The Intelligent Transportation Systems (ITS) Joint Program Office (JPO) will coordinate and conduct investigations and exploratory research into emerging technologies across government, academia, and the private sector. This research will provide the U.S. Department of Transportation (U.S. DOT) with a significant understanding of the potential benefits and disruptions these technologies could represent to the transportation system.

EMERGING AND ENABLING TECHNOLOGIES

ITS JPO High-Priority Research Areas

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

Alignment with U.S. DOT Strategic Goals

Safety
Infrastructure
Innovation
Accountability

As ITS capabilities improve and become more widespread, the transportation industry continues to develop new ways to utilize emerging technologies as well as the useful data they produce. As a leader in transportation, the U.S. DOT is at the forefront of ITS development, funding, and utilization. With a finger on the pulse of this area of the industry, the U.S. DOT is already making big strides in guiding the evolution of ITS technologies.

Emerging and Enabling Technologies is a new program area focused on identifying and assessing next-generation technologies. By formalizing these activities into a program, the ITS JPO and modal partners have a mechanism to determine opportunities and risks for introducing promising innovative or disruptive technologies to transportation.

Research Activities

The ITS JPO will be positioned and engaged as a partner to guide research, development, and technology adoption in a systematic manner. Activities include:

- Identifying and assessing the potential of emerging technologies (e.g., artificial intelligence, passenger drones, or Hyperloop) for adoption or adaptation to the transportation system
- Exploring and developing institutional models and best practices that support system flexibility so that state and local agencies can adopt and use next-generation technologies
- Developing roadmaps to track rapidly evolving innovations such as new communications technologies (e.g., 5G).

Research Collaboration Partners

Most of the ongoing research into next-generation communications is funded by the private sector and focused on enhancing technical performance of existing equipment or development of new radios. The private sector, academia, and governments around the world have formulated questions associated with whether new communications technologies can enable safety-critical applications, provide crash avoidance, and support automation. Chipset and vehicle manufacturers are working on prototypes to prove out the concept, while experts are working to design performance-based test procedures that demonstrate the capabilities as well as the gaps that still need to be addressed.

For the existing communications technologies in use in transportation today, U.S. DOT modal partners and stakeholder partners have invested in a wide range of research and analyses including:

- Development of a band plan for the 5.9 GHz part of the spectrum
- Comparison of cellular, Wi-Fi, and satellite capabilities and costs to deliver interoperable, low-latency messages
- Assessment of out-of-band and adjacent channel interference in the 5.9 GHz spectrum.

The ramifications of ITS have already begun to transform the transportation sector. Vehicle manufacturers, infrastructure providers, innovators, academics, entrepreneurs, and other groups are invested in the safe implementation and efficient usage of ITS technologies, and representatives from every corner of the globe are partnering with the U.S. DOT and the ITS JPO to achieve this mission.

COMMUNICATIONS TECHNOLOGY

Communications technologies are critical to the safe, secure, and efficient operations of transportation systems across the nation. Transportation agencies have incorporated communications into their operational environments (i.e., field systems, management centers, and public fleets), and vehicle manufacturers are increasingly including multiple types of communications in their vehicles. While much research has been conducted with Wi-Fi, dedicated short range communications (DSRC), cellular, and satellite communications, there are emerging communications technologies such as cellular-vehicle-to-everything (C-V2X) and 5G that could also have significant impacts on transportation systems. For example, C-V2X is being developed as a potential replacement for the DSRC system used by many ITS communications technologies today, and the capabilities of 5G are not yet clearly defined. 5G technology could drastically increase the speed at which information is communicated between vehicles and other entities, like roadside infrastructure, other vehicles, or even pedestrians with smartphone applications.

The U.S. DOT has an important role to play in pursuing research and analysis in the area of transportation technologies and their use of telecommunications to deliver public benefit. Federal leadership offers state and local agencies an opportunity to express their needs and have Federal telecommunications experts translate those needs into use cases and requirements that cross market boundaries and ensure interoperability among vehicles, infrastructure equipment, and portable devices.

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

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