SAVING LIVES

V2X Today & Tomorrow
The 5.9 GHz Safety Spectrum

36,560 *Lives lost on U.S. roads in 2018 and families shattered.* [1]

Vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I) and vehicle-to-pedestrian (V2P) communications can change that number. These applications provide drivers with *instant, highly accurate alerts* (basic safety messages shared 10 times a second from the vehicles or immediately from nearby pedestrian or cyclists) so that the driver can take action to avoid a crash or reduce the severity of injuries or damage to vehicles and infrastructure. By providing drivers with timely warnings of impending crash situations, vehicle-to-everything (V2X) could reduce the number and severity of unimpaired motor vehicle crashes by up to 80% (NHTSA). With two million people injured in 2016 alone and hundreds of billions of dollars in economic costs each year due to motor vehicle crashes (NHTSA), V2X is helping address the scourge of lives lost and ruined on U.S. roads.

80% crash [2]
reduction

40% roadway [3]
capacity increase
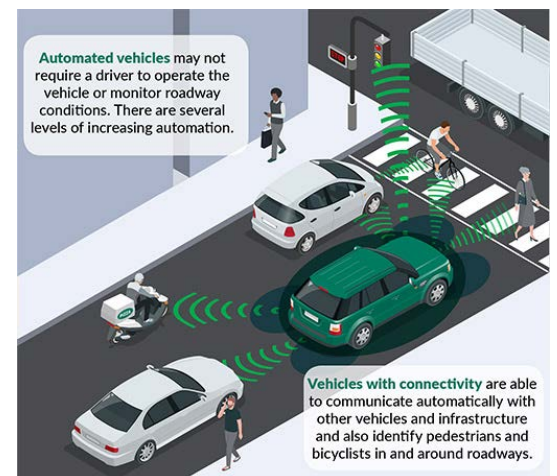
10% emissions [4]
and fuel waste
reduction

V2X *Powered by the 5.9 GHz Safety Spectrum*

Throughout the United States, auto manufacturers, cities and states and others are actively working and investing millions in the research, standardization and development of V2X technologies – all of which rely on the 5.9 GHz Safety Spectrum as the backbone for communication between vehicles, infrastructure and all other road users. The V2X ecosystem works when:

1. **Vehicles talk to each other.** The automotive industry, including ITS America members below, is deploying commercial scale V2X technologies into vehicles equipped with advanced safety features.

2. **Road operators listen to these vehicles and talk directly to them to better operate their transportation system.** Road operators are deploying road side units, fiber and data ecosystems to make that happen.

TOYOTA · Volkswagen · Ford · GM · DAIMLER · BMW · HONDA · SAIC MOTOR = Connected Vehicle

Road-Side Sensors + Fiber - Wireless + Network Connection = Streaming Data Realtime

Connected Versus Automated

Automated vehicles may not require a driver to operate the vehicle or monitor roadway conditions. There are several levels of increasing automation.

Vehicles with connectivity are able to communicate automatically with other vehicles and infrastructure and also identify pedestrians and bicyclists in and around roadways.

Automated vehicles benefit from connectivity as the situational awareness of the automated driving system goes beyond its radar, lidar and camera system to "see" and engage with the connected vehicles and infrastructure around them.
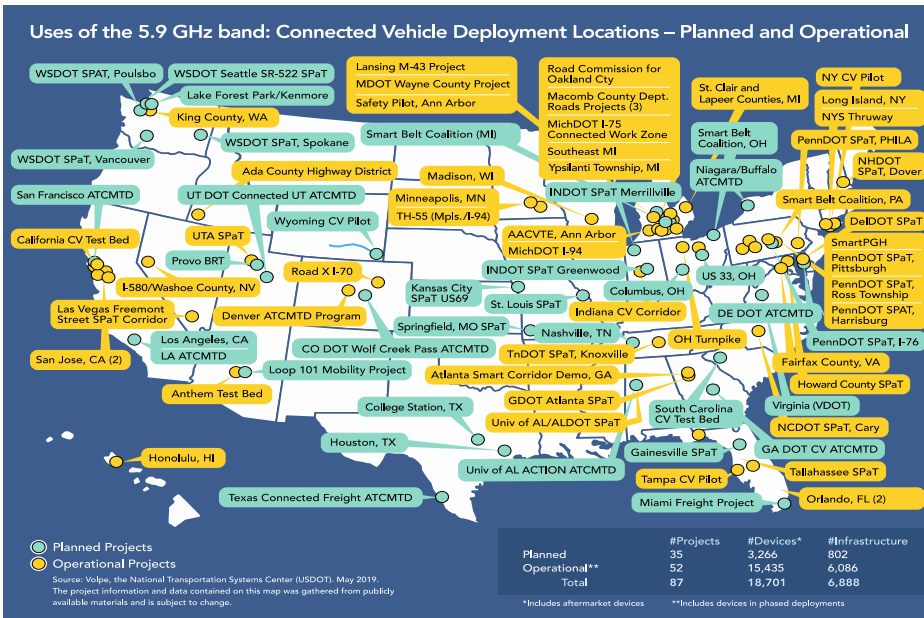
Graphic Courtesy of WSDOT

References:
1. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812826
2. https://www.its.dot.gov/cv_basics/cv_basics_what.htm
3. https://www.its.dot.gov/factsheets/pdf/ConnectedVehicleBenefits.pdf
4. ibid.

ITS AMERICA

SAVING LIVES

V2X Today & Tomorrow
The 5.9 GHz Safety Spectrum

Uses of the 5.9 GHz band: Connected Vehicle Deployment Locations – Planned and Operational

	#Projects	#Devices*	#Infrastructure
Planned	35	3,266	802
Operational**	52	15,435	6,086
Total	87	18,701	6,888

*Includes aftermarket devices   **Includes devices in phased deployments

Source: Volpe, the National Transportation Systems Center (USDOT). May 2019. The project information and data contained on this map was gathered from publicly available materials and is subject to change.

½ of U.S. *Deploying V2X*

Vehicle-to-everything (V2X) technologies are deployed in more than half of the states and dozens of cities for the purposes of improving road safety and saving lives. Connected vehicle technologies offer the U.S. a powerful set of tools to save lives, but only if these technologies are given the certainty of the 5.9 GHZ Safety Spectrum needed for progress to continue.

A snapshot of deployments around the country include:

Powering Freight Safety in Wyoming
Wyoming DOT is deploying V2V and V2I connectivity to provide enhanced monitoring like work zone warnings, distress notifications, forward collision warnings, and spot weather impact warnings to vehicles on I-80. Weather impact warnings can serve to mitigate truck blow-overs along I-80 during harsh winter conditions.

Connecting Mobility Users in Florida
The Tampa Hillsborough Expressway Authority is pairing streetcars, buses, and hundreds of private vehicles with V2V and V2I technology. Features include the mitigation of morning rush-hour backups and transit delays, as well as warning wrong-way drivers on city roads.

Protecting Pedestrians in Ohio
The city of Marysville, Ohio is underway with a project to improve intersections by pairing connected traffic signals and vehicles, allowing them to communicate about the presence of pedestrians, alert to oncoming emergency vehicles, and warn of possible crashes.

Accelerating Transit in Utah
Utah's Redwood Road Connected Vehicle project allows the traffic signal network to give conditional transit signal priority to buses that are running behind schedule. The project has been operational since November of 2017 and has already succeeded in increasing schedule reliability by 6%.

Negating Gridlock in New York
The NYCDOT is planning to deploy V2V and V2I technology in up to 8,000 vehicles, which will warn drivers about red-light or speeding violations, as well as the presence of pedestrians in crosswalks. It can also indicate to connected drivers when sudden breaking is taking place ahead of them.

Evolving Connected Tech in Colorado
Colorado is deploying C-V2X technology along the I-70 mountain corridor to relay safety messages to drivers, including real-time warnings of crashes ahead. This technology can also communicate crash alerts to a local data center, which can immediately deploy emergency personnel.

ITS AMERICA