



Evolution from a 20th Century ITS Program to a 21st Century Roadway Digital Infrastructure

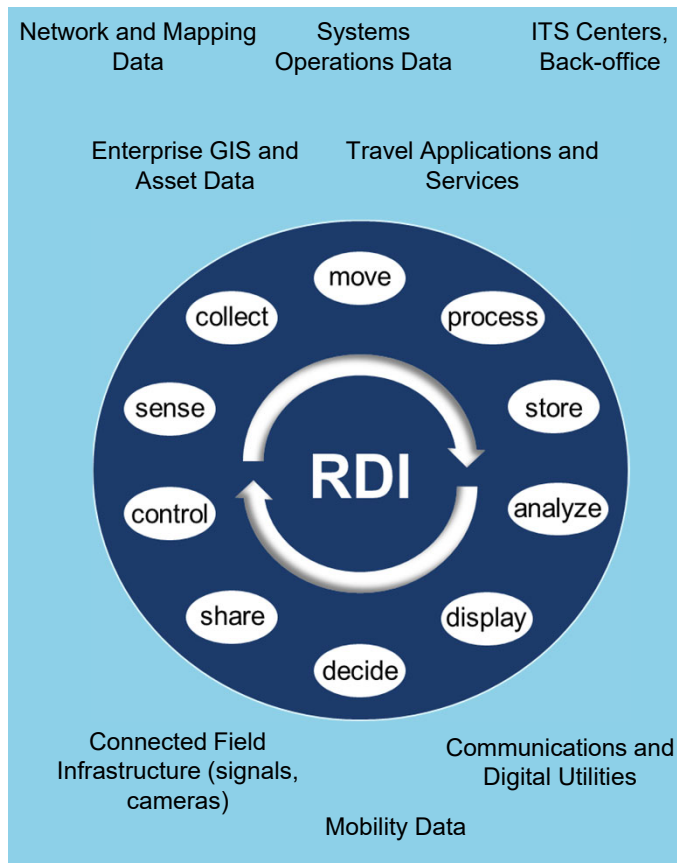


2023 ITS Washington Conference & Exhibition

Ted Bailey, P.E. Director of Government Technology Solutions

INTEGRITY
PARTNERSHIP
OPTIMISM

What is Roadway Digital Infrastructure?



Source: FHWA.

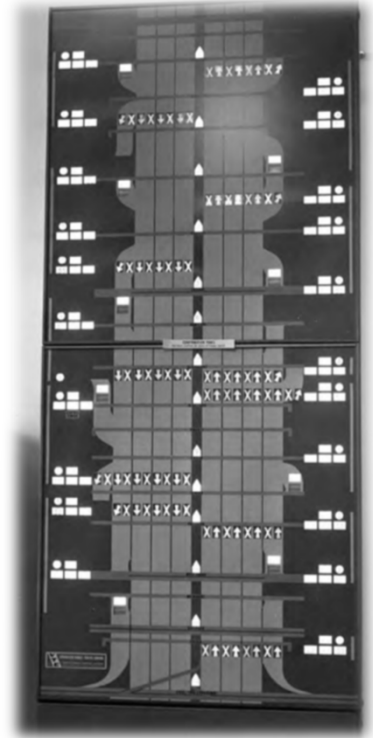
Collective **public and private technology assets** that create, exchange, or use data or information to improve the transportation system by the provision of existing and new services for travelers, businesses, and agencies.

RDI is not just data. It includes **all the assets that generate, move, process, and display data and information** that support end user usage of the generated information.

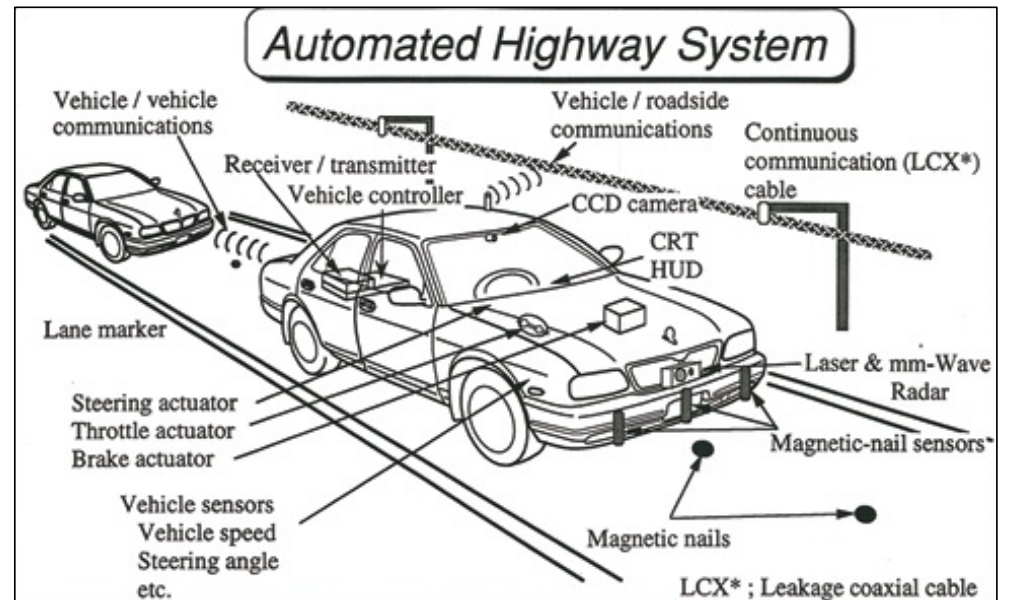
20th Century ITS Program: Proving Grounds



Source: USDOT.



20th Century ITS Program: View of Automated Highways



Source: USDOT.

Early 21st Century: Emergent Technologies



Source: USDOT-Getty.

Evolution: 20th Century ITS Program to a 21st Century Roadway Digital Infrastructure

1920s - 1990s

Infrastructure Builder

Humans

IOO Infrastructure

1990s - 2010s

Infrastructure Operator
and Maintainer

Humans

Devices

IOO Infrastructure

2010s - Now

Infrastructure Service
Provider

Humans

Devices

IOO Infrastructure

Private Sector
Infrastructure

Private Sector
Infrastructure

Private Sector
Infrastructure

Future

Infrastructure Service
Manager

Humans

Devices

IOO
Infrastructure

Private Sector
Infrastructure

Private Sector
Infrastructure

Private Sector
Infrastructure

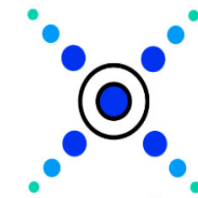
Private Sector
Infrastructure

Private Sector
Infrastructure

- Increased need to communicate with diverse digital devices (machines)
- New availability of digital information from diverse devices

Why Now?: A Unique Opportunity in Time

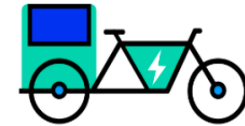
1. **The Infrastructure Investment and Jobs Act (IIJA)** brought about an unprecedented investment in technology projects for at least the next 5 years
2. **2026/27 Reauthorization** could and should include dedicated formula funding for technology
3. **Funding Flexibility and Eligibility** for Technology in place
4. **Federal Grants:** The recent USDOT \$40M V2X grant funding opportunity and other Federal Discretionary Grants Programs are helpful (e.g. SMART, SS4A, PROTECT, ATTAIN) but there are too many competing needs and priorities.
5. **Public Agencies (Infrastructure Owner Operators) have a choice.**
 - Strategic decisions should be made to reprioritize existing resources in lieu of waiting for a dedicated federal funding program and/or more discretionary grants.
 - Embrace the role of the private sector in providing services, infrastructure, applications, assets, data and other core functions.



Smart Grid



Sensor-Based Infrastructure



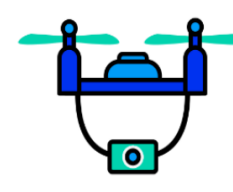
Commerce Delivery & Logistics



Smart Traffic Signal



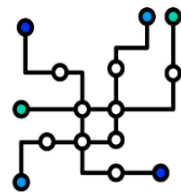
Coordinated Automation



Innovative Automation



Connected Vehicles

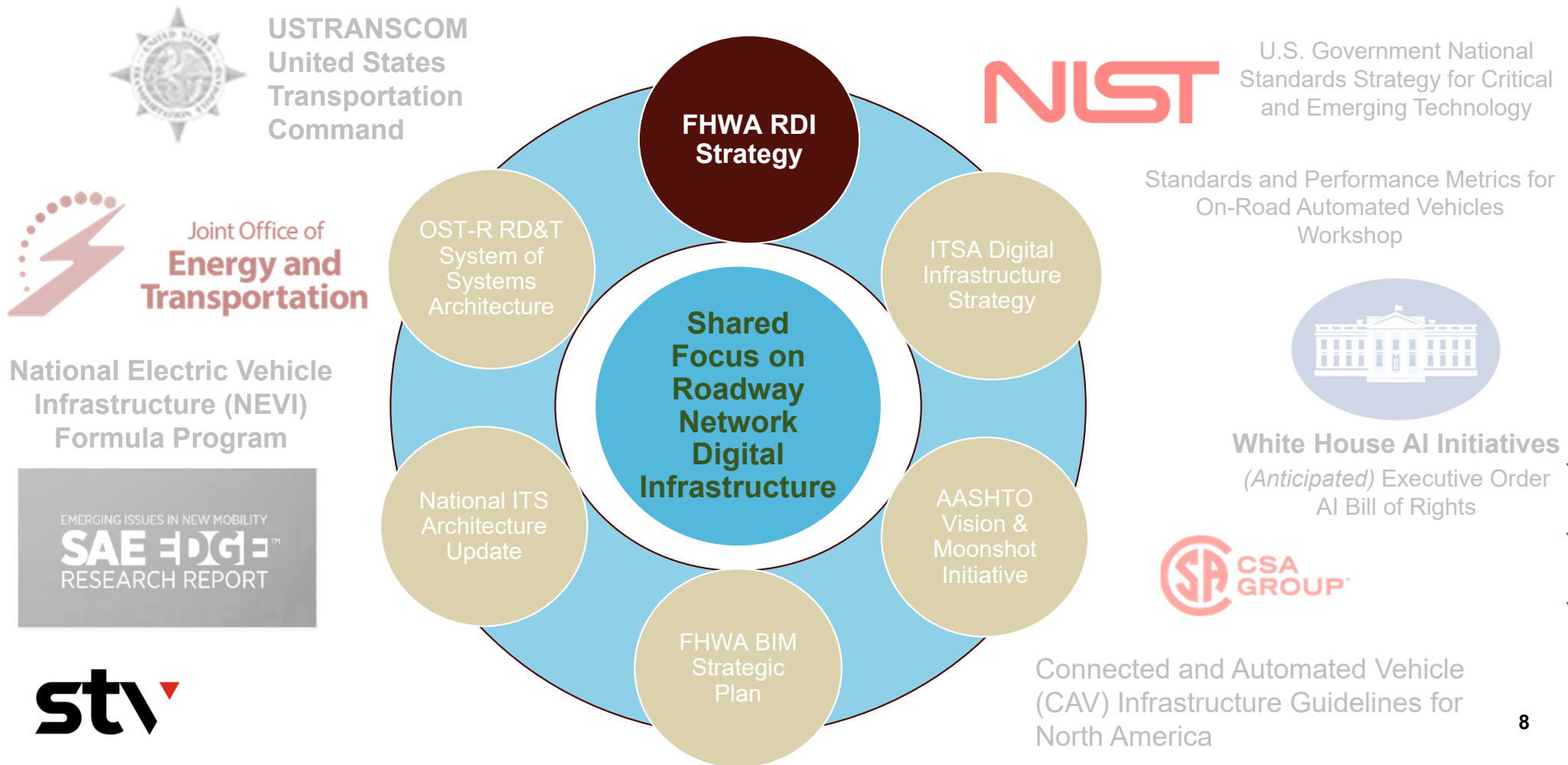


Systems Integration

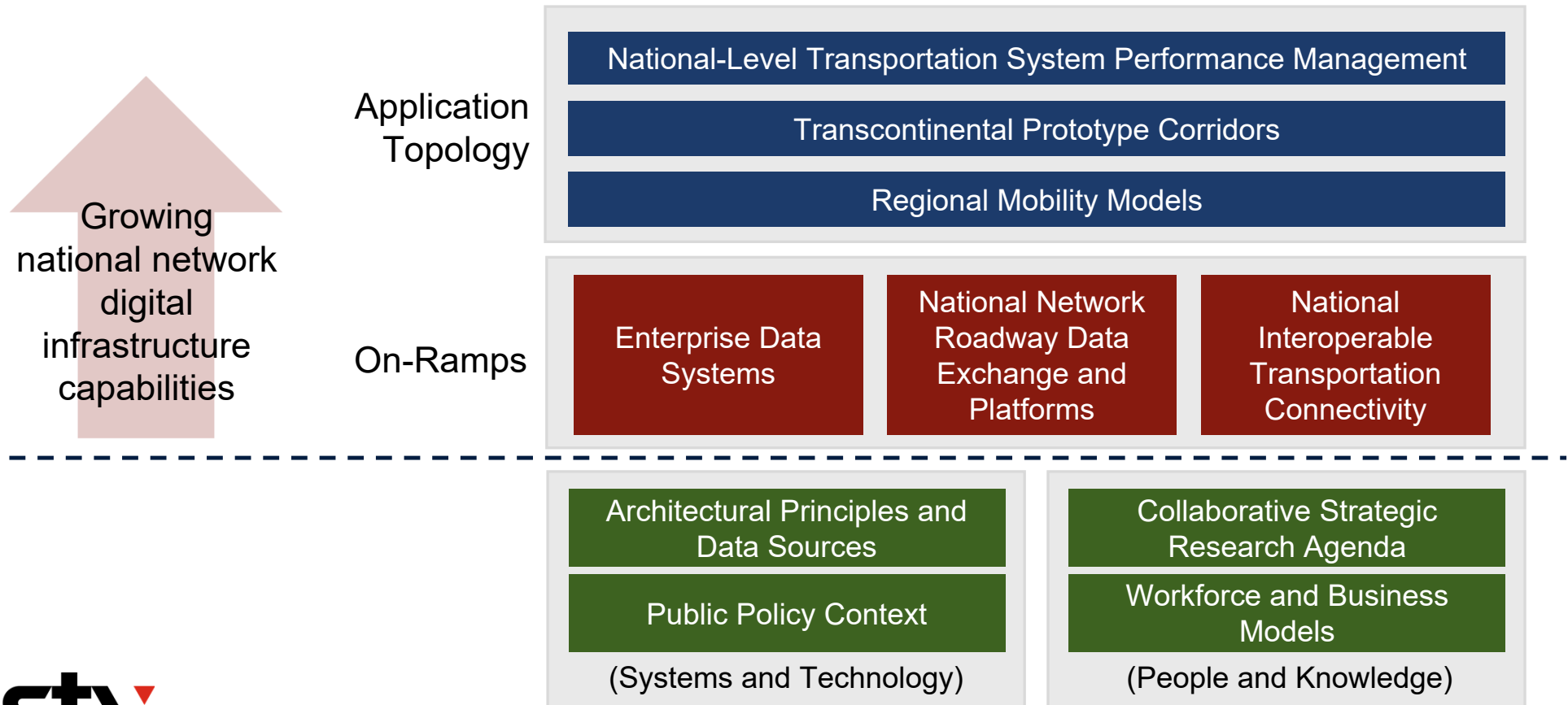
Each project creates/requires its own technology assets, generates valuable transportation system

Source: FHWA

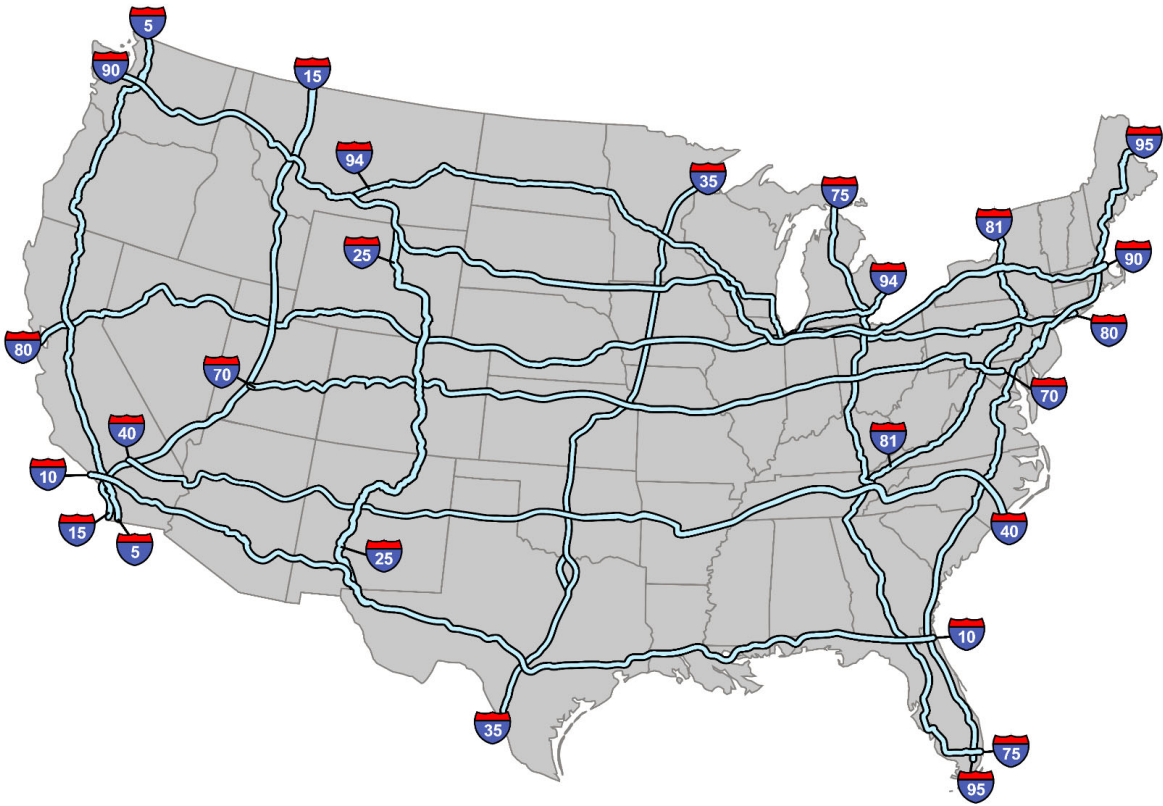
Who is involved in the National Roadway Digital Infrastructure



What is the current DRAFT National Roadway Digital Infrastructure Strategy



So where do we start?: Transcontinental Prototype Corridors



Potential North-South Corridors

- I-5
- **I-15**
- **I-35**
- I-75
- I-81
- **I-95**

Existing “Coalitions”

Potential East-West Corridors

- I-10
- I-40
- I-70
- I-80
- I-90

What could we invest in first: Potential Services / Applications / Use

Investments need to be implementable at scale within the next 2-3 years

| Area | Candidate Services |
|---|--|
| Traveler Oriented Services | Active Lane Closures |
| | Workers and Agency Fleet Equipment Presence |
| | Wrong-way Driving Alerts |
| | Traffic Hazard warnings using Multi-Edge Cloud |
| Emergency/ Resilience Oriented Services | Wireless emergency alerts directly to vehicles |
| | Automated permitting for vehicles involved in emergency response |
| | Charging availability and support services during emergencies |
| Freight Oriented Services | Truck Parking Information Service |
| | Smart Roadside and Virtual WIMS |
| Freight Oriented Services | Electronic Traffic Regulations |
| | CAD Integration of State Police and ATMS systems |
| | Road asset condition monitoring service |

10 Preliminary Use Cases

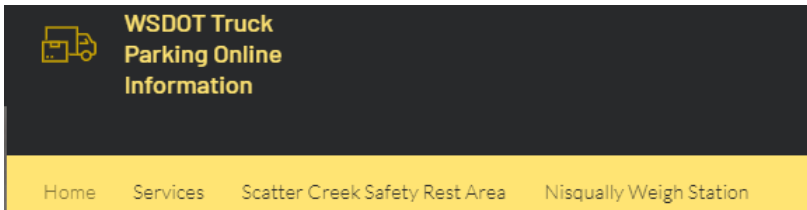
- Traffic signal integration
- Connected vehicle data
- Cybersecure systems
- AAM
- Interoperability
- Curb data
- EV charging stations
- Sharing weather data
- Digital policy
- Reliable transit



As of today, what are some investments options being discussed the most?

1. **Truck Parking Information Service**
2. **Roadway Intelligence for Corridors** – Active Lane Closers; Work Zone Incidents, Wireless Digital Alerts
3. **Virtual Coordinating Center** – Situational Awareness for System Operations

Truck Parking Information Service



<https://uwstarlab.wixsite.com/wsdotparking>



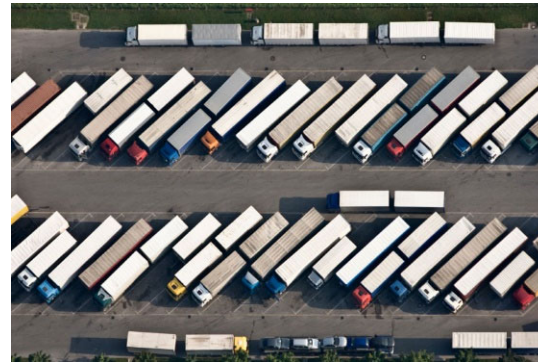
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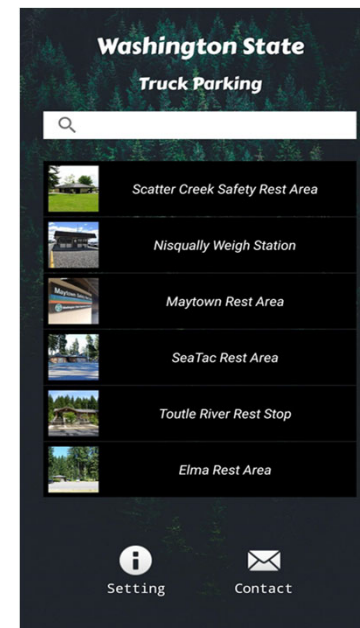
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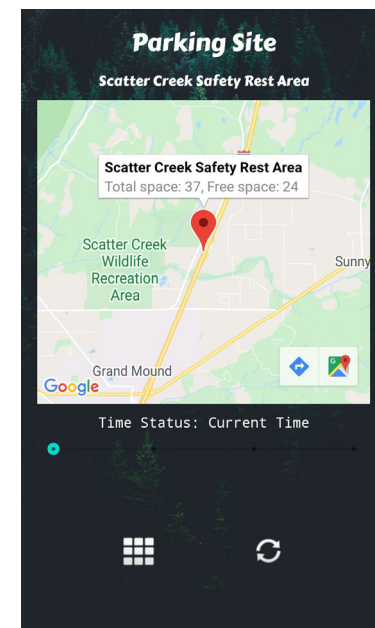
Limited Parking



Illegal on road parking



Mobile App



Roadway Intelligence for Corridors: For Example - Smart Work Zones – Digital Alerts

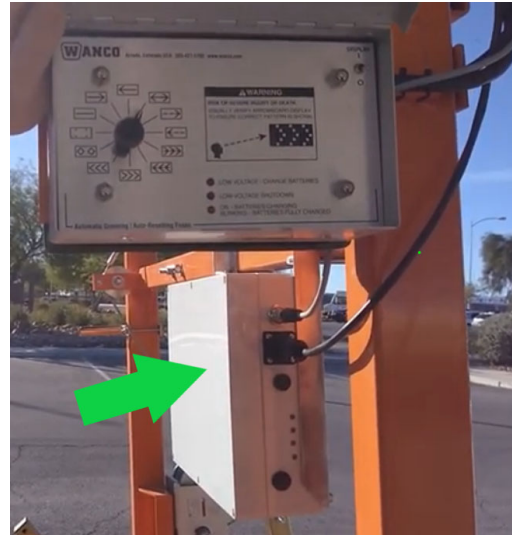


Smart Sequential Flares (Pi-Lit)

Automatic synchronization of flares and data sent to Waze

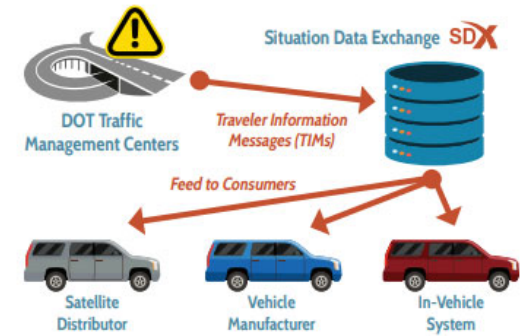


Real-time Work Zone Location Marks
End of Work Zone (iCONE: iPin)



Connected Arrow Board Kit

WSDOT Work Zone Crews



Connected Vehicle Messages

Disseminate traveler information with minimal field infrastructure

“Smart Vests”

Wearable technology integrated
(Ver-Mac)



Virtual Coordination Center (VCC): Situational Awareness for System Operations: Washington State Example for Multimodal Integrated Corridor Management

1. Map view of current incident

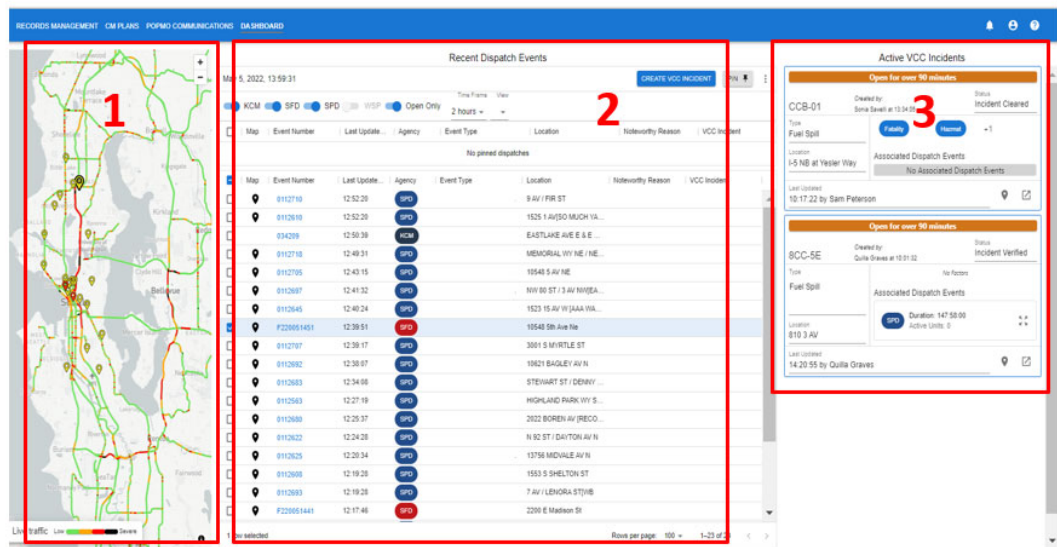
- Quickly understand situation from multiple inputs

2. Integrated Dispatch Feed

- Identified as highest priority knowledge gap

3. Incident Model

- Enables real-time sharing of information
- Backbone of shared incident awareness



- **Multiple Agency Response & Information Sharing**
- **Investment to Date: \$8.5 Million**
 - **2022 USDOT SMART Grant Proposal;** 2 Million for Planning, Governance, Expansion and Enhancements
 - Private Partners
- **2023-2025 WSDOT Decision Package;** 3.9 Million
 - Continue Operations post grant
 - Expansion

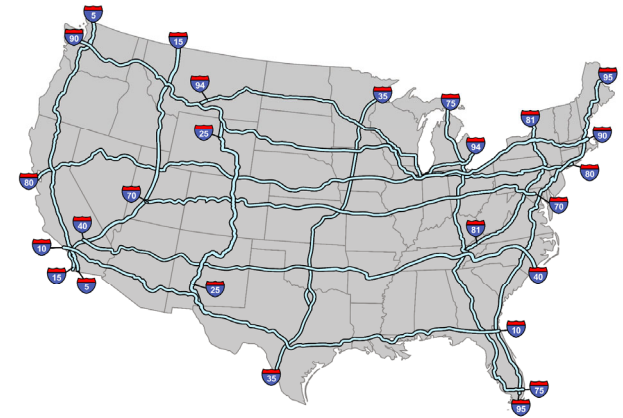


Where do we go from here?

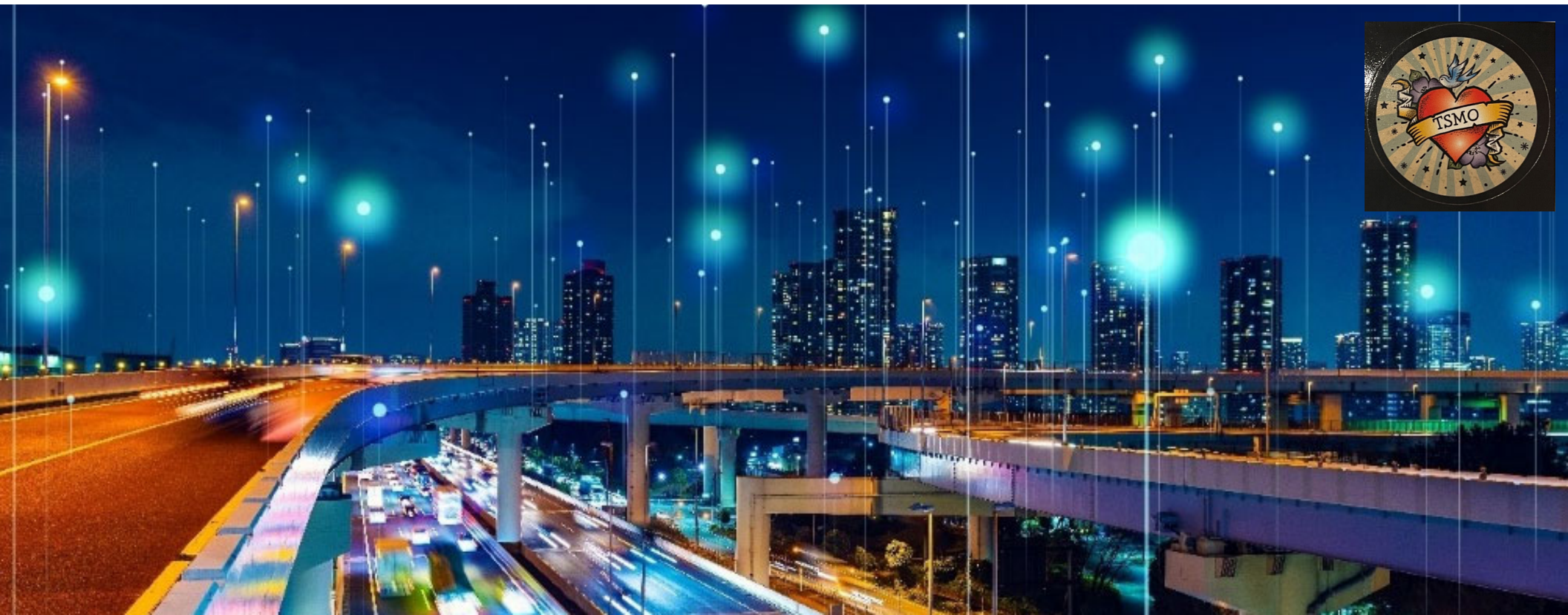
1. **Transcontinental Corridor Investment:** FHWA, ITSA, AASHTO, USDOT Office of Research and Technology (OST-R), State DOTs and others need a focused commitment to start investing, beginning with the Interstate System
2. **Mechanism for Sustained Momentum: Leverage the Coalition Model** There are models out there that exist to pool public and private sector investment toward a shared mission/vision. The USDOT should bring together existing Coalitions, Pooled Funds to evaluate how these governance models could be used to combine and direct public and private investment in RDI. Private Players are willing to come to the table if IOOs are prepared to act at scale and in unison

Examples

- [NASCO Network - NASCO Network](#) Formerly the I-35 Coalition
- [The Eastern Transportation Coalition](#) Formerly I-95 Coalition
- [North/West Passage \(NWP\)](#) I-90
- AASHTO Moonshot I-80
- [Home - Ten Across \(10across.com\)](#) I-10



3. **Keep the next steps simple and easy to communicate:**
 - What are we going to do that we can all agree upon?
 - Why is it important?
 - Keep it simple (Next steps should be clear and doable in 2-3 years with existing resources)



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