

National ITS Architecture Update

ITS Joint Program Office
Professional Capacity Building Program
Talking Technology and Transportation
(T3) Presentation
October 27, 2009

Cliff Heise, Vice President, Federal and Research Programs
Iteris, Inc.

Emiliano Lopez, ITS Deployment Program Manager
FHWA Headquarters

David Binkley, Senior Systems Engineer
Lockheed Martin

T3 Webinars are brought to you by the ITS Professional Capacity Building Program (ITS PCB) at the U.S. Department of Transportation's (USDOT) ITS Joint Program Office, Research and Innovative Technology Administration (RITA)



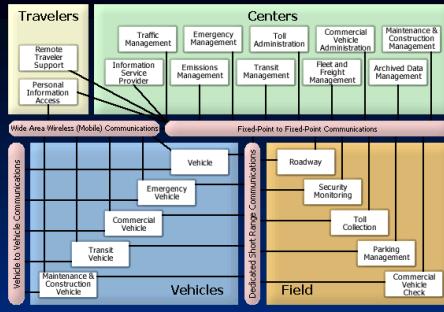
RESEARCH AND INNOVATIVE TECHNOLOGY ADMINISTRATION

RESEARCH AND INNOVATIVE TECHNOLOGY ADMINISTRATION

INTELLIGENT TRANSPORTATION SYSTEMS

Agenda

- National ITS Architecture
 - Overview
 - Version 6.1 update
- Turbo Architecture version 4.1
- Discussion of deployment support and resources available
- Presenters
 - Cliff Heise, Iteris
 - Emilio Lopez, FHWA

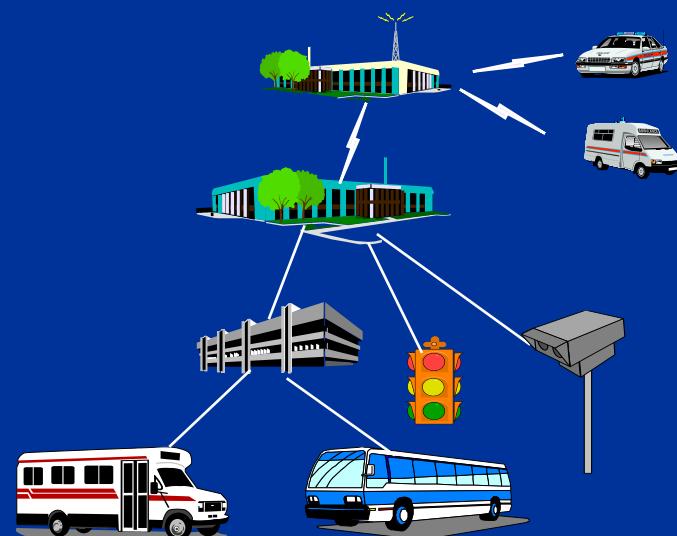


National ITS Architecture Overview



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

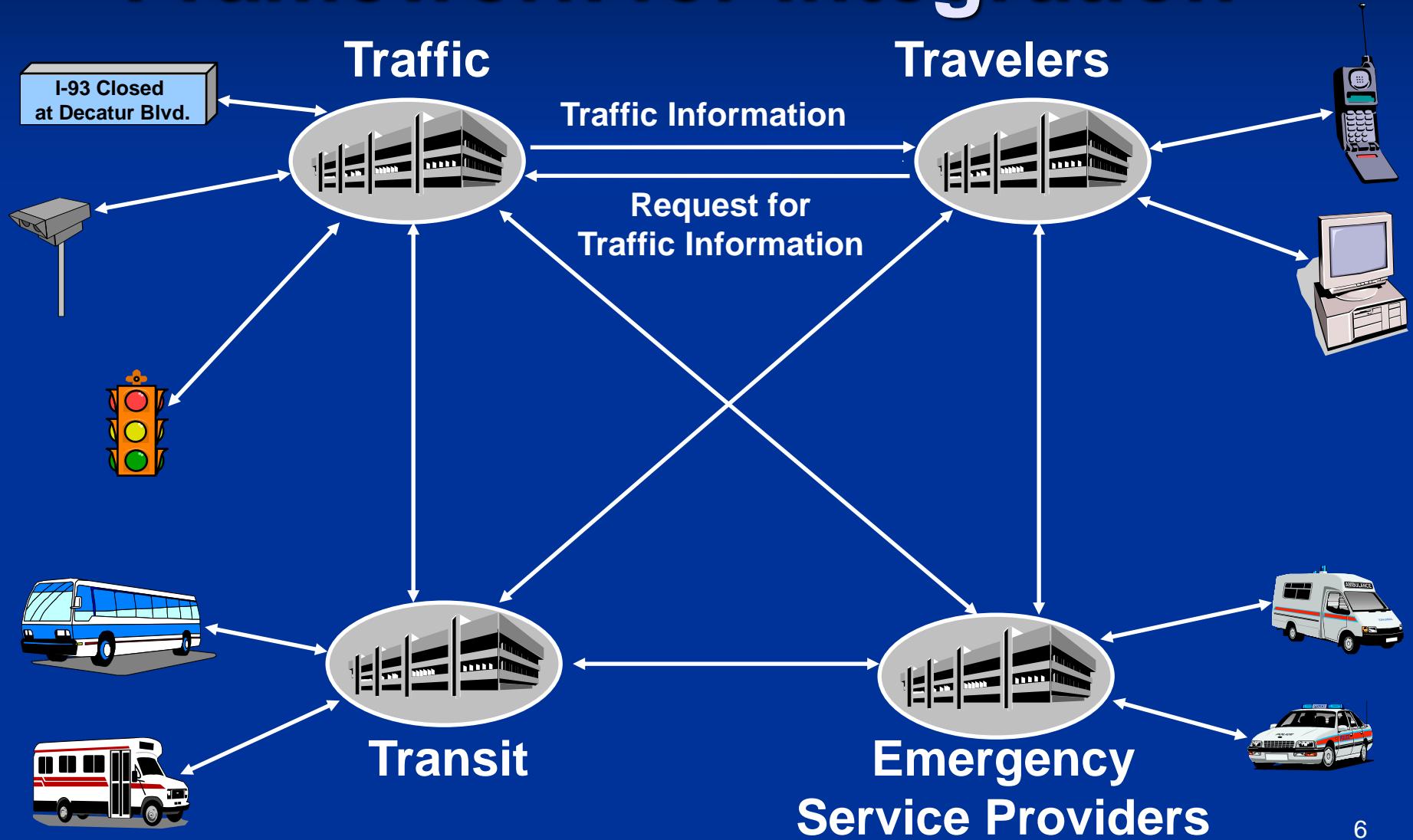


What is an ITS Architecture?

- Framework for Developing Integrated Transportation Systems
- Identifies:
 - Organizations
 - Systems operated
 - Functions performed
 - Communications
 - Information exchanged



ITS Architectures Provide a Framework for Integration

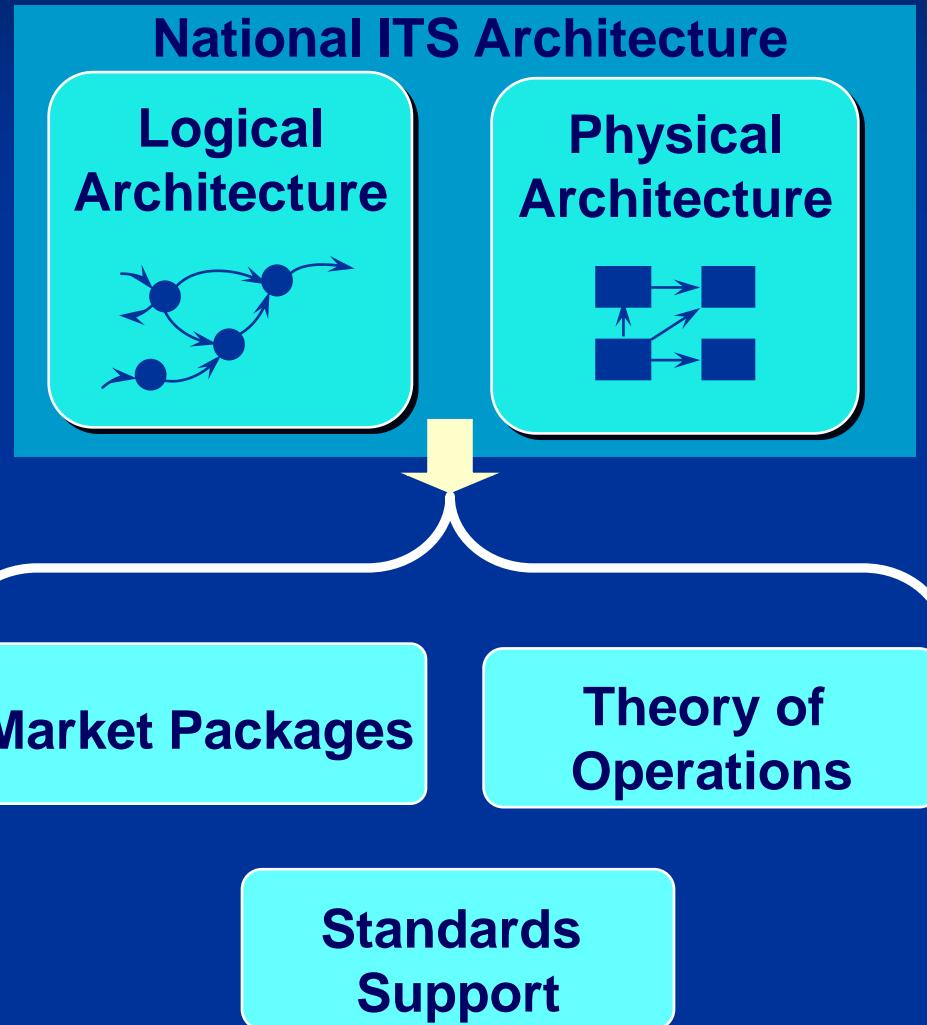


What is the National ITS Architecture?

- HIGH-LEVEL national framework, “blueprint”, used to help guide ITS deployment and transportation planning
- Based on 33 transportation related ITS User Services:
 - Physical Entities – Subsystems/Terminators
 - Logical Architecture – Processes, Data Flow
 - Interfaces – Information Flows
 - Deployment oriented Market Packages

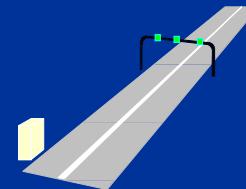
Architecture Products

- Available on
 - CD-ROM
 - Website
- Contains
 - Hypertext
 - PDF docs
 - Databases

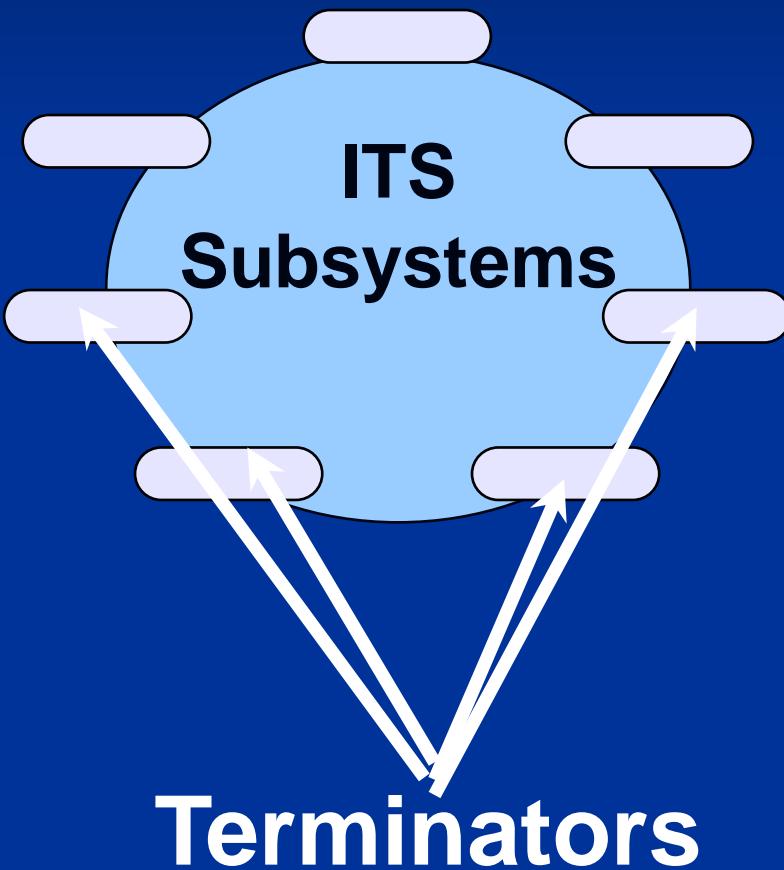


Subsystems

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



Terminators Define the ITS Boundary

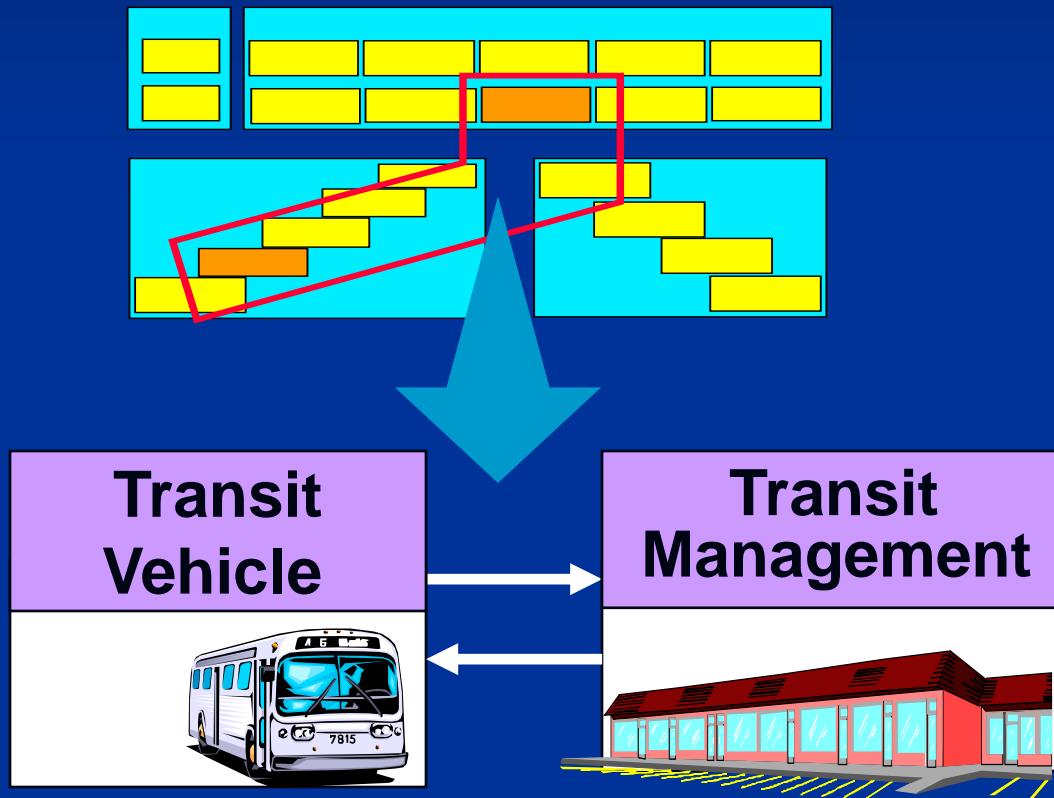


- Entities outside of ITS
- Define interfaces but not functionality
- Four types of Terminators
 - Environment
 - Human
 - System
 - Other System

Market Packages

Architecture

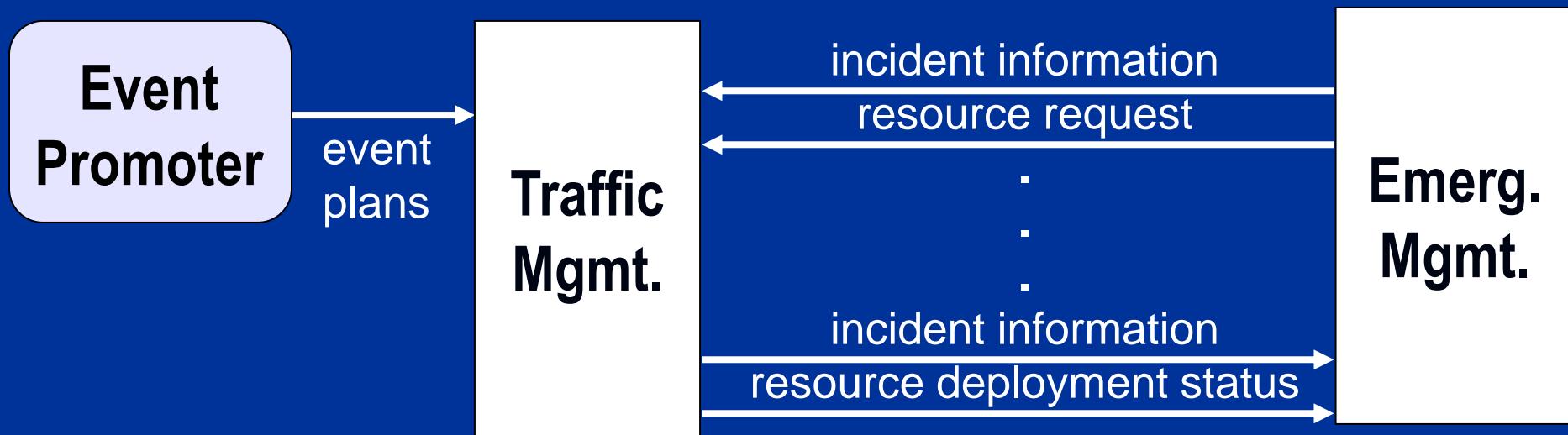
Framework
spanning all of ITS

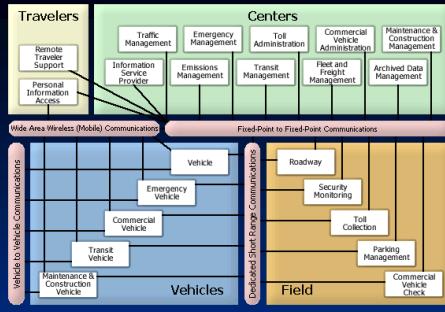


Market Packages

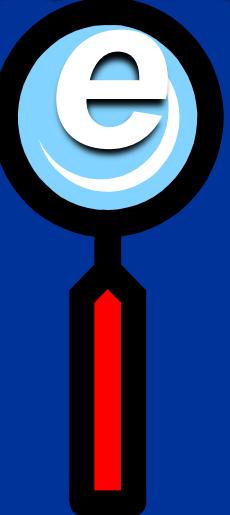
Contain pieces of the
architecture
that provide a
particular
transportation service

“Architecture Flows” Define Information Exchanged



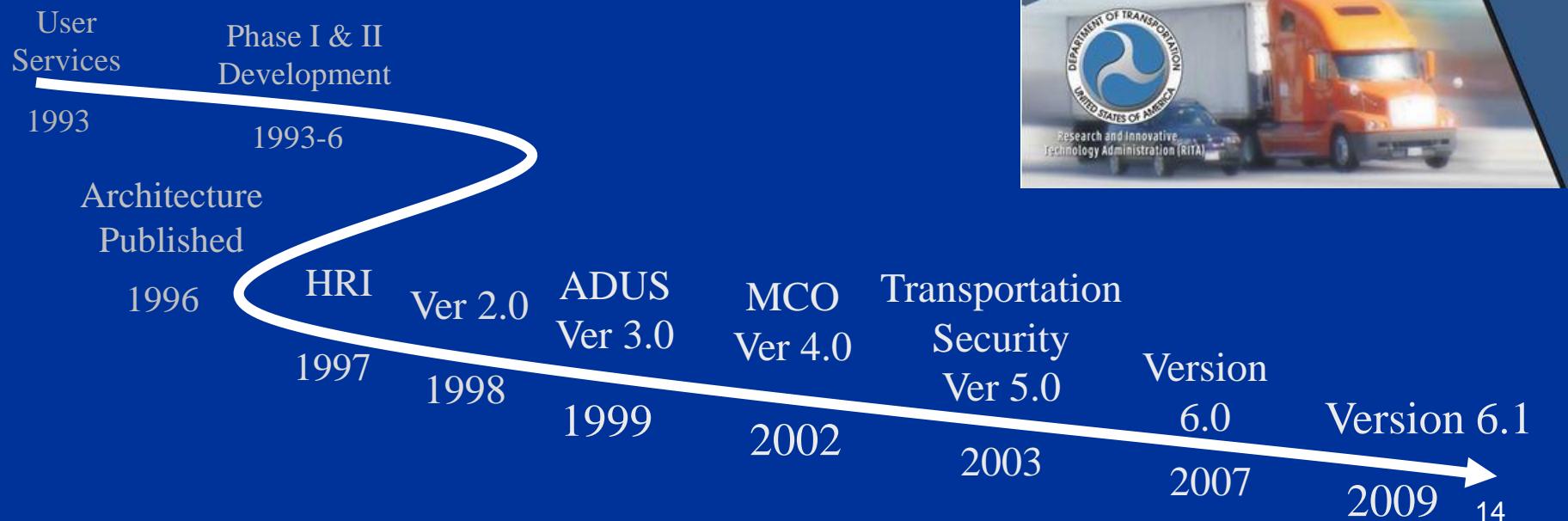


National ITS Architecture Version 6.1 Update



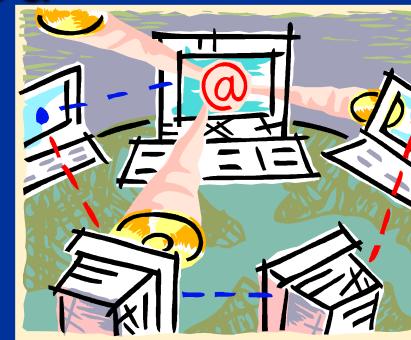
National ITS Architecture is a “Living Document”

- Continuing evolution of the architecture over 13 years
- Version 6.1 continues support for ITS technical evolution and deployment



Architecture Evolution in Step with Industry

- Research and Federal Programs
 - DOT Initiatives
 - Border Information Flow Architecture (BIFA)
 - Commercial Vehicle Information and System Networks (CVISN)
 - IntelliDriveSM
- ITS Standards
- Deployment Lessons Learned



National ITS Architecture



Version 6.1

U.S. Department of Transportation

Home

Search

What's New ●

HyperText View

Document View

Database View

User Services

Logical Architecture

Physical Architecture

Market Packages

Standards

Security

Training

Turbo Architecture

Glossary

Acronyms

CD Orders

Contact Us

Last updated 1/7/2009

A yellow arrow points from the "What's New" link in the sidebar to the "High Level Changes" button on the right.

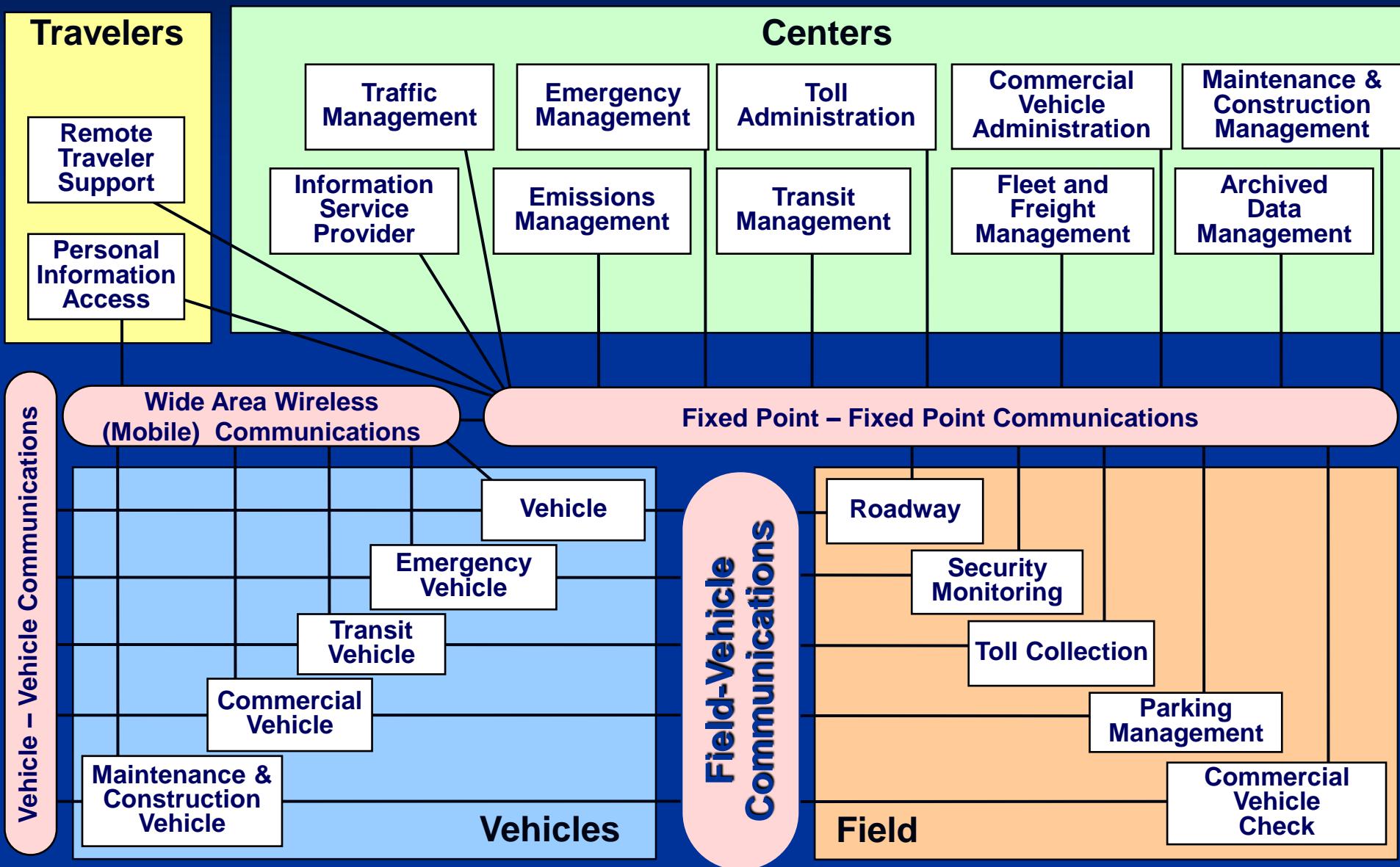
What's New in V6.1

High Level Changes

Detailed Change Log

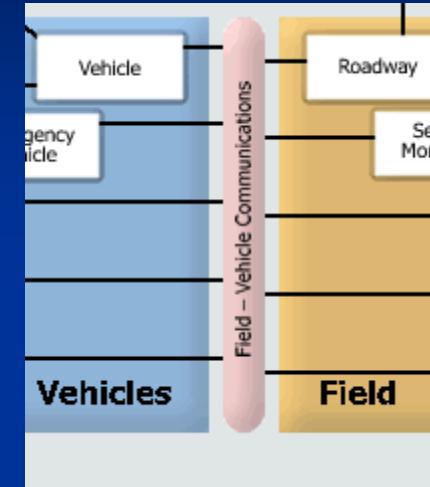
- Refreshing communications paths
- Representing initiatives
- Reflecting standards
- Keeping pace with ITS innovations

V6.1 Subsystems & Communications



V6.1 Communications

- Renamed Dedicated Short Range Communication (DSRC) to “Field-Vehicle Communication”
- Added a new Communications Layer web/hyperlink page



Field - Vehicle Communications

A wireless communications channel used for broadcast and interactive close-proximity communications between vehicles and the immediate infrastructure. It supports location-specific communications for ITS capabilities such as toll collection, transit vehicle management, driver information, and automated commercial vehicle operations as well as Vehicle Infrastructure Integration (VII) applications. This communication channel is supported by technologies such as 5.9 GHz Band Wireless Access in Vehicular Environments (WAVE) / Dedicated Short Range Communications (DSRC), Wi-Fi, WiMAX, and wireless mesh networks.



Initiatives in V6.1

- Formerly known as VII, built on core functions / interfaces added in v6.0:
 - Added support for all appropriate use cases: signing, electronic payment, fleet management, probe data, etc.
- ICM: Decision Support Systems for traffic / transportation management
- Clarus: New traveler “alert” flows, data quality
- Electronic Freight Management: updated interfaces with Intermodal Freight Depot / Shipper

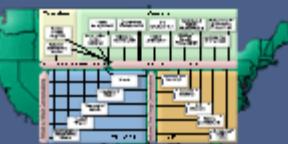
Standards & v6.1

- Updated Mapping between Architecture Flows and Standards activities
 - Used by regional / project architects
- Reflect new messages in SAE 2735: intersection collision avoidance and Signal Phase and Timing (SPAT)
- Synchronize terminology with TMDD v3.0

Other ITS Innovations in v6.1

- Split transit scheduling flows to show differences between Static & Dynamic information
- Transportation Information for Operations: added 2-way exchange between information collectors and operations centers

National ITS Architecture



Version 6.1

U.S. Department of Transportation

[Home](#)

[Search](#)

[What's New](#)

[Hypertext View](#)

[Document View](#)

[Database View](#)

[User Services](#)

[Logical Architecture](#)

[Physical Architecture](#)

[Market Packages](#)

[Standards](#)

[Security](#)

[Training](#)

[Turbo Architecture](#)

[Glossary](#)

[Acronyms](#)

[CD Orders](#)

[Contact Us](#) 

Last updated 1/17/2009

Want more info?

*Required Fields

*First Name:	Enter first name here
*Last Name:	Enter last name here
Title:	Enter title here
Organization:	Enter organization here
*E-mail Address:	Enter e-mail here
Telephone:	Enter phone # here
Fax:	Enter fax # here

Street:	Enter street here
City:	Enter city here
State/Province:	Enter state here
Zip Code:	Enter zip here
Country:	Enter country here

*Comments:

Enter any comments that you might have here

[Submit](#)

[Reset](#)

Version 6.1 Available Now

- On the Web: <http://www.its.dot.gov/arch/index.htm>

The screenshot shows the official website for the Research and Innovative Technology Administration (RITA). The main navigation bar includes links for About RITA, Communities of Interest, Contact Us, and Press Room. Under the 'About ITS' dropdown, there are links for About ITS, ITS Overview, and ITS Resources. The 'Architecture' page is currently selected, featuring a large diagram of the National ITS Architecture. This diagram is organized into three main vertical columns: 'Travelers' (containing Vehicle-to-Vehicle, Vehicle-to-Infrastructure, Emergency Vehicle, Emergency Vehicle Infrastructure, and Traveler Information Services), 'Vehicles' (containing Vehicle-to-Vehicle, Emergency Vehicle, Emergency Vehicle Infrastructure, and Vehicle-to-Infrastructure), and 'Field' (containing Emergency Vehicle, Emergency Vehicle Infrastructure, and Vehicle-to-Infrastructure). The 'Centers' column is positioned between the Vehicle and Field columns and includes Traffic Management, TSI Administration, Threat Assessment, and Traveler Information Services. The 'National ITS Architecture Version 6.1' section contains a brief update about the latest version and links to the National ITS Architecture web site and how to access the architecture documents.

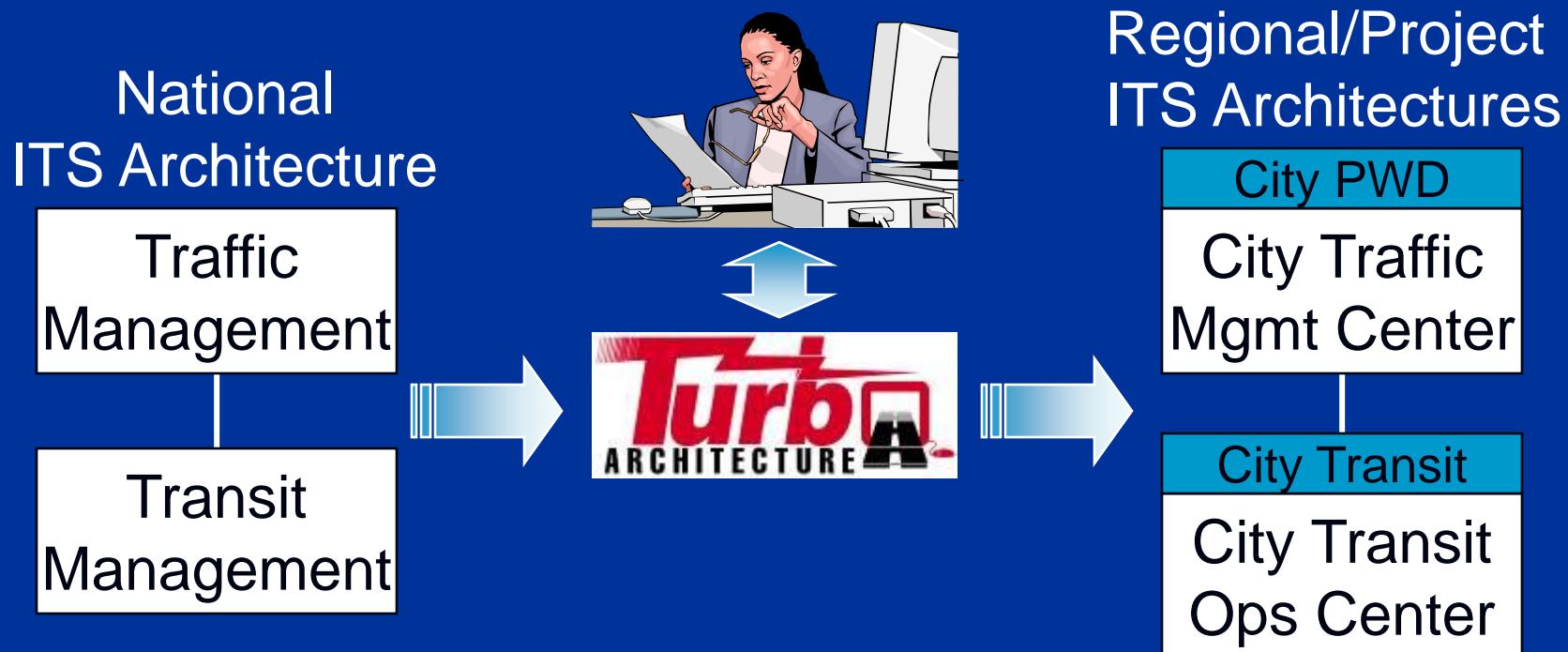
The screenshot shows the 'National ITS Architecture - Windows Internet Explorer' page. The title bar indicates the URL is <http://www.its.ritsarch/index.htm>. The page header features the 'National ITS Architecture' logo and the text 'Version 6.1'. A sidebar on the left lists various navigation options: Home, Search, What's New, Hypertext View, Document View, Database View, User Services, Logical Architecture, Physical Architecture, Market Packages, Standards, Security, Training, Turbo Architecture, Glossary, Acronyms, CD Orders, and Contact Us. At the bottom of the sidebar, it says 'Last updated 1/7/2009'. The main content area is titled 'National ITS Architecture Version 6.1' and includes a 'What's New' section. This section highlights the new features in Version 6.1, such as support for IntelliDriveSM (VII) applications and changes from Clarus addressing new architecture changes to align with the latest TMDD V3.0 standard. It also mentions the availability of Turbo Architecture Version 4.1. Below this is a 'Where to Start' section, which suggests three ways to navigate: hypertext view, document view, and database view. A note at the bottom right suggests reading the glossary if unsure about terms like 'hypertext view'.



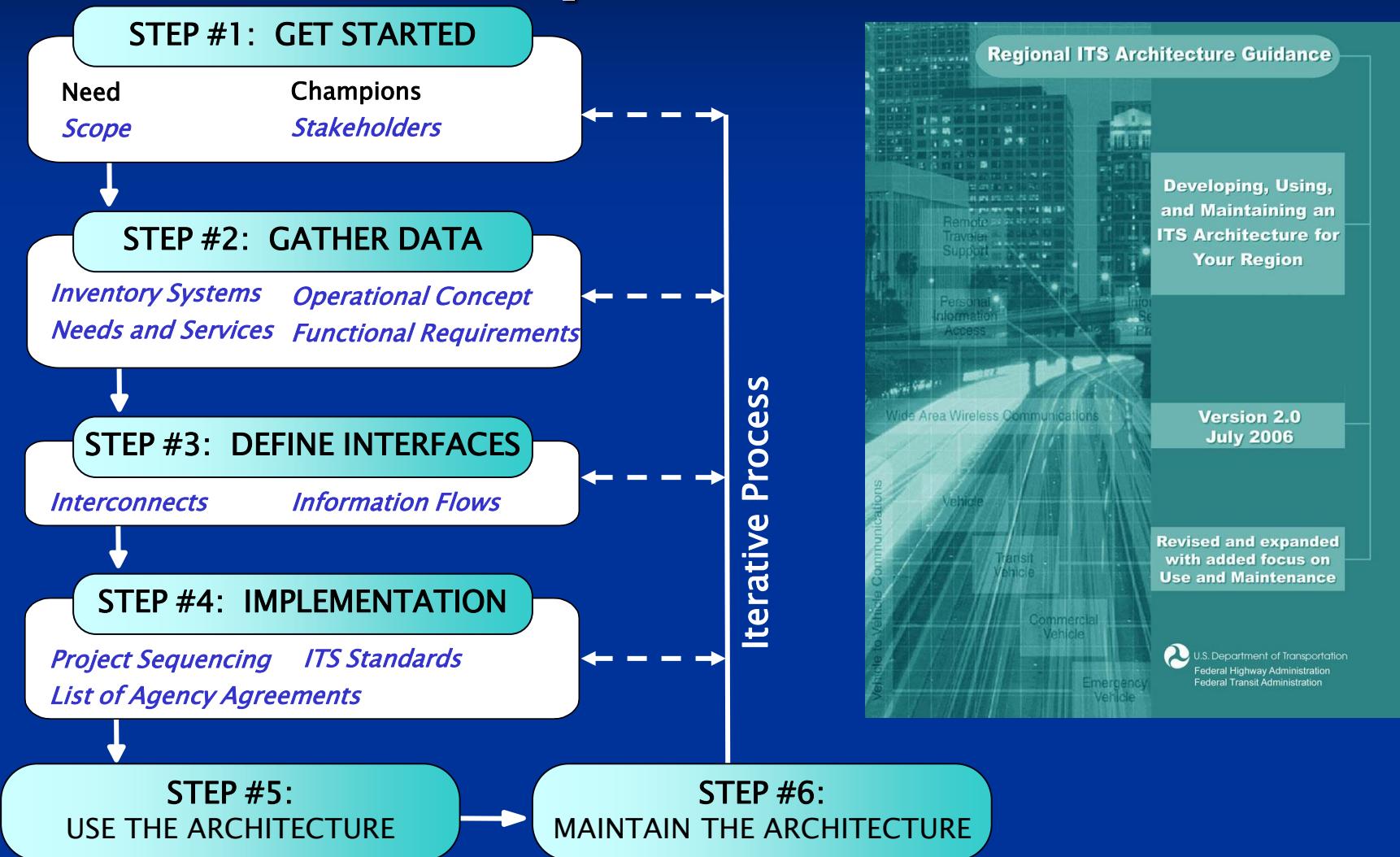
Turbo Architecture Version 4.1 Update

What Turbo Does

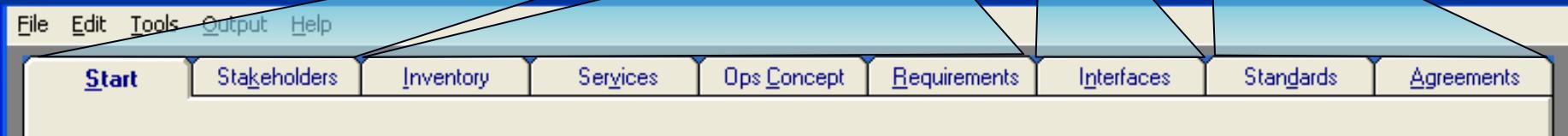
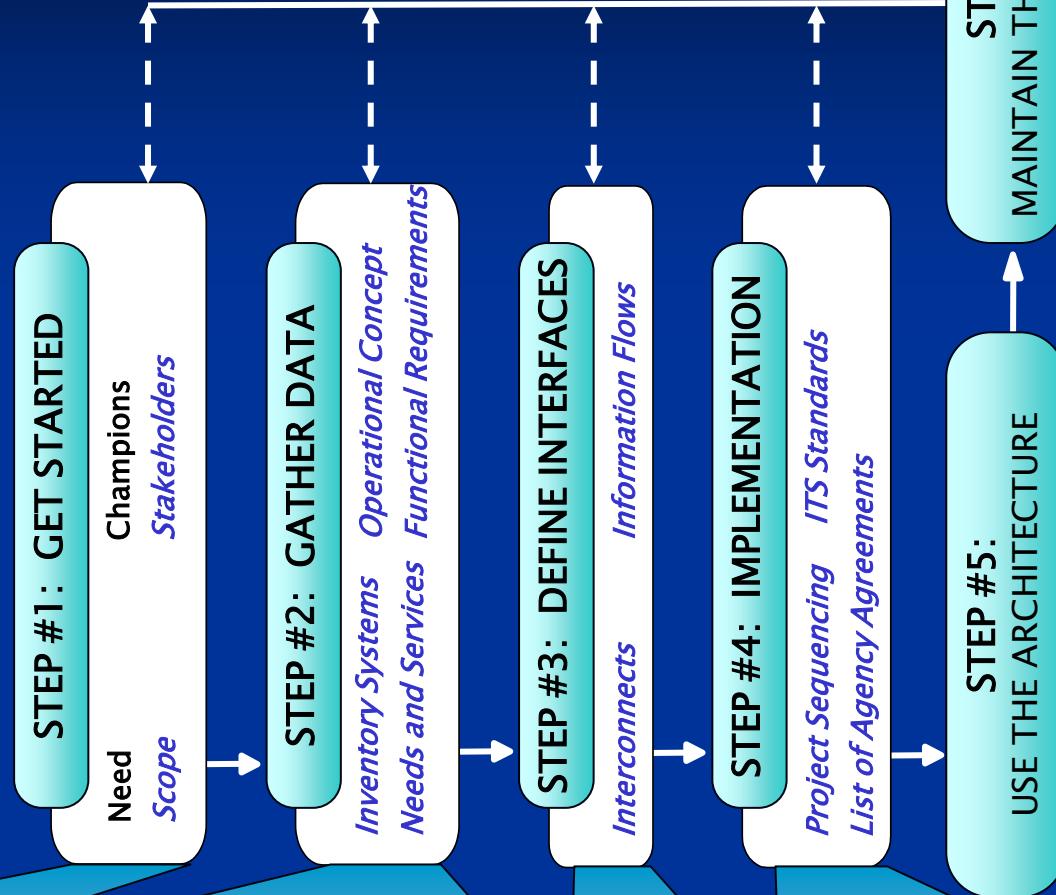
Turbo is a software tool that automates use of the National ITS Architecture.



Turbo Supports ITS Architecture Development Process



Turbo Interface Reflects Development Process



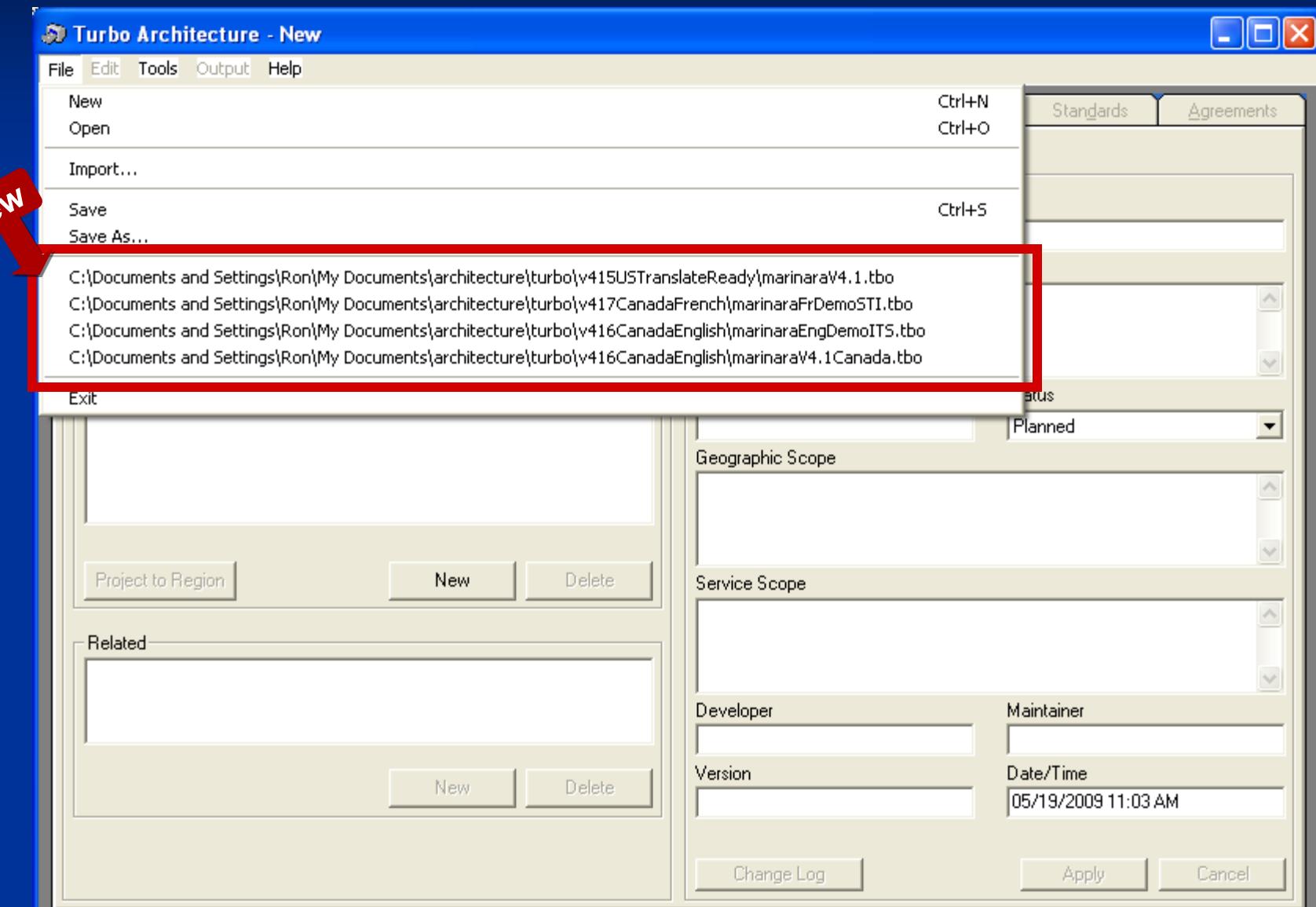
Turbo Version 4.1

■ Released March 2009



- Supports Version 6.1 of the National ITS Architecture
- Enhanced features including communications elements and web page creation
- Bug fixes to ensure trouble-free operation

Most Recently Used Files



Communications Elements

Turbo Architecture - C:\Documents and Settings\Ron\My Documents\architecture\turbo\v415USFinal\ITSA Demo.t...

File Edit Tools Output Help

Start Stakeholders Inventory Services Ops_Concept Requirements Interfaces Standards Agreements

Current Project: Alert Project Demo

Elements

New

Project Elements	All Elements
<input type="checkbox"/> Alfredo County Freeway M...	Name
<input type="checkbox"/> Bus Operations Center	Marinara County Transportation Communications Network
<input checked="" type="checkbox"/> City Operations Center	Type
<input type="checkbox"/> Communications for Alfredo Network	Communications
<input type="checkbox"/> County Traveler Kiosk Network	Description
<input type="checkbox"/> Digital Map Products	This communications gateway provides communications infrastructure for
<input type="checkbox"/> Event Clearinghouse	the county, providing the communications network that supports
<input type="checkbox"/> GARLIC Information System	information sharing by all Marinara regional agencies. The initial network
<input type="checkbox"/> Internet PC Access via the WWW	
<input type="checkbox"/> Loops and Controllers	
<input type="checkbox"/> Marinara County Flood Monitoring System	
<input checked="" type="checkbox"/> Marinara County Freeway Management Center (BASIL and PINCH)	
<input checked="" type="checkbox"/> Marinara County Transportation Communications Network	
<input checked="" type="checkbox"/> Marinara Public Safety Communications and Dispatch Centers	
<input type="checkbox"/> MCDOT Field Equipment	
<input type="checkbox"/> Parking lots larger than 200 spaces	
<input type="checkbox"/> Planning Data Warehouse	
<input type="checkbox"/> Port Management System	
<input checked="" type="checkbox"/> Saucelito Fire and Rescue Center	
<input type="checkbox"/> TOMATO Advertisers	
<input type="checkbox"/> TOMATO Event Parking System	

Selected Subsystems/Terminators All Subsystems/Terminators

- Archived Data Management Subsystem (Subsystem)
- Commercial Vehicle Administration (Subsystem)
- Commercial Vehicle Check (Subsystem)
- Commercial Vehicle Subsystem (Subsystem)
- Emergency Management (Subsystem)
- Emergency Vehicle Subsystem (Subsystem)
- Emissions Management (Subsystem)
- Fleet and Freight Management (Subsystem)
- Information Service Provider (Subsystem)
- Maintenance and Construction Management (Subsystem)
- Maintenance and Construction Vehicle (Subsystem)

Sort By: Element Stakeholder Subsystem/Terminator

New Delete Apply Cancel

Communications Elements

Turbo Architecture - C:\Documents and Settings\Ron\My Documents\architecture\turbo\v415USFinal\ITSA Demo.t...

File Edit Tools Output Help

Start Stakeholders Inventory Services Ops Concept Requirements Interfaces Standards Agreements

Current Project: Alert Project Demo

All Build Connect Flows Group Sort

Filter Elements Limit New Info Present

New

All Interconnects (17 Entries)

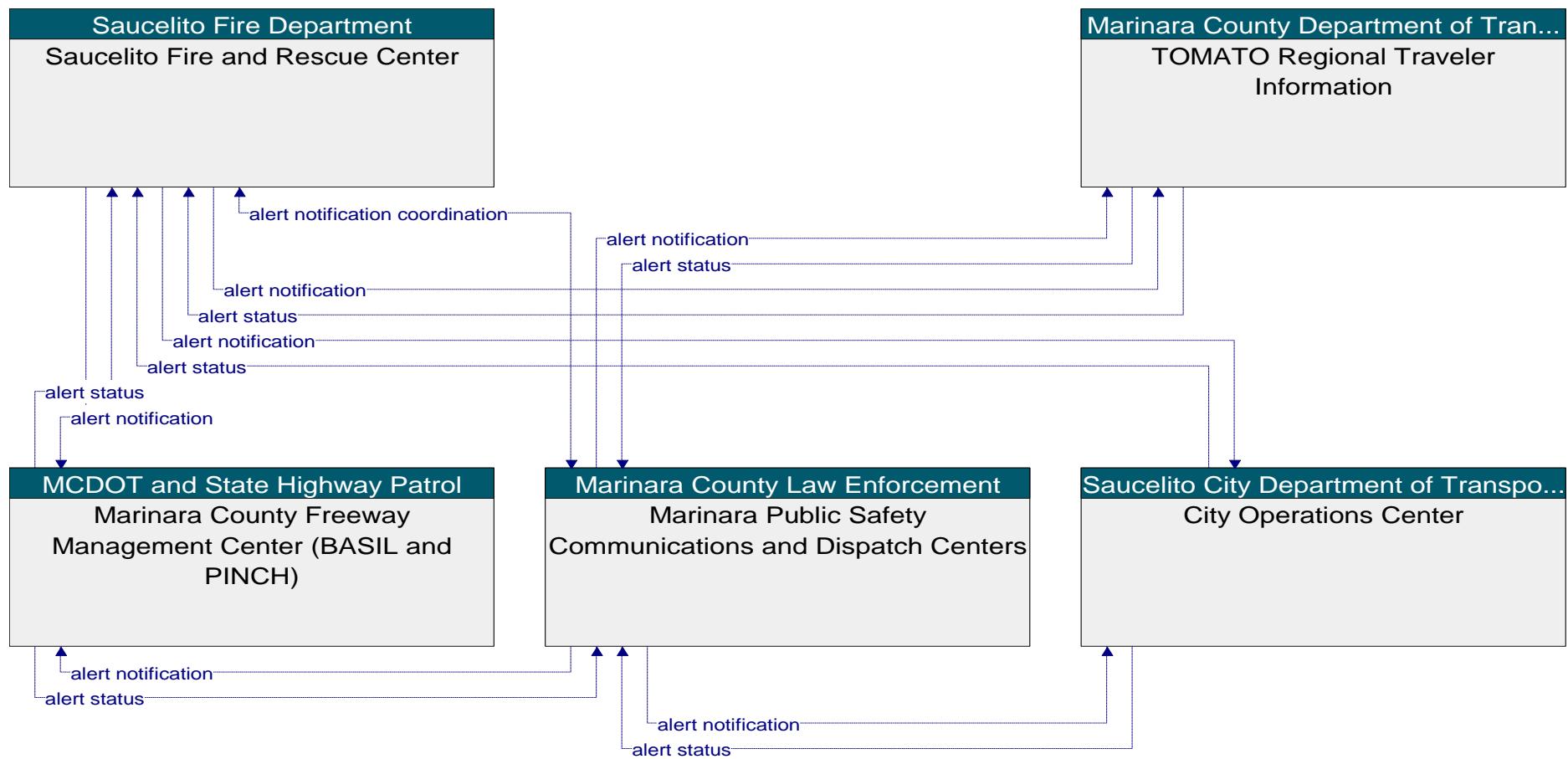
Element	In Region	Communications	Include
Marinara Public Safety Communications a1	<input type="checkbox"/>	Marinara County Transportation	<input checked="" type="checkbox"/>
Saucelito Fire and Rescue Center	<input checked="" type="checkbox"/>	Not Identified	
Marinara Public Safety Communications a1	<input checked="" type="checkbox"/>	Communications for Alfredo Networking and Operations Loca	
Saucelito Fire and Rescue Center	<input checked="" type="checkbox"/>	Marinara County Transportation Communications Network	

Include All Clear All Apply Cancel

1

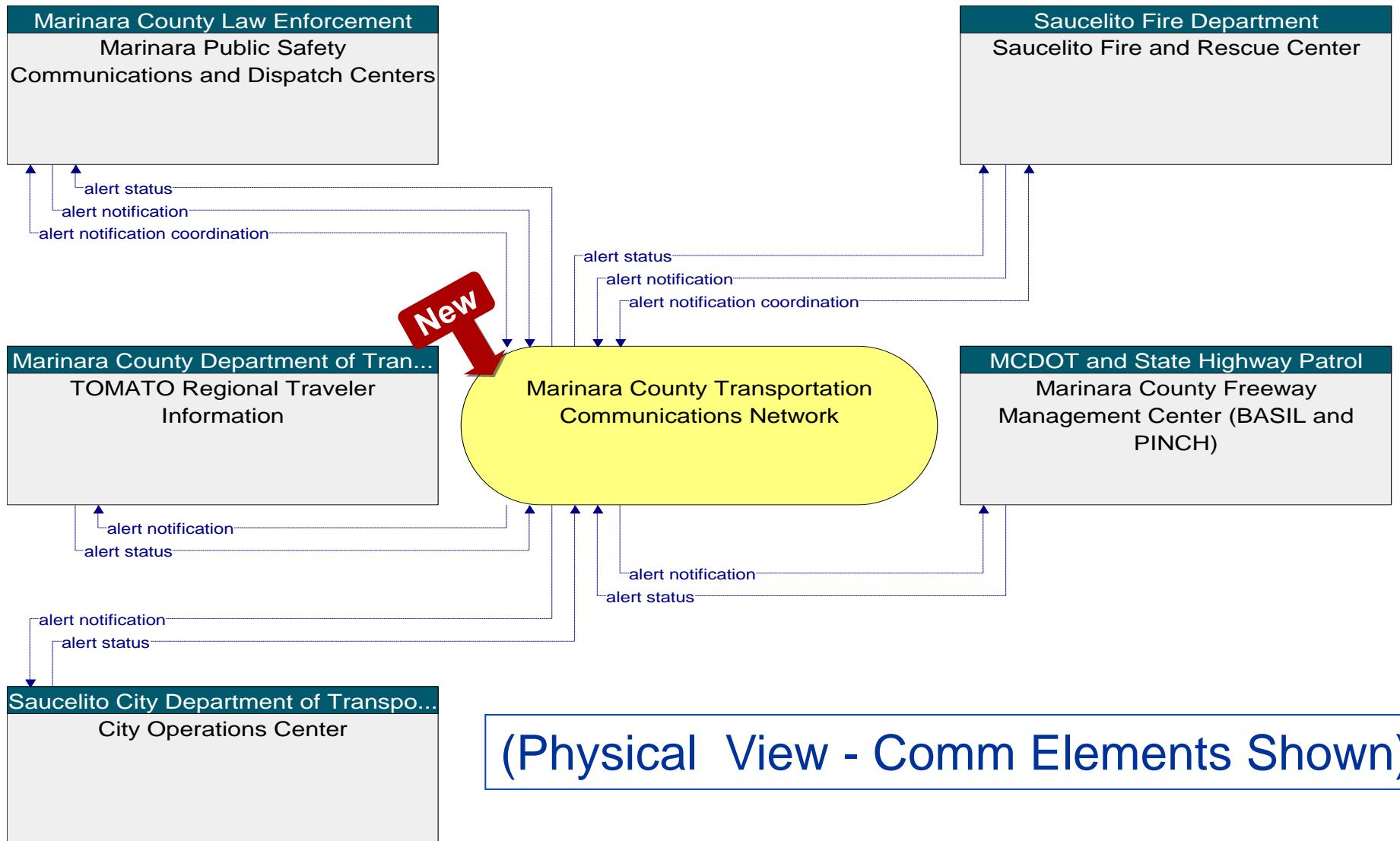
Communications Elements

One Architecture – Two Views



(Logical “Point to Point” View – Comm Elements Hidden)

Communications Elements One Architecture – Two Views



Web Output

Step 1: Select Content

New

The screenshot shows the 'Web Page Attributes' dialog box, which is part of a larger application interface. The dialog is divided into several sections:

- Order:** A numeric input field containing the value "5".
- Menu Name:** A text input field containing the value "Services".
- Page Title:** A text input field containing the value "Market Packages".
- Overview:** A descriptive text area:

One of the first steps in developing an architecture is to identify the transportation services that are important to the Region. The following table lists each Market Package and its applicability to the Region. More information about each market package can be obtained by selecting the market package in the table below.
- Options:** A group of checkboxes:
 - Include Unselected Market Packages (This checkbox is currently unselected.)
 - Include Description in Detailed Pages (This checkbox is currently selected.)
 - Include Related Elements in Detailed Pages (This checkbox is currently selected.)
- Buttons:** At the bottom of the dialog are two buttons: "Apply" and "Cancel".

On the left side of the image, there is a separate window titled "Web Pages" with tabs "Included Web Pages" and "All Web Pages". The "Included Web Pages" tab is selected, showing a list of items with checkboxes:

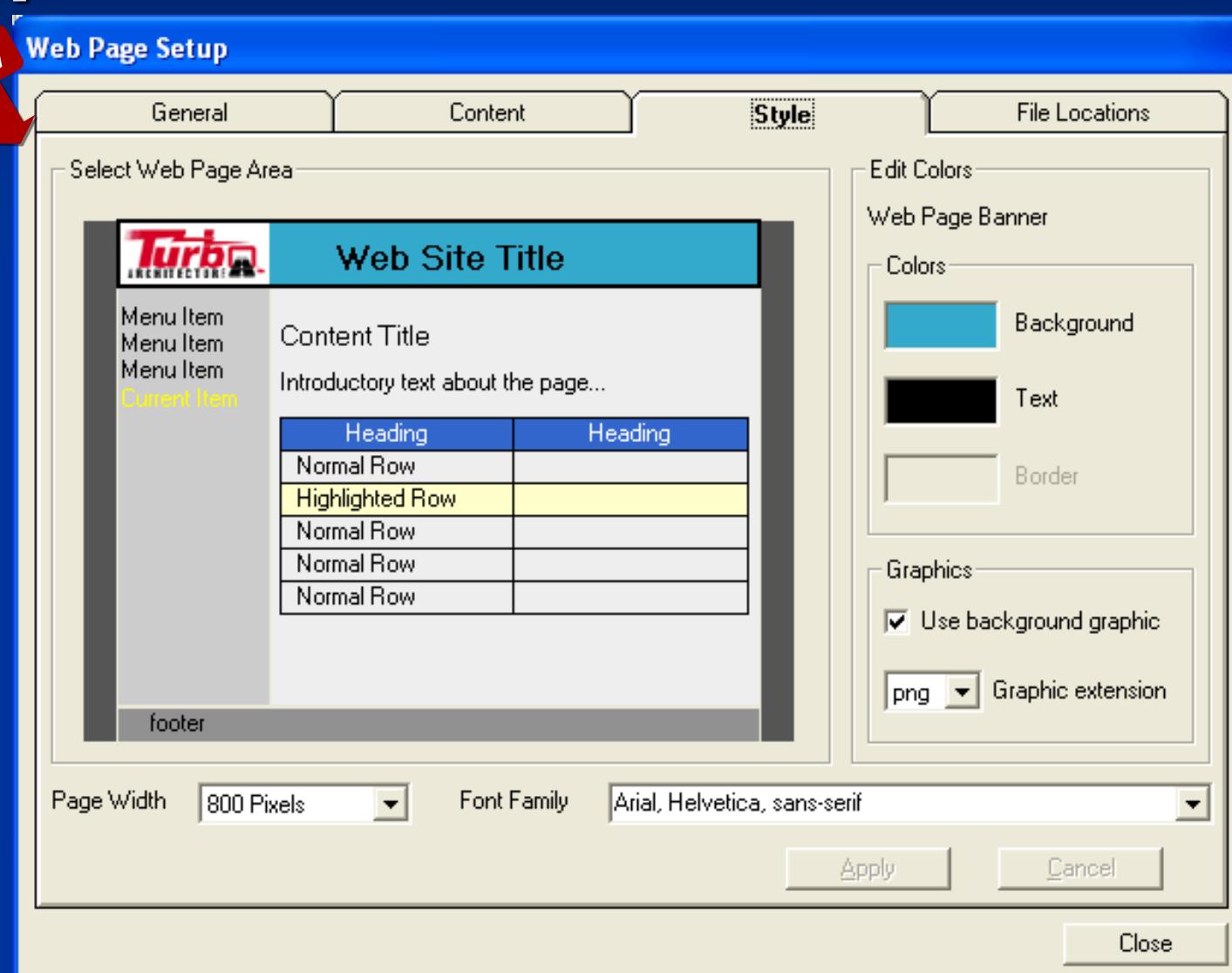
- Home (checked)
- Scope (checked)
- Stakeholders (checked)
- Inventory
 - By Entity (checked)
 - By Stakeholder (checked)
- Services (checked) - This item is highlighted with a blue selection bar.
- Ops Concept (checked)
- Requirements (checked)
- Interfaces (checked)
- Standards (checked)
- Agreements (checked)
- Projects (checked)

At the bottom of this window are "New" and "Delete" buttons.

Web Output

Step 2: Select Colors/Fonts/Images

New



Web Output

Step 3: Create Your Web Pages

The diagram illustrates the process of creating web pages. On the left, a software interface titled "Web Pages" shows a "Create" section with three checked options: "Top-Level Web Pages", "Detailed Web Pages", and "Diagrams". A red "New" button with a red arrow points to this interface. A large yellow arrow points from the interface to the right, leading to a stack of five identical web browser windows. Each window displays the "Buffalo-Niagara Demo Web Site" with a header featuring the U.S. Capitol and the "MOVING AMERICA FORWARD 2009" logo. The main content area of each window shows the "MPO Data Collection and Reporting System" with a status of "Existing" and a description of "Buffalo-Niagara Demo Web Site". Below this, a section titled "Interface: MTO Compass - MPO Data Collection and Reporting System" contains a box for "Ontario Ministry of Transportation MTO Compass". A dashed red line labeled "archive coordination" connects this box to another box labeled "Greater Buffalo Niagara Regional Tra... MPO Data Collection and Reporting System". At the bottom of the interface, there is a section titled "Architecture Flow Definitions" with a note about "archive coordination (Planned) Applicable ITS Standards". The footer of the interface includes links for "Send Email Comments" and the date "3/31/2009".

Sample Web Output

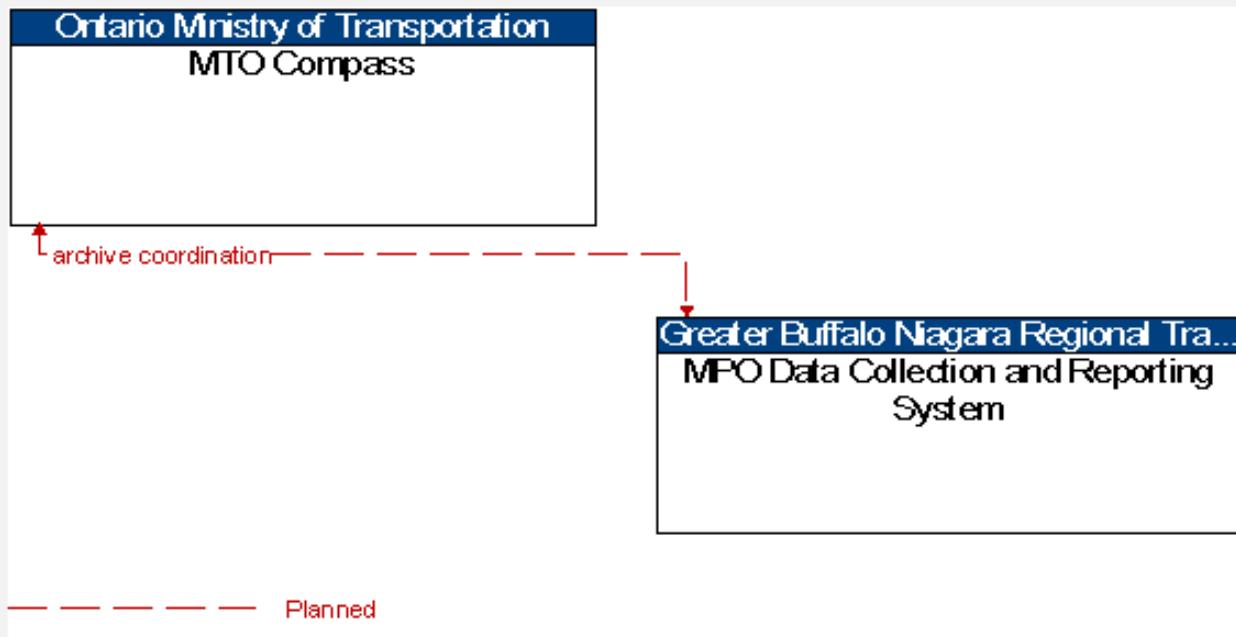


Buffalo-Niagara Demo Web Site



Home
Scope
Stakeholders
Inventory
 By Entity
 By Stakeholder
Services
Ops Concept
Requirements
Interfaces
Standards
Agreements
Projects

Interface: MTO Compass - MPO Data Collection and Reporting System



Architecture Flow Definitions

archive coordination (Planned) [Applicable ITS Standards](#)

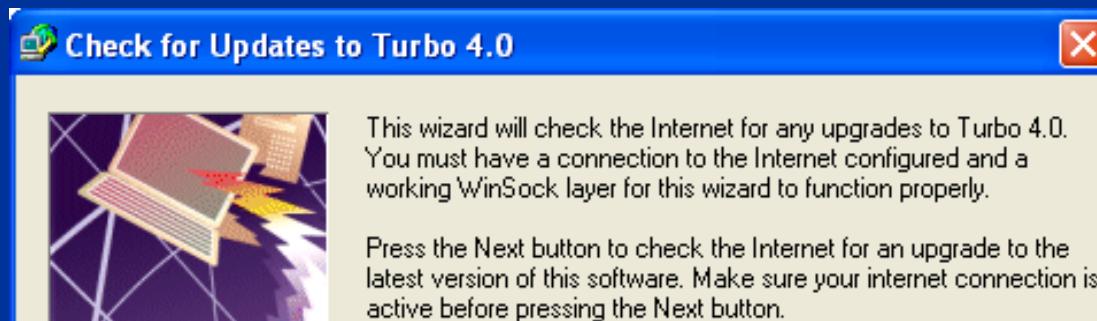
Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.

Turbo Version 4.1 Availability

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



- Current users are notified by Turbo



Turbo User Support

- 800 Number (800-260-1001)
- E-Mail (turbo@iteris.com)
- Web (www.iteris.com/itsarch)



Contact Information

Cliff Heise, Vice President, Federal and Research Programs
Iteris, Inc.
cdh@iteris.com

Emiliano Lopez, ITS Deployment Program Manager
FHWA Headquarters
Emiliano.Lopez@dot.gov

David Binkley, Senior Systems Engineer
Lockheed Martin
david.binkley@lmco.com