

Preventing Crashes
Saving Fuel
Connecting Trucks



Platooning: Worldwide Activity



EU - Platooning Challenge 2016



Japan - ENERGY ITS 2009-12



EU (Sweden) - SARTRE 2009-Present



Canada - PIT 2009



Germany – KONVOI 2005-09



US – PATH, NREL, etc. '90s and ongoing

Peloton Team



Josh Switkes

Chief Executive Officer



PhD ME –
Vehicle Control



First Audi
Lanekeeping assist



TULA

First employee



Dave Lyons

Chief Innovation Officer



ME, MBA



Employee 12,
Dir. Eng.



Steve Boyd

Government, Public



Asst. Press
Secretary



Producer, Reporter



Chuck Price

Engineering



VP Eng



VP Dev.
Cloud



Butch Winters

Sales, BD



VP GM Global
Alliances



Division President



Garrett Matt

Truck Operations



Program Mgr



Mike Palmer

Research



CTO



PhD CS Caltech, Yale



Oliver Bayley

User Experience Design



Princ. Designer



Interaction Design



Chris Gerdes

Founder

2016 US DOT CIO



Director Center
Automotive Research



Team Lead Vehicle
Dynamics



Peloton Team

KEY POSITIONS

Data Architect
Founder DASH

Network Architect
Cisco Fellow

HW Lead
VW Lead Darpa

User Experience
Navdy, Yahoo

Controls Lead
PhD Stanford

Perception Lead
Volkswagen

Dir. of Research
CTO Inktomi

Systems Lead
Google

BOARD OF DIRECTORS

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Commercial GPS

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Formation Sys

Mark Lydon
Intel Managing Dir.
Internet of Things

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Founder TeleTrac

John Formisano
Former head of FedEx
Express Fleet

Mike O'Connor
Founder Novariant

Dirk Langer
Volkswagen, ASC Lidar



Strategic Investments from Industry Leaders

No Strategic Investor Has Any Exclusivity, Discount, ROFR

Trucking Industry

VOLVO

DENSO



MAGNA

Lytix

Technology and Energy



NOKIA

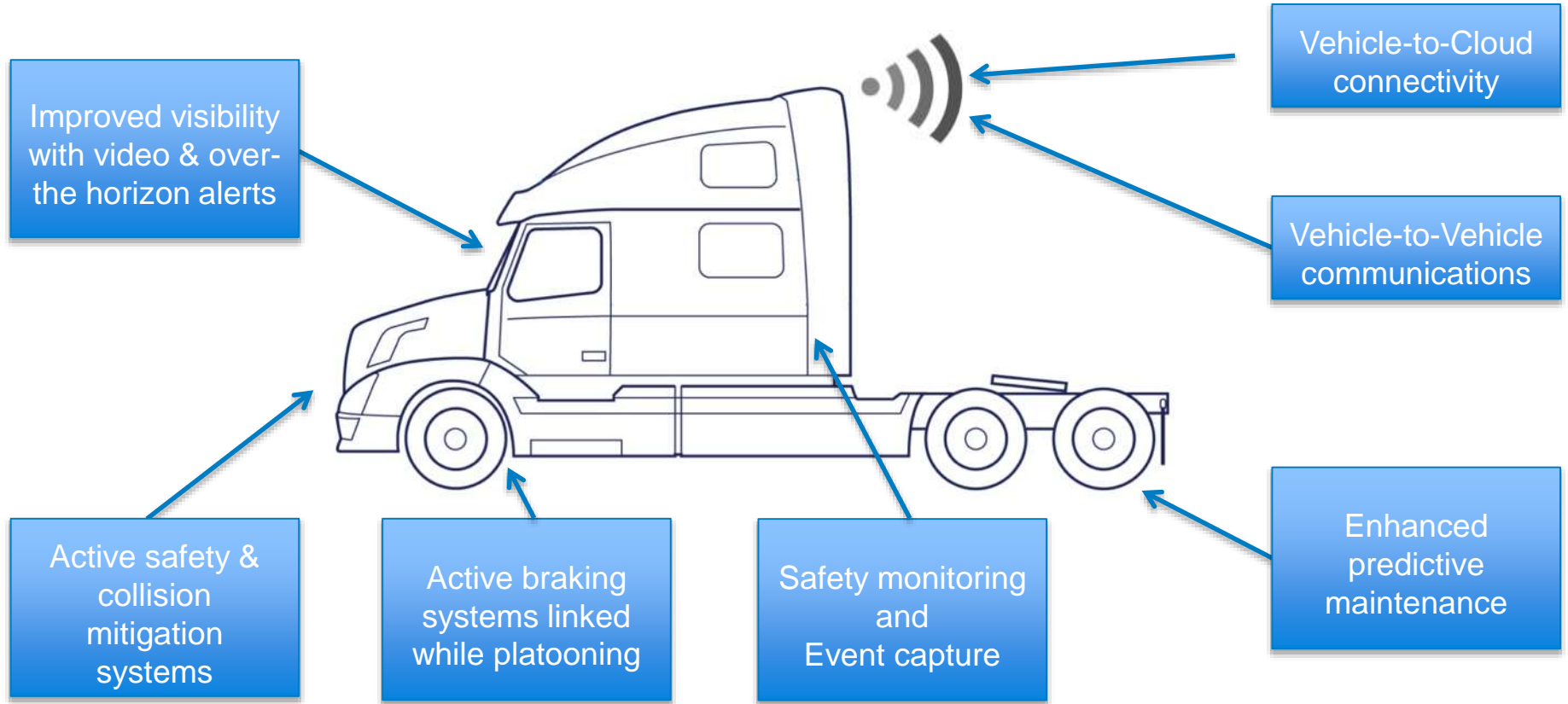


Financial Investors

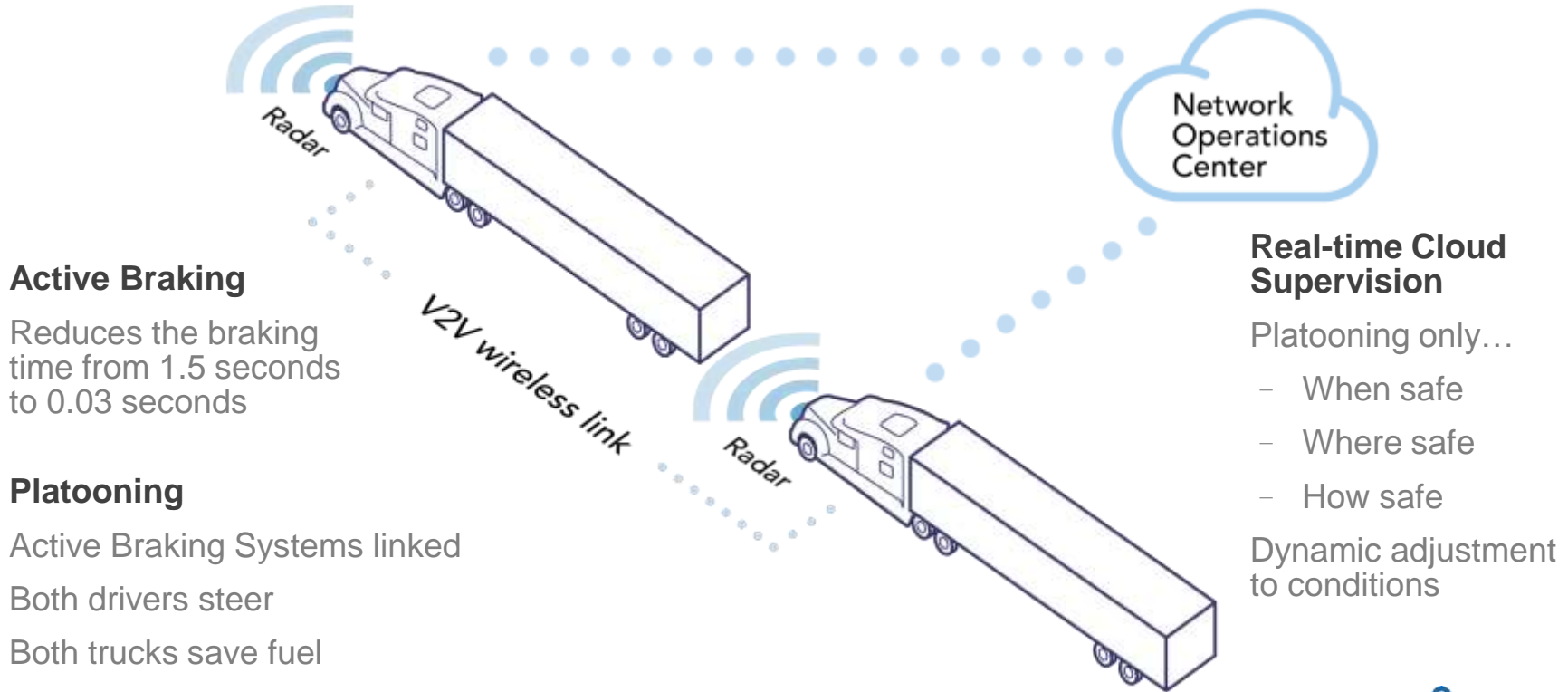


band
OF ANGELS

Making Trucks Safer While Solo & Platooning



Connecting Trucks



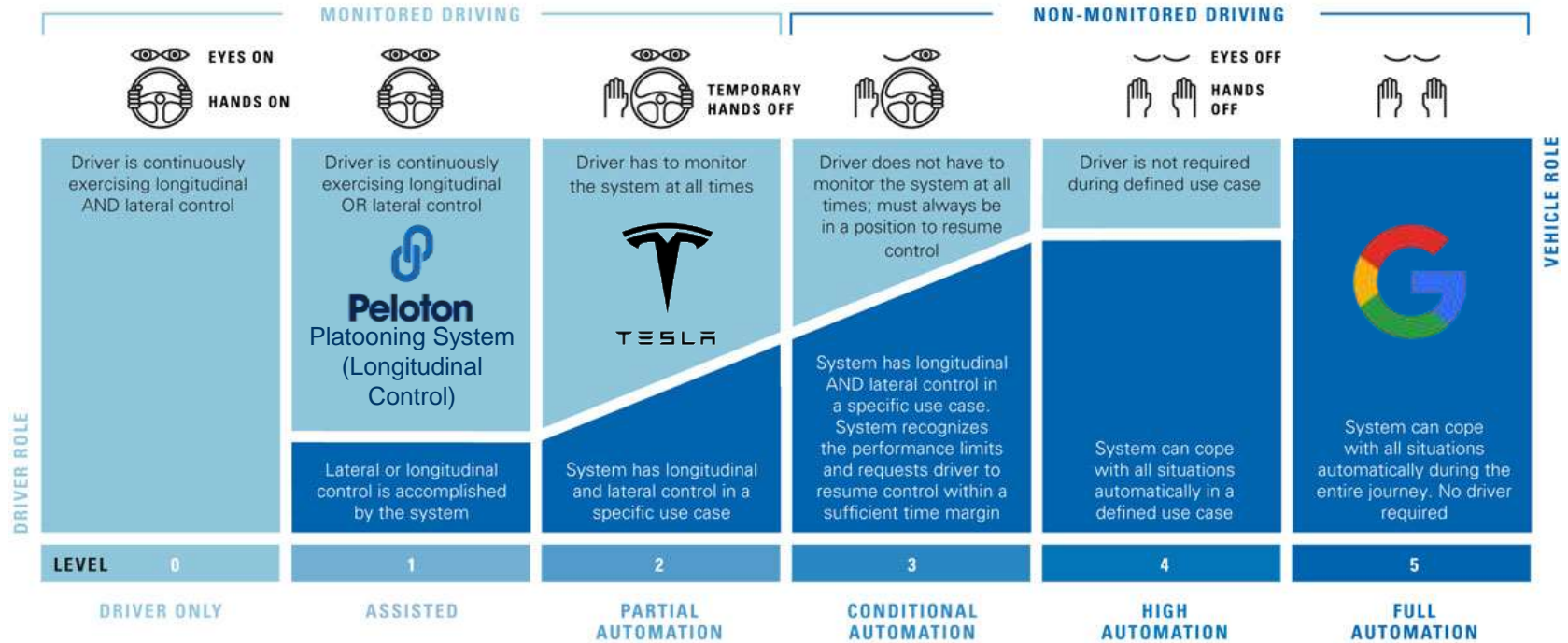
Driver Awareness

Live video from other driver's view

- Look Ahead view of road ahead for rear driver
- Blind Spot view for front driver
- Both drivers in communication to share critical information



Levels of Automation



Graphic courtesy:



Peloton Platooning System



Front Driver:
-Hands on
-**Feet on**
-Eyes/Brain on



Rear Driver:
-Hands on
-**Feet off**
-Eyes/Brain on

Network Operations Center

Internet Data

Traffic
Weather
Work Zones

Vehicle Data

Engine
Drivetrain
Braking

Platooning Sensors

Radar
Video
GPS

NOC

The diagram features a central blue cloud icon with the text 'NOC' inside. Three blue arrows point from the left towards the cloud, originating from boxes labeled 'Internet Data', 'Vehicle Data', and 'Platooning Sensors'. Three green double-headed arrows point from the cloud towards the right, connecting to boxes labeled 'With Drivers', 'With Hwy Operators', and 'With Fleet Managers'. The background is a map of the United States with red lines indicating major highways.

With Drivers

Link Finding
Safety Approvals
Platoon Ordering
Alerts/Warnings

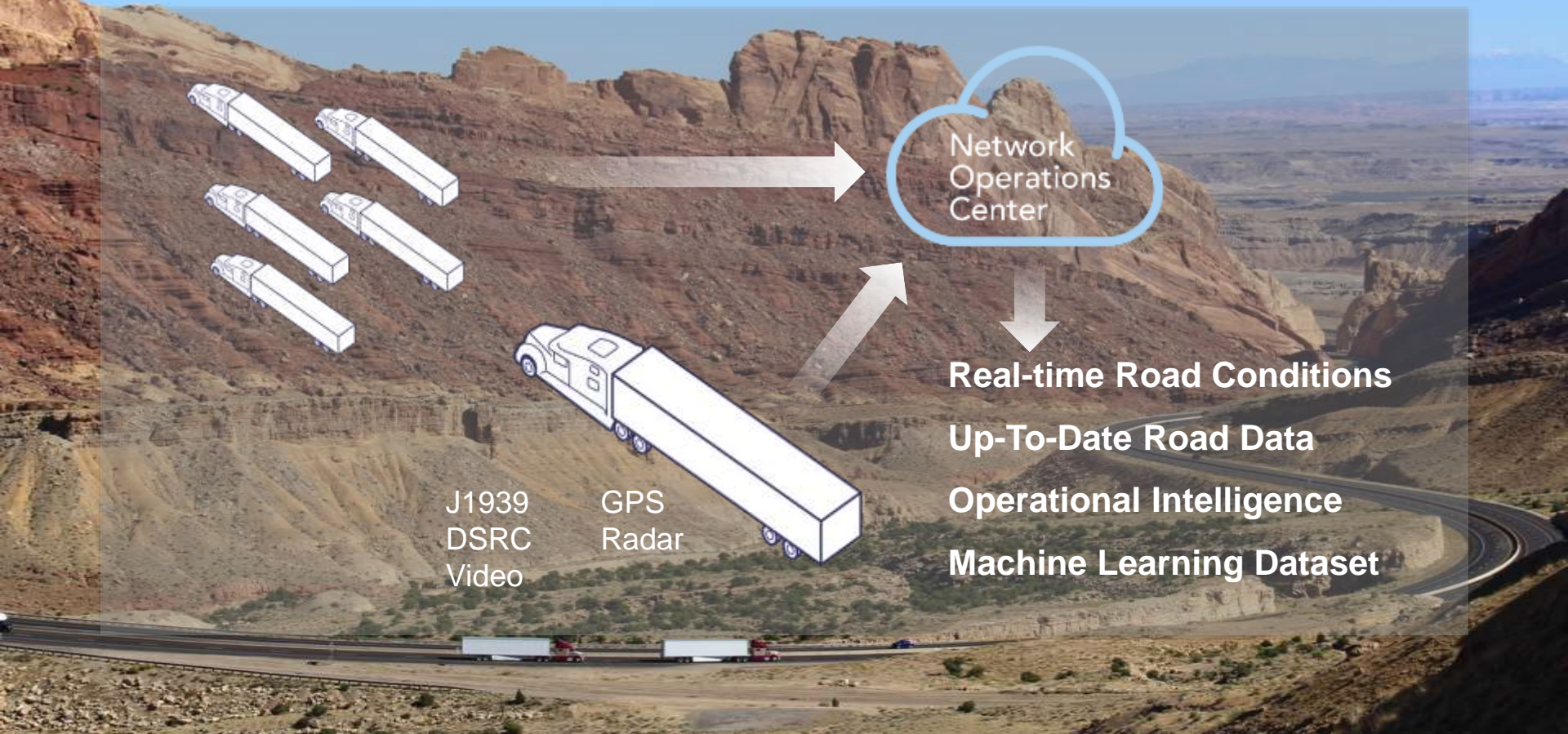
With Hwy Operators

Granular Weather
Hwy Condition
Accident Patterns
Congestion Monitoring

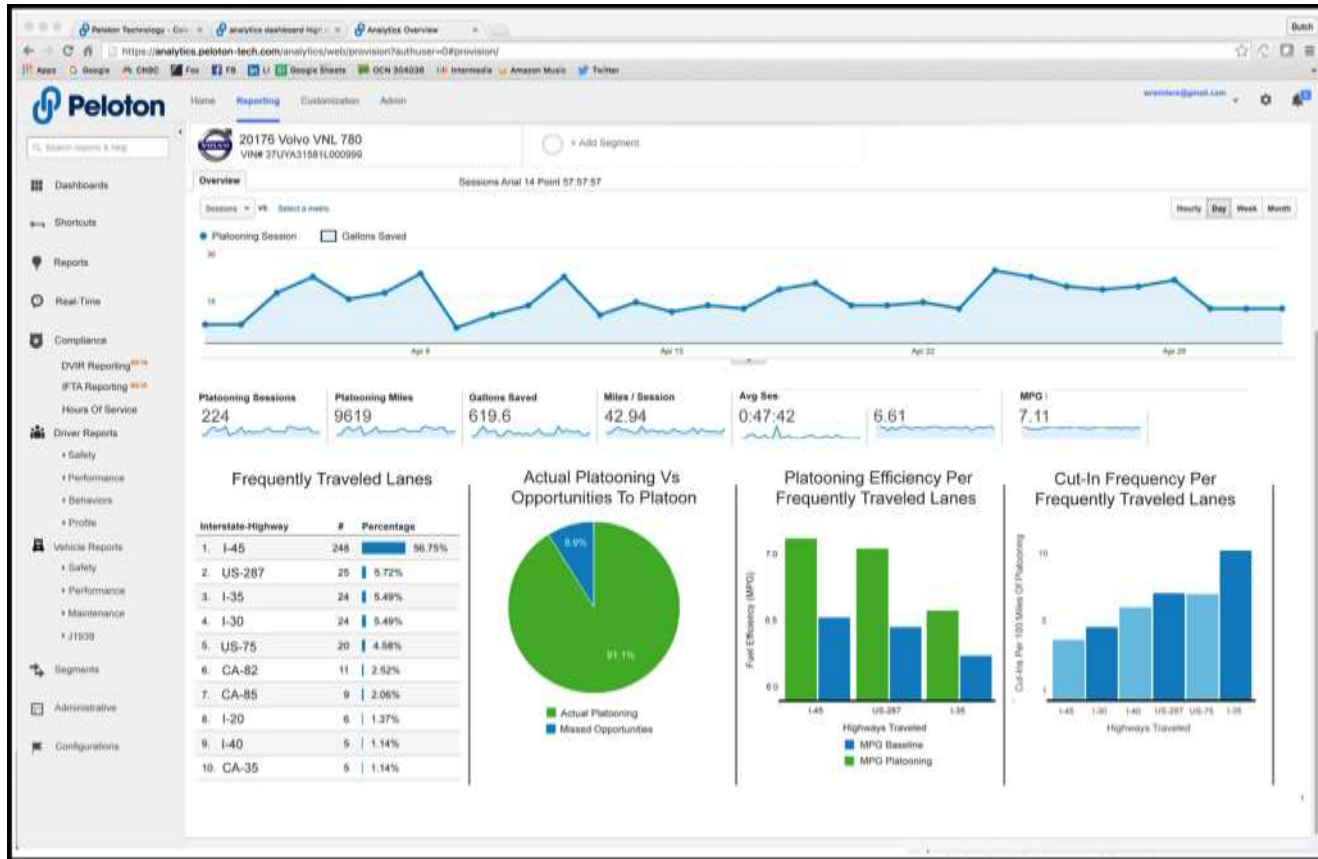
With Fleet Managers

Analytics
Diagnostics
Predictive Maintenance

Data: Massive and Where it Matters



Peloton Platooning System: Reporting



Hard Cost Economics Of Platooning



Fuel savings of 10% on rear truck and 4.5% on front truck

Independently tested with DOE, DOT & NACFE (w/major fleet)

Verified savings at a 40 foot distance traveling 65mph

NREL & FHWA testing showing strong savings at 75 foot+ gap

Platooning Benefits



- **Fuel savings/Range extension**
 - Independent test, 7.5% avg for both trucks
- **Crash reduction and crash congestion-related fuel savings**
 - NTSB: Collision Avoidance Systems could reduce ~80% of rear-end truck crashes
- **Corresponding reduction in GHG & Criteria Pollutant emissions**
- **High quality data generation for fleets & governments**
- **Increased infrastructure efficiency**
- **Economically viable with <1 year payback period for fleets**

Platooning Variations



Near Commercial Systems

- **Number of trucks**
 - Two trucks (Peloton, some EUTPC)
- **Use-Environment**
 - On-highway
 - Urban / Low-speed: ports, DCs, railyards, mines,
- **Levels of automation**
 - L1: longitudinal control only
- **New Infrastructure Requirements**
 - None or limited
 - V2I beneficial but not needed



Research Systems

- **Number of trucks**
 - Three trucks (some EUTPC, PATH)
 - Four+ (SARTRE, Japan Energy ITS)
- **Use-Environment**
 - On-highway
 - Urban/Low-speed: ports, DCs, railyards, mines, military convoys
- **Levels of automation**
 - L2+: lateral + long. control (some EUTPC, TTI-Navistar, others)
- **New Infrastructure Requirements**
 - Dedicated lanes may assist deployment
 - V2I may assist deployment

Facts on the Ground

US Freight Trucking: \$700 Billion in Revenues

- Fuel Cost: **\$100+ Billion for nearly 30 billion gallons of fuel**
 - **33%+ Operating Costs**
- Accident Cost: **\$90+ Billion and 113 million gallons of fuel**
- Industry Net Profit: **3%**

Canada Freight Trucking: \$65 Billion in Revenues

- Preventing Accidents
 - Saving Fuel
 - Improving Decisions
- 
- Enhanced
Fleet Economics
& Safety

*Platooning accelerates the payback period for
collision mitigation and advanced safety technology*

Many Trucks Travel in Packs Today

LTL (Less than TruckLoad) Fleets:

Trucks travel hub-hub in packs by nature of operations



Private fleets:

Trucks travel in packs on high density corridors



Truck Load fleets:

Growing trend toward relay style operations w/ trucks in packs



US Freight Arteries



Government Engagement & Partnerships

Demonstrating platooning with fleets, establishing best practices & creating deployment pathway

Federal	States
<ul style="list-style-type: none">• Two USDOT projects (CalTrans/PATH/Volvo & Auburn/Peterbilt)• Partners on DOE Supertruck II, USDOT Smart City Challenge (Smart Columbus)• 2 Pending applications to ARPA-E NEXTCAR	<ul style="list-style-type: none">• Demonstration activity in 7 states (UT, NV, MI, FL, CA, TX, OH, more to come)• Testing and Trials approved in 10 states (CA, NV, UT, TX, MI, OH, VA, AL, FL, TN)• High Interest in 20 more states (WA, OR, ID, AZ, NM, CO, WY, MT, ND, KS, OK, IA, AR, LA, MS, TN, WI, NC, PA, NY)• Projects incl CEC Port of San Diego

Funded Projects with:



Thank You



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