Outline

Overview of ITS
- What is ITS?
- ITS Benefits
- ITS Applications

Overview of Regional ITS Architectures
- What is a Regional ITS Architecture?
- Benefits of the Regional ITS Architecture
- Other Federal FHWA Programs and Initiatives

Discussion
- Regional ITS Architecture Update Process
- Existing and Planned Projects in the Region
- ITS Needs in the Region
- Interagency Connections in the Region

Chattanooga Regional ITS Architecture Update  Stakeholder Kickoff Meeting
What is ITS?

**ITS:**
An acronym that stands for Intelligent Transportation Systems.

**One definition of ITS:**
The application of data processing and data communications to surface transportation to increase safety and efficiency.
What is ITS?
Why Deploy ITS?
Why Deploy ITS?

Congestion caused urban Americans to travel **6.9 billion hours** longer and use an extra **3.1 billion gallons** of fuel for an estimated congestion cost of **$160 billion**

Annual delay for the average traveler was **42 hours**, wasting **19 gallons** of fuel at a value of about **$960** per traveler

Some of the most common causes of congestion included incidents, special events, and weather

*from the 2015 Urban Mobility Scorecard*
ITS Benefits

- Increased roadway and transit efficiency
- Enhanced incident and special event management
- Improved safety for travelers, public safety, and maintenance personnel
- Accurate and timely traveler information
ITS Applications

- Traffic Management
- Traveler Information
- Emergency Management
- Maintenance & Construction Management
- Public Transportation
- Commercial Vehicle Operations
- Archived Data Management
- Vehicle Safety (Connected & Autonomous Vehicles)
Traffic Management

- Data Collection
- Control
- Roadside Traveler Information
Emergency Management

- Computer-aided Dispatch Systems
- AMBER Alerts
- Traffic Signal Preemption
- Video/Information Sharing
- Coordinated Incident Management
Public Transportation

- Smart Fare Payment Systems
- Automated Vehicle Location
- Video Security Systems
- Real-time Bus Arrival Information
- Transit Signal Priority
- Automated Passenger Counters
*Not a large component of regional ITS planning because CVO are mostly determined at a state level.*
Maintenance & Construction Management

- Flood Detection and Closure Systems
- Smart Work Zones
- Anti-icing Systems
- Vehicle Tracking Systems
Archived Data Management

Archived Data User Service at Traffic Management Centers

ITS Virtual Data Warehouse

Chattanooga Regional ITS Architecture Update  Stakeholder Kickoff Meeting
Emerging ITS Technologies

- Automated Vehicles
- Connected Vehicles
- Active Traffic Management
- Integrated Corridor Management
- Decision Support Systems
- Vehicle Detection System (Bluetooth)
- Privatized Traffic Data
Regional ITS Architectures – an overview

Nick Renna
Operations Program Manager
Federal Highway Administration
Tennessee Division Office
Discussion Topics

1. Regional ITS Architectures
2. Planning for “TSM&O”
3. Connected Vehicles – V2I
4. Real-time traveler information
5. Opportunities for Chattanooga RITSA update
Regional Intelligent Transportation System Architecture

...or “RITSA”

Put simply, it is a vision for how transportation should work in a metropolitan area given all the technologies that are reasonably expected to be available.
Key pieces of a RITSA:

• Regional description
• Stakeholders
• Operational concept, including roles and responsibilities
• Operational agreements (such as MOUs)
• Functional requirements
• Information exchanges: existing and planned
• Applicable ITS standards
• Project sequence (a.k.a. deployment plan)
All Highway Trust Fund ITS projects must conform with a RITSA

...yes, but RITSA also:

- Help scope projects appropriately
- Ensure regional interoperability
- Offer a focused perspective for long-range planning
- Ensure preparedness for un-deployed technologies
What could happen when you don’t have a good, up-to-date RITSA:

• The traveler experience is inconsistent, traveler information doesn’t achieve its potential, and public satisfaction worsens.

• Across jurisdictions systems are incompatible, and opportunities to enhance safety and mobility are missed.

• Project life-cycle is reduced as obsolescence becomes commonplace.

• Agency costs rise as ITS deployments become segregated from other project deliveries.
A RITSA should be based on:

• The requirements of 23 CFR 940 ([www.ecfr.gov](http://www.ecfr.gov))

• The National ITS Architecture ([http://www.iteris.com/itsarch/index.htm](http://www.iteris.com/itsarch/index.htm))

• The respective state or states ITS architecture ([https://www.tn.gov/tdot/topic/its-statewide](https://www.tn.gov/tdot/topic/its-statewide))

• Ideally, the format of Turbo Architecture software

• Former RITSAs and adjacent area RITSAs

• **Regional needs and priorities using stakeholder input!**
ITS Architecture Implementation Program

The ITS Architecture Implementation Program provides ITS practitioners with the guidance and resources necessary for implementing the Final Rule on Architecture and Standards Conformity issued on January 8, 2001. This program is part of the Facilitating Integrated ITS Deployment Program within the FHWA Office of Operations.

- **FHWA Rule/FTA Policy** presents the final text of both the FHWA Rule and the FTA policy, and several fact sheets and brochures.
- **Frequently Asked Questions** on the FHWA Final Rule/FTA Final Policy, regional ITS architectures, systems engineering and standards.
- **Guidance** contains several guidance documents on developing, using and maintaining a regional ITS architecture.
- **Examples** links to example sections of existing regional ITS architectures.
- **Training for ITS Architecture Development and Implementation** lists the available training and technical assistance on the development, use and maintenance of a regional ITS architecture including links for scheduling.
- **Resources** provides links to tools and information related to regional ITS architectures.
- **Links** to related sites.
- **Contact Us** for more information and assistance.

http://www.ops.fhwa.dot.gov/its_arch_imp/
Planning for TSM&O
Planning for TSM&O

- TSM&O = transportation system management and operations
- Purpose of TSM&O = managing the existing capacity of transportation infrastructure with strategies that optimize reliability and safety
Difference between TSM&O and ITS?

-TSM&O doesn’t need to be ITS – for example, freeway service patrols, non-connected traffic signals, special event management, etc.

-Most, if not all, ITS is TSM&O, but not all TSM&O is ITS
Planning for TSM&O at TDOT

- **Capability Maturity Model (CMM) Assessment** to organize for transportation reliability

- **TSM&O Coordinating Committee** and working groups

- **CMM Implementation Plan** (ITS Asset Management System, TSM&O Annual Report, etc.)

- Sent staff to **Operations Academy**  [http://operationsacademy.org/](http://operationsacademy.org/)

- Draft **Traffic Operations Program Plan** and starting new Statewide ITS Architecture

- **Reliability measure** integration in long-range plan policies

Planning for TSM&O at MPOs?

• Same tools are available

The role of the RITSA:

Introduction

The U.S. Department of Transportation's Planning for Operations Program supports the integration of transportation systems management and operations strategies into the planning process for the purpose of improving transportation system efficiency, reliability, and options. This program is led by the Office of Operations and Office of Planning, Environment, & Realty of the Federal Highway Administration (FHWA) in coordination with the Federal Transit Administration (FTA), which work with metropolitan planning organizations, State and local departments of transportation, transit agencies, and other organizations to maximize the performance of existing infrastructure through multimodal and multi-agency programs and projects. Learn more about planning for operations.

Focus Areas

- Integrating Operations into Planning and Programming
- Analysis and Performance Measurement
- Regional Collaboration and Coordination
- Organizing for Operations
- Congestion Management Process (CMP)
- Regional Concept for Transportation Operations (RCTO)

Find It Fast

News

- Advancing Transportation Systems Management and Operations Through Scenario Planning
- The Use of Data in Planning for Operations: State-of-the-Practice Review
- Transportation Systems Management and Operations Benefit-Cost Analysis Compendium
So what about connected vehicles?
Let’s catch up:

• Connected vehicles talk to each other (V2V) or talk with the road (V2I)
• Autonomous vehicles drive themselves
• CVs can use any sort of technology, but DSRC is the radio bandwidth currently reserved for CV communications

http://its.dot.gov/cv_basics/index.htm
What USDOT has been up to

- Systems engineering documents and standards

http://its.dot.gov/pilots/cv_pilot_apps.htm

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<th>Environment</th>
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<td>Eco-Approach and Departure at Signaled Intersections</td>
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<td>Curve Speed Warning</td>
<td>Eco-Traffic Signal Timing</td>
<td>Intelligent Traffic Signal System (I-SIG)</td>
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<td>Stop Sign Gap Assist</td>
<td>Eco-Traffic Signal Priority</td>
<td>Signal Priority (transit, freight)</td>
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<td>Spot Weather Impact Warning</td>
<td>Connected Eco-Driving Wireless</td>
<td>Mobile Accessible Pedestrian Signal System (PED-SIG)</td>
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<td>Eco-Lanes Management</td>
<td>Dynamic Speed Harmonization (SPD-HARM)</td>
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<td>Pedestrian in Signalized</td>
<td>Eco-Speed Harmonization</td>
<td>Queue Warning (Q-WARN)</td>
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<td>Crosswalk Warning (Transit)</td>
<td>Eco- Cooperative Adaptive Cruise Control</td>
<td>Cooperative Adaptive Cruise Control (CACC)</td>
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<td>Eco-Traveler Information</td>
<td>Incident Scene Pre-Arrival Staging Guidance for Emergency Responders (RESP-STG)</td>
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<td>Eco-Ramp Metering</td>
<td>Incident Scene Work Zone Alerts for Drivers and Workers (INC-ZONE)</td>
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<td>Low Emissions Zone Management</td>
<td>Emergency Communications and Evacuation (EVAC)</td>
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<td>AFV Charging / Fueling</td>
<td>Connection Protection (T-CONNECT)</td>
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<td>Information</td>
<td>Dynamic Transit Operations (T-DISP)</td>
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<td>Eco-Smart Parking</td>
<td>Dynamic Ridesharing (D-RIDE)</td>
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<td>Dynamic Eco-Routing (light vehicle, transit, freight)</td>
<td>Freight-Specific Dynamic Travel Planning and Performance</td>
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<td>Eco-ICM Decision Support System</td>
<td>Drayage Optimization</td>
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<th>Road Weather</th>
<th>Smart Roadside</th>
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<td>Motorist Advisories and Warnings (MAW)</td>
<td>Wireless Inspection</td>
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<td>Forward Collision Warning (FCW)</td>
<td>Enhanced MDSS</td>
<td>Smart Truck Parking</td>
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<td>Intersection Movement Assist (IMA)</td>
<td>Vehicle Data Translator (VDT)</td>
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<td>Do Not Pass Warning (DNPW)</td>
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<td>Vehicle Turning Right in Front of Bus Warning (Transit)</td>
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<td>Probe-enabled Traffic</td>
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<td>Monitoring</td>
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<td>CV-enabled Turning</td>
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<td>Movement &amp; Intersection</td>
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<td>Analysis</td>
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What USDOT has been up to

- **Pilot deployments:**
  - Wyoming, NYC, Tampa
  - Lessons and resources

- **Connected Vehicle Affiliated Test Beds**
  - [http://www.its.dot.gov/testbed.htm](http://www.its.dot.gov/testbed.htm)

- **Engineering and planning tools**
  - RDE, OSADP, CVRIA, SET-IT, CO-PILOT, and upcoming guidance documents
A quick word about Every Day Counts
A quick word about Every Day Counts

ITS-related initiatives part of Round 4:

• Using Data to Improve Traffic Incident Management
• Automated Traffic Signal Performance Measures (ATSPMs)
• Road Weather Management – Weather-Savvy Roads

See fact sheets handed out.

http://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/
Real-time traveler information

Real-time traveler information

23 CFR 511:

By November 8, 2014, state agencies needed to make available real-time information on the Interstate system:

- Lane blockages
- Road weather
- Construction
- Travel times or speeds
23 CFR 511.311(d):

In short:
RITSAAs need to ensure all this happens, too.
Real-time traveler information

TDOT:
- Recently joined Waze’s “Connected Citizens” program
- Recently overhauled its SmartWay website
- In process of upgrading its TMC software
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Chattanooga Regional ITS Architecture

Defines:

- ITS Inventory and Needs
- ITS Services and Agencies Involved
- Projects to be Deployed

Last updated in 2014
Update Process

Deliverables

- Regional ITS Architecture Update and Deployment Plan Report
- Executive Summary
- Project Website
- Turbo Architecture Database (Version 7.1)
- Presentations to the TPO Executive Board and Technical Committee
Update Process

- ITS Inventory and Needs
- ITS Service Packages
- ITS Deployment Plan
Update Process

Inventory

- Identify all existing and planned ITS components
- Identify all existing and planned connections between components

Needs

- Identify transportation needs in the Region
- Needs can be general or specific to ITS
- Continually update needs list throughout the project
ITS service packages are the services that ITS can provide in the Region.

Common service packages:

- Network Surveillance
- Traffic Signal Control
- Traffic Information Dissemination
- Incident Management
- Road Weather Data Collection
- Transit Vehicle Tracking
- Transit Security
- Transit Signal Priority

A total of 97 service packages exist in the current version of the National ITS Architecture. 47 were selected for the current version of the Chattanooga Regional ITS Architecture.
Update Process

Prioritizes projects into three time-frames (timeframes may be adjusted)

- Short-term (next 5 years)
- Mid-term (5 to 10 years)
- Long-term (beyond 10 years)

For each project the following information is included:

- Project description
- Responsible agency
- Estimate of probable cost
- Applicable service packages

Does not guarantee funding of the projects
Discussion Items

Additional Stakeholders to Include?

Existing and Planned ITS Projects in the Region?

Suggested ITS Projects?

Regional ITS Needs?

Regional Interagency Connections?
Discussion Items

- Additional Stakeholders to Include?
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Regional ITS Needs?

- Traffic Management
- Traveler Information
- Emergency Management
- Maintenance & Construction Management
- Public Transportation
- Commercial Vehicle Operations
- Archived Data Management
- Vehicle Safety (Connected & Autonomous Vehicles)
Discussion Items

- Additional Stakeholders to Include?
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- Regional ITS Needs?
- Regional Interagency Connections?
Discussion Items

Regional Interagency Connections?

Traffic Agency ↔ Traffic Agency

Traffic Agency ↔ Transit Agency

Traffic Agency ↔ Emergency Management

Transit Agency ↔ Emergency Management

Emergency Management ↔ Emergency Management
Chattanooga Regional ITS Architecture Update
Stakeholder Kickoff Meeting

Yuen Lee
Chattanooga  Hamilton County RPA
ylee@chattanooga.gov

Tom Fowler
Kimley-Horn
thomas.fowler@kimley-horn.com

Terrance Hill
Kimley-Horn
terrance.hill@kimley-horn.com

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