Setting Deployers Up for Success

Using Technical Assistance Resources to Make a Better Business Case for Deployment, Improve Project Execution, and Accelerate ITS Deployment

Today's Presenters

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U.S. Department of Transportation
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Turn on voting in Interactivity to let participants vote for their favorites

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Where do you work?

ITS Joint Program Office: Full ITS Lifecycle Leadership

Identify Emerging Technologies

- Communications/Spectrum
- Climate Change and Environment
- Artificial Intelligence
- Blockchain & Quantum Computing
- Modeling and Simulation

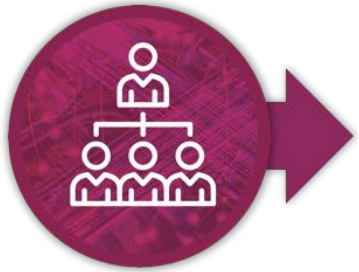
Coordinate and Lead Research

- V2X / Interoperable Connectivity
- Roadway Safety
- Automation
- Cybersecurity
- Data Access/Exchanges

Demonstrate Value

- **ITS4US Deployments**
- **CV Pilots**
- **Benefit & Cost Data**
- ATTAIN & SMART Grants
- Intersection Safety Challenge
- Decision Support & Analytics

Accelerate Implementation



- **Deployment Evaluation**
- **Professional Capacity Building**
- **Architecture & Standards**
- Communications & Outreach

Leverage Knowledge

- Deployment Tracking
- **Smart Communities Resource Center**
- **Technical Assistance**
- **Cohort Support**
- **Knowledge Transfer**
- **Training**

“Solving Problems Worth Solving”

Safety

Mobility

Equity

Climate & Sustainability

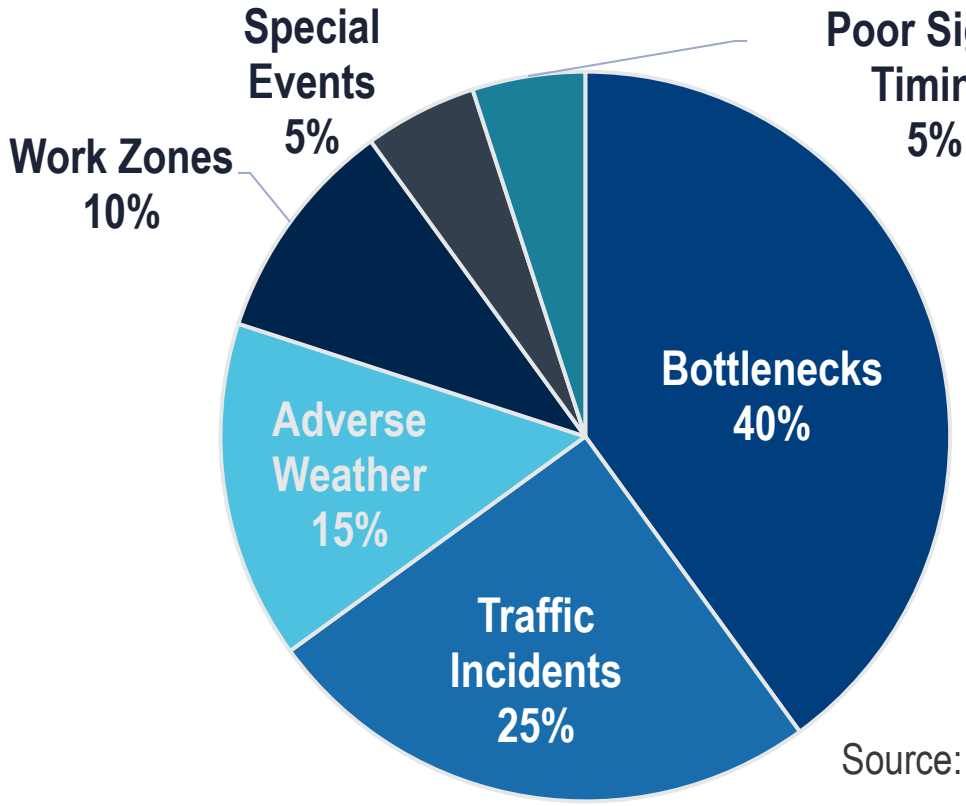
Safety Challenges

- **118 people die** on our roadways daily.
  - Roughly **25% of traffic fatalities** and about 50% of all traffic injuries in the U.S. **occur at intersections**.
  - Roadway **pedestrian and cyclist fatalities** totaled 8,952 in 2022 (▲ 2.3% from 2021).
  - The overall fatality rate is **1.7 times higher in rural areas** than urban areas.

Source: USDOT

Mobility Challenges

- In 2022, traffic congestion led to:
  - 51 hours lost (per typical driver) which cost the average driver $869 in lost time (2022 INRIX Traffic Scorecard).
  - $81 billion in economic cost to the country (2022 INRIX Traffic Scorecard).
- Mobility challenges often result in increased traffic crashes.



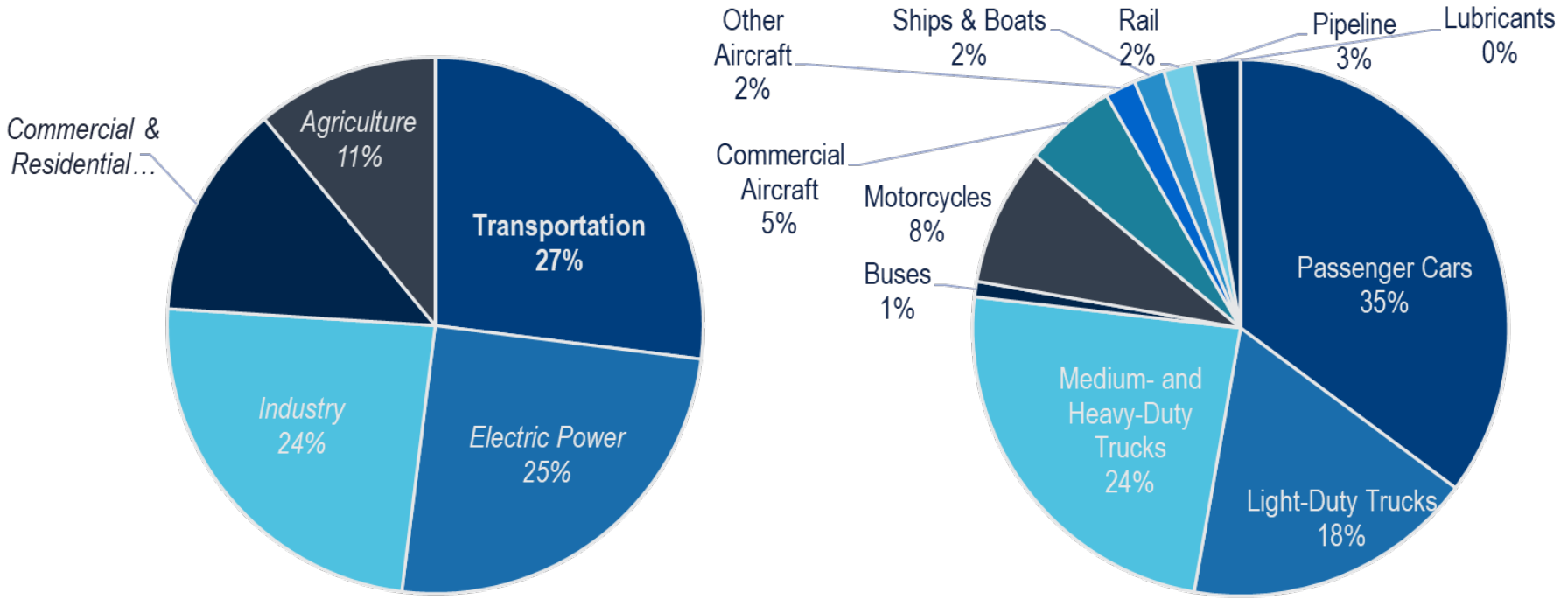
Source: USDOT

Equity Challenges

- According to the National Household Travel survey, 25.5 million Americans have travel-limiting disabilities.
- Nearly 10% of households do not have access to a personal vehicle.
  - Lack of access to alternatives to personal vehicles can limit access to jobs, school, healthcare, and social services leading to higher rates of unemployment, poverty, chronic illness, and isolation.
- Roughly 25% of all transit stations in the U.S. were not accessible in FY2020.
- People who are American Indian and Alaska Native have roadway fatality rates more than double the national rate on a per population basis.

Source: USDOT

Climate & Sustainability Challenges



Total U.S. Greenhouse Gas Emissions by Economic Sector in 2020 (left) and Transportation-Related GHG Emissions (right) - Source: EPA

Intelligent Transportation Systems (ITS)

You can't build your way out of congestion

…

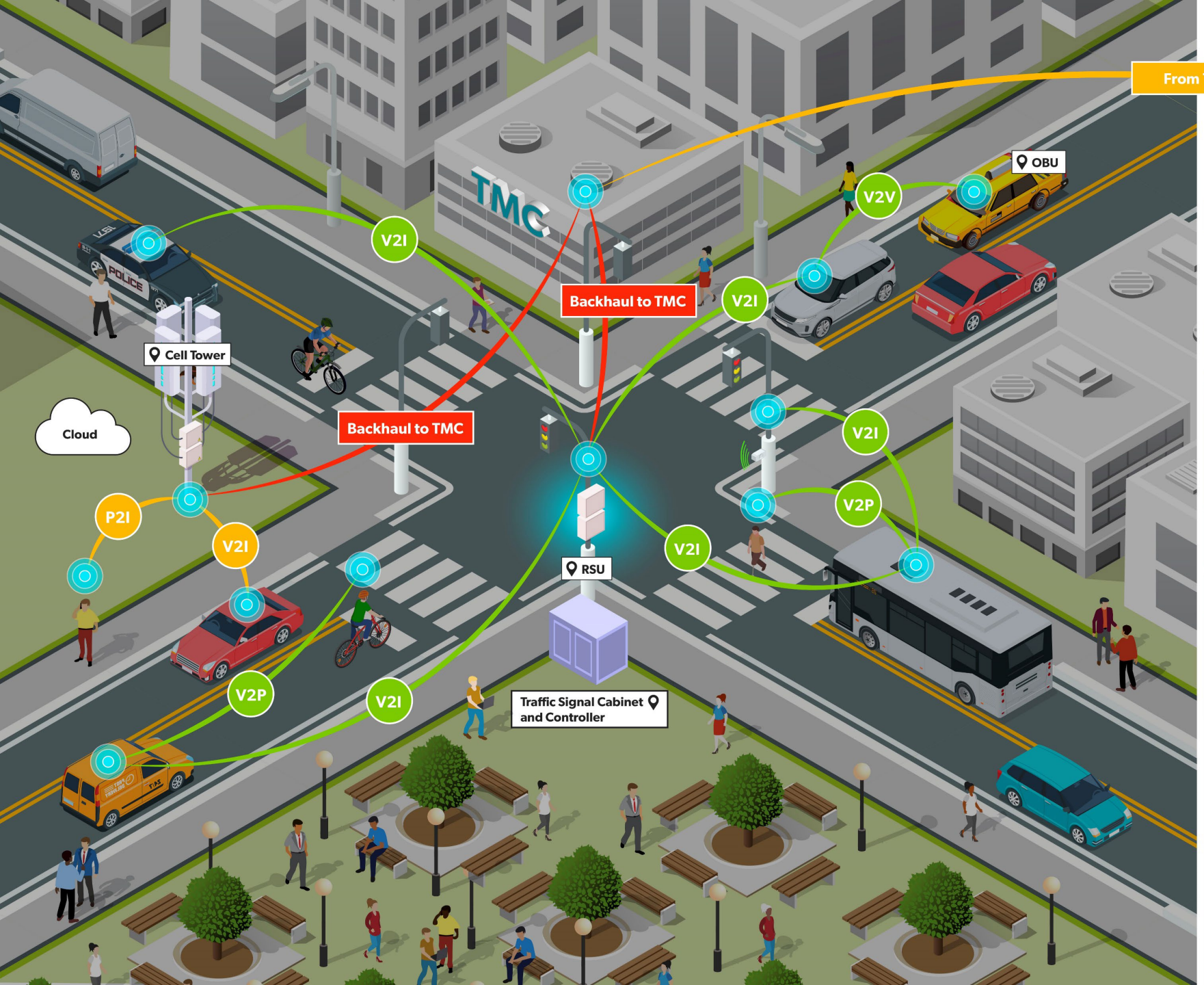
But you can better operate the transportation system to improve safety, reliability, and overall system efficiency

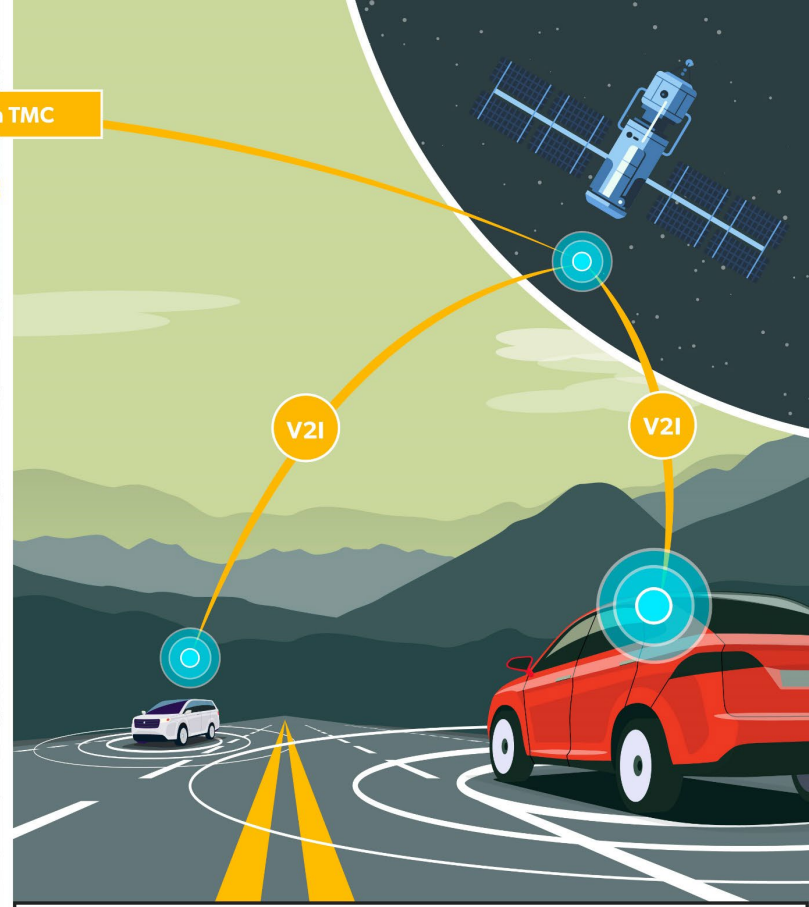
Source: iStock

Example ITS Solutions

- Traffic signal coordination
- Transit signal priority
- Congestion pricing
- Managed lanes
- Ridesharing programs
- Electronic toll collection
- Traveler information
- Freight management
- Parking management
- Freeway management
- Traffic incident management
- Work zone management
- Special event management
- Road weather management
- Integrated Corridor Management (ICM)
- Active Transportation and Demand Management (ATDM)
- Coordinated highway, transit, bicycle, and pedestrian operations

Vehicle to Everything (V2X) is the use of a **variety of wireless communications technologies** to enable vehicles to communicate with each other, with other road users, such as pedestrians and bicyclists, and infrastructure.





V2X Communication Using the 5.9 GHz Safety Band (e.g., LTE-V2X Sidelink)

V2X Communication Outside the 5.9 GHz Safety Band (e.g., LTE Uu Link, Satellite)

Backhaul to TMC

Abbreviations:

V2X - Vehicle-to-Everything
V2V - Vehicle-to-Vehicle
V2P - Vehicle-to-Pedestrian/Bicyclist
V2I - Vehicle-to-Infrastructure
P2I - Pedestrian-to-Infrastructure
RSU - Roadside Unit
OBU - Vehicle On-board Unit
TMC - Traffic Management Center
LTE - Long-Term Evolution

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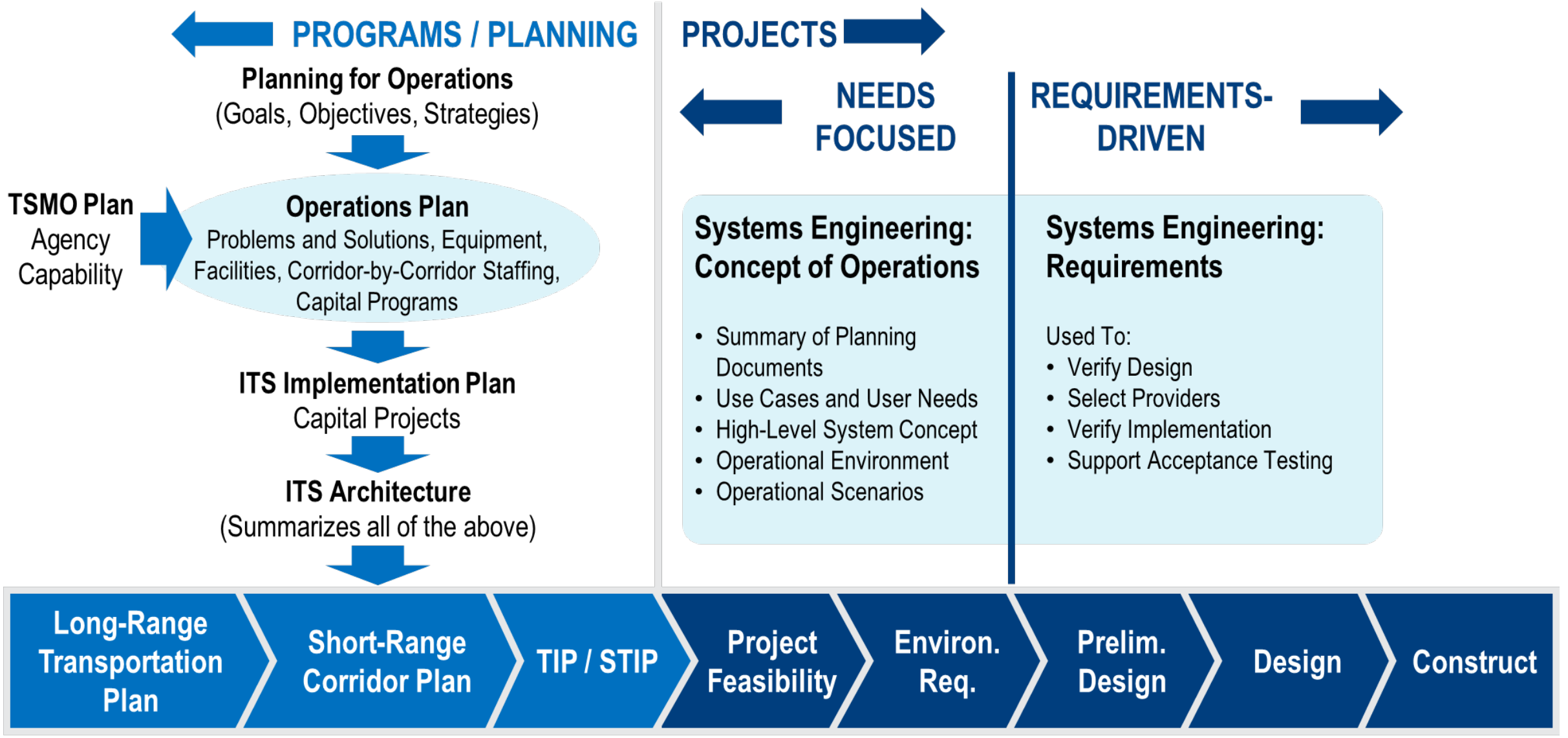
What documents and tools does your agency/regional use to support ITS Planning?

All responses to your question will be shown here

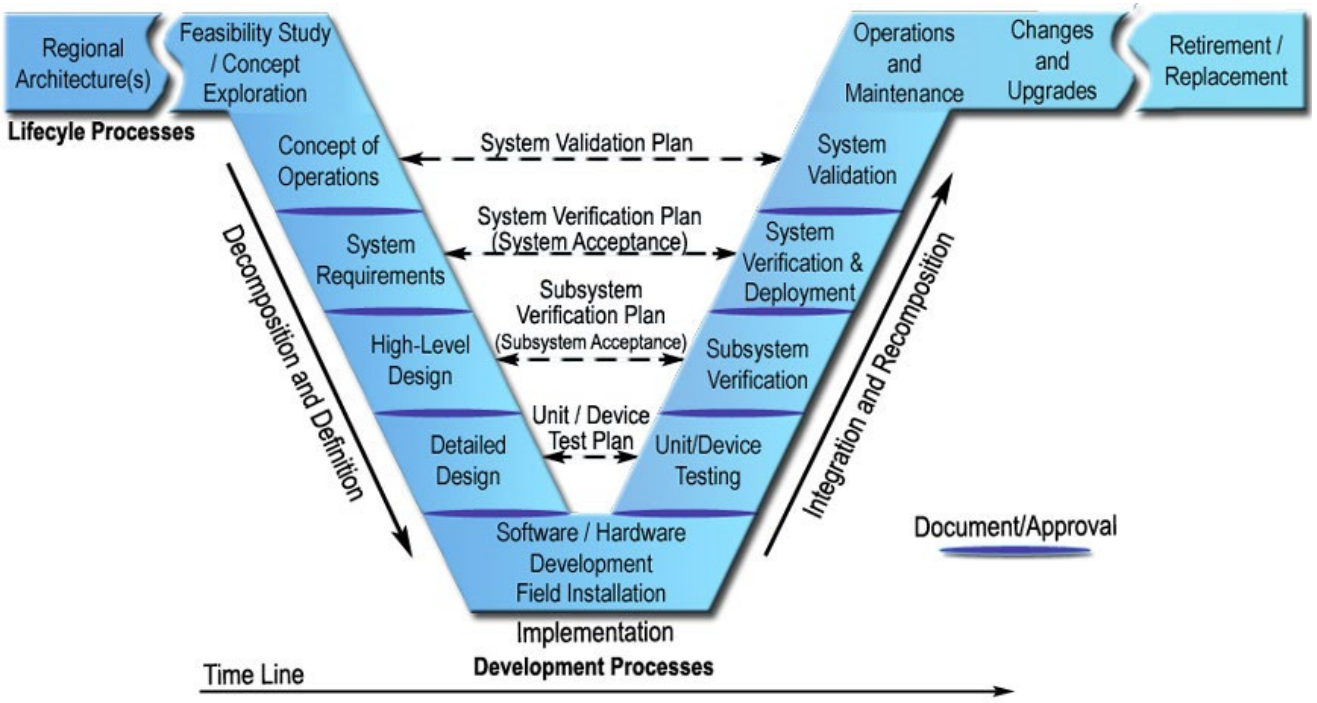
Each response can be up to 200 characters long

Turn on voting in Interactivity to let participants vote for their favorites

Where Does ITS Fit into the Planning Process?



ITS and Systems Engineering

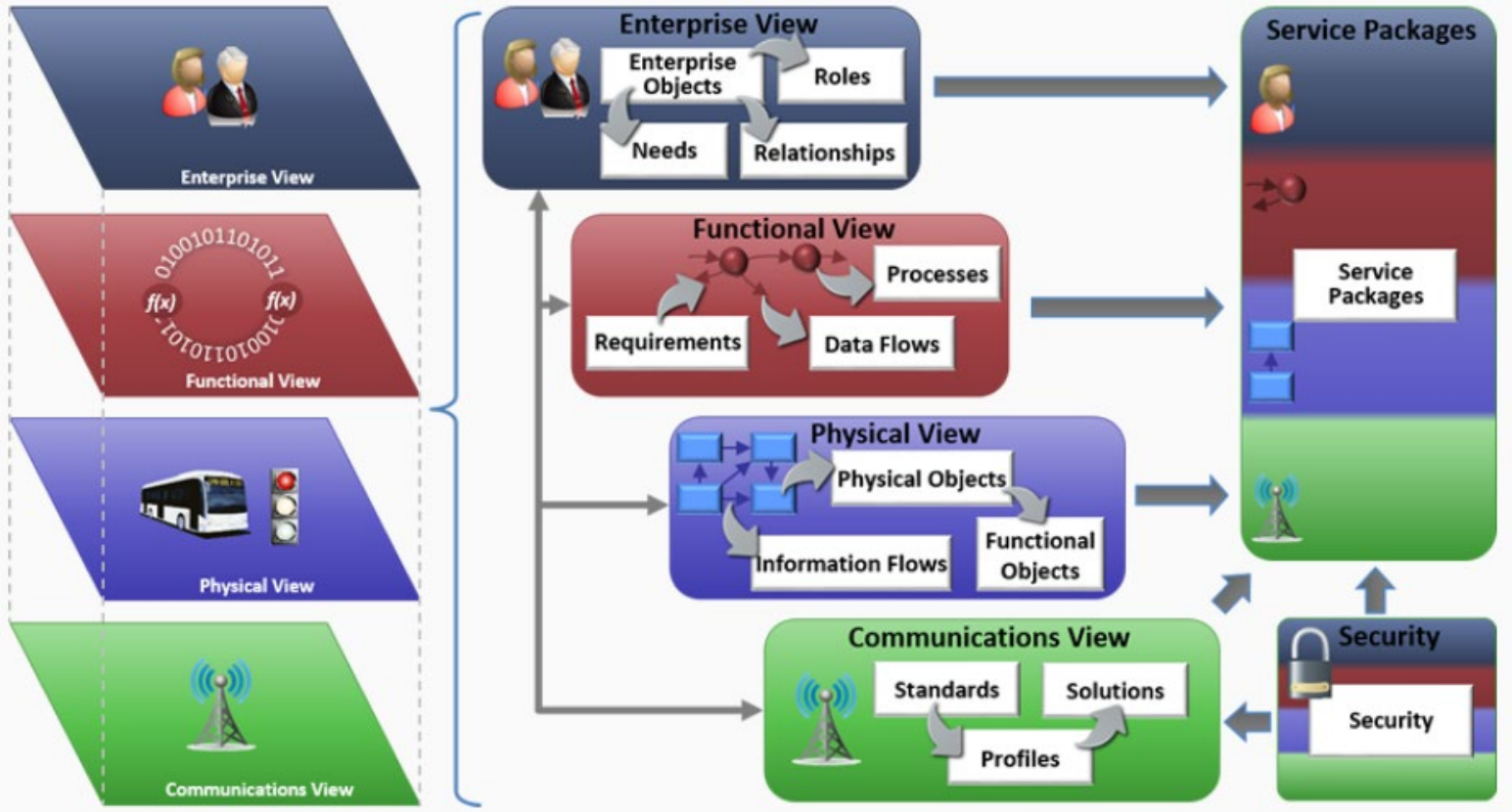


Systems Engineering benefits include:

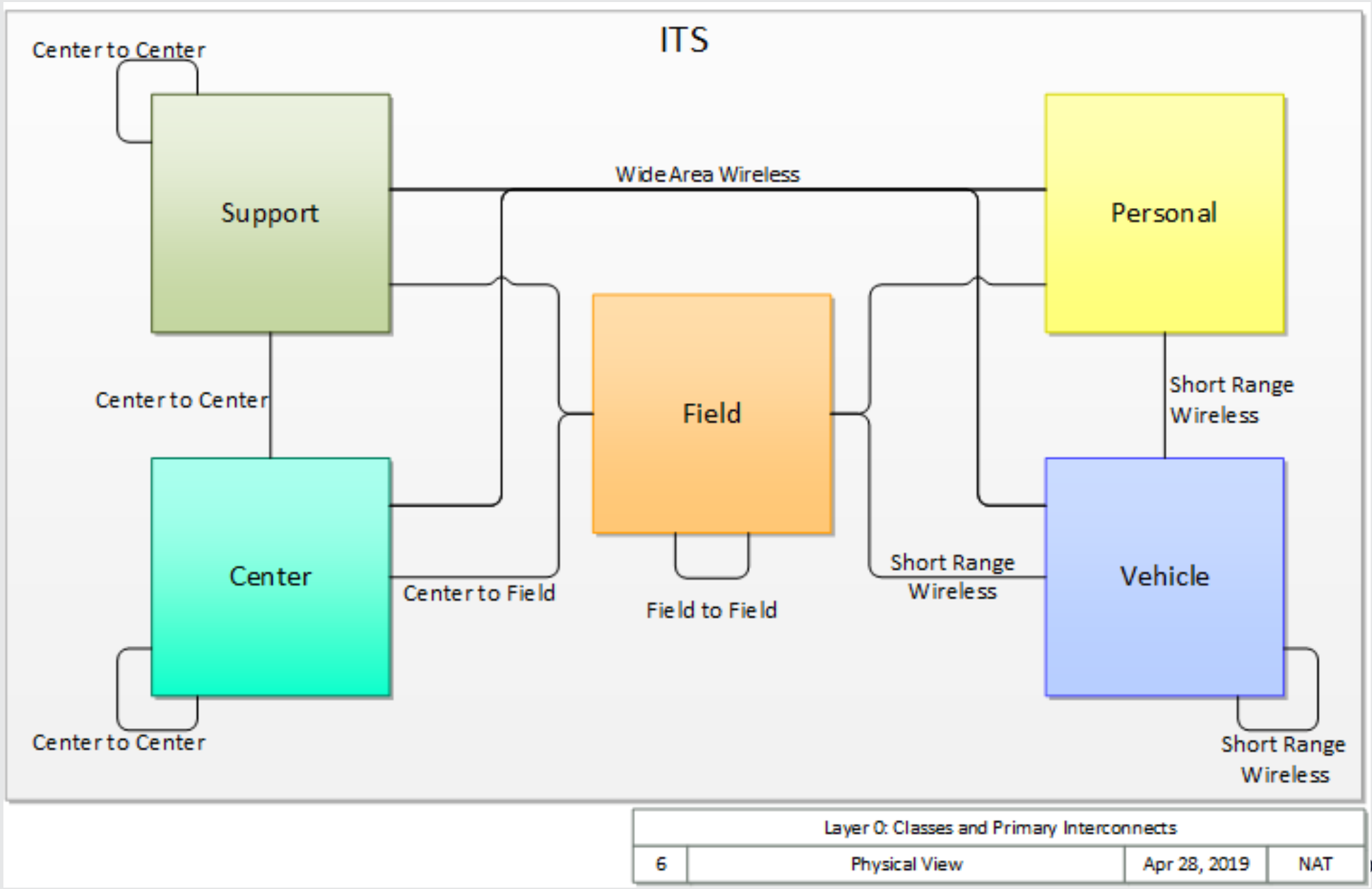
- Better system documentation
- Higher level of user engagement
- System functionality that meets user needs
- Potential for shorter project cycles
- Systems that can evolve with a minimum of redesign and cost
- Higher level of system reuse
- More predictable outcomes from projects

ITS Architecture (ARC-IT)

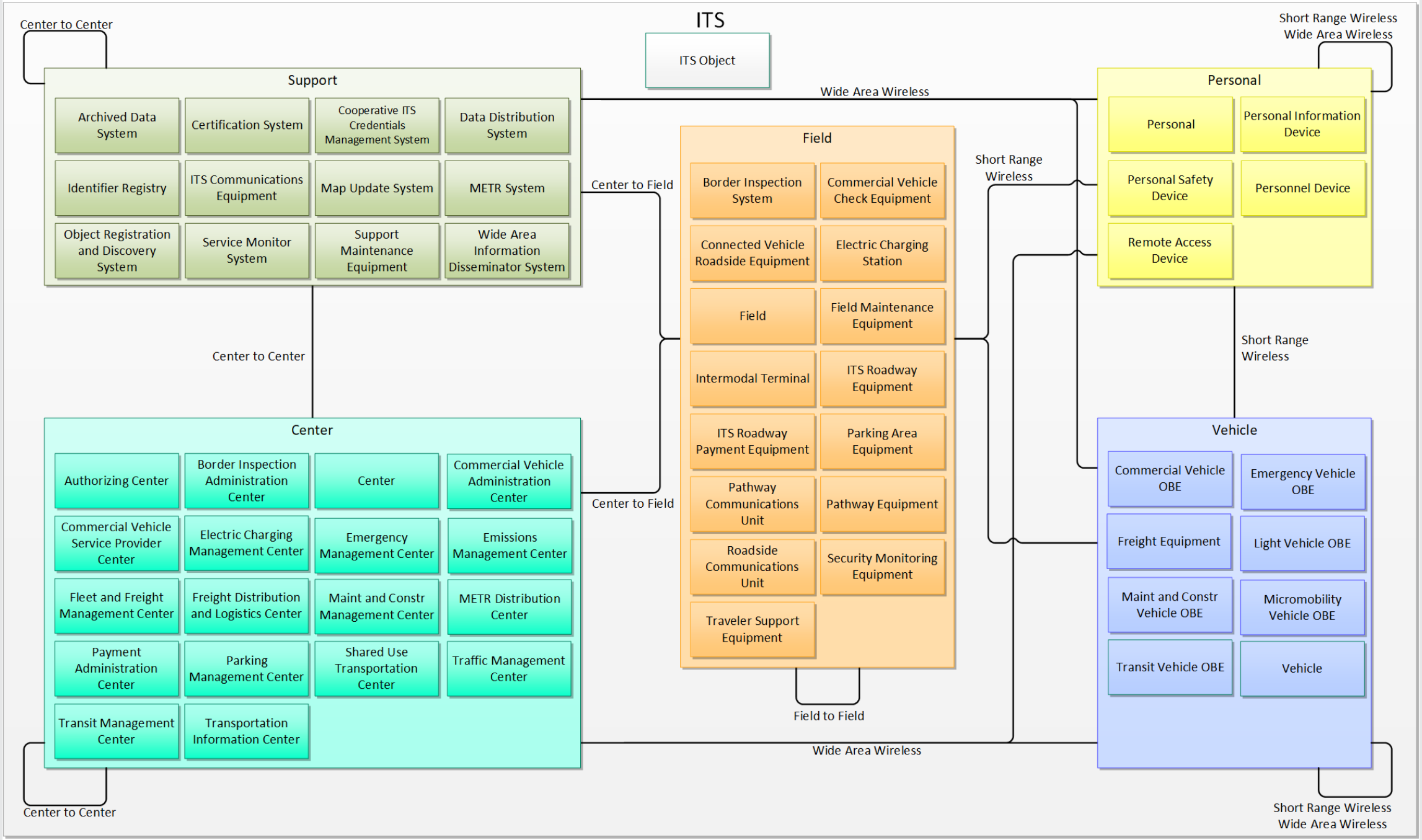
www.arc-it.net



Source: USDOT


ITS
Center to Center
Support
Wide Area Wireless
Personal
Center to Center
Field
Short Range
Wireless
Center
Center to Field
Field to Field
Short Range
Wireless
Vehicle
Center to Center
Short Range
Wireless
Layer 0: Classes and Primary Interconnects
6
Physical View
Apr 28, 2019
NAT

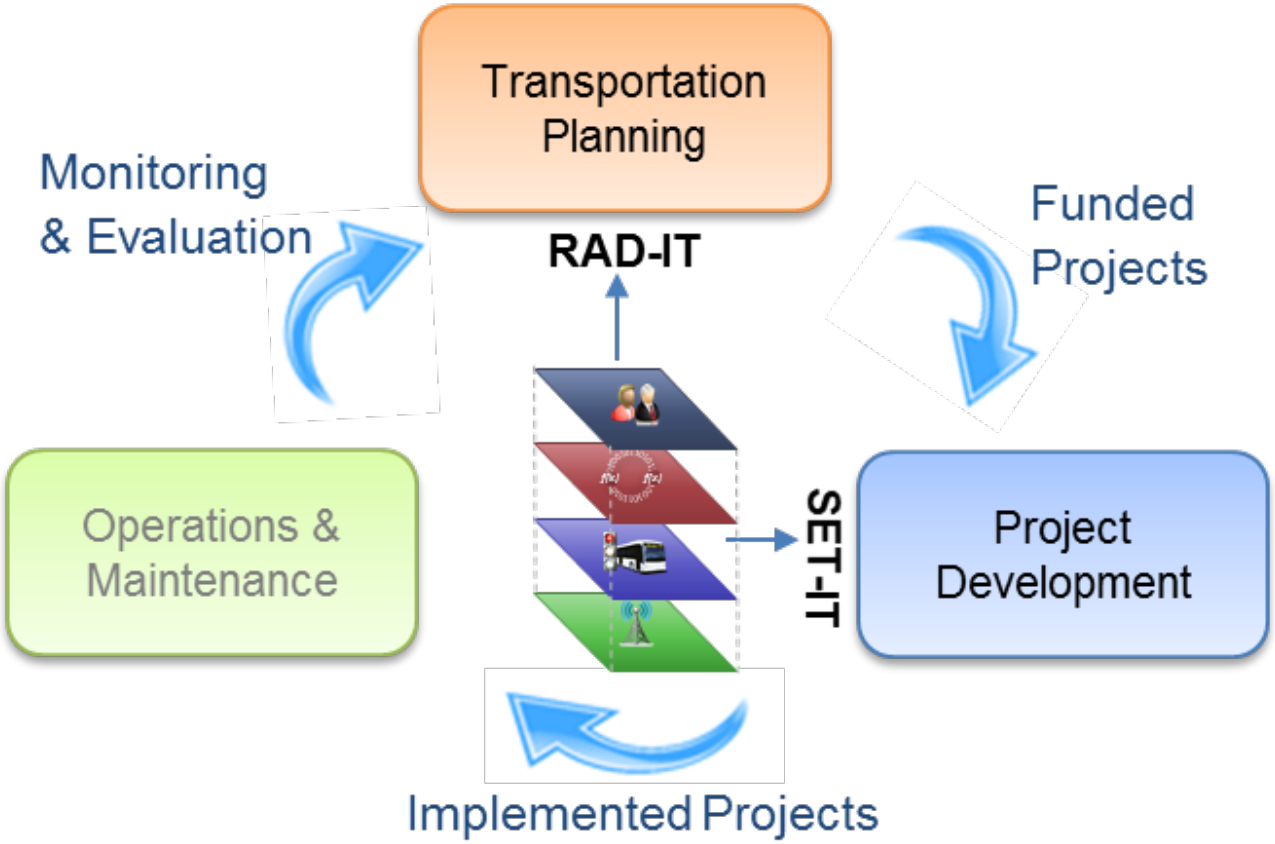
Diagram



ARC-IT Subsystem Diagram			
9	Physical View	Aug 12, 2023	NAT

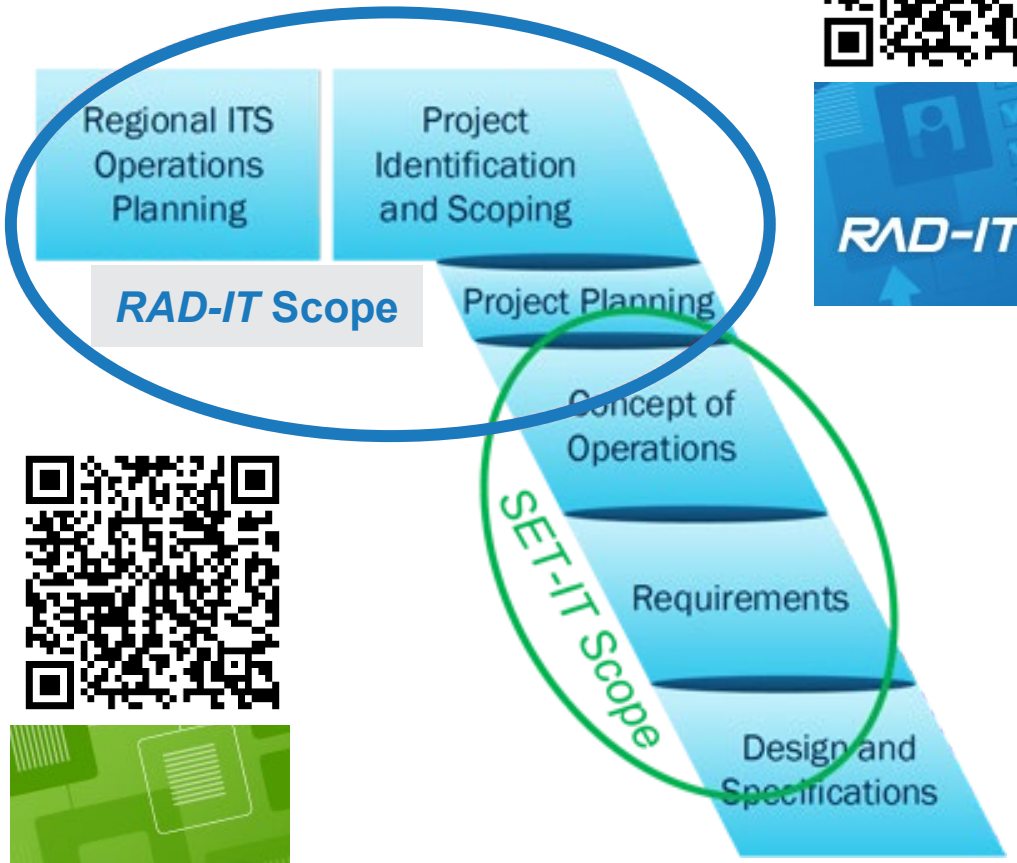
How are the Reference Architecture and Tools used?

- Focuses on “what must be done” not “how it will be done”
- Regional ITS architecture supports major steps:
  - Planning
  - Programming
  - Development
  - Implementation



Regional ITS Architectures

- **Regional architectures** are structured descriptions of services provided, relationships required, and items to be deployed, operated, maintained and managed.
- Regional ITS Architectures help jumpstart the SE process supported by two tools:
  - RAD-IT – Regional Architecture Design for Intelligent Transportation
  - SET-IT – System Engineering Tool for Intelligent Transportation



ITS Technical Assistance Resources

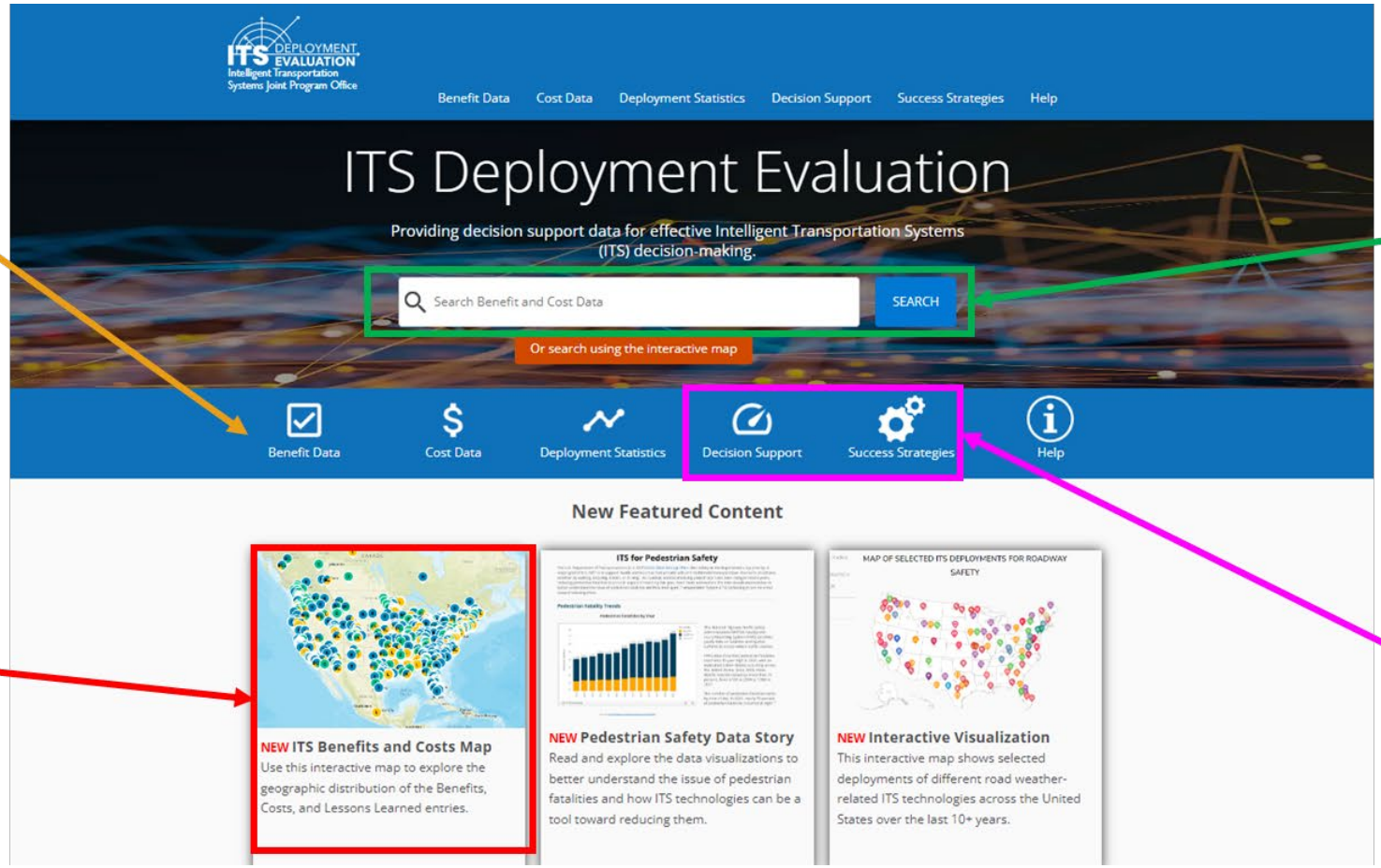
- ITS Deployment Evaluation Resources
- Smart Community Resource Center (SCRC)
  - ITS and Safety
  - Interoperable Connectivity (V2X)
  - Systems Engineering
- ITS Trainings and Other Technical Assistance Resources
- DOT Navigator and Federal Grants for ITS

ITS Deployment Evaluation

www.itskrs.its.dot.gov

Focused ITS Benefit and Cost Data

Searchable ITS Benefits and Costs Map



Global Keyword Search

Decision Support Resources

Source: USDOT

Example ITS Benefits

Dynamic ramp metering strategies designed to actively counter developing bottlenecks can reduce vehicle delay up to 48 percent.

Experience using real-time traffic data to improve ramp metering and mainline performance on Highway-100 in Minneapolis, Minnesota.

A Variable Speed Limit System on I-95 in in Virginia Reduced Fatal and Serious Crashes by 13 Percent.

A Nine-Month Before and After State Study Showed That Variable Speed Limit System Increased Safety on a Freeway in Virginia During Congested Conditions.

A Queue Warning System Installed near Downtown Minneapolis Was Found to Reduce Crashes by 56 Percent and Near Crashes by 69 Percent after Two Years.

Safety Evaluation of Minnesota's Queue Warning System Implemented on Interstate-94.

Truck-mounted radar speed signs were effective in reducing traffic speeds by 5 to 23 percent versus reductions of 4 to 8 percent in work zones without them.

Evaluation of the use of radar speed displays for mobile maintenance operations at four sites in Oregon.

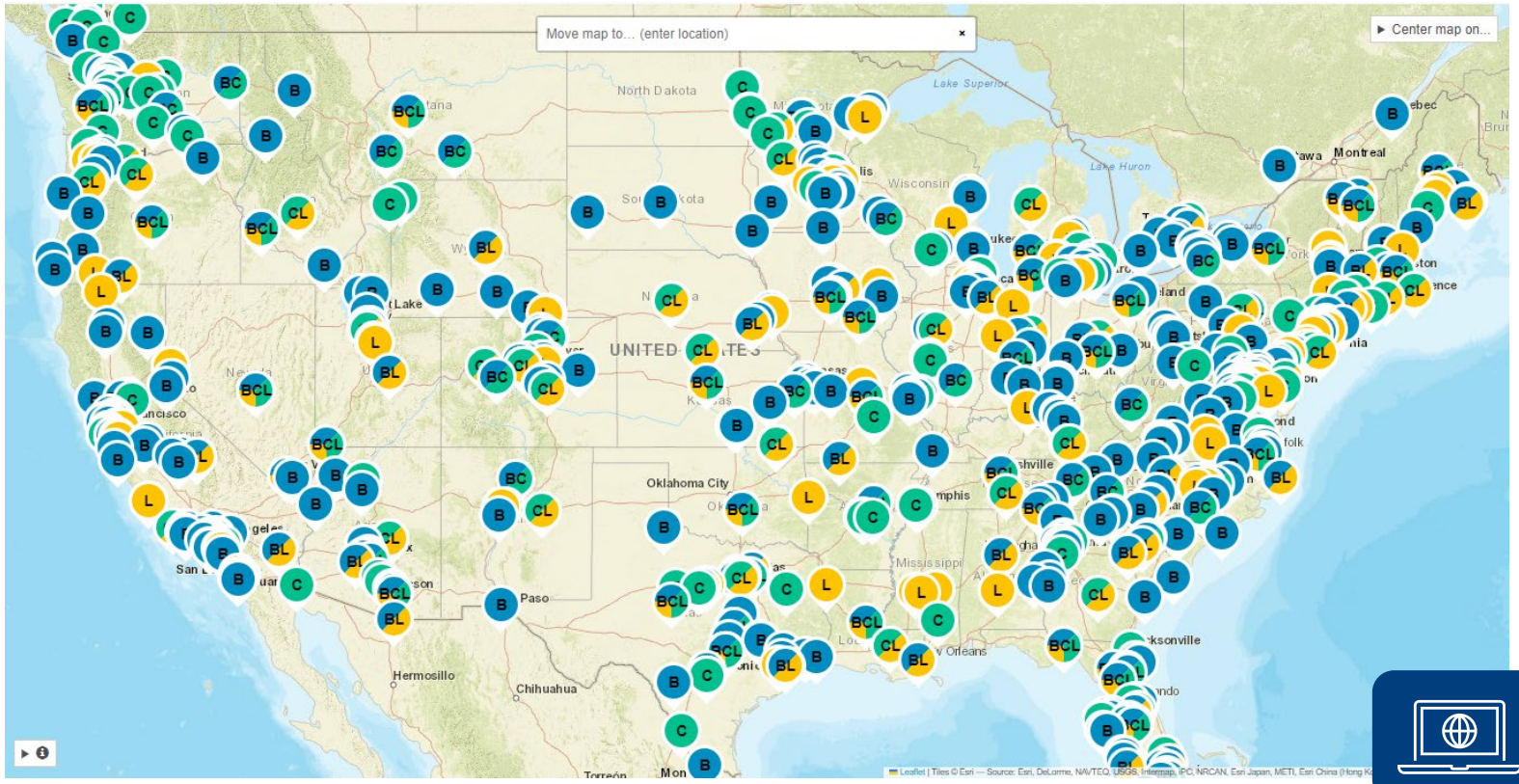
Maryland switches to all electronic tolling on certain bridges and estimates that drivers in the state will collectively save $1.0 million per year in fuel costs.

A newspaper reporter highlights the benefits of all electronic tolling in Maryland.

Example ITS System Cost Entry

Item	Cost
Vendor (RSU, sensors, system + maintenance for 12 months, and install staff time)	$50,000
MDOT State Highway Administration (SHA) project management and installation staff time	$20,000
MDOT SHA Engineering Design	$7,500
MDOT SHA Offices review, approval, and install (mixed staff and consultant support)	$6,500
Total rounded cost	**$84,000**

ITS Benefits, Costs, and Lessons Learned



Search by:

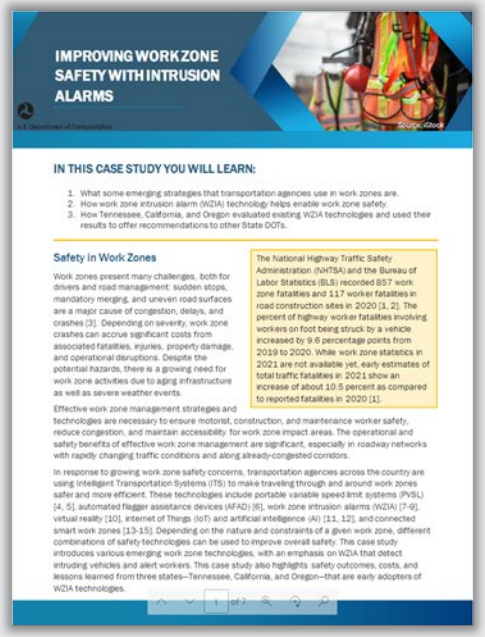
- Keyword
- ITS Topic
- Goal Area
- CV Benefits/Costs
- Result Type (Modeled or Deployed)

www.itskrs.its.dot.gov/its-map

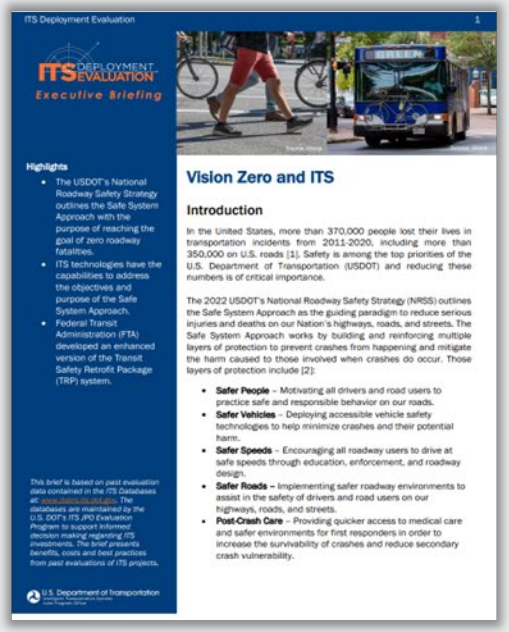
Other Resources to Help with Evaluation

- ITS Executive Briefings
- ITS Deployment Case Studies
- Infographics
- Data Visualizations
- Deployment Data
- ROI Guide and Use Cases

Case Studies

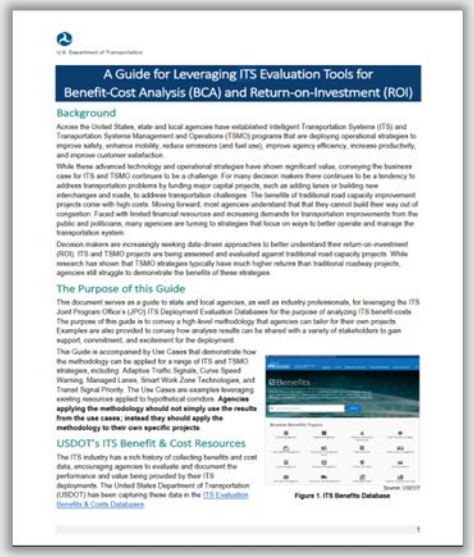


Executive Briefings

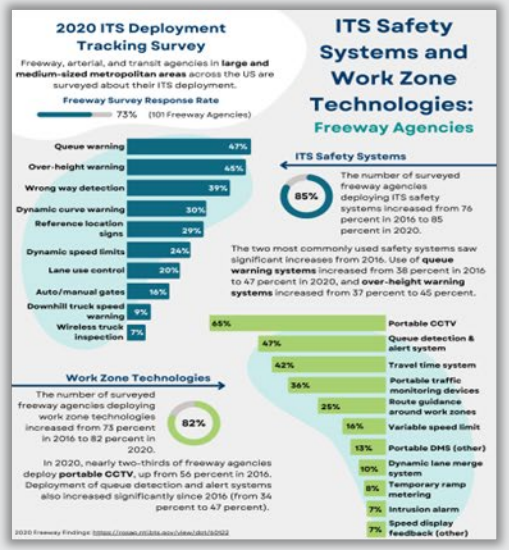


Infographics

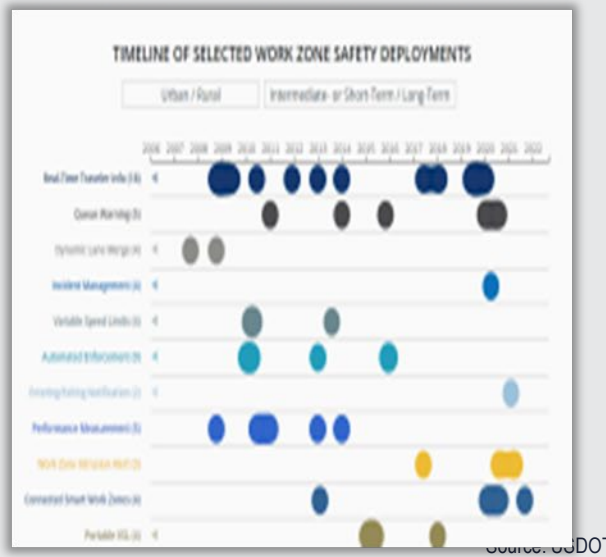
ROI Sample Use Cases



ITS Deployment Data



Interactive Data Visualizations

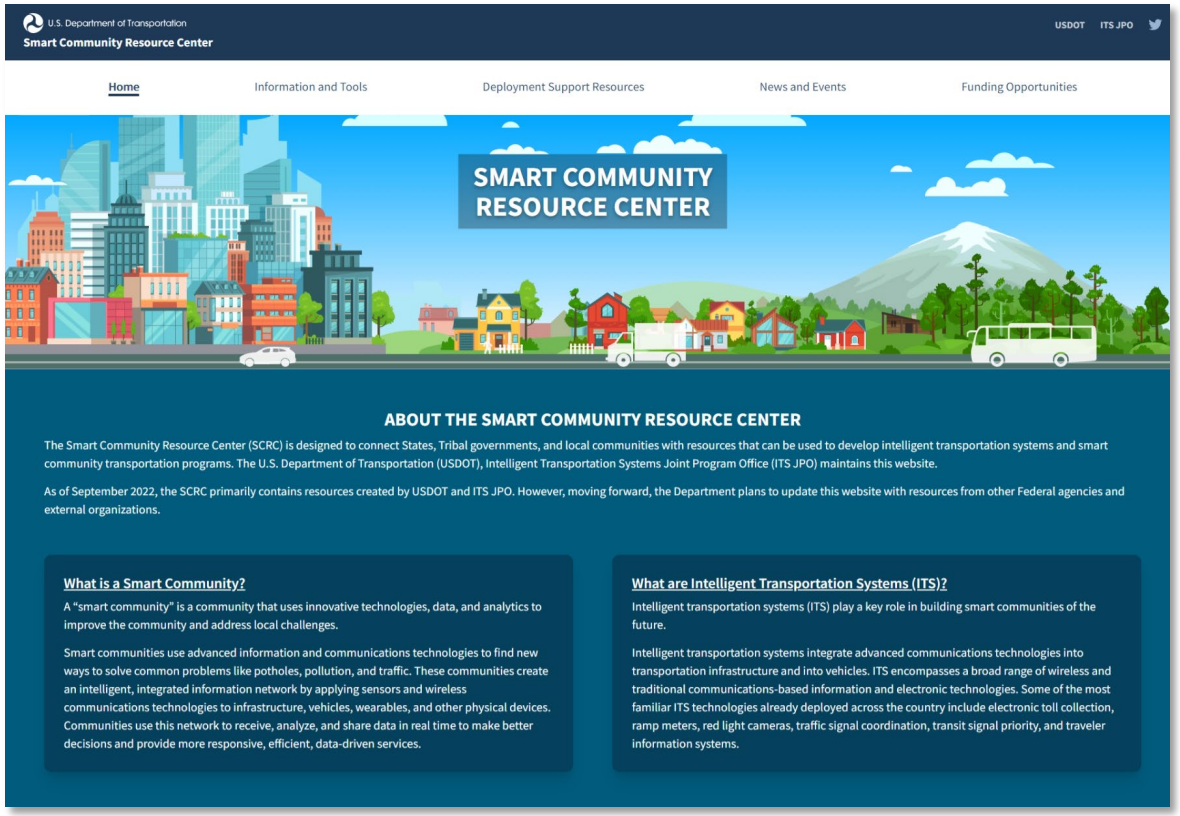


Source: USDOT

Smart Community Resource Center (SCRC)

- Online resource supporting information sharing and technical assistance related to ITS and Smart Community deployments.
- The site will evolve over time to continue being a source of current information, data and tools to support ITS investments.

www.its.dot.gov/scrc

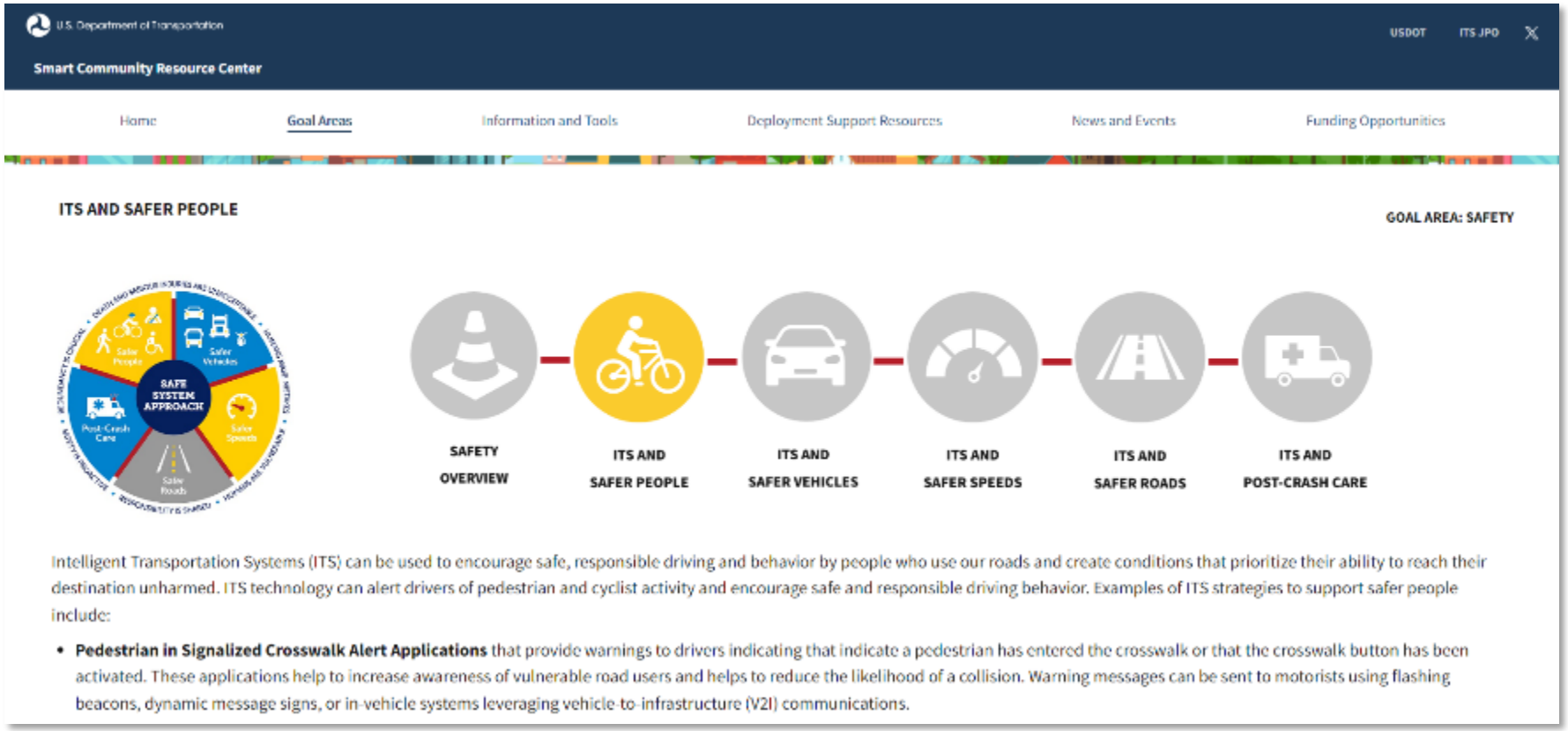


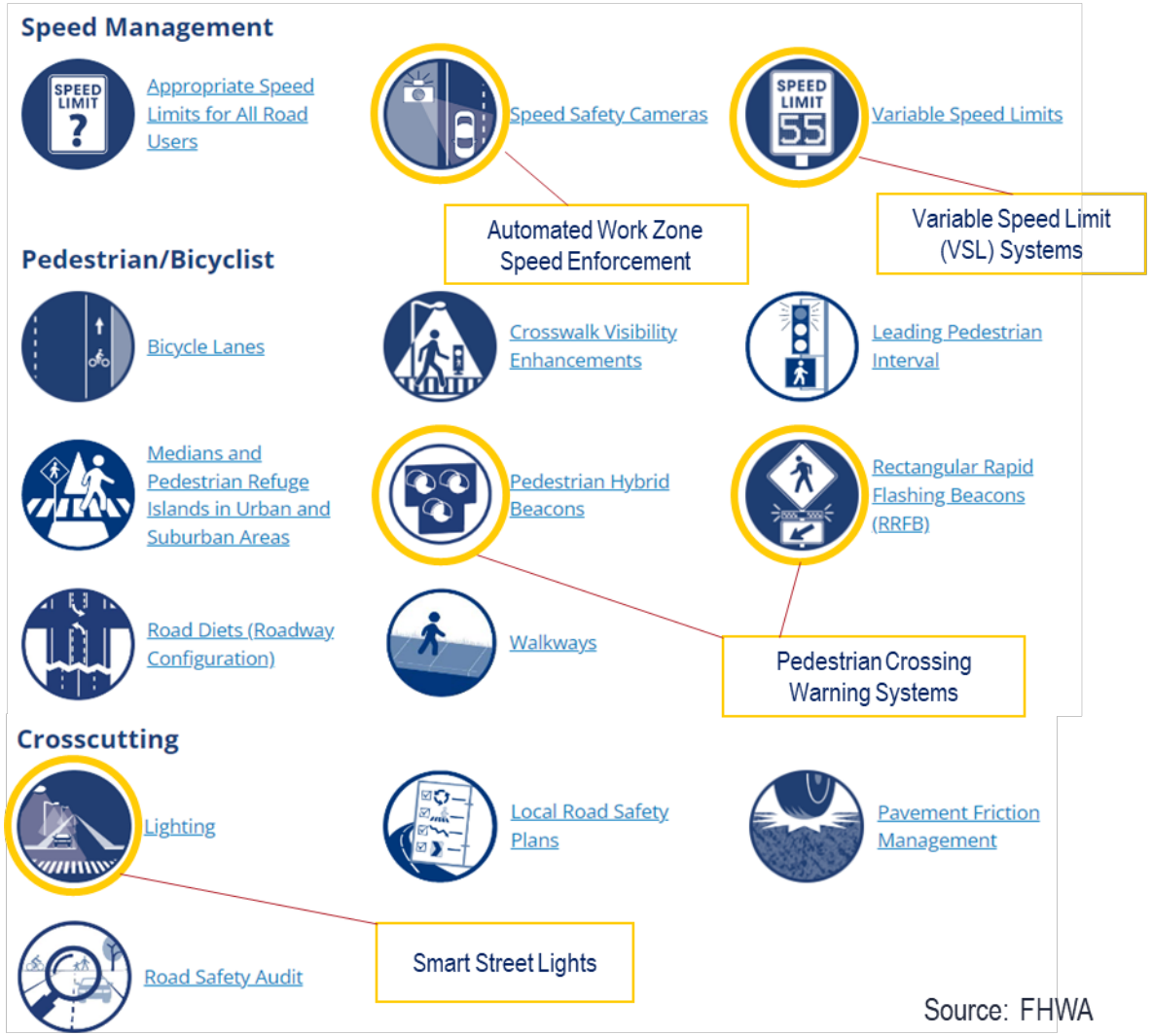
Source: USDOT

SCRC – Moving Forward

- **Goal Areas**
  - **Safety**, Equity, Climate and Sustainability
- **Technology Areas**
  - **Interoperable Connectivity (V2X)**, Vehicle Automation, Transit Innovation, ITS and Complete Streets, Innovative Aviation (UAS), TSMO, Smart Gride and Vehicle Electrification, and Freight Operations
- **Crosscutting and Enabling Areas**
  - Operations Planning, **Systems Engineering**, ITS Architecture and Standards, Performance Measurement and Evaluation, Artificial Intelligence (AI), Cybersecurity, Data Management

SCRC: Safety Page





…There are a variety of other ITS Strategies that can enhance safety

https://highways.dot.gov/safety/proven-safety-countermeasures

ITS and the Safe System Approach (SSA)

ITS and Safer People

- Bike & Pedestrian Safety Systems

ITS and Post Crash Care

- Traffic Incident Management
- Emergency Vehicle Preemption
- UAS for Crash Reconstruction

ITS and Safer Roads

- Active Traffic Management (ATM)
- Smart Work Zone Technologies
- Road Geometry Warnings
- Highway-Rail Crossing Safety Systems
- Intersection Collision Warning Systems
- Road Weather Warning Systems
- Wrong Way Driver Warning Systems

ITS and Safer Vehicles

- Connected Vehicles
- Advanced Driver Assistance Systems (ADAS)
- Automated Vehicles

ITS and Safer Speeds

- Variable Speed Limits
- Curve Speed Warnings
- Reduced Speed Warnings
- Automated Speed Enforcement

ITS and Safety Micro-Learning Videos

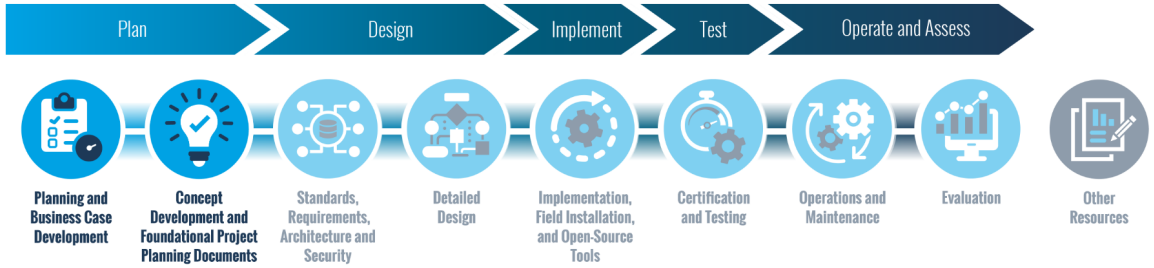
Short, compact e- learning modules designed to increase awareness

- **Video 1:** ITS and the Safe System Approach
- **Video 2:** ITS and Safer Speeds
- **Video 3:** ITS and Safer Roads
- **Video 4:** ITS and Safer Vehicles
- **Video 5:** ITS and Safer People
- **Video 6:** ITS and Post-Crash Care

Source: USDOT

SCRC: Interoperable Connectivity (V2X) Page

Over 100 Resources + Open-Source Tools



CONCEPT DEVELOPMENT AND FOUNDATIONAL PROJECT PLANNING DOCUMENTS

Successful interoperable connectivity projects address real-world challenges. This section includes resources that can be used to develop successful interoperable connectivity concepts for smart communities. It also includes example foundational project planning documents including Data Management and Privacy Plans, Safety Management Plans, and other relevant project planning documents.

- INTEROPERABLE CONNECTIVITY: DEPLOYMENT CONCEPTS AND APPLICATIONS
- INTEROPERABLE CONNECTIVITY: CONCEPT OF OPERATIONS (CONOPS)
- INTEROPERABLE CONNECTIVITY: SAFETY MANAGEMENT
- INTEROPERABLE CONNECTIVITY: DATA MANAGEMENT

Systems Engineering for ITS

www.arc-it.net

Trainings & Other Technical Assistance Resources

- In-Person Trainings
  - Foundational V2X Training (+ future V2X trainings)
  - Systems Engineering
  - Crowdsourcing for Operations
- Web-based Trainings
  - ITS: What, Why, and How
  - Improving Highway Safety with ITS
  - Systems Engineering Fundamentals for ITS
  - ITS Cybersecurity (coming soon)
  - Various ITS Standards Trainings
- Cohorts (Accelerating V2X Cohort) and Peer Exchanges

ITS Grants, Challenges, & Deployment Programs

INTERSECTION SAFETY CHALLENGE

SMART

ATTAIN

ITS4US
IT'S TRANSPORTATION FOR ALL OF US

S | S
4 | A

V2X Accelerator

Annual Federal ITS Grants

Grant	Description	Annual Funding
Strengthening Mobility and Revolutionizing Transportation (SMART)	Provides grants to eligible public sector agencies to conduct demonstration projects focused on advanced smart community technologies and systems in order to improve transportation efficiency and safety.	$100 million appropriated annually for fiscal years 2022-2026
Advanced Transportation Technology and Innovation (ATTAIN)	Provides funding to deploy, install, and operate advanced transportation technologies to improve safety, mobility, efficiency, system performance, intermodal connectivity, and infrastructure return on investment.	$60 million annually
Safe Streets for All (SS4A)	Focuses on comprehensive safety action planning and implementing those plans and is inclusive of all types of roadway safety interventions across the Safe System Approach (SSA).	$1 billion/year over 5 years

DOT Navigator

Focus on Helping to Develop Strong Discretionary Grant Applications

https://www.transportation.gov/dot-navigator

What Do You Want to Do?

PREPARE A SUCCESSFUL GRANT APPLICATION

Get planning tips, checklists, and information on applying for federal grants

FIND FUNDING OPPORTUNITIES

Search grant opportunities to meet your community's transportation needs

GET TECHNICAL ASSISTANCE RESOURCES

Find resources to get funding and build capacity to do transportation projects

LEARN ABOUT FUNDING AND MATCH

Learn about USDOT grant funding, including match requirements and flexibilities

ACCESS DATA AND MAPPING TOOLS

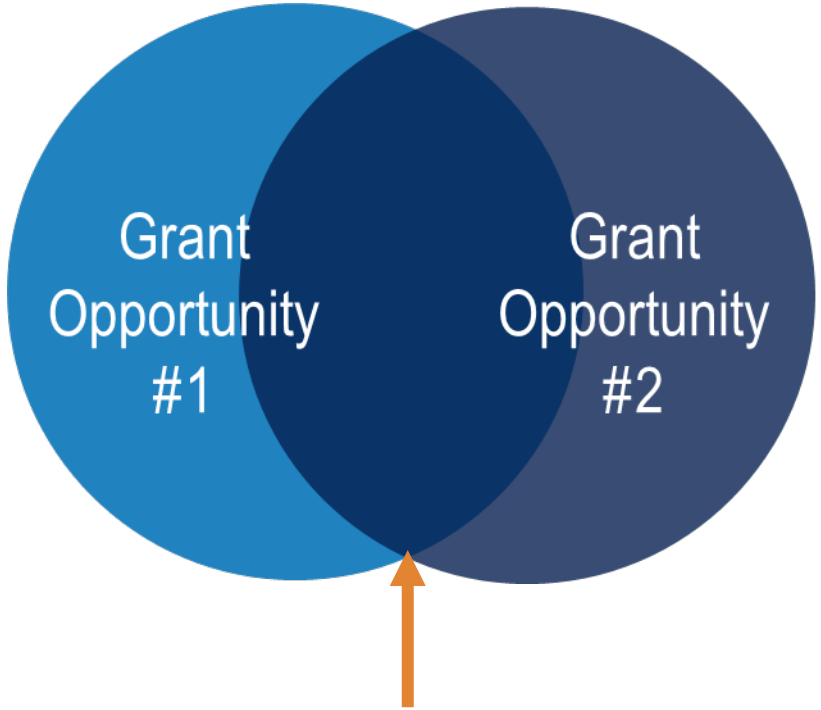
Access data and mapping tools to help write a strong grant application

LEARN ABOUT THE BIPARTISAN INFRASTRUCTURE LAW

Get information to help access BIL funding programs

Reminder: Go for the Grant (or Other Funding Opportunity)

- When opportunities come, try for the funding opportunity. Even if you don't win, you'll have a good foundation for future opportunities.
- Many opportunities are similar enough that parts of previous applications can be repurposed.
- Be "shelf ready" for future opportunities.



E.g., Opportunity for application re-purposing

For More Information

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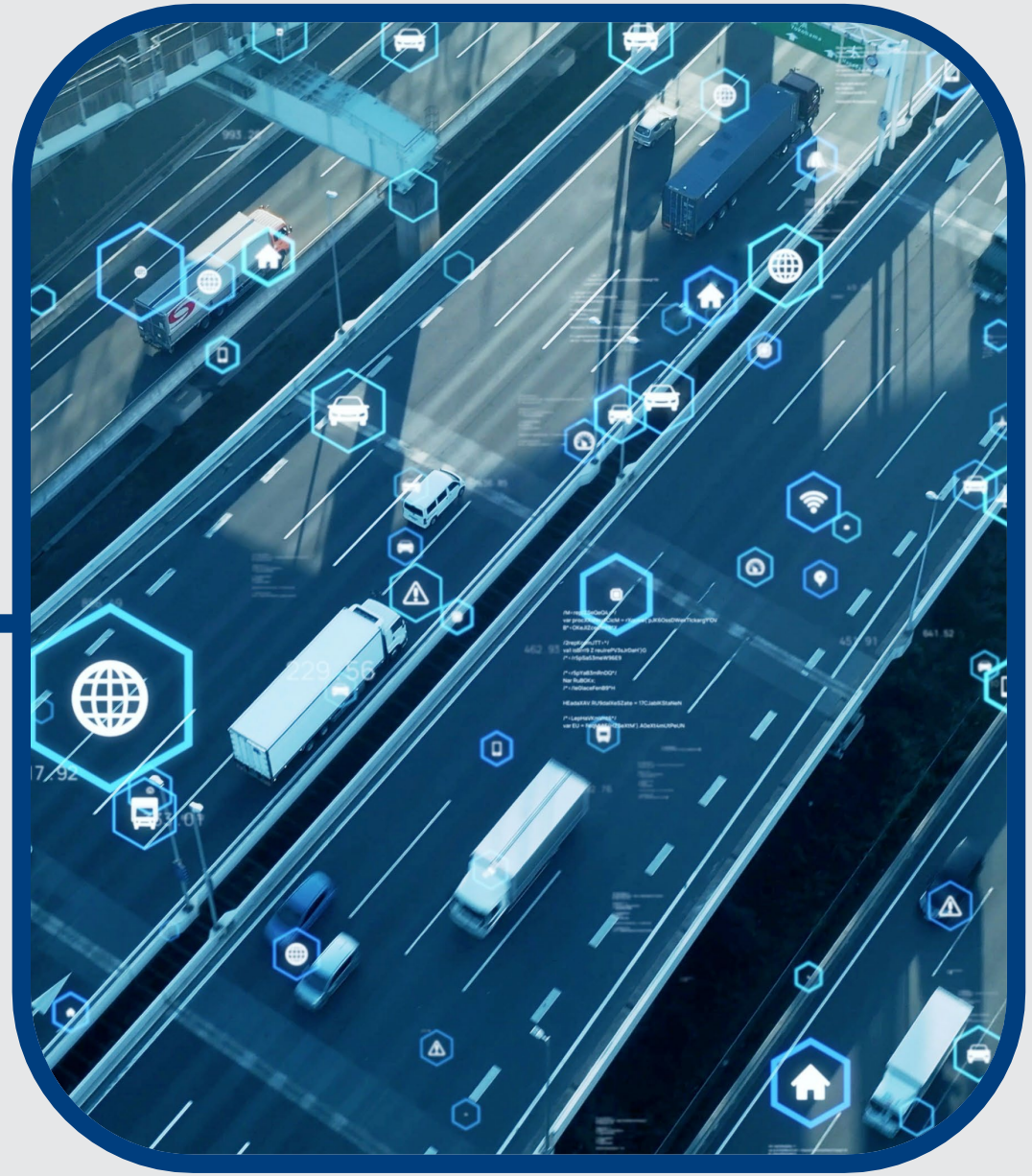
www.its.dot.gov/pcb and www.its.dot.gov/scrc/#/

ITS JPO Deployment Programs

Highlights and Resources from
Connected Vehicle Pilots and
ITS for Underserved Communities (ITS4US)



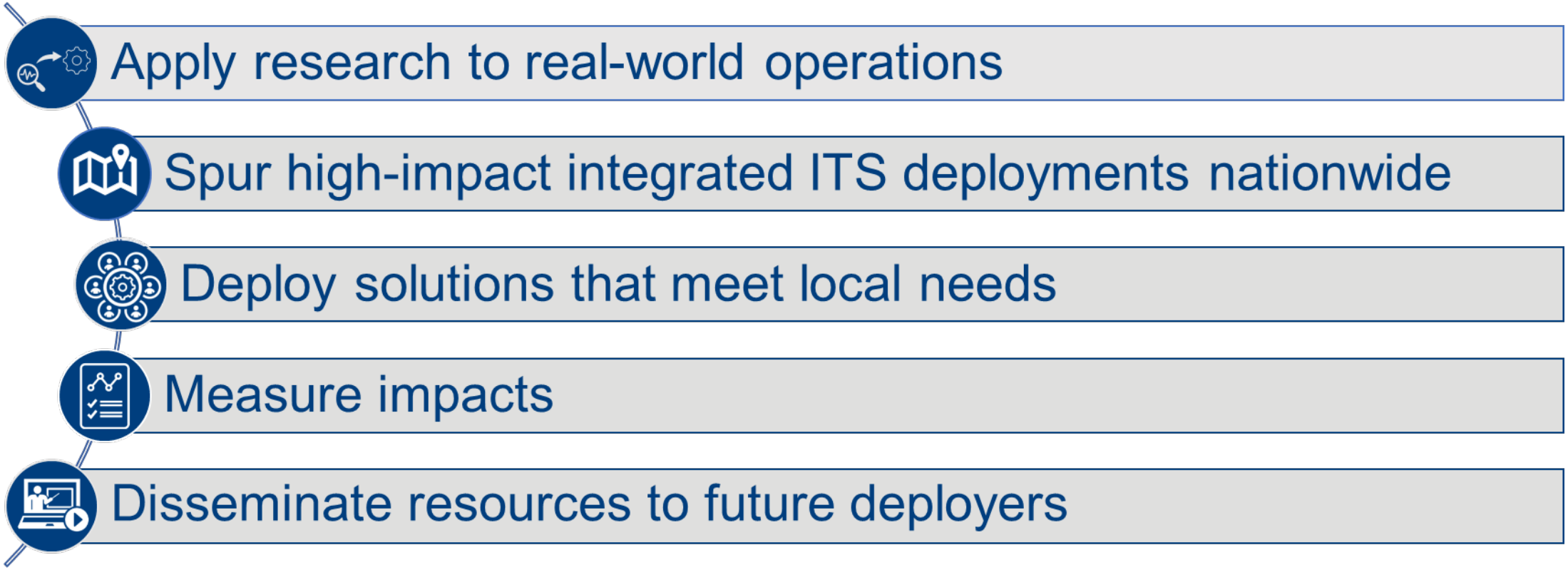
Elina Zlotchenko

Program Manager, ITS4US

U.S. Department of Transportation

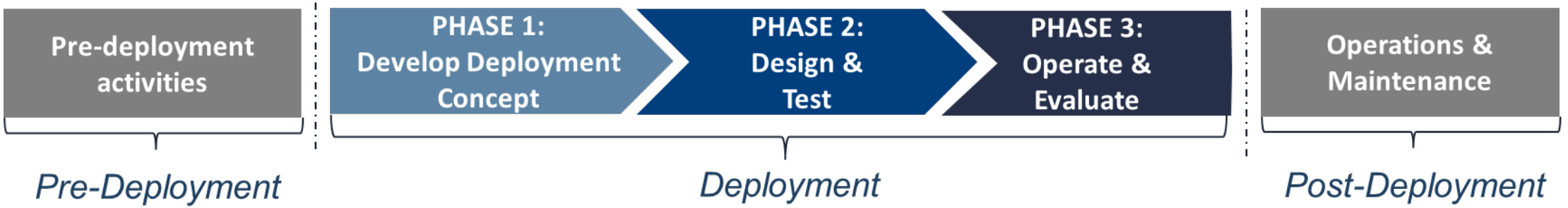
Intelligent Transportation Systems (ITS) Joint Program Office (JPO)

JPO Deployment Program Fundamental Elements



ITSJPO Deployment Program Design

- Multiple awards supports diversity in geography and technology implementation
- Phased design with decision gates ensures successful deployments
- Collaborative design fosters cooperation between deployment sites



Deployment Benefits and Potential Measures

CV Pilots (Results)

- Reduced red-light running by 41%. (NYC)
- Reduced travel-time index by 30%. (Tampa)
- Reduced fuel consumption of idling trucks by over 46 gallons per closure. (Wyoming)
- 83% of pedestrians using the mobile crossing app felt safer. (NYC)

ITS4US (Anticipated Benefits)

- Save ~2 hours/day for dispatch team. Save ~2 days/month for accounting team. (HIRTA)
- Improved access to new destination types. (GDOT)
- Increased availability of detailed, vetted sidewalk data in OpenStreetMap. (UW)
- ≥ 90% of users can book a pick-up time within 30 minutes of request. (NFTA)

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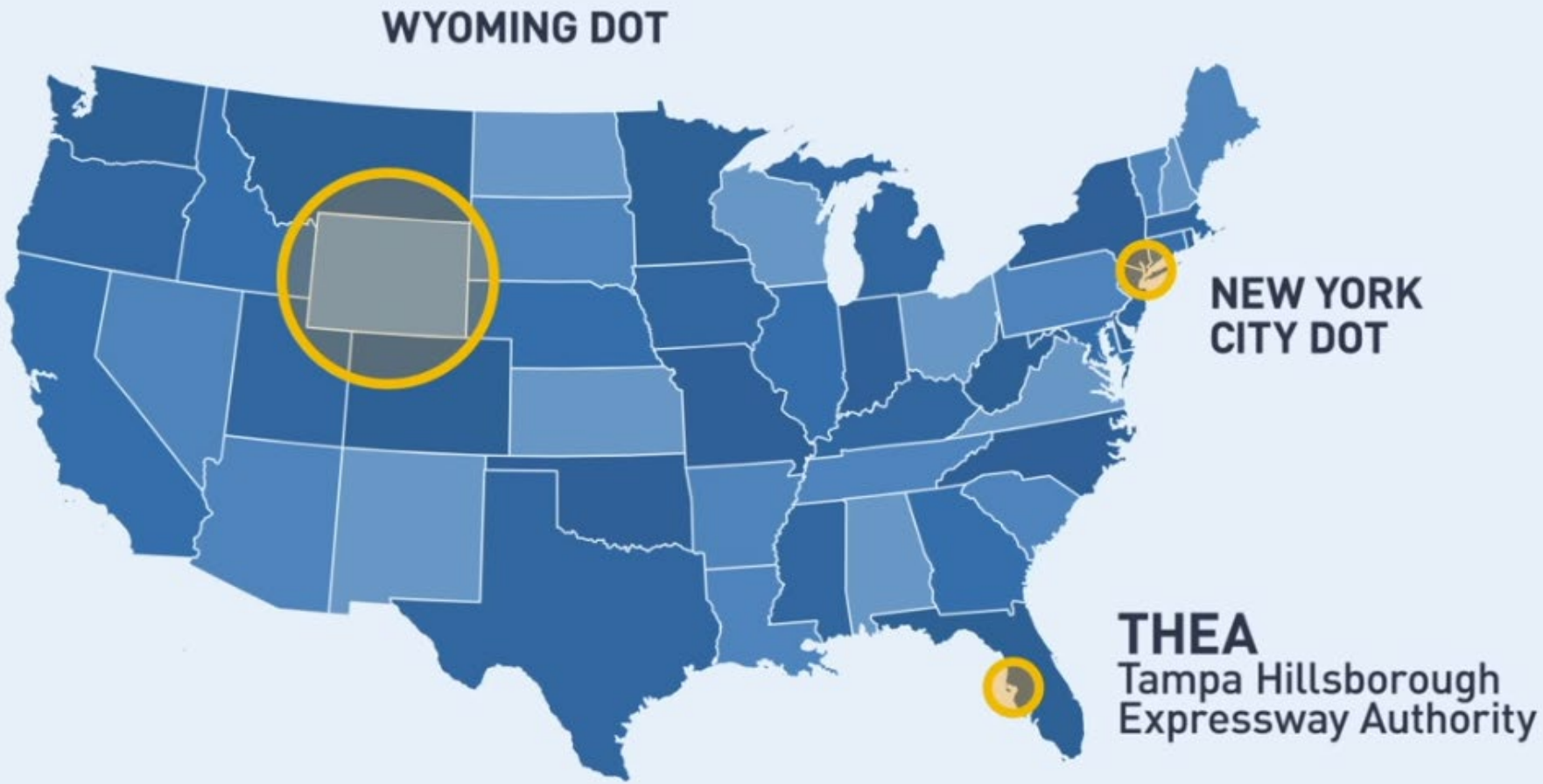
What performance measures does your agency typically use for ITS projects?

All responses to your question will be shown here

Each response can be up to 200 characters long

Turn on voting in Interactivity to let participants vote for their favorites

CV Pilots Deployment Program



WYDOT CV Pilot

- I-80 in Wyoming
- CV Applications Deployed:
  - Forward Collision Warning
  - I2V Situational Awareness
  - Work Zone Warnings
  - Spot Weather Impact Warnings
  - Distress Notifications

THEA CV Pilot

- Selmon Reversible Express Lanes in Tampa, Florida
- CV Applications Deployed:
  - Wrong Way Entry (WWE)
  - Pedestrian Collision Warning (PCW)
  - Transit Signal Priority (TSP)
  - 6 additional applications

NYCDOT CV Pilot

- New York City, NY
- CV Applications Deployed:
  - Speed Compliance
  - Mobile Accessible Pedestrian Signal System
  - Oversize Vehicle Compliance
  - 12 additional applications

ITS4US Deployment Program

Heart of Iowa Regional Transit Agency (HIRTA) – Dallas County, IA

Integrated health appointment and mobility service system

Georgia Department of Transportation (GDOT) – Gwinnett County, GA

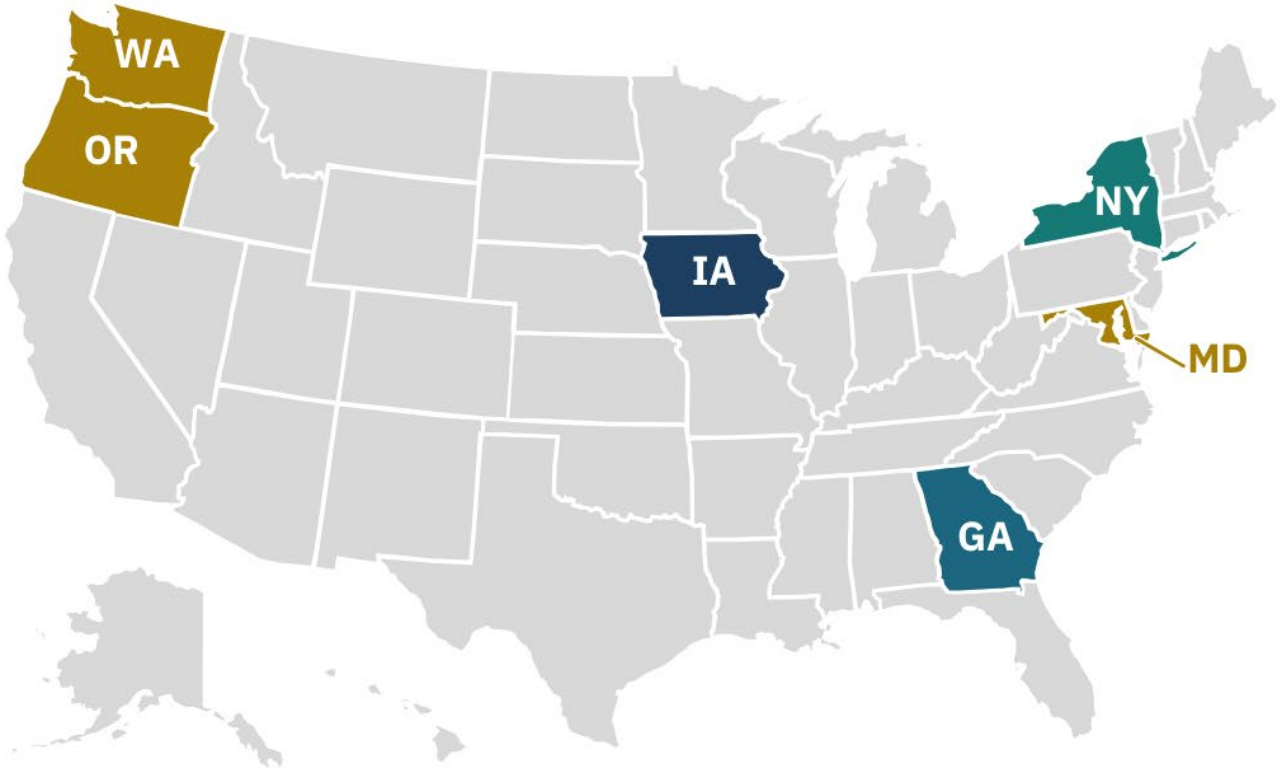
Safe trips in a connected transportation network

University of Washington (UW) – OR, WA, MD

Data and software promoting equitable travel opportunities

Niagara Frontier Transportation Authority (NFTA) – Buffalo, NY

Personalized, multi-modal trip planning, on-demand transportation and wayfinding



Health Connector for the Most Vulnerable

- Dallas County, Iowa
- Key Technologies:
  - Trip planning, booking and management
  - Middleware for coordination with healthcare providers and Medicaid brokers
  - Information and wayfinding

HEALTH CONNECTOR

Buffalo All Access

- Buffalo, NY
- Key Technologies:
  - Indoor/Outdoor Wayfinding
  - Smart Signalized Intersections
  - On-Demand Shuttles, including autonomous
  - Door-to-Door travel planning app (Buffalo All Access App)

BUFFALLO ACCESS
IN AND AROUND BNMC

Safe Trips in a Connected Transportation Network (ST-CTN)

- Gwinnett County, GA
- Key Technologies:
  - Connected Vehicle Messaging
  - Transit Signal Priority
  - Machine Learning
  - Predictive Analytics
  - Mobile Application (G-MAP)

Transportation Data Equity Initiative

- King & Snohomish County, WA
- Multnomah & Colombia County, OR
- Harford & Baltimore County, MD
- Key Technologies:
  - Data Standards (OpenSidewalks, GTFS-Flex, GTFS-Pathways
  - Data Collection Open-Source
  - Data Sharing System

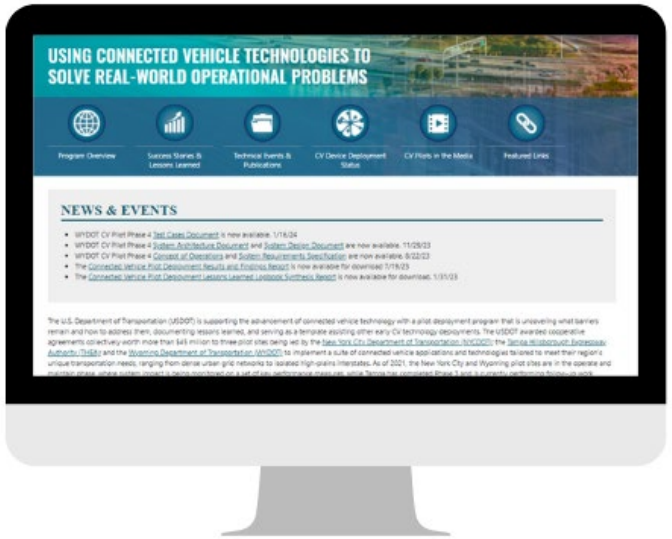
Transportation Data Equity

an initiative by TCAT and TRAC at UW

Key Lessons Learned

1. Identify the challenges facing your community and incorporate them into long range planning.
2. Prepare for challenges in deploying maturing technologies.
3. Use non-technical language and tailor your materials to the stakeholders.
4. Leverage existing relationships and networks.
5. Engage early and often in the design/planning process.

CV Pilot Resources for Deployers



https://www.its.dot.gov/pilots/

CV Pilots Program

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ITS4US Resources for Deployers

www.its.dot.gov/its4us

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HIRTA (ITS4US)
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UW (ITS4US)
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Join at menti.com | use code 6785 4133

What resources do you wish you had to launch your own ITS deployment?

All responses to your question will be shown here

Each response can be up to 200 characters long

Turn on voting in Interactivity to let participants vote for their favorites

Q&A

Subscribe to the ITS JPO Mailing List!

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