A strategic document to guide the anticipation and inclusion of advanced technologies for the Texas transportation system and within TxDOT.
Technology Utilization Plan: Phase I

- Prioritization
- Goal Assessment
- Maturity & Readiness
- Use Case Mapping
- Barrier Assessment
- Timelines for Adoption
Technology Utilization Plan: Phase I

Next Generation Vehicles & Energy
- Automated Vehicles
- Connected Vehicles
- Electric Vehicles
- Unmanned Aerial Vehicles

Infrastructure & Construction
- Infrastructure Enhancements
- Construction Techniques
- Solar Powered Highways

Materials & Additive Manufacturing
- Self-Healing Pavements
- Nanotechnologies
- 3D Printing

Other Technologies
- Robotics
- Virtual/Augmented Reality
- Hyperloop

Information & Communications
- Cloud Computing
- Crowdsourcing
- Blockchain
- Big Data & Open Data
- Cybersecurity
- RFID
- Cloud & Edge Computing
- Data Standards & Interoperability
- Machine Learning & AI
- Telecommunications

Service-Based Platforms
- Mobility on Demand
- Micromobility
- Transportation Subscription Services
- Freight Brokerage
- Uber Elevate
- Last Mile Delivery
Technology Utilization Plan: Phase I

- Autonomous Vehicles
- Connected Vehicles
- Electric Vehicles
- Big & Open Data
- Mobility as a Service
- Unmanned Aerial Vehicles
### Priority Technologies: Phase I (Goal Assessment)

<table>
<thead>
<tr>
<th>Technology</th>
<th>Safety</th>
<th>Congestion</th>
<th>Sustainability</th>
<th>Access</th>
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<tr>
<td>Big &amp; Open Data</td>
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</table>

- **Negative Impact**
- **Somewhat Negative Impact**
- **No Impact**
- **Somewhat Positive Impact**
- **Positive Impact**
## Priority Technologies: Phase I (Technology Maturity)

<table>
<thead>
<tr>
<th>Category</th>
<th>Concept</th>
<th>Experimental</th>
<th>Prototype</th>
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<td>*Applications</td>
<td>*5G</td>
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<td>*Hardware (DSRC)</td>
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<td>Analytics Platforms and Algorithms</td>
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<td>Integrated Trip Planning</td>
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</tbody>
</table>
Autonomous Vehicles

- Lyft & Aptiv Deployment
  Las Vegas, NV

- Volvo and Nanyang
  Technological University (NTU)
  Singapore

- TuSimple & USPS
  Dallas, TX – Phoenix, AZ
Connected Vehicles

NYC Connected Vehicle Pilot
New York, NY

THEA Connected Vehicle Pilot,
Tampa Bay, FL

Ford 5G Testing
Dearborn, MI
Electric Vehicles

Battery Technology National Labs

West Coast Electric Highway

Electric Bus Fleet Los Angeles
Technology Utilization Plan: Phase II

Big & Open Data

WayCare
Las Vegas, NV

City of Seattle Privacy
Seattle, WA

CCPA & GDPR

California Consumer Privacy Act

CCPA checklist

Washington Privacy Act
Mobility as a Service

New Mobility Options in Kleberg & Rylie

GoLink
Uber

DART & Uber On-Demand
Dallas, TX

ideKC Bus

Free Transit
Kansas City

MaaS Platforms
Unmanned Aerial Vehicles

Amazon Urban Air Delivery
Las Vegas, NV

Urban Air Mobility

North Carolina DOT
UAS Program
Technology Utilization Plan (Other Technologies)

- Hyperloop
- Blockchain
- Virtual Reality
- 5G
Technology Utilization Plan: Phase III

Recommendations & Strategies

- Conduct further research
- Deploy a pilot
- Prepare a Division and/or District for implementation
- Recommend a policy action
Technology Utilization Plan: Phase III

- Recommendations & Strategies
- Action Items
- Stakeholder & Partnership Plans
- Resources
Discussion Questions

- Are there other pilot programs or technology initiatives that should be covered?
- What information is most useful to help form recommendations and strategies?
- What timeframe should the research team focus (short-term vs. long-term)?
Critical Topics in Transportation Technology
A SERIES OF WHITE PAPERS
Looking at current regulations and safety frameworks for AVs, lessons learned from aviation certification can be utilized for unified AV safety evaluation.

Examining mobility opportunities and access to health and general services, rural residents face unique challenges not seen by all Texans.

Exploring the impact that vehicular automation may have on jobs, disputes about worker designation in the gig economy, and telework.

Diving into the tradeoffs related to data sharing and privacy, start with privacy principles and move beyond policies and regulations.
AV Safety Evaluation

Lessons Learned from Aviation Certification
AV Safety Evaluation

Key Topics

- CENTRAL SET OF SAFETY PRINCIPLES
- REVIEW OF STANDARDS AND ASSESSMENTS
- PUBLIC AND CONSUMER EDUCATION
AV Safety Evaluation

Key Topics

CENTRAL SET OF SAFETY PRINCIPLES
Facilitate the creation and promotion of a central set of safety principles

REVIEW OF STANDARDS AND ASSESSMENTS
Realize need for continuous review and update of safety standards and assessments

PUBLIC AND CONSUMER EDUCATION
Increase public communication & trust
AV Safety Evaluation

Key Topics

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A Closer Look

**Design**
- Aircraft Certification Offices (ACO)
  - Design approval and certificate management
  - Engineering and Analysis questions
  - Department of Transportation

**Production**
- Manufacturing Inspection District Office (MIDO)
  - Production approval and Certification
  - Manufacturing Designee Oversight
  - Department of Public Safety

**Airworthiness**
- Inspectors locate within or near Major airlines
  - Each aircraft inspected and given airworthiness certificate
  - Can be tested through approved list of flight tests
  - Department of Public Safety
  - Department of Motor Vehicles
AV Safety Evaluation

Key Takeaways

- Creation of Safety Principles
- Standards and Safety Assessment Procedures
- Consumer and Public Education
- Development of Training and Licensing Materials
- Work with Governor’s Task Force on AV Safety
Transportation Equity for Rural Texans

Challenges and Opportunities
Transportation Equity for Rural Texans

Key Topics

MOBILITY FOR RURAL RESIDENTS

HEALTH SERVICES

BROADBAND CONNECTIVITY

"I guess I could hitchhike. Or I could find me a donkey and a sled. At 81 years old, it’d be pretty hard to walk to Round Rock, now wouldn’t it?

- Rockdale, TX"
Transportation Equity for Rural Texans

**Key Topics**

**MOBILITY FOR RURAL RESIDENTS**
Promote enhanced mobility opportunities and trip planning services

**HEALTH SERVICES**
Realize need for bringing services to residents

**BROADBAND CONNECTIVITY**
Improve connectivity in rural areas
Transportation Equity for Rural Texans

Key Topics

MOBILITY FOR RURAL RESIDENTS
Promote enhanced mobility opportunities and trip planning services

HEALTH SERVICES
Realize need for bringing services to residents

BROADBAND CONNECTIVITY
Improve connectivity in rural areas

Sources: Texas Department of State Health Services, Texas Organization of Rural and Community Hospitals,
Transportation Equity for Rural Texans

**Key Topics**

**MOBILITY FOR RURAL RESIDENTS**
Promote enhanced mobility opportunities and trip planning services

**HEALTH SERVICES**
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**BROADBAND CONNECTIVITY**
Improve connectivity in rural areas
Transportation Equity for Rural Texans

A Closer Look

One Stop Shop Opportunities
- Travel information was scattered
- State cooperative provides planning, safety, and regional information
Transportation Equity for Rural Texans

A Closer Look

One Stop Shop Opportunities
- Travel information was scattered
- State cooperative provides planning, safety, and regional information

Dig Once Policies
- Proactive and cost savings
- Shared leasing of poles and ducts
- Collaboration with utilities
- Collaboration with local roadwork and DOT
White Paper Topic #2
Key Takeaways

- Invest in One Stop Shop Opportunities
White Paper Topic #2
Key Takeaways

- Invest in One Stop Shop Opportunities
- Encourage a Dig Once or Cooperative Policies
White Paper Topic #2
Key Takeaways

- Invest in One Stop Shop Opportunities
- Encourage a Dig Once or Cooperative Policies
- Develop Statewide Guidelines for Technology Readiness
The Changing Texas Transportation Workforce

Developing a Workforce that Meets the Future’s Needs
The Changing Texas Transportation Workforce

Key Topics

- Telework & Flexible Scheduling
- Vehicular Automation and Jobs
- Existing Workforce Development Infrastructure
- Worker Classification
The Changing Texas Transportation Workforce

Key Topics

Telework & Flexible Scheduling
AZ state agencies exceed VMT goals

- Leads ALL state agencies in employee engagement
- Leads ALL state agencies in SOV trip reduction
The Changing Texas Transportation Workforce

Permanent changes
Key Takeaways

- Telework protects employees and reduces SOV trips
- We have an opportunity to shift our work/lifestyle paradigm
Data Privacy

Lessons on privacy, security, and consumer protections
Data Privacy

Key Topics

START WITH PRIVACY PRINCIPLES
Regulations and internal privacy policies should be principle based

GO BEYOND REGULATIONS AND POLICIES
A good privacy law or internal policy is important, but it is only the tip of the iceberg

BALANCE ENFORCEMENT AND ENCOURAGEMENT
Public partners should approach private sector data partnerships with a balance of enforcement and encouragement

“We work to find a fair balance between gathering information to provide needed services and protecting the public’s privacy.”
Data Privacy

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Data Privacy

A Closer Look: Seattle Privacy Advisory Committee

Seattle Privacy Advisory Committee

Community Activist Groups

Local Tech Companies

Private Legal Groups

Local Journalism Organizations

Local Academics
Data Privacy

A Closer Look: Seattle Privacy Advisory Committee

PRIVACY PRINCIPLES
MAYOR & CITY COUNCIL
ADOPT PRIVACY PRINCIPLES

PRIVACY PRINCIPLES IMPLEMENTED ACROSS ALL DEPARTMENTS OF CITY GOVERNMENT
Data Privacy

A Closer Look: Seattle Privacy Advisory Committee

Seattle Privacy Advisory Committee

- Community Activist Groups
- Local Tech Companies
- Local Legal Groups
- Local Academics
- Local Journalism Organizations

Mayor & City Council Adopts Privacy Principles

Privacy Principles Implemented Across All Departments of City Government
Data Privacy

A Closer Look: Seattle Privacy Advisory Committee

1. We value your privacy...
   Keeping your personal information private is very important. We consider potential risks to your privacy and the public’s well-being before collecting, using and disclosing your personal information.

2. We collect and keep only what we need...
   We only collect information that we need to deliver City services and keep it as long as we are legally required and to deliver those services. Whenever possible, we tell you when we are collecting this information.

3. How we use your information...
   When possible, we make available information about the ways we use your personal information at the time we collect it. We commit to giving you a choice whenever possible about how we use your information.

4. We are accountable...
   We are responsible for managing your personal information in a manner that is consistent with our commitments and as required by law. We protect your personal information by restricting unauthorized access and by securing our computing resources from threats.

5. How we share your information...
   We follow federal and state laws about information disclosure whenever we work with outside governmental agencies and in answering Public Disclosure Requests (PDRs). Business partners and contracted vendors who receive or collect personal information from us or for us to deliver City services must agree to our privacy requirements.

6. Accuracy is important...
   We work to maintain and use accurate personal information for City business. When practical, we will work to correct inaccurate personal information. We also direct our partners and contracted vendors to follow the same guidelines.
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Data Privacy

A Closer Look: Working with Private Partners

[Map showing states with enacted data privacy legislation, proposed data privacy legislation, and states with statewide privacy taskforces.]
Data Privacy

Key Takeaways

- Start with Privacy Principles
Data Privacy

Key Takeaways

- Start with Privacy Principles
- Go Beyond Regulations and Policies
Data Privacy
Key Takeaways

- Start with Privacy Principles
- Go Beyond Regulations and Policies
- Balance Enforcement and Encouragement