



ELECTRONIC FLEET MANAGEMENT

www.zonarsystems.com

RFID Sensors in Transportation

Passive Wireless Sensor-Tag Workshop

Ron Stieger

Zonar Systems | July 28, 2010



Vehicle Inspection

Post-trip report mandated by Federal Motor Carrier Safety Administration

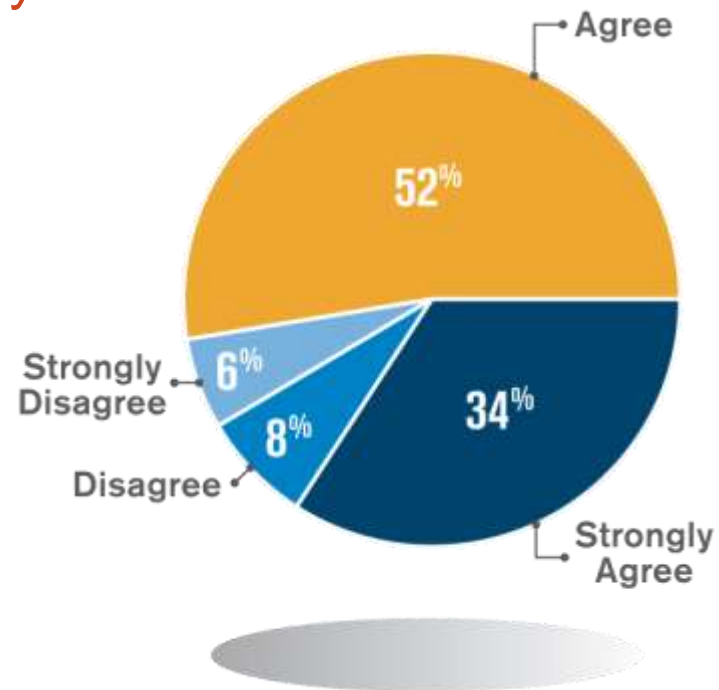
DRIVER'S VEHICLE INSPECTION REPORT <small>AS REQUIRED BY THE D.O.T. FEDERAL MOTOR CARRIER SAFETY REGULATIONS</small>		
CARRIER: _____		
ADDRESS: _____		
DATE: _____	TIME: _____	A.M. _____ P.M. _____
<small>CHECK ANY DEFECTIVE ITEM AND GIVE DETAILS UNDER "REMARKS"</small>		
TRACTOR/ TRUCK NO. _____	ODOMETER READING _____	
<input type="checkbox"/> Air Compressor <input type="checkbox"/> Air Lines <input type="checkbox"/> Battery <input type="checkbox"/> Body <input type="checkbox"/> Brake Accessories <input type="checkbox"/> Brakes, Parking <input type="checkbox"/> Brakes, Service <input type="checkbox"/> Clutch <input type="checkbox"/> Coupling Devices <input type="checkbox"/> Defroster/Heater <input type="checkbox"/> Drive Line <input type="checkbox"/> Engine <input type="checkbox"/> Exhaust <input type="checkbox"/> Fifth Wheel <input type="checkbox"/> Frame and Assembly <input type="checkbox"/> Front Axle <input type="checkbox"/> Fuel Tanks <input type="checkbox"/> Generator	<input type="checkbox"/> Horn <input type="checkbox"/> Lights <input type="checkbox"/> Head - Stop <input type="checkbox"/> Tail - Dash <input type="checkbox"/> Turn Indicators <input type="checkbox"/> Mirrors <input type="checkbox"/> Muffler <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Radiator <input type="checkbox"/> Rear End <input type="checkbox"/> Reflectors <input type="checkbox"/> Safety Equipment <input type="checkbox"/> Fire Extinguisher <input type="checkbox"/> Reflective Triangles <input type="checkbox"/> Flags - Flares - Fuses <input type="checkbox"/> Spare Bulbs & Fuses <input type="checkbox"/> Spare Seal Beam	<input type="checkbox"/> Suspension System <input type="checkbox"/> Starter <input type="checkbox"/> Steering <input type="checkbox"/> Tachograph <input type="checkbox"/> Tires <input type="checkbox"/> Tire Chains <input type="checkbox"/> Transmission <input type="checkbox"/> Wheels and Rims <input type="checkbox"/> Windows <input type="checkbox"/> Windshield Wipers <input type="checkbox"/> Other _____
TRAILER(S) NO.(S) _____		
<input type="checkbox"/> Brake Connections <input type="checkbox"/> Brakes <input type="checkbox"/> Coupling Devices <input type="checkbox"/> Coupling (King) Pin <input type="checkbox"/> Doors	<input type="checkbox"/> Hitch <input type="checkbox"/> Landing Gear <input type="checkbox"/> Lights - All <input type="checkbox"/> Roof <input type="checkbox"/> Suspension System	<input type="checkbox"/> Tarpaulin <input type="checkbox"/> Tires <input type="checkbox"/> Wheels and Rims <input type="checkbox"/> Other _____
Remarks: _____ _____ _____ _____ _____		
<input type="checkbox"/> CONDITION OF THE ABOVE VEHICLE IS SATISFACTORY		
DRIVER'S SIGNATURE: _____		
<input type="checkbox"/> ABOVE DEFECTS CORRECTED:		
<input type="checkbox"/> ABOVE DEFECTS NEED NOT BE CORRECTED FOR SAFE OPERATION OF VEHICLE		
MECHANIC'S SIGNATURE: _____ DATE: _____		
DRIVER'S SIGNATURE: _____ DATE: _____		
ORIGINAL		

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Challenge: Inspection Compliance

Pre-trip and post-trip inspections are often performed **inadequately**.



Zonar EVIR®

Electronic Vehicle Inspection Report



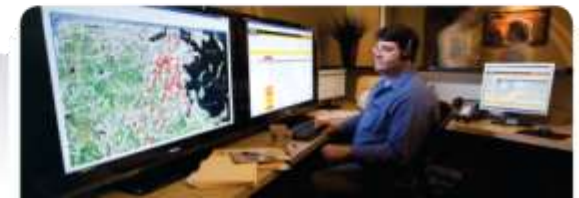
- Zonar's RFID tags are placed on the vehicle in critical inspection zones
- Using Zonar's 2010 inspection tool, drivers place reader near tag and indicate condition of components in the zone
- Guarantees actual inspection, but still limited to visual



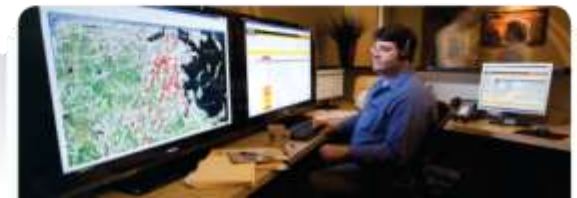
Beyond Inspection – with PWST



- Not only visual, but actually collect measurements
- On every inspection!
- Beyond legal compliance to provide alerts for maintenance requirements



What can we measure?

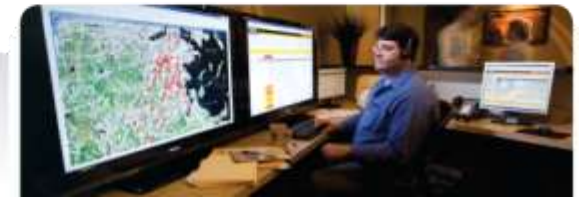


What would we like to measure?



Odometer

- Need calibration for tire size
- Can passive sensor include accumulator?

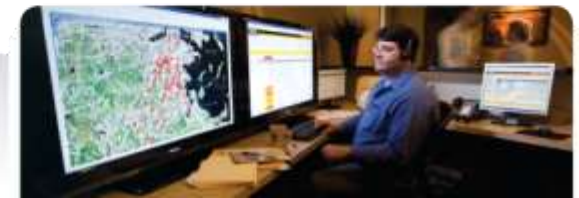


What would we like to measure?



Tire pressure

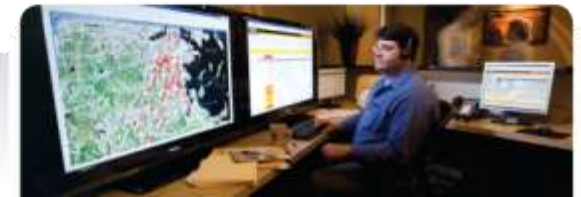
- Active devices common in passenger vehicles



What would we like to measure?



Payload weight



What would we like to measure?



Photo credit: Chip Muckenhirn

Battery voltage on trailers

- Not passive!



What would we like to measure?

Temperature

- Engine
- Refrigerated truck



Photo credit: Thomas Cizauskas



What would we like to measure?

Photo credit: Stephen Petit



Brake stroke



What would we like to measure?

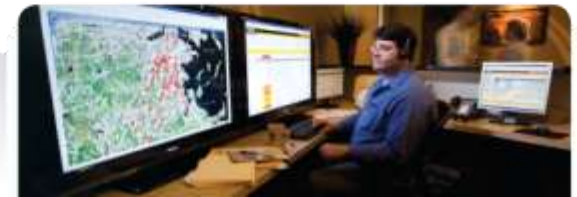
Fluid levels

- Fuel
- Oil
- Other



Summary of Benefits

- Improved vehicle safety
- Reduced maintenance costs
- Lower costs/complexity compared to existing active sensors



Questions and Answers

