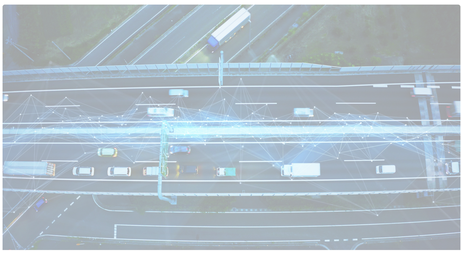
# How satellite-powered Smart-IoT will speed the connected vehicles revolution

Alex Miller
Technology

4 minutes



The pace at which vehicles of all kinds are being connected is remarkable; for example, there are more than 470 million connected cars estimated to be on roads by 2025, up from 237 million in 2021. Many more types of vehicles will add to that number — from over-the-road trucks and agricultural vehicles to drones, construction equipment and others. The market for telematics — the equipment installed in vehicles enabling the collection and transmission of real-time data — is projected to grow from $73.4 billion in 2022 to $334 billion by 2032.

The Internet of Things (IoT) plays a pivotal role in the connectivity of smart vehicles. IoT-enabled cars can provide real-time weather updates, communicate with roadside infrastructure, such as traffic lights, road signs and toll booths. This allows for real-time traffic information, optimized traffic signal timing, electronic toll collection and alerts about road conditions or construction. Additionally, IoT connectivity allows manufacturers to remotely diagnose vehicle issues, schedule maintenance and push software updates.

Vehicle monitoring tools such as tire sensors and trailer tracking devices for large trucks as well as fleet-management and owner-level enhancements all require constant connectivity anywhere. That makes cellular networks' lack of ubiquitous coverage an issue, while existing satellite options are prohibitively expensive and have limited capacity and coverage.

E-Space's low Earth orbit satellite constellation is being designed to enable connected IoT devices virtually anywhere, ensuring ubiquitous coverage whether the vehicle is in the city, the suburbs or the open road far from reliable cell service. The mini terminals the company is developing can be used in almost any application and, importantly, are highly affordable.

As smart vehicles — cars, truck and many others — become more common, it's worth a look at just how some of these advancements will work and what problems they'll help solve. Some examples:

- **Autonomous vehicle connectivity:** From over-the-road trucks, passenger cars and delivery vehicles on land to unmanned boats at sea or UAVs in the sky, connected IoT sensors will be a base requirement for it all. Operators of all kinds will need highly reliable, ubiquitous connectivity that works in cities and in rural areas either as a replacement or to augment cellular networks.
- **Trailer tracking and monitoring:** Real-time awareness of tractor-trailer locations, operating conditions, tire pressure and more results in fewer breakdowns and greater efficiency for the fleet.
- **Software updates:** IoT provides a secure and reliable way to deliver updates over the air (OTA). This will allow vehicle makers to fix bugs, add new features and improve the performance of vehicles without needing to take them to a dealership or fleet center.
- **Emergency services**: Sending accident alerts and location details can mean the difference between life and death.
- **Vehicle-to-vehicle (V2V) communication**: This technology enables vehicles to exchange critical safety information in real-time, including data about vehicle speed, direction, braking status and more. V2V can reduce road fatalities and other incidents by anticipating potential hazards to prevent accidents.
- **Vehicle-to-infrastructure (V2I) communication:** V2I technology allows vehicles to communicate with things such as traffic signals, road signs and smart traffic-management systems. The result can be smoother traffic flow, optimized routing and reduced congestion. Real-time traffic updates and alternative route suggestions also save time and fuel.
- **Advanced Driver Assistance Systems (ADAS):** Connected smart vehicles equipped with ADAS use cameras, radar, Lidar and other sensors to assist drivers in making safer decisions on the road. These include adaptive cruise control, lane-keeping assist, automatic emergency braking and blind-spot monitoring — all of which act together as a safety net to help drivers avoid collisions.

## Environmental impact

While safety, convenience and efficiency are important considerations for the connected vehicle, it's hard to overstate the positive impact on the environment this technology enables. Optimized routes and traffic flow reduce fuel consumption and greenhouse gas emissions. Vehicle automation can also change the need for individual parking spaces — transforming land use — and lead to less personalized driving and more automated ride share and shuttle usage.

Similar advantages for the environment can be realized by the millions of off-road vehicles in use around the world, alongside potentially significant cost savings for the companies operating them. Finally, excess emissions are often driven by inefficiency in transportation – yet with connected vehicles, data-driven insights and real-time monitoring can enable optimized routes, fuel efficiency, and maintenance, drastically reducing excess emissions and contributing to a greener and more sustainable future for transportation. Smart vehicles powered by satellite-connected IoT devices is still a nascent field. However, the steps made today will be a big step forward in revolutionizing transportation efficiency, safety, connectivity and sustainability, paving the way for advanced autonomous driving and seamless navigation on a global scale.

**Alex Miller**

Alex Miller leads editorial at E-Space. Based in Denver, he's a longtime journalist who's been involved with the satellite industry for over a decade.

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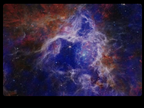

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