GAO Highlights

Highlights of GAO-23-105740, a report to congressional committees

September 2023

INTELLIGENT TRANSPORTATION SYSTEMS

Benefits Related to Traffic Congestion and Safety Can Be Limited by Various Factors

Why GAO Did This Study

Traffic congestion wastes time and money, and can also jeopardize drivers' safety. Moreover, congestion-related challenges are projected to increase. ITS is designed to improve the performance and/or safety of traffic systems through detecting and communicating information about road users or road conditions, among other things.

The Infrastructure Investment and Jobs Act includes a provision for GAO to review the potential societal benefits of improving the efficiency of traffic systems. This report describes (1) ITS technologies selected state and local government agencies have deployed and (2) the benefits identified from using ITS to manage traffic, and the associated factors and challenges of ITS use.

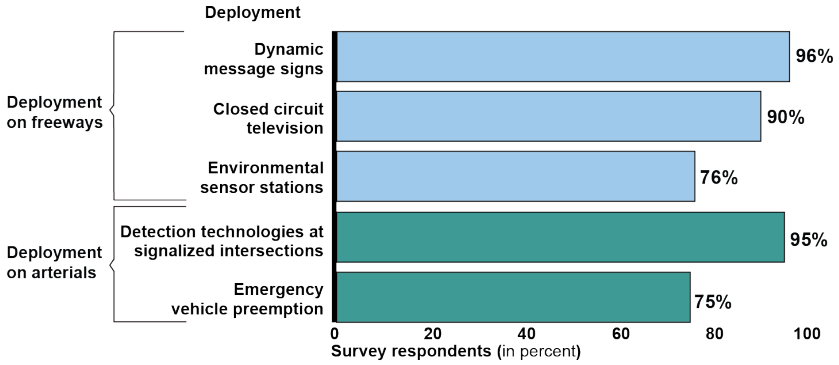
GAO reviewed information from the most recent (2019 and 2020) DOT surveys (conducted periodically since 1997) of state and local transportation agencies on ITS deployment. Additionally, GAO reviewed relevant studies and publications, and interviewed knowledgeable officials. In particular, GAO interviewed officials from 17 state and local transportation agencies selected to get perspectives from urban and rural locations in geographically dispersed areas where ITS has been deployed to varying degrees. The views GAO obtained from the states and localities are not generalizable. GAO also interviewed officials from DOT, the Department of Energy, and professional organizations and academic institutions with relevant knowledge about ITS.

View GAO-23-105740. For more information, contact Elizabeth Repko at (202) 512-2834 or repkoe@gao.gov.

What GAO Found

Deploying intelligent transportation systems (ITS) is one way that state and local transportation agencies have attempted to address issues related to traffic safety and congestion. ITS consists of sensors, computer hardware and software, and communications systems that, for example, automatically change the timing of traffic signals ("adaptive signal control technology"). According to Department of Transportation (DOT) 2020 surveys of state and local agencies, some technologies are widely deployed on arterials (roads with traffic signals) or freeways, while others are less widely deployed. Examples of widely deployed technologies include dynamic message signs, which provide information to travelers; technologies that detect vehicles and other roadway users to provide information on traffic flow; and emergency vehicle preemption, which provides green lights to emergency vehicles (see figure). Examples of technologies deployed by less than 30 percent of survey respondents include adaptive signal control technology and ramp meters that control vehicle access to freeways.

Examples of Intelligent Transportation System Technologies Deployed by 75 Percent or More of DOT Survey Respondents in 2020



Source: GAO Summary of Department of Transportation (DOT) survey information. | GAO-23-105740

Note: DOT surveyed transportation agencies responsible for freeways (response rate 73 percent) and arterials (response rate 68 percent) from 108 medium and large metropolitan areas. Closed circuit television cameras transmit video on traffic conditions in real time, such as to a transportation management center. Environmental sensor stations collect information on roadway conditions.

According to selected state and local transportation officials GAO interviewed and studies GAO reviewed, ITS can provide benefits related to traffic congestion and safety, but various factors and challenges can limit the extent of these benefits. For example, officials said that after a crash, ITS enables them to get emergency services to people and to clear lanes more quickly. Because blocked lanes can lead to secondary crashes, these activities reduce post-crash congestion and improve safety. One study of crash data from 2011 to 2018 on five corridors found that adaptive signal control technology, which is designed to keep traffic flowing smoothly, led to a reduction in crashes of about 5 percent. Many state and local officials told GAO that their ability to realize such benefits depends on sustained funding and leadership. In addition, these officials described challenges to operating their ITS, such as procurement and obsolescence issues, interoperability problems with ITS-related equipment, and staffing-related challenges.