

OnStar Vehicle Diagnostics

**DoD Maintenance Symposium
24 October 2005**

Briefing Agenda

- OnStar overview
 - Technologies
 - Services
- OnStar Vehicle Diagnostics
- OnStar Business Vehicle Manager
- Potential Military Applications

Telematics Background - Technology

Combines and integrates directly into the vehicle's electrical architecture:

- Cellular technology
- GPS satellite network location capability
- Sophisticated voice recognition technology

Telematics Background - Services

- Call center-based services
 - Safe and Sound
 - Directions and Connections
- One button hands-free cellular calling
 - Minutes purchased on prepaid basis – good for 12 months
 - Sharing plan available with Verizon's America's Choice
 - Allows delivery of web-based Virtual Advisor into the vehicle: weather, traffic, and stock information



Safe & Sound Service Plan



Airbag
Notification



Accident
Assist



Emergency
Services



Remote
Diagnostics



Remote
Unlock



Online
Concierge



Roadside
Assistance



Stolen Vehicle
Location Assistance

\$16.95 per month

Directions & Connections Service Plan

All Safe & Sound Services...plus



Route Support



Point of Interest &
Convenience
Services



RideAssist

\$34.95 per month

OnStar Availability on GM Models

| | |
|------------------|---|
| Buick | Rainier, Century, LeSabre, Park Avenue, LaCrosse, Lucerne, Rendezvous, Terazza (<i>standard on all '06 models</i>) |
| Cadillac | CTS, DTS, Escalade, Escalade EXT, STS, SRX, XLR |
| Chevrolet | Avalanche, Express, Corvette, Impala, Monte Carlo, Silverado, Suburban, Tahoe, Trailblazer, Trailblazer EXT, Malibu, Malibu Maxx, Equinox, Cobalt, Uplander |
| GMC | Envoy, Envoy XL, Envoy Denali, Savana, Sierra, Sierra Denali, Yukon, Yukon Denali, Yukon XL, Yukon XL Denali |
| Hummer | H2, H3 |
| Pontiac | G-6, Aztek, Bonneville, Grand Prix, Montana, Sunfire, Pursuit, Solstice |
| Saab | 9-3, 9-5 |
| Saturn | Ion, L-Series, VUE, Relay (<i>standard on all '06 models</i>) |

Telematics Emergency Calls

- Emergency Key-press – customer initiated
- Automatic Crash Notification (ACN)
 - Automatically initiated due to an airbag deployment
- Advanced Automatic Crash Notification (AACN)
 - Automatically initiated upon airbag deployment, rear impact, above threshold Delta V or other trigger in a severe crash

On Scene Assistance

- Conference in emergency dispatcher or first responder
- Stay on with occupants until public safety arrives
- Sound the horn and flash the lights
- Longitude and latitude for medical flight

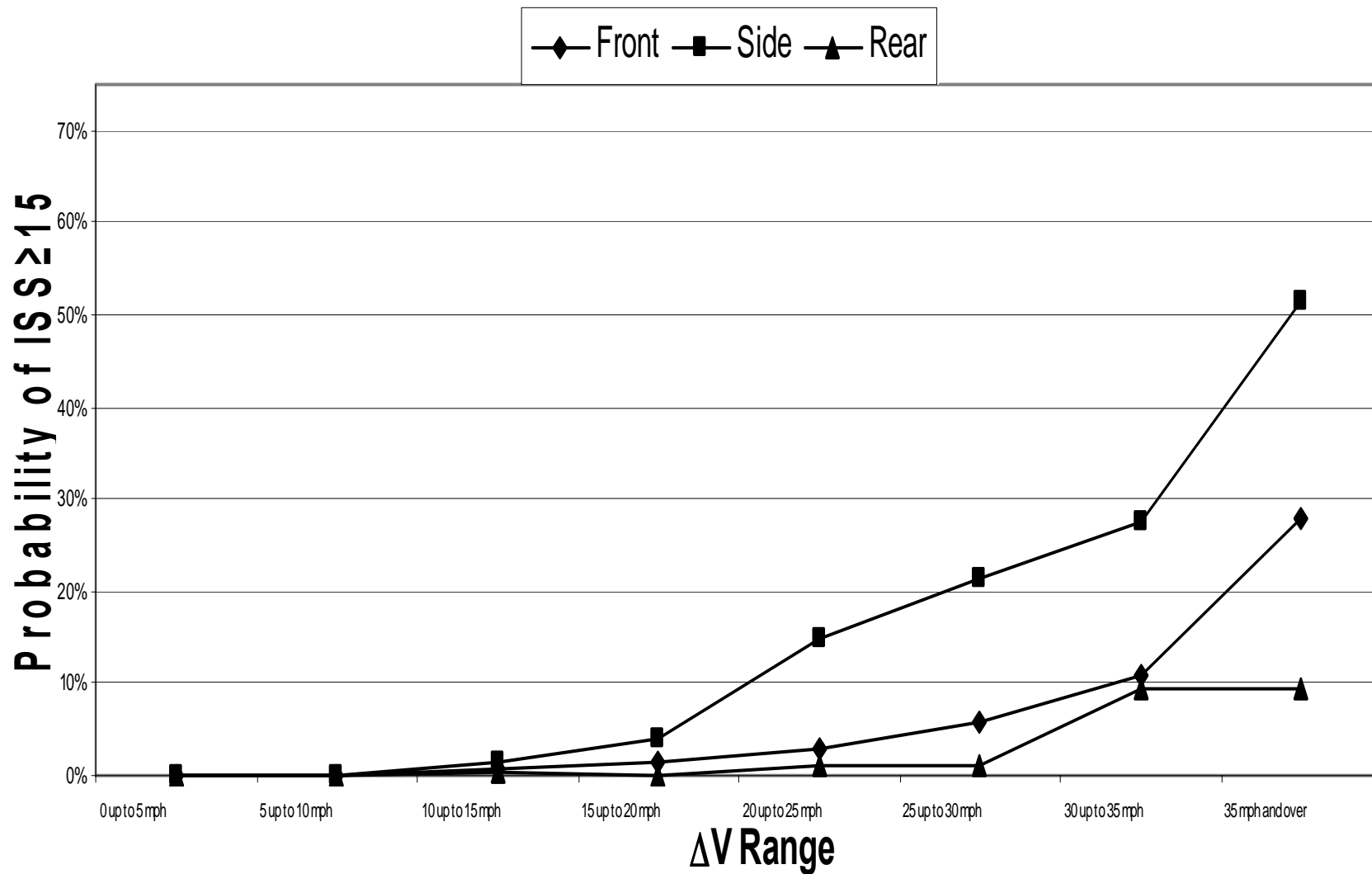
Embedded Telematics AACN Functionality

- Continues to transmit location data and crash data to the OnStar call center
- Advisor receives and will relay
 - Location
 - Direction of Impact Force (New – 360°)
 - Air Bag Deployment
 - Delta V (New)
 - Multiple Severe Impacts (New)
 - Rollover (if equipped)

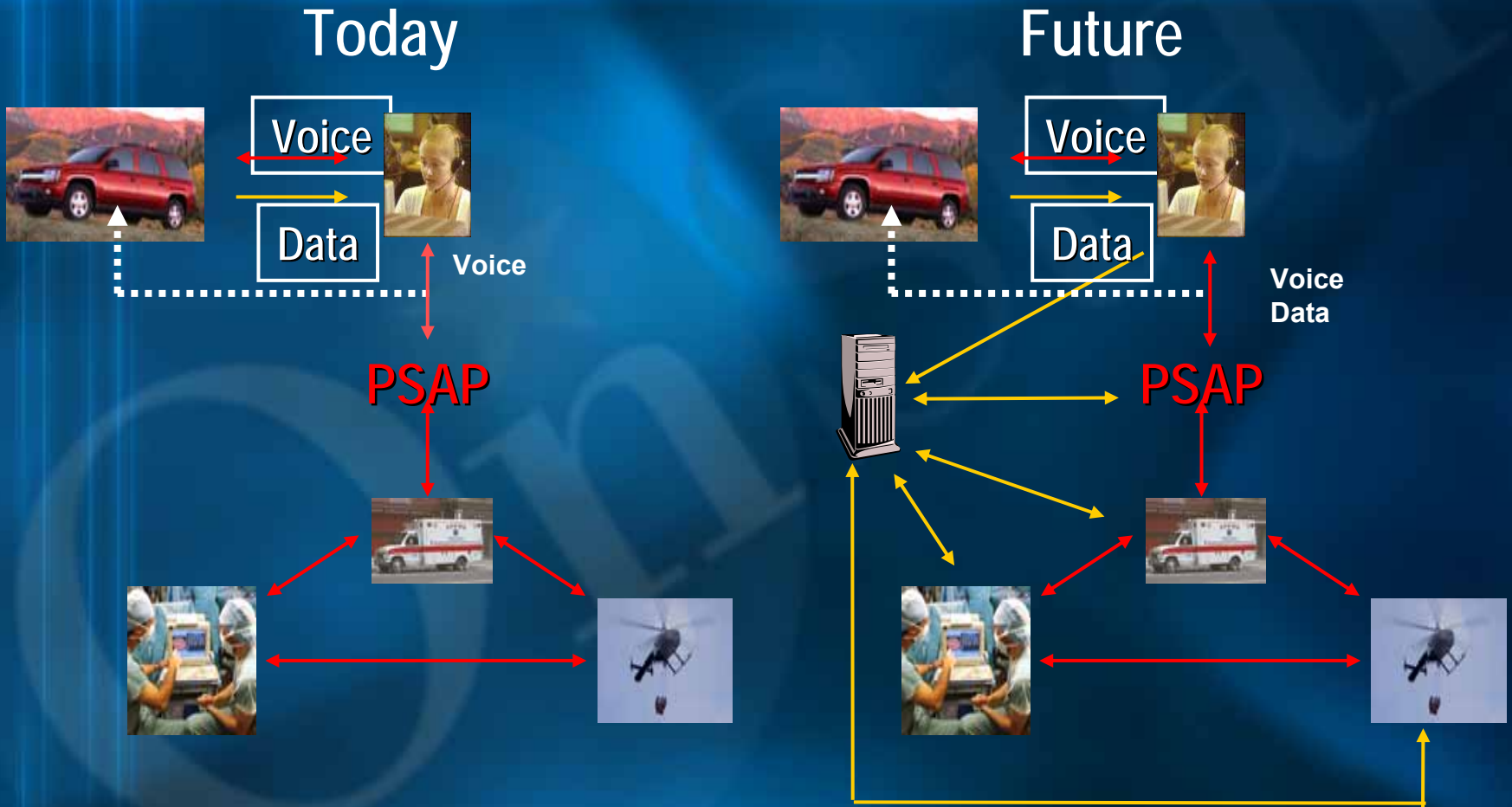
Urgency Algorithms

- Allow prediction of probability of injury using multiple factors, such as:
 - Rollover
 - Delta V
 - Vehicle weight
 - Principal direction of force
- In early development
- Lehman Medical Center and George Washington University with NHTSA support

Conditional Probability of Injury in the Vehicle Tow Away Crashes



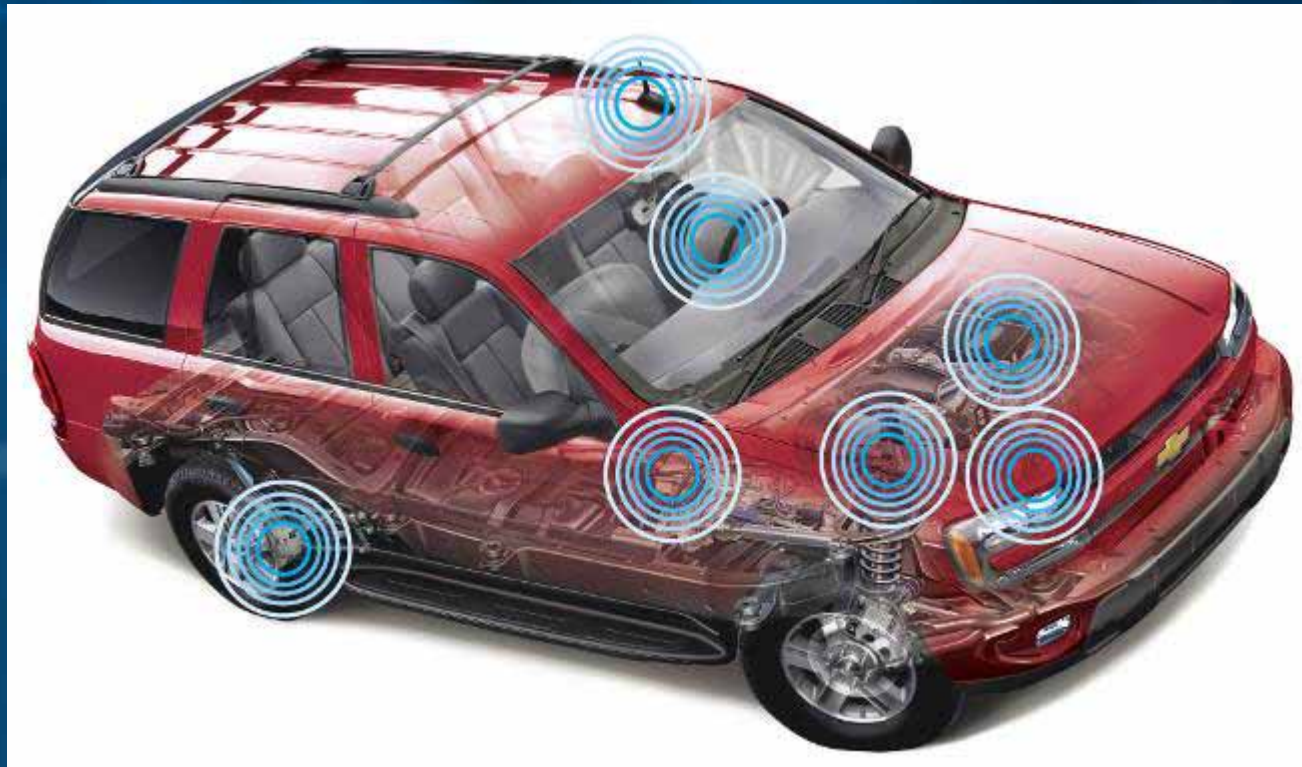
An OnStar strategic objective: relay data as well as voice



GM Goodwrench Remote Diagnostics

- Powertrain Module
- Braking System
- Airbag System
- OnStar

OnStar Vehicle Diagnostics



OnStar Vehicle Diagnostics Overview

- About every 30 days and at 20% remaining oil life, the vehicle automatically transmits selected diagnostic data to OnStar
- Each month, the Subscriber will receive a simple e-mail report with the status of 4 key operating systems:
 - Engine/Transmission
 - Airbag
 - Antilock Brake
 - OnStar System
- Report also includes:
 - Current mileage and remaining oil life
 - Scheduled maintenance alerts
 - OnStar subscription status
 - Number/expiration date of Hands-Free Calling minutes remaining in the vehicle
- Requires Subscriber to opt-in

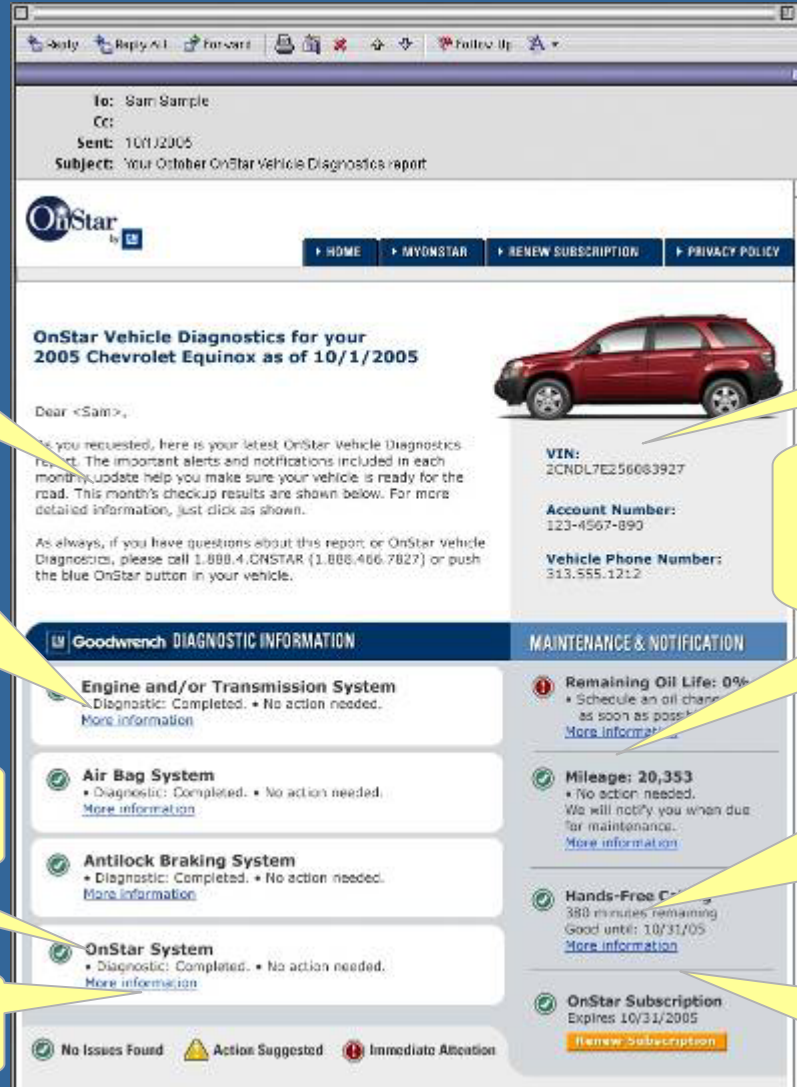
GM Goodwrench Diagnostic Information

- Only active codes retrieved from a running vehicle
- E-Mail presents high-level information only (no diagnostic codes)
 - System status at time of e-mail
 - What system is affected (e.g. engine)
 - Current status:
 - “Green” – No issues found (*no action needed*)
 - “Yellow” – Diagnostic test incomplete (*push blue OnStar button*)
 - “Red” – Issue possibly found (*push blue OnStar button*)

GM Oil Life System (GMOLS)

- Change oil based on operating conditions, not on mileage/time elapsed.
- Monitors engine temperature, combustion events and other parameters to gauge oil life
- As of 2004 MY, nearly all new GMNA vehicles use GMOLS.
- Consumer Benefits
 - Simplifies consumer decision about when to change oil.
 - Routine maintenance completed in one simple visit.
 - Owner's manual maintenance schedule has decreased to 3 pages.
 - Consumers save time and money.
- Environmental Benefits
 - GM has built more than 20 million vehicles with GMOLS.
 - In the next five years, if used as intended, almost 100 million gallons of oil could be saved.

OnStar Vehicle Diagnostics – Sample Email



Introductory Message:
Variable msg. content

Vehicle Diagnostics:
Variable msg. content based on codes received, codes will not be communicated

(Future) XM Account:
Status of XM Radio account

OnStar/Vehicle Tips:
Variable msg. content

Account Information:
Name, Acct. No., Vehicle type, VIN, Phone No., Package Type

Vehicle Maintenance Data
Remaining Oil Life, Odometer Mileage, Service Reminder

HFC Information:
Minutes remaining, Expiration date, Variable msg. content

(Future) Dealer Info:
Selling Dealer and contact information

Current Vehicle Diagnostics Availability

- Vehicle Requirements
 - 2004 MY or later
 - GM Oil Life System
 - Diagnostic Capability
- Subscriber
 - Currently available in the US
 - Available in Canada in early 2006
- Pricing & Packaging
 - Included in base Safe & Sound Plan at no additional charge
 - Subscriber opts-in to receive this service

Business Vehicle Manager

- Spreadsheet emailed monthly to fleet managers with:
 - Odometer readings
 - Oil life remaining
- Can be used in conjunction with Vehicle Diagnostics at user level

Potential Military Applications

- Safe and Sound applications
 - ACN/AACN and emergency services
 - Remote unlock/lock
 - Remote diagnostics
 - Hands Free Calling
 - Roadside Assistance
 - Accident Assist
 - Remote alert
 - Stolen Vehicle Location Assistance
- OnStar Vehicle Diagnostics
- Business Vehicle Manager
 - Diagnostic input can be added

Making a Distinctive Difference

Monthly, OnStar responds to approximately:

- 900 air bag deployments;
- 140 advance automatic crash notifications;
- 15,000 emergency calls;
- 5,000 Good Samaritan calls;
- 27,000 Remote Diagnostics requests;
- 420 stolen vehicle location requests;
- 23,000 requests for roadside assistance;
- 43,000 door unlocks.

Thank You!!

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