

Eyes of the V2X ecosystem

Creating smarter, safer intersections is a key part of a major initiative by Utah DoT. Ouster's Asad Lesani explains how Lidar tech is helping to protect pedestrians, cyclists and drivers

Lidar detection technology is a key part of the Connecting the West programme, a widespread Vehicle to Everything (V2X) deployment by three US departments of transportation - Utah, Colorado and Wyoming - which also includes connected vehicle technologies such as traffic signal pre-emption and prioritisation, and traveller information messaging.

Utah DoT (UDoT) is using Lidar specialist Ouster's BlueCity system, integrated into Econolite's Cobalt controllers and EOS firmware. "Ouster provides the critical sensing and perception technology," explains Asad Lesani, the company's VP - smart infrastructure product.

This involves accurate 3D spatial awareness about the road environment along with the intelligence to enable multimodal detection, classification and tracking on the intersections and freeways where UDoT is using BlueCity. Vehicles' on-board computers use Lidar data to trigger emergency braking or dashboard warnings, while traffic

engineers and public-safety agencies access the data through cloud-based dashboards to monitor 'near-miss' incidents, identify dangerous traffic patterns, and dynamically adjust signal timings to protect vulnerable road users.

Hi-res, 3D view

"Ouster BlueCity acts as the essential 'eyes' of the V2X ecosystem, providing a high-resolution, three-dimensional view of the road and detection of multimodal road users," says Lesani. "While connected vehicles often rely on onboard sensors, they are limited by line-of-sight; meaning they cannot always see a pedestrian behind a parked truck or a cyclist approaching around a blind corner. By creating a real-time 3D digital twin of an intersection, Ouster BlueCity detects, classifies and tracks road users in adverse weather and light (darkness, rain, or sun glare). This data is then converted into standardised safety messages that are broadcast to connected vehicles, effectively giving advance warning of potential safety hazards before they are even visible to the driver or the car's own sensors."

Advanced detection

Ouster's Utah deployment will expand to over 100 intersections in Salt Lake City, Ogden, Orem and Cedar City, with two sensors typically installed on existing traffic poles. UDoT is able to more dynamically adjust signals based on traffic conditions as well as potential safety events - such as extending the crosswalk light for a slow-moving group of pedestrians, Lesani adds.

"It's a complete traffic management system - meaning that a single installation also automates data collection for analytics on vehicles cyclists and pedestrians, and provides safety alerts and V2X communication. UDoT is able to access data on safety incidents like near-miss detection, jaywalking and red-light running, as well as traffic data like speed and count."

By combining advanced detection with connected vehicle communication, Lidar significantly improves intersection safety, paving the way for a safer and smarter transportation network for drivers and pedestrians alike, he concludes. **ITS**

• *An in-depth look at the Connecting the West V2X project will be published in ITS International March/April 2026*

Lidar use cases

- **Multimodal Actuation:** Improving mobility for road users, ensuring that signal changes are triggered by real-time demand rather than pre-set timers.
- **Vulnerable road user safety:** Protecting pedestrians and cyclists by identifying them in 3D space and adjusting signal timings (actuation) to ensure they clear the intersection safely.
- **V2X Communications:** Broadcasting standardised safety messages to connected vehicles to provide 3D spatial awareness. By integrating with roadside units, Ouster BlueCity alerts drivers and automated systems to potential hazards, such as a pedestrian entering the intersection that may be outside the driver's line of sight.