

## Electronics of Usage Based Insurance "Device Considerations"

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Danlaw Inc



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## Agenda

- Danlaw DNA – Corporate Overview
- Automotive Telematics 101 – The Basics
- What data is available from the car
- OBDII Device Considerations
- Data Transmission
- Best Practices
- Automotive Telematics 201 – The Road less Travelled

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## Insurance Telematics Growing



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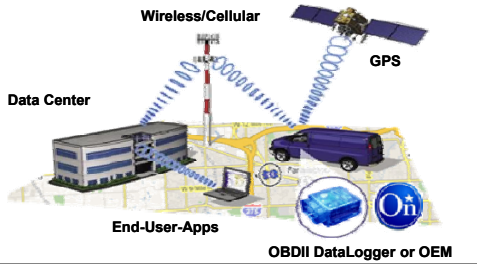
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### Vehicle Telematics

How it works:



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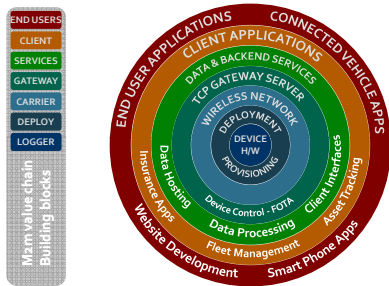
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### m2m Value Chain



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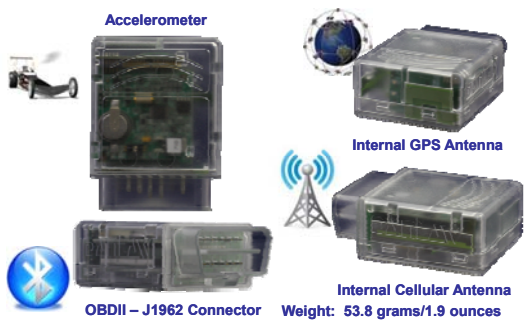
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### Typical OBD DataLogger



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### Additional Device Features Friend or Foe?

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### Simple Self-Installation

**Step 1**

Find the OBDII Port usually located in the driver's side foot well under the steering column

**Step 2**

Insert the DataLogger into the OBDII Port

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### OBD: 1996-Present

#### What, Where, When, Why, How and How Many

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## How can a “standard” not be standard?

### Vehicle Protocol Support

Protocol Name	Speed	Used by
ISO 9141	10.4 Kbits/second	most Asian and European manufacturers
J1850 PWM (Pulse Width Modulation)	41.6 Kbits/second	Ford, Mazda
J1850 VPW (Class II) (Variable Pulse Width)	10.4 & 41.6 Kbits/second	primarily older model GMs
ISO 14230 KWP2000	100 Kbits/second	Older Chrysler
ISO 15765	250 & 500 Kbits/second	All major OEMs by 2008
CAN (Controller Area Network) 11bit & 29bit identifier addressing	Varies by application: 500Kbit (GM), 1Mbit (Ford)	Ford, GM, DCX, European & Asian OEMs




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Feature	Example
Installs via OBDII	<input checked="" type="checkbox"/>
Unit ID	<input checked="" type="checkbox"/>
VIN	<input checked="" type="checkbox"/>
ODO*	<input checked="" type="checkbox"/>
Vehicle Speed	<input checked="" type="checkbox"/>
Trip Start/End	<input checked="" type="checkbox"/>
Connect Event	<input checked="" type="checkbox"/>
Disconnect Event	<input checked="" type="checkbox"/>
GPS - LAT/LON/ALT	<input checked="" type="checkbox"/>
RPM	<input checked="" type="checkbox"/>
Throttle Position	<input checked="" type="checkbox"/>
Battery Voltage	<input checked="" type="checkbox"/>
Coolant Temp	<input checked="" type="checkbox"/>
MIL Status	<input checked="" type="checkbox"/>

### Common Logger Parameters



Other OEMs and Non OEMs data can be collected on a custom back  
\* ODO is provided as long as the ODO output is provided by the OEM

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### Data Transport & Firmware Updates

- Cellular
  - GSM vs. CDMA
  - TCP vs. UDP
  - SMS



- Bluetooth
- Wifi
- USB



- FOTA vs. Fixture




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### Transport Certifications

- FCC Certification: PTCRB 
- Carrier Certifications:
  - AT&T
  - Rogers
  - Sprint
  - T-Mobile
  - Verizon

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### Physical & Electrical Testing

- Bump test occasional EN 60068-2-29:1993 
- Random vibration 5Hz to 200Hz 8 Hours
- Power Temperature Cycling 35 Cycles -40 to +85
- Thermal Shock EN 60068-2-14: 1999xii
- Free fall - EN 60068-2-32:1993xxii 
- EMC - ESD SAE J551/15
- Sleep State Current Consumption
- Functional Validation – As per customer requirements
- Independent Customer Testing 

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### Data Transmission

Why less is more and other Heresies

- Give me ALL the data 
- Data Compression
- Event Thresholds 
- Summary Reporting 

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## Detour Ahead Where is my data?

- Compatible Vehicle?
- Device Shipped?
- Installed?
- Provisioned on Cell carrier?
- Pointed at correct server?
- Correct firmware?
- Functioning device?
- Activated in Gateway?
- Cell coverage?
- Mapped to DB?
- Output from Scoring Alg?
- Pushed to Data Warehouse?
- Insurance or Consumer Facing App working?

**USER ERROR:  
REPLACE  
USER**

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## Vehicle M2M Challenges



**Wireless:**  
Certifications: PTCRB & FCC & Wireless Carrier Certifications  
Data Plans, Roaming Rules, FOTA  
Bluetooth, WiFi, Zigbee, DSRC for device-to-device communications

**Vehicle Compatibility:**  
250 million cars, suvs & pickups on the road with over 35,000 unique Year/Make/Models  
Hybrid Vehicles, Future Vehicles & Future Protocols (FlexRay, etc.)  
Truck and Heavy Duty Vehicle Protocol (1708 & 1939)

**Data Integrity:**  
GPS Data Quality, OBD Data Capture  
Functional/Proprietary Message Data support (ODO, VIN, etc.)

**Integration & Website Issues:**  
Integration of Device Data with backend Applications  
IT Infrastructure, Backend & website to display the data

**Automotive OEM vs. Aftermarket Lifecycles 9.5 vs. 2.5 years**

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## Just when you thought it was safe to get back in the car

**Q&A: UW researchers explain risks, realities of car hacking**

Lead story on Monday, May 17, 2011, 4:04pm PDT  
[Comments](#) / [Contact](#)

Technology | Human Resources | Cars | Seattle | Technology  
University of Washington

Researchers from University of Washington and UC San Diego have been [subjected to attention for a new study](#) that highlights the potential security risks in automotive computer systems. Their paper ([PDF, 10 pages](#)) reads at times like a prankster's diary -- explaining, for example, how they were able to remotely turn up the radio volume in a test vehicle. Despite the driver's best efforts to keep it down.

But other times, it's troubling, such as the just what they explain how they were able to override the brakes.

The study, funded by the National Science Foundation, is being presented this week at the [IEEE Symposium on Security and Privacy](#) in

**Car-hacking now a possibility**

WashPost.com | News | Technology | Security | May 17, 2011

Researchers from the University of Washington and UC San Diego have been subjected to attention for a new study that highlights the potential security risks in automotive computer systems. Their paper (PDF, 10 pages) reads at times like a prankster's diary -- explaining, for example, how they were able to remotely turn up the radio volume in a test vehicle. Despite the driver's best efforts to keep it down.

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### Best Practices from 15 projects

- Reducing Risk: Trusted Partners 
- Setting Expectations 
- Phased Rollouts 

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### Critical Task Items

- Critical Data Elements
- Trip Report Summary
- Trip Definition
- Data Frequency
- Data Format

- LBS services
- IT Systems Integration
- Single Sign-On Strategy
- Wireless Data Billing



- Branding
- Enclosure Logo/Color
- Packaging
- Website Colors/Logos/look & feel

- Unit Provisioning
- SIM, VIN, Unit ID
- Username/Password
- Shipping (FEDEX, UPS...)
- Opt-Out Strategy & RMA

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### Vehicle Telematics Vertical Markets

INSURANCE	ROADSIDE ASSIST	LEASING/ LOANS	AUTOMOTIVE FLEET	TRUCK/HEAVY EQUIPMENT	TRAFFIC CONTROL	OEM - TIERS ENGINEERING
PAVD	Towing	Buy/Play Here	Mileage	Mileage	TFS	Data Recording
Tech Safety	Diagnostics	High Risk	Maintenance	Maintenance	Road Tolling	Trouble Shooting
High Risk	Door Unlock	Immobilizer	Diagnostics	Diagnostics	Congestion Mgt	Service Systems
Crash Detect	LBS	Track & Trace	Dispatch	Dispatch	VIL	Track & Trace
Theft Recovery	F-Call/C-gas	Diagnostics	Track & Trace	Track & Trace	VAY	ECLU/FOIA
Break-in Detect	Crash Detect		Fuel Use/Econ	Fuel Use/Econ	Pay-Go	
	Recovery		Hard Tax	Service Hours		
			Emissions	Road Tax		
				Emissions		

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### The Road less Traveled



- One port ≠ One application
- Who else wants to take a *byte* out of your data?

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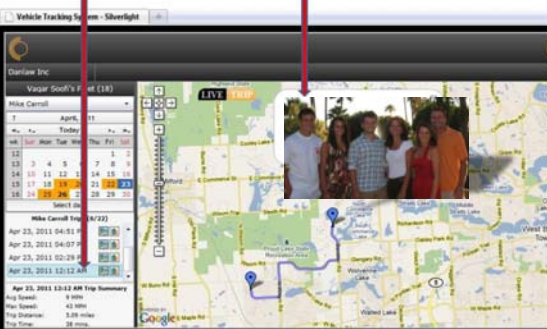
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Violation of State and Family Curfew for 16-year-old: 12:12 am

Visiting girlfriend when parents are out of town....Not allowed



Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
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### Questions?

- Mike Carroll
- [mikec@danlawinc.com](mailto:mikec@danlawinc.com)
- 248-705-5732



- Thanks for your time.....
- From your friends at Danlaw



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