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).
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
  - Emiliano 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

Traffic Information

Request for Traffic Information

Emergency Service Providers

Traffic

Travelers

Transit

I-93 Closed at Decatur Blvd.
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

National ITS Architecture

Logical Architecture

Physical Architecture

Market Packages

Theory of Operations

Standards Support
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


- Event plans
- Incident information
- Resource request
- Resource deployment status
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)
  - IntelliDrive™

- ITS Standards
- Deployment Lessons Learned
What’s New in V6.1

- Refreshing communications paths
- Representing initiatives
- Reflecting standards
- Keeping pace with ITS innovations
V6.1 Subsystems & Communications

Travelers
- Remote Traveler Support
- Personal Information Access

Centers
- Traffic Management
- Emergency Management
- Toll Administration
- Commercial Vehicle Administration
- Maintenance & Construction Management

Vehicles
- Traffic Management
- Emergency Management
- Toll Administration
- Commercial Vehicle Administration
- Maintenance & Construction Management

Field
- Wide Area Wireless (Mobile) Communications
- Fixed Point – Fixed Point Communications

Vehicle – Vehicle Communications
- Vehicle
- Emergency Vehicle
- Transit Vehicle
- Commercial Vehicle
- Maintenance & Construction Vehicle

Field-Vehicle Communications
- Roadway
- Security Monitoring
- Toll Collection
- Parking Management
- Commercial Vehicle Check
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
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


National ITS Architecture
Version 6.1

What's New

Version 6.1 of the National ITS Architecture includes a host of new features that enhance the architecture definition and make it easier for you to access the information that you need. The architecture will continue to evolve as new user services are developed, standards activities progress, and more and more ITS implementations put the architecture into action.

Turbo Architecture Version 4.1 is currently available for download from the Turbo area of this website. Turbo Version 4.1 is compatible with Version 8.1 of the National ITS Architecture and includes a host of new features including a web page creation capability and the ability to define ‘communications elements’ that represent ITS communications infrastructure.

Where to Start

There are three ways to navigate through the National ITS Architecture:

1. The hypertext view provides immediate, interconnected access to all the elements of the architecture definition.
2. The document view presents the complete set of architecture documentation as it exists in printed format.
3. The database view provides developers direct access to the source material for the National ITS Architecture in several connected relational databases.

If you are wondering which view is best for you, we have a few suggestions.
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

STEP #1: GET STARTED
- Need
- Champions
  - Scope
  - Stakeholders

STEP #2: GATHER DATA
- Inventory Systems
- Operational Concept
- Needs and Services
- Functional Requirements

STEP #3: DEFINE INTERFACES
- Interconnects
- Information Flows

STEP #4: IMPLEMENTATION
- Project Sequencing
- ITS Standards
- List of Agency Agreements

STEP #5: USE THE ARCHITECTURE

STEP #6: MAINTAIN THE ARCHITECTURE

Iterative Process

Regional ITS Architecture Guidance

Developing, Using, and Maintaining an ITS Architecture for Your Region

Version 2.0
July 2006

Revised and expanded with added focus on Use and Maintenance
Turbo Interface Reflects Development Process

STEP #1: GET STARTED
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STEP #6: MAINTAIN THE ARCHITECTURE

Turbo Interface Reflects Development Process

File Edit Tools Output Help
Start Stakeholders Inventory Services Ops Concept Requirements Interfaces Standards Agreements
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

- C:\Documents and Settings\Ron\My Documents\architecture\turbo\v415USTranslateReady\marinaraV4.1.tbo
- C:\Documents and Settings\Ron\My Documents\architecture\turbo\v417CanadaFrench\marinaraFrDemoSTI.tbo
- C:\Documents and Settings\Ron\My Documents\architecture\turbo\v416CanadaEnglish\marinaraEngDemoITS.tbo
- C:\Documents and Settings\Ron\My Documents\architecture\turbo\v416CanadaEnglish\marinaraV4.1Canada.tbo
Communications Elements

**New Element**

- **Name**: Marinara County Transportation Communications Network
- **Type**: Communications

Description:
This communications gateway provides communications infrastructure for the county, providing the communications network that supports information sharing by all Marinara regional agencies. The initial network...
## Communications Elements

### Turbo Architecture - C:\Users\Ron\Documents\architecture\turbo\415USFinal\ITSA Demo... Interface

**Current Project:** Alert Project Demo

**Filter:** All

**Connect:** Build

**Flows:** Group

**Sort:**

<table>
<thead>
<tr>
<th>Element</th>
<th>In Region</th>
<th>Communications</th>
<th>Include</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marinara Public Safety Communications ai</td>
<td></td>
<td>Marinara County Transportation</td>
<td>✔️</td>
</tr>
<tr>
<td>Saucelito Fire and Rescue Center</td>
<td>✔️</td>
<td>Not Identified</td>
<td></td>
</tr>
<tr>
<td>Marinara Public Safety Communications ai</td>
<td>✔️</td>
<td>Communications for Alfredo Networking and Operations Local</td>
<td></td>
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<tr>
<td>Saucelito Fire and Rescue Center</td>
<td>✔️</td>
<td>Marinara County Transportation Communications Network</td>
<td></td>
</tr>
</tbody>
</table>
Communications Elements
One Architecture – Two Views

Saucelito Fire Department
Saucelito Fire and Rescue Center

Marinara County Department of Tran...
TOMATO Regional Traveler Information

MCDOT and State Highway Patrol
Marinara County Freeway Management Center (BASIL and PINCH)

Marinara County Law Enforcement
Marinara Public Safety Communications and Dispatch Centers

Saucelito City Department of Transpo...
City Operations Center

(Logical “Point to Point” View – Comm Elements Hidden)
Communications Elements
One Architecture – Two Views

Marinara County Law Enforcement
Marinara Public Safety
Communications and Dispatch Centers

alert status
alert notification
alert notification coordination

Saucelito Fire Department
Saucelito Fire and Rescue Center

alert status
alert notification
alert notification coordination

Marinara County Department of Transportation
TOMATO Regional Traveler Information

alert status
alert notification

MCDOT and State Highway Patrol
Marinara County Freeway Management Center (BASIL and PINCH)

alert status
alert notification
alert notification coordination

Saucelito City Department of Transportation
City Operations Center

alert status
alert notification

(Physical View - Comm Elements Shown)
Web Output

Step 1: Select Content

New

Included Web Pages
- Home
- Scope
- Stakeholders
- Inventory
  - By Entity
  - By Stakeholder
- Services
- Ops Concept
- Requirements
- Interfaces
- Standards
- Agreements
- Projects

All Web Pages

Web Page Attributes

<table>
<thead>
<tr>
<th>Order</th>
<th>Menu Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Services</td>
</tr>
</tbody>
</table>

Page Title
- Market Packages

Overview
- 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
- Include Unselected Market Packages
- Include Description in Detailed Pages
- Include Related Elements in Detailed Pages
Web Output

Step 2: Select Colors/Fonats/Images

[Diagram of a web page setup interface showing options for colors, fonts, and images]
Web Output

Step 3: Create Your Web Pages
Sample Web Output
Buffalo-Niagara Demo Web Site

Interface: MTO Compass - MPO Data Collection and Reporting System

Ontario Ministry of Transportation
MTO Compass

Greater Buffalo Niagara Regional Tra...
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)
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