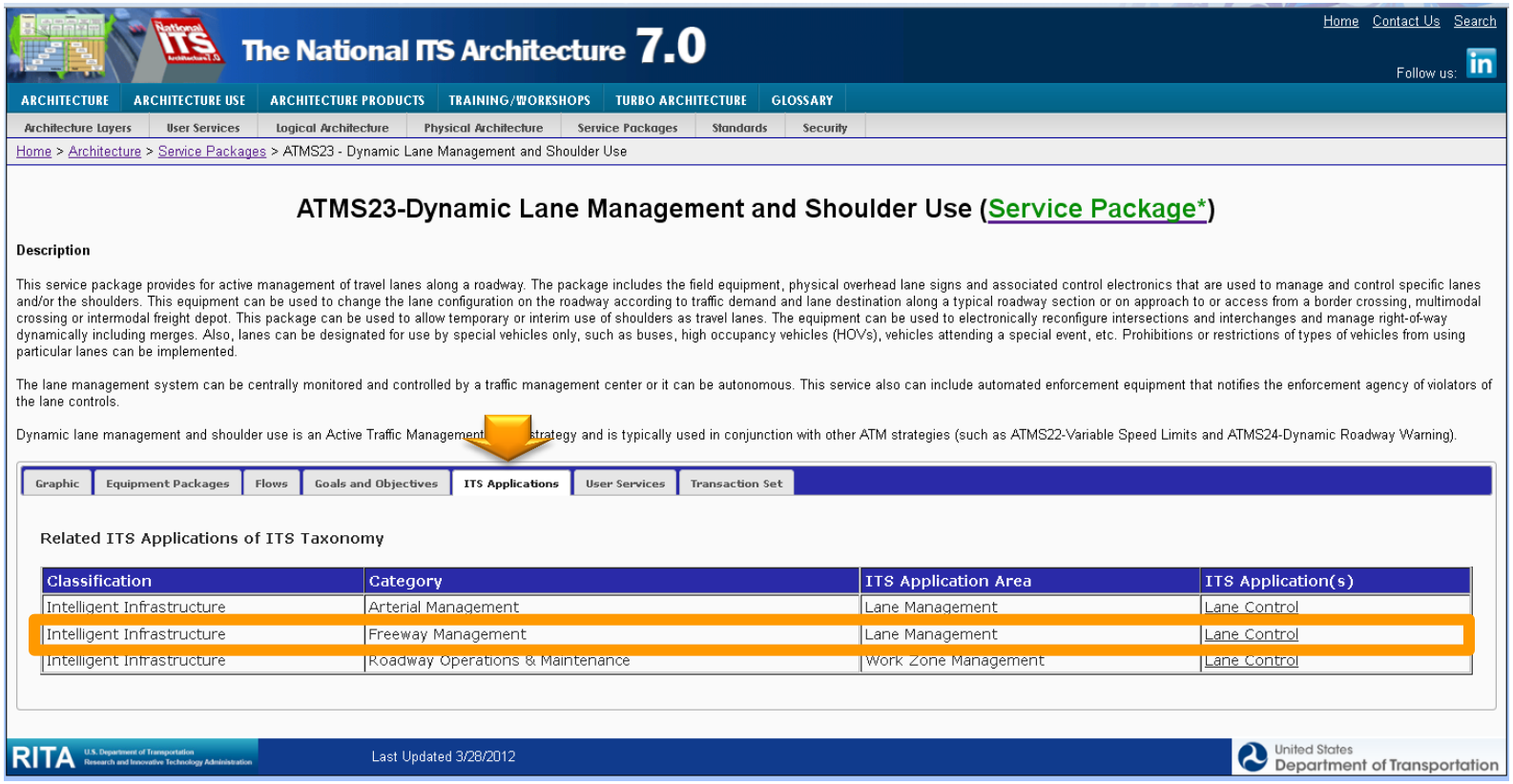
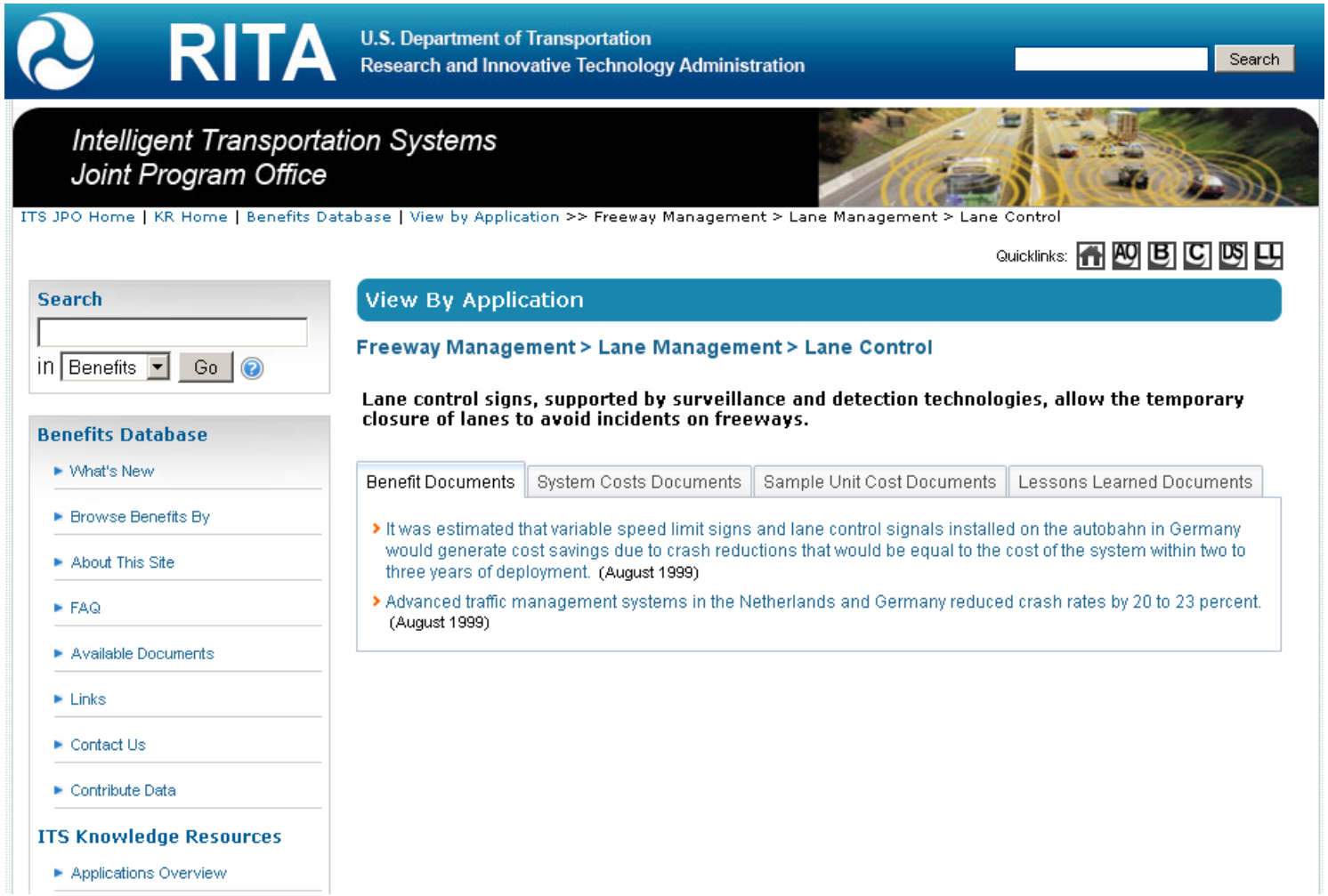
Example Use of Version 7

- Identify benefits, costs & lessons learned



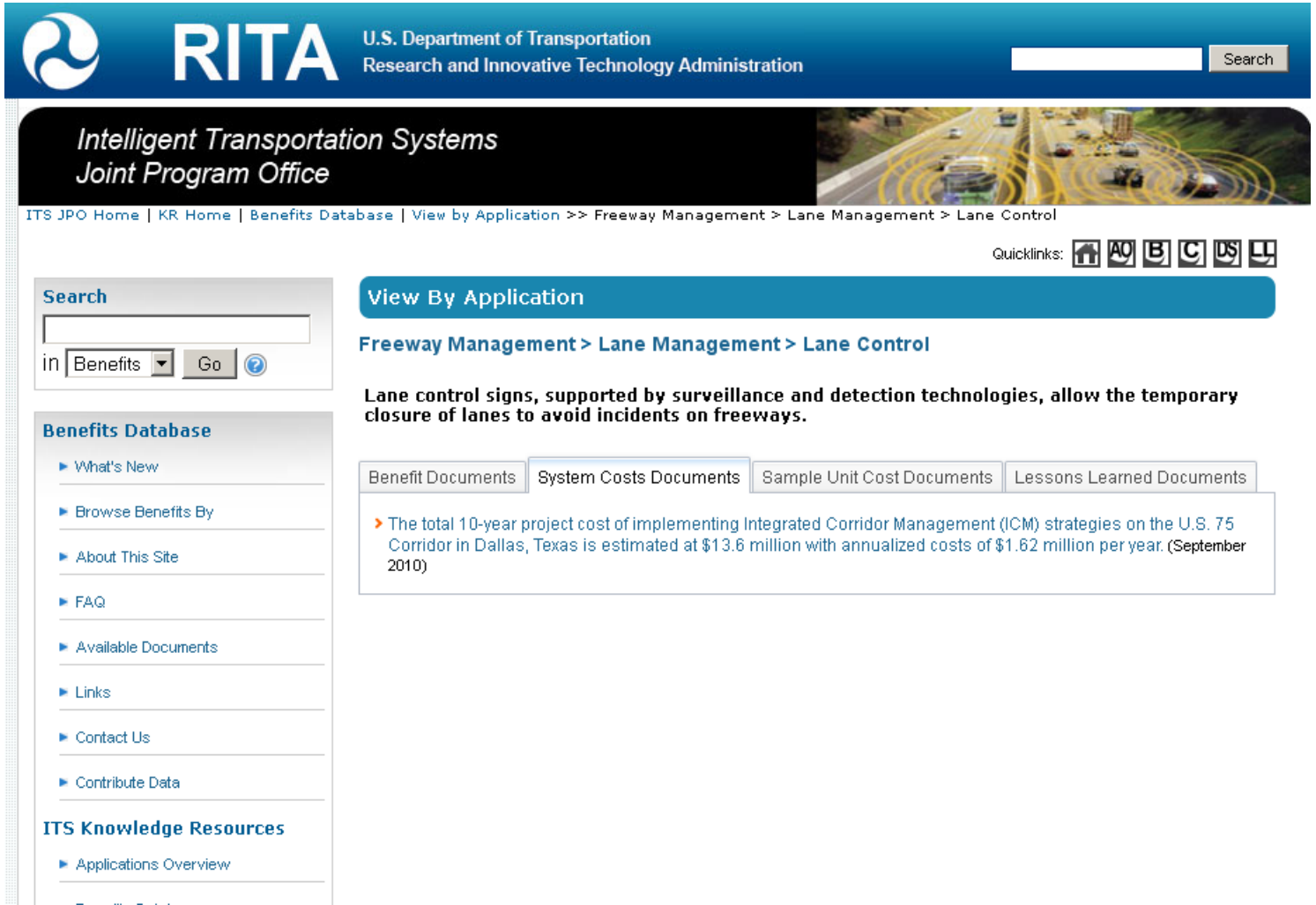
Example Use of Version 7

- Identify benefits



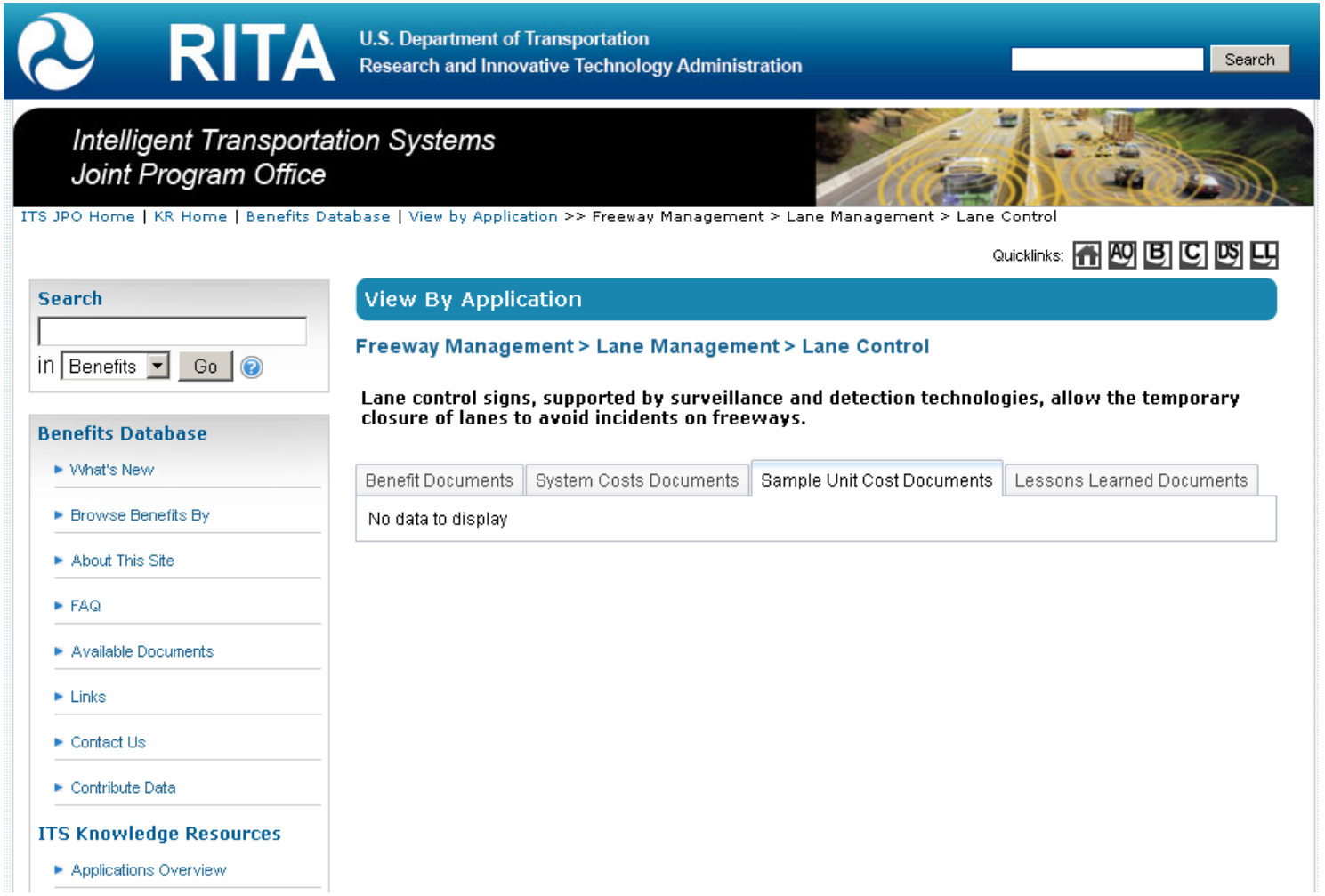
Example Use of Version 7

- Identify system costs



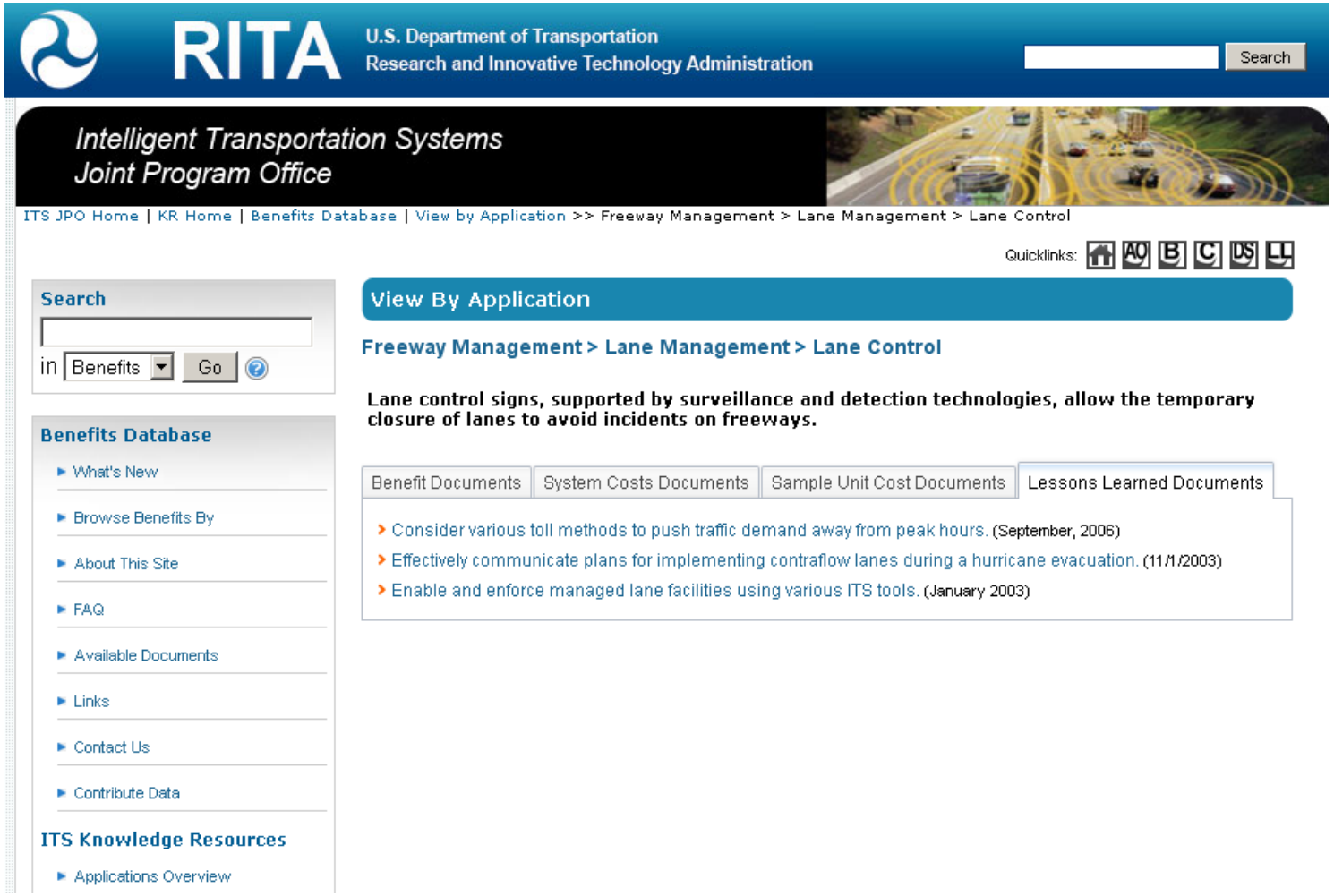
Example Use of Version 7

- Identify unit costs



Example Use of Version 7

- Identify related lessons learned



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Poll Question

3. In the example, we saw how the National ITS Architecture supported development of an ITS project. Which use of the architecture would you find to be most useful? (Select only one.)

   a) To identify what ITS strategies are applicable.
   b) To identify what elements are involved in the strategies.
   c) To identify realistic goals/objectives.
   d) To identify the benefits can be expected.

New National ITS Architecture's V7 – What's New and How to Use It!

Turbo Architecture Version 7.0 Update

U.S. Department of Transportation
Research and Innovative Technology Administration

U.S. Department of Transportation
Federal Highway Administration

What is Turbo Architecture?

A software tool that automates use of the National ITS Architecture

National ITS Architecture

- Traffic Management
- Transit Management

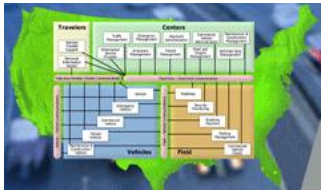
Turbo ARCHITECTURE

Regional/Project ITS Architectures

- City PWD
  - City Traffic Mgmt Center
- City Transit
  - City Transit Ops Center

Turbo Version 7.0

- Released February 14, 2012



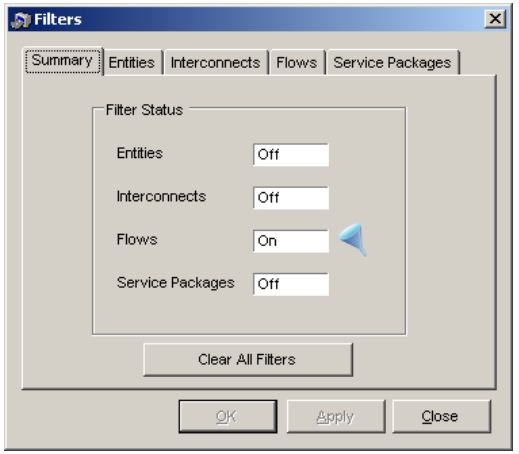
- Supports Version 7.0 of the National ITS Architecture (& align version numbers)

- Bug fixes to ensure trouble-free operation

- New features and capabilities to ease use

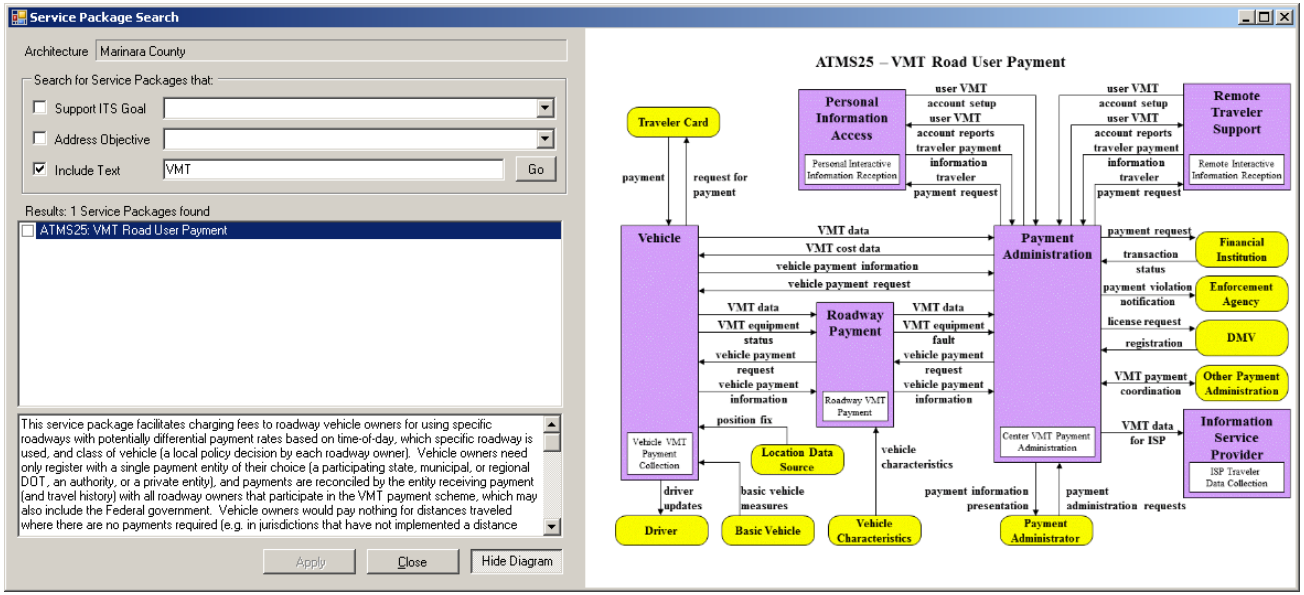
Turbo V 7 New Features & Capabilities

- Publish document for a project architecture
- Clear all filters with one click
- Context menus: right-click to undo, cut, copy, paste, select all, or spell check



Turbo V 7 New Features & Capabilities

- Transfer service package selections from the Planning tab to the Services tab
- Service package diagrams available in SP search



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Turbo Version 7.0 Availability

- Free download
- Follow links from http://www.its.dot.gov/arch

More on Turbo Architecture

- NHI Web-based Course (#137048)
  http://www.nhi.fhwa.dot.gov
- T3 Webinar (from Feb. 2012)
  http://www.pcb.its.dot.gov/t3/s120202_turbo.asp

T3 Webinar

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New National ITS Architecture's V7 – What's New and How to Use It!

Questions & Answers

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