

USA Perspective: Automated Goods Movement

SIP-adus Workshop 2020 Regional Activities Panel

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Highly Automated Driving: Fleets First!

Fleets First!

Robo-delivery, Robo-taxis, Robo-trucks.

- Operations area selected for best fit with tech capability.
- Cost pressure much less than retail model: all about ROI!
- Hands-on, skilled staff: software upgrades, system safety certification, maintenance, etc.

Use Cases: Goods Movement



Controlled
Environments

Streets

Resource Roads

Highway



Controlled
Environments

Streets

Resource Roads

Highway

(Goods movement are less
affected by COVID-19.)



Controlled Environments

- Low speeds; dirty, dusty
- Specialized, high user need
- Small market

Outrider.ai: Distribution Yards



- Distribution yard ideal for automation:
 - well-defined environments
 - complexity constrained
 - discrete repetitive tasks
- Automates all aspects of the yard including **connecting and disconnecting the brake lines to the trailers.**
- Pilots underway with Georgia-Pacific and others



Outrider



Street

- Complex environment
- Low speed
- Customer-facing
- Strong market, growing

Use Cases for Goods: Parcel Delivery



- Waymo Via
 - Phoenix: shuttling packages from UPS Stores to local sorting facility, using Waymo's Chrysler Pacifica minivans



Resource Roads

- Unpaved roads
- Remote areas
- Medium speed
- Modest market

Forest Product Innovations



- Driver shortage is a key pain point!
Automated Follower platooning of interest.
- Targeting to launch a C\$10 million five-year project later this year to accelerate development for rural public-roads.
- Project will address challenges to facilitate deployment
 - all-weather conditions (dust, snow)
 - complex truck configurations



Highway

- Well ordered environment
- High speed
- Huge market
- Platooning L1 / L4
- Stand-alone L4 driverless

Truck Platooning Basics



- “Close Drafting” done safely, reducing fuel use
 - 4% for leader, 10% for follower at 60 ft at 60 mph
- Close following via “**connected braking**” between trucks, using low-latency vehicle-to-vehicle communications (DSRC)
- Operating only on multi-lane, divided, limited access highways
- Properly handling **cut-in’s** a key part of safety case.
- **Level 1 Platooning (1st generation)**
 - front driver drives normally (crash avoidance support)
 - rear driver(s) steer, monitor the road, respond to traffic
- **Level 4 Following (2nd generation)**
 - front driver drives normally (crash avoidance support)
 - no driver in follower truck(s)

Current Active Truck Platooning Players

LOCOMOTION



DAIMLER TRUCKS

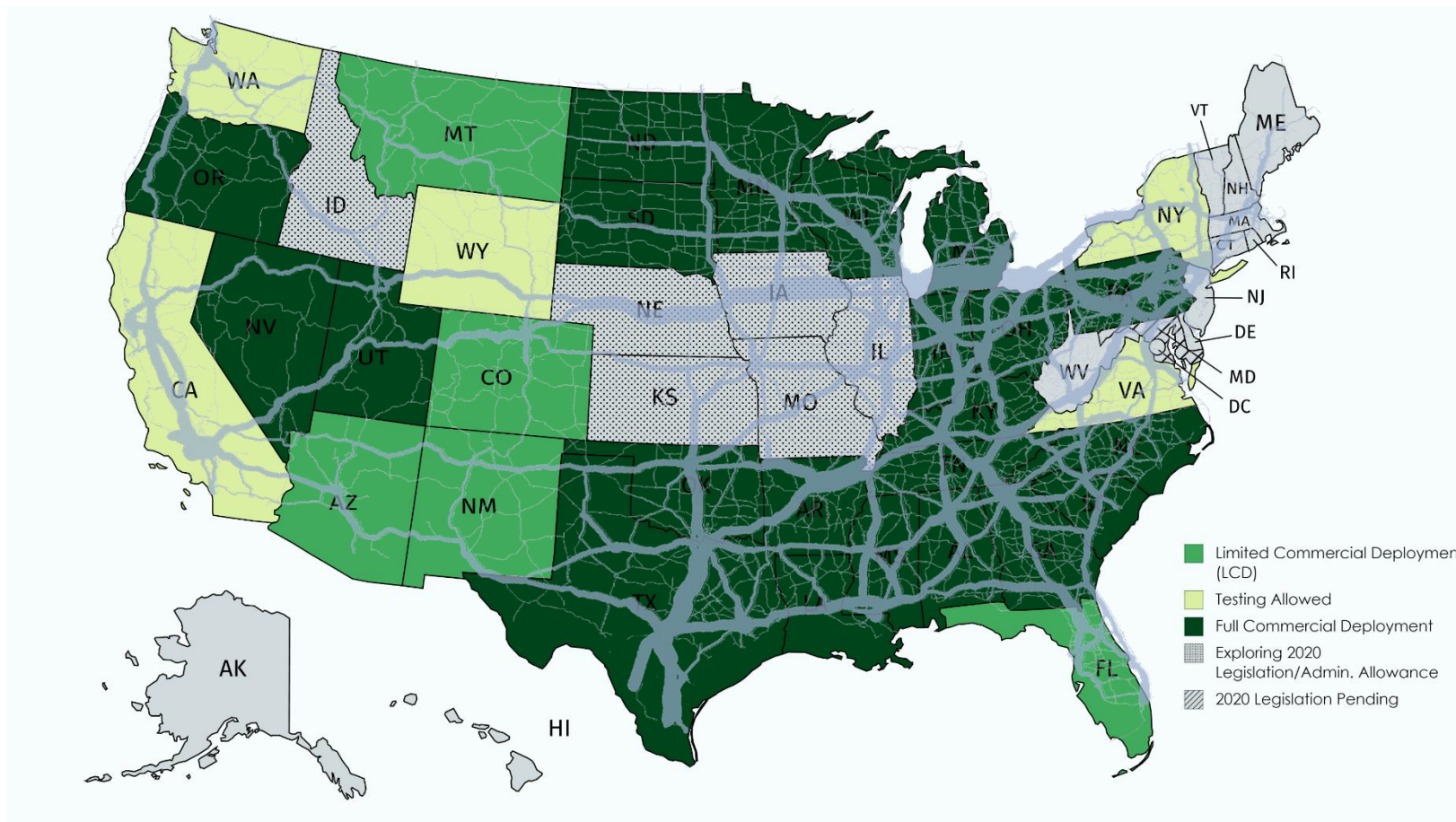


TRATON
GROUP

May 2020

U.S. State Allowance for Truck Platooning

Commercial deployment now widely allowed



- Level 1 Commercial Deployment now allowed in 27 States
- Approved States now Encompass over 80% of Annual US Freight Truck Traffic
- AutoFollow allowed in Arizona, Texas, Utah thus far

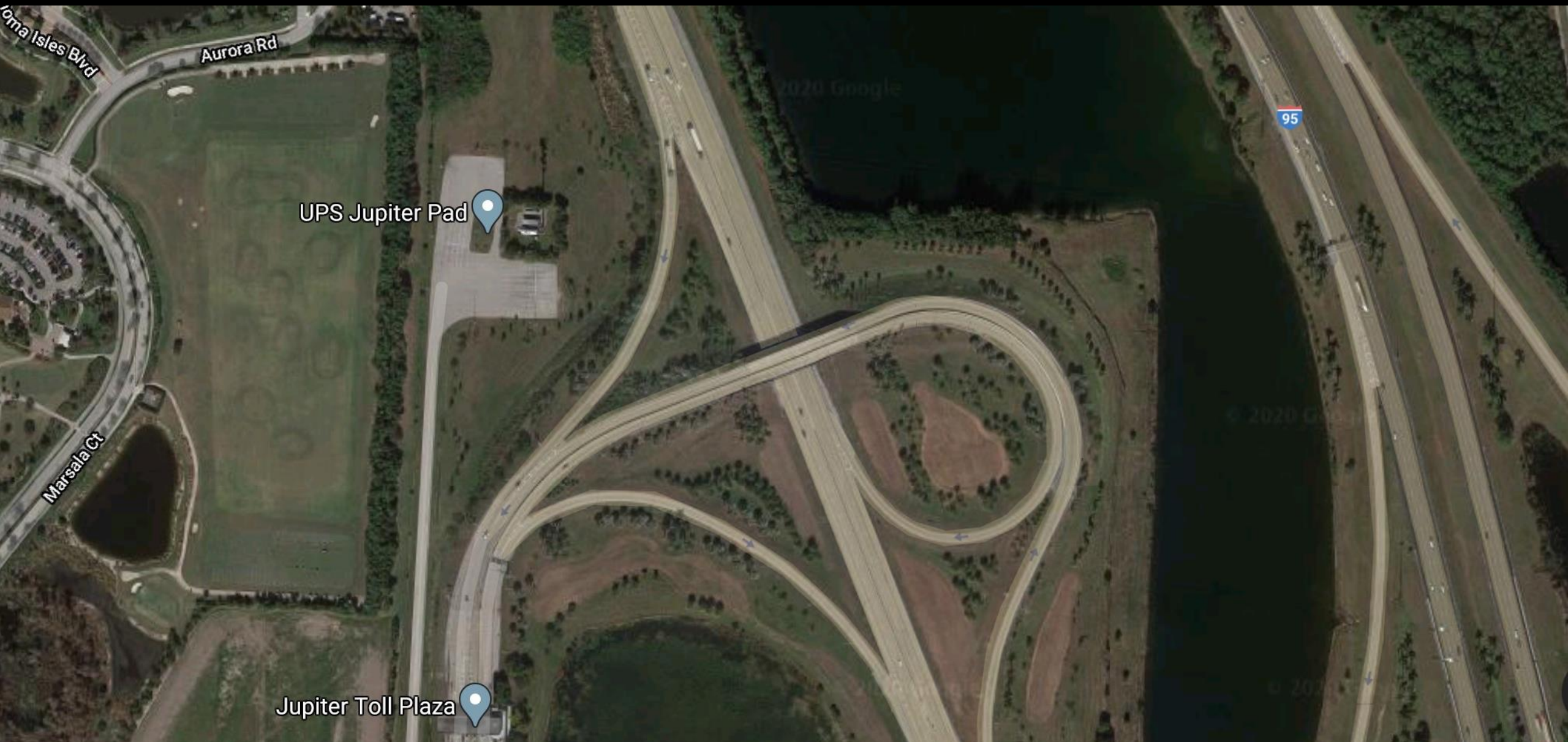
U.S. Army Developing “Leader-Follower” Kits



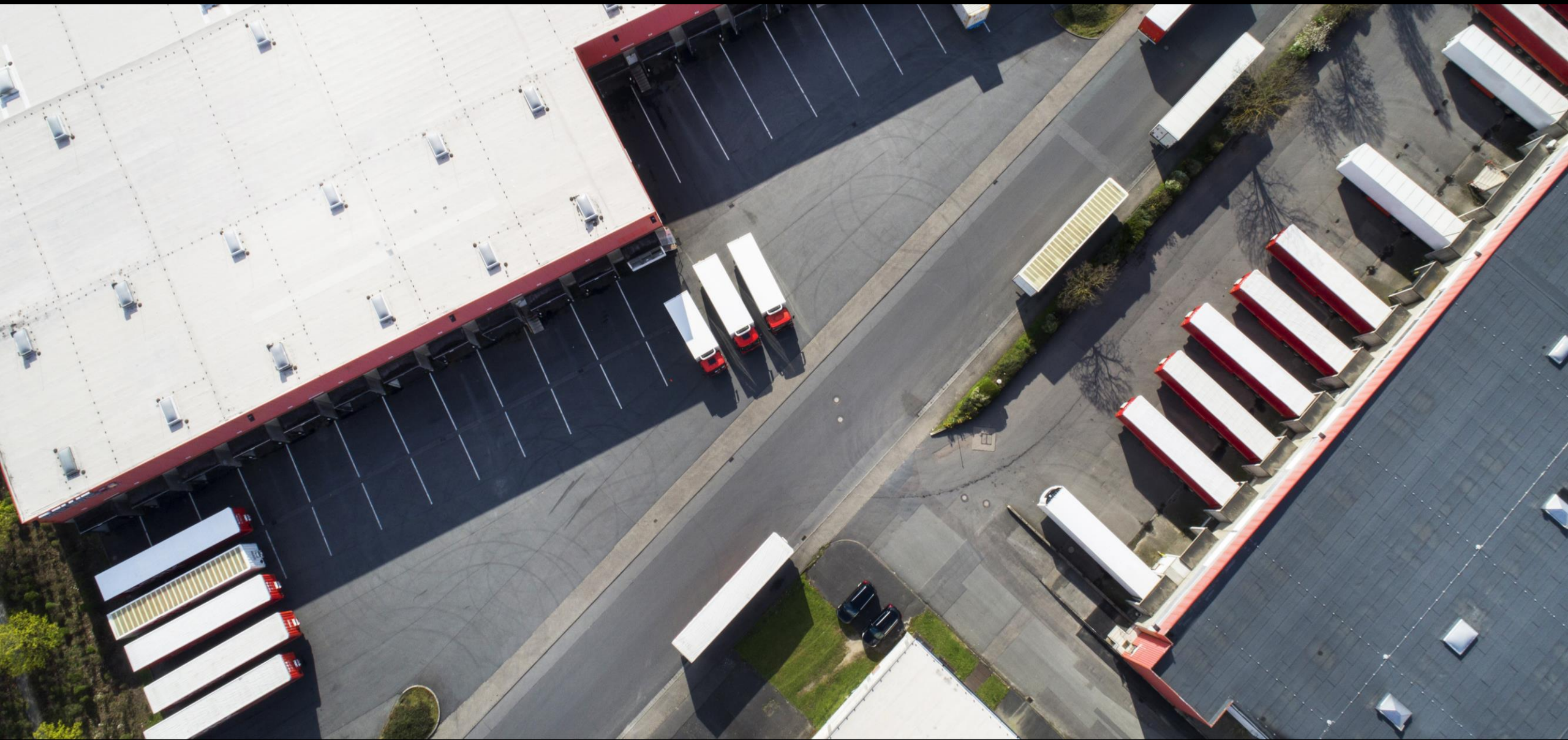
- Different functional specification
 - short to long gaps
 - Level 1 and Level 4
- 100 systems being evaluated at an Army base.
- Production runs of significant volume expected in near future.

Level 4 “Solo Driverless”

Ramp-to-Ramp



Dock-to-Dock



Current Active Truck ADS Players



E/NRIDE



PRONTO

~~K~~odiak

Aurora



tu simple

+ plus.ai



PACCAR

NAVISTAR

TESLA

TRATON

DAIMLER TRUCKS

G R O U P

Solo Driverless Trucking

- Truck ADS startups are operating L4-intent systems on public roads, backed up by safety drivers, supporting system development and testing.
- **Einride**
 - Unique design: Autonomous Electric Transport “pod” with no driver compartment
 - already deployed on public road in Sweden running at low speed (remote operations)
- **Plus**
 - Intelligent trucks powered by Plus.ai’s self-driving system and jointly developed with China’s largest truck maker coming to **production in 2021**.
- **TuSimple**
 - **2021: first driver-out operations** via retrofit
 - 2024: factory built Level 4 trucks
- **OEMs**
 - Daimler and Volvo have initiated internal large programs.
 - Navistar and Traton are partnering with TuSimple.
- Several developers note **significant fuel savings** from automated driving.



Einride Pod

A Harbinger of Things to Come: Plus.ai “Butter Run”



- Land O’Lakes partnered with Plus.ai to complete a hub-to-hub trip from Tulare, CA to Quakertown, PA -- 2,800 miles -- in less than three days.
- First cross-country automated freight run with refrigerated cargo.



Deployment Geography

Deployment Geography – Future Collaboration



Thank You

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