

Saving Lives with Connectivity:

A Plan to Accelerate V2X Deployment



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EXECUTIVE SUMMARY

The U.S. Department of Transportation (DOT) is committed to reducing deaths and serious injuries on our nation's roadways. As it implements the National Roadway Safety Strategy, the DOT is actively pursuing a comprehensive approach to reduce the number of roadway fatalities to the only acceptable number: zero.

A powerful tool for achieving this ambitious, long-term goal is vehicle-to-everything (V2X) technology, which enables vehicles to communicate with each other, with other road users such as pedestrians, cyclists, individuals with disabilities, and other vulnerable road users, and with roadside infrastructure, through wirelessly exchanged messages. Deployments utilizing V2X technologies have already demonstrated the safety benefits on a smaller scale throughout the nation. However, to realize the full lifesaving potential of V2X technology, it is important to expand the deployment and require vehicles and infrastructure to communicate safely, securely and without harmful interference across a variety of devices and platforms. To achieve this type of 'interoperable connectivity,' a diverse range of mobile, in-vehicle, and roadside technologies must be able to communicate everywhere, efficiently, and securely, in a way that protects personal information.

V2X can save lives by enabling wireless communications among vehicles, roadside infrastructure, and mobile devices.

The National V2X Deployment Plan sets the DOT's vision, aspirational goals, and milestones, and issues a call to action for stakeholders, including *government at all levels*, public agencies, and the private sector. The aspirational goals and targets do not imply a legislative/regulatory mandate or dedicated federal funding. The Plan describes how deployments can start now and defines the specific actions needed across stakeholder groups. The Plan also identifies support available from the DOT and other sources.

V2X connectivity is a crucial, lifesaving tool in the safety toolbox ready to deploy now.

The DOT has a significant role in coordinating, facilitating, and supporting V2X deployments, including such activities as resolving regulatory uncertainty; providing technical assistance and resources; and providing seed funding for deployments across the nation. The DOT is challenging other public agencies, the transportation industry, communities, and researchers to do their part.

The DOT has established a set of short-term, medium-term, and long-term deployment goals and targets to focus activity and coordinate stakeholder actions for making progress toward achieving the vision. Achieving these goals will depend on collaboration with multiple stakeholders. No one group can achieve interoperable connectivity on its own.



VISION

Enable a safe, efficient, equitable, and sustainable transportation system through the national, widespread deployment of secure, interoperable V2X technologies.

MISSION

Accelerate deployment of secure, interoperable V2X connectivity using the dedicated 5.895-5.925 GHz spectrum and other available spectrum through collaboration and coordination across federal government, the public sector, and private industry.

Short-Term Goals (2024–2028)

Infrastructure Deployments

- V2X deployed on 20% of National Highway System
- Top 75 metro areas have 25% of signalized intersections V2X enabled
- 12 interoperable, cybersecure deployments
- 20 grants in at least 10 states utilizing the 5.895-5.925 GHz band

Vehicles

- 2 Original Equipment Manufacturers (OEMs) commit to 5.895-5.925 GHz capable vehicles by 2028 model year

Spectrum and Interoperability

- 2 Security Credential Management System (SCMS) providers demonstrate interoperable security credentials management following secure by design principles
- 3 device suppliers and 2+ OEMs demonstrate interoperability
- Federal Communications Commission (FCC) completes 2nd Report and Order on 5.9 GHz band

Benefits and Technical Assistance

- 3 benefit/cost case studies, including at least one focused on vulnerable road user safety
- 25 active Accelerating V2X Cohort members
- 10 regional secure, interoperable connectivity hands-on training events



Medium-Term Goals (2029–2031)

Infrastructure Deployments

- V2X deployed on 50% of National Highway System
- Top 75 metro areas have 50% of signalized intersections V2X enabled
- 25 interoperable, cybersecure deployments
- V2X installed in 40% of the nation's intersections

Vehicles

- 5 vehicle models are 5.895-5.925 GHz capable
- 3 active deployments generate Infrastructure Owner-Operator (IOO) data used by 2 OEM production vehicles
- 4 suppliers, 3 OEMs demonstrate secure, interoperable connectivity

Spectrum and Interoperability

- 5 V2X use cases demonstrated in the 5.895-5.925 GHz band
- 5 V2X use cases demonstrated **beyond** the 5.895-5.925 GHz band (i.e., other communications technologies, including network-based communications technologies)
- 20 public agencies demonstrate interoperability
- 2 providers utilize interoperable SCMS credentials
- 10 certified devices on the market

Benefits and Technical Assistance

- 6 use cases (2 involving vulnerable road users) document V2X safety benefits/costs
- 50 active Accelerating V2X Cohort members author progress report

Long-Term Goals (2032–2036)

Infrastructure Deployments

- V2X fully deployed on National Highway System
- Top 75 metro areas have 85% of signalized intersections V2X enabled, a majority of which feature vulnerable road user safety applications
- 50 interoperable, cybersecure deployments
- Secure, interoperable 5.895-5.925 GHz operations across 50 states
- V2X installed in 75% of the nation's intersections

Vehicles

- 6 OEMs have 5.895-5.925 GHz capable production vehicles for safety use cases
- 20 vehicle models are V2X capable

Spectrum and Interoperability

- 5 V2X use cases operational in the 5.895-5.925 GHz band in all 50 states
- 5 V2X use cases operational beyond the 5.895-5.925 GHz band in 5 states
- 20 certified devices dominate deployed V2X technology base

Benefits and Technical Assistance

- 10 deployments in operation for 5 years streaming benefits/cost data
- 75 active Accelerating V2X Cohort members sponsor pooled fund projects

Source: DOT

Potential Actions for Major Stakeholder Groups

DOT

Provide federal leadership by hosting events and documenting a national vision and action plan for deployment.

Provide seed funding and investment to accelerate V2X deployments.

- Launched a new financial assistance program focused on V2X investment in 2023.
- Promote use of discretionary grant programs like ATTAIN, SMART, and SS4A grants to launch V2X deployments that address cyber risk per DOT discretionary grant Critical Infrastructure Security and Resilience (CISR) requirements.

Convene and facilitate stakeholders to share information/best practices.

- Establish an Accelerating V2X Cohort and document benefits, costs, and lessons learned.
- Fund detailed technical assistance training at conferences, annual meetings, and regional events.
- Operate training and equipment loan programs.
- Fund the Connected and Automated Transportation Coalition program.
- Update websites and the Smart Community Resource Center.
- Foster emerging V2X technology addressing vulnerable road user safety and multi-modal use cases.
- Enable interoperability through coordination with stakeholder groups and standards-related activities.
- Organize and deliver a V2X community event in 2024, specifically providing a venue for states and private industry to register their commitments to actions aligned with the Plan.

Provide support for standards, architecture, and testing to accelerate interoperability.

- Conduct additional spectrum testing to provide data to FCC/National Telecommunications and Information Administration (NTIA) for consideration by FCC in their Second Report and Order on C-V2X.
- Explore data-driven strategies that could effectively incentivize secure interoperable systems and accelerated deployment.
- Assess rules and guidance to ensure alignment with the Plan.

FCC

Work with DOT and industry to determine rules for use of 30 megahertz spectrum allocation to ITS services in 5.895-5.925 GHz band.

NTIA

Coordinate and convey federal (DOT) transportation perspective and interests in spectrum decisions and rules to FCC.

OEMs

Develop, test, and deploy secure interoperable V2X safety applications.

- Initiate deployment of C-V2X technology and safety applications in new vehicles of all types (including fleet vehicles).
- Deploy secure interoperable safety and non-safety applications utilizing 5.895-5.925 GHz and other spectrum approaches.
- Actively partner with IOOs to enable national rollout of secure interoperable applications in production vehicles.
- Support precompetitive Research and Development (R&D) and standardization.
- Collaborate on message sets and standards for interoperability.
- Provide sustained input to FCC regarding impact of V2X technologies.

Automotive Suppliers

Develop secure V2X-enabled vehicle components and applications for OEMs to include in production vehicles.

Support precompetitive R&D and standardization.

Collaborate on message sets and standards for interoperability.

States, Local Governments, Tribes, and Public Agencies

Update investment and transportation plans to include V2X technology.

Deploy and operate secure interoperable, cybersecure infrastructure-based V2X technologies and applications.

- Leverage federal seed funding to inform and test interoperability.
- Collaborate on message sets and standards for interoperability.
- Work with local emergency services, transit, school bus, and other public sector vehicle fleets to enhance vehicle participation.
- Ensure interoperability is a routine element of state long-range and Metropolitan Planning Organization (MPO) plans.
- Participate in national events to remain up-

to-date on V2X technology.

Transit Operators

Deploy and operate on-board and center-based V2X applications to enhance transit safety, efficiency, and performance.

Freight Operators

Deploy V2X applications that provide internal return-on-investment, including safety and efficiency applications and driver support.

App Developers

Design and develop applications that utilize connectivity.

Service Providers

Develop and operate supporting services that enable secure interoperable connectivity applications.

ITS Equipment/Software Vendors

Develop infrastructure-based components and software to fulfill public agencies' secure interoperable connectivity needs.

Design/Integration/Deployment Consultants

Provide support for public agencies to design, procure, integrate, and deploy solutions for secure interoperable connectivity.

Security Credential Providers

Provide security credential-related services (i.e., SCMS, certificates) to enable trust among interoperable connectivity entities and applications.

Test Certification Providers

Provide testing and certification services to enable trust in secure interoperable connectivity component functionality, performance, and standards conformance.

Standards Development Organizations

Develop standards to realize interoperability and support cooperative applications.

Trade and Industry Associations

Provide industry stakeholder feedback to inform DOT and provide expertise.

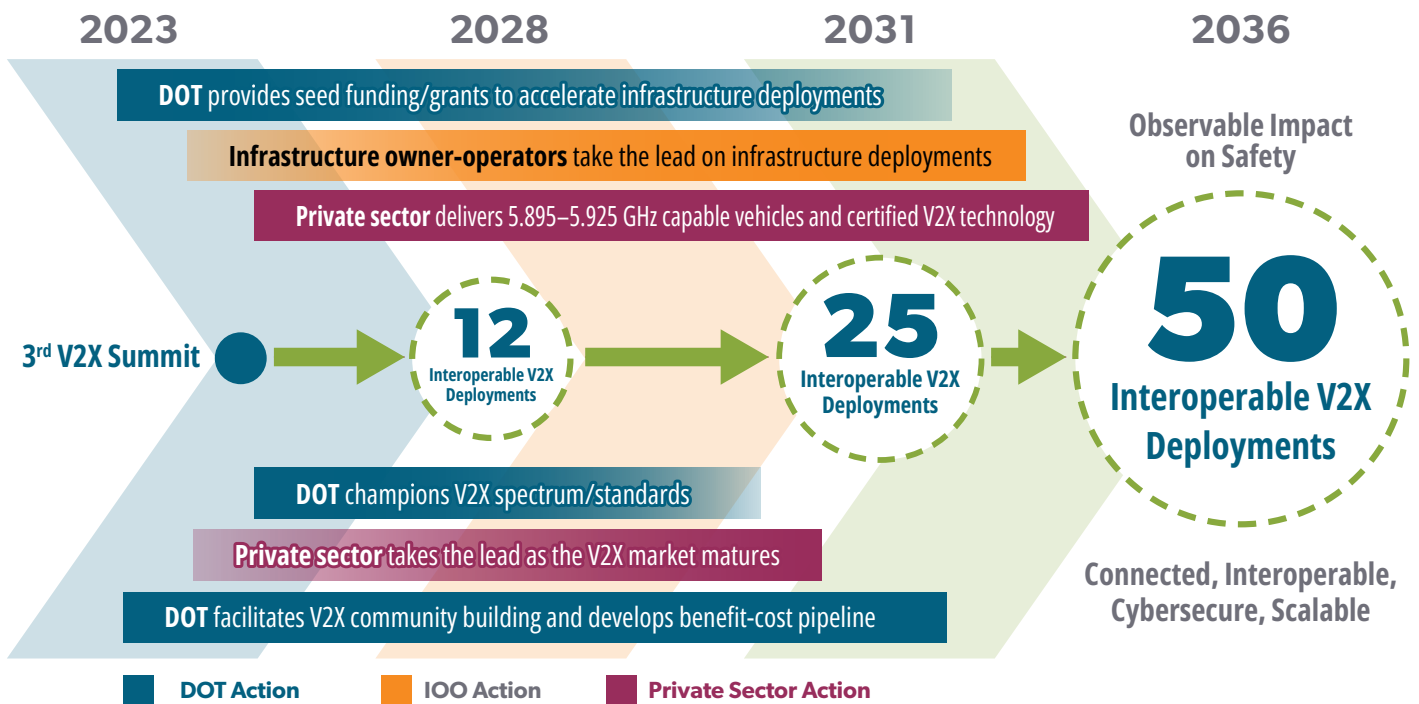
Communications Providers

Build, operate, and maintain private communications networks to provide communications services to customers.

Past research and deployments show the promises of V2X technology. The need for action is urgent in order to realize these benefits today. V2X is fundamentally a cooperative technology where the large-scale benefits are a magnitude greater as a whole than in an individual system, and through this Deployment Plan, the Department is leading efforts to accelerate the use of V2X to benefit the nation and the traveling public. Achieving and sustaining interoperability is necessary to fully realize the benefits across a nation, where vehicles and travelers span cities, states, counties, federal, and tribal lands. The DOT, public agencies, the private sector, and transportation operators must work together to shape the direction of the future. The DOT remains committed to supporting and advancing the deployment of V2X technologies that enable the vision of a future with zero deaths or serious injuries.



V2X connectivity is an important transformational technology that not only advances safety but also enhances mobility, bolsters efficiency, improves equity, and reduces negative environmental impacts. Accelerating V2X deployment now is a crucial step toward saving lives with connectivity.



Source: DOT

For more information, please visit the Smart Community Resource Center:
<https://www.its.dot.gov/scrc>