

TRANSFORMATION GRAND CHALLENGE

THE FUTURE TRANSPORTATION SYSTEM-OF-SYSTEMS

Develop connected intelligent infrastructure that provides people-centered mobility.



TRANSFORMATION

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CRITICAL RESEARCH TOPICS:

- Advanced Materials
- Automation
- Cybersecurity
- Digital System Architecture
- Machine Learning
- Open Data Platforms
- Sensor Technology

VISION: The transportation system of the future will integrate digital technologies and infrastructure to support safe, reliable, and convenient multi-modal travel. This integrated system-of-systems will generate secure and reliable real-time data that drives better decisions by transportation system users, owners, and operators, and supports the development of innovative mobility systems and business models that improve the traveler experience and strengthen the economy.

DESIRED OUTCOMES:

- Sensors, devices, and systems connected by high-speed communications networks produce and consume reliable, secure, trustworthy, real-time data to support decision-making.
- Digital twins, digital infrastructure, and real-time data will improve situational awareness and facilitate management of the national transportation system.
- Connected infrastructure, vehicles, and shared data platforms support cooperative technologies and services, which dramatically improve transportation system safety, operations, efficiency, and maintenance.
- Open data standards and accessible data portals enable shared use of anonymized data to support real-time operations, enhance data analysis and predictive analyses, and enable more responsive, data-driven municipal services.
- Environmental sensors support the assessment and early detection of pollutants, helping public agencies reduce environmental impacts of transportation and respond to environmental emergencies.
- Open access to broadband and wireless services support access to education, employment, health services, and future services enabled by connectivity.
- Transportation systems detect and adapt to changing conditions by reconfiguring capacity and quickly integrating new technologies.
- Established and routinely updated cybersecurity and privacy standards minimize cyber-risks and maintain privacy.
- Construction materials are self-aware, self-healing, and can self-report status.

