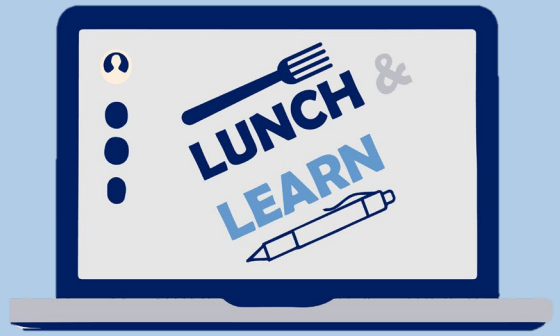
Welcome to NVTA's InNoVAtion Lunch & Learn



Presented by: Megan Brock, Senior Strategy Manager at Cavnue

Hosted by: Keith Jasper and Griffin Frank

NVTA's InNoVAtion Lunch & Learn Series

Identify Current & Future Needs

45 minutes long

Pragmatic information on actionable innovations

NVTA's InNoVAtion Lunch & Learn Series

Today's Topic:
The Future of Roads and Connected Corridors

Megan Brock
Senior Strategy Manager
Cavnue

NVTA InNoVAtion Lunch and Learn

December 2024

Yesterday's roads are not solving today's challenges…

Safety

~40,000

U.S. road fatalities in 2023, representing ~25% 10-year increase[1]

Efficiency

21.4%

10-year increase in U.S. congestion[2]

(1) United States Department of Transportation (April 2024), (2) INRIX (2015-2022).

...and are unprepared for the future of autonomy

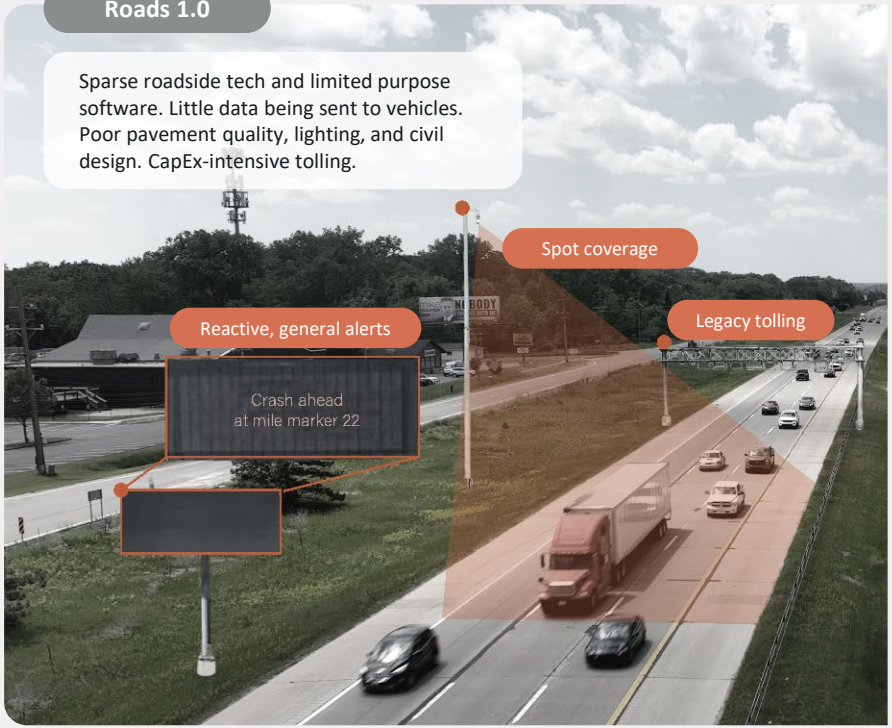
(1) Based on a minimum feature set of adaptive cruise control, lane keep assist, automatic emergency braking, and 4G connectivity. Uses multiple S&P forecasts extending to between 2028-2032. We then extrapolate vehicle demand, retirements, and tech features in new vehicle sales based on historic trends. S&P Global Mobility independently reviewed this model, finding the assumptions and methodology to be logically sound and consistent with available benchmarks.

Cavnue is the world's leading smart road developer

Through performance-based road management contracts, we deliver digital and physical infrastructure improvements that enable the safe, efficient, and automated transportation of goods and people

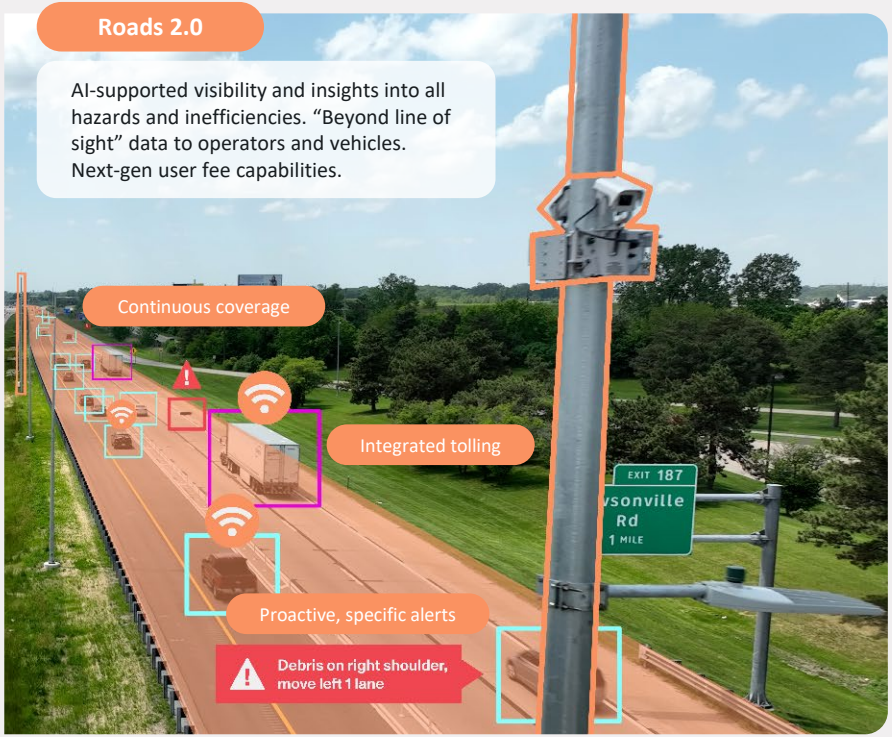
Roads 1.0

Sparse roadside tech and limited purpose software. Little data being sent to vehicles. Poor pavement quality, lighting, and civil design. CapEx-intensive tolling.



Roads 2.0

AI-supported visibility and insights into all hazards and inefficiencies. "Beyond line of sight" data to operators and vehicles. Next-gen user fee capabilities.



Cavnue is partnered with transportation industry leaders to develop smart roads that deliver better outcomes.

Sidewalk Infrastructure Partners (SIP) is a company backed by Alphabet, OTPP, and StepStone to develop and fund innovative infrastructure projects, like Cavnue's.

Alphabet

Google Maps
Google Cloud
waze
androidauto
WAYMO
DeepMind

ONTARIO TEACHERS' PENSION PLAN

IFM
chicago SKYWAY

STEPSTONE

>$30B deployed across over160 infra investments

Ford Motor Company is a longtime Cavnue partner. We are currently collaborating with Ford to unlock the full potential of connected and automated vehicles (CAVs) on Cavnue infrastructure.

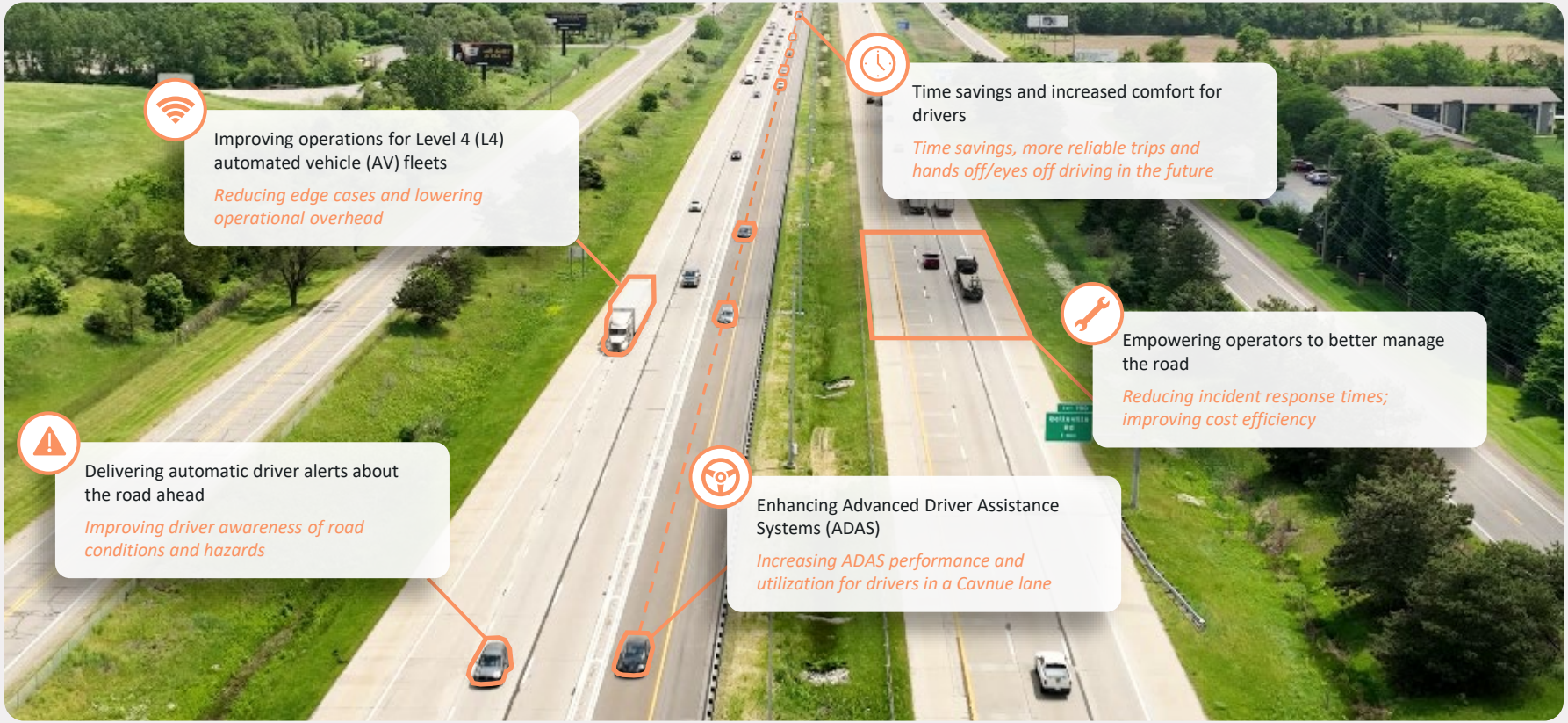
openvia + globalvia

Openvia is the tech and innovation platform of the Globalvia Group – a global leader in transportation infrastructure, with a global portfolio of 21 highways representing over 1,000 miles.

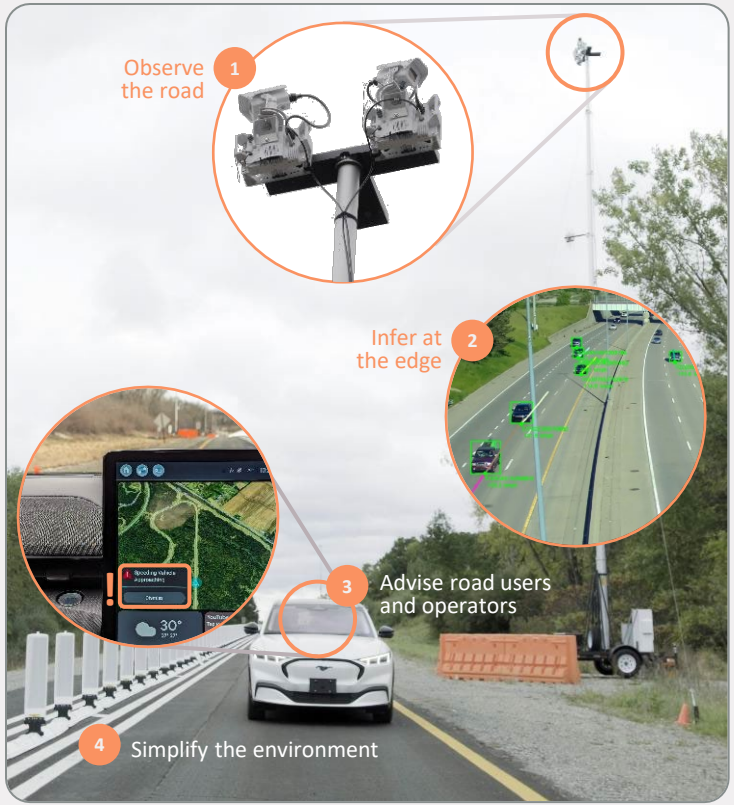
LANDSTAR

Landstar is a technology-enabled, asset-light provider of integrated transportation management solutions, delivered through over 100,000 third-party capacity providers.

Our AI-managed roads benefit users and operators



We are powered by an unparalleled road tech platform



See Everything

Our dense sensor network reliably and accurately observes the road with lane-level precision. *There are no other firms offering this capability.*

Know What Matters

Cavnue's AI / ML models infer road conditions and events at the edge.

- Automated Incident Detection
- Work Zone Characterization
- Vulnerable Road User Detection
- Emergency Vehicle Alert
- Foreign Object Detection
- Traffic Conditions Monitoring

Protect Ahead

We deliver alerts to road users and operators, using industry-established messaging standards.

Faster response times, improved safety for traffic management centers

Greater reliability, increased usage of ADAS for passenger vehicle drivers

Improved operational resiliency, reduced costs for automated freight fleets

Cavnue unlocks safer, more efficient, and automated travel

Improved Safety and Comfort

Automated safety risk detection provides large public benefits; speed advisory and other alerts can reduce crashes by 29%[1]

Improved Efficiency

Incident and other non-recurrent delays can be reduced by 35% through crash reduction and speed harmonization[2]

Enhanced Autonomy

Our platform reduces ADAS / AV disengagements and enhances performance – unlocking and capturing value from autonomy

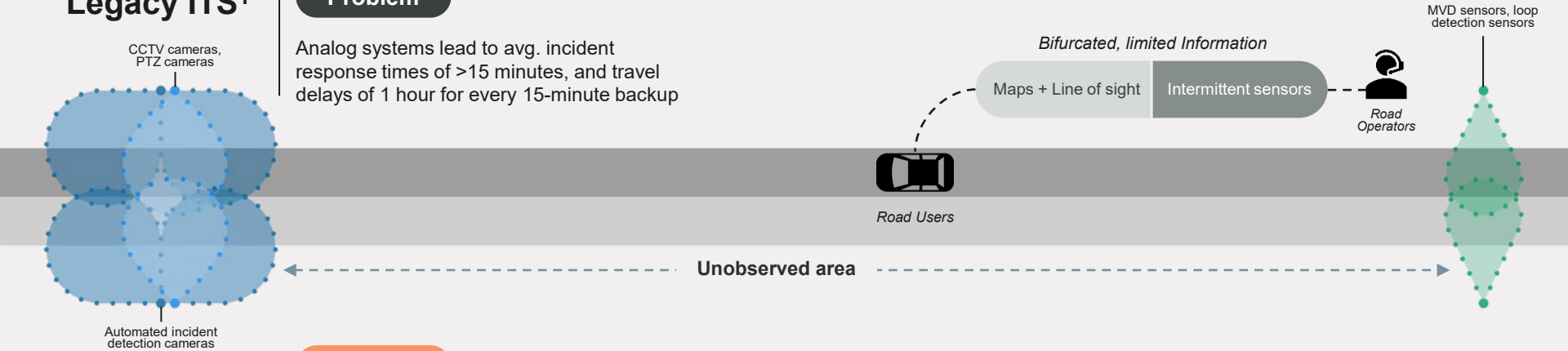
(1) Crash Modification Factors Clearinghouse; (2) IEEE Transactions on Intelligent Transportation Systems. These metrics are an early derivation of how Cavnue's solution can improve roadways and are based on technology-only deployments.

Our full road coverage enhances safety and comfort

Legacy ITS[1]

Problem

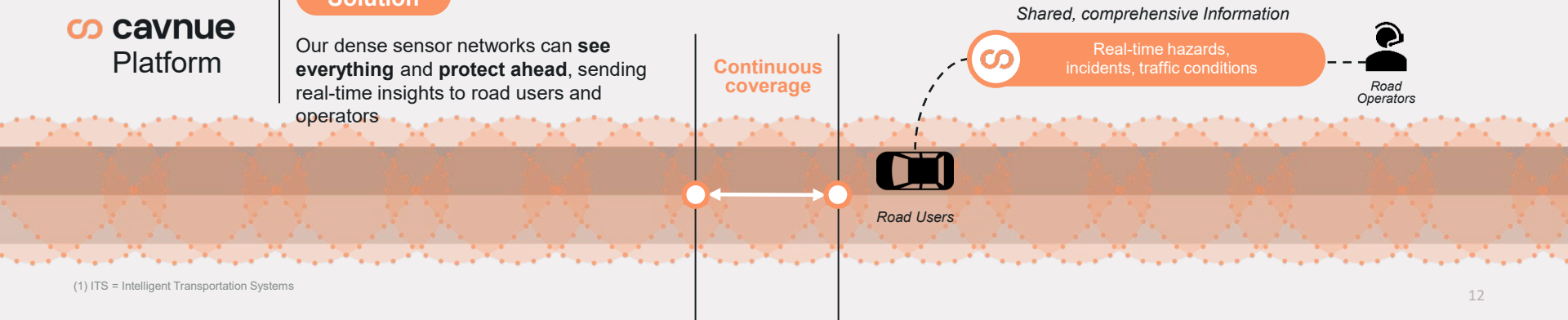
Analog systems lead to avg. incident response times of >15 minutes, and travel delays of 1 hour for every 15-minute backup



cavnue Platform

Solution

Our dense sensor networks can **see everything** and **protect ahead**, sending real-time insights to road users and operators



(1) ITS = Intelligent Transportation Systems

Our smart road platform enables efficiency

Problem Uncoordinated vehicles, dangerous drivers, roadway incidents, and hazards create congestion

Solution We **harmonize drivers**; just 1% of vehicles responding to alerts can reduce driver-instigated congestion by up to 50%[1]

(1) "Phantom Jam Avoidance Through In-car Speed Advice", Transportation Research Procedia (2015).

Digital Interventions

In-Vehicle Driver Alerts

- We give guidance on recommended speeds and lanes
- Alerts shared via in-vehicle system or personal devices
- Extends driver situational awareness beyond line of sight

ADAS Enhancement

- Standardized messages describe events and hazards
- Cavnue extends ADAS perception beyond line of sight
- Reduces disengagements, increases driving consistency

Civil Intervention

Cooperative Cruise Control

- We deliver targeted speed guidance across vehicles
- Unlocks cooperative driving, even in stop-and-go traffic
- Coordination creates smooth driving, higher throughput

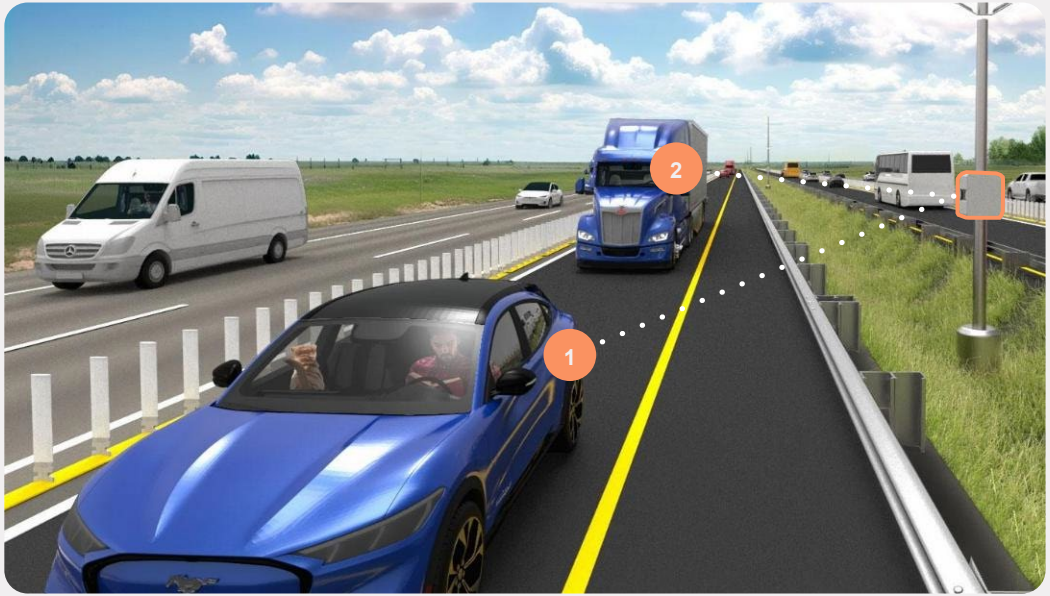
Lane Separation

- Where possible, we create a dynamically managed lane
- By pricing demand for the lane, we deliver time savings to drivers and monetize their value of time

We create value from enhanced autonomy

Problem ADAS suffers from constrained capabilities and performance; L4 automated vehicles operate under a high-cost structure

Solution Our digital and physical infrastructure enhances ADAS and AV performance, and reduces operating costs for AV fleets



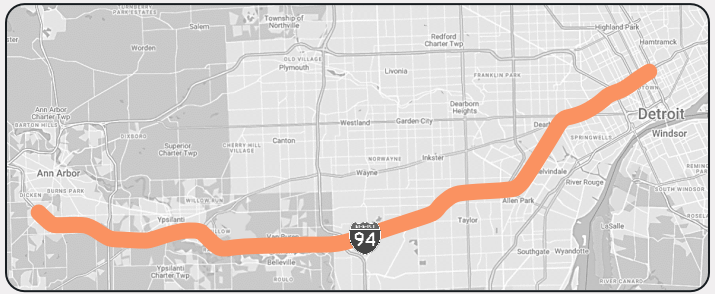
1 ADAS Enhancement

- We serve as a “super sensor” by observing the road and sending recommendations to the vehicle
- Our recommendations extend vehicle line of sight with detailed, lane-level insights
- This significantly expands access to and improves the performance of passenger vehicle autonomy

2 AV Enablement

- L4 fleets have high OpEx tied to tele-assist, vehicle downtime, and resourcing for vehicle rescues
- Extended perception and a simplified environment can improve L4 performance and increase uptime
- Full-corridor coverage can also benefit tele-assist operators, reducing the operator-to-vehicle ratio

Cavnue deployed the roadway of the future in MI



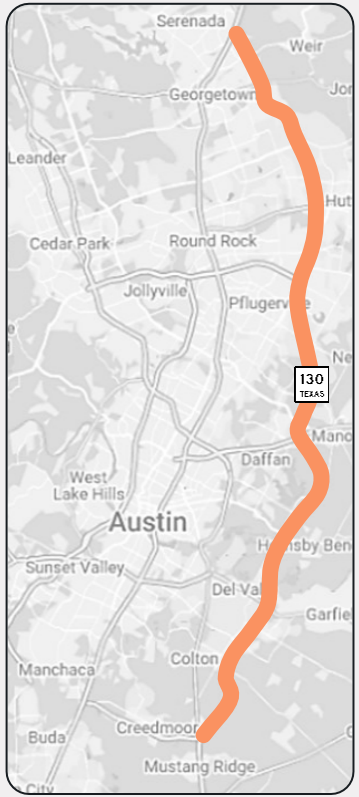
Background

- Cavnue was selected by the Michigan Department of Transportation (MDOT) to develop a delineated CAV lane on I-94 between Detroit and Ann Arbor
- Completed development of initial 3-mile proof of concept in May 2024
- Implementing testing with MDOT and automotive OEM partners in 2024-25

Initial Project Overview

Initial Route	Initial Length	Total Traffic	Primary Use Case
INTERSTATE 94	27 Miles	~100k Daily Vehicles	PassCar

Cavnue partnered with TXDOT for a Smart Freight Corridor



Background

- The Texas Department of Transportation selected Cavnue to implement a Smart Freight Corridor for Segments 2-3 of SH 130
- Focus is on delivering digital insights to TxDOT and advanced freight operators
- 4-mile proof-of-concept in development for 2024-22025

Initial Project Overview

130 TEXAS	26 Miles	~45k Daily Vehicles	Trucking
Initial Route	Initial Length	Total Traffic	Primary Use Case

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Moderated Q & A

- This time is dedicated for attendees to ask questions for today's speaker
- If you have a question, please raise your virtual hand to ask the question verbally, or type it in the chat box

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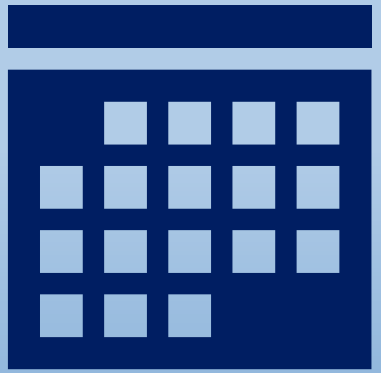
Stay tuned for information about our upcoming series when we resume for the Spring season!



Thank You!

Scan the QR code to connect with us