

An aerial photograph of a road construction site. A white semi-truck is driving on a newly paved road that curves through the landscape. In the background, there is a large area of dirt and construction equipment, including excavators and trucks. The scene is captured in a monochromatic blue-green color scheme.

F FORTERRA

**GROUNDBREAKING, GROUND-BASED AUTONOMY
FOR LOGISTICS CENTERS**



AGENDA

Forterra Overview

AutoDrive® Technology

Whole Yard Approach

Safety

FORTERRA

Advanced autonomous driving systems that enhance vehicle platforms running on-road or off-road in complex commercial and industrial operating environments.





20 YEARS OF LEADERSHIP

Military and Commercial Autonomy Pioneers

Deep experience.

- 2003: First US Army deployments
- 2008: First DoD-approved vendor to operate fully unmanned
- 2010: Deployed unmanned vehicles in Afghanistan to clear IEDs
- 2014: First commercial shuttles
- 2019: Largest US military deployment
- 2022: Launched first commercial yard program
- 2023: First commercial forestry program
- 2023: Autonomy for 5 active military programs

Broad capabilities.

Integrated autonomous solutions into over 50 vehicle platforms for manufacturers including General Dynamics, Kalmar, Mack, Oshkosh, Plasan, and others.



Globally deployed.

Personnel based in four company offices across the U.S. and supporting customers at office sites and on military bases worldwide.



AUTONOMOUS SOLUTIONS AT SCALE

NOW.

Delivering a range of successful commercial pilots.

- Distribution Centers
- Truck Ports
- Ports, Railheads and Intermodals
- Manufacturing and Logistics Centers with Private Drayage
- Natural Resource Harvesting and Processing

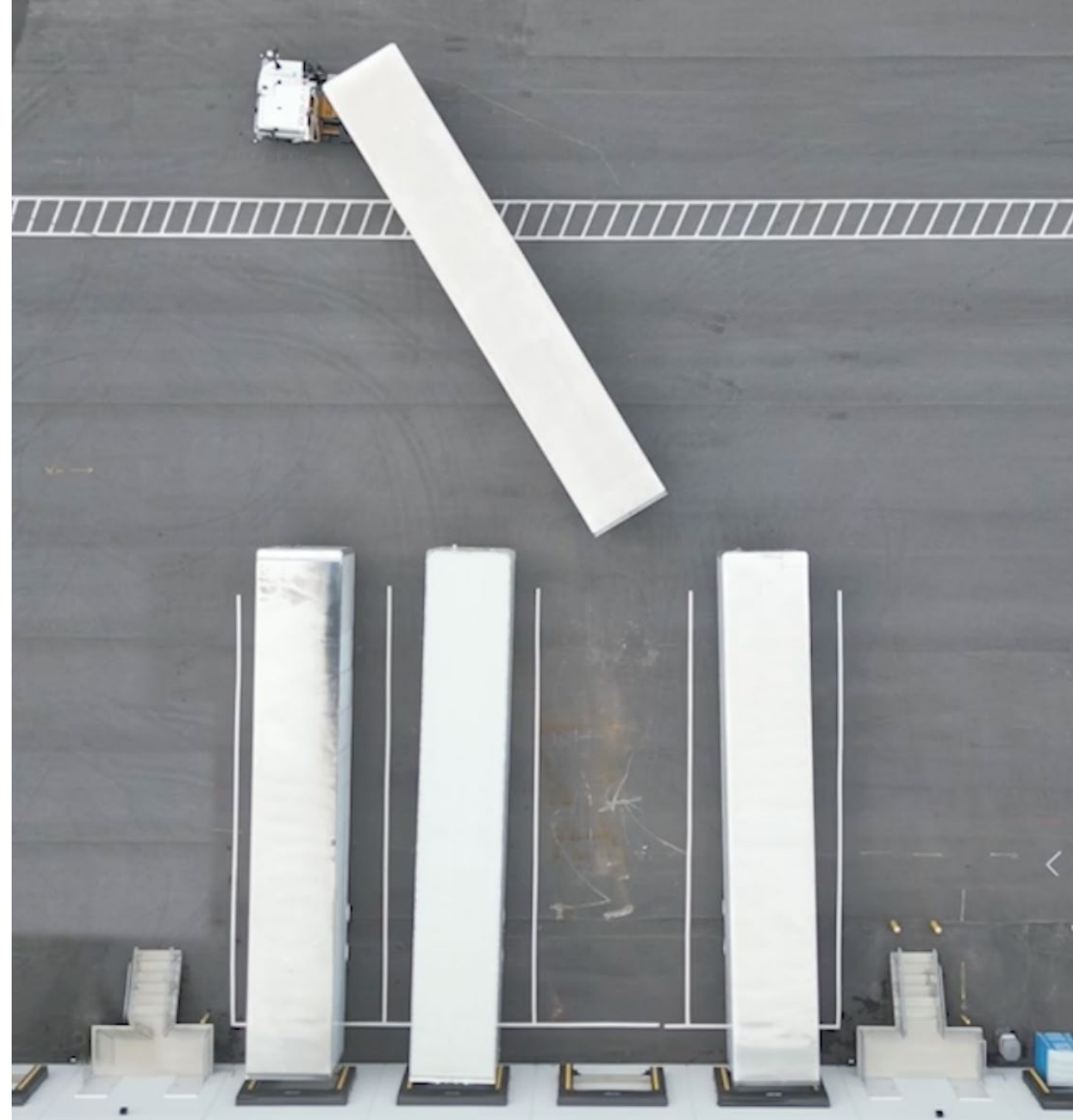
Navigating complex yards, with throughput equivalent to human operators.

Providing autonomy for OEMs holding 90% of international yard truck market.

NEXT.

Converting prototypes into practical customer capabilities.

- Scaling to 100+ yard trucks deployed at distribution centers and intermodals.
- Expanding Vehicle Management software for local and remote autonomous vehicle oversight.
- Advancing technologies for connectivity to adjacent yard processes.
- Attracting staff in all disciplines from leading companies across tech, robotics, and autonomy.



AUTODRIVE TECHNOLOGY

Operating independently or side-by-side with human drivers, AutoDrive® helps workers meet logistics and distribution duties more efficiently and with increased safety.



FULLY INTEGRATED AUTONOMOUS GROUND NAVIGATION

Baseline AutoDrive® Capabilities:

- Off-road or on-road operation
- Navigates inclement weather conditions and poor visibility
- Operates in GPS-denied areas
- Does not require roadway infrastructure
- Single-vehicle waypoint route navigation
- Multi-vehicle leader-follower, uncrewed platooning, and convoys
- Retro-traverse and reverse platooning, with trailers
- Static and dynamic obstacle avoidance and trajectory re-pathing
- Onboard or Remote Operator control/oversight



AUTODRIVE ARCHITECTURE

Modularity, universal adaptability, and clearly defined interfaces at its core.

Artificial intelligence and machine learning enable sensors to guide vehicles to work with or without human operators.

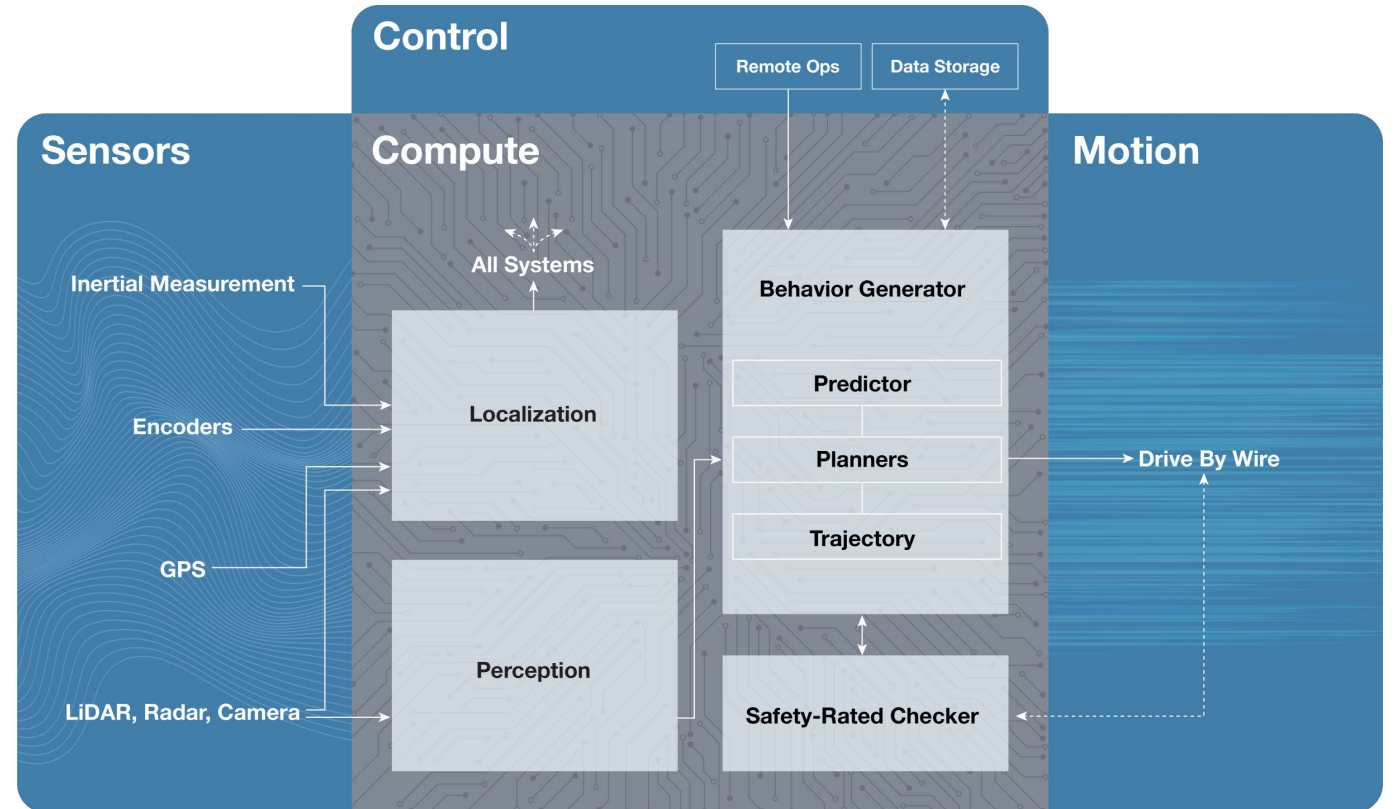
Configurable for most heavy-duty vehicles.

Supports driver assistance (SAE Level 2) and fully-autonomous driving (SAE Level 4).

Clear application programming interfaces (APIs).

Interoperability Profile (IOP) standards and modular open systems approach (MOSA) fundamentals.

Extensible integration of operator control layers.



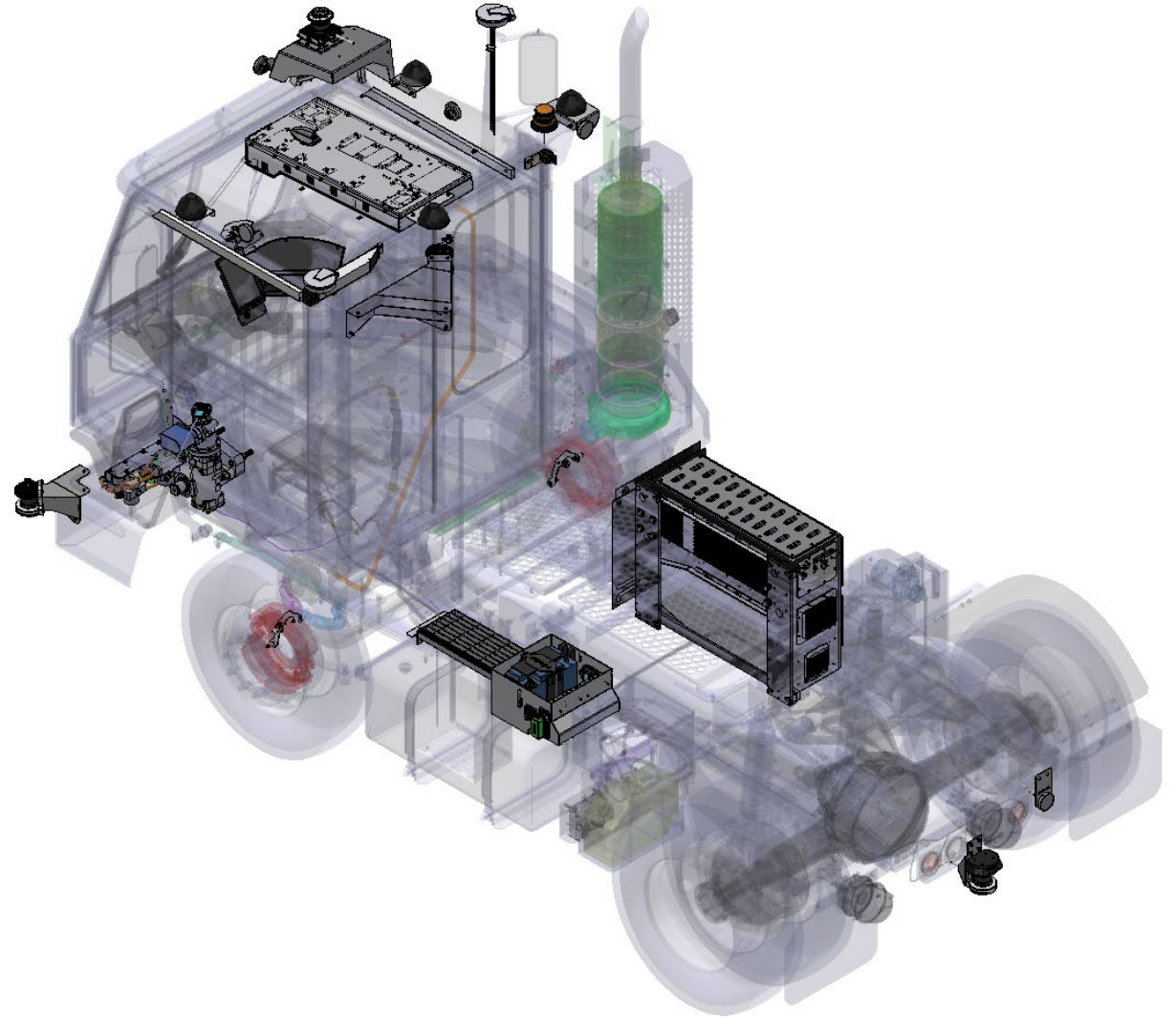
AUTODRIVE COMPONENTRY

Sensors, Hardware, Software, Compute.

Localization, perception, path-planning, route-following, and other navigation capabilities are based on using surrounding infrastructure as it currently stands, without special infrastructure build-out.

AutoDrive sensors, software and hardware enable:

- Localization
- Perception
- Behavior Generation
- Vehicle Control





WHOLE YARD APPROACH

Long-term customer value and AV adoption are best-served by a future-state point of view on transportation and logistics.

Addressing hard-to-automate tasks alongside vehicle autonomy enables maximum seamlessness in yard operations, including coordinated management of tasks and systems.

Forterra's TerraLink™

Remote Monitor

Observing all vehicles with call outs to look at certain scenarios.

Remote Assistance

Observing all vehicles with call outs to look at certain scenarios as well as the ability to command predetermined actions/scripts, provide remote troubleshooting, and diagnostics.

Remote Driving

Ability to remotely drive and control the system. Utilizes AutoDrive sensing logic to prevent collisions by the remote driving operator.



SAFETY

Forterra is committed to protecting personnel, customers and the public from accidental death or injury arising from interaction with our products.





APPROACH TO SAFETY

Forterra seeks to safeguard infrastructure, property and our products from accidental destruction or damage.

Forterra is an ISO9001 certified company allowing us to drive rigorous processes and procedures and ensure due diligence in safety.

We have defined our state-of-the-art processes incorporating guidance from industry leading safety consultancies such as Edge Case Research, kVA by UL, FEV, Stantec GenAV and TUV SUD.

Our approach incorporates safety management system (SMS), engineering safety including Functional Safety (FuSa) and Safety of the intended Function (SOTIF), Safety Case and Frameworks, as well as rigorous Verification and Validation (VV) activities.

FUNCTIONAL SAFETY

Forterra operates in multiple domains, across multiple product variants, with differing operating modes and goals.

We incorporate multiple industry approaches to functional safety.

- Forterra has partnerships with industry leading safety consultancies including ECR, Stantec GenAV, Tuv Sud and FEV.
- For military applications, we abide by MIL-STD-882E for functional safety.
- For commercial applications, depending on industry and use case, there are differing governing standards:
- For series production road vehicles, we conform to ISO26262
- Machinery and industrial standards such as ISO13849 or ISO61508 may also be of relevance, however in most cases the levels and activities within these standards are either similar to, or lesser than ISO26262
- Therefore, for commercial projects ISO26262 is our normal approach as 26262 is usually the more exacting standard, while being directly applicable to vehicles





Groundbreaking, Ground-Based Autonomy