Vehicle-to-Everything — Especially You

V2X innovators say fleets are critical to helping communities reach a connectivity tipping point.

By Carla Kalogeridis

Why is it important for innovations in vehicle-to-everything (V2X) technology to be on a fleet manager's radar? Don't feel bad if you aren't completely familiar with it; the average person is just starting to hear about V2X (see sidebar, "What Is V2X?"). It's important to fleet managers because V2X technology allows vehicles to communicate with the moving traffic system around them more safely and intelligently. It is going to change everything about how your drivers drive and how your people and products move.

V2X is a component of the Internet of Things (IoT) — in fact, many experts say that once V2X becomes mainstream, the IoT will boom across the world. In a 2019 report, Gartner stated that connected vehicles will be the biggest market for 5G IoT solutions by 2023 — that's a very short 2 years away.

The United States began developing intelligent transportation communications over 20 years ago. After years of protocols, prototypes, lab tests, and field demonstrations, V2X is making inroads in communities across the country, and automakers are equipping vehicles with V2X technology. Although treading water a bit over the last couple of years waiting for wider adoption, standards, and regulations, V2X should get a significant boost from the new federal infrastructure plan and significantly impact how fleets operate in the future.

Heidi R. King, an environmental and social risk consultant and former NHTSA deputy and acting administrator from 2017 to 2019, says the benefits of a V2X world are primarily safety and the environment. "V2X encompasses the innovation that prepares us all for the future," she says. "Now is a fascinating time because we are seeing the merging of technology and automotive, even though some of the tech companies involved do not know much about automotive."

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> — Heidi King

King says that just as digital technologies and connectivity have revolutionized our lives, that revolution is not expanding into the transportation sector. "As V2X takes hold, increased safety and time savings will be the two biggest impacts on fleet operators," she says. "Drivers don't need to sit idling at a red light, emitting pollutants and wasting fuel, when no one is coming for miles around. If you're

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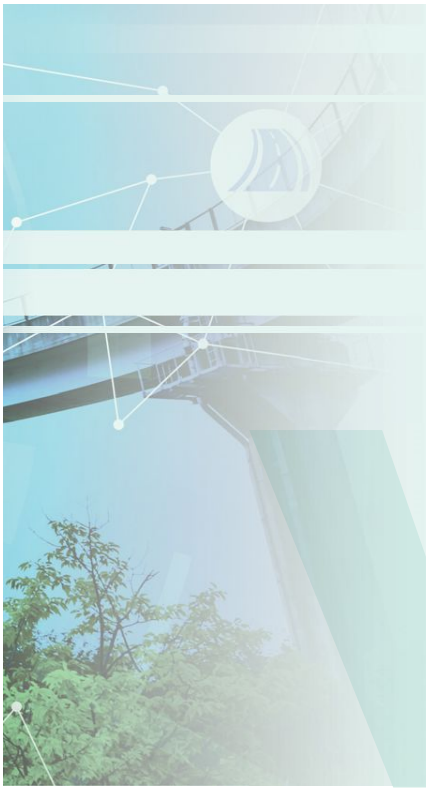
What Is V2X?



Vehicle-to-everything (V2X) is communication between a vehicle and anything around it that could impact the vehicle. Think connecting vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), vehicle-to-pedestrians (V2P), and vehicle-to-network (V2N). V2X is simply the umbrella term for a vehicle communication system that encompasses all these things.

"People think that V2X is autonomous driving, but it's not," says Mark Seng, president and COO of Connex2X, LLC. "V2X is the building block, the foundation for autonomous driving."

In this transportation ecosystem, vehicles will talk to each other, to traffic lights and parking spaces, to pedestrians with smartphones, and to data centers via cellular networks.

V2X will help create safer, greener, and more efficient driving. Sensors and other technologies capture and transport information via high-bandwidth, high-reliability links. And while V2X may seem futuristic, most of the technology involved is available now — such as high-precision maps, real-time traffic information, radars, sensors, cameras, etc. The only piece still being proven is the high-reliability communications system. Regulations and standards also need to catch up before V2X can expand across our country, and eventually, the world.

stuck at that light, wouldn't you want your vehicle to communicate to the traffic light and turn that red to green?"

The prospects of a V2X era impassions her, especially after the challenges she faced as NHTSA's executive leader responsible for advancing policies that mitigate risk to public safety on roadways and in motor vehicles.

"An ambulance can communicate to the traffic light as it's approaching so that the light stays green, and it will hold other vehicles so the ambulance can get through faster," she says. "Just think about what that could mean to someone."

Admittedly, there are obstacles to overcome such as creating regulations, establishing standards, and getting more companies and communities to take the leap. And in the wake of recent ransom attacks on some of our nation's most important suppliers, cybersecurity must be dealt with too. "Cybersecurity is a risk that needs to be managed, and the tools exist to manage it," says King.

But what about all the vehicles already on the roads? Neither fleet operators nor most individuals can afford to scrap their current vehicles and buy new ones. "The pilot programs are already in place to retrofit existing vehicles for V2X," says King.

The timeline for V2X? "Now to soon," she says. "The technology is here. It will take the coordination of local and state governments and consumer education. And fleet owners are consumers — and the governments work for consumers. Fleets have to make the move."

"V2X is not far off or futuristic. The real-time notifications to keep fleets moving instead of idling — coupled with the safety features — should make integration of this technology a priority for fleets now." — Nick Porrini

Examples of V2X Use Cases

Traffic lights alerting vehicles to adjust their speed due to an impending light change

Warnings between vehicles to prevent collisions

Traffic or hazard alert shared between vehicles

Safety warnings to pedestrians or cyclists

Alerts of emergency vehicles approaching

Speed limit alerts

Source: otonomo

> **Whether original equipment or retrofit, V2X needs to connect 80% of fleets to reach that tipping point and see the real benefits."** — Mark Seng

Fleets: V2X Catalysts

If fleet operators can help move things forward, what does that look like?

"Fleet managers can start by urging the communities where they operate to implement V2X," King says. "Where are you losing safety? Where are you facing fuel risks? Smart tags on toll booths? That's V2X. So many are already using it. Think about where this technology could solve your problems and your pain points and start there."

Gaining momentum in V2X can be as simple as calling your city planners, your local and state traffic departments, and your local and state governments, she says. "Ask them: 'Can we pull together a program here?' Identify the opportunities in your fleet's traffic patterns. The state governments already have the technology…they're just waiting for enough people to be interested in a pilot program."

Bryan Mulligan, president and founder of Applied Information, Inc., has been involved in V2X pilot programs. He has 20 years of experience developing wireless, IoT, cloud-computing, and connected vehicle technologies into modern solutions for the transportation sector. As an infrastructure electronics expert, he is the "I" in V2I. Mulligan — who has collaborated with companies like Ford, Audi, and Qualcomm — knows how to make traffic lights do what we want them to do. "As cool as that sounds, it's only good if the technology can talk to a smart vehicle," he says.

"Cities are our customers," Mulligan says. "We talk to them about getting paramedics and firetrucks to citizens in need more quickly and more safely. Imagine if you were approaching a traffic light and a voice from your car speaker tells you, 'There is a firetruck approaching from behind on your left.' These are the kinds of examples that get people thinking."

Mulligan runs a lab in the Atlanta area called Infrastructure-Automotive Technology Laboratory or iATL, where companies can come to test their vehicles against the infrastructure. It's a playground for carmakers and everyone in the connected world.

"We got started by approaching the communities, OEMs, technology providers, and people representing the most vulnerable road users," he says. "It's a place to tell your partners your pain points. The lab is a proving ground to help companies devise practical technologies that can be deployed to scale."

Last October, Applied Information collaborated with Audi of America and Temple, Inc. to develop two connected vehicle applications that improve safety in school zones and around school buses. The first application warns drivers when they are approaching an active school safety zone and exceeding the speed limit when children are present. The second application warns drivers when they are approaching a school bus stopped to pick up or drop off students. By March, school bus maker Blue Bird Corp. and the Greater Atlanta area's Fulton County School System also joined the deployment. The project will be completed this year.

The technologies are similar to those announced last September by Audi in a collaboration with the Virginia Department of Transportation to help protect vulnerable roadside construction workers. "The growth of V2X will be all about cities, fleets, and consumers understanding the applications," says Mulligan.

"There are many more smart cities than people realize," says Nick Porrini, CEO and founder of V2X/ADAS aftermarket technology developer, Connex2X. "The more companies, communities, and consumers that get involved, the faster the V2X infrastructure can grow, and that's one key benefit to fleets adopting V2X now."

Another beautiful thing about V2X: Even though it is based on standardized, interoperable communications, the V2V component is customizable. "This is a real benefit to fleets," says Connex2X's president and COO, Mark Seng. "Vehicles within one fleet talking to each other will deliver multiple efficiencies in fuel and route optimization, as well as a whole new level of safety for drivers and those around them."

What Are the Opportunities for Fleets?

The approaching V2X ecosystem brings lots of opportunities to fleets. "It's important that fleet managers understand that V2X is not far off or futuristic," says Porrini. "It's not really new. The real-time notifications to keep fleets moving instead of idling — coupled with the safety features — should make integration of this technology a priority for fleets now."

In fact, the immediacy of V2X is critical to understand, adds Seng. "We've seen momentum in V2X at the OEM level, but there has to be a penetration of existing vehicles with V2V to accelerate that adoption rate," he says. "Whether original equipment or retrofit, V2X needs to connect 80% of fleets to reach that tipping point and see the real benefits."

"We must tell everyone about this transformative set of technologies and what they can do," King says. Mulligan advises fleet operators to start with these steps:

- Educate yourself on V2X applications where you could make your business safer and better.
- Strategize on who to collaborate with to achieve your objectives.
- Determine how to integrate V2X into your business processes. Understand how the technology applies to your fleet.
- Advocate for V2X technology in your city, and in the areas in which you operate.

"Ask, 'What can V2X do for me?" advises Mulligan. "Really think about that and talk about it. For each fleet, there's a different answer. And think about it from an understanding that the future of transportation is electric, connected, and autonomous."

"If I were a fleet manager, I wouldn't want to be a follower — I would want to be a leader," King points out. "There are so many benefits for fleets in V2X right now, such as fuel savings, safety, time efficiencies, and being a socially conscious leader. If I were a fleet manager, I'd want to get out in front of this thing right now." *FS*

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