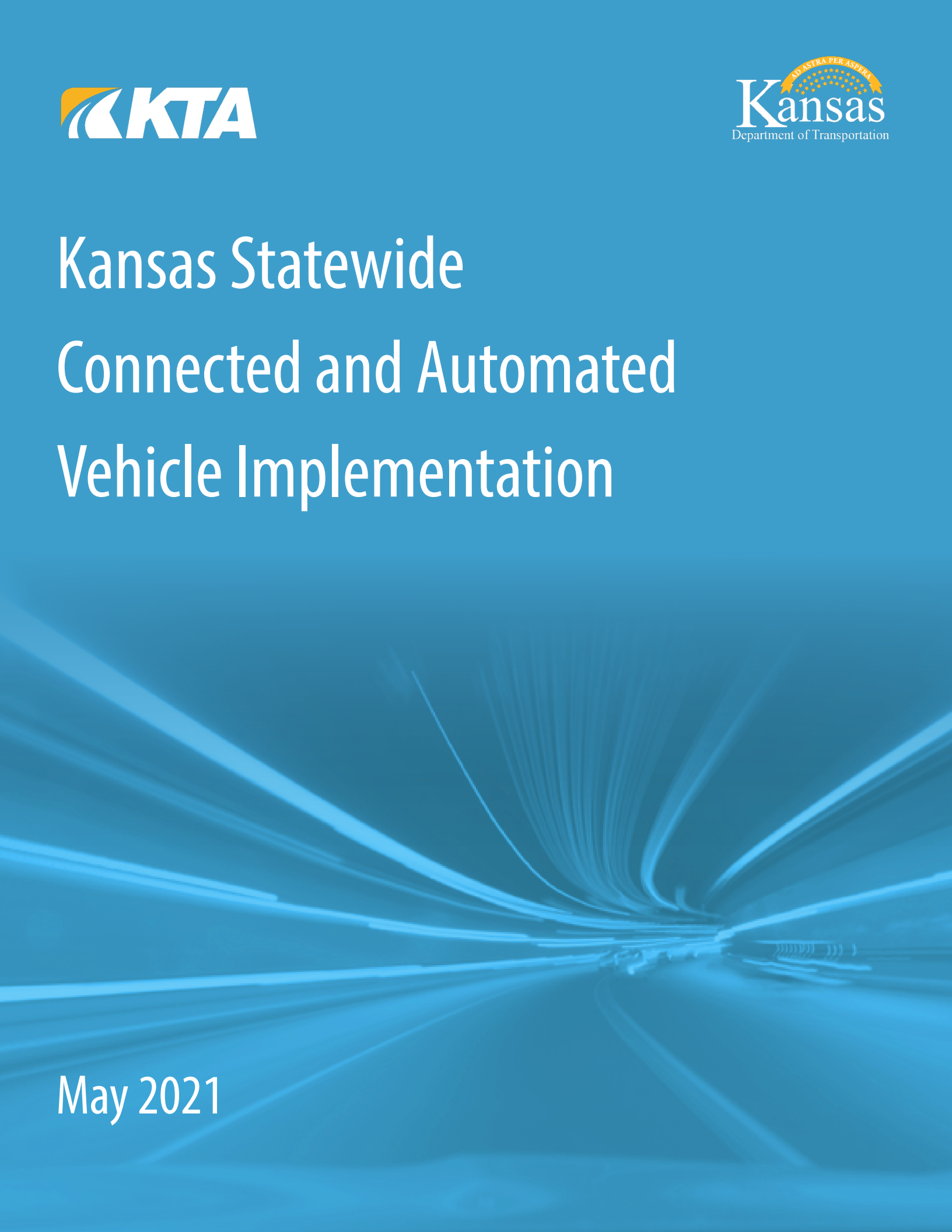
KTA

Kansas Department of Transportation

Kansas Statewide Connected and Automated Vehicle Implementation



May 2021

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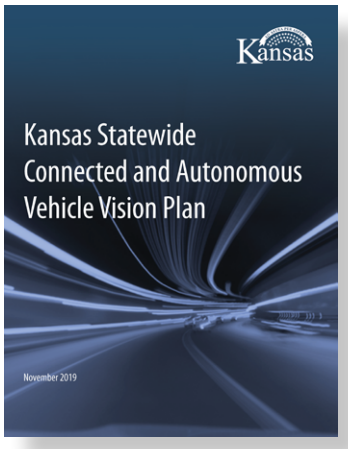
1. OVERVIEW

The Kansas Department of Transportation (KDOT) and Kansas Turnpike Authority (KTA) undertook the Connected and Automated Vehicle (CAV) Implementation Plan (Implementation Plan) as a means of identifying and improving safety through technology that meaningfully addresses Kansas state needs.

Figure 1 – Kansas CAV Vision



In Phase 1, the Kansas Statewide Connected and Autonomous Vehicle Vision Plan (Vision) was created through a collaboration between statewide public- and private-sector representatives. The Implementation Plan is the next phase in a sustained, multi-year Kansas effort to develop and implement strategies that support improvements through infrastructure. The Vision and its development provided a framework for:

- Developing a Kansas statewide CAV Vision, Mission and Goals;
- Engaging a previously established CAV Task Force made up of state agencies and the private sector to assist in CAV planning;
- Developing state agency blueprints for supporting CAV deployments from legal, regulatory, financial and technological perspectives; and
- Ensuring that short-term CAV decisions by state agencies and organizations support a collaborative, long-term Kansas CAV operational vision.

The Vision provided a framework for determining how best to promote Kansas CAV deployments while adapting to a rapidly evolving CAV environment.

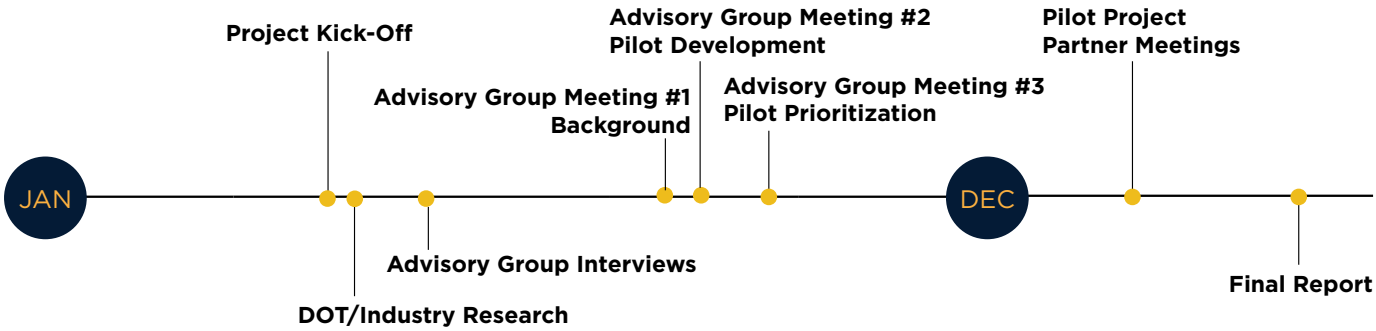
In Phase 2, the Implementation Plan identified three potential pilot projects that KDOT, KTA and their partners could pursue to:

- Evaluate their respective capabilities and processes for advancing CAV technologies and strategies;
- Establish a collaborative, longer-term operational vision that maximizes CAV benefits and mitigates CAV impacts to help speed broader adoption of positive emerging transportation technologies;
- Signify that Kansas is "open for business" when it comes to CAV deployments that improve statewide safety, economic vitality and quality of life; and
- Provide a framework for testing the kind of multi-agency collaboration set forth in the Vision.

Identifying the pilot projects was accomplished through activities (**Figure 2**) involving research, surveys, interviews and facilitated, interactive work sessions with Advisory Group members drawn from KDOT and KTA staff, state universities and Kansas CAV Task Force representatives. Findings and other documents related to these activities can be found in the **Appendix**.

The Implementation Plan identified the three projects from a potential range of reasonable CAV pilot projects evaluated and prioritized against a set of CAV goals established in the Vision (**Figure 3**). The outcome identified three actionable pilot projects that KDOT and/or KTA could pursue or support in collaboration with its public- and private-sector partners.

Figure 2 – 2020-2021 Implementation Plan Activities Timeline



2. APPROACH

To create this foundation for advancing emerging technologies, KDOT and KTA turned to an Advisory group comprised of their staff, state universities and selected members of the Statewide Connected and Autonomous Task Force that had helped craft the state's CAV Vision. Also supporting KDOT and KTA was a consultant Study Team led by HNTB and including Cambridge Systematics and CAVita, as well as various national CAV subject matter experts experienced in CAV deployments.

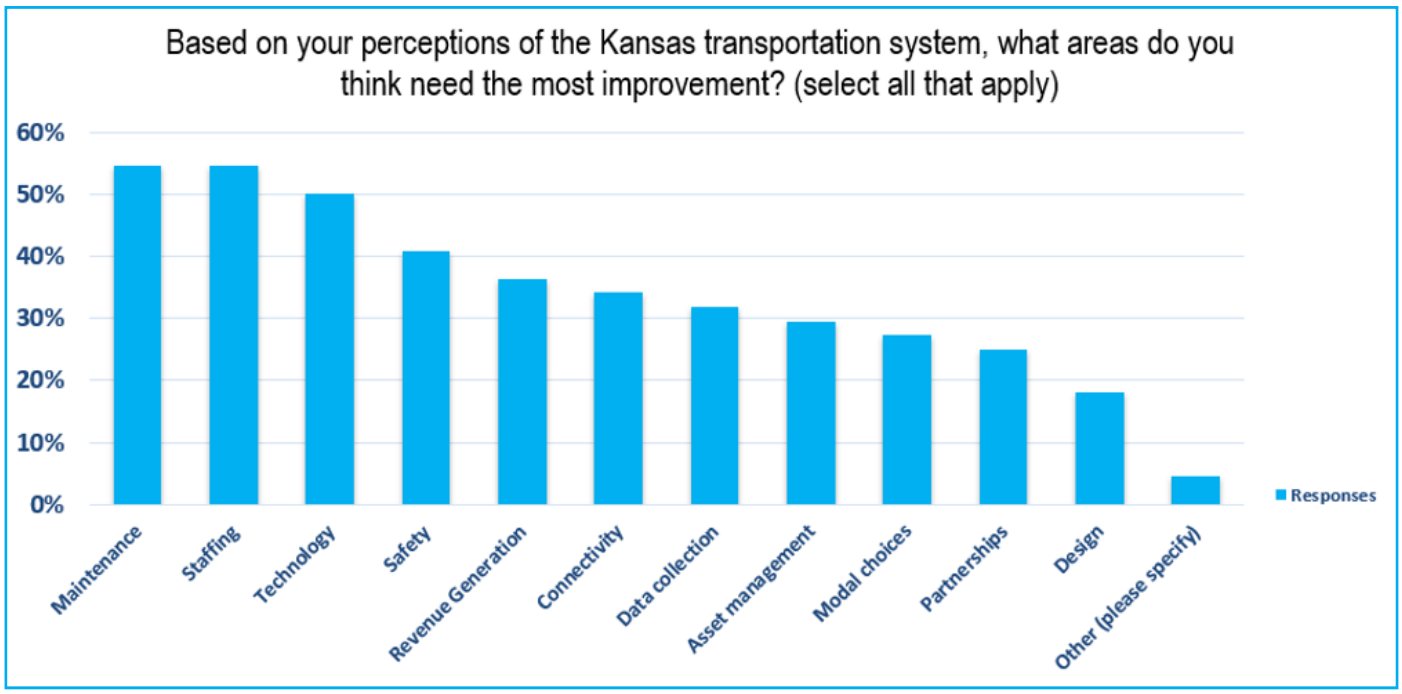
The Advisory Group made an initial assessment of the state's most compelling transportation needs and opportunities. This was done through an electronic survey (**Figure 4**) coupled with individual interviews with select Advisory Group members. In effect, this established a preliminary, high-level prioritization of statewide transportation needs that would be refined through a number of activities conducted within the context of three Advisory Group workshops.

Figure 3– Implementation Plan

Pilot projects that . . .

- Match CAV Vision and Mission
- Varied in type and location
- Can be done over short term
- Are multi-agency and scalable
- Do not require legislative action

Figure 4 – Sample Electronic Survey Results



3. IMPLEMENTATION PLAN WORKSHOPS

Using the electronic survey and interview results as a starting point, the Study Team conducted three Advisory Group workshops virtually due to COVID-19 safety protocols. The workshops focused on iterative knowledge building and practical collaboration on identifying and prioritizing potential pilot projects (**Figure 5**).

Figure 5 – CAV Workshop Focus Areas

WORKSHOP 1 – CAV BACKGROUND

Workshop 1 provided the opportunity to detail Implementation Plan goals for the Advisory Group and bring members up to date on survey results, explore CAV pilot case studies from other states and discuss pilot project considerations. This workshop also covered the relationship between the group's work and other Kansas transportation planning documents, such as the state's new comprehensive Eisenhower Legacy Transportation Program, its long-range transportation plan and different modal plans. Several presentations were made regarding various leading-edge national CAV pilot projects and deployments to help the group better understand pilot project considerations that could help improve Kansas deployments. At the conclusion of the workshop, the Advisory Group identified six initial pilot project categories (**Figure 6**) in which to group and prioritize potential individual pilot project components.

Figure 6 – Initial Pilot Categories

- Freight and Supply Chain Process
- CAV-Supportive Maintenance
- Emergency Transportation Operations
- Highway Work Zone Safety
- Traffic Management Center Operations
- Vehicle-to-Infrastructure Communication

WORKSHOP 2 – INITIAL PILOT PROJECT DEVELOPMENT

Workshop 2 focused on providing Advisory Group members with background information about technology trends affecting CAV demand and deployment, and how those trends potentially could affect Kansas.

Then Advisory Group members split up into virtual breakout rooms **(Figure 7**), with each one focused on one of five pilot project themes that represented further refinement of the initial pilot project categories considered in Workshop 1:

1. Enhanced Safety & Incident Management
2. Stronger Data Collection & Reporting
3. Improved CAV Ecosystem
4. Improved Mobility & Access
5. Heightened Goods Mobility

Figure 7 – Breakout Agenda

1. Pilot Theme Background
   - Technology Availability
   - Challenges and Opportunities
2. Review Initial project list
   - Missed projects or considerations
   - Project preferences
3. Identify top 3 pilot projects

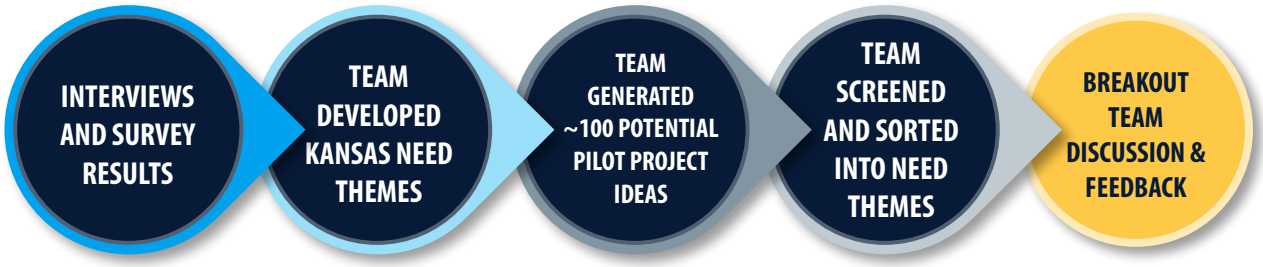
Each breakout group considered potential pilot project lists specific to their category that were developed from Advisory Group feedback, identified Kansas needs, successful deployments across the country and additional study team input. After the breakouts, Advisory Group members returned for a report-back session.

WORKSHOP 3 – PILOT PROJECT SCREENING AND PRIORITIZATION

The Advisory Group prioritized potential pilot projects, eventually making three pilot project recommendations for further investigation and implementation. Getting to the pilot project shortlist involved multiple refinements (Figure 8):

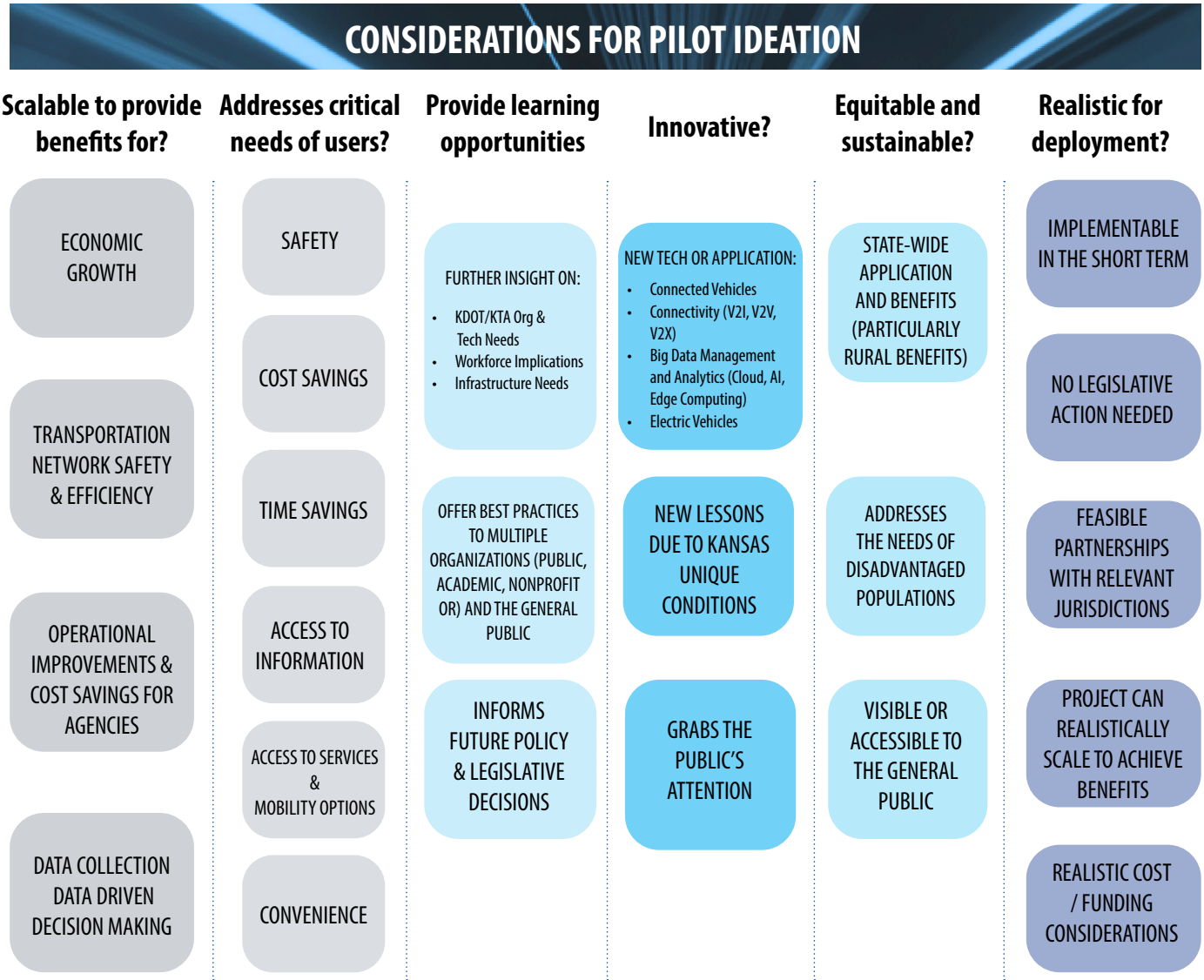
- Over the course of the Implementation Plan development, more than 100 pilot project concepts were initially developed by the Study Team through Advisory Group feedback, needs identified by KDOT and KTA, and other inputs.
- These concepts were further narrowed down in Workshop 2 by Advisory Group deliberations, resulting in an interim list of 19 potential projects.
- These projects were then further screened down to nine projects by combining like pilots, eliminating ones not fully meeting Workshop 1 goals and assessing each pilot candidate's feasibility and impact.
- Finally, the nine potential pilot projects were ranked in order of importance. Participants then identified commonalities among the nine projects that could be captured in three pilots designated for advancement.

Figure 8 – The CAV Pilot Project Refinement Process



At Workshop 3, participants were provided with an "Ideation Framework" to help them consider and reject or advance particular pilot concepts (**Figure 9**). The intent was to provide participants with a set of specific considerations for determining whether a particular CAV pilot project could, for example, be considered innovative or equitable. This framework did not impose Yes/No selection criteria; instead it aimed to provide commonly shared starting points for Advisory Group discussion and deliberation.

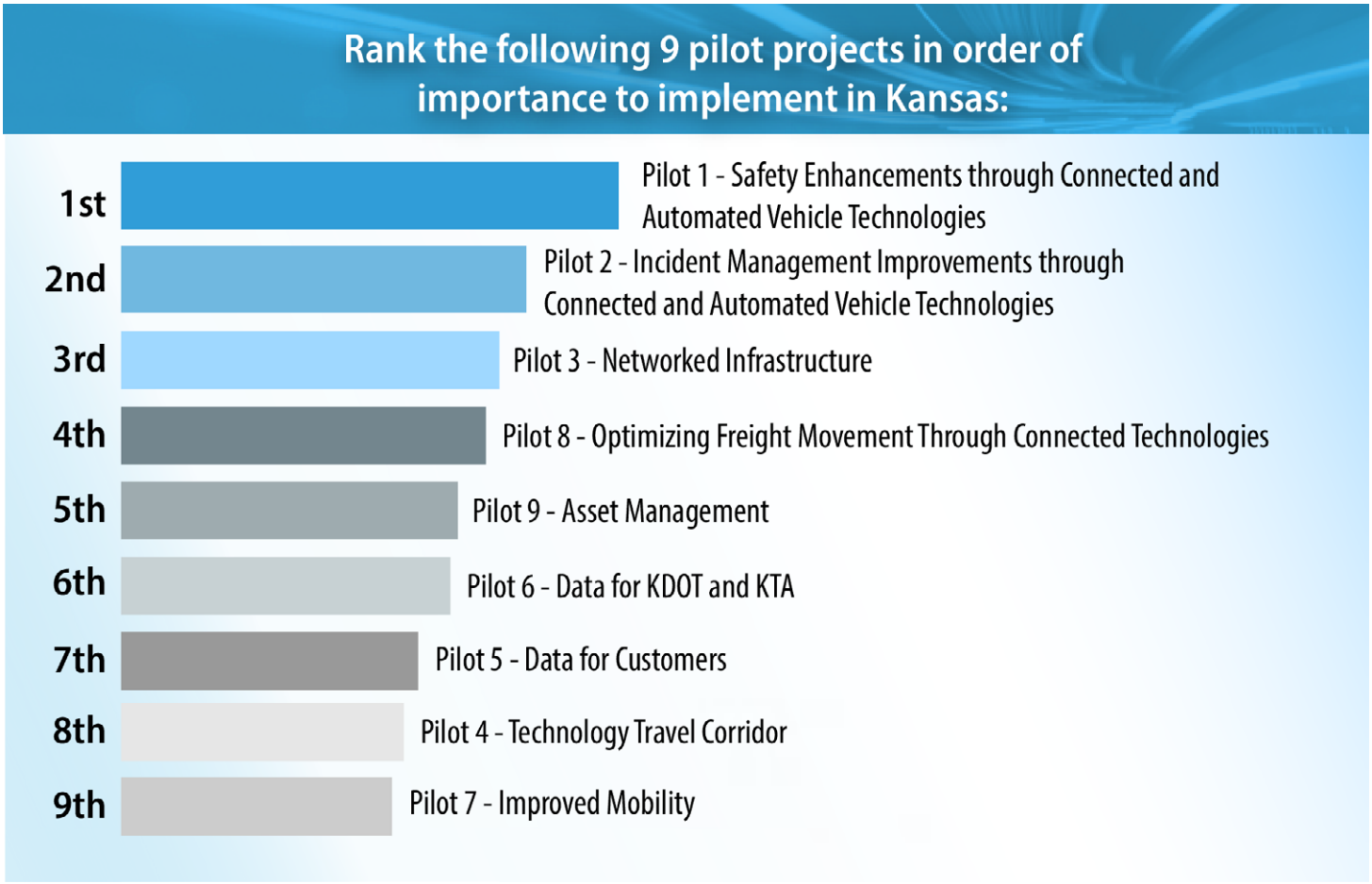
Figure 9 – CAV Ideation Framework



Source: HNTB

Advisory Group members were asked to rank the nine remaining pilot projects in order of importance to the State of Kansas, a process made simpler through the Ideation Framework. This determined which pilot project candidates advanced.

Figure 10 – Preliminary CAV Pilot Prioritization



Source: Kansas CAV Advisory Group Menti Poll Results

The Advisory Group also recognized that the final three pilot projects would likely encompass multiple pilot concepts shown above. For example, a connected safety enhancement pilot project focused on incident management would likely also include networked infrastructure and provide important data for both KDOT and KTA as well as to customers. Combining the top two ranked pilot concepts shown in **Figure 10** would also improve implementation, leverage resource use and maximize the alignment of pilot projects and potential results with previously identified goals and objectives.

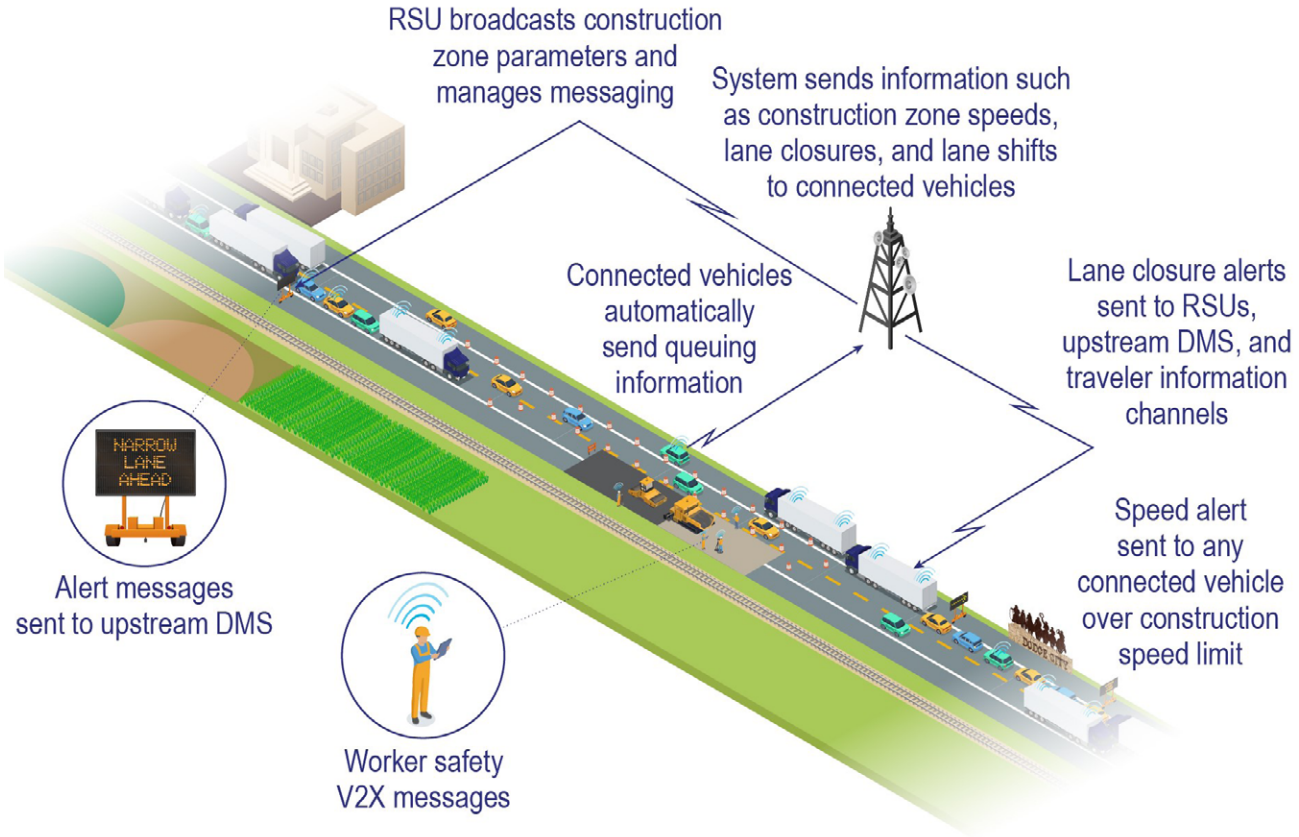
4. RECOMMENDATIONS

As part of the analysis, the Study Team identified considerable overlap among many of the projects. From this exercise, the Study Team was able to further detail three pilot projects to be advanced into the next phase in which more detailed Concept Development design and implementation will take place. These are summarized below, with the Pilot Project Fact Sheets immediately following:

1. **RURAL WORK ZONE SAFETY**
   Identify a rural work zone safety location where technology could provide updates to motorists regarding lane closures, lane shifts, speed reductions and narrow lanes. Data would be transmitted to customers and to the KDOT and/or KTA. This would be done through Road Side Units (RSUs), transceivers that broadcast or exchange data with Onboard Units (OBUs) and Dynamic Messaging Signs (DMS) in its communications zone.

   The pilot would establish policies and procedures to implement new technologies to enhance support for these applications. A partnership with the KDOT Aviation Department to incorporate unmanned aerial systems (UAS) to support work zone and incident management may be possible.

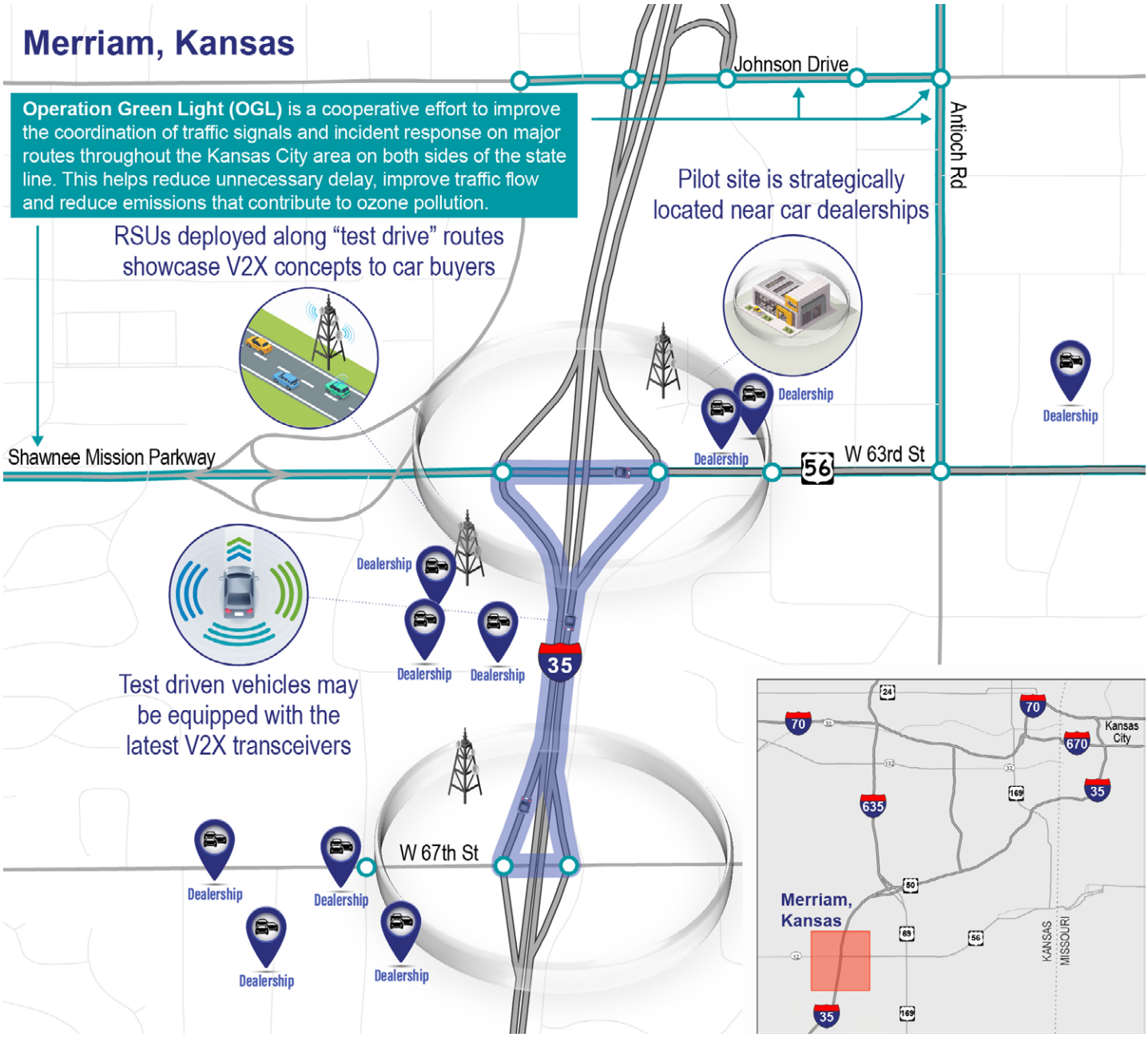
Figure 11 – Rural Work Zone Pilot Concept



2. URBAN VEHICLE-TO-INFRASTRUCTURE

Identify an urban networked infrastructure project that transmits data to customers and KDOT related to speed restrictions and real-time traffic and safety-related concerns so as to better manage traffic operations. New data would help improve modifying traffic signal timings in collaboration with the local entities that operate those signals. (The KTA could implement a similar project as a partner with a local community along the Turnpike.) This pilot would enable KDOT to beneficially leverage the existing Operation Green Light initiative, which is a cooperative effort to improve traffic signal and incident response coordination on major routes throughout Kansas City on both sides of the state line. This helps reduce unnecessary delay, improve traffic flow and reduce emissions that contribute to ozone pollution.

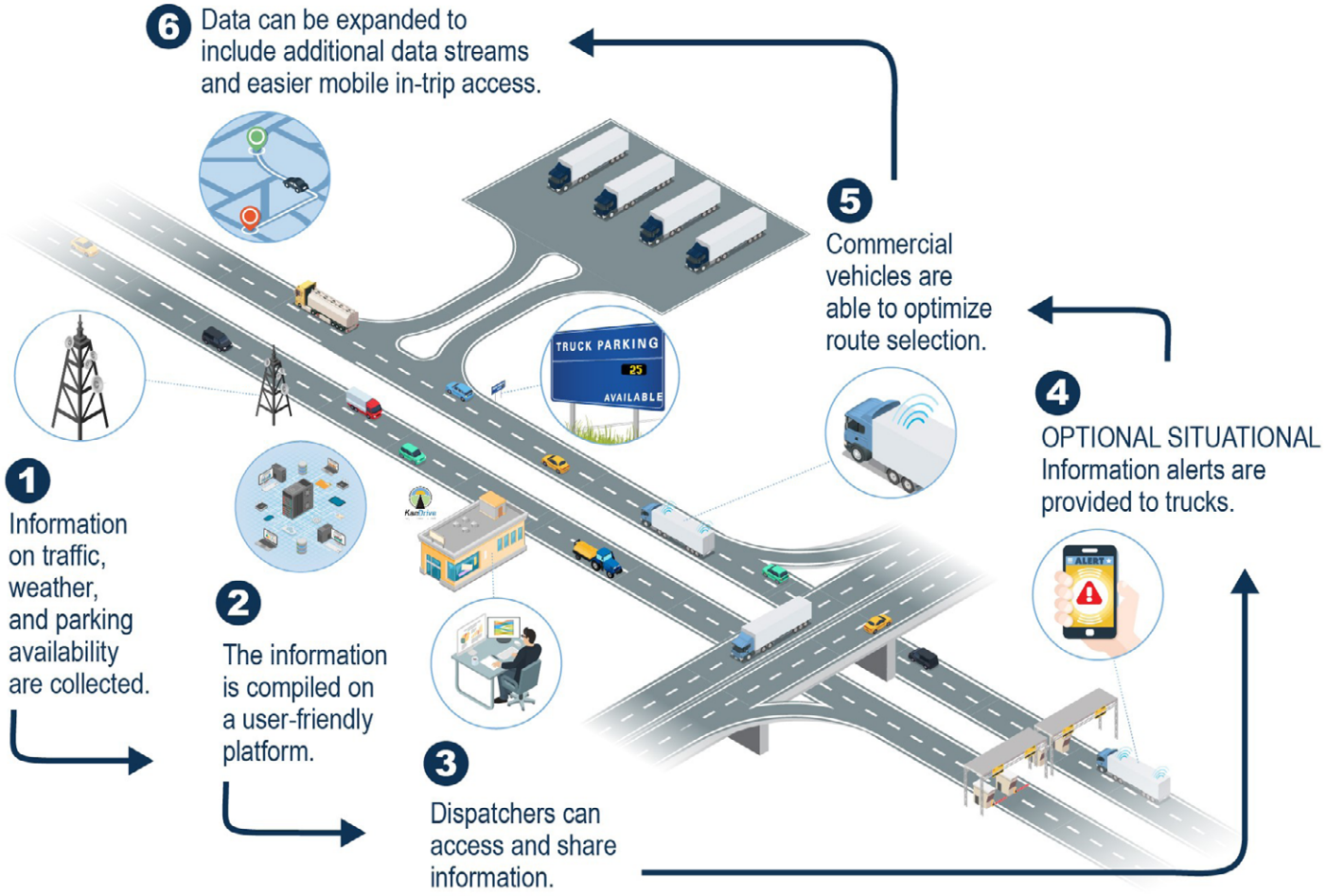
Figure 12 – Urban Vehicle-to-Infrastructure Pilot Concept



3. COMMERCIAL AND AGRICULTURAL VEHICLE INFORMATION TO IMPROVE PRODUCTIVITY

Develop a freight urban or rural technology project that focuses on priority freight corridors in Kansas to improve safety, operations and mobility for the economic benefit of the state such as connected vehicle safety applications at high-crash areas.

Figure 13 – Commercial and Agricultural Vehicle Information to Improve Productivity Pilot Concept



5. NEXT STEPS

As KDOT and KTA move forward with developing detailed implementation concepts for the three proposed pilots, they are undertaking additional activities to finalize how to turn them into reality, including:

- Meeting with stakeholders to refine pilot concepts and identify potential pilot implementation partners;
- Looking for opportunities to connect pilot projects with winners of KDOT's Innovation Grants to combine and leverage complementary efforts;
- Exploring whether to develop an innovation collaborative in which these and other pilots can be investigated and specific action plans developed and implemented in a unified way;
- Considering whether and how best to develop a foundational data management platform in addition to the pilot projects. This platform would provide the support necessary for the aggregation, storage, analysis, applications, security and micro-services needed for a Kansas CAV ecosystem.

Once pilot implementation partners are identified, KDOT and KTA plan to move into a CAV deployment phase (Phase 3). This phase will help advance the Kansas CAV Vision and Implementation Plan by demonstrating whether the implemented pilot projects deliver on the Vision's CAV goals in ways that accelerate CAV deployments and improve safety, economic vitality and quality of life for the state's residents, travelers and businesses.

Kansas Connected and Automated Vehicle Implementation Plan

RURAL WORK ZONE SAFETY PILOT

MARCH 2021

PILOT TOPIC AREA	Rural Work Zone Safety
OWNER	Kansas Department of Transportation (KDOT), Kansas Turnpike Authority (KTA)
KEY STAKEHOLDERS	KDOT, Traffic Management Centers (TMCs), Local Public Works, and Work Zone Contractors
END-USERS	Motorists, Freight Industry, Roadside Workers, Data Aggregators

Motivation

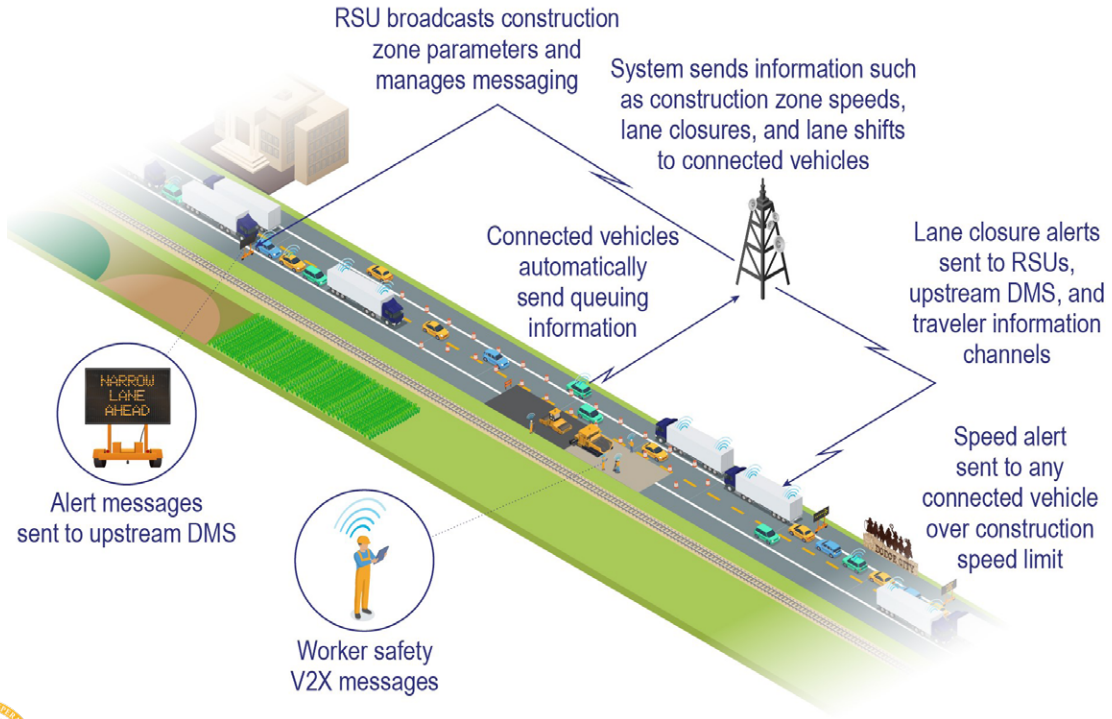
Construction zones can be difficult to navigate for motorists and lead to delays and safety issues. They may also reduce roadway capacity resulting in traffic congestion and queues waiting to traverse the work zone area. Technology to improve awareness in these complex environments would help motorists utilize alternate routes, recognize speed restrictions, be informed of upcoming construction delays (e.g., queues), and navigate more safely through work zones.

Pilot Considerations (Low ● to High Priority ●●●)

✓	Addresses Critical State Need ● ●
✓	Builds Kansas Innovation Abilities/Reputation ● ● ●
✓	Produces Positive, Equitable Outcomes ● ● ●
✓	Deployable Immediately in State ● ● ●

Pilot Description

Identify a rural work zone safety pilot program in the State where technology could be utilized to provide real-time notifications to motorists such as lane closures, lane shifts, speed reductions, delays, narrow lanes, and height restrictions for vehicles entering/exiting the work zone. This data would be transmitted to customers via traditional Intelligent Transportation System (ITS) devices and Connected Vehicle (CV) applications to facilitate real-time response, as well as to KDOT/KTA to help increase situational awareness of roadside workers and real-time traffic operations and incidents of TMC operators. The pilot would establish policies and procedures to enhance support to existing applications, implement new technologies, raise awareness of CV applications, and provide a mechanism to facilitate discussion of how to advance the rural work zone safety pilot program in the future.



Detailed Scope

- Identify near-term rural roadway construction project with KDOT/KTA champion for piloting Connected and Automated Vehicle (CAV) work zone technologies.
- Develop high-level concept for CAV applications in maintenance of traffic plans. Plan should specify KDOT/KTA in oversight roles with design, implementation, and maintenance of pilot conducted by contractors. Technologies to include:
    - Queue Detection (QD)
    - Variable Speed Limits (VSL)
    - Dynamic Message Signs (DMS)
    - Data Aggregator (crowdsourced data)
    - Work Zone Worker Interface (V2X, I2X)
    - TMC Monitoring
    - Roadside Units (RSU)
    - KDOT/KTA Connected Fleet Vehicle (I2V)
- Include opportunity points for awareness and skill building for KDOT/KTA staff.
- Develop early evaluation plan to prepare for documenting lessons learned during pilot. Conduct evaluation.
- Develop system requirements and concept of operations for CAV applications in maintenance of traffic (MOT) plans
- Investigate policies and procedures to implement new technologies to support site-specific work zone safety applications.
- Collaborate with existing networked infrastructure Work Zone efforts to identify needed applications, the prevalent gaps with current technology for those applications, and opportunities to utilize new technology to support those applications.
- Work with the USDOT and national standards organizations to implement pilot standards that align with the current CAV state of the practice.
- Develop an Application Programming Interface (API) that will provide the work zone data in a Work Zone Data Exchange (WZDx) format.
- Repurpose existing ITS networked infrastructure work zone applications to support a CAV environment. Common applications include queue detection and zone warning systems, speed monitoring systems, real-time travel time systems, incident detection systems, lane closure systems, and over height detection systems.
- Provide real-time traffic work-zone data to approaching CAVs. Broadcast work zone information drawn from ITS devices and other sources including work zone locations, lane closures, lane shifts, speed reductions, vehicles entering/exiting the work zone, and other current travel conditions to improve driver situational awareness.
- Contribute to the creation of a statewide digitized mapping database for CAVs to support work zone navigation. Update digitized map database as changes in work zones layouts will require frequent revisions. Share data with other outlets such as KanDrive.
- Identify and utilize a small fleet of KDOT or KTA CAVs to test CAV-focused broadcasts and digitized work zone environment. For non-CAV fleet, implement RSUs at work zone locations, and outfit vehicles with on-board units (OBUs) to receive messages from the RSUs. Prove pilot concept by demonstrating CAV reception of messages and CAV navigating through a work zone without disengaging.

RESEARCHED BENEFITS

SAFETY	MOBILITY	COSTS	BENEFIT/COST RANGE
• Up to 45% reduction in work zone related crashes • Up to 50% reduction in number of vehicles speeding	• Up to 20% reduction in travel time • Up to 50% reduction in delay	• 5% to 16% reduction in fuel consumption • Greater return on investment on the use of existing infrastructure	• 2:1 to 14:1

Source: ITS Deployment Evaluation Database

COST ESTIMATES (2020 DOLLARS)

CAPITAL COST

- Typical networked infrastructure Work Zone: 1% - 5% of capital construction cost (for qualifying projects)
- Roadside Units Cost between $5,000 - $18,000 plus deployment costs. Yearly maintenance is estimated at $3,000/yr.

Source: ITS Deployment Evaluation Database

TIMESCALE FOR IMPLEMENTATION

NEAR-TERM (2021)		MID-TERM (2022)		LONG-TERM (2023-2024)	
✓	Identify Planned or Existing Project Suitable for Pilot	✓	Deploy Initial Phase of Pilot	✓	Deploy Pilot
✓	Identify KDOT/KTA Champion to Lead Pilot	✓	Evaluate Results in System Usage and Efficiency Returns	✓	Evaluate and Document Lessons Learned
✓	Craft High-Level Concept and Scope for CAV MOT Plans	✓	Develop Expansion Opportunities		
		✓	Select Implementation Contractor		
		✓	Evaluate Pilot Performance		

HOW IT SCALES

NEAR-TERM PLAN		LONG-TERM EXPANSION	
✓	Conduct Pilot Evaluation to Document Benefit/Cost	✓	Expand to Additional Work Zones
✓	KDOT to Document Operational Needs from the Pilot	✓	Document Lessons Learned to Help Expand CAV Concepts Statewide
✓	Deploy with KTA as locations are identified	✓	KDOT/KTA Employees to Assume Responsibility for Operations of Rural Work Zone Safety Systems

Kansas Connected and Automated Vehicle Implementation Plan

URBAN VEHICLE-TO-INFRASTRUCTURE PILOT

MARCH 2021

PILOT TOPIC AREA	Urban Corridor
OWNER	Kansas Department of Transportation (KDOT)
KEY STAKEHOLDERS	KDOT, City of Merriam, Traffic Management Centers (TMCs), Local Auto Dealerships, General Public, Operation GreenLight
END-USERS	Motorists, Data Aggregators, Academics

Motivation

Connected Vehicle (CV) applications are discussed as offering many benefits to the driving public, but only a few members of the public have first-hand experience with CV-equipped vehicles. As this technology starts to become mainstream, it is advantageous for both KDOT, Kansas Turnpike Authority (KTA), and their partners, as well as the general public to gain real-world experience in this technology area.

Pilot Considerations (Low ● to High Priority ●●●)

✓	Builds Kansas Innovation Abilities/Reputation ●●●
✓	Produces Positive, Equitable Outcomes ●●
✓	Deployable Immediately in State ●●●

Pilot Description

This pilot will instrument two interchanges along the I-35 corridor in Merriam, Kansas, with roadside units (RSUs) to serve as a consumer demonstration of CV applications. This project site is strategically located near several car dealerships that conduct test drives for interested car buyers, facilitating a highly consumer-focused demonstration of CV applications in vehicles that–being fresh off the assembly line–may be equipped with the latest Vehicle-to-Infrastructure (V2X) transceivers. Key to this pilot will be the engagement of local auto dealerships within this corridor that could showcase V2X technologies to new car buyers during test drives of vehicles. The pilot team will work with dealerships to craft specific "test drive" routes so as to strategically deploy RSUs with CV applications and show the car buyer how V2X concepts work with the vehicle. Pre- and post-evaluations will help inform other consumer-focused CV application concepts for KDOT.

Detailed Scope

- Review the state of CV applications and communications, most notably private-sector automotive Original Equipment Manufacturers (OEMs) that are actively instrumenting their vehicles.
- Identify public-sector champions and determine the needs criteria for a demonstration in this corridor, including the CV applications of interest.
- Identify interested private-sector car dealerships in the corridor that offer OEM-equipped or aftermarket CV devices as part of their fleet and secure participation.
- Issue a request for information (RFI) to identify interested RSU partners that would like to test equipment in this pilot.
- Develop three to five "test drive" routes for cars traveling in this corridor to demonstrate various scenarios that are supported by CV applications. Seek routes that maximize the number of CV applications that can be observed to increase pilot visibility.
- Develop systems engineering documentation to envision the proposed system for stakeholders, which includes a Concept of Operations, System Requirements, and High-Level Design. Explore opportunities to integrate with Operation Green Light (OGL).
- Develop a data management plan that includes privacy and security considerations. Identify the data collection requirements for historical and (if applicable) real-time applications, which should examine real-time distribution of data to KC Scout and WICHway TMCs. Determine what information can be collected, saved, and analyzed, as well as what notices or waivers are needed.
- Develop an early evaluation plan to prepare for documenting lessons learned during the pilot:
    - Conduct evaluations with car dealerships on their experience with each scenario.
    - Conduct evaluations of the user experience from potential car buyers completing test drives.
    - Evaluate KDOT's technical and organizational capabilities to integrate CV technology and data and perform a needs assessment to scale the pilot across the State.
- Develop materials that detail to the car dealerships and their interested customers what technologies and how they are being showcased as part of these test drives. Collaborate with participating OEMs and RSU vendors to create cut-sheets and pamphlets that focus on "general" interest and "technical" interest categories to aid the dealership in understanding and showcasing the technology and its applications.
- Initiate a strong education campaign, focusing primarily on the car salespeople who would demonstrate the technology as part of their role. Designate proper technical points-of-contact for dealership salespeople to contact to address technical questions.
- Train KDOT and other public-sector staff on the latest CV equipment that is deployed as part of this pilot. Ensure sufficient technical education is given to allow timely response to maintenance issues.
- Conduct a public awareness campaign to bring attention to this pilot and attract interested citizens to the dealerships for a test drive.
- Investigate policies and procedures to implement new technologies to support V2X applications.
- Identify how this CV pilot could integrate with other CV applications in the future, such as for transit services, emergency vehicle preemption, and third-party transportation data providers.

RESEARCHED BENEFITS

SAFETY	MOBILITY	GOODWILL	BENEFIT/COST RANGE
• Connected vehicle applications are anticipated to improve 80% of unintentional crash scenarios	• Provides opportunity to collect cutting edge data from new vehicles • Provides greater engagement of universities to explore data streams from Connected and Automated Vehicles (CAVs)	• Provides opportunity to partner with local businesses • Provides opportunity to showcase technology deployments by KDOT to the general public	• Safety: Up to 45% improvement to safety index (probability of incidents) • Mobility: Up to 37% improvement of corridor travel times • Emissions: Up to 30% reduction in emissions

Source: ITS Deployment Evaluation Database

COST ESTIMATES (2020 DOLLARS)

CAPITAL COST

- Roadside Units cost between $5,000 - $18,000 plus deployment costs. Yearly maintenance is estimated at $3,000/yr.
- Aftermarket onboard equipment costs between $300 to $500 to install per vehicle. Yearly maintenance is minimal.

Source: ITS Deployment Evaluation Database

TIMESCALE FOR IMPLEMENTATION

	NEAR-TERM (2021)		MID-TERM (2022)		LONG-TERM (2023-2024)
✓	Identify interested auto dealerships willing to participate and identify a champion at each dealership	✓	Develop evaluation plan and scope	✓	Generate education materials geared to the general public covering the benefits of the technologies being tested and mainstreamed into the vehicles
✓	Identify KDOT champion to lead pilot	✓	Select contractor and deploy full pilot	✓	Evaluate and document lessons learned
✓	Craft high-level concept and test scenarios	✓	Evaluate pilot performance		

HOW IT SCALES

	NEAR-TERM PLAN		LONG-TERM EXPANSION
✓	Coordinate with Operation GreenLight	✓	Partner with Wejo for CV data, insights, and analytics
✓	Conduct pilot evaluation	✓	Expand to include V2X test exchanges with first responders and transit vehicles
✓	KDOT to document operational needs from the pilot	✓	Expand to greater transportation system as determined by the scenario results
		✓	Document lessons learned to help expand CAV concepts statewide
		✓	KDOT employees to assume responsibility for operations of future V2X deployments

Kansas Connected and Automated Vehicle Implementation Plan

COMMERCIAL AND AGRICULTURAL VEHICLE INFORMATION TO IMPROVE PRODUCTIVITY PILOT

MARCH 2021

PILOT TOPIC AREA	Commercial and Agricultural Vehicle Information to Improve Productivity
OWNER	Kansas Department of Transportation (KDOT), Kansas Turnpike Authority (KTA)
KEY STAKEHOLDERS	KDOT, KTA, Kansas Department of Agriculture, Traffic Management Centers (TMCs)
END-USERS	Commercial Vehicle Fleets with a special focus on Agricultural Shippers, Carriers, and Dispatchers

Motivation

Advancements in communicating critical data help add efficiency and safety to the freight movements that keep Kansas' economy moving. This is particularly true in the agricultural sector, a major driver of freight activity within and through Kansas. Better and more focused data can lead to more efficient trips and numerous related benefits.

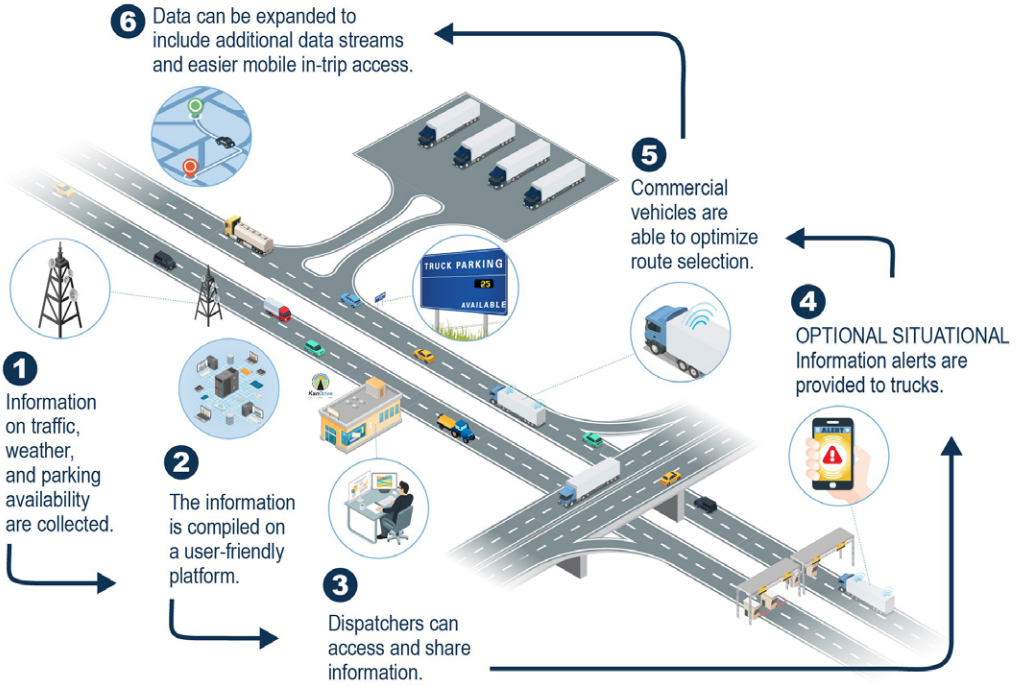
Pilot Considerations (Low ● to High Priority ●●●)

✓	Produces Positive, Equitable Outcomes ● ●
✓	Addresses Critical State Need ● ● ●
✓	Builds Kansas Innovation Abilities/Reputation ● ● ●
✓	Deployable Immediately in State ● ● ●

Pilot Description

Develop new and augmented data streams which expand on KDOT's KanDrive traveler information platform. Expand field equipment or data subscription services to provide highly detailed data along a strategic freight corridor that is used by commercial agricultural and other motor carriers. Includes:

- Enhanced information and alerts related to inclement weather, incidents, and traffic congestion;
- Expanded truck parking availability (location-based);
- Data would primarily be for carrier dispatchers, with secondary users potentially being drivers who receive audible notifications on their mobile devices;
- Includes (at dispatcher discretion) optional situational awareness alerts (using K-TAG, PrePass or trucking company secure GPS location data); and
- Lay the groundwork for future Connected Truck apps such as freight signal priority on key arterials, permitting systems integration, and oversize/overweight alerts.



Detailed Scope

- Identify user needs and opportunities in commercial vehicle and traffic data collection and exchange.
- Identify a pilot corridor location. Consider the following selection criteria:
    - Includes freeway(s) and key freight arterial(s);
    - Access to key freight facilities (e.g. railyard, agricultural facility, retail distribution center);
    - Access to a truck parking facility;
    - Upstream public sector transponder reader to provide time-stamped location of trucks (i.e. K-TAG or PrePass readers/gantry);
    - A significant level of freight traffic congestion that needs to be addressed; and
    - Economic importance to the State.
- Identify opportunities for commercial vehicle-focused operational data collection, compilation, and exchange, including:
    - Real-time traffic conditions data from sensors and probes;
    - Construction, maintenance, and road closures;
    - Weather-related conditions and incidents;
    - Truck queues at freight or agricultural facilities; and
    - Truck parking availability.
- Identify data integration and management requirements and opportunities with KanDrive platform serving as a primary mechanism.
- Consider coordination opportunities with other technology pilot efforts and ongoing projects, neighboring states and federal partners, and as a part of other infrastructure upgrades.
- Develop Concept of Operations and System Requirements documents to define what this pilot will perform and what is needed for operations.
- Solidify partnership agreements and identify project funding opportunities.
- Identify a test fleet of commercial vehicles.
- Share information with test fleet.
- Measure outcomes in customer satisfaction and, where possible, efficiency, reliability, and safety gains.
- Identify opportunities for expanding to additional corridors and to include new data streams.
- Develop concept for second phase of project which could include a mobile application for direct communication to drivers and connectivity to:
    - Traffic signal priority systems at/near major freight transfer points based on commodity specific needs;
    - K-TRIPS permit information to support routing, warnings for oversize/overweight vehicles and weigh-in-motion equipment;
    - Credentialing connections, such as the International Fuel Tax Association and International Registration Plan; and
    - "Future-proofing" technology infrastructure to support other potential Connected Truck applications.

RESEARCHED BENEFITS

SAFETY	MOBILITY	COSTS	BENEFIT/COST RANGE
• Up to 4% reduction in crashes	• 5% to 25% travel time savings • 5% to 15% improvement in travel time reliability	• 1% to 10% reduction in fuel consumption	• 3:1 to 15:1

Source: ITS Deployment Evaluation Database

COST ESTIMATES (2020 DOLLARS)

CAPITAL COST

- Estimated cost per mile of coverage can range from $286K for an Urban Deployment to $73k for a Rural Deployment, with Suburban Deployments falling in-between at $144k.
- Traveler Information Website/App: $1.46M.
- Yearly maintenance is estimated at $8k-$29k/mile of coverage depending on deployment environment (i.e., urban, suburban, or rural), with an additional $115k/yr to maintain the Traveler Information Website/app.

Source: ITS Deployment Evaluation Database

TIMESCALE FOR IMPLEMENTATION

NEAR-TERM (2021)		MID-TERM (2022)		LONG-TERM (2023-2024)	
✓	Identify User Needs and Opportunities	✓	Deploy Initial Phase of Pilot	✓	Develop and Deploy Mobile Application
✓	Develop Concept of Operations and System Requirements	✓	Evaluate Results in System Usage and Efficiency Returns	✓	Evaluate and Document Lessons Learned
✓	Select Contractor for Implementation	✓	Develop Expansion Opportunities	✓	Generate Education Materials for Commercial Vehicle Community and General Public

HOW IT SCALES

NEAR-TERM PLAN		LONG-TERM EXPANSION	
✓	Identify User Needs and Market Potential	✓	Develop Mobile App(s) to Push Straight to Electronic Logging Devices
✓	Identify Core Data and Data Management Practices	✓	Expand Number of Commercial Vehicle Users and Corridors of Use
✓	Establish Open Data Portal using KanDrive	✓	Add New Commercial Vehicle-Focused Data Elements and Expand Connectivity to Other Data Resources