Automated vehicles have the potential to bring about transformative safety, mobility, energy, and environmental benefits to our nation's surface transportation system. These benefits could include crash avoidance, reduced travel times, improved travel time reliability, increased multimodal connectivity, improved transportation system efficiency, and increased accessibility—particularly for individuals with disabilities and the growing population of older adults.

AUTOMATION

ITS JPO High-Priority Research Areas

- Automation
- Data Access and Exchanges
- Emerging and Enabling Technologies
- Cybersecurity for ITS
- ITS4US Deployment
- Accelerating ITS Deployment

Alignment with U.S. DOT Strategic Goals

Safety

Economic Strength and Global Competitiveness

Equity

Climate and Sustainability

Transformation

Organizational Excellence

The U.S. Department of Transportation (U.S. DOT) Intelligent Transportation Systems Joint Program Office (ITS JPO) conducts technical and policy research to accelerate the safe, efficient, and equitable integration of automation into the transportation system. The ITS JPO partners with the Federal Aviation Administration (FAA), Federal Highway Administration (FHWA), Federal Motor Carrier Safety Administration (FMCSA), Federal Transit Administration (FTA), Maritime Administration (MARAD), and National Highway Traffic Safety Administration (NHTSA) to conduct research; assess impacts; communicate results; convene and coordinate internal and external stakeholders; and provide guidance, education, and assistance.

The ITS JPO's automation research supports the federal role in automation safety assurance, infrastructure interoperability, and policy analyses.

Safety Assurance

The ITS JPO, NHTSA, and FHWA are studying key human factors issues both inside and outside the vehicle to improve our understanding of safe operations for all road users.

The ITS JPO and FHWA are examining how **adverse road weather conditions** affect the abilities of automated vehicles to operate safely. Outcomes include actionable data and decision support results for infrastructure owners and operators (IOOs) and information providers.

Infrastructure Interoperability

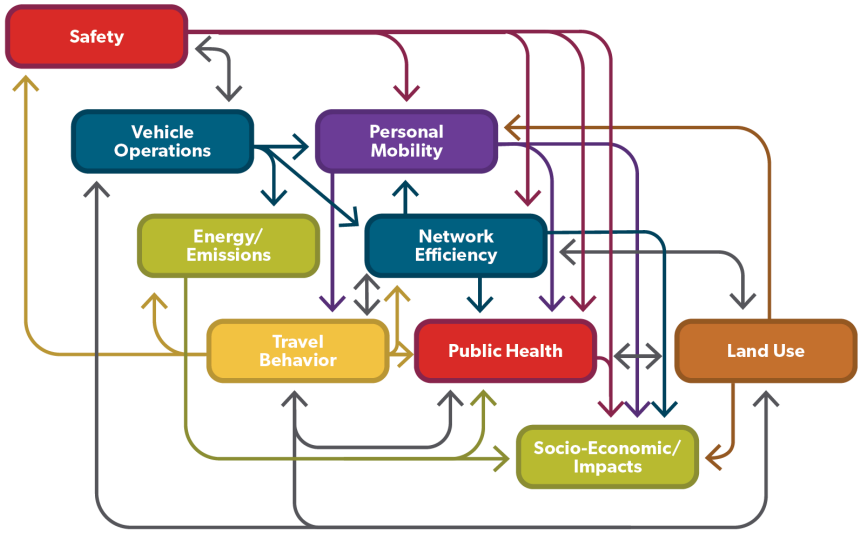
The ITS JPO and FHWA, in partnership with NHTSA, FMCSA, and FTA, are working with stakeholders to understand what IOOs must do to plan for and initiate design, build, and maintenance activities to support **infrastructure readiness** for automated vehicle testing and deployment.

Cooperative automation can improve the safety and efficiency of the transportation system. Cooperation is achieved through continuous exchange of information and coordination of tactical and strategic driving maneuvers.

The ITS JPO, FHWA, and FMCSA are evaluating the on-road safety and operational impacts of truck platooning. Outcomes will support assessments of bridge and pavement performance as well as regulatory and technical issues that may inhibit nationwide truck platooning.

AUTOMATED VEHICLE BENEFITS FRAMEWORK

Benefits Estimation Model for Automated Vehicle Operations: Phase 2 Final Report, January 1, 2018. *https://rosap.ntl.bts.gov/view/dot/34458*.



In addition, the ITS JPO and FHWA are partnering with the automotive industry to investigate how light-duty vehicle cooperative automated driving systems can improve the operations of freeways and surface streets, with a focus on traffic signal systems and freeway speed harmonization. Outcomes will include cooperative automation applications and data exchanges to enable speed harmonization on freeways, as well as safe automated operation in work zones and around incidents.

Policy Analyses

Impact assessment supports a clear understanding of how automated vehicle adoption may affect the public interest and is important to federal, state, and local policy-making. The ITS JPO and FHWA are assessing the impacts of automation on travel behavior as well as economic impacts at the regional and national level. This research will help the U.S. DOT and its state and local partners conduct performance-based planning and programming in the face of uncertainty. Outcomes will include performance measures as well as the development of models to support exploratory scenario planning.

Research Reports

Review the following reports for more details on the U.S. DOT's automation research:

- *Understanding Surveys of Public Sentiment Regarding Automated Vehicles* reviews recent surveys and studies and tracks consumer attitudes about automated vehicles over time, focusing specifically on attitudes regarding safety, trust, and willingness to try, as well as the factors that influence those attitudes. The paper also presents an overview of research on the factors that affect consumer technology adoption and identifies implications of this research for future assessments of the public's interest in automated vehicles. *https://rosap.ntl.bts.gov/view/dot/43628*
- *Meta-Analysis of Adaptive Cruise Control Applications: Operational and Environmental Benefits* reviews some 60 papers on the performance of adaptive and cooperative-adaptive cruise control, presenting mobility and energy and emissions results. *https://rosap.ntl.bts.gov/view/dot/41929*
- *The Low-Speed Automated Shuttles: State of the Practice Final Report* describes current conditions in testing and deployment of low-speed automated shuttles and identifies challenges (such as the role of the onboard attendant) that must be resolved to enable a broader and more useful deployment. *https://rosap.ntl.bts.gov/view/dot/37060/*.

COOPERATIVE AUTOMATION EFFORTS

FHWA developed the CARMA[SM] software platform to enable vehicles to interact and cooperate with infrastructure and other vehicles. CARMA3 is now under development in collaboration with the stakeholder community. *https://highways.dot.gov/research/research-programs/operations/CARMA*

FHWA is working with SAE on the development of a new standard Taxonomy and Definitions for Terms Related to Cooperative Driving Automation for On-Road Motor Vehicles (J3216) machine-to-machine (M2M) communication to enable cooperation between a subject vehicle and other participants. The cooperation supports or enables performance of the Dynamic Driving Task for a subject vehicle with driving automation feature(s) engaged.

To learn more about this program, visit: *https://www.its.dot.gov/research_areas/automation.htm*

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