# ARC-IT Version 9.2 Webinar

December 12, 2023

1:00 – 2:30 pm Est

U.S. Department of Transportation

Intelligent Transportation Systems
Joint Program Office

INTELLIGENT TRANSPORTATION SYSTEMS

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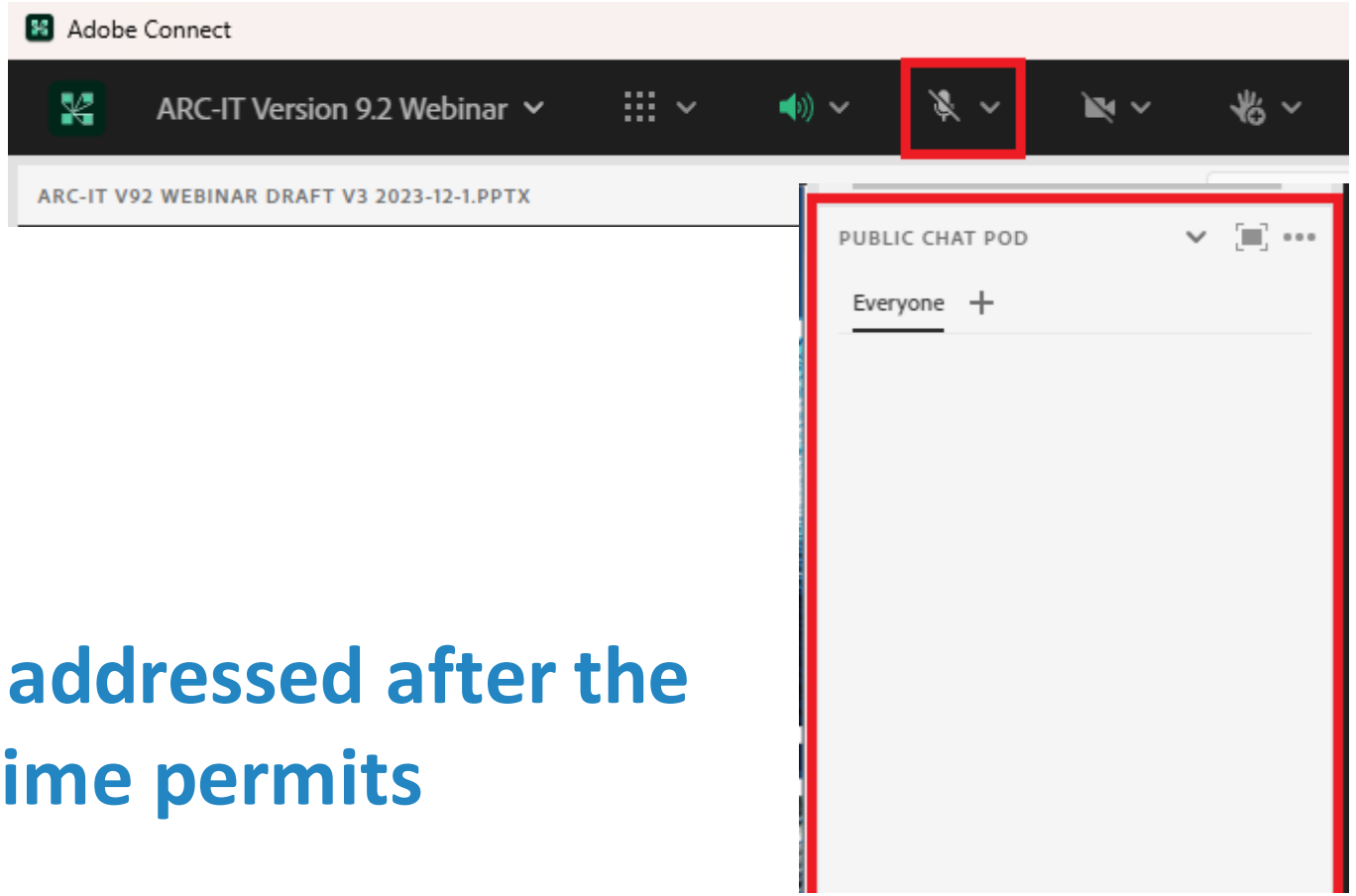
## Use the Chat Pod

- Click on the Public Chat square on your screen
- Submit your question or comments in the Chat window




**Questions/comments will be addressed after the last presentation, as time permits**

# Poll Questions

# Today's Speakers

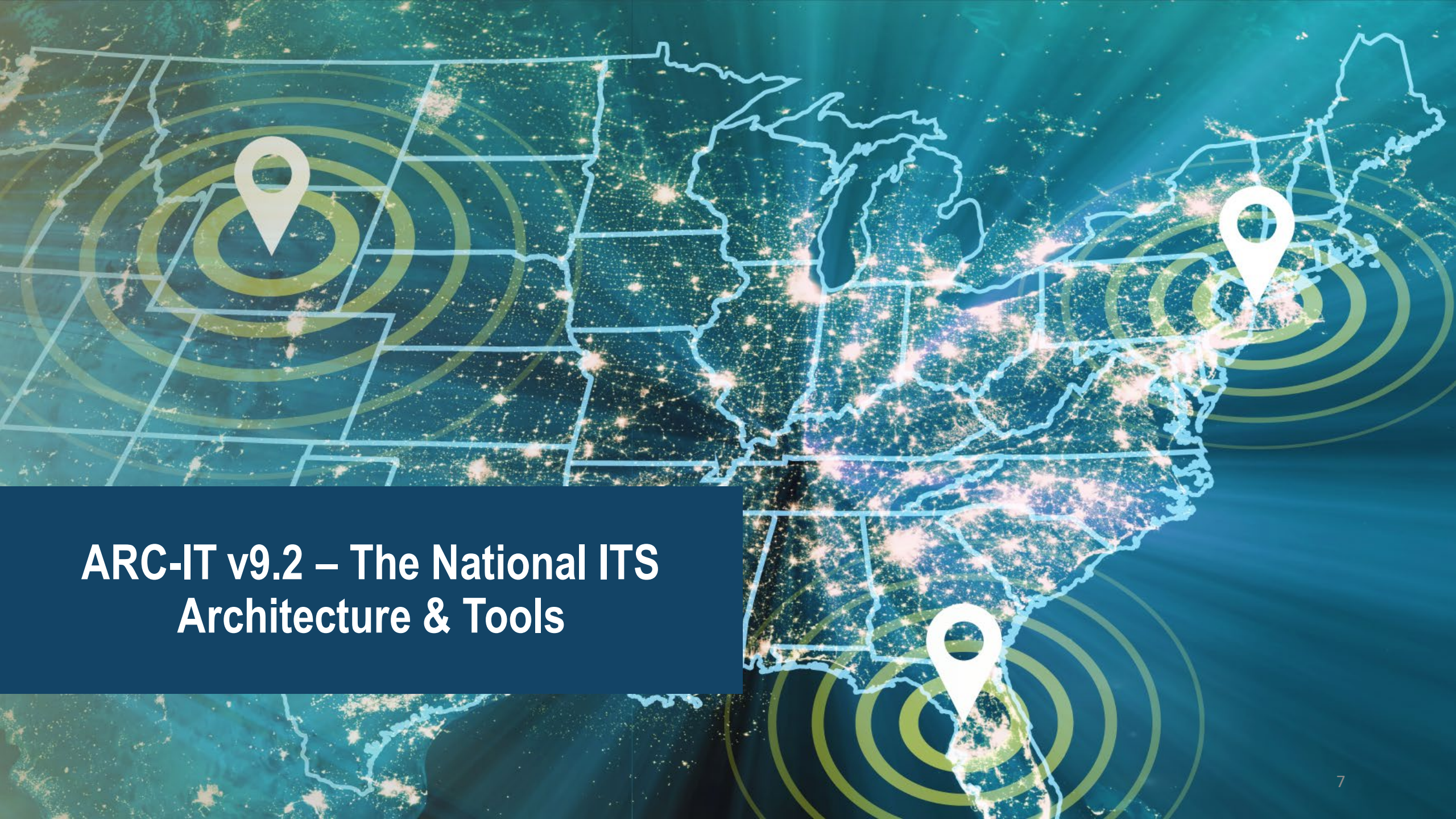
**Robert Sheehan, PE, PTOE**
Program Manager
ITS Joint Program Office

**Kingsley Azubike, P.E., PTOE**
Transportation Specialist
FHWA Office of Operations

**David Binkley**
Principal Systems Engineer
Iteris

**Cliff Heise**
Vice President, Iteris

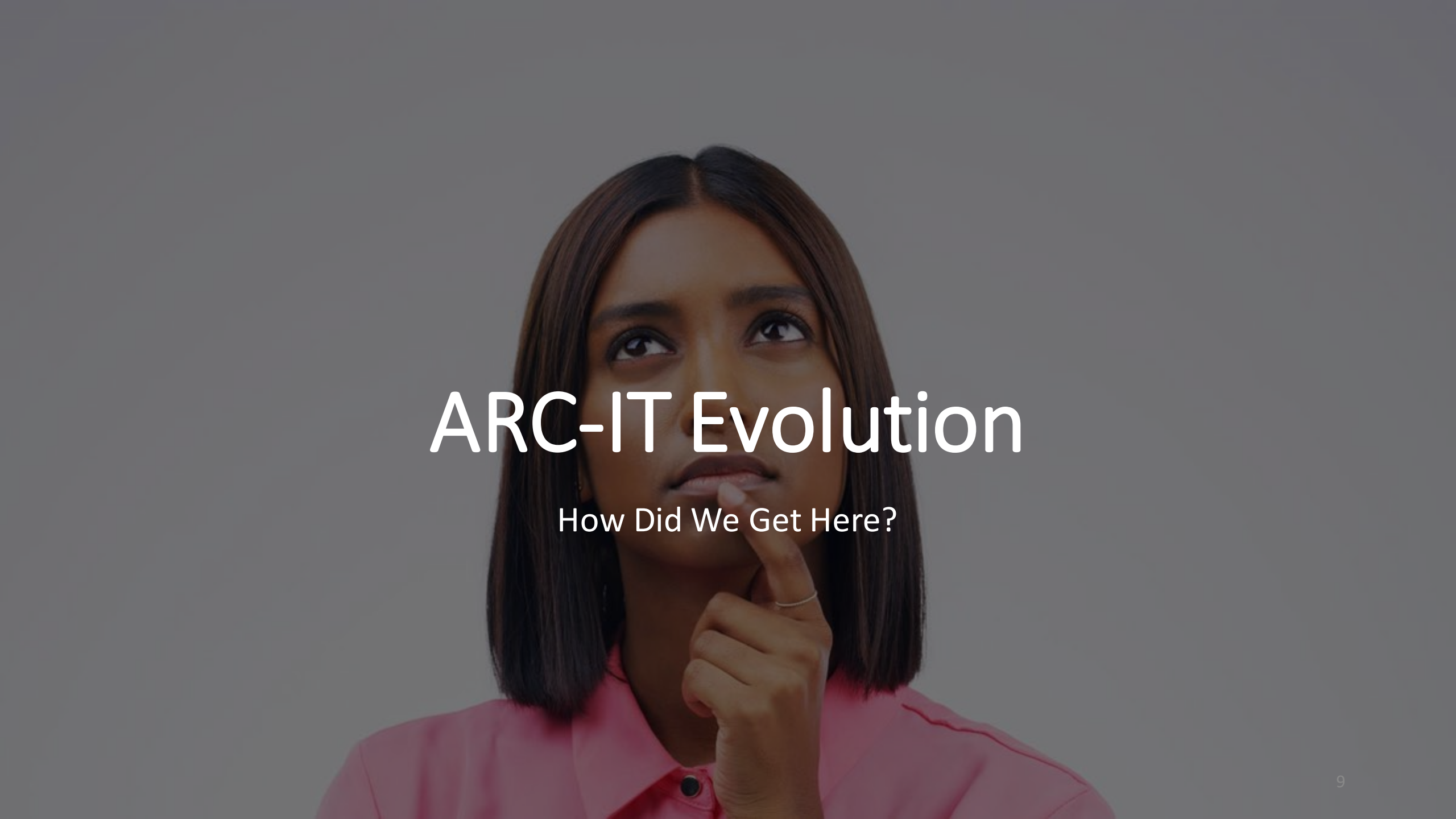
**Andrew Magee**
Senior Planner
Indianapolis MPO



# ARC-IT v9.2 – The National ITS Architecture & Tools

# ARC-IT Discussion Today

- Describe the latest updates to the National ITS Reference Architecture, version 9.2 known as ARC-IT
- Tour the Website
- Describe the tools—what they are, what they are used for, and who should use them in planning for deployment and project implementation
- Discus how ARC-IT fits into the deployment process and where to find out more

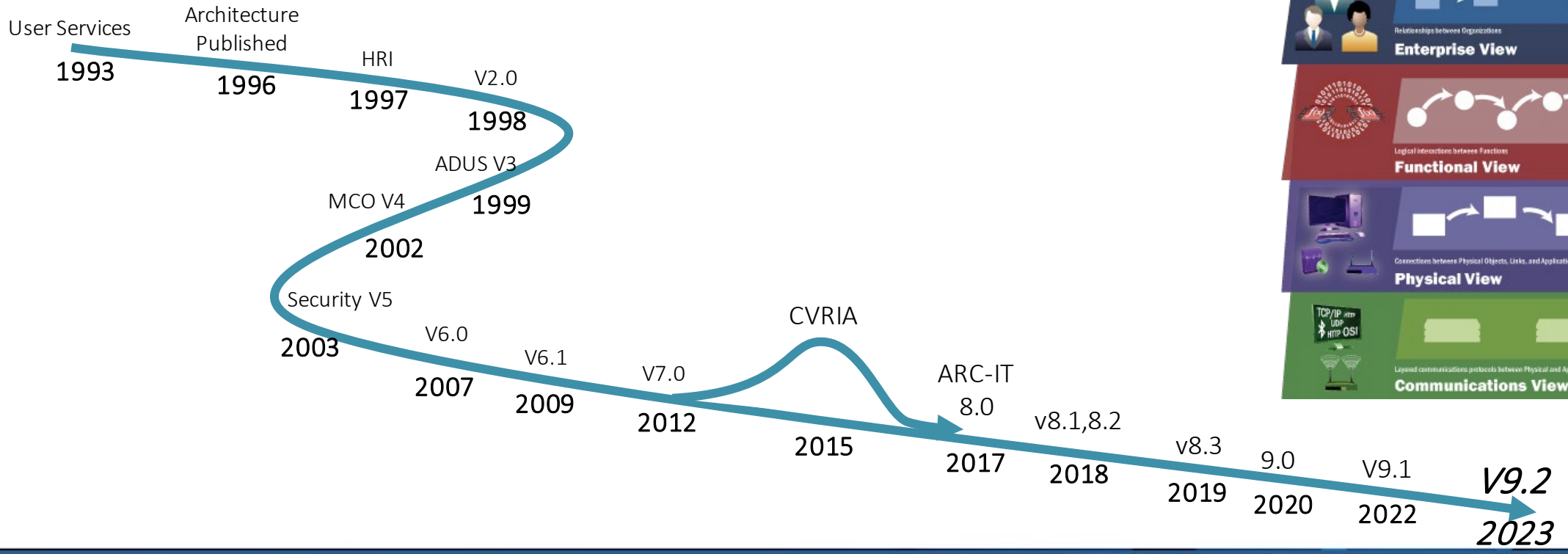


# ARC-IT Evolution

How Did We Get Here?

# ARC-IT – The National ITS Reference Architecture is a "Living Document"

- Provides a common framework for planning, defining, and integrating ITS
- Continually evolving & growing



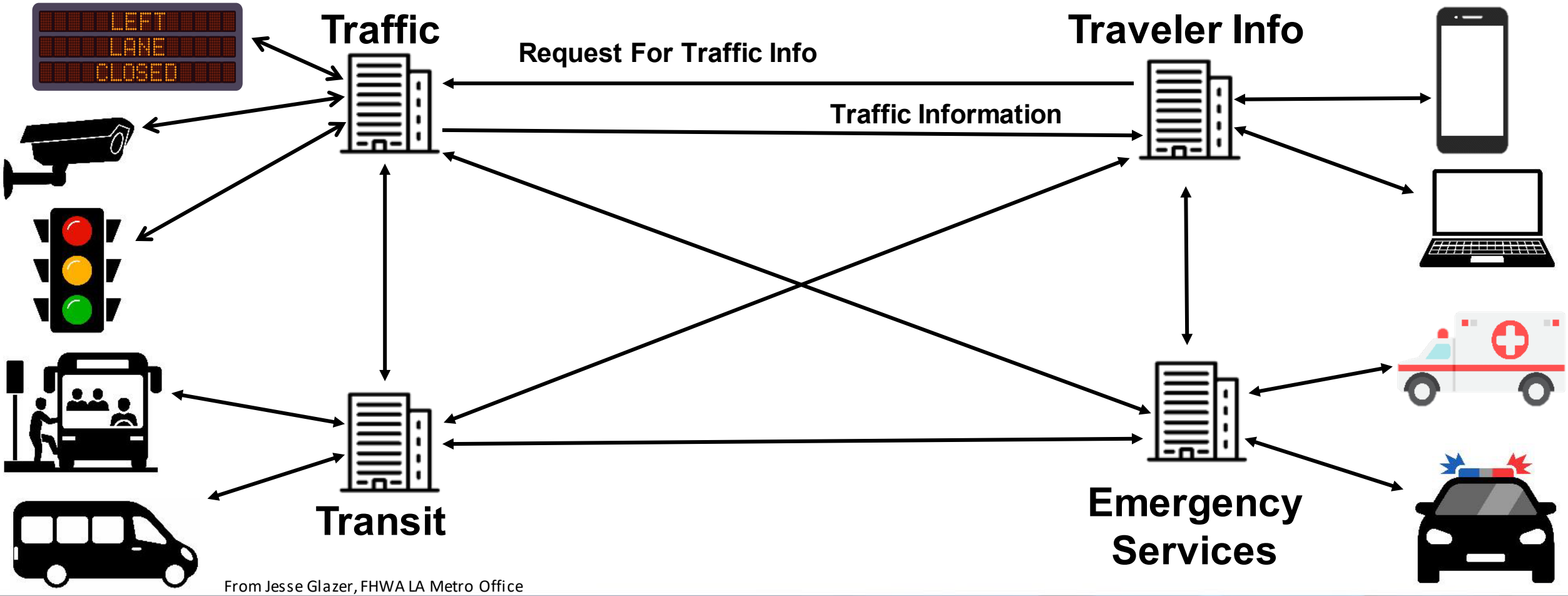
# Why Do We Need a National ITS Reference Architecture?

- Provide a national “vision” for ITS
- Guide sound ITS planning and investments at the state and local level
- Support systems engineering analysis for projects deploying ITS
- Identify and scope the needs for standardized interfaces

# System Architecture for ITS

- Provides a framework for developing integrated transportation systems
- Identifies:
  - Organizations
  - Systems operated
  - Functions performed, services provided
  - Communications required
  - Information exchanged
- WITHOUT getting into specific technologies, picking winners/losers
  - Technology Neutral is key

# ITS Architecture Includes: Agencies, Systems, Communications, Information Flows




From Jesse Glazer, FHWA LA Metro Office

# Users and Use Cases Supported

- Regional Planning
- Project Scoping, Project Development
- Standards Investment, Standard scope, standard development

# ARC-IT Gives Us a Framework and a Platform


## Ask Big Questions

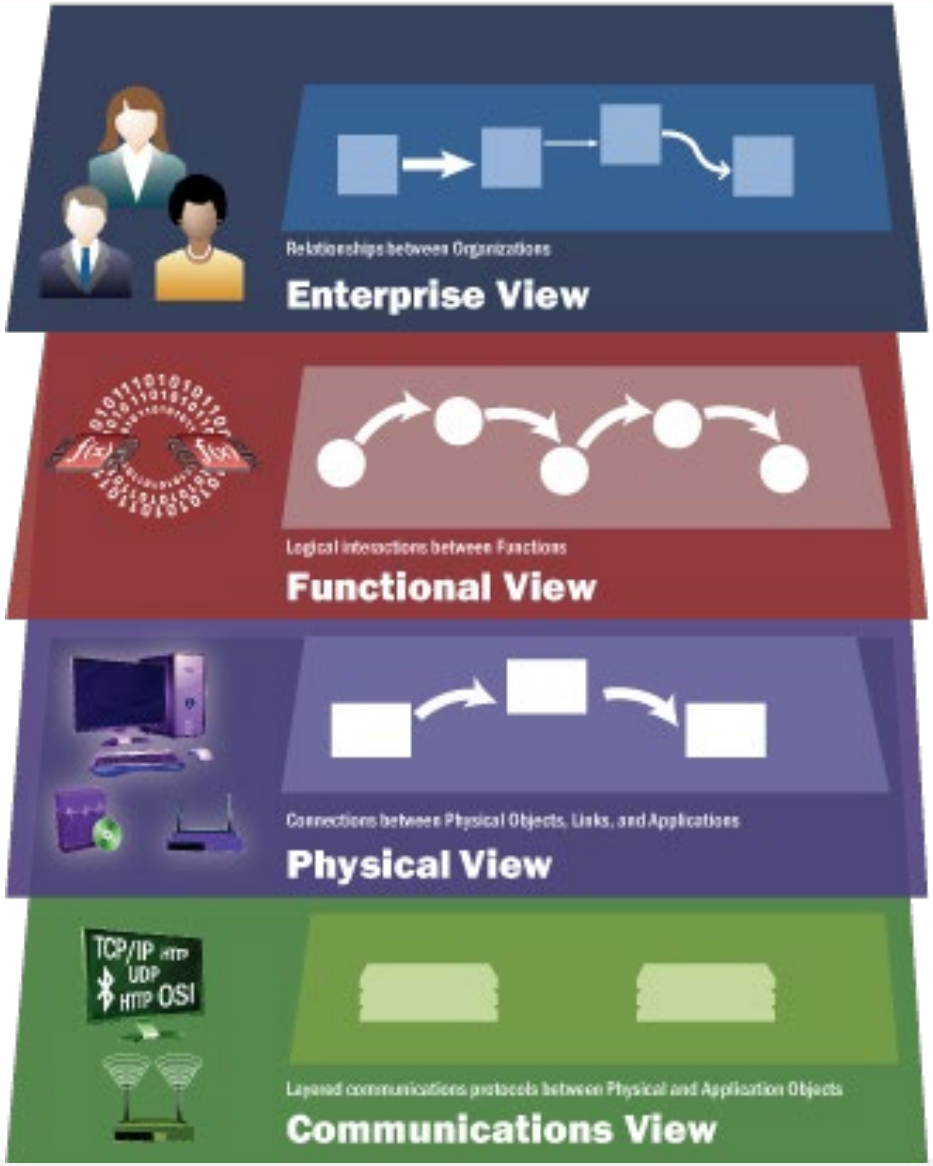
- What is ITS?
- How do we build and deploy ITS?
- How do we make ITS deployment more efficient?
- How do we leverage new communications technologies?
- How do we balance privacy and public safety?
- What can we deploy on shared spectrum?

## In an Evolving Domain

- Traffic, transit, commercial vehicle, traveler information
- Archived data
- Highway railroad intersections
- Maintenance and construction
- Security
- Connected & automated vehicles
- Multimodal accessible travel
- Intermodal freight
- Robots, aerial mobility and other science fiction

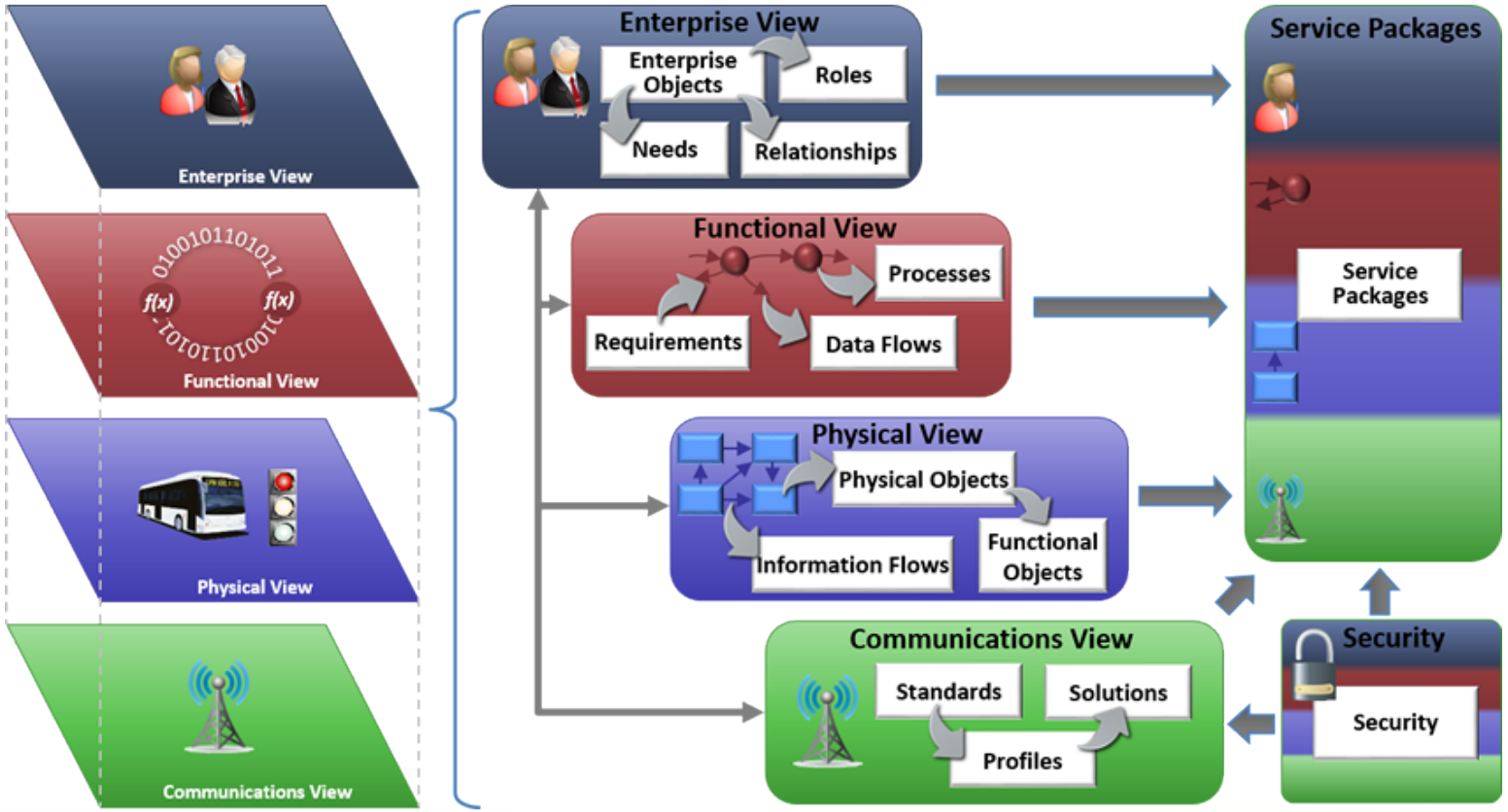
# ARC-IT's Structure

How is it Organized and Put Together?



# ARC-IT Structure and Organization

- Defined around 4 views, Organized by Service Packages

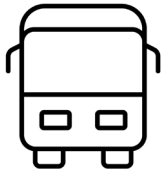



www.arc-it.net

# ARC-IT Service Package Areas

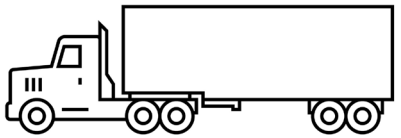
**Traffic Management**

**Public Transportation**



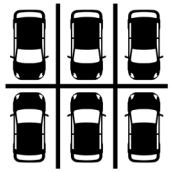
**Maintenance and Construction**

**Commercial Vehicle Operations**



**Public Safety**

**Parking Management**



**Vehicle Safety**

**Traveler Information**

**Data Management**

**Support**

**Sustainable Travel**

**Weather**

# What's New for 2023

## New Features and Services for version 9.2

Intelligent Transportation Systems Joint Program Office

U.S. Department of Transportation

# ARC-IT V9.2 Changes

- Multimodal Accessible Travel (MAT)
  - Vulnerable Road Users (VRU)
    - Pedestrians
    - Micro Mobility Vehicles (MMV)
  - Wayfinding and Navigation
    - Pathways
    - Indoor and Outdoor
  - Shared Use Fleets
    - Personal mobility fleets such as shared-use cars, ebikes, and scooters plus ride hail/ taxis
  - Payment Integration
    - Across a range of mobility services (e.g. bus, rail, shared use, and micro mobility services)

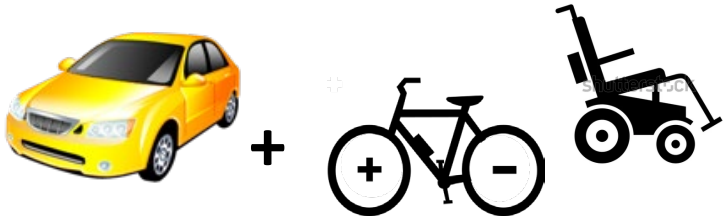
# New 9.2 – more personal devices, especially for Vulnerable Road Users

## ARC-IT 9.1

Vehicle On-Board Equipment (OBE)

Personal Info Device (PID)

## ARC-IT 9.2

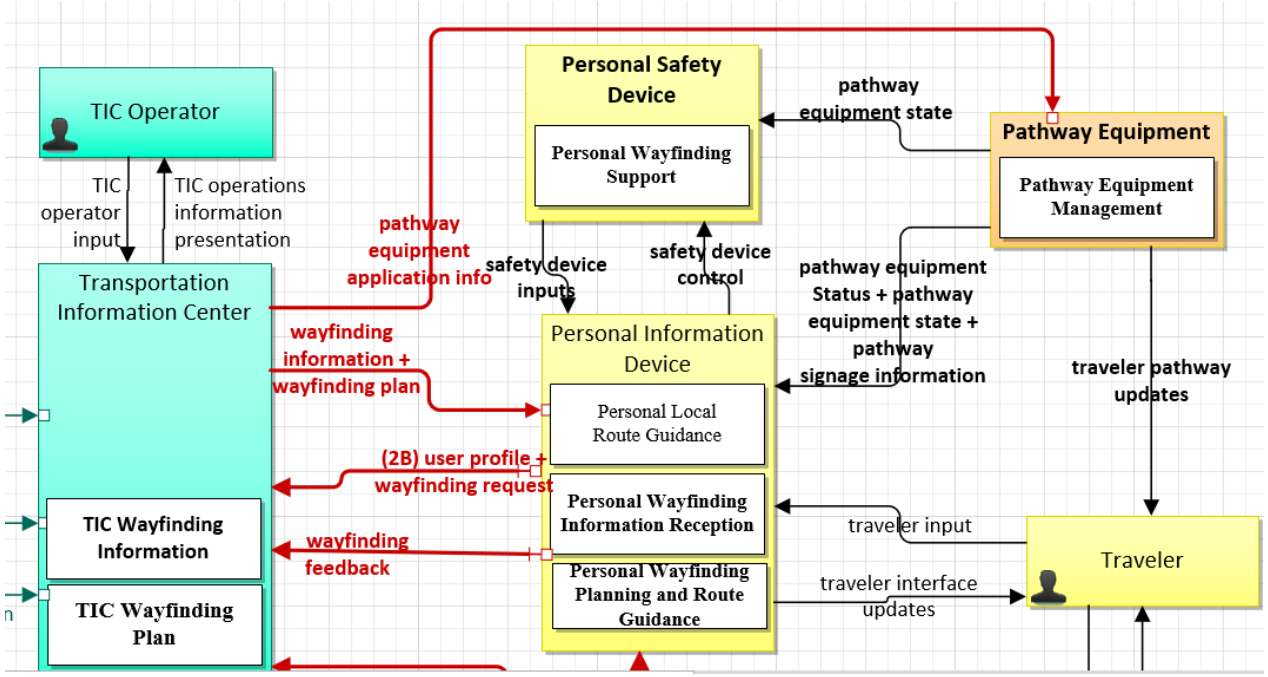


Micro Mobility Vehicle (MMV)

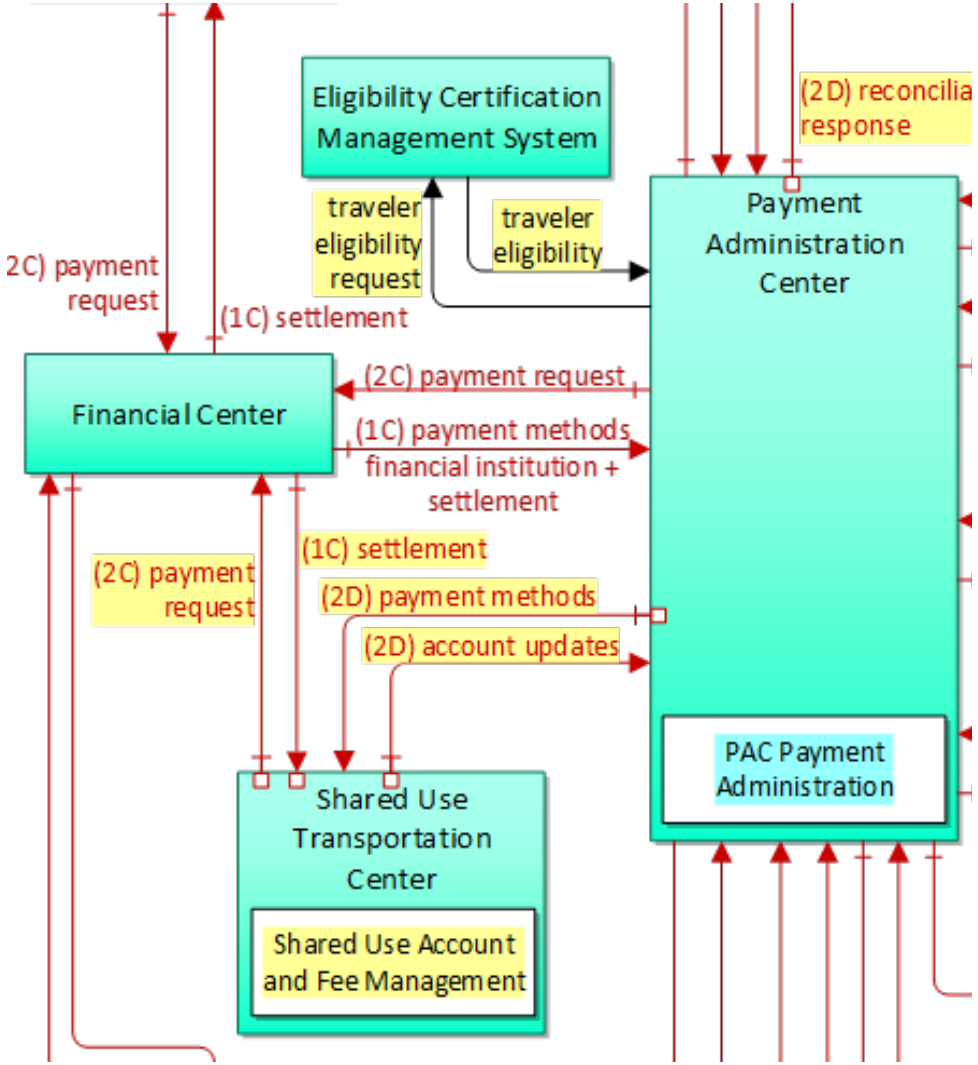

Personal Safety Device (PSD)

# ARC-IT Updates for Wayfinding

- New Service Package - **TI08 Personal Wayfinding**
  - Tailored wayfinding information, both pre-trip and real-time guidance
  - Addresses
    - Pathways (sidewalks & bike lanes)
    - Open areas (pedestrian plazas),
    - Indoor facilities, and
    - Crosswalks

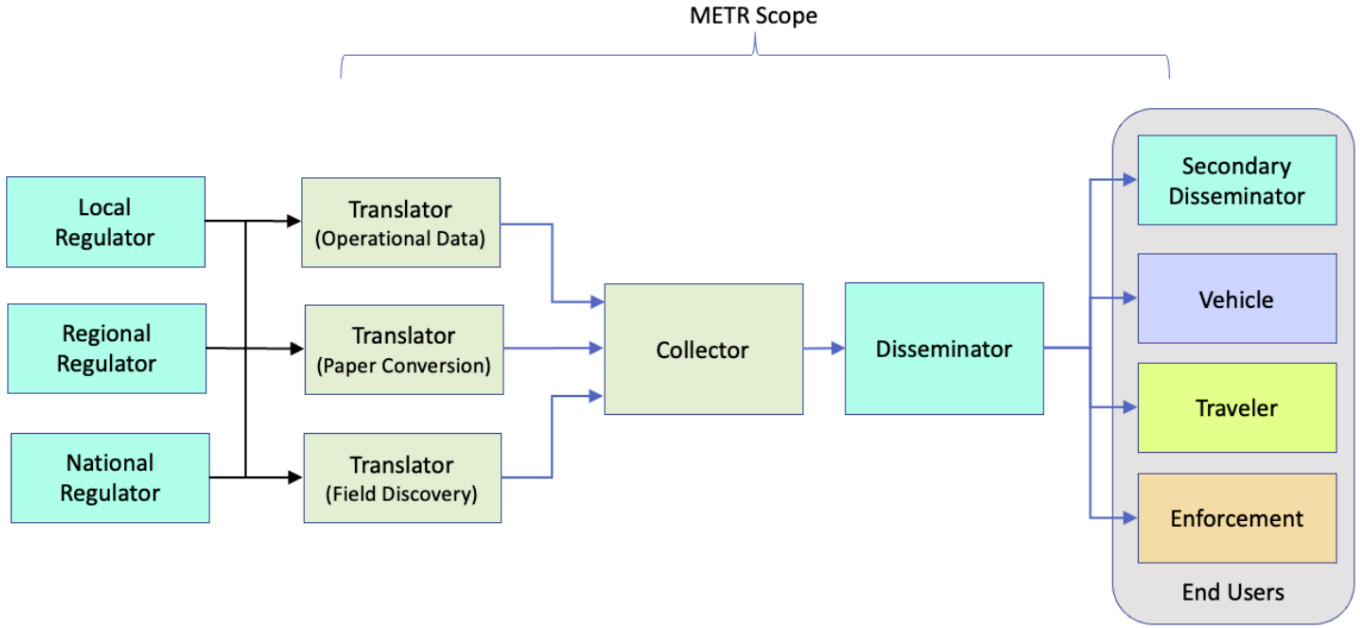


# Updates to TI05 Integrated Multimodal Electronic Payment

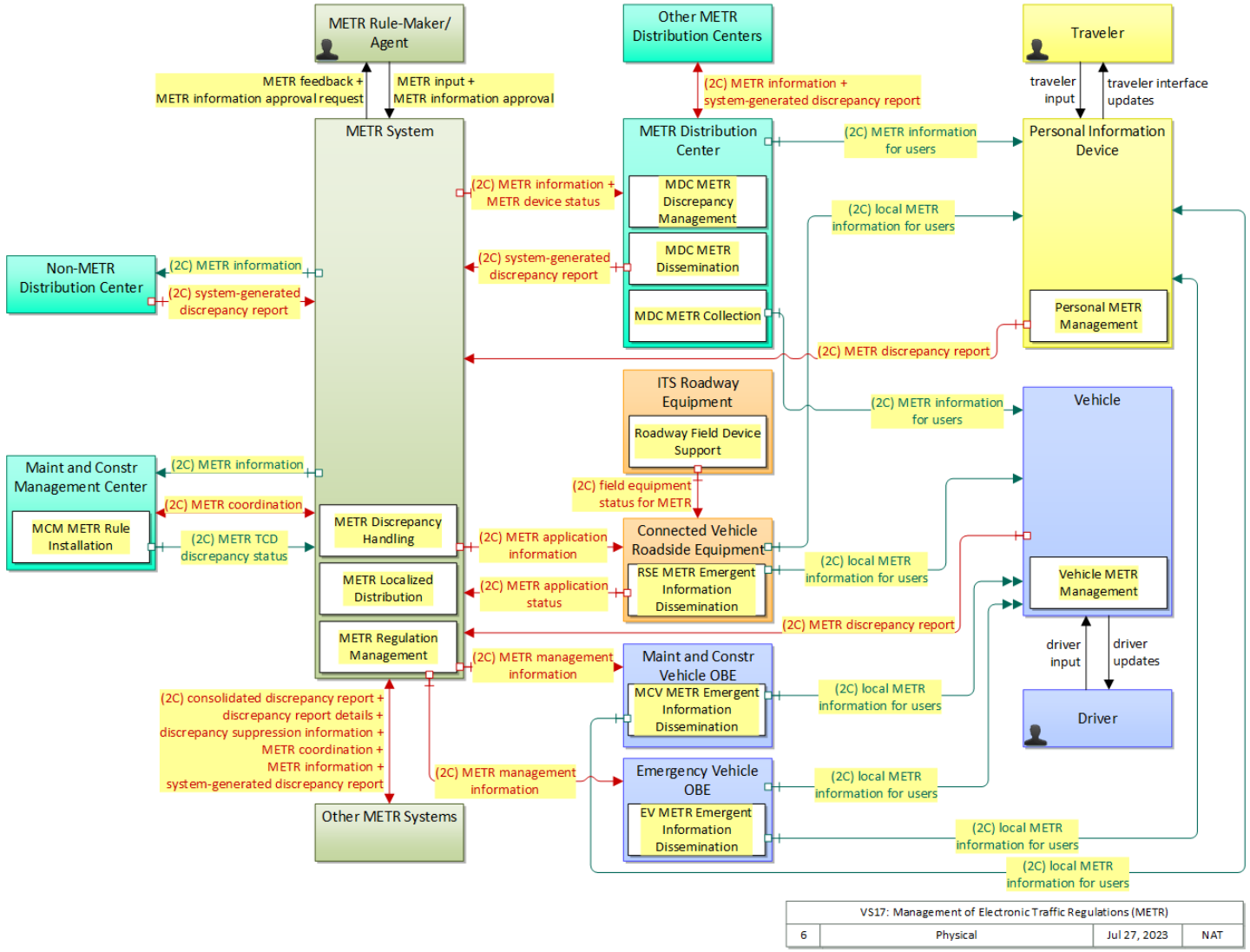


# ARC-IT V9.2 Changes, continued

- Management of Electronic Traffic Regulations (METR)
  - Provide a trustworthy way for electronic systems to learn about transport rules
  - ISO Standard in Development




# METR in ARC-IT



# ARC-IT V9.2 New Service Packages

- MC12: One-Way Convoy Driving
- SU15: Vulnerable Road User Device Transition Support
- TI08: Personal Wayfinding
- VS18: Vulnerable Road User Clustering

- Significant Modifications made to 17 other Service Packages
  - VS12 renamed VRU Safety
  - TI05 Integrated Multimodal Electronic Payment
  - ST05 Electric Charging Stations Management
  - MC07 Work Zone Safety Monitoring

# Other New Content

- Physical Objects
  - Vehicle vs Light Vehicle (now a generic Vehicle can be used to model safety and other common functions for any vehicle class)
  - Micromobility Vehicle Onboard Equipment
  - Pathway Equipment
  - Pathway Communications Unit
  - Electric Charging Management Center
  - Shared Use Transportation Center

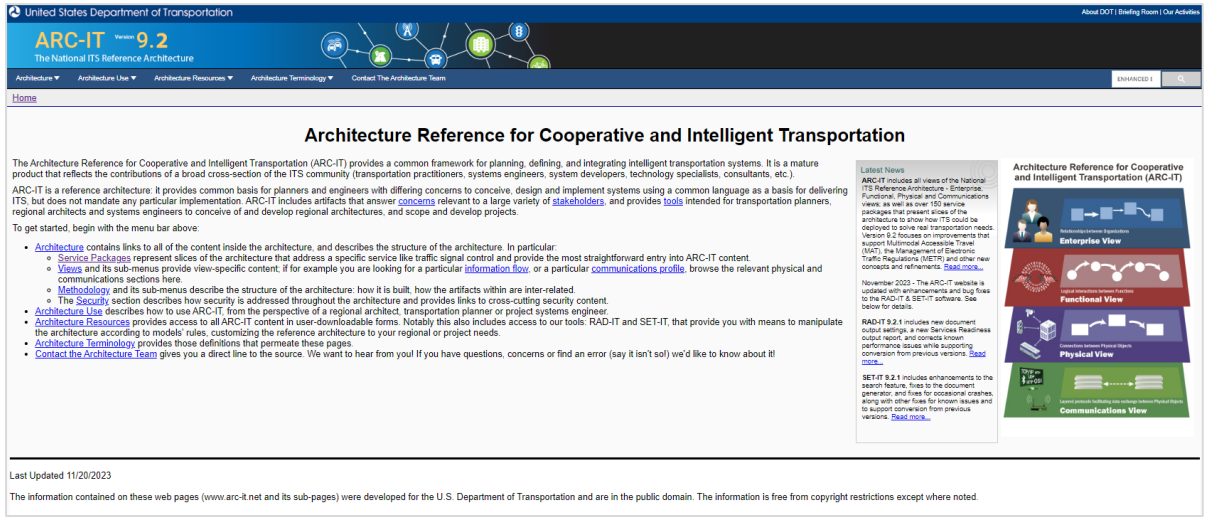
# Version 9.2 Tools Updates

- Both RAD-IT & SET-IT are updated
  - Incorporate all of ARC-IT's new services, objects, communications solutions
  - Conversion automates parts of your upgrade process
- Other New Features:
  - Document Settings: RAD-IT remembers settings for document generation; support multiple documents per file
  - Improved Performance
  - Alias: to use your own terminology for information flows and interconnects without losing traceability to ARC-IT
  - Diagram Enhancements: SET-IT diagram generator improved for physical and enterprise context diagrams

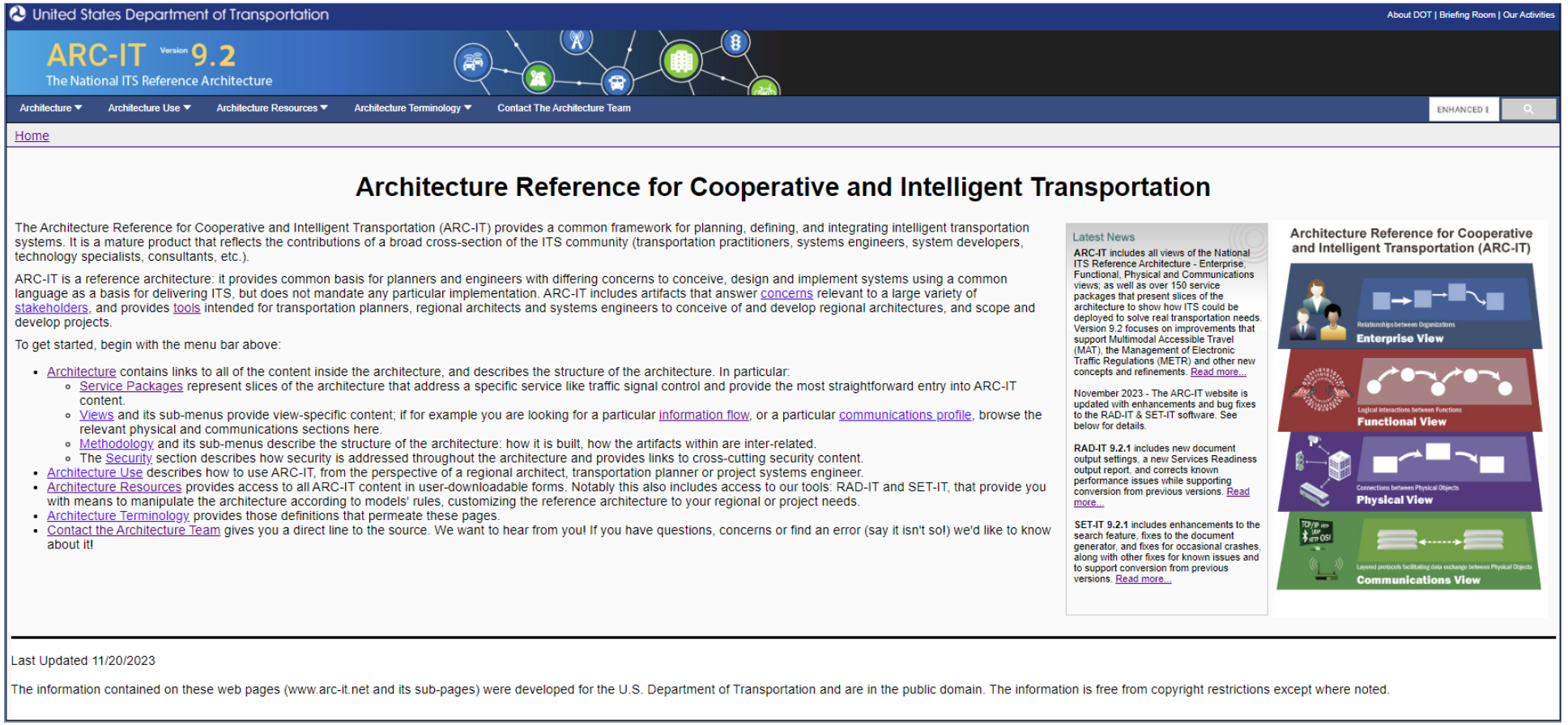
# Website Tour

Let’s take a tour of:

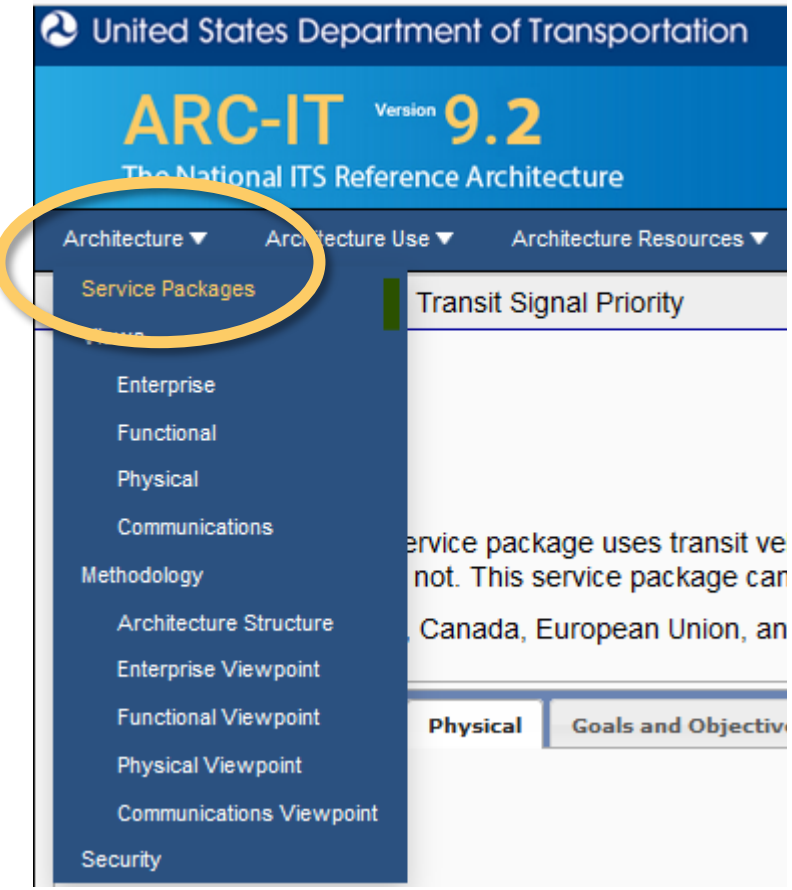
www.arc-it.net



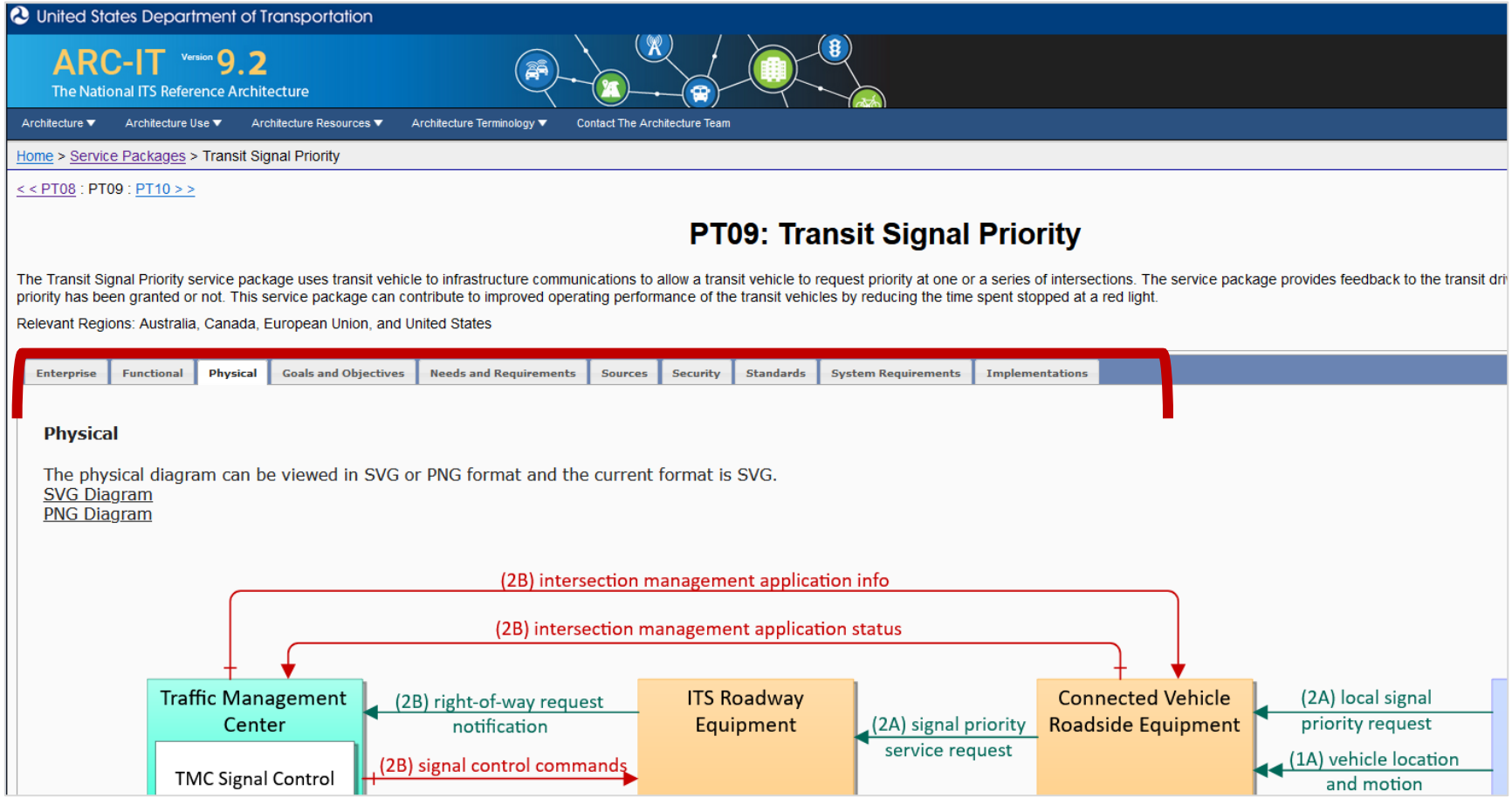
# ARC-IT Website (www.arc-it.net)



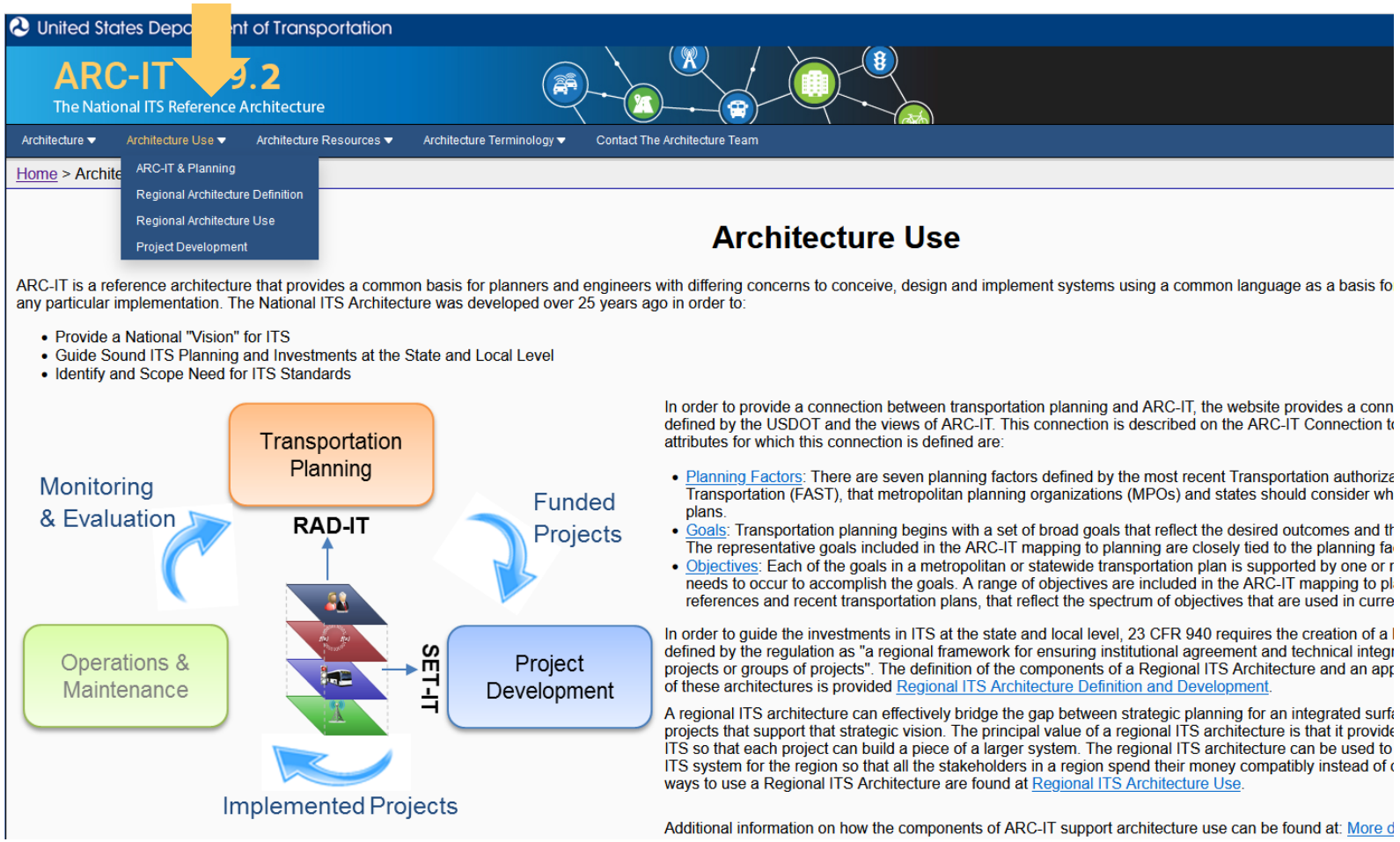
# ARC-IT Website: Architecture Pull-Down



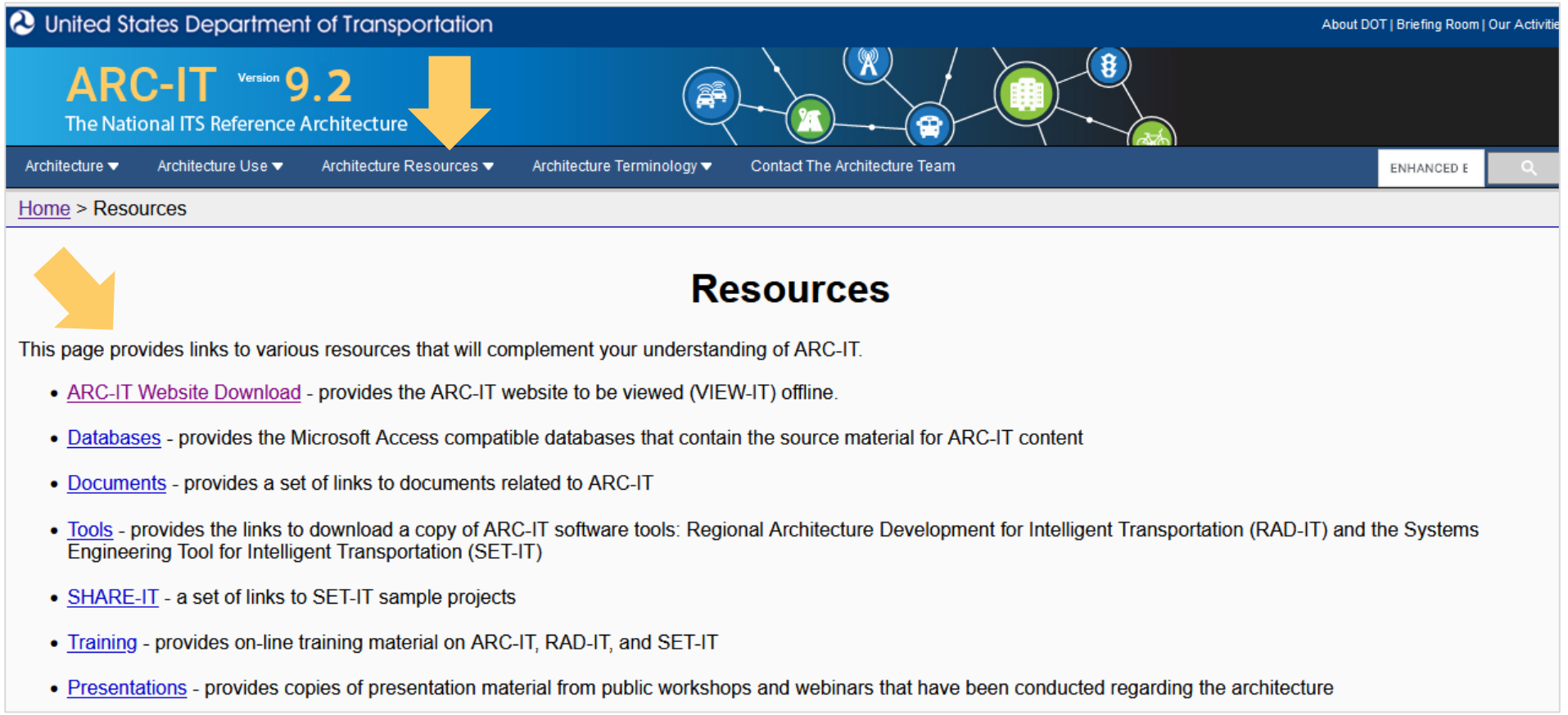
# ARC-IT Service Packages Menu



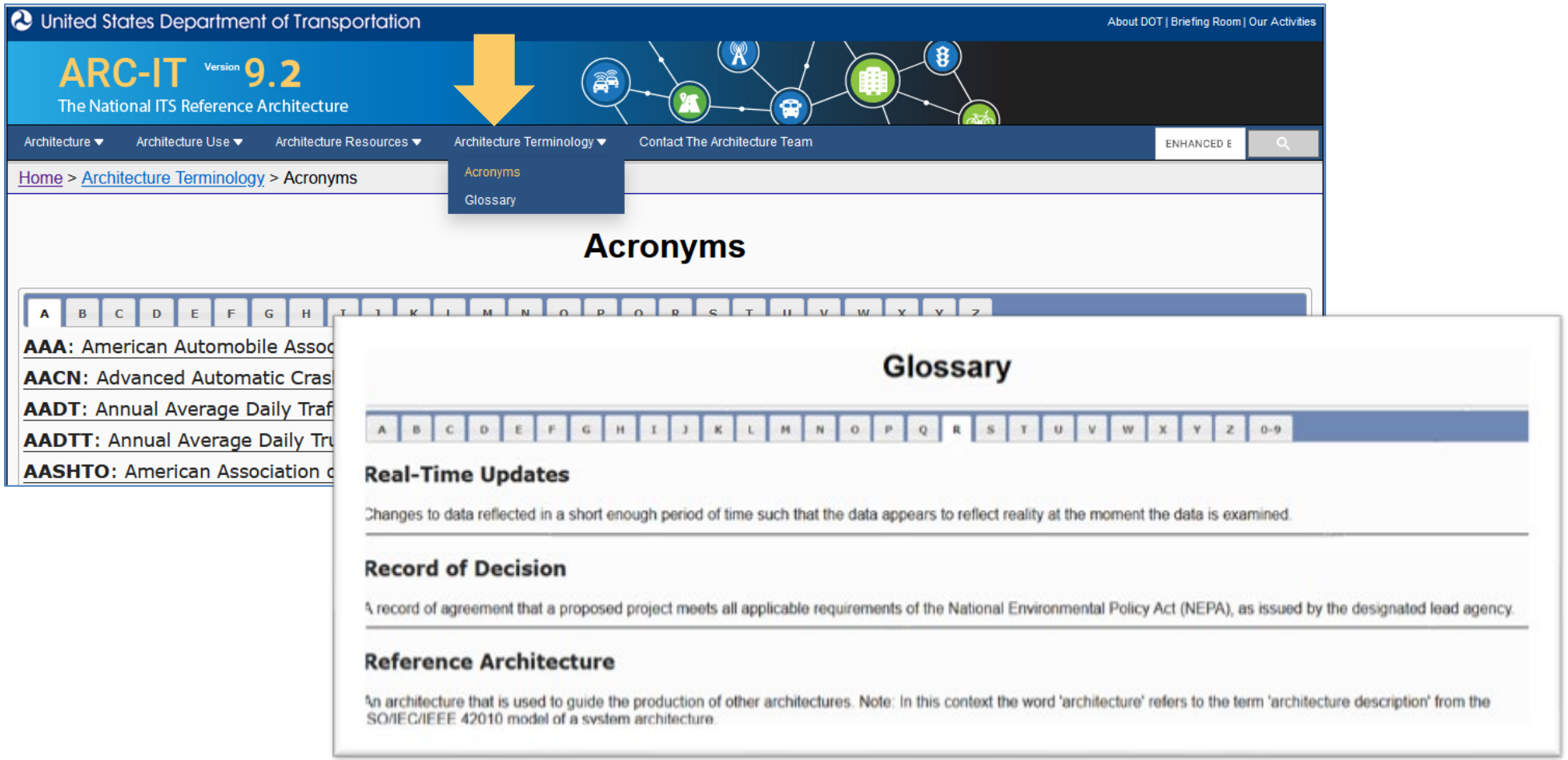
# ARC-IT Website: Architecture Use



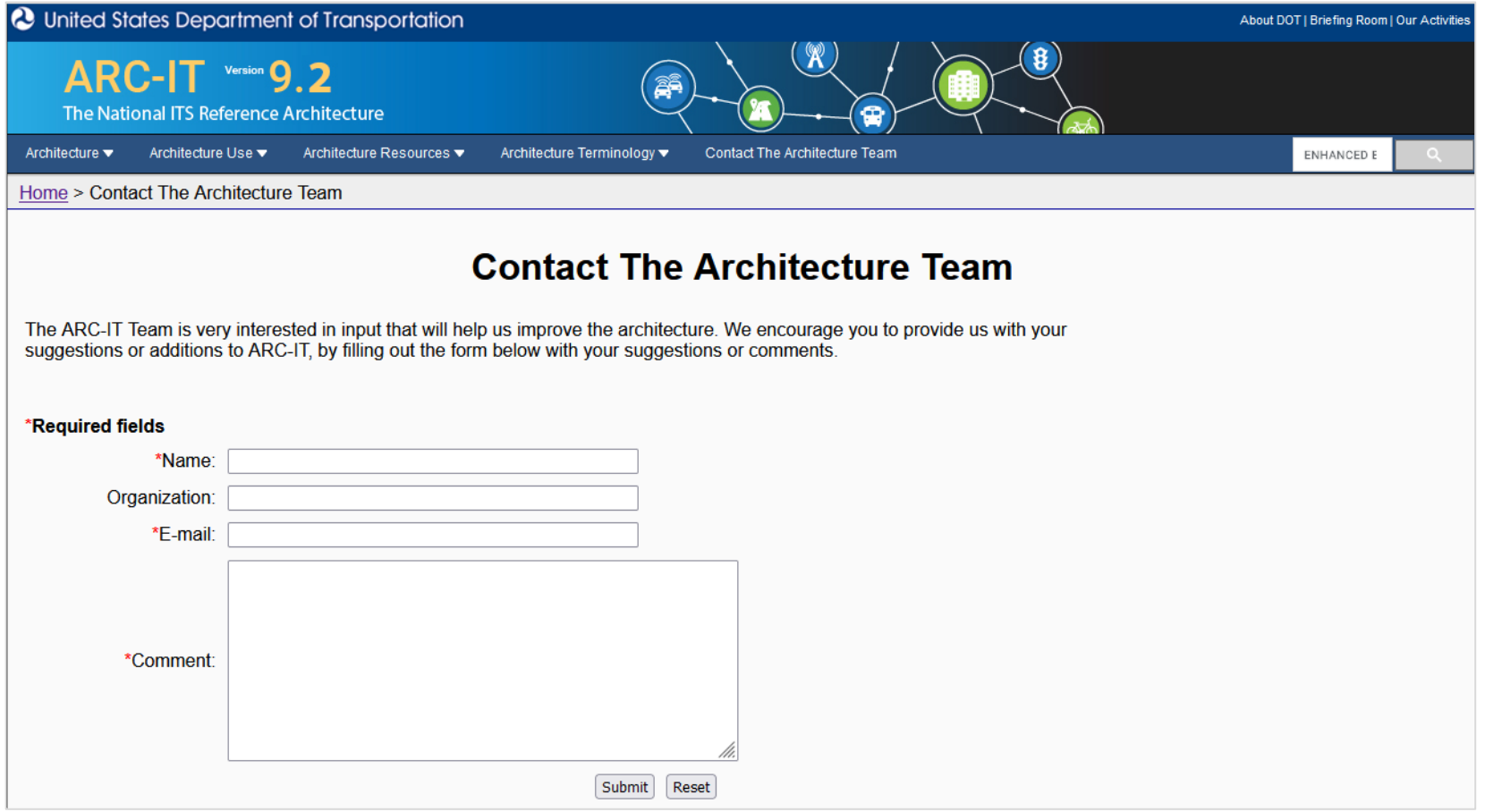
# ARC-IT Website: Architecture Resources



# ARC-IT Website: Architecture Terminology



# ARC-IT Website: Contact Us Page

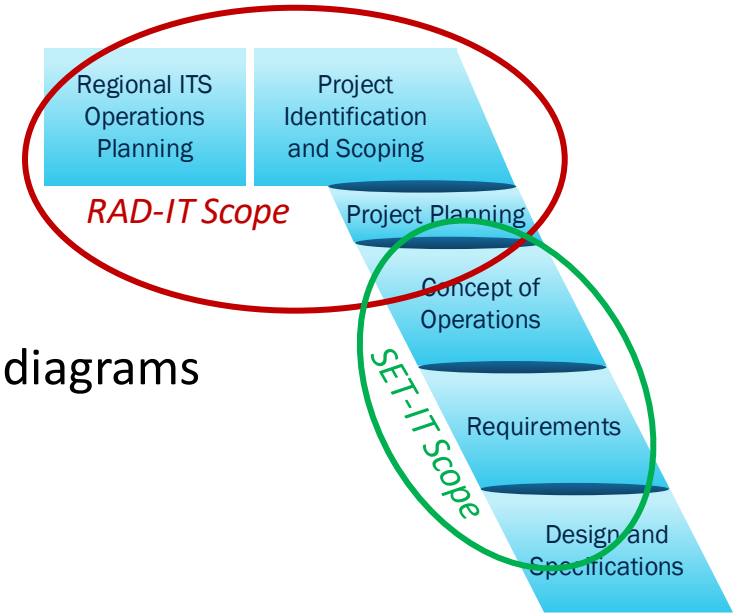


# Architecture Toolset

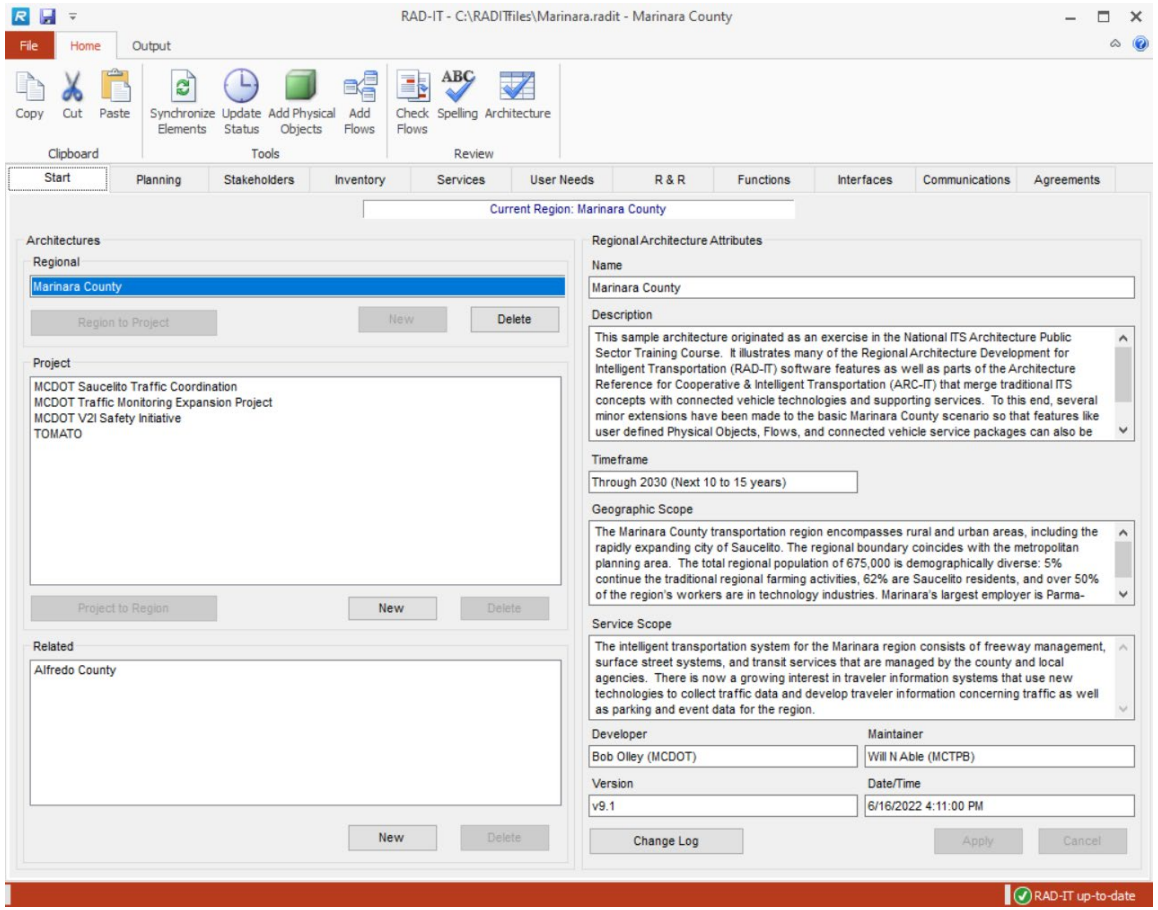
- RAD-IT & SET-IT


# Scope of Tools

- RAD-IT focuses on regional planning and the development of operational concepts,
  - Stakeholders, Physical Objects, Service Packages, Interfaces for the region
- SET-IT is project-focused
  - scope specified in the regional architecture
  - graphical tool,
    - providing visual feedback and tools to manipulate service package diagrams
  - Identify/Customize Comm solutions
  - Develop Enterprise agreements
  - Outputs – ConOps, diagrams, tables
- Training for both tools available on the ARC-IT website



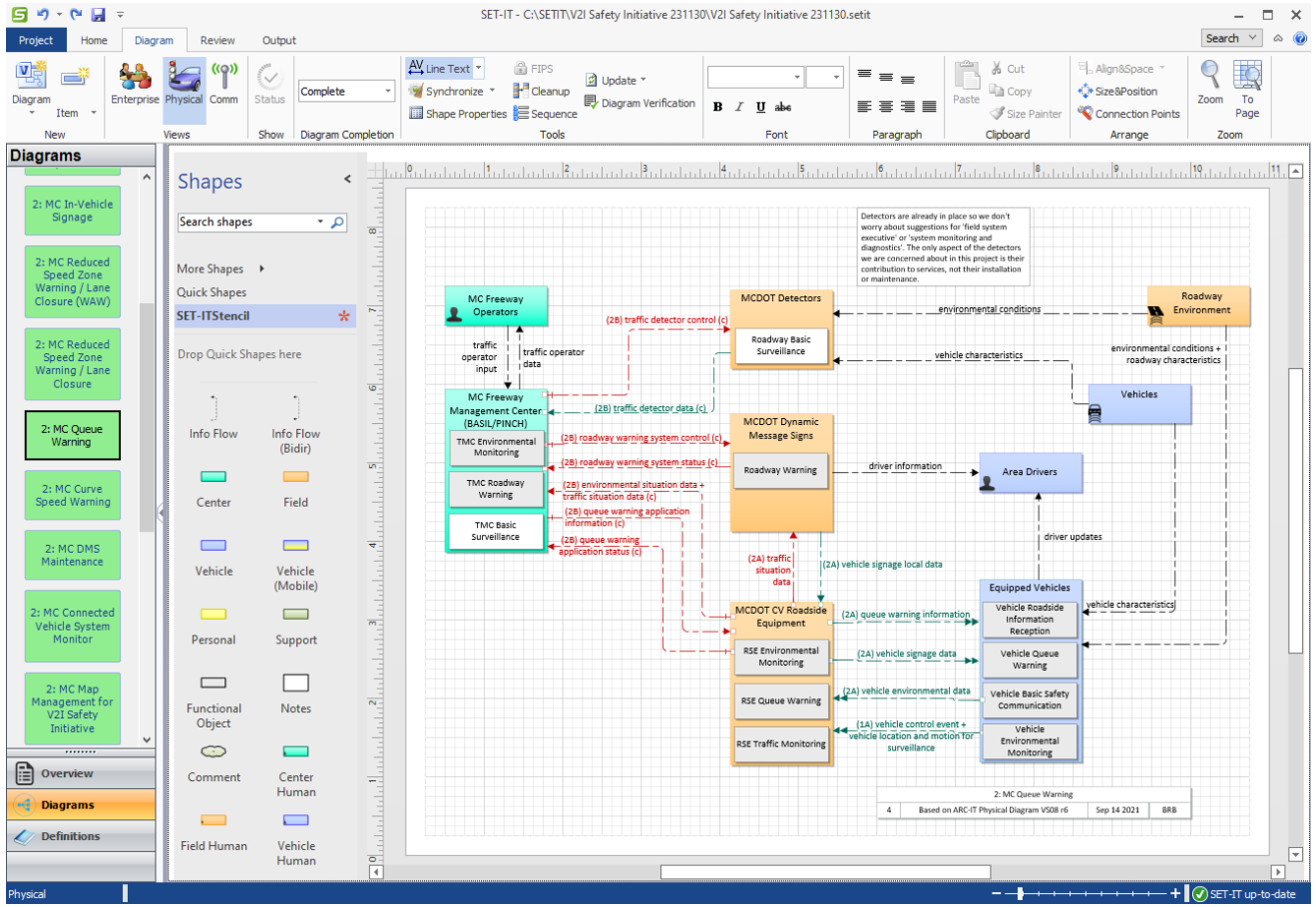
# Regional Architecture Development for Intelligent Transportation (RAD-IT)



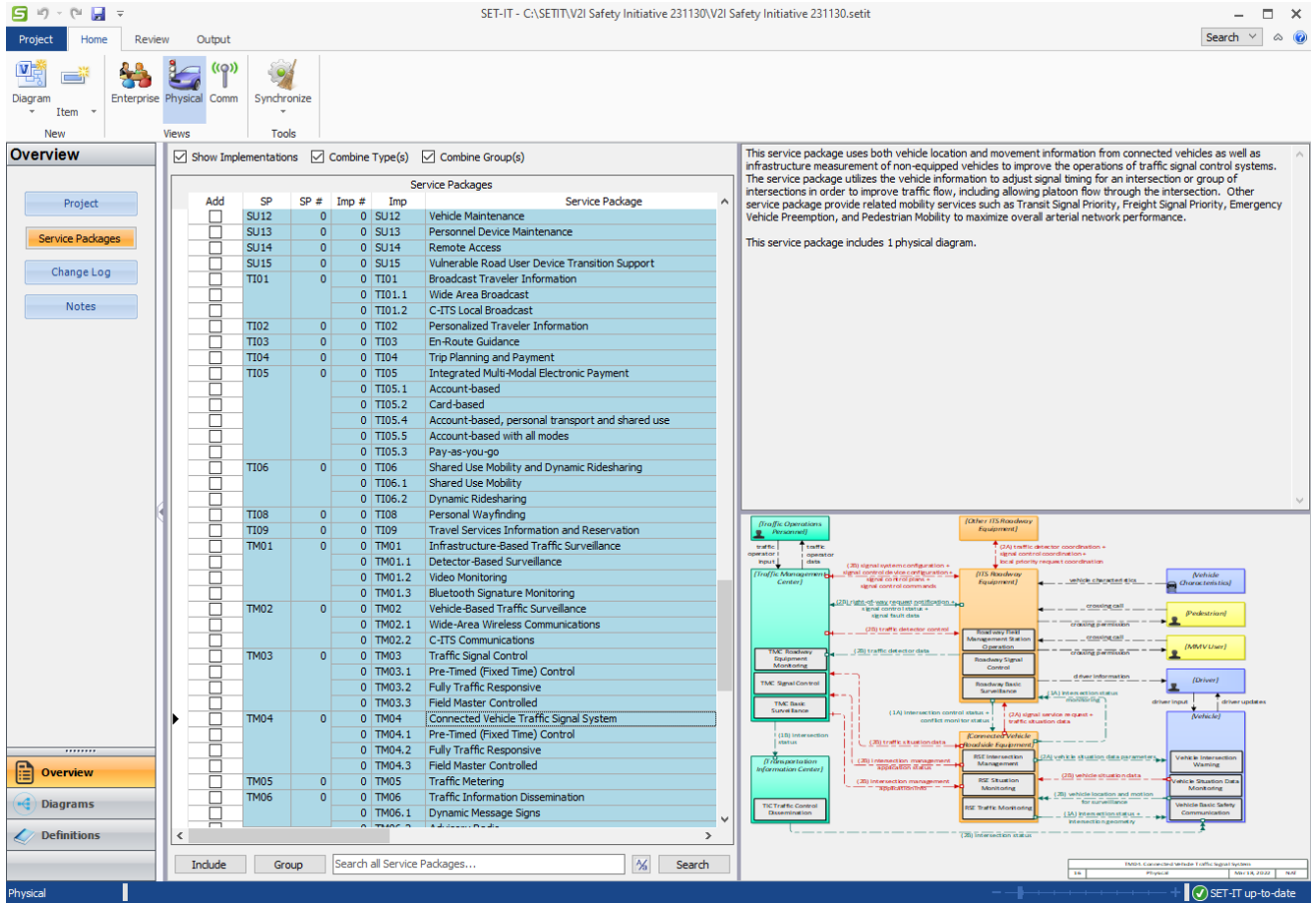
# Systems Engineering Tool for Intelligent Transportation (SET-IT)

- Originally to support Connected Vehicle project architecture development
- Expanded to include all ITS
- Creation of diagram-based project architectures
- Covering the Physical, Enterprise and Comm Views
- Outputs include Concept of Operations document, project document, Visio drawings.
- Microsoft Visio 2013 or newer

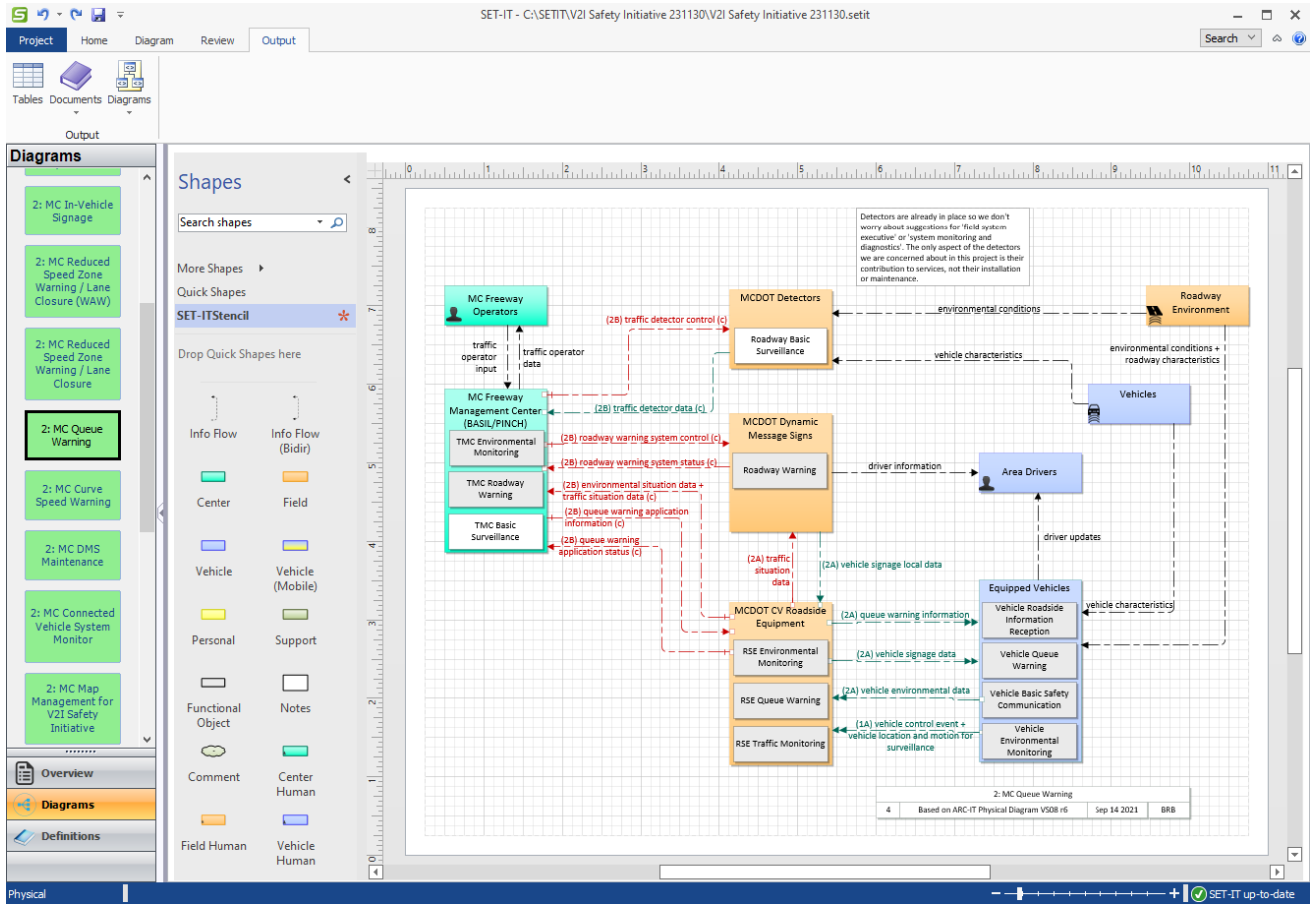
# SET-IT – Visually Customize a Project's Architecture

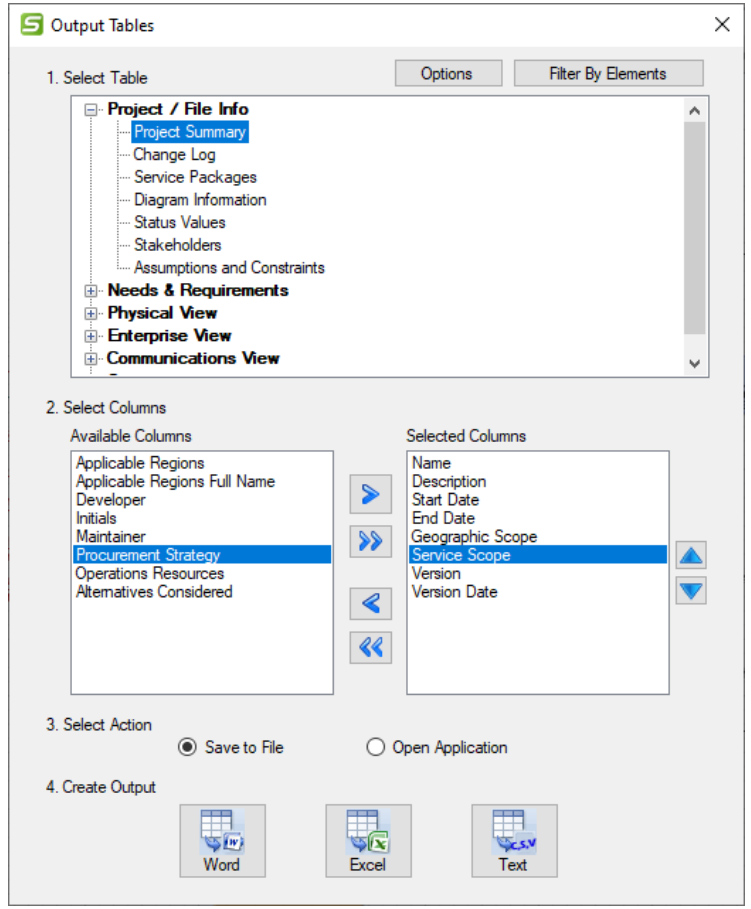


# SET-IT Provides Access to All ARC-IT Service Packages



# SET-IT User Interface & Output Menus



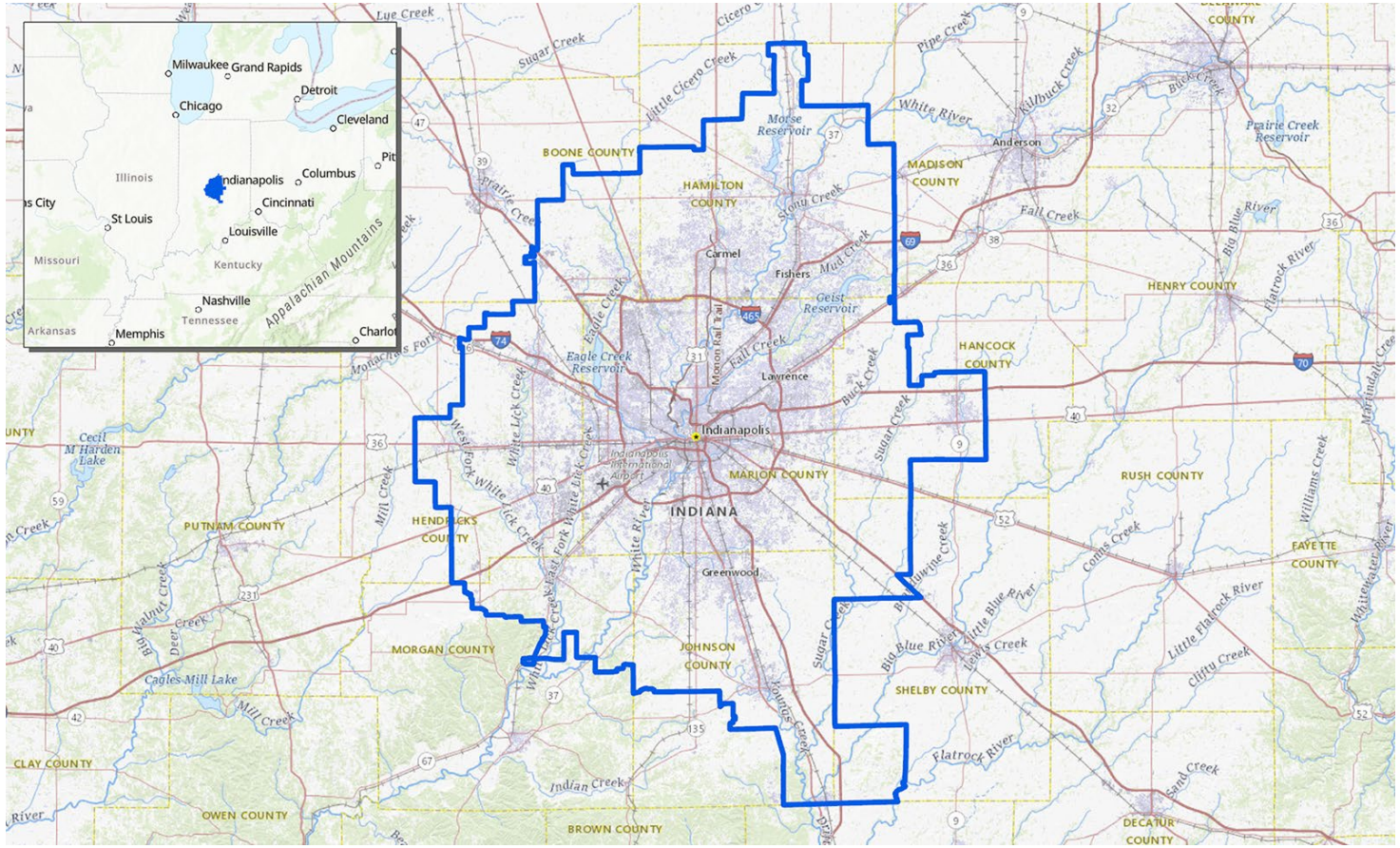
# ARC-IT Tools Integration

- SET-IT's Import: connecting regional planning to project definition
  - Take the Regional Architecture content as an input for a project in SET-IT
  - Drive more SE analysis using tools → requirements, ICDs, security, comm standards
- RAD-IT's Import supports feedback from a project back into the regional architecture

# Andrew Magee

Senior Planner
Indianapolis MPO

# Indianapolis MPO

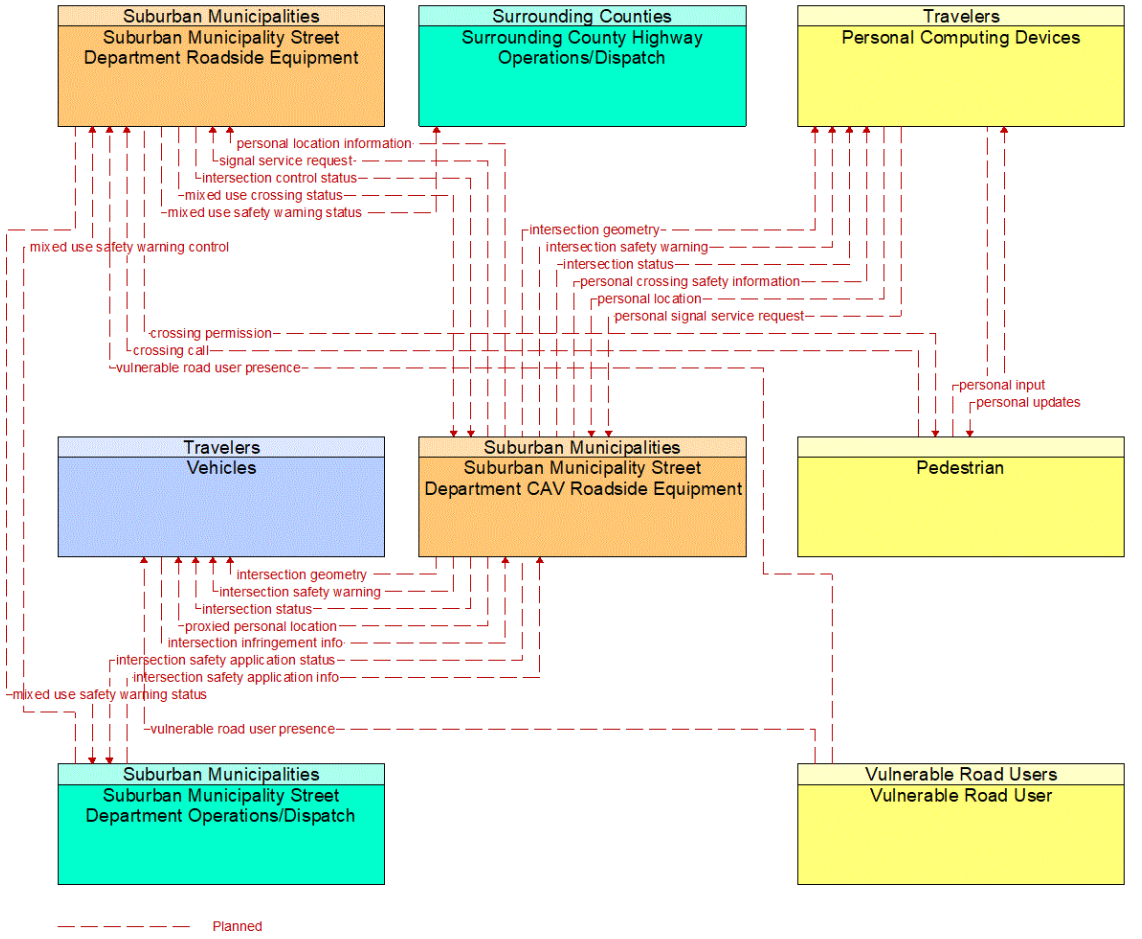


# Indianapolis Regional ITS Architecture

- Managed and maintained by Indianapolis MPO
- Representative of ITS across Central Indiana Region
  - Available to all agencies and communities to support ITS planning
  - Reference architecture for entire Region
- Supports Active Transportation Plan
  - Bike, pedestrian, micro-mobility devices such as shared scooters
  - Multimodal Accessible Travel (MAT) through interaction with existing transit systems such as Bus Rapid Transit and local bus service
  - Safety for Vulnerable Road Users
- Architecture Update Project will be completed in January 2024
  - Incorporated VRU Safety and MAT services supporting Active Transportation Plan
  - Developed example projects to facilitate stakeholder engagement
  - Phased approach for MAT: Planning, En-Route Guidance, and Payment Integration

# Vulnerable Road User Safety

- Detection of VRU via
  - Roadside devices (cameras)
  - Mobile device (smart phone)
- VRU presence communicated to CAV Roadside Equipment
  - Communication to CAV-equipped vehicles
- Use of “generic” stakeholder Roadside Equipment supports planning as stakeholders are ready



# Poll Question

# Architecture Deployment Support

Intelligent Transportation Systems Joint Program Office

U.S. Department of Transportation

# ARC-IT Training Available

| Topic Area | Web-Based Training | On-Site Training | Workshops |
|---|---|---|---|
| ITS Architecture | ARC-IT Web-Based<br>RA Use & Maintenance Web-Based | ARC-IT 101 / Refresher | Quick-Starting Your RA Update<br>Architecture Development<br>Use & Maintenance Workshop |
| Software Tools | RAD-IT Web-Based<br>SET-IT Web-Based | RAD-IT<br>SET-IT | --- |
| Systems Engineering | --- | Systems Engineering | Systems Engineering for ITS |

{Directly from the website} {Coordinated w FHWA Operations}

# Technical Assistance Available from FHWA

- ITS Architecture Assessments
- Process Improvement Reviews
- Tools Assistance

| 1. Architecture Scope and Region Description | | Purple |
|---|---|---|
| *General Scope Comments Here* | | |
| **Question** | **Answer** | **Comments** |
| a. Is the region defined geographically? Have boundaries been established such as counties, municipal boundaries, metropolitan areas, statewide, etc.? | Unknown | |
| b. Has a timeframe for the architecture been defined? (For example, 5 or 10 years into the future, or the TIP/STIP or other Capital Plan planning period)? | Unknown | |
| c. Has the scope of the regional architecture been defined (i.e. the range of services, institutions, or jurisdictions)? Does the scope seem appropriate given the circumstances? | Unknown | |
| d. Are adjacent/overlapping ITS architectures identified? | Unknown | |

## Contact

- FHWA Resource Center/Division Offices
- Kingsley Azubike, FHWA Office of Operations (kingsley.azubike@dot.gov)

- https://ops.fhwa.dot.gov/its_arch_imp/index.htm

# ITS PCB Trainings


www.pcb.its.dot.gov/itscourses/default.aspx#training

# New Web-Based Trainings & In-Person Trainings

## Web-based Trainings (WBT)

- ITS: What, Why, and How
- Improving Highway Safety with ITS
- *ITS Cybersecurity**
- *ITS Systems Engineering**

nhi national highway institute

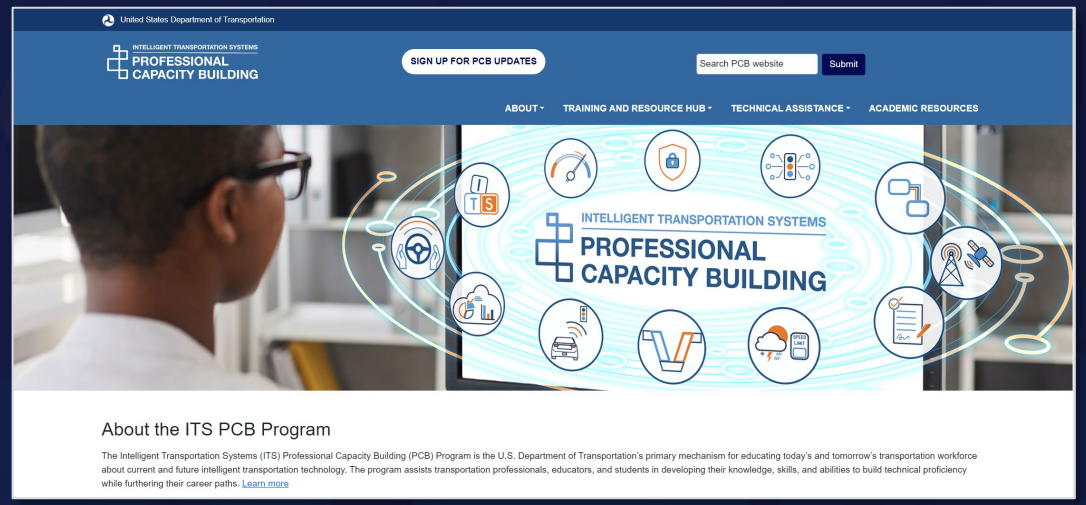
www.nhi.fhwa.dot.gov

## In-Person Trainings
*(Offered to ITS State Chapters)*

- Crowdsourcing for Advancing Operations
- Building an ITS Project SOW to Carry Out the Systems Engineering Process
- Applying the NIST Framework to Transportation Systems
- *V2X Foundational Training**

** In Development; available in early 2024*

# Thank You for Coming




For more information, visit:

www.pcb.its.dot.gov