INTELLIGENT TRANSPORTATION SYSTEMS (ITS) DATA

LIMIT 35 SAFETY **MOBILITY** **ENVIRONMENT**

As our transportation system becomes more technologically advanced, it is generating unprecedented amounts of data – and the data generated will continue to grow in size and complexity as vehicles and travelers become increasingly connected to each other and physical and digital infrastructure. Increasing automation will further increase data production and demand. ITS data holds great potential to improve the safety, mobility, and accessibility of our transportation system and drive economic opportunities. In fact, according to KPMG's 2017 *Global Automotive Executive Survey*, in the future, the digital ecosystem will generate higher revenues in the automotive value chain than the car itself. [1]

Our transportation system as a whole, and how we manage data within it, is at a crossroads. Decisions that the public and private sectors make now regarding data and information technology will determine whether the next generation of ITS technologies realize their potential benefits. Which data should be retained and shared, and with whom, and for what purposes? What digital infrastructure will support local and national needs as they evolve? How can the transportation system keep up with the pace of change in technology and consumer expectations while protecting privacy, ensuring safety, and enabling private sector innovation? Through its Data Program, the ITS Joint Program Office (JPO) provides strategic and tactical support to the ITS community as we navigate this transition.

The ITS JPO Data Program is a multimodal effort that works in partnership with the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the National Highway and Traffic Safety Administration (NHTSA), the Federal Motor Carrier Safety Administration (FMCSA), other federal agencies, state and local governments, academia, and the private sector. These partners are aligned around the need for new ways to manage data efficiently and securely through the transportation system to support the next generation of ITS technologies.

The ITS JPO Data Program is investing in data management technologies and methods that are:

- **Low cost** and **interoperable** to enable regional and national data sharing and integration with other government and third-party data applications

- **Scalable** and **flexible** to adjust for different size deployments and evolving needs

- **Secure** to protect and safeguard personal and proprietary data

- **Fast** enough to support real-time decision making.

Program Vision and Objectives:

The ITS JPO Data Program is a multimodal effort to enhance how data is managed and used throughout the transportation ecosystem to support the next generation of ITS technologies.

We aim to establish a foundation for agile data sharing and privacy protection in the future transportation system, including connected and automated vehicles and smart communities, to maximize the societal benefits of these technologies.

Specific objectives include:

- Increasing adoption of efficient and secure data sharing architectures within ITS deployments

- Sharing ITS research data to fuel third-party research and application development

- Operationalizing privacy-positive principles

- Providing strategic direction for the ITS community.

[1] https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2017/01/global-automotive-executive-survey-2017.pdf

U.S. Department of Transportation

Photo Source: USDOT

Supporting Deployers with Data Products

The ITS JPO Data Program sponsors the collaborative development of data management products – software, guidance, and architectures – that state and local agencies and other early deployers can use to effectively manage data emerging from the changing transportation environment and accelerate deployment of new technologies. This toolset is available at no cost and will expand over time based on the needs of the community. Wherever possible, products are developed using agile methodologies, open source code, and standards to increase interoperability and flexibility while lowering costs. Visit https://its.dot.gov/code/ to access the available products.

Example products include:

- **ITS Operational Data Environment (ODE):** The ITS ODE is a real-time data acquisition and distribution software system that processes and routes data from connected vehicles, personal mobile devices, infrastructure sensors, and other sources as needed and distributes data to subscribers based on their needs and level of authorized access. To learn more about this product, or to get involved, visit: https://github.com/usdot-jpo-ode/jpo-ode.

- **Privacy Protection Module (PPM):** The PPM processes real-time data from vehicles and infrastructure devices, routed through the ODE. This technology retains data within a pre-determined geographic boundary – a process known as geofencing – while suppressing data from outside the boundary. The PPM can apply other constraints as needed and is capable of rapidly processing large-volume data streams. To download the code, visit: https://github.com/usdot-jpo-ode/jpo-cvdp.

- **Privacy Protection Application (PPA):** The PPA prevents inferences of drivers' identities from large collections of connected vehicle geo-location data. The PPA uses road networks, map-matching, and vehicle dynamics to identify and hide potentially sensitive locations based on information theory. Times and locations in retained records are not modified, so analysis for safety application development remains possible. An independent party evaluated the tool and found that it effectively mitigates certain risks. Visit: https://github.com/usdot-its-jpo-data-portal/privacy-protection-application.

Enhancing Third-Party Access to Data

The ITS JPO Data Program enhances third-party access to real-time and archival ITS data to accelerate research and demonstrate the value of sharing and retaining data within the ITS ecosystem.

Example investments supporting this objective include:

- **ITS Public Data Hub:** The ITS Public Data Hub is the public access point to USDOT funded ITS research data to support third-party research, evaluation, and application development. To access the growing number of real-time and archived datasets to provide to the public including the Connected Vehicle Pilots data, please visit: www.its.dot.gov/data. Additional ITS research data focused on road weather is publicly available at: https://wxde.fhwa.dot.gov.

- **ITS Secure Data Commons (Commons):** The Commons is a proof-of-concept system to advance the state of the art around sharing sensitive transportation data with authorized users in a collaborative environment with algorithms and shared computing resources. The project will help establish low-cost ways to accelerate research with sensitive data. Interested in getting involved? Contact us at: data.itsjpo@dot.gov.

Advancing National Priorities

The ITS JPO Data Program helps advance national priorities like accelerating the safe deployment of automated vehicles. Within and across all modes of transportation, data exchanges will be key to accelerating the safe deployment of automated vehicles. This includes mutually-beneficial exchange of data among private sector entities, infrastructure operators, and policy-makers at different levels of government. The Department is working with stakeholders to understand critical use cases for data exchange and the appropriate federal role to enable such exchanges while protecting privacy and proprietary interests.

The ITS JPO Data Program and our multimodal partners are advancing this effort through various activities. To learn more about Data for Automated Vehicle Safety, visit: www.transportation.gov/av/data.