



Legislation Supports Autonomous Vehicles But Not Connected Ones

Safety Requires Legislation

It is inspiring to notice that legislation that helps incorporate autonomous vehicles on our roads in the near future is moving forward. The National Highway Traffic Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (USDOT), has integrated automated vehicles into the existing safety standards such that the text in the standards do not rely on the existence of steering wheels and driver's seats, which may not exist in fully autonomous vehicles. In addition, the NHTSA has incorporated lane-keeping support, pedestrian automatic emergency braking, blind spot detection, and blind spot intervention into its Five-Star Safety Ratings program. Such driver-assistance technologies are the first steps toward fully autonomous vehicles but, more importantly, toward safer ones. Developing safer vehicles requires significant investments, so it is important that the legislation provide a framework that is predictable, reducing the risk of long-term commitment.

To this end, it is likely good that a California court recently ruled that the state Department of Motor Vehicles (DMV) is not allowed to share details that Waymo regards as trade secrets to a third party. Any compa-

ny looking to test and deploy autonomous driving technology in California has to submit information about its safety practices and technology to the DMV. When a third party requests this information under the California Public Records Act, it could have a "chilling effect across the industry" according to Waymo, as potential market participants may be dissuaded from investing valuable time and resources.

While legislation efforts are favoring autonomous vehicles, the same cannot be said for connected vehicles. According to Sjöberg [1], "Ad hoc V2X [vehicle-to-everything] communication is essential for automated vehicles, and 4G/5G connectivity is important." However, for ad hoc communications to take place, reserved spectrum is needed. The 75-MHz spectrum previously reserved for V2X communications on the 5.9-GHz band has been opened up for consumer electronics equipment and cellular networks by the authorities. This is due to an argument from the consumer electronics market that more spectrum is needed and that the vehicular industry has not been making good use of its available spectrum.

Also, the cellular industry argues that V2X communication should, instead, use base stations and proprietary spectrum via the so-called cellular V2X (C-V2X) technology. The Intelligent Transportation So-

ciety of America (ITS America) is actively working to again make the spectrum available for V2X through both a lawsuit and through continuous discussions with different parts of the U.S. authorities. The hope is to preserve the full 75 MHz through the appeal or to ask the FCC to work with the DOC and USDOT to identify additional spectrum elsewhere so that the full benefits of V2X technologies can be realized. In the meantime, U.S. cellular providers are phasing out cellular technology from 3G and 4G to make room for 5G, which will affect most vehicles currently connected via C-V2X.

Toward Autonomous Vehicles

Final Rule by the NHTSA Amends Occupant Protection for Vehicles With Automated Driving Systems

On 10 March 2022, the final rule aiming to integrate automated vehicles into the existing safety standards was submitted for publication in the *Federal Register* in the United States. This final rule amends the occupant protection Federal Motor Vehicle Safety Standards (FMVSSs) to account for future vehicles that do not have the traditional manual controls associated with a human driver because they are equipped with automated driving systems (ADSs).

This amendment is needed since the current occupant protection standards are written for traditionally

designed vehicles and, therefore, use terms, such as *driver's seat* and *steering wheel*, that are not meaningful to vehicle designs that, for example, lack a steering wheel or other driver controls. In addition, this final rule amends the standards in a manner that maintains the existing regulatory text whenever possible to make clear that it maintains the same level of crash protection currently provided to occupants in more traditionally designed vehicles. In other words, the rule is limited to the crashworthiness standards to provide a unified set of regulatory texts applicable to vehicles both with and without ADS functionality.

The NHTSA has been evaluating its FMVSSs to identify where concepts or terms used in the standards do not account for the designs that the agency expects—and industry confirms—could be used in certain vehicles equipped with ADSs. The NHTSA has detailed this in previous rulemaking notices, which resulted in the agency's 30 March 2020 notice of proposed rulemaking (NPRM) underlying this final rule. The final rule adopts most of the provisions included in the NPRM with some exceptions; its aim is to minimize changes to the current standards but maintain the level of occupant protection currently provided in all FMVSS-compliant vehicles.

Waymo Can Prevent Trade Secrets About Its Autonomous Vehicle Technology From Disclosure

Waymo decided to sue the California DMV in an attempt to prevent the disclosure of information to its competitors, that Waymo considers to be sensitive trade secrets. The DMV develops and administers an Autonomous Vehicle Deployment Program to establish regulations that manufacturers and other entities are required to meet before they can deploy autonomous vehicles on California's public roads. Autonomous vehicle manufacturers, such as Waymo, must submit several details about their

autonomous techniques—e.g., how autonomous vehicles identify and navigate through certain conditions—to the DMV to ensure safety. Since this type of information could provide strategic insight to Waymo's competitors and undermine the investments made in autonomous vehicle technologies, it was promised to be kept private, and the information was marked "contains confidential business information."

However, the DMV received a request for the release of records relating to Waymo pursuant to the California Public Records Act. According to the lawsuit, the DMV then contacted Waymo to provide redacted versions of the requested material to protect its proprietary and trade secret information. However, certain parts of the redactions were challenged by the third party who made the request for release. In an attempt to prevent this unknown third party from getting access to the information, Waymo decided to sue the DMV. In February 2022, the California Superior Court in Sacramento ruled in favor of Waymo.

The NHTSA Proposes Including Several Driver-Assistance Technologies in Its Five-Star Safety Ratings Program

The NHTSA is proposing the following updates to its Five-Star Safety Ratings program, also known as the *New Car Assessment Program (NCAP)*:

- recommending four new driver-assistance technologies: lane-keeping support, pedestrian automatic emergency braking, blind spot detection, and blind spot intervention
- strengthening the current testing procedures and performance criteria for the driver-assistance technologies already included in the NCAP
- establishing a 10-year road map for future NCAP updates
- requesting comments on ways to develop a meaningful rating system for driver-assistance technologies

- considering the potential addition of emerging vehicle technologies related to driver distraction, alcohol detection, seat belt interlocks, intelligent speed assist, driver monitoring systems, and rear seat child reminder assist
- discussing ways to provide a crash avoidance rating on the window sticker (Monroney label) on new and used vehicles.

Several driver-assistance technologies are now included, and, also, for the first time ever, the NCAP includes technology recommendations not only for drivers and passengers but for road users outside the vehicle, like pedestrians. The proposal also seeks comments and suggests a novel approach for using technological change to reduce driver behaviors that contribute to many crashes, injuries, and fatalities.

Cooperative ITS

ITS America Aims to Ensure That the Spectrum for V2X Is Available and Usable

As described in a previous column [2], ITS America and the American Association of State Highway and Transportation Officials (AASHTO) filed a lawsuit in June 2021 with the intention of reversing the U.S. Federal Communications Commission's (FCC's) reallocation of 45 MHz from ITS to Wi-Fi. The reason is that ITS America states that it has demonstrated that the full range of V2X applications—including sensor sharing and cooperative maneuvering, which are important for enhancing automated vehicle safety, as well as safety applications for vulnerable road users—would be unable to fit within the remaining 30-MHz spectrum environment. In March 2022, ITS America and the AASHTO presented oral arguments to the United States Court of Appeals for the District of Columbia Circuit evoking the FCC's order to reallocate the majority of the spectrum in the 5.9-GHz band for use by unlicensed devices.

ITS America is pursuing several strategies in addition to the legal case with the intention of preserving the viability of V2X communications. Among other things, it has been working within the FCC's rule-making process, advocating for the retention of an adequate spectrum for the range of V2X message types, explaining the importance of sufficient interference limits, and arguing in favor of a reimbursement mechanism for stranded V2X deployments.

If the FCC continues to move forward with reallocation, ITS America has also called on the Commission to work with the U.S. Department of Commerce (DOC) and the USDOT to identify a suitable additional spectrum for V2X deployment. To fully use the tools that will be lost due to this spectrum reallocation, an additional 40 MHz of low-latency, midband spectrum are required.

According to ITS America, these spectrum attributes are essential for allowing the instantaneous, reliable message transmission that is required to avert crashes and coordinate vehicle actions at high speeds. ITS America is focused on trying to ensure that whatever spectrum is available for V2X is usable and protected from interference.

European Data Act Proposed to Clarify Who Can Create Value From Data

On 23 February 2022, the European Commission proposed new rules on who can use and access data generated in the European Union across all economic sectors. The Data Act aims to ensure fairness in the digital environment, stimulate a competitive data market, open opportunities for data-driven innovation, and make data more accessible for all. The hope is that this will lead to new, innovative services as well as more competitive prices for aftermarket services and repairs of connected objects.

In the press release, the following is stated:

Data is a non-rival good, in the same way as streetlight or a

scenic view: many people can access them at the same time, and they can be consumed over and over again without impacting their quality or running the risk that supply will be depleted. The volume of data is constantly growing, from 33 zettabytes generated in 2018 to 175 zettabytes expected in 2025. It is an untapped potential, 80% of industrial data is never used. The Data Act addresses the legal, economic and technical issues that lead to data being under-used. The new rules will make more data available for reuse and are expected to create €270 billion of additional GDP by 2028.

In the fact sheet, we can read that the 33 ZB of data generated globally would reach the moon if it was stored on 512-GB tablets stacked on top of each other. In 2025, the expected 175 ZB of data would travel back and forth to the moon five times if stored on the same 512-GB tablets, a growth equivalent of 1,260 tablets per second.

Notably, the Data Act reviews certain aspects of the Database Directive, which was created in the 1990s to protect investments in the structured presentation of data. It clarifies that databases containing data from Internet of Things (IoT) devices and objects should not be subject to separate legal protection. The Data Act will make more data available for use since it will set up rules on who can use and access what data for which purposes. For vehicles, this implies, e.g., that consumers and businesses will be able to access the data of their devices and use them for aftermarket and value-added services, like predictive maintenance.

Cellular Communications

U.S. Cellular Providers Are Phasing Out 3G and 4G, Which Will Affect Most Vehicles Connected via C-V2X
AT&T announced that it is phasing out its 3G network in the United

States starting 22 February 2022, to make room among its frequency bands for 5G. Its customers are requested to upgrade their wireless phones and devices such that they support at least 4G LTE. According to the FCC, the cell phone providers Verizon and T-Mobile will soon follow and do the same thing in December 2022 as well as by 31 March 2022 for the Sprint 3G network and 30 June 2022 for the Sprint 4G LTE network.

Some carrier websites provide lists of devices that will no longer be supported after the 3G networks are shut down. In some cases, there is a need to upgrade to a newer device to ensure that you can stay connected, whereas some devices may only require a software update. For units purchased independent of a mobile provider, you should be able to check whether your device is 4G LTE enabled by checking its settings or the user manual to determine whether you need to purchase a new device or install a software update.

The FCC emphasizes that not only phones but also other devices, such as certain medical devices, tablets, smart watches, vehicle SOS services, home security systems, and other connected products may be using 3G network services. In other words, this may affect the already installed C-V2X devices on several vehicle models.

So why are 3G networks being phased out? As mobile carriers seek to upgrade their networks to use the latest technologies, they periodically shut down older services, such as 3G, to free up spectrum and infrastructure to support new services, such as 5G. Similar transitions have happened before. For example, some mobile carriers shut down their 2G networks when they upgraded to support 4G services. Mobile carriers have the flexibility to choose the types of technologies and services they deploy, including when they decommission older services in favor of newer ones to meet consumer demands. It should also be

noted that other access technologies providing V2X, like Dedicated Short Range Communications (DSRC) in the US or the European counterpart ITS-G5. Which do not rely on base stations, are not affected. This is due to the fact that the upgrade only affects centralized networks (which rely on communication via base stations) using proprietary frequency bands.

The IoT

Smart Streetlights in Uruguay

The Sydney-based National Narrowband Network Company has signed a contract with technology provider Wellness TechGroup to provide IoT network coverage to 70,000 smart streetlights in Montevideo, the capital of Uruguay. The project will cover 200 km² and provide smart street lighting to more than 1.3 million people, improving community and road safety as well as reducing carbon emissions by up to 80% according to

the press release. This initiative will also establish an infrastructure-based network that can accommodate other smart city initiatives.

The idea is to replace Montevideo's existing lighting system with LED technology and roll out an interoperable remote management system, with units connecting via Long Range Wide Area Networks (LoRaWAN) which is an international ITU standard. The initiative will be able to provide added services to the city of Montevideo, as the contract signed includes the opportunity to bring third-party customers across the same gateways into the LoRaWAN network.

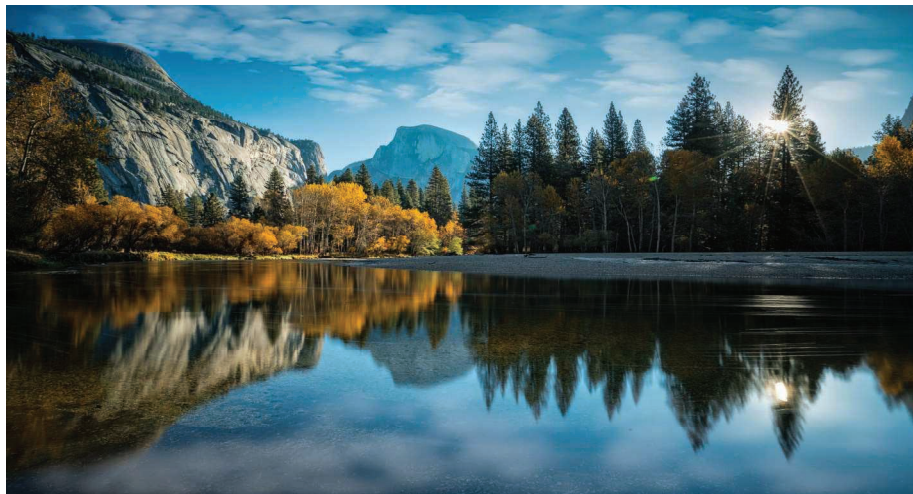
LoRaWAN is a scalable low-power, wide-area networking protocol technology that wirelessly connects devices to the Internet and manages communication between end-node devices and network gateways. Real-time information on all of the data from the intelligent public lighting

service will therefore be available. The lights become a data enabled lightning server and form part of a smart city IoT ecosystem beyond lighting. Montevideo's new public lighting system will be one of the largest smart street lighting projects over LoRaWAN to date. LoRaWAN technology was selected to ensure a low total cost of ownership, advanced technical attributes, high security, flexible network deployment models, the optimization of battery life, and the ability to access a fast-growing ecosystem of other solutions.

References

- [1] K. Sjöberg, "Have we underestimated the challenges with automation? [Connected and Automated Vehicles]," *IEEE Veh. Technol. Mag.*, vol. 16, no. 4, pp. 99–102, Dec. 2021, doi: 10.1109/MVT.2021.3115873.
- [2] K. Sjöberg, "Activities on legislation for autonomous vehicles take off [Connected and Autonomous Vehicles]," *IEEE Veh. Technol. Mag.*, vol. 16, no. 3, pp. 149–152, Sep. 2021, doi: 10.1109/MVT.2021.3091393.

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