

GAO Highlights

Highlights of [GAO-23-105069](#), a report to the Committee on Transportation and Infrastructure, House of Representatives

Why GAO Did This Study

DOT estimates that automobile crashes caused 42,915 fatalities in 2021, the highest number for any year since 2006. According to DOT, CV technologies that enable radio communication among vehicles and roadway infrastructure could significantly reduce crashes while also improving traffic efficiency. In 1999, FCC allocated spectrum in the 5.9 GHz spectrum band for CV technologies but then, in 2020, repurposed some spectrum to increase access for Wi Fi and other unlicensed wireless users. DOT and transportation stakeholders have voiced concerns that the reduced spectrum could prevent CV technologies from achieving their intended safety and other benefits.

GAO was asked to examine the status of CV technologies and relevant federal efforts. This report discusses (1) DOT's efforts to facilitate the deployment of connected vehicle technologies and (2) how DOT is addressing challenges to the further deployment of connected vehicle technologies. GAO reviewed documents, interviewed agency officials including from DOT and FCC, and interviewed a non-generalizable sample of 40 stakeholders. Our sample included 23 transportation stakeholders and seven wireless industry stakeholders.

What GAO Recommends

GAO recommends that DOT share additional information about its strategy to support the future deployment of connected vehicle technologies under the new spectrum rules.

DOT agreed with this recommendation.

View [GAO-23-105069](#). For more information, contact Andrew Von Ah at (202) 512-2834 or VonAhA@gao.gov.

November 2022

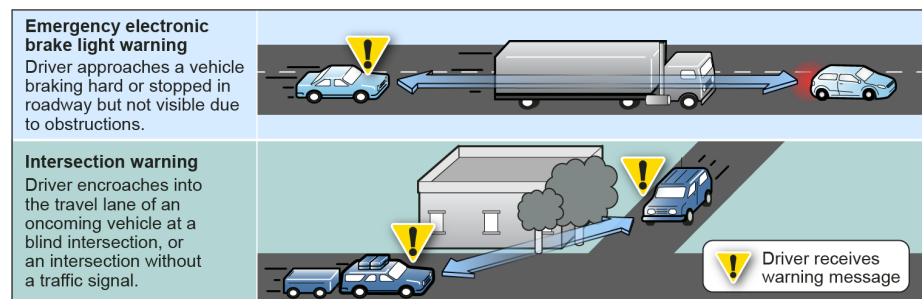
CONNECTED VEHICLES

Additional DOT Information Could Help Stakeholders Manage Spectrum Availability Challenges and New Rules

What GAO Found

Since 1999, the U.S. Department of Transportation (DOT) has pursued efforts to advance the deployment of connected vehicle (CV) technologies, which enable data to be exchanged among vehicles, infrastructure and road users' personal devices. A driver could receive, for example, a warning about a vehicle that is braking hard on the road ahead but not visible to the driver (see figure below for examples of CV warning messages). According to DOT, these technologies could significantly reduce crashes and improve traffic efficiency. To create a CV environment requires several components, including vehicles and transportation infrastructure equipped with devices to exchange messages. A CV environment also requires radio spectrum (the medium for exchanging messages), and a shared communication protocol or "common language" so messages can be reliably and quickly exchanged. Two communication protocols are available, the original protocol used for CV technologies and a newer protocol. DOT has provided over \$800 million in related federal research grants. As of September 2022, transportation agencies in 38 states held licenses to use CV technologies from the Federal Communications Commission (FCC), the agency responsible for regulating, allocating, and assigning non-federal spectrum. Some transportation agencies have deployed CV technologies on roadside infrastructure, but few automakers have produced vehicles equipped for exchanging safety messages.

Examples of Connected Vehicle Warning Messages



Source: GAO analysis of Department of Transportation (DOT) information. | GAO-23-105069

In 2020, FCC changed the communication protocol for and repurposed 60 percent of the spectrum previously allocated to CV technologies to be used for Wi Fi and other wireless users. DOT is taking steps to respond to these spectrum changes, including assessing whether CV technologies that use the new communications protocol can provide safety benefits under the new spectrum rules. DOT has shared some information about its strategy for facilitating the further deployment of CV technologies. However, most of the transportation stakeholders GAO interviewed (18 of 23) said that more information about DOT's strategy to facilitate the deployment of CV technologies could be helpful. By sharing more information with stakeholders, such as the estimated timeframes for key steps to advance CV technologies that use the new communication protocol and achieve nationwide deployment, DOT can help to reduce stakeholders' uncertainty and help them plan their own actions related to investing in CV technologies.