



EMERGING TECHNOLOGY PORTFOLIO



DETAILED EMERGING TECHNOLOGY PORTFOLIO

Next Generation Vehicles & Energy

- Autonomous Vehicles
- Connected Vehicles
- Electric Vehicles
- Unmanned Aerial Vehicles

Information & Communications

- Cloud Computing
- Crowdsourcing

Materials & Additive Manufacturing

- Self-Healing Pavements
- Nanotechnologies
- 3D Printing

Infrastructure & Construction

- Infrastructure Enhancements
- Construction Techniques
- Equipment

Service-Based Platforms

- Location-Based Services
- Transportation Subscription Services

Other Technologies

- Google Glass
- Virtual Reality

MAINTAIN A SAFE SYSTEM. CONNECT TEXAS COMMUNITIES. BECOME BEST-IN-CLASS STATE AGENCY. ADDRESS CONGESTION.



STRATEGIC TECHNOLOGY BUSINESS PLAN

TEXAS TECHNOLOGY TASK FORCE



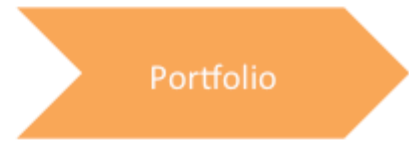
DISCOVER



DEVELOP



DELIVER



Texas is on the move again, leading the way in the transportation of people, goods, and information.

- *Why is it important to build awareness of emerging technologies?*

Emerging technologies have the potential to save lives, time, and money. Texas cannot afford to rely upon business as usual to solve its traffic problems.

- *What role will emerging technologies play in the future of the Texas transportation system?*

Technology is a tool that enables TxDOT to better serve the traveling public. Through research and innovation, TxDOT is dedicated to improving the safety, economic competitiveness, and quality of life for all Texans.

- *How do we achieve a common vision?*

By engaging with all stakeholders, TxDOT strives to develop an integrated action plan that reflects the needs of the state's growing population. Broad participation is sought out from public agencies, industry, and research to generate unity of purpose.

- *Who is responsible for implementing the plan?*

Every individual who believes in moving the Texas transportation system forward may be considered a champion for change. In order to fully realize performance benefits, TxDOT commits to involving its stakeholders in planning and implementation.



CRITICAL TECHNOLOGIES

May 11, 2015



Unmanned Aerial Vehicles (UAVs)

Unmanned Aerial Vehicles (UAVs) have potential applications in law enforcement, border control, agriculture, traffic control, and freight. Rapid delivery of lightweight commercial products using UAVs has been proposed by Amazon and Google X's program known as "Project Wing." Policymaking is underway concerning the civil applications of UAVs and the FAA has selected six states to host test sites.



Automated Freight

The use of autonomous long-haul trucks (ALHTs) could add up to a multibillion-dollar opportunity for companies throughout the trucking value chain, and in turn, lower prices for consumers. Combined with 3D printing and last-mile solutions, Texas has the opportunity to overcome urban freight challenges, reduce the impacts on its infrastructure, and grow the state's economy.



Big Data

Cloud computing and crowdsourcing technologies are revolutionizing transportation. Companies from IT service providers and OEMs are making advancements in the collection, storage, management, and integration of data. Application programming interfaces (APIs), smartphone platforms, and open data portals are enabling consumers to share information with one another and public agencies.



Connected Vehicles

Connected vehicles will directly impact areas of safety and mobility. Using cellular or DSRC technology, vehicles may connect with one another (V2V) and/or with the infrastructure (V2I). When applications such as collision warning, automatic incident reporting, and emergency vehicle signal priority are combined, connected vehicles have the potential to move Texas towards a goal of zero traffic fatalities.



3D Printing

3D printing allows for mass customization, express manufacturing, and rapid prototyping. Major OEMs are incorporating 3D printed components, while Local Motors and others are fully 3D printing the car chassis and body. When 3D printing combines with cloud computing, decentralized production and distribution may be achieved, alleviating congestion and lowering the impact of freight vehicles on the roadways.



CRITICAL TECHNOLOGIES

August 11, 2015



Open Data Portals

Creating a centralized repository of information enhances the efficacy of multiple stakeholder operations. By integrating and standardizing data, port community systems and traffic management centers can break down silos and encourage the development of a multimodal interface. Open data may also enable third parties to leverage the data through the creation of applications and services that address public and private demands.



Robotics

Advanced robotics has the potential to affect \$6.3 trillion in labor costs globally. From collaborative welding in automotive manufacturing to automated loading and unloading operations at port terminals, increasingly sophisticated robots are improving productivity. As the labor market continues to evolve, robotics skills will play a crucial role in modernizing the Texas economy to take advantage of industry growth opportunities.



RFID

Radio frequency identification (RFID) may be used for radical improvements in intelligent transportation systems. To address the issues of congestion, security, and air quality, ports can utilize RFID transponders to expedite the identification and authentication process. RFID may also be used as part of a major multimodal smart card system that incorporates local, regional, and state infrastructure to provide Texas travelers with seamless connectivity.



Cybersecurity

By the year 2020 it is projected that more than a billion connected M2M (machine-to-machine) devices will be in highway transportation, of which more than half will be road vehicles. With the new insights promised by big data, there are also concerns about the privacy and security of these devices. Public agencies will need to protect their citizens and infrastructure by minimizing risks to safety and mobility systems.



Smart Cities

Transportation is the key to developing a network of smart cities. As urban populations continue to grow and consumer behavior shifts towards e-commerce, municipalities will need to work closely with the freight industry to address logistical challenges. By using transportation investment as a catalyst, Texas can fuel sustainable development for citizens' energy, water, communications, health, and public safety.