



Future Truck

Future Technologies on the Horizon
The growth and risk of electronics
Telematics and the ELD mandate
Securing the data bus is paramount



Thank you!

We appreciate the opportunity

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What is already upon us Rolling DATA CENTERS

- J1587/J1708 was the start of Vehicle Electronics in Heavy Trucks. The industry outgrew it in just over a decade. Transmitted 960 characters per second (9600 baud) over a twisted pair (that's how your office network is wired, too).
- J1939 came of age at varying dates and "levels" following 2004. Data communication speeds (aka bandwidth) jumped to 256,000 baud (256K)
- J1939 is now 512K and the industry is moving two offering TWO J1939 networks – public and private (Business Link versus Vehicle Performance, if you will)
 - That's over 53 times faster than the FIRST network...and now we are going to a SECOND network

What is already upon us Newer equipment and capability

- Alphabet soup.
 - The addition of DEF and DPF and DOC have created substantially more traffic on the Bus
- Automated and automatic transmissions increased the need for drive-train communications – MORE POWER, SCOTTY!
- Adaptive Cruise and Collision Mitigation increased safety and increased the load on the Bus







What challenges are presented

- Managing all the various Fault Codes is now a major task
 - Fault Code severity must be determined and Fault “frequencies” managed
 - Large fleets have found a need to increase staffing to properly maintain the fleet
 - Over 90% success in predicting which trucks needed to come in for service
 - Drivers more satisfied. Freight moves more predictably. Costs are reduced!
- The need to secure the Bus is now at the forefront
 - We ARE running a network in every truck
 - Your fleet really could be held hostage

What’s a “regen”? 3 requests in 2 days

- If you don’t clean the lint out of the clothes dryer, you WILL pay in energy consumption and COULD have a fire...
 - Vehicle 1579595 04/29/16 09:29 Diesel Particulate Filter Cape Coral, FL;
Regeneration Requested
 - Vehicle 1579595 04/28/16 09:56 Diesel Particulate Filter Cape Coral, FL;
Regeneration Requested - TWO FULL GALLONS
 - Vehicle 1579595 04/28/16 00:57 Diesel Particulate Filter Punta Gorda, FL;
Regeneration Requested

Sample Faults Managed to prevent roadside failure

 SPN3719 - FMI0 (5)	DPF Soot Load - Highest (level 3/3)
 SPN3246 - FMI3 (1)	DPFOT Signal Out Of Range HIGH
 SPN3251 - FMI4 (1)	DPFDP signal Out of Range LOW
 SPN3719 - FMI16 (7)	DPF Soot Load - Moderate (level 2/3)
 SPN4765 - FMI3 (1)	DOCIT signal Out of Range HIGH
 SPN4766 - FMI3 (1)	DOCOT signal Out of Range HIGH

Let's change channels Vehicle to Driver and Ops

Operational impacts

Safety Impacts

What's the risk?

- The data Bus was defined as an "open platform". It is fully and openly documented. ANYONE has access to learn how it works!
- If a USB charging port or a Bluetooth connection is a part of the radio (infotainment) system, and if that system can detect motion there is a strong possibility malware from any attached device (drivers phones, for example) can be moved to the Bus or (maybe) the ECU.
 - The Chrysler Jeep incident proves this CAN be done REMOTELY
 - Want to route a driver to the WRONG customer site? That bit of malware may be even MORE feasible.

What is coming up, FAST!

- Telematics systems (at some level) are now a requirement.
 - ELD compliance is required by January of 2018 even in fleets that are already using AOBRDs (Automatic On Board Recording Devices)
 - Newly acquired trucks must be ELD compliant
 - Fleets will have 8 days to repair issues impacting a drivers log
 - A driver may only use paper for 8 days in a rolling 30 day window absent a waiver from USDOT
- Fleets using systems provided by multiple vendors will have a really tough time
 - The ELD rules do NOT require interoperability

Now – we change gears Future Truck Technologies

Duke Drinkard chairs the TMC Future Truck Committee

What's coming up more SLOWLY

- We can do anything if we throw enough money at it, but we must consider Technology for the sake of technology is likely NOT a benefit
- Technician training
 - Interactive Video – Pac Man
 - Video immersion – Goggles – no physical control of reality
 - Augmented Reality – Iron Man glasses
 - Virtual Reality – “really” repair an “imaginary truck/component”

What's coming up more SLOWLY

- S-1 Truck Electrical
 - Higher Voltage Platform
 - Drive/Steer by wire
 - Electric Motor Transaxle – Regenerate and capture power while braking (Prius)
 - Wireless Powered Signals – Do you have an electric toothbrush?
 - Transferring power over-the-air

What's coming up more SLOWLY

- S-2 Tire and Wheel Innovations
 - Airless Tires
 - Tire Dimensioning
 - Frictionless Wheel Ends
- S-3 Engines
 - Waste Heat Recovery
 - Hydrogen Fuel Cell
 - Micro turbine Power
 - Low-Carbon Intensity Biofuels – Examine from cradle to grave

What's coming up more SLOWLY

- S-4 Cab and Controls
 - Driver-dynamic seats – Women in trucking
 - Cab insulation – comfort and fuel economy
 - Forward Lighting – computer-controlled LED
 - 360 Degree Driver Awareness
- Automated/Autonomous Driving
 - Platooning – up to you!
 - Trucks running together with an electronic tow bar

What's coming up more SLOWLY

- S-5 Fleet Maintenance Management
 - Vehicle to shop connectivity
 - ECU update? Detailed data from an issue?
- Sensor-Enhanced Maintenance
 - IT staff needed for the data centers called trucks
 - Tread Depth monitoring
 - Air line monitoring

What's coming up more SLOWLY

- S-6 Chassis and Brakes
 - Ferromagnetic suspension fluid – SMOOTH ride
- S-7 Trailer, body and material handling
 - High strength-to-weight structural composites
 - Solar roof panels or regenerative braking?
 - Need STORAGE
 - Auto-weight sensing distribution

What's coming up more SLOWLY

- S-11 Sustainability & Environmental Technology
 - Thermo-depolymerization / Out-gassing – Film on windshield
 - Alternative-powered shops & fleet facilities
 - V2I road energy
- S-12 On-board vehicle electronics
 - Remote wireless diagnostics – Check Engine lights
 - Over the air programming of the truck ECU(s)
 - Vehicle to everything (V2X)

Thank you! Questions???

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