Kansas City SCOUT MoDOT + KDOT

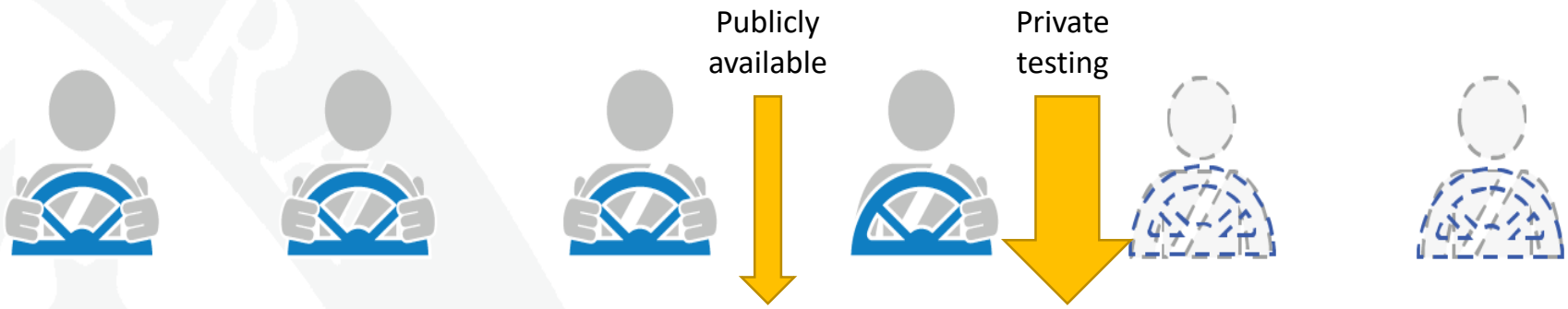
WICHway
KDOT Intelligent Transportation System

WHAT IS KDOT DOING TO PREPARE FOR THE FUTURE

AUTONOMOUS OR CONNECTED?

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation



0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Statewide Connected and Autonomous Vehicle Vision Plan

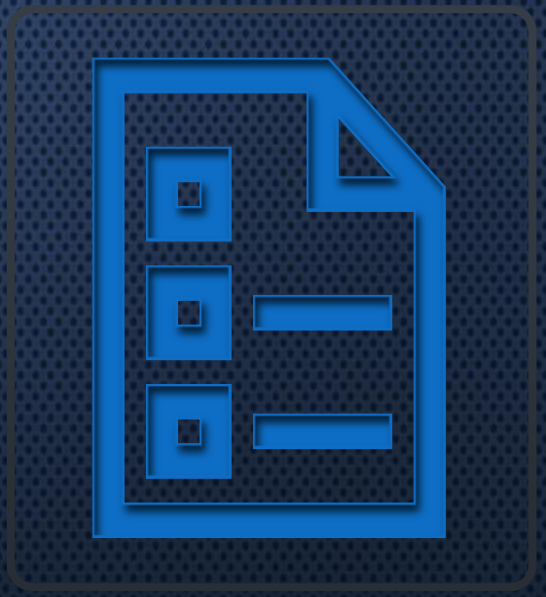
- Process
- Preliminary Survey
- Guest Presenters
- Agency Blueprints

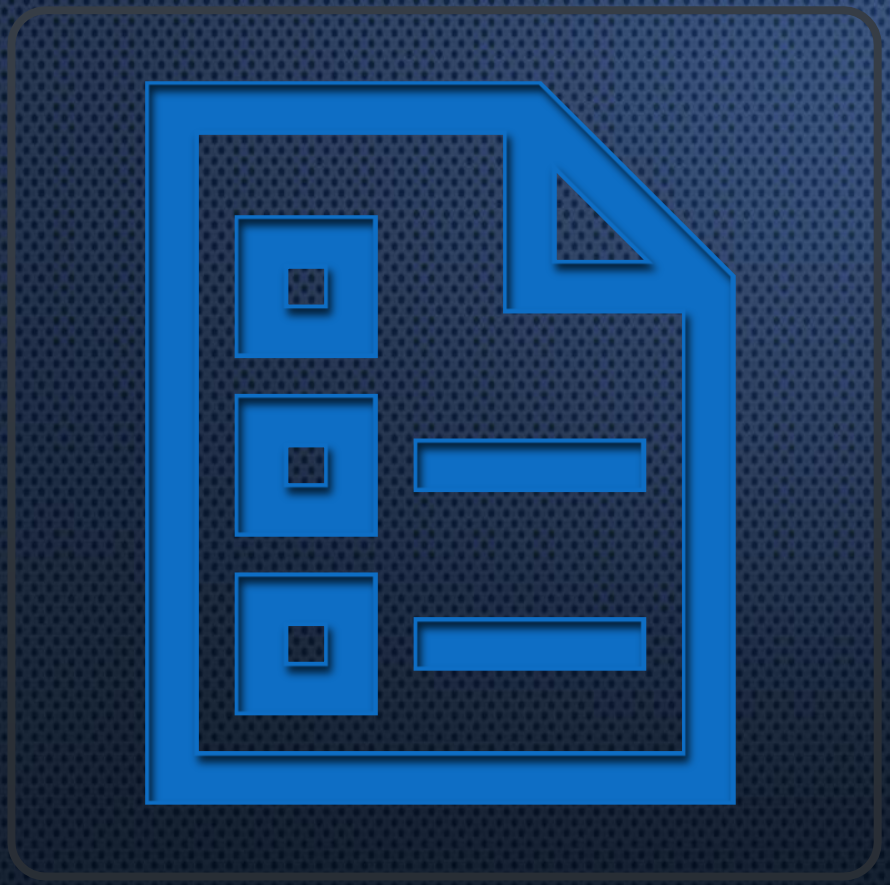
PROCESS

- Selected HNTB – 6 Month Timeline
- Stakeholder Survey
- 4 In-person meetings and 1 Skype Meeting
- Stakeholder Interviews
- Final Plan

SURVEY

- **State Agencies – 18 Responses**
- 80% Informed Minimum
- 75%+ Impact next 1 – 5 yrs
- 75% will be affected and only 25% include planning or budgeting
- Most agencies addressing AV/CV technologies including data.
- Concerns - Laws, legislation, cybersecurity, liability and coordination
- Needs – Infrastructure, Mobility Options, policies to allow at local levels, platooning, V2V communications, and insurance
- Impacts – safety, cost maintenance (roads & Broadband)





SURVEY

- **Private Industry – 3 Responses**
- **Addressing AV/CV Technology**
  - AV, CV, Shared Vehicles, EV and Fleet Vehicles
  - 65+%
- **NEED TO SUCCEED**
  - Allow Companies to Innovate
  - Public education for operators
  - Embrace technology
- **BENEFITS**
  - Shortage of staff to move freight
  - Leads to Safer outcomes

PRESENTERS

- Tony Reinhart – Ford
- Kirk Steudle - Former Director of Michigan DOT
- Michelle Maggiore – Cisco
- Sarah Lawson – HyperLoop
- Brian McClendon - KU

Kansas Connected and Autonomous Vehicle Vision

DEPARTMENT OF TRANSPORTATION BLUEPRINT

Kansas

The safety, economic and personal mobility opportunities for Kansas residents, businesses, and visitors will expand tremendously with the evolution and deployment of connected and autonomous vehicles. This blueprint provides a high-level plan for how the Kansas Department of Transportation (KDOT) can incorporate connected and autonomous vehicles (CAV) into their business planning. The blueprint is a starting point for KDOT to advance CAV planning and should be adapted, revised, and updated as the state advances with CAVs.

Kansas Vision Statement

To support an evolving and partnering environment of innovative and practical CAV solutions for a safe, reliable, and integrated transportation network.

KDOT Mission

To provide a statewide transportation system to meet the needs of Kansas.

CAV Challenges

- Demonstrating and proving CAV technology safety and reliability.
- Keeping pace with industry and national CAV developments.
- Transition phase with some CAVs and other vehicles.
- Upgrading infrastructure to appropriate base-line.
- Impacts to revenues from transition to electrification.
- Assist in providing broadband coverage to all areas of the state.
- Impacts of uninformed, conservative or resistant population on deployment opportunities.

CAV Opportunities

- Improved safety for all users; reduced crashes and fatalities.
- Increased mobility for aging or disabled population.
- Leverage CAV technologies to advance VMT mileage-based funding.
- Continual feedback on condition of infrastructure for asset management and maintenance decision support.
- Robust real-time data on traffic conditions and patterns.
- Robust real-time data on weather conditions and events that impact travel and highway maintenance.
- Partnering with neighboring states for CAV initiatives.

System Needs

- Data - permissible uses, exchange records, access determination, consistency, exchange mode, security and monitoring, management, standardization, conform with local and federal regulations
- Network - security, vehicles, charging stations
- Infrastructure - additional resources, private pilots, retrofit signage, urban and rural infrastructure needs and communications networks, electrical infrastructure, grid modernaization
- Agency Organization Structure - education and public outreach positions, support for data retention staff, determine departmental CAV requirements, senior leadership engagement and support, internal policies, partnerships with other Kansas departments
- Funding - private partnerships, statutes to allow revenue generation, communicate CAV benefits to legislature, federal grants, pooled fund initiatives with other states, CAV research, CAV benefits for disadvantaged populations
- Policy/Legislation/Regulation - define inattentive/impaired driving, revise liability issues, data ownership, compliance with federal laws/legislation to ensure federal funding eligibility, harmonization of state and federal statutes, permit requirements for CAV oversize/overweight loads, legislation for black box access
- Workforce, Agency - data analytics staff, new expertise, training
- Workforce, Public - educate/update driver's education teachers, partnerships universities and community colleges to grow the workforce of the future
- Public Education and Outreach - statewide promotion, case studies from peers, commercial and individual motorist education, Kansas CAV brand development and optimization

Strategies

- To address these challenges and maximize opportunities, several strategies were identified:
- Model pilots to be nimble (fail fast, if needed).
- Develop a CAV strategic plan focused on improving motorist experience related to safety, reliability, and KDOT's infrastructure costs to improve operational efficiencies.
- Identify system needs and timelines and how they correspond with CAV Vision.
- Focus on mobility and safety enhancements of personal and freight trips.
- Take advantage of roadside connections and the statewide fiber optic network.
- Leverage the KDOT vehicle fleet for early CAV pilots and tests.
- Investigate public-private partnerships for pilot project implementation, seek federal grant funding to support pilot implementation.
- Evaluate how CAV can support asset management and maintenance decision support capabilities.

AGENCY BLUEPRINTS

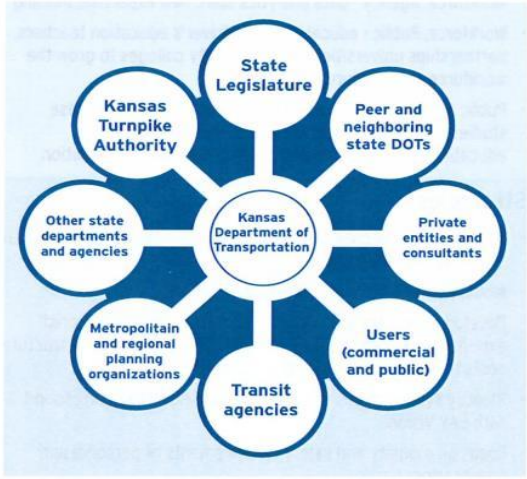
Cost and Funding

The relative cost and ease to implement CAV within the KDOT system is moderate based on KDOT's existing financial environment to test and implement technology and other state needs. While there are vast statewide needs, CAV technology benefit-cost ratio will continue to outperform large infrastructure benefit-cost ratios and prove to be a smart investment. Investigate P3 opportunities and federal grants as seed funding.

Relative Cost

Partnership Opportunities

Partnerships are a strategic way to maximize CAV opportunities in Kansas. The following identifies potential CAV partnerships and stakeholders.



Educational Audiences

- Disseminate information to other state departments.
- Solicit commercial transportation providers to gain freight perspective on CAV technology and implementation.
- Develop comprehensive outreach plan (multifaceted to cover public, policy makers, and industry).
- Establish brand and marketing program for CAV.
- Establish internal webinar series and training to educate KDOT and other Kansas state staff.
- Present and communicate with legislators on a regular basis.

Immediate Key Actions

- ❑ Develop a detailed KDOT CAV strategic plan and framework for deployment.
- ❑ Continue to engage the Task Force and legislators.
- ❑ Peer review of how other DOT's are approaching CAV's.
- ❑ Collaborate with standards development organizations to review and update KDOT standards for highway design, signage, striping, signals, and other traffic control devices.
- ❑ Identify, prioritize, and implement CAV initiatives and pilot project(s).
- ❑ Develop standards for V21 and V2X.

Time Frame

Expected time frame when CAVs will impact the KDOT system:

Performance Measures

The current transportation program under the United States Department of Transportation emphasizes performance based planning. Therefore, developing clear, measurable, and aligned CAV performance measures is critical.

PERFORMANCE MEASURE	MEASUREMENT
Driver satisfaction	Surveys or focus groups
Safety	Crash records
Mobility	Travel time
Reliability	Planning time index
Readiness and maturity	Percent of state highway network ready for CAV
Success	Pilot test success rates

Contact

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AGENCY BLUEPRINTS

Where are we going from here

- Phase 2 – Vision Plan
- Legislation
- Fiber Optic Network Upgrade
- Pilot Deployments
- Pooled Fund Study

Pilot Deployments

- Internet of Things (IoT)
- Wind warning

POOLED FUND STUDY

- Autonomous maintenance technology
  - 10 states
    - AL, CA, CO, IL, KS, MN, OH, TX, VA, and WA
  - Two Research projects
    - Deployment Guidelines
    - Human-automated maint. Vehicle interaction

THANK YOU!!

- Questions??

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