

# Challenge: Targets



# Example – Target Patterns

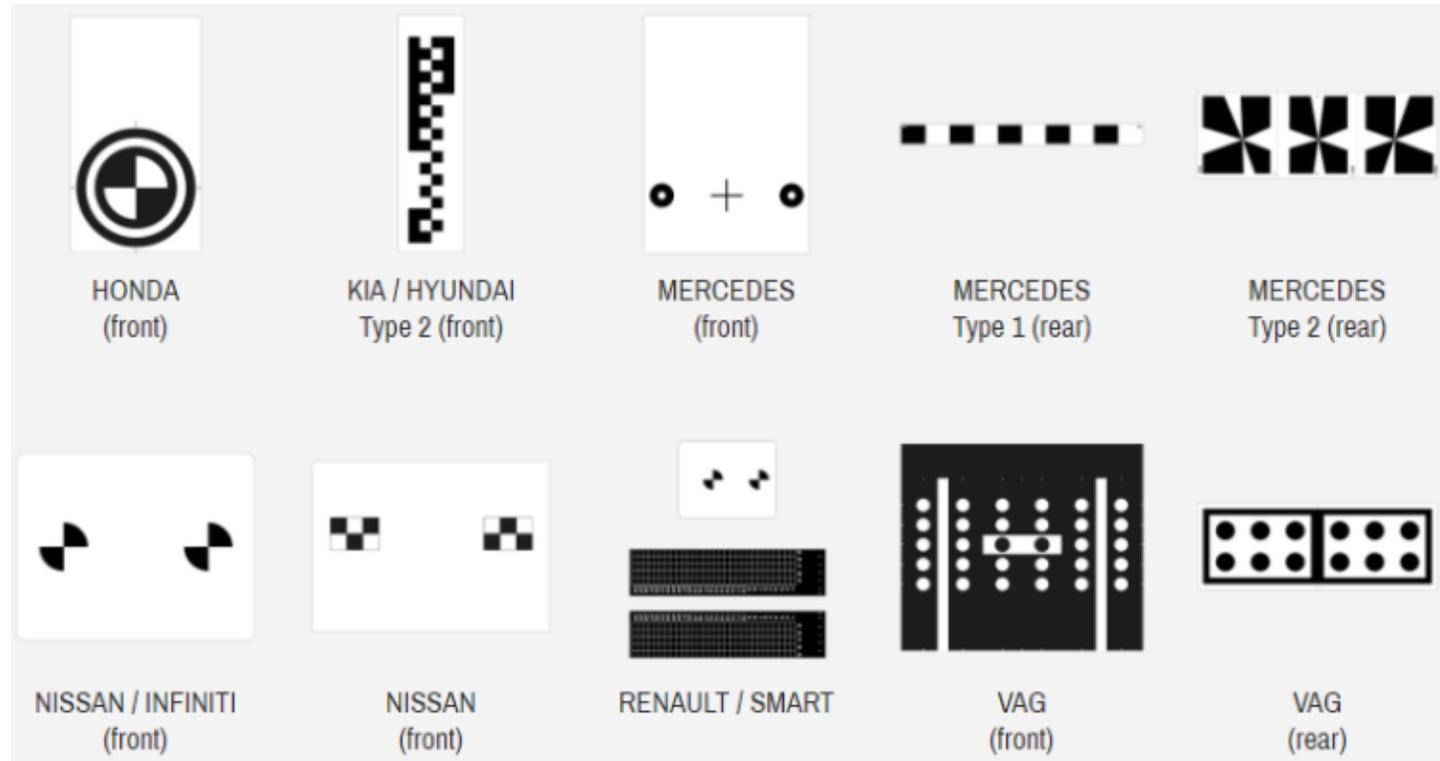
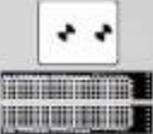
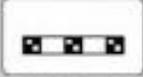
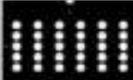


Figure 7. Typical ADAS camera aiming targets – VAG indicates Volkswagen/Audi Group. (Image: TEXA)

# TEXA ADAS kit: a complete range for vehicle safety

The TEXA ADAS kit lets you work with maximum precision on vehicles equipped with video cameras (front and rear) and radar to restore the correct functioning of these driver assistance systems.

-  KIA/HYUNDAI Type 2  
FIAT 500X  
JEEP RENEGADE  
(front)
-  HONDA  
(front)
-  HONDA Type 2  
(front)
-  MAZDA  
(front)
-  NISSAN/INFINITI  
(front)
-  NISSAN  
(front)
-  RENAULT/SMART
-  TOYOTA Type 1  
(front)
-  TOYOTA Type 3-2  
(front)
-  MERCEDES  
(front)
-  MERCEDES Type 1  
(front)
-  MERCEDES Type 2  
(rear)
-  MERCEDES  
NIGHT VISION  
(front)
-  VAG  
(front)
-  VAG  
(rear)
-  ALFA GIULIA  
(front)
-  MAT PLUS  
Universal calibration  
mat with laser levels



# Bosch DAS 1000 Calibration Set





# Example – 360 camera calibration



# Example – 360 camera calibration



# Autel Maxisys ADAS

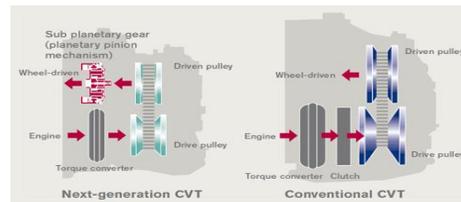


# Mahle ADAS Calibration Kit

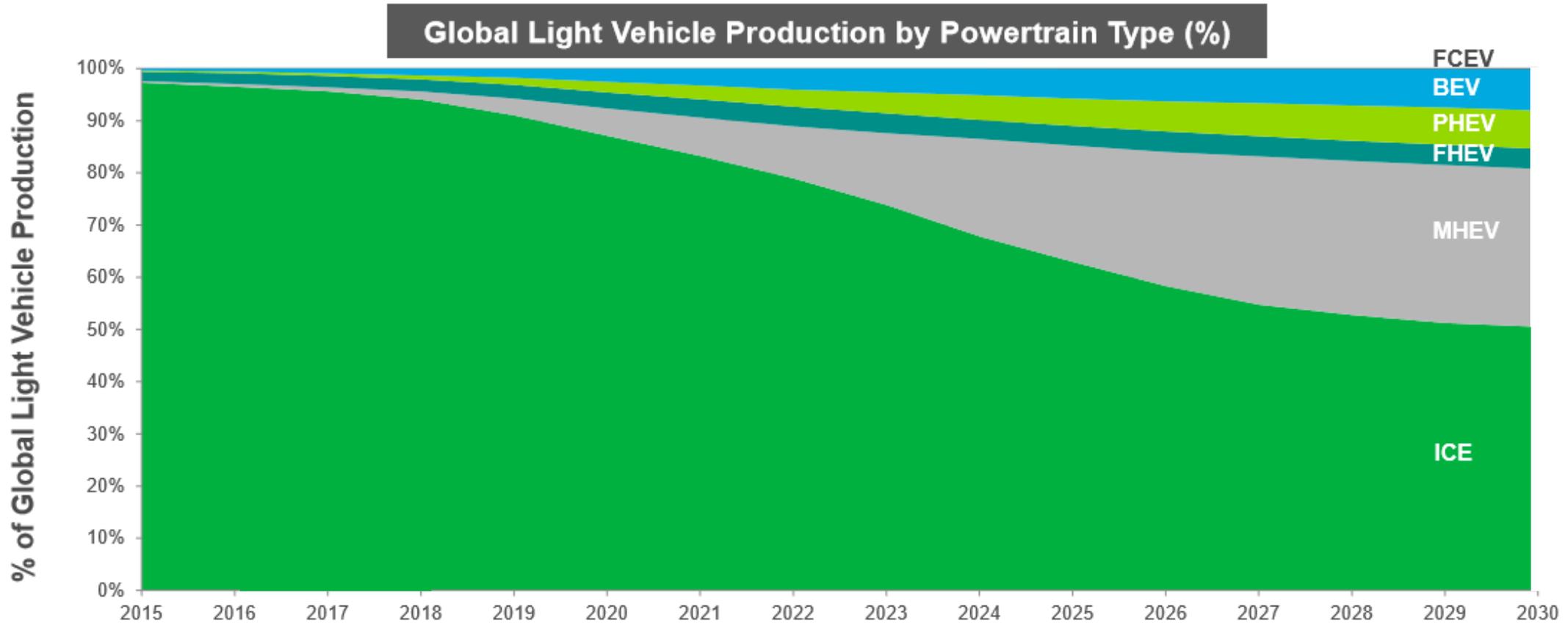


# Revising the Traditional Internal Combustion Engine *(ICE)*

- Gasoline direct-injection
- Turbo chargers
- Stop/start capability
- Cylinder de-activation
- AWD disconnect
- More efficient transmissions
  - more speeds and CVTs



# Global Powertrain Technology Trends



ICE: Internal Combustion Engine & Stop/Start  
MHEV: Mild Hybrid Electric Vehicle

FHEV: Full Hybrid Electric Vehicle  
PHEV: Plug-in Hybrid Electric Vehicle

BEV: Battery Electric Vehicle  
FCEV: Fuel-Cell Electric Vehicle

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Source: IHS Markit – 2018 Forecast

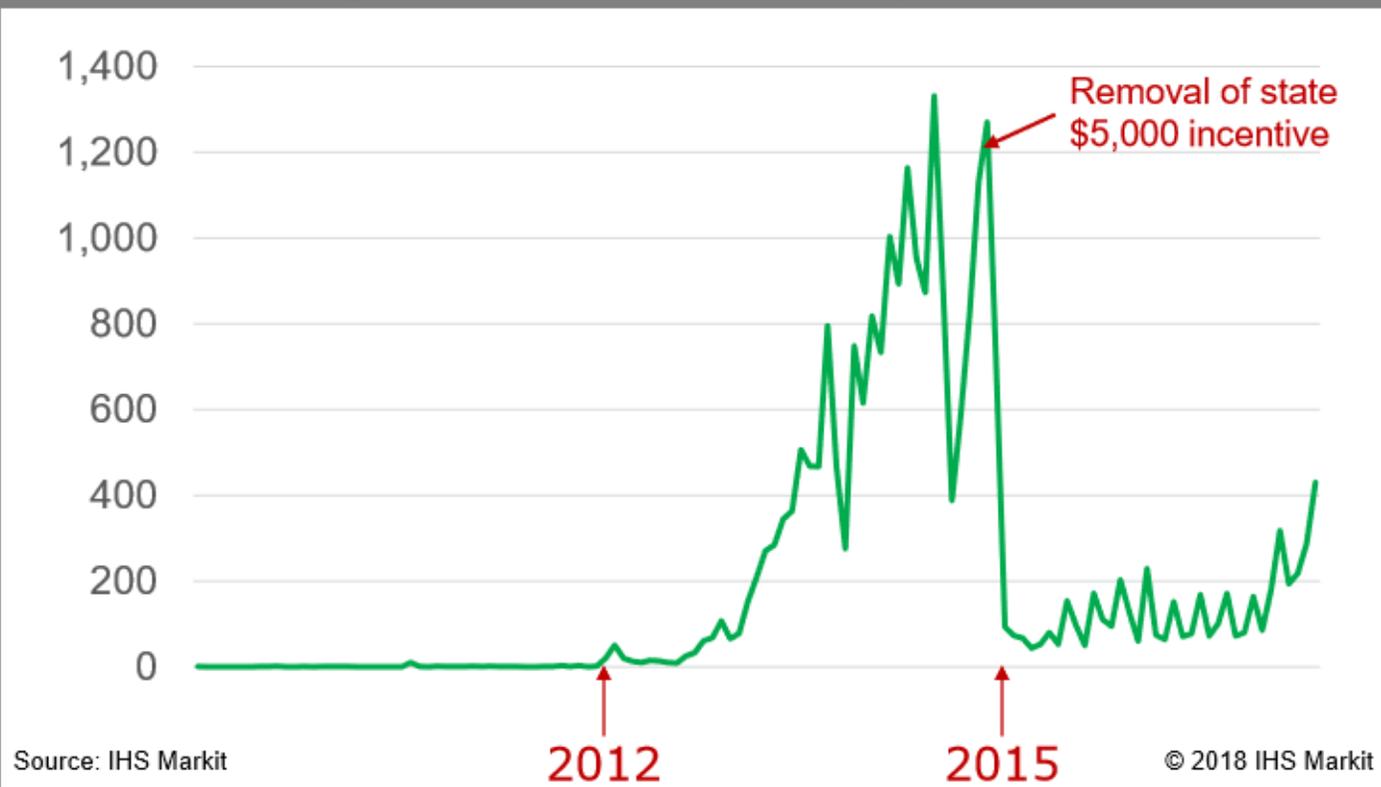
# New technology applied to I.C.E. leads technology investments

Technology Baseline Assumptions		
IHS Markit 2025 US Technology Assumptions (Baseline Forecast)	IHS Markit 2018 US Technology Assumptions (H1 2018 Forecast)	IHS Markit 2025 US Technology Assumptions (H1 2018 Forecast)
Super/Turbocharging	31.2%	54.9%
Cylinder Deactivation (including Dynamic Skipfire)	11.2%	15.8%
Advanced Trans (>6 speeds +CVTs+EVTs)	73.4%	90.7%
12V Start Stop	22.4%	60.3%
Mild HEV	0.3%	10.7%
Full HEV	2.5%	4.4%
PHEV	0.7%	5.5%
BEV	0.7%	4.6%

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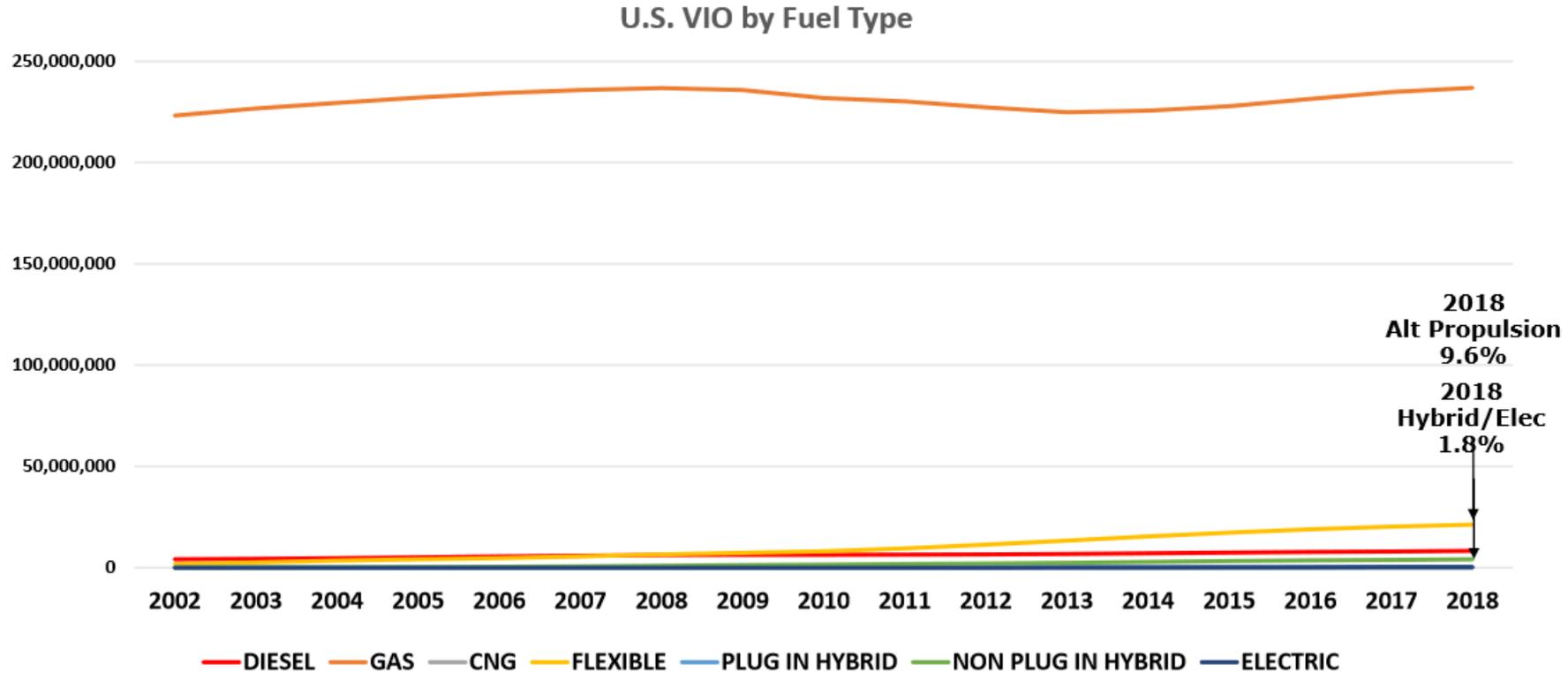
# Incentives Supporting EV Sales are Drying Up

EV Sales in Georgia – 10 Yr History of Monthly Sales – 2008-2018



- GM and Tesla are running out of federal \$7,500 credits within the next few months.
- Ford and Nissan are 12-18 months from the same position.
- Will they continue to be able to sell electric vehicles as a core compliance strategy or will other technology need to proliferate?

# Electric Vehicles Remain non-factor as part of VIO

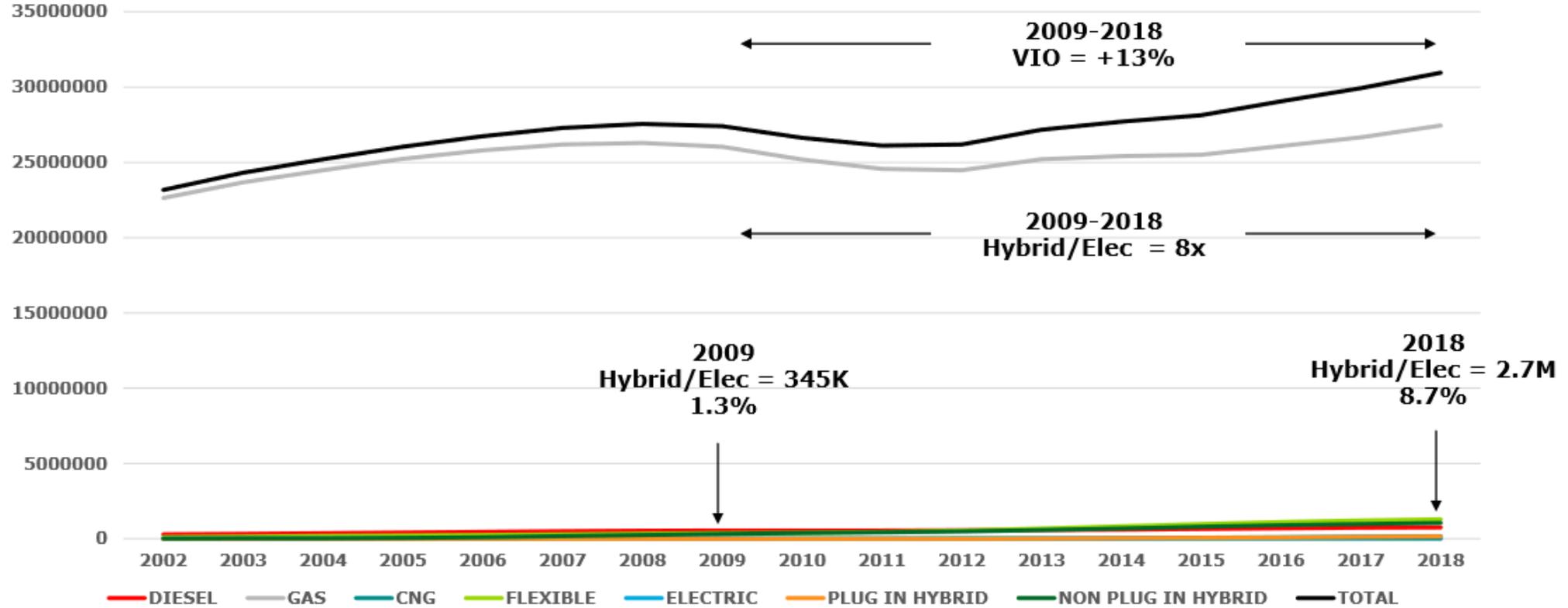


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Source: IHS Markit

# Even in California!

California Light Vehicles by Fuel Type



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Source: IHS Markit

# 48 Volt is (finally) coming!

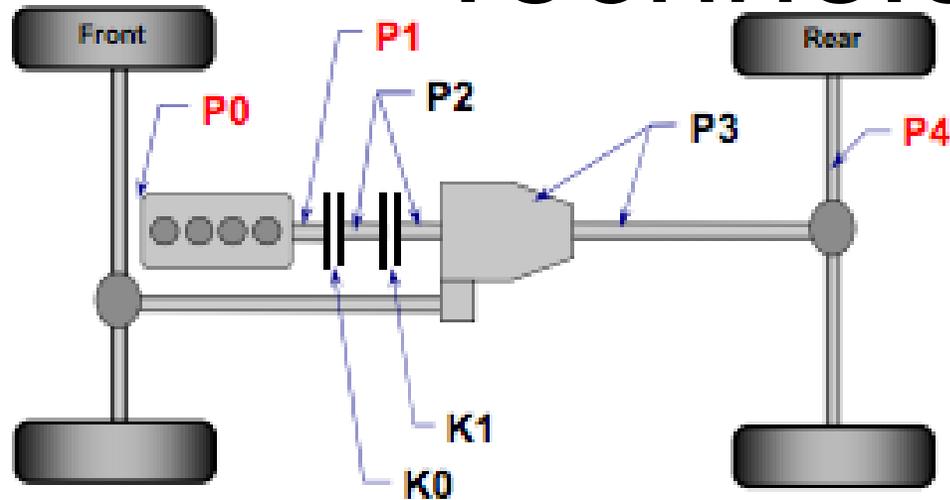


The Bentley Bentayga and Audi SQ7 TDI utilize the 48-volt system today – expected to spread into the mainstream in coming years

# 48v Enables...

- Electric sway bar systems for better handling
- Fans, pumps, electric power steering racks, compressors all running more efficiently
- Benefits to wire-harness size and weight (smaller and lighter)
- Potential to drive a car under only electric power and run AC without the engine on can result in major fuel economy and comfort-related benefits
- Quickly heat up a catalyst in a diesel exhaust system to reduce emissions

# 48v – Enabling new hybrid Technologies



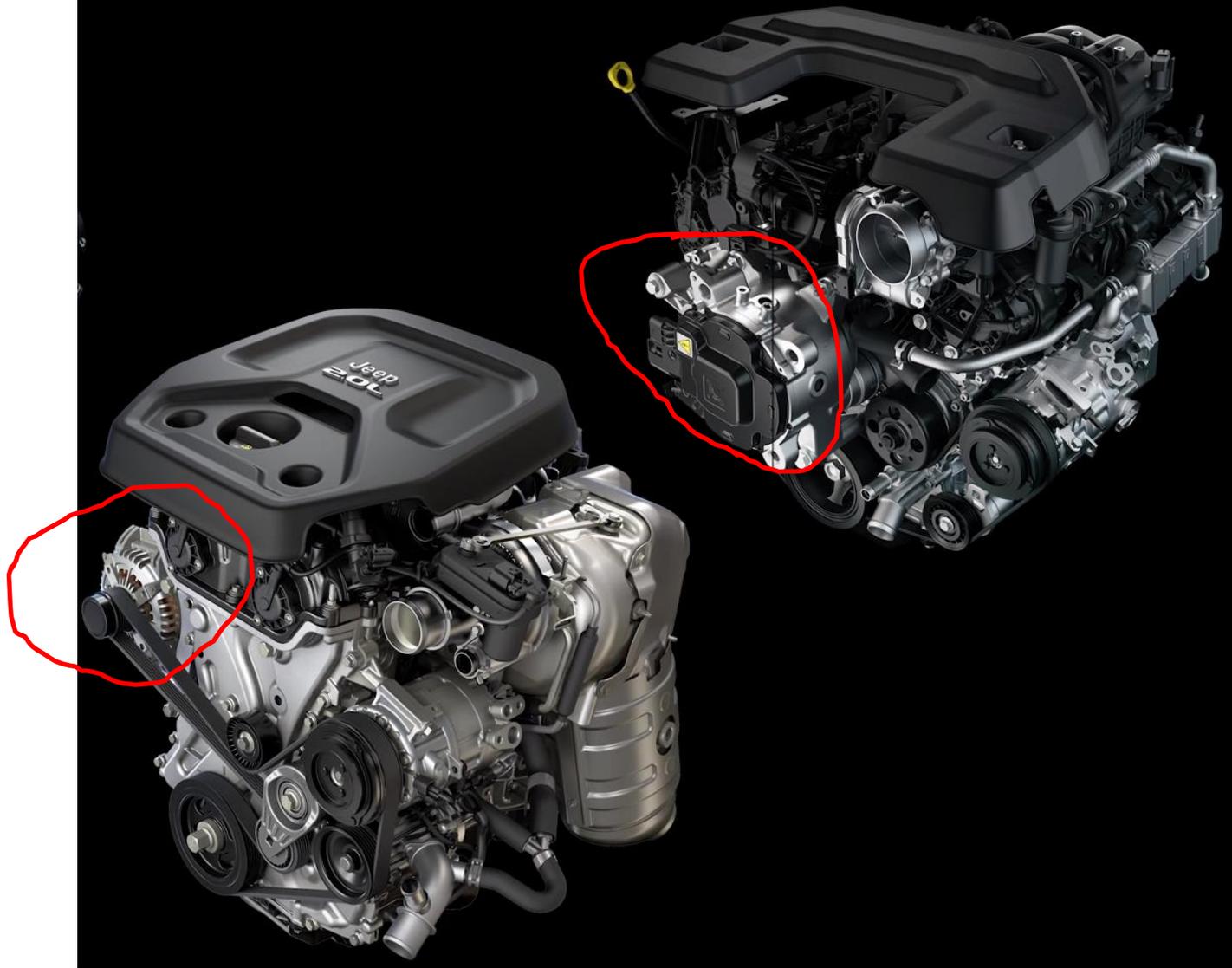
- P0 = Belt driven Starter Generator (BSG)**
- P1 = Crankshaft mounted E-machine (CSG)**
- P2 = E-Machine on the gear input**
- P3 = E-Machine on the gear output**
- P4 = Axle Drive**

BSG/CSG can be used for low speed commutes. P2 has been used in the RWD Honda Civic Hybrid. With 100% efficiency, 150hp and 100kWh, P2 can be used for 100% of the time. P3 has been used in the RWD Honda Civic Hybrid. With 100% efficiency, 150hp and 100kWh, P3 can be used for 100% of the time. P4 has been used in the RWD Honda Civic Hybrid. With 100% efficiency, 150hp and 100kWh, P4 can be used for 100% of the time.

# MHEV Vehicles

Wrangler and Ram  
Go Hybrid

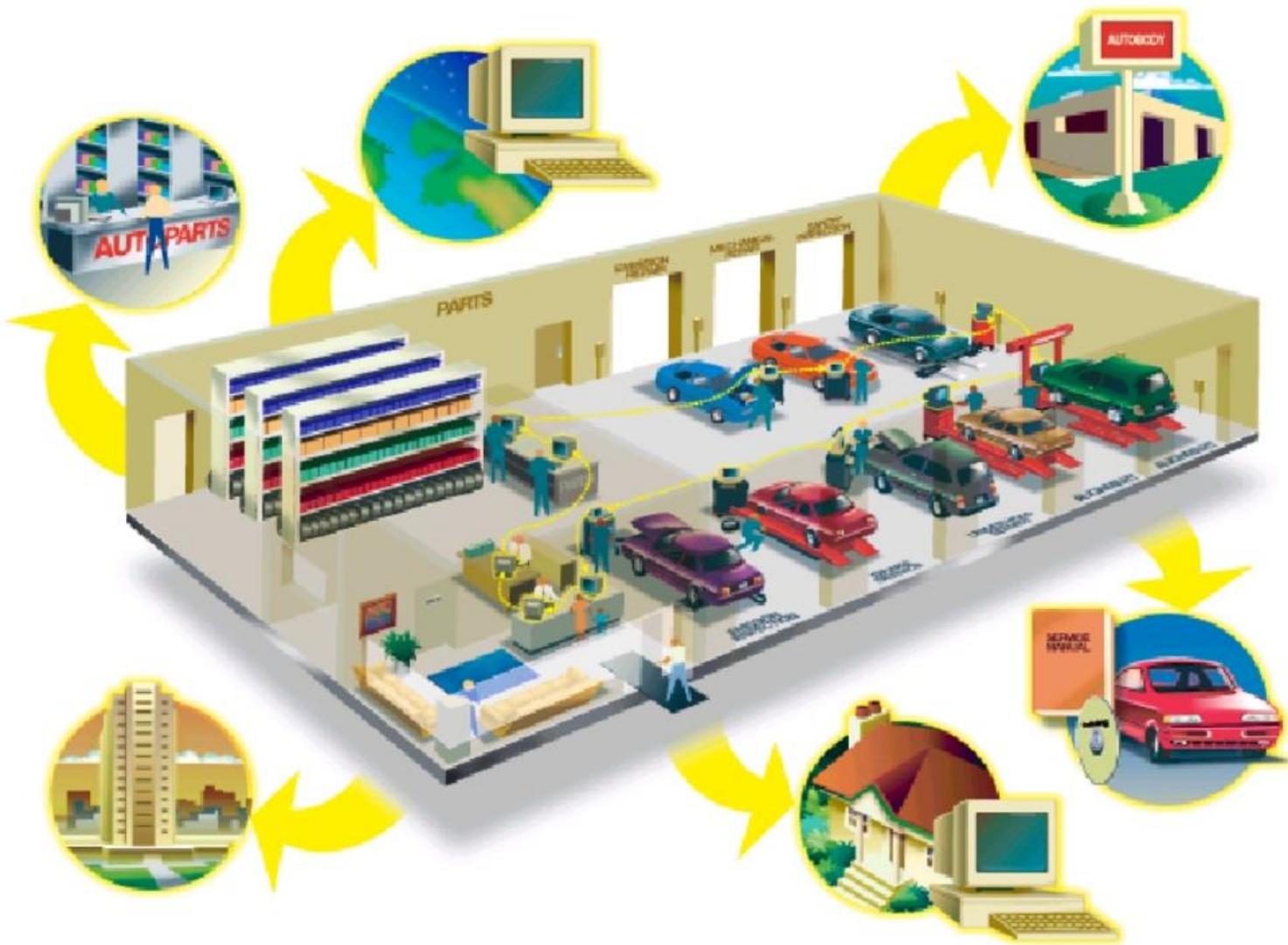




# THE CONNECTED REPAIR ECO-SYSTEM





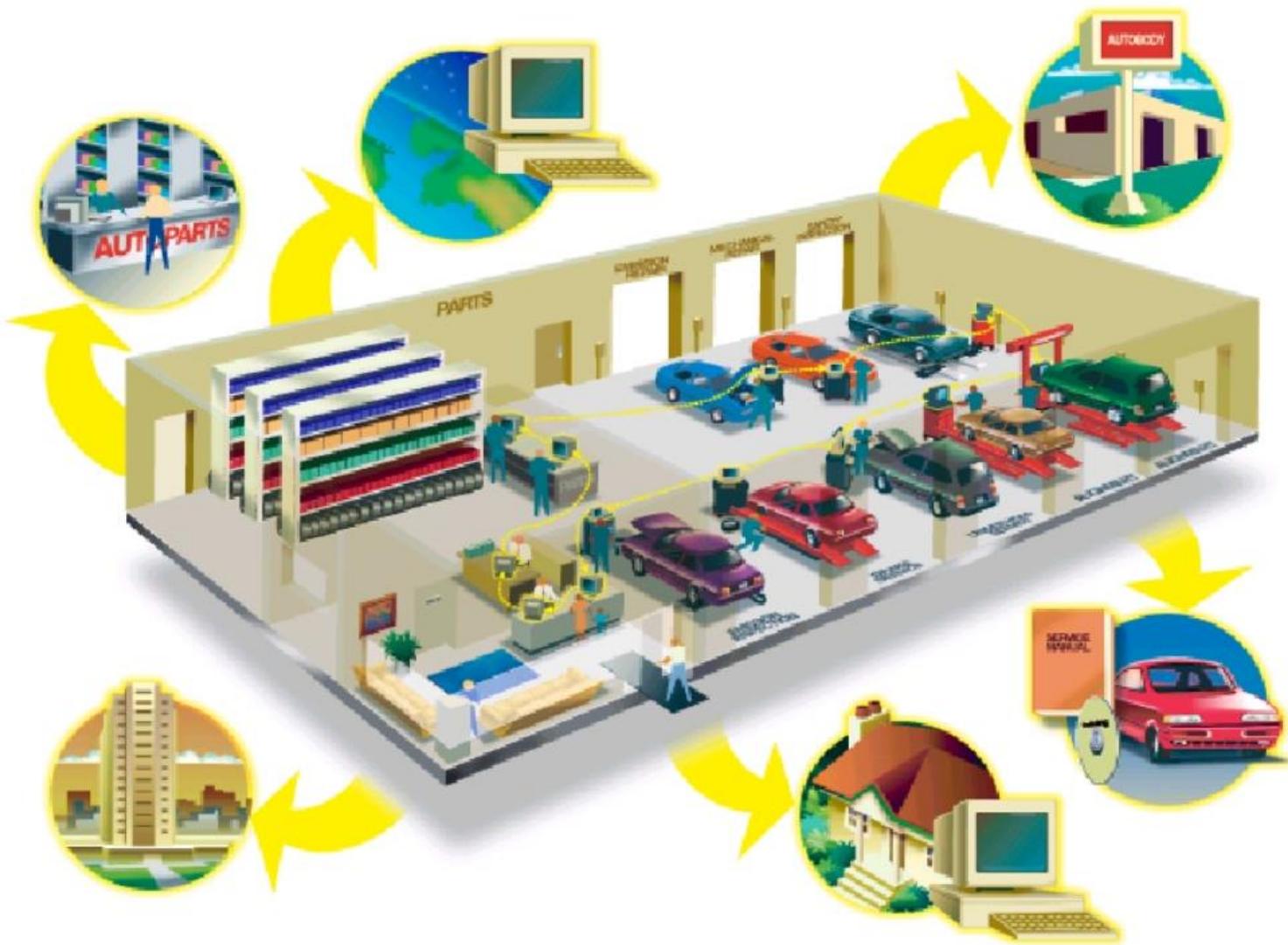


Way ahead of its time

Technology  
Challenges

Business Model  
Challenges

Competitive  
Challenges



Standards Revamped  
in 2010

Added Connected Car

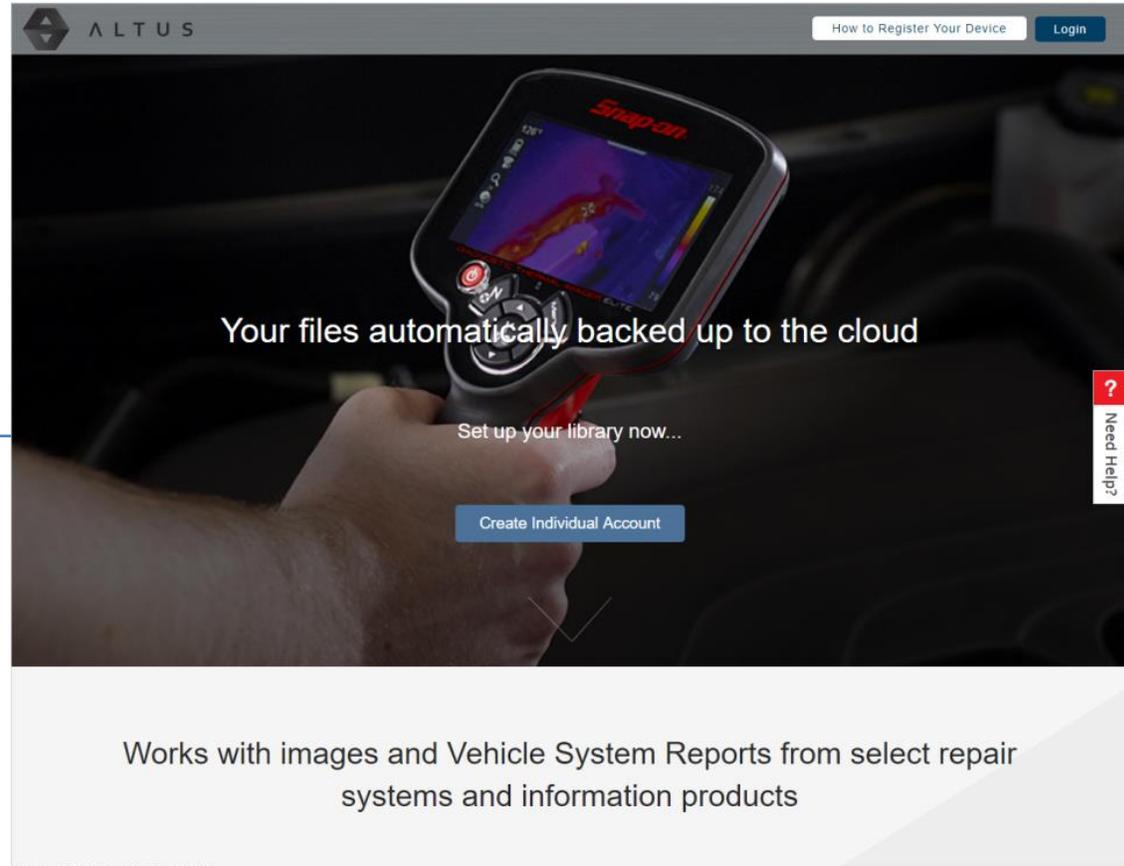
Prototype shown  
AAPEX 2010

# Consumer Trends - Receiving Text Messages is Expected...



# Tool-to-Cloud-to Shop Management Initiatives

Manager SE



Diagnostic Tools

ProSpect DVI App

Personal Assets

Realizing the connected shop vision - connecting shop management to mobile inspection/check-in devices







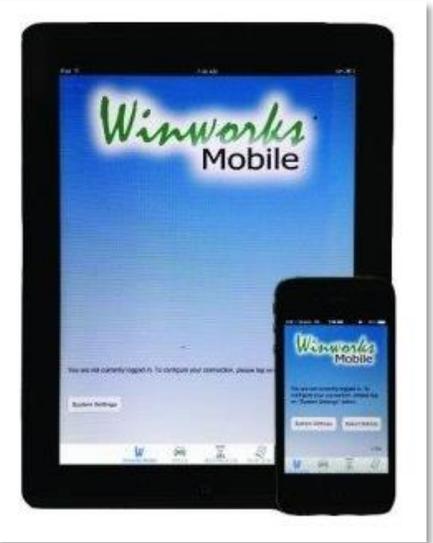
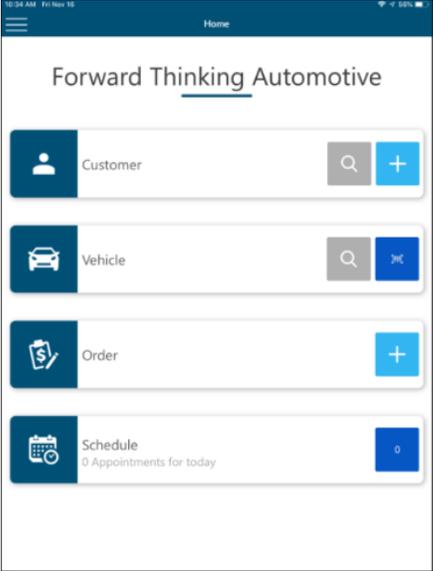
**Mitchell1**<sup>®</sup>  
In your shop, at your side

A CENTURY OF INNOVATION  
**Mitchell100<sup>th</sup>**  
AND STILL ACCELERATING



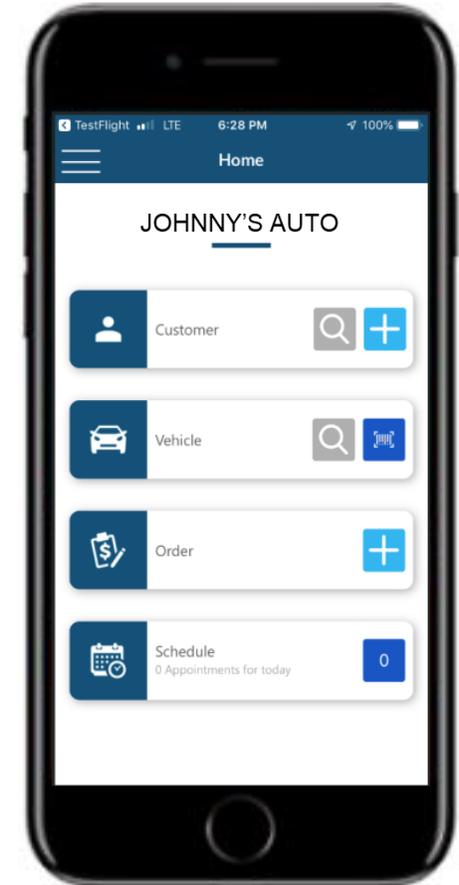
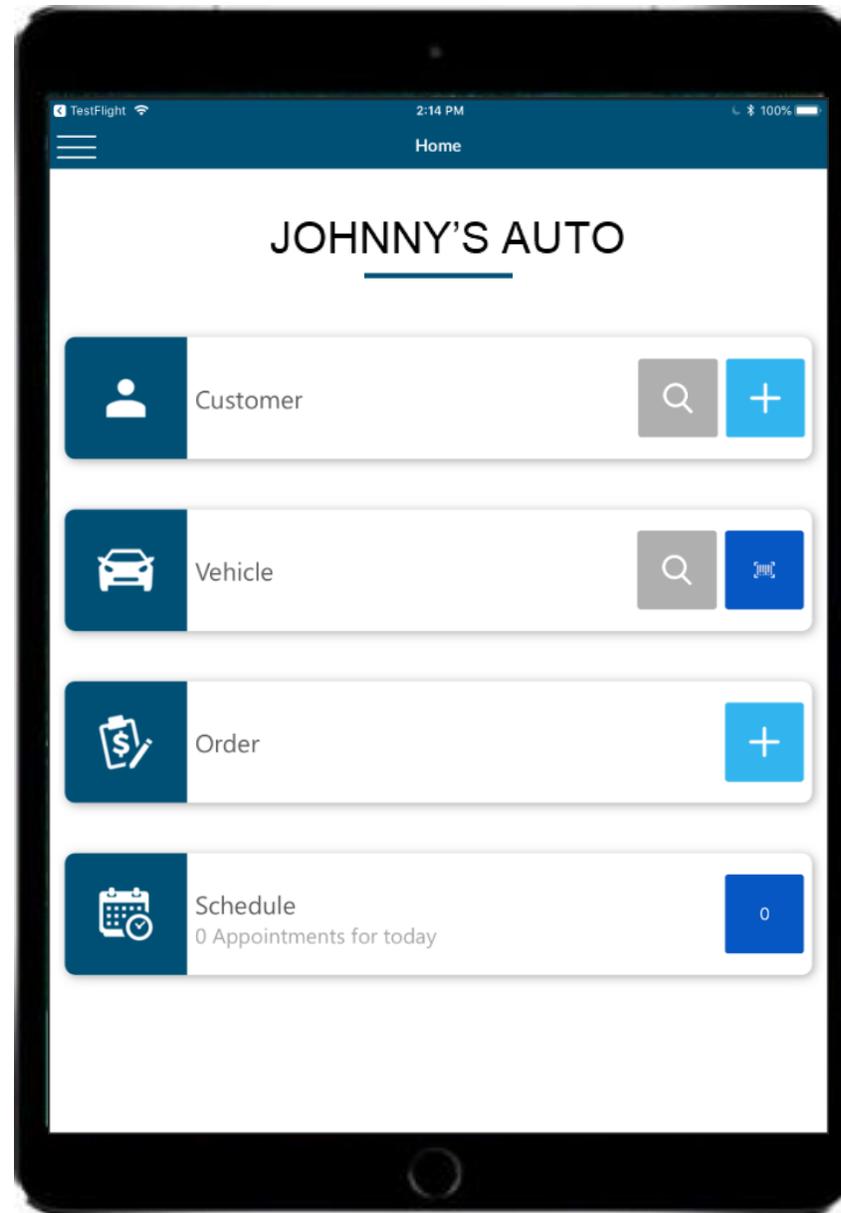


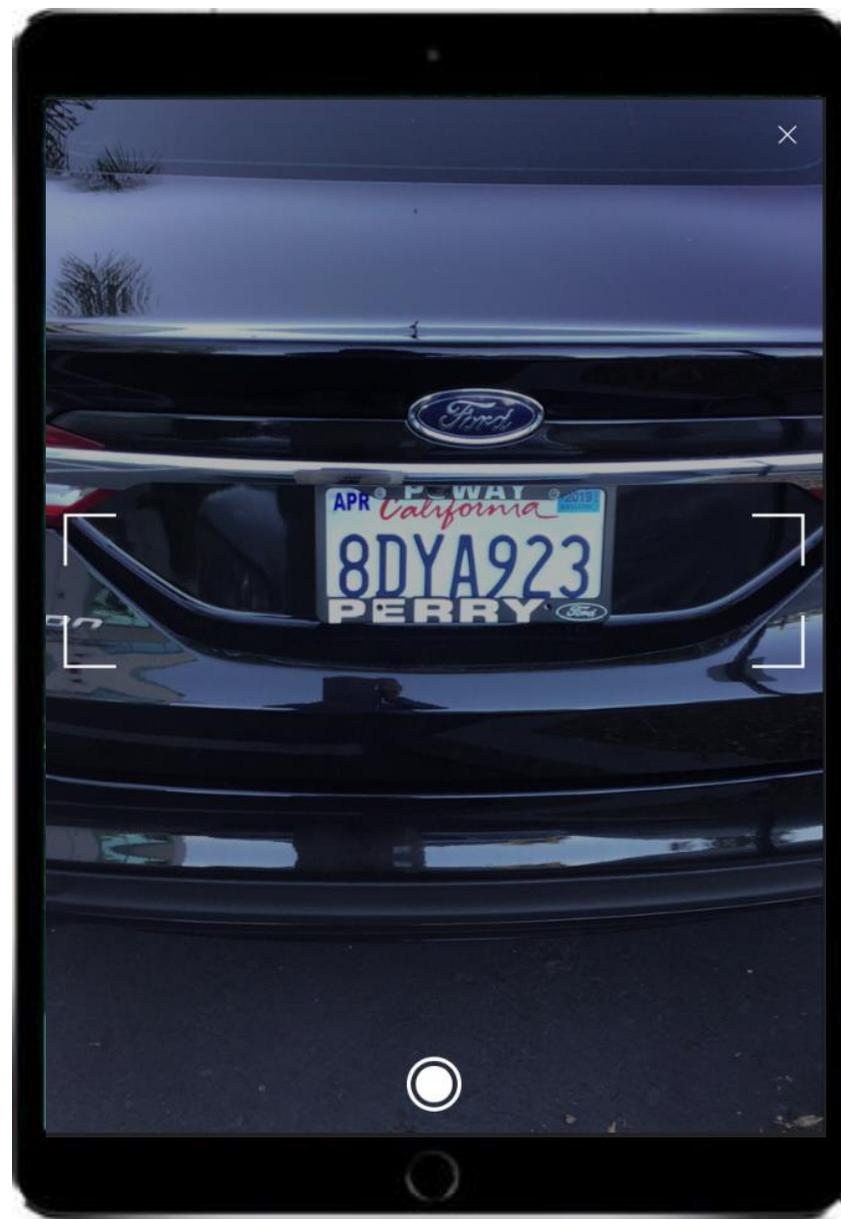
# Extending the Reach to Point-of-Need

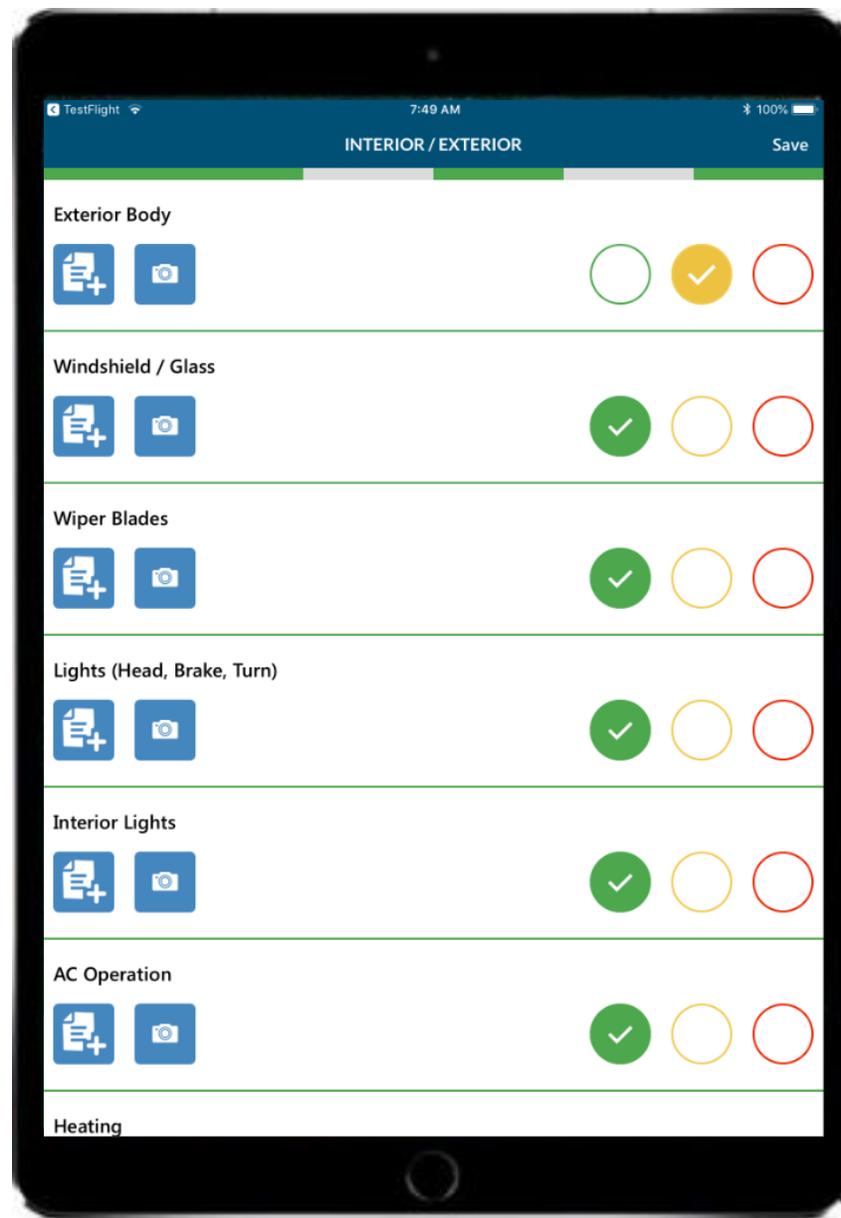


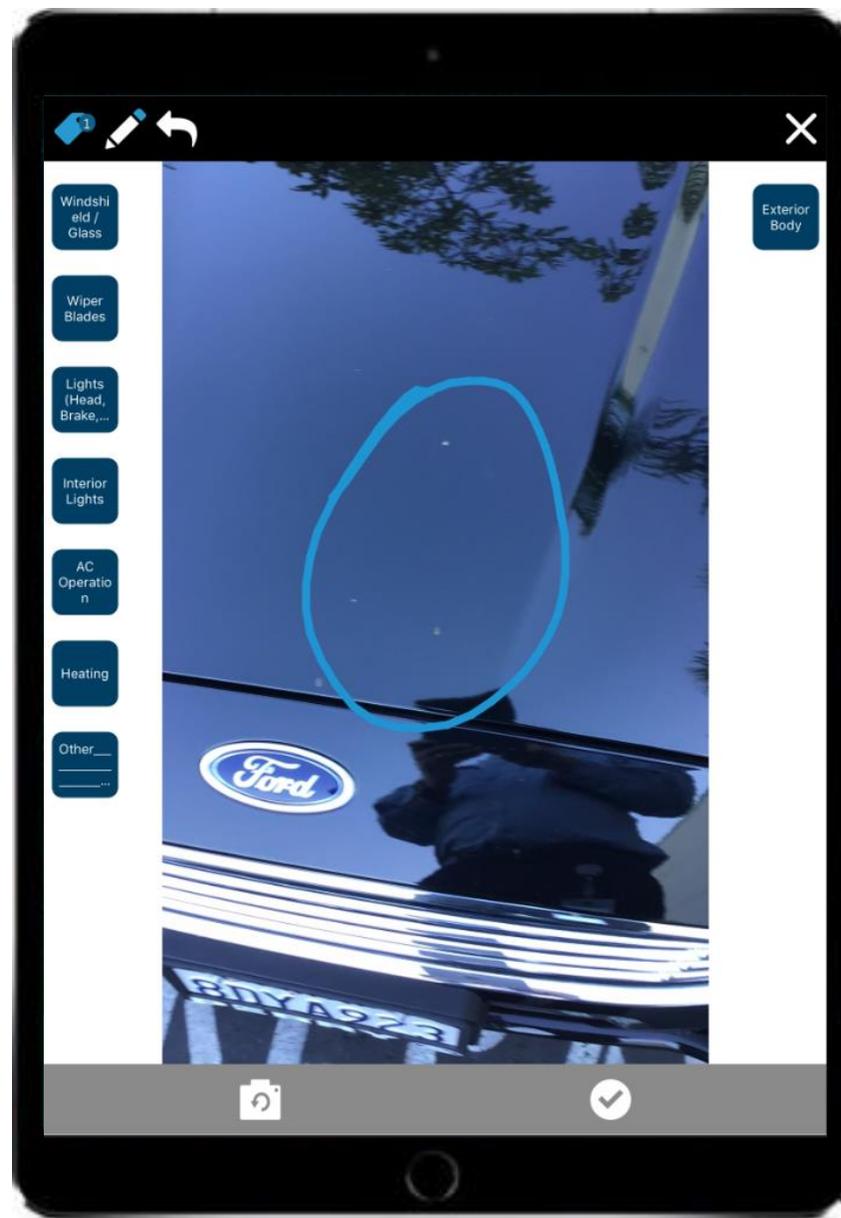
# Introducing ProSpect

Focused entirely on the Vehicle Intake and Inspection Process!











### Vehicle Check ID

A and J Auto Service  
14143 Danielson St., Poway, CA 92084  
Phone: 656-221-5333

Name: *Moclean, Rosalyn* Y/M/M: 2010 Toyota Sienna Mileage: \_\_\_\_\_

VIN: *5TDKK4CCSAS314869* License: *9R2DS13 CA* Date Completed: 10/29/2018

#### Brake G Y R

Front Brake Condition	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Rear Brake Condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brake Hydraulics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brake Lines	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### Steering & Suspension G Y R

Steering Components	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Suspension Condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alignment Needed	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Inspection Item 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### Tire Inspection G Y R

TREAD DEPTH					
FRONT					
Left	<input type="text" value="5"/>	mm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right	<input type="text" value="2"/>	mm	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
REAR					
Left	<input type="text" value="4"/>	mm	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Right	<input type="text" value="2"/>	mm	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3 mm or greater     3 mm to 4 mm     2 mm or less

AIR PRESSURE		WEAR PATTERN				
FRONT <small>Before Use/Spec</small>						
Left	<input type="text" value="31"/>	<input type="text" value="38"/>	Left	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Right	<input type="text" value="35"/>	<input type="text" value="31"/>	Right	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
REAR <small>ki's ki's</small>						
Left	<input type="text" value="37"/>	<input type="text" value="33"/>	Left	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Right	<input type="text" value="28"/>	<input type="text" value="34"/>	Right	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<small>ki's</small>		<small>ki's</small>				

#### Underhood G Y R

Belts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hoses	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engine Coolant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engine Oil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transmission Fluid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power Steering Fluid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



### Vehicle Check ID

A and J Auto Service  
14143 Danielson St., Poway, CA 92084  
Phone: 656-221-5333

#### Underhood G Y R

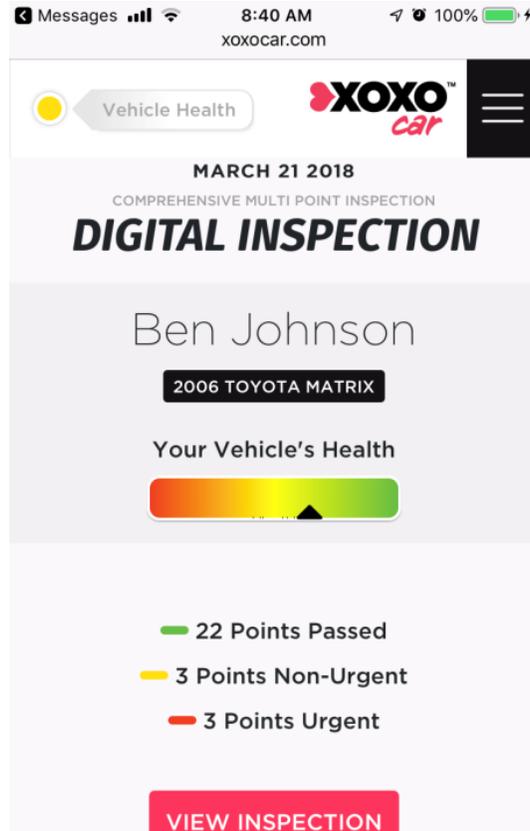
Leaks?	green		
Battery Terminals/Connections	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### Lights & Safety G Y R

Headlights	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turn Signals Front	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turn Signals Rear	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hazard Lights	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Windshield/Wipers/Washer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seat Belts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

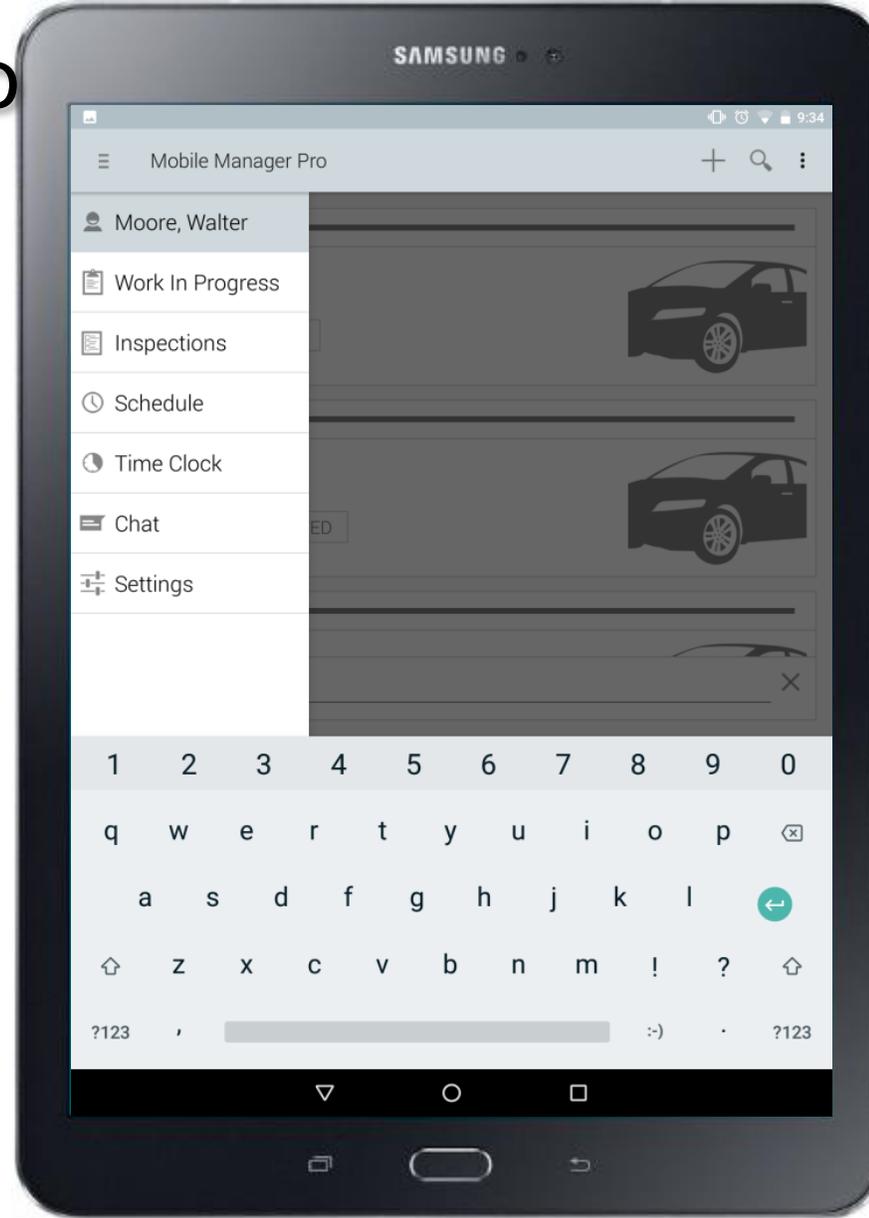
Front Brake Condition  
Front brake condition comment

Left Front Tire  
Left front



# Mobile Manager Pro

Full-featured Android  
Tablet App – works with  
ProPack



Integrates with:  
Mitchell1  
NAPA TRACS  
R.O. Writer  
ALLDATA

EKERT, MATT 2006 Honda Odyssey EX 3.5L,V6 (212C1) VIN(RL3) Lic: CA 5THD645 Color: BLUE VIN: 5FNRL3846 6B064805 UNKNOWN: 888-888-8888

Customer Vehicle Order Revision History Invoice # 033377

Parts Labor Notes Sublet Symptom Jobs PartKit Promos Estimator Maint. Fluids TSBs **MPIs 1** Open Recalls Print LOF

Written By THACKER, RYAN Hat # Ref # Odometer - Prev. 143648 In 400000 Out 0  
 Promised 10/ 2/2018 5:00 PM Source <None> Engine Hours - Prev. 0.0 In 0.0 Out 0.0

Order Hrs: 1.00 Driver: <None> [Row Color Definitions](#)

	Time	Rate	Description	Qty	Extended	Sale	Price	List
+			5/30 SYN BLEND	1.00	\$0.00	\$0.00	\$0.00	
	1.00	\$94.99	this and that		\$94.99	\$94.99		
	0.00			0.00	\$0.00	\$0.00	\$0.00	

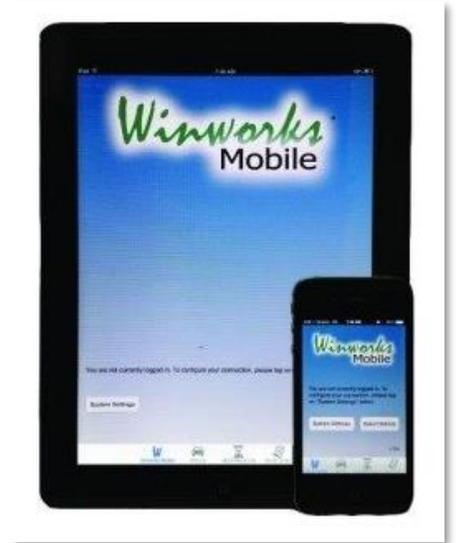
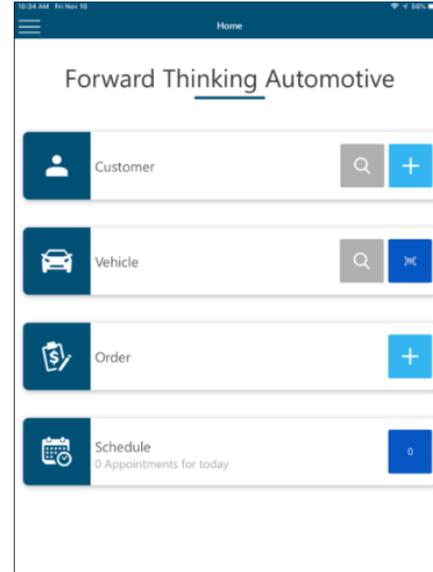


	Parts	Labor	Sub Total	Haz Mat.	Supplies	Tax	Total	Inv. Bal.
Invoice	0.00	94.99	94.99	2.85	0.00	0.00	97.84	97.84
Estimate	0.00	94.99	94.99	2.85	0.00	0.00	97.84	

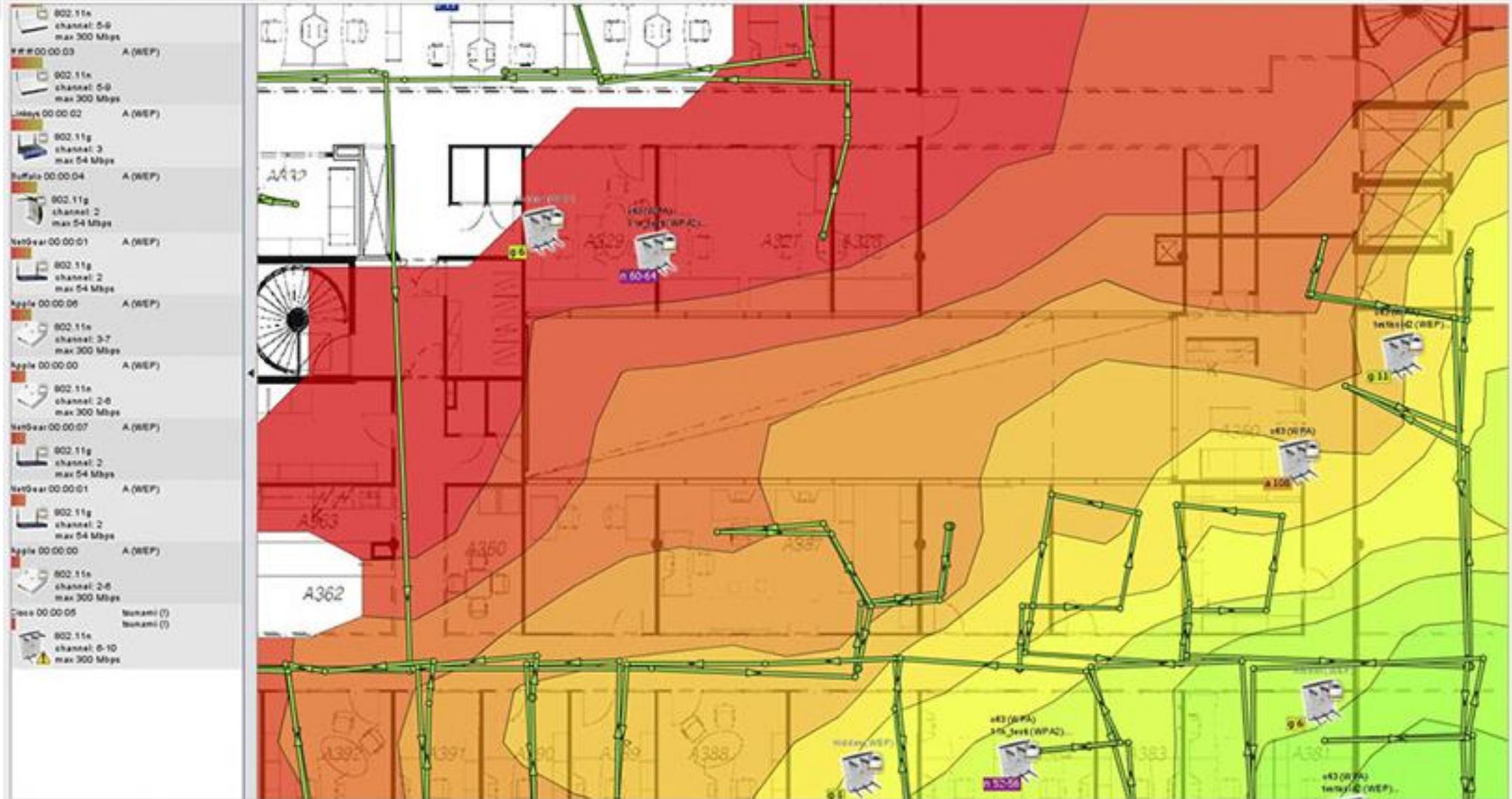
Pay/Post Invoice Parts Ordering SocialCRM Details ProPack Options View PO Worksheet Email Text Print Exit



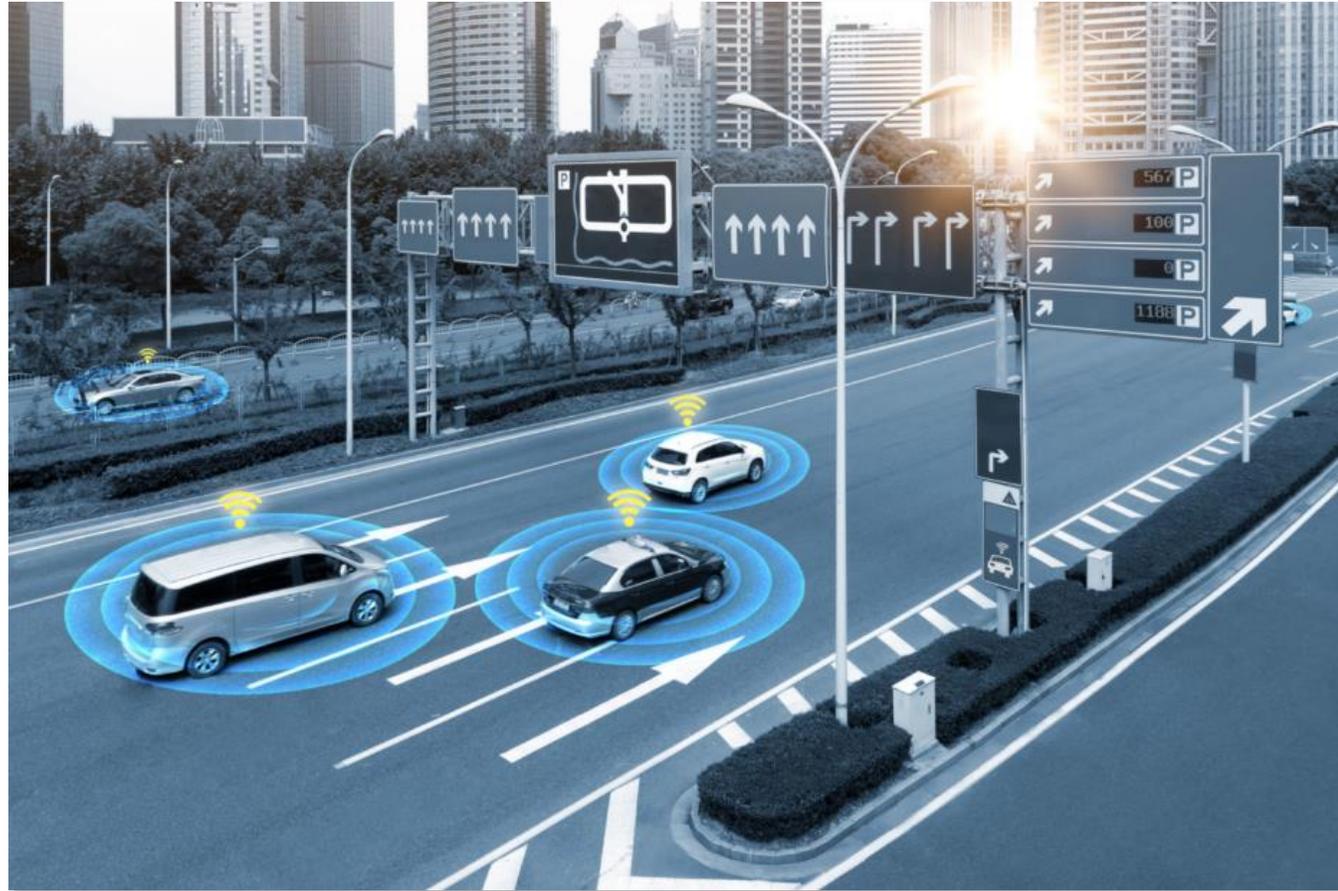
# Lots of choices!



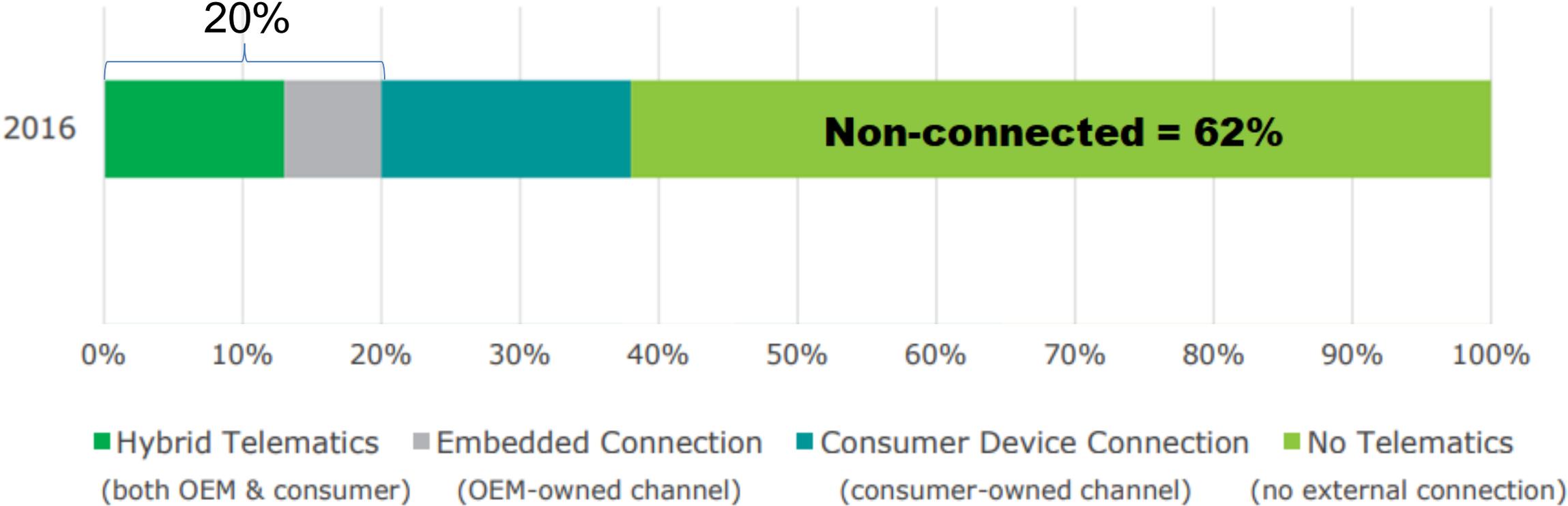
# Infrastructure Matters



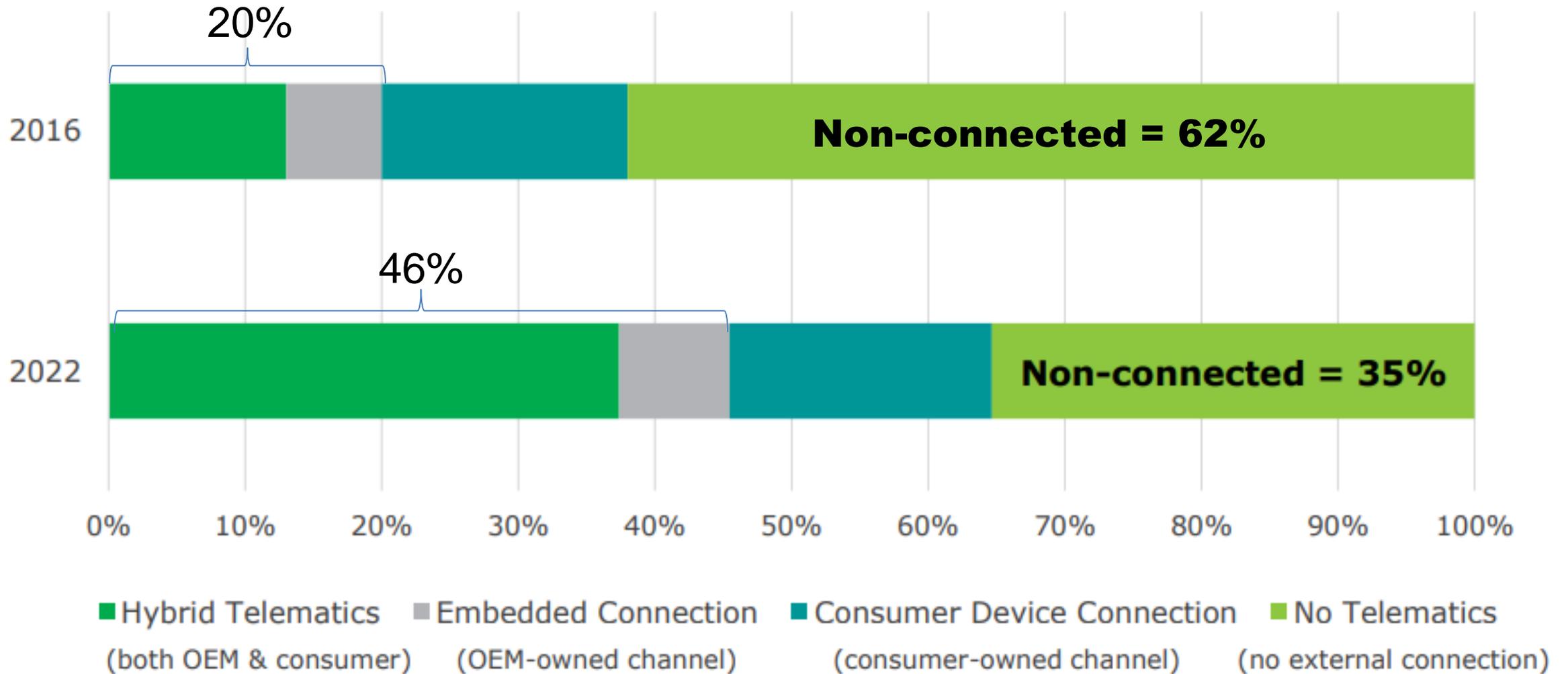
# What about the Connected Car?



# Vehicle Connection Initiatives



# Vehicle Connection Initiatives





### OnStar Vehicle Diagnostics for your 2008 GMC Acadia as of 10/22/2008

Dear

You have a tire pressure alert, indicated in the Maintenance Information section. Improper tire pressure can lead to poor vehicle performance, including lower fuel economy. Take the suggested action below to stay safe on the road.



VIN:

[GM Owner Center](#)

✔ No Issues Found ⚠ Action Suggested 🚨 Immediate Attention

#### Goodwrench DIAGNOSTIC INFORMATION

##### ✔ Engine and/or Transmission System

• Diagnostic: Complete. No action needed.  
[More Information](#)

##### ✔ Emissions System

• Diagnostic: Complete. No action needed.  
[More Information](#)

##### ✔ Air Bag System

• Diagnostic: Complete. No action needed.  
[More Information](#)

##### ✔ Antilock Braking System

• Diagnostic: Complete. No action needed.  
[More Information](#)

##### ✔ OnStar System

• Diagnostic: Complete. No action needed.  
[More Information](#)

#### MAINTENANCE INFORMATION

##### ✔ Vehicle Maintenance

Remaining Oil Life: 67%

Mileage: 16,330

No required maintenance due at this time.

[How to reset your vehicle's oil life indicator](#)  
[View Vehicle History](#)

##### ⚠ Tire Pressure Monitoring: Low

• Recommended tire pressure - Front: 35 psi, Rear: 35 psi  
• One or more tires may require inflation to optimize performance and fuel economy.

Left Front:  
Low, 30 psi



Right Front:  
Low, 30 psi

Left Rear:  
Low, 30 psi



Right Rear:  
Low, 30 psi

[More Information](#)

#### ADDITIONAL INFORMATION

- Rely on Crisis Assist

#### NOTIFICATION INFORMATION

##### ✔ OnStar Subscription

• Account #:  
• Directions & Connections Plan  
• Expires 04/21/2009  
• Enroll in [Continuous Coverage](#)

##### ✔ Turn-by-Turn Navigation

Turn-by-Turn Navigation just got even better — now you can easily send MapQuest directions right to your vehicle with OnStar eNav.  
[Watch how it works](#)

##### ⚠ Hands-Free Calling

• Calling #:  
• Minutes Remaining: 0  
• Expiration: 06/22/2008 (or when OnStar subscription ends, whichever comes first)  
Getting started is easy - [watch our video now](#)

Take advantage of our special first-time offer.

[▶ SPECIAL OFFER](#)

##### ⚠ Account Profile

• To get the most of your OnStar service, please complete your profile.  
[Update Profile](#)

##### ⚠ XM Satellite Radio

• Radio ID #  
• Vehicle equipped but inactive  
[More Information](#)

[▶ SUBSCRIBE TO XM](#)

#### DEALER INFORMATION

**Selling Dealer**  
GROULX AUTOMOTIVE, INC.  
15435 S MONROE  
MONROE, MI 48161  
734.241.3704

ur Data. Your Choice.

autocare™  
ASSOCIATION Independence drives us.



# Vehicle Connection Initiatives



# Insurance Telematics



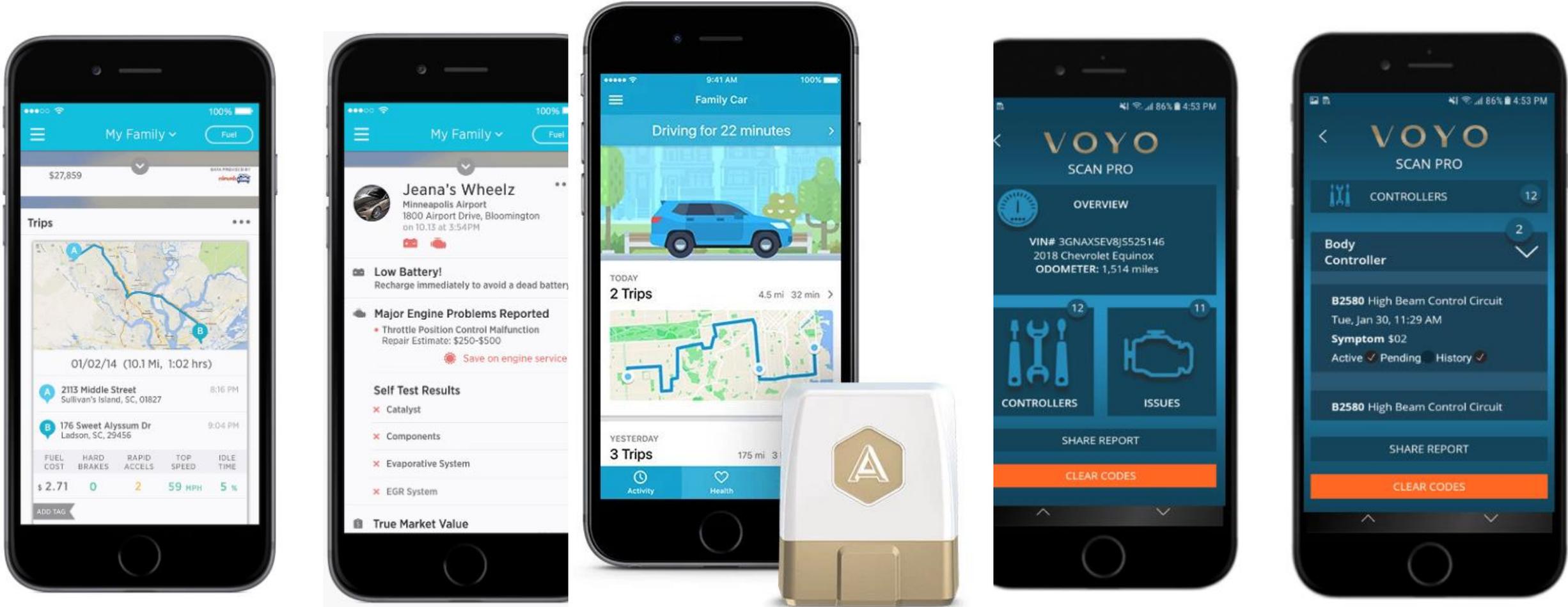
**PROGRESSIVE**



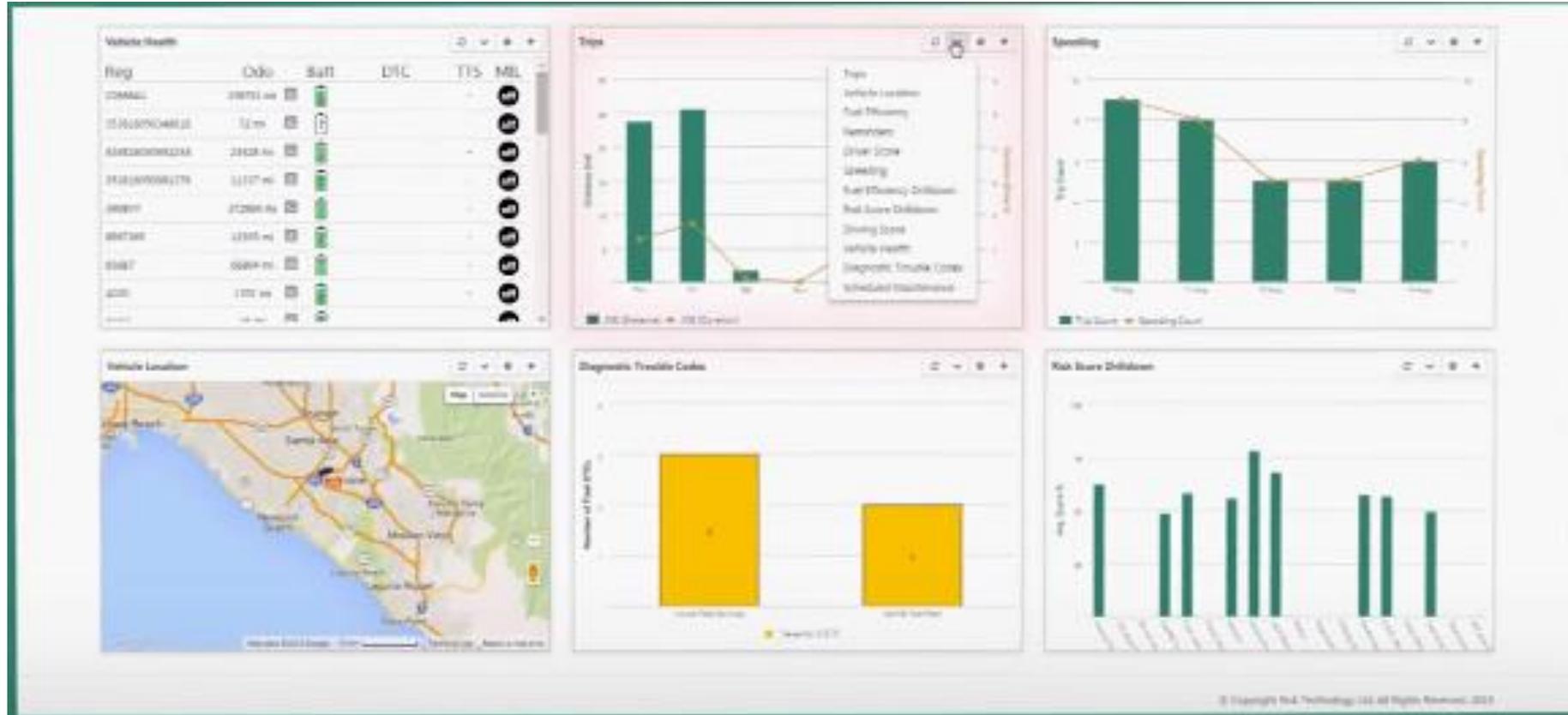
**Allstate**  
You're in good hands.



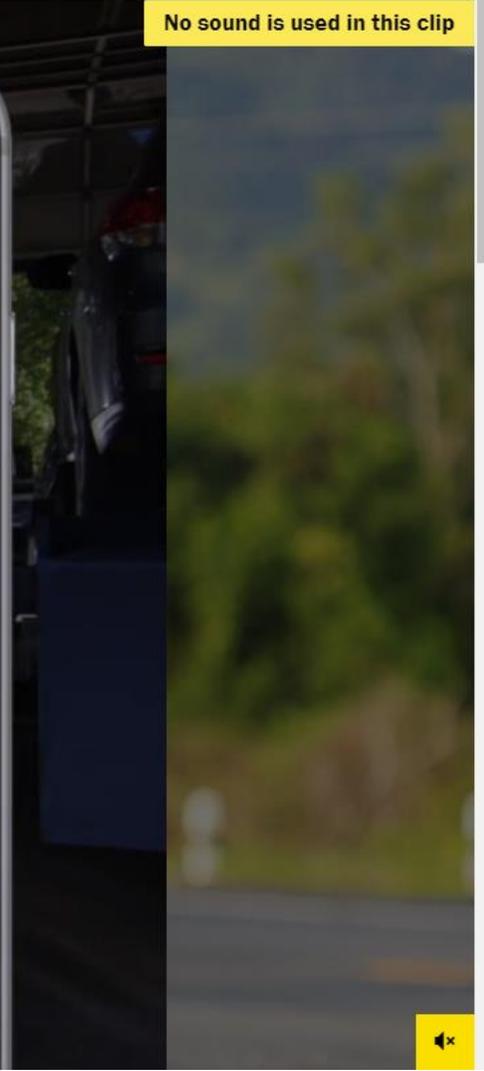
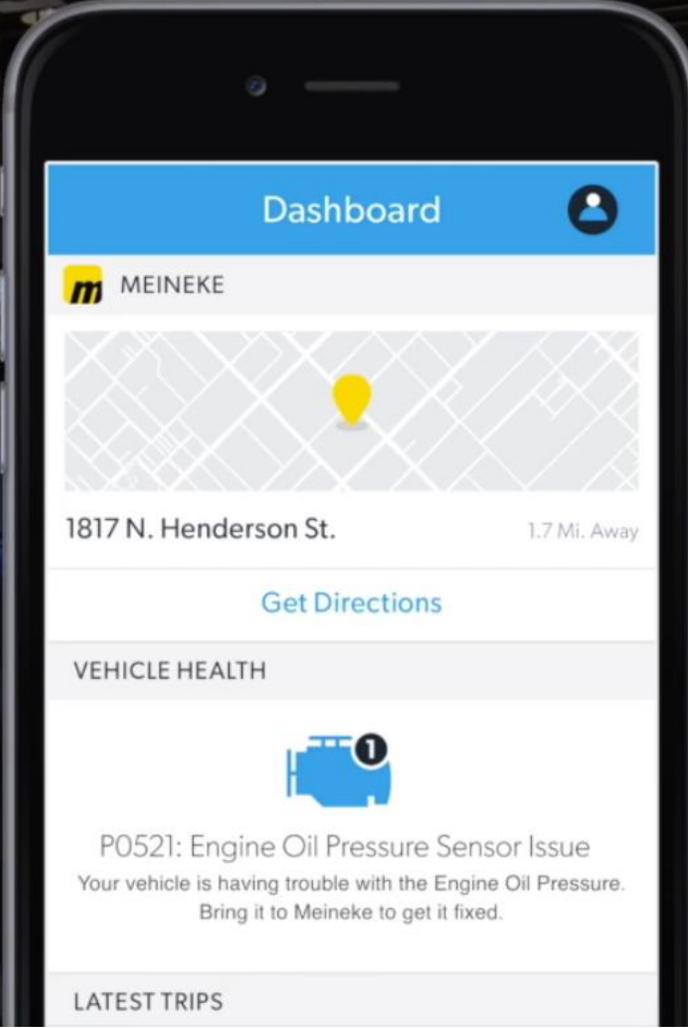
# SiriusXM acquires connected car company n Initiatives Automatic for over \$100M



# Telematics Monitoring Dashboards



No sound is used in this clip



What's new in this release? Using the new Scheduler

# MANAGER SE

## POWERFUL OPTIONAL FEATURES AVAILABLE

- ▶ Debit, Credit, Fleet Card Processing
- ▶ Shop Marketing Services
- ▶ Class 4-8 Truck Labor Integration
- ▶ Mobile Application



[What's new in this release?](#)[Using the new Scheduler](#)

# MANAGER SE

## POWERFUL OPTIONAL FEATURES AVAILABLE

- ▶ Debit, Credit, Fleet Card Processing
- ▶ Shop Marketing Services
- ▶ Class 4-8 Truck Labor Integration
- ▶ Mobile Application

**Mitchell1**<sup>®</sup>  
*In your shop, at your side*

Connected Vehicles Request - submitted 10/17/2017 5:00 PM : Williams, Monica

Save & Close Cancel Alert Management... Auto Adjust End Time Match Drop-Off to Start Time

Subject Williams, Monica  
Drop Off 10/17/2017 8:00 AM Reminder 0 minutes Service Advisor <None>  
Promised 10/17/2017 5:30 PM Technician Ibanez, Irving  
Starts 10/17/2017 10:23 AM Scheduled Hours: 0.50 Resource <None>  
Ends 10/17/2017 10:53 AM All day event Order Hrs: 0.00

Shop Comments Print on order as Note Customer Comments/Special Requests Print on order as Note  
[Connected Vehicle: DTCs P0300,P0304,P0354], [Mileage: 96,935 miles]  
[Provider: Entricit Program] [Geolocation: 34.000000, -118.000000]

Customer - Williams, Monica  
Preferred contact method? Phone: (Home) 323-274-9658 Membership: --  
Email: -- How did you learn about us?  
Company: -- Waiting options?  
Address: 1604 S Figueroa St Los Angeles, CA 90007

Vehicle - 2005 Lexus ES 330  
0 Recommendations  
VIN: JTHBA30G9 55087040  
License Plate: --  
Engine: 3.3L, V6 (202CI) VIN(A)  
Hat: --  
Odometer In: None  
Yearly Mileage: --  
Color: --

Job Hours: 0.00 Source: <None> Category: <None> Provider: Entricit Program Jobs: Add Delete

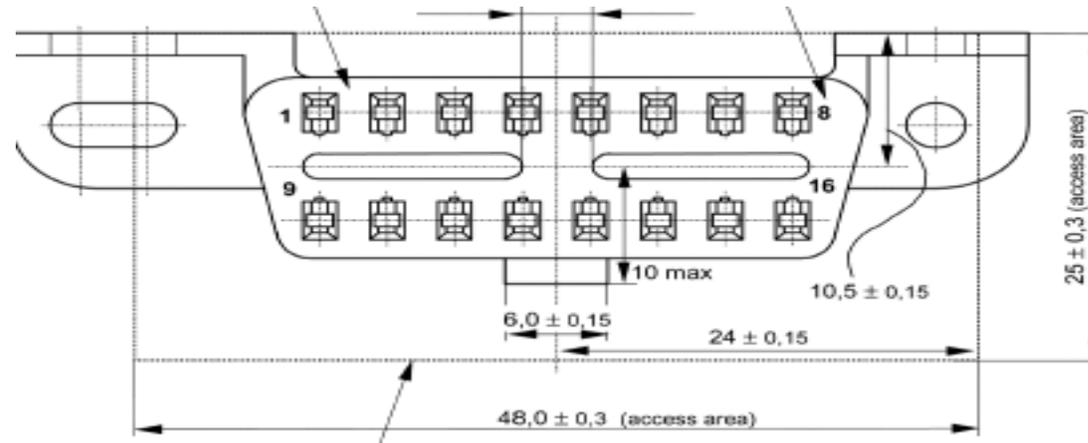
Description

Tying it all together –  
Including the  
Consumer/Driver in the shop-  
vehicle connection



Security will be a “forever”  
challenge

# The OBDII Port – a History Lesson



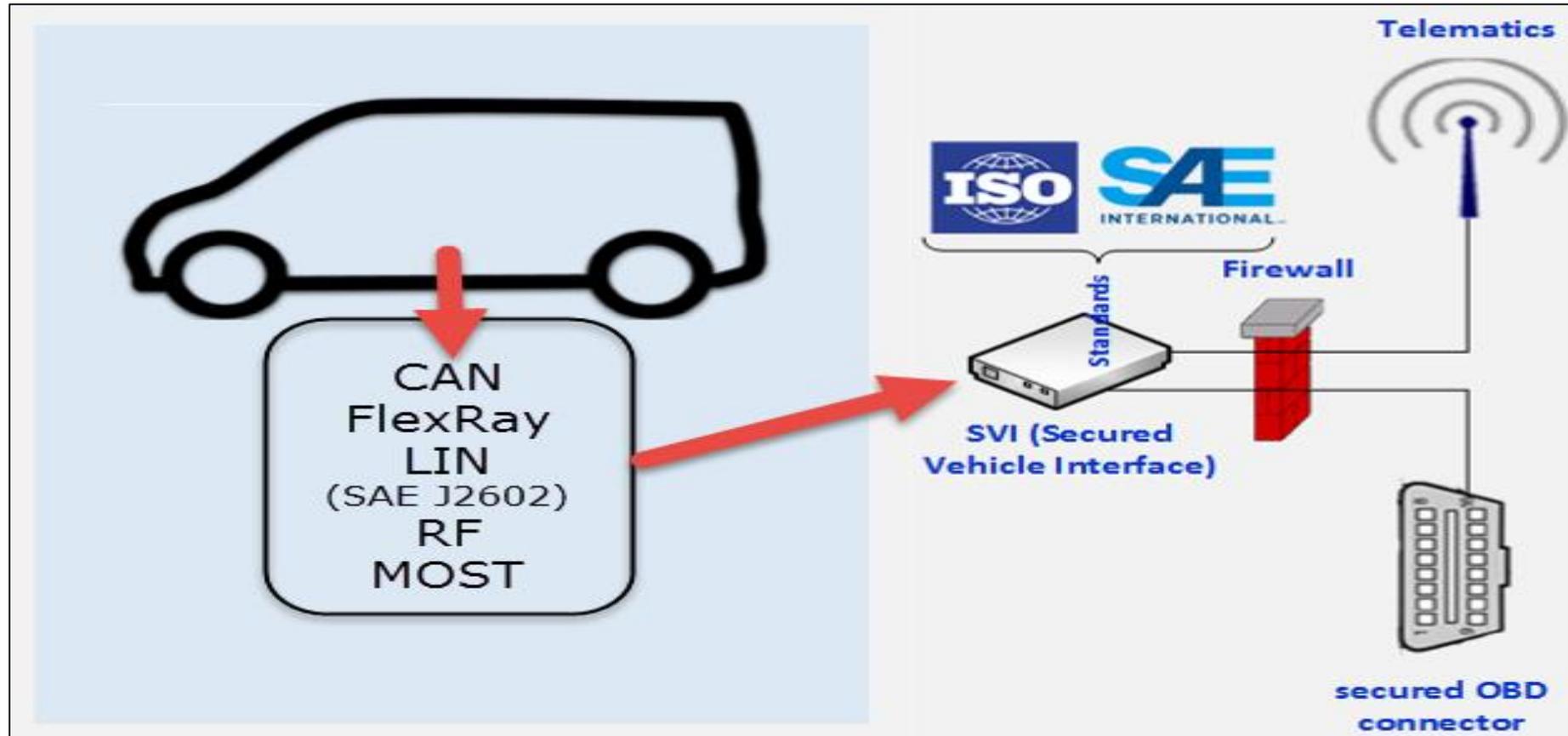
# Security Concerns Increase with Telematics “Nomadic Devices”



# Security Concerns over Connected Cars



# ISO Secure Vehicle Interface (SVI)



# Be Ready!

LeBron's car may be driving itself to your shop soon!

