



Photo Source: USDOT

TECHNOLOGY SCAN AND ASSESSMENT



INTRODUCTION

The Technology Scan and Assessment program identifies, analyzes, and presents technology options that might enable successful connected vehicle deployments. The activity is part of a multimodal connected vehicle research program, led by the U.S. Department of Transportation (USDOT) Intelligent Transportation Systems Joint Program Office (ITS JPO). This research focuses on leveraging the potentially transformative capabilities of wireless technology to enhance the safety, mobility, and environmental sustainability of surface transportation systems.

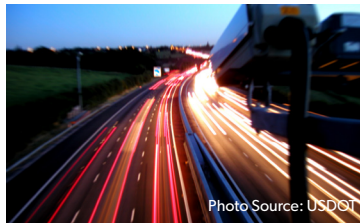


Photo Source: USDOT

The mission of the Technology Scan and Assessment program is to identify critical technologies or technical trends that may enable successful deployment of ITS technologies. The technology scan focuses on long-range, global, and crosscutting technologies. The technology assessment is specific to the USDOT's plans for connected vehicle research. The assessment highlights particular global technical risks (such as security), uncertainties (for example, a game-changing scenario such as a technological breakthrough), or social or economic changes that may tilt the playing field to favor one technology over another. The Technology Scan and Assessment program will identify and explore issues regarding trends outside of transportation that may potentially impact state-of-the-art ITS deployment over the next decade.

IDENTIFYING CRITICAL TECHNOLOGIES

The Technology Scan and Assessment program is designed to: (1) identify new or converging technologies that may influence specific trade-offs that occur along the path of research and development, prototyping, testing, and model deployments; and (2) facilitate discussion among the engineering community and decision makers to enable continued progress in technical research. The research plan is to:

- Cover technologies over three time horizons—science-based technologies (10 to 30 years), emerging technologies (5 to 10 years), and pacing technologies (3 to 5 years, applied on a trial basis)—in the information technology, telecommunications, transportation, and energy sectors.
- Focus on technologies that are centered on efficient data and information flows, from acquisition (sensors) and dissemination (wireless) to processing (computing) and management (decision support) systems.

GOALS

The goals of the Technology Scan and Assessment program are to:

- Educate and enrich discussion about technology options among members of the engineering community interested in connected vehicle research.
- Encourage the ITS community to evaluate technology opportunities several years ahead, rather than basing assumptions on past developments or potential misconceptions regarding future trends.
- Establish, validate, or revise, key assumptions in ITS JPO research and development programs regarding scalability, security, or safety of particular technologies.
- Inventory new technology-enabled systems that may interface with future connected vehicle core systems utilizing vehicle-to-vehicle and vehicle-to-infrastructure technology.



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EVALUATING TECHNOLOGY EVOLUTION

The Technology Scan and Assessment program also seeks to:

- Evaluate a given technology's technical merit and evolution while also searching for constraints or compromises that may reduce capability, affordability, adaptability, economies of scale and scope, and market demand.
- Examine, across several technologies, the competitive and complementary elements and nascent development of industry value chains that can encourage a given technology's widespread application.
- Identify centers of research excellence in the government, academia, and industry. Engage domain subject matter experts to speculate on a given technology's potency, desirability, and timing.

TECHNOLOGY SCAN AND ASSESSMENT RESEARCH OUTCOMES

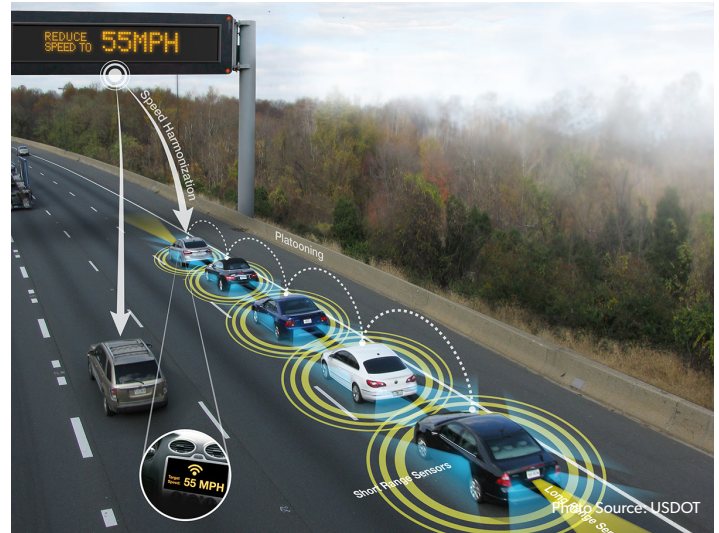
Through the structured, comprehensive research and analysis framework cited above, the Technology Scan has provided perspective on a number of long-range technology trends:

- Navigation, ranging, and computer vision-based object detection sensors, along with innovations such as sensor fusion and processing algorithms, will likely exploit a wealth of information that may support future connected vehicle collision avoidance or mobility applications.
- Computer vision has been long used in highway infrastructure, but it may become as common as GPS as a data acquisition platform on vehicles.
- Fourth Generation (4G) wireless networks will likely become "application-aware," intelligently supporting critical "off-board" or cloudbased ITS applications, such as an automated collision notification.
- Future advanced 4G systems may be able to establish and manage communication sessions that hop between many wireless nodes (e.g., 4G, WiFi, dedicated short-range communications) in a coordinated fashion, a concept known as heterogeneous or "vertical" roaming, operating based on application needs such as coverage, availability, and cost.
- Telematics (or more broadly, machine-to-machine applications) architecture may evolve to allow resources to be pooled, allowing any sensor to be securely addressable and accessible to any ITS application service.

The Technology Assessment highlights particular risks or uncertainties that are broadly understood to impact a number of sectors, not just transportation.

Assessment topics will discuss:

- **Security:** Global innovations in computing and designing secure systems, as well as risk management (addressing unique challenges in securing safety-critical systems).
- **Energy:** Global innovation in the development of a utility "smart grid" and electric vehicle powertrains and support systems, and how they may leverage these innovations to improve vehicle safety, mobility, and environmental sustainability.



The U.S. Government's Role

The ITS JPO is housed within the USDOT's Office of the Assistant Secretary for Research and Technology. The ITS JPO fosters the development and future deployment of connected vehicle technologies. But connected vehicle research involves all agencies within the USDOT including the National Highway Traffic Safety Administration, the Federal Highway Administration, the Federal Motor Carrier Safety Administration, the Federal Transit Administration, and the Federal Railroad Administration. The USDOT and its public and private partners are working to address the technical, safety, and policy challenges and are helping to create the standards and the wireless architecture that will be the backbone of the system. Connected vehicle research will leverage the potentially transformative capabilities of wireless technology to make surface transportation safer, smarter, and greener. If successful, connected vehicles will ultimately enhance the mobility and quality of life of all Americans, while helping to reduce the environmental impact of surface transportation.

For more information about this initiative, please contact:

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