



Everything you wanted to know about autonomous trucks but were afraid to ask

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Texas Trucking Association

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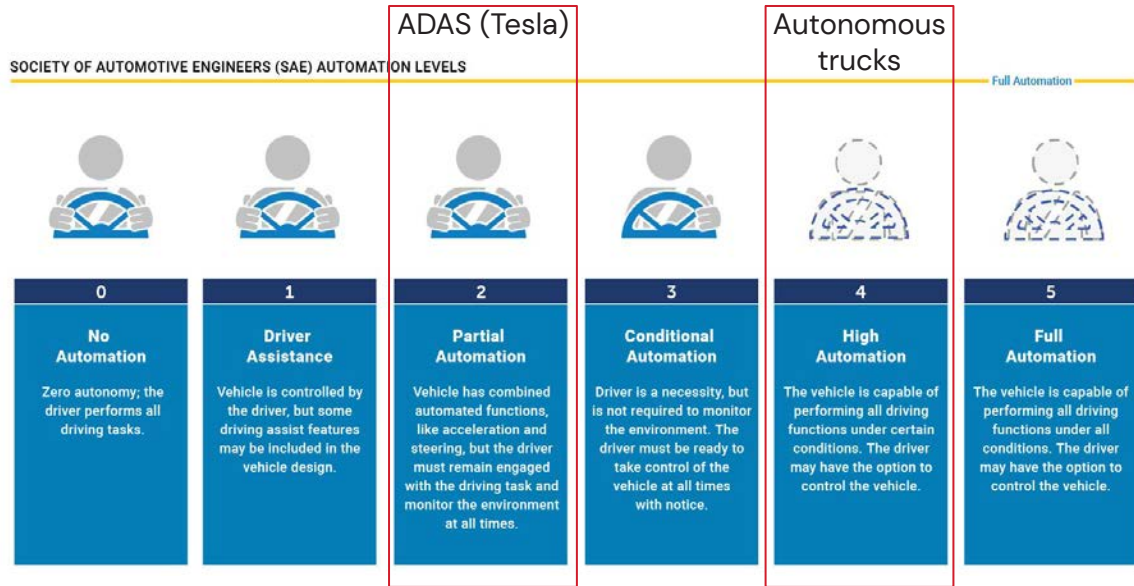
Kodiak's mission

To build technology
that carries freight
forward—so people,
partners, and the
planet thrive.



What is an autonomous truck?

- When I say an autonomous truck, I mean SAE L4 truck
 - L4 = driverless in *some Operational Design Domains*
 - Focus on long-haul
 - L5 = a myth
 - L2 = Advanced Driver Assistance System



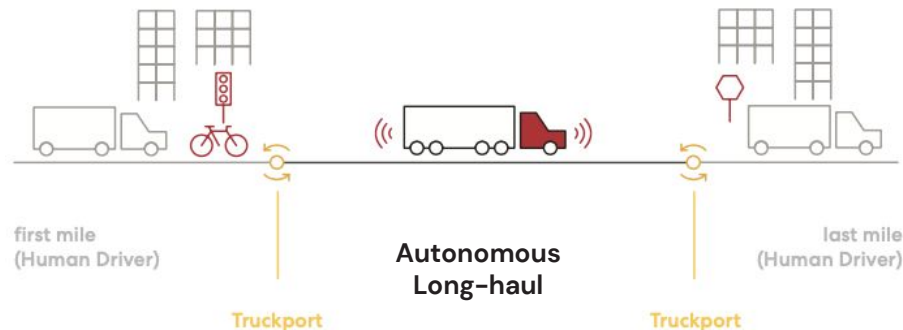
How are autonomous trucks different?

Similar

- Built on traditional trucking platforms, so same underlying hardware and maintenance needs
- Hauls regular trailers

Different

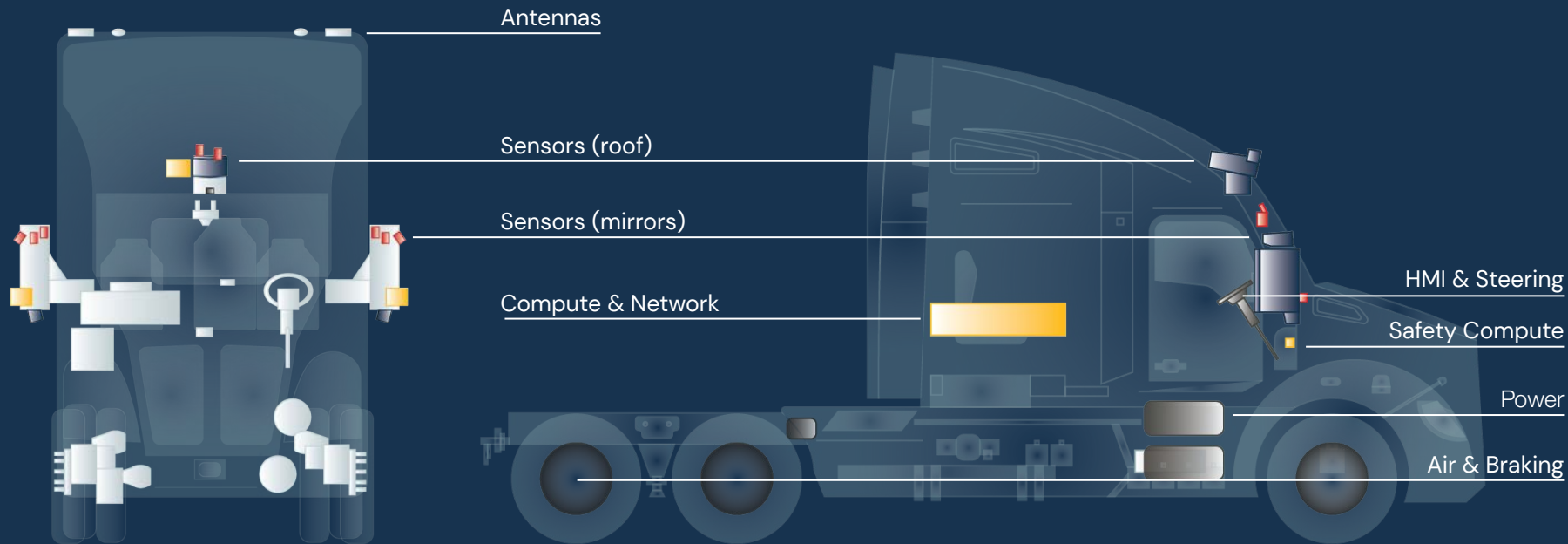
- Additional maintenance needs for sensors, computers, and other components
- Narrower ODD and operations model



Proprietary & Confidential



Kodiak's hardware platform



Patent-pending automotive grade sensor integration/mounting | Architected with redundancy and scale in mind | Custom-designed safety compute



Why build an autonomous truck?

- Technology
 - Highway driving is a more *constrained problem* than city driving – no bikes, no pets, no kids
 - Closer to being a reality
- Solves a real problem
 - Autonomous trucks can help address multiple industry pain points, from the driver shortage to safety
- Safety
 - Autonomous trucks will soon be safer than traditional trucks
- Efficiency and utilization
 - Autonomous trucks will be able to operate nearly 24/7
 - USDOT study – >\$200 per worker per year



Led By AV Industry Pioneers



Don Burnette
Co-Founder & CEO

Co-founded Otto
Lead AV Engineer at Google
and Waymo



Paz Eshel
Co-Founder & COO

Vice President at Battery
Ventures



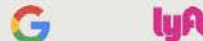
Andreas Wendel
VP, Engineering

Perception Tech Lead at
Waymo



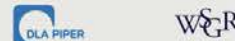
Jamie Hoffacker
Head of Hardware

Lead Hardware Engineer at
Lyft's Level 5 and Google
Street View



Jordan Coleman
General Counsel &
VP, Policy

Technology and Corporate
Attorney at Wilson Sonsini
Goodrich & Rosati



Team of 70+ comprised of world-class technologists and industry pioneers from leading self-driving programs



Proprietary & Confidential



Where Kodiak is today

- Founded in 2018
- In mid-2019, opened our testing and operations hub in Lancaster, TX
 - The first autonomous trucking startup to build operations in Texas
- Fleet of 10 trucks – focused on testing
- Deliver freight daily between DFW and Houston with a 100% on-time delivery rating



Self-driving truck company Kodiak Robotics honored at CES after reaching milestone on Texas roads

Source: Dallas Morning News



Lancaster: A Hidden Gem On The Automated Vehicle Community's Radar

Source: BisNow



Are Kodiak's trucks driverless?

- No – we (and everyone else) in the industry are still in the testing phase
- We test with:
 - Safety Drivers
 - CDL-holders
 - Monitor the road and maintain control of the vehicle
 - Disengage the Kodiak Driver whenever appropriate
 - Operate the vehicle outside the ODD
 - System Operators
 - Monitor the operation of the Kodiak Driver
 - Communicate system intentions to Safety Drivers



What can autonomous trucks do today?

Our system can safely navigate cut ins, construction, heavy traffic and vehicle on shoulder – day and night

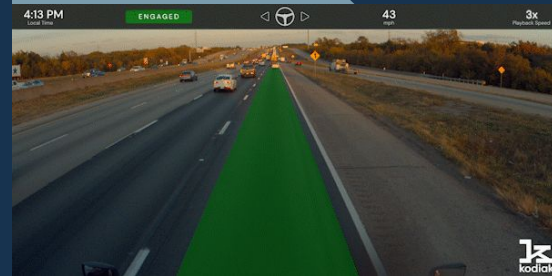
Merging



Construction



Heavy traffic



Vehicles on shoulder



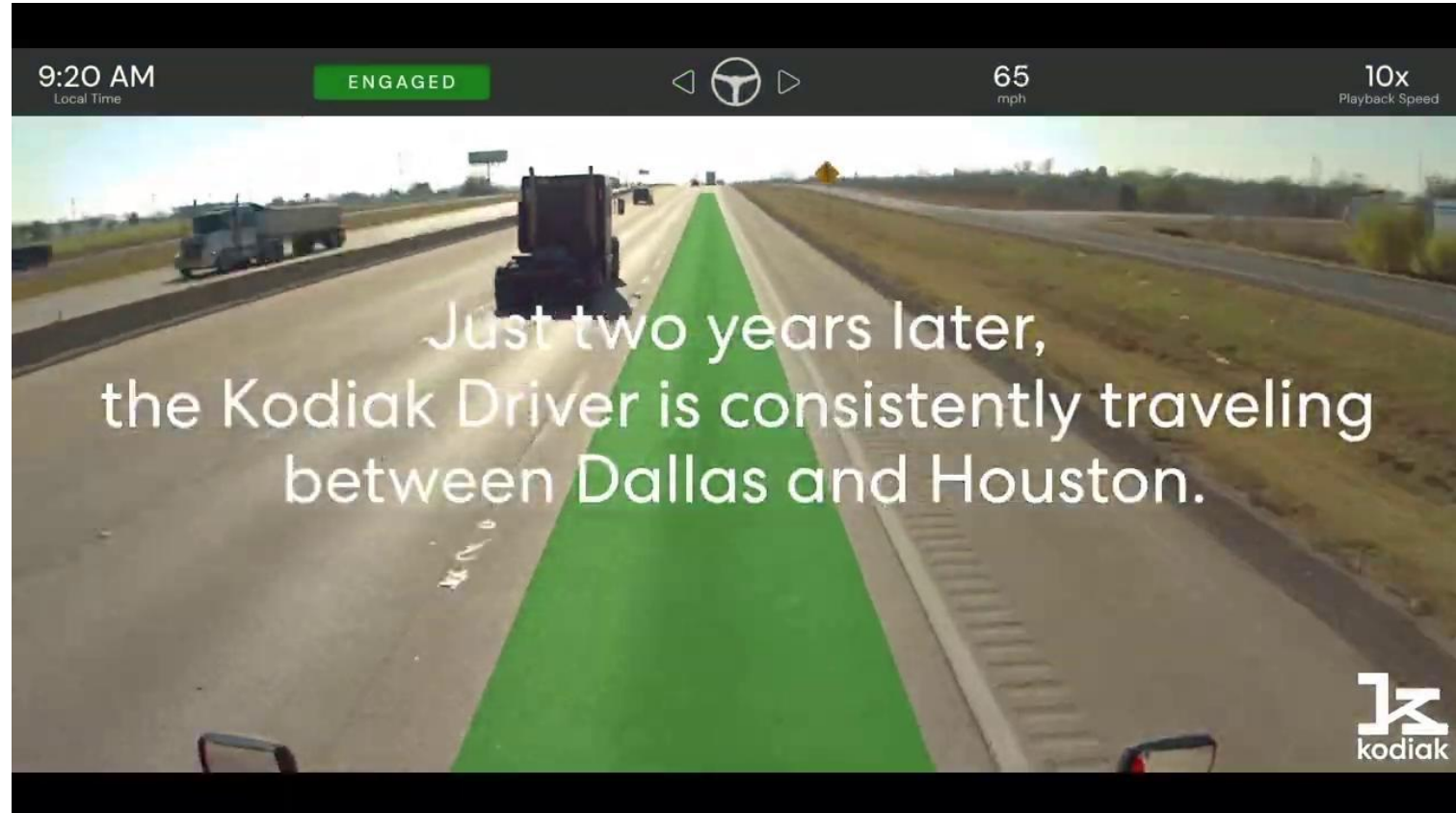
Harsh weather



Driving at night



How far has the technology progressed?



Who is building autonomous trucks?

- Lots of companies! Particularly in Texas
- Texas has a great combination of freight density, workforce, and a positive regulatory environment

In Texas

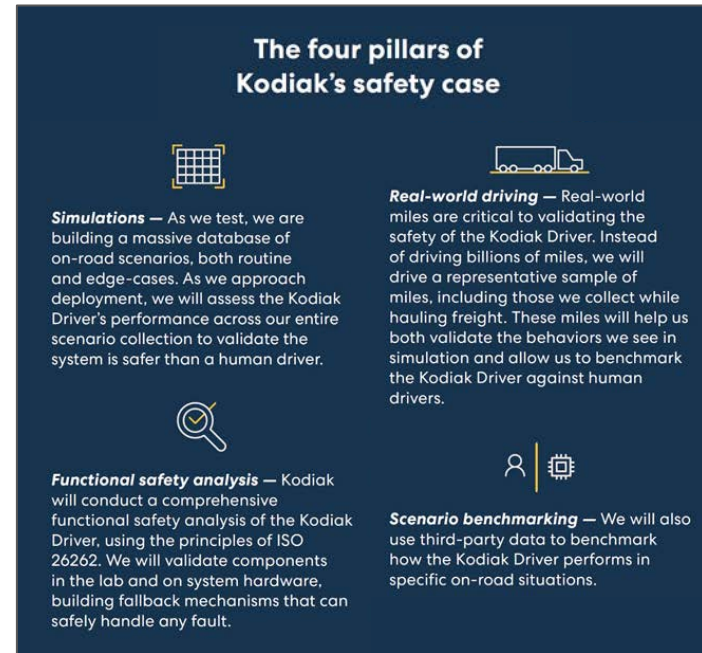


Everywhere else



How do you know if an autonomous truck is safe?

- We're not just making 1000 trips and saying "good enough"
- The industry talks about building a *safety case*
 - A safety case is an "argument" that your vehicle is safer than the average human driver
- Safety cases are built using a variety of data analyses



What regulations are there for autonomous trucks?

Autonomous vehicles

- Congress has not yet passed a law regulating autonomous vehicles
- USDOT primarily has issued guidance, rather than hard rules
- NHTSA just launched rulemaking for safety regulations, has used recall authority

Autonomous trucks

- FMCSA has focused on adapting rules to for autonomous trucks
 - Launched rulemaking in 2019 for issues like warning triangles, inspection requirements, and others
- Industry is engaged with law enforcement through CVSA for inspection regimes



What regulations are there for autonomous vehicles?

Federal

- Congress has not yet passed a law regulating autonomous vehicles
- USDOT primarily has issued guidance, rather than hard rules
- NHTSA just launched rulemaking for safety regulations, has used recall authority

Texas SB 2205:

An automated motor vehicle may operate in this state with the automated driving system engaged, regardless of whether a human operator is physically present in the vehicle

TxDOT's Connected and Autonomous Vehicle Task Force
coordinates autonomous vehicle work in the State



Are there specific regulations for autonomous trucks?

- Not today, but regulations are in motion
- FMCSA has focused on adapting rules to for autonomous trucks
 - Launched rulemaking in 2019 to address issues such as warning triangles, inspection requirements, and HOS
- Law enforcement (through CVSA) is working with industry to develop inspection regimes for autonomous trucks
 - I chair ATA Task Force on Automated Truck Inspection
- These processes are beginnings, not ends



Can I buy an autonomous truck at a dealer today?

- Not today – developers all operate their own testing fleets
 - This helps build the technology and the operations model
- In the long-run, different companies may have different models
 - Kodiak plans an *Autonomous Trucking as a Service* model
 - Lots of different options – no need for purity
- Developers and fleets will need long-term partnerships around software, infrastructure, maintenance, mapping, and other critical technologies
 - Liability is also critical



When will autonomous trucks be available?

- Industry predicts first driverless deployments ~2025
- But...you can already run some loads today
- The transition will be gradual
 - There are <100 autonomous trucks, out of 3.6M trucks in the US
- If you're interested in running some loads, please be in touch!





Any questions?

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kodiak

