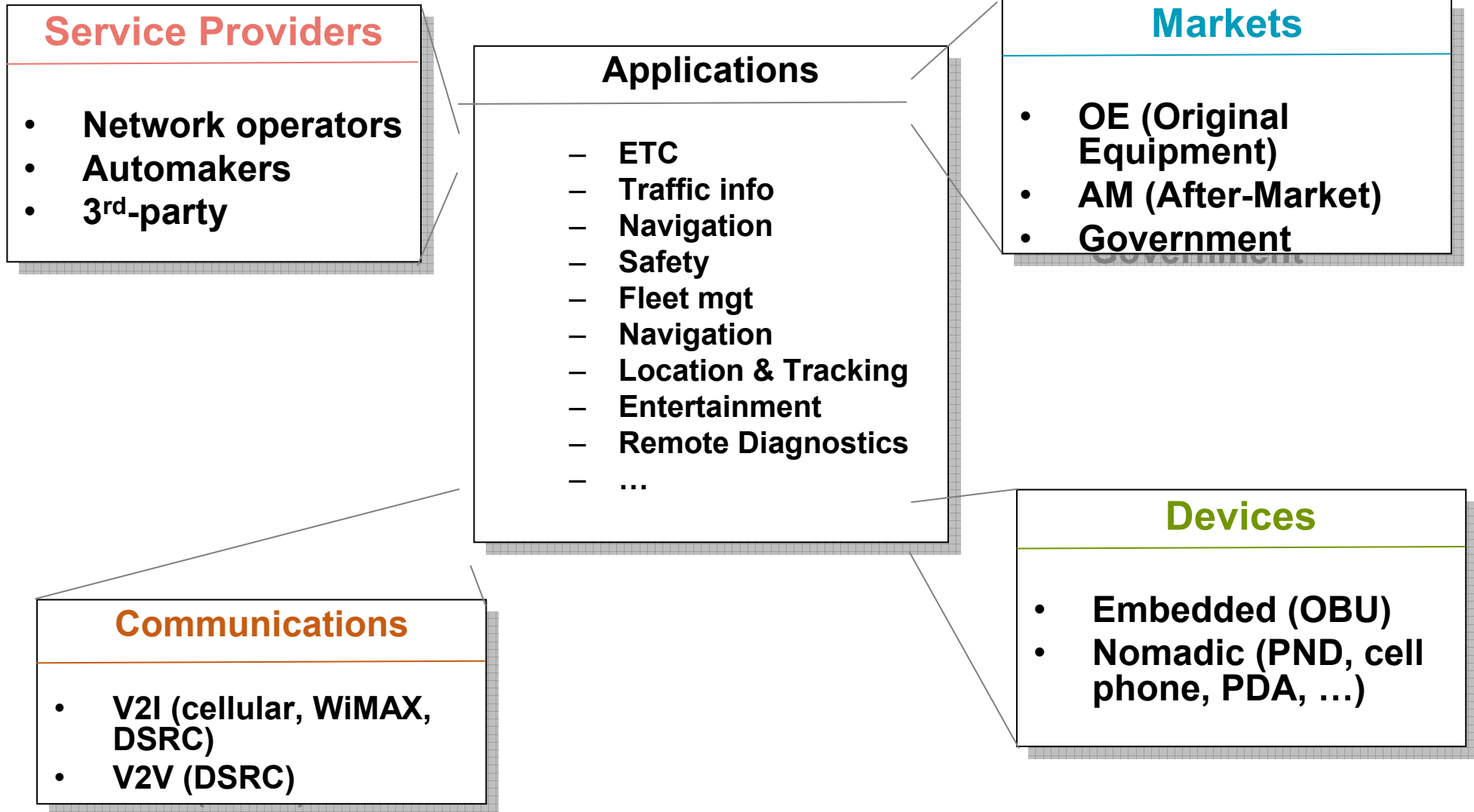


A Brief History of Telematics

– services, technologies and
standards

Chung-Min Chen (陳仲民)

Telematics Application Dimensions



Leading Telematics Services

- Driver Assistance
 - Onstar, ATX, Cross Country, Ford Sync
- Diagnostics & Prognostics
 - OEMs, dealership
- Fleet Management
 - Delivery companies (trucking, package, ...)
 - Utility companies (carrier, cable, lawn mowing, ...)
- Safety and Congestion
 - US VII
 - eCall

Onstar - monitored

- \$16.05/month
- Call center receives 40,000-100,000 calls per day
- Services
 - Hands-Free Calling
 - Automatic Crash Notification (airbag deployment, roll-over)
 - Emergency Assistance (“red” button)
 - Roadside Assistance (“blue” button)
 - Vehicle Diagnostics Email
 - Remote Door Unlock
 - Turn-by-Turn Navigation



SYNC - unmonitored

- Introduced in fall 2007
- 30,000 unit sales in first three months
- Estimated to reach 1M sales in early 2009
- Available in nearly all Ford, Lincoln and Mercury vehicles by late 2008
- **Relies on user Bluetooth-enabled mobile phone**
- Services available
 - Connects to portable MP3 players
 - Hands free calling
 - 911 Assist
 - Vehicle health report

Current Services

Service	Provider
Automatic Emergency Notification/Call	OnStar, SYNC
Manual Emergency Notification/Call	OnStar
Roadside Assistance Call	OnStar
Remote Door Lock/Unlock	OnStar
Remote Control	OnStar
Intruder Detection	Volvo
Remote Vehicle Diagnostic Check	OnStar
Result Notification By Email or SMS	OnStar
Web Portal for Customers	OnStar

Future Services

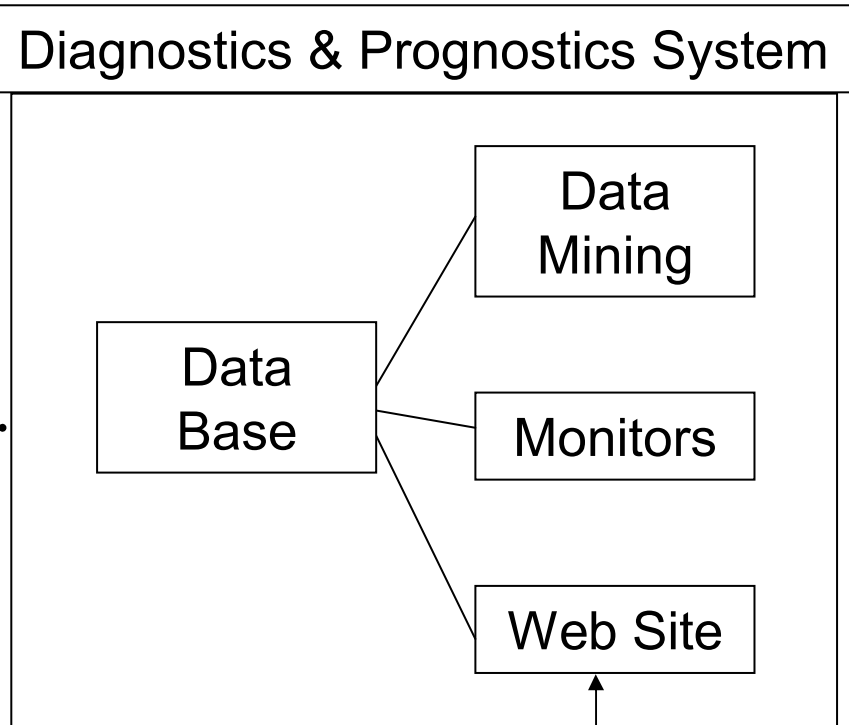
Service
Teen Drive Tracking
Geo-Fencing
Prognostics
Recall or Service Notification
Maintenance Scheduling Assistance
Mileage/Speed/Trip Monitoring
Driving Coach
Remote Software Update
Drunk Drive Protection

D&P System



OBU collects data from
CAN Bus and sensors

Cellular and
Satellite
links



Engineers set
alerts and get
customized
reports



Diagnostics and Prognostics

- Fleets monitoring
 - Real-time monitoring of vehicles in the field
 - Development engineers can calibrate on-board parameters
 - Improved customer service with pro-active maintenance
- Hydrogen vehicles
 - Monitor fuel pressure and engine parameters
 - Long-term trends such as cranks per start
- Diesel exhaust after-treatment
 - Reduce diesel exhaust levels by 50% by 2010
 - Monitor exhaust after-treatment system and engine parameters
 - Many operating environments: desert, cold, humid, etc.

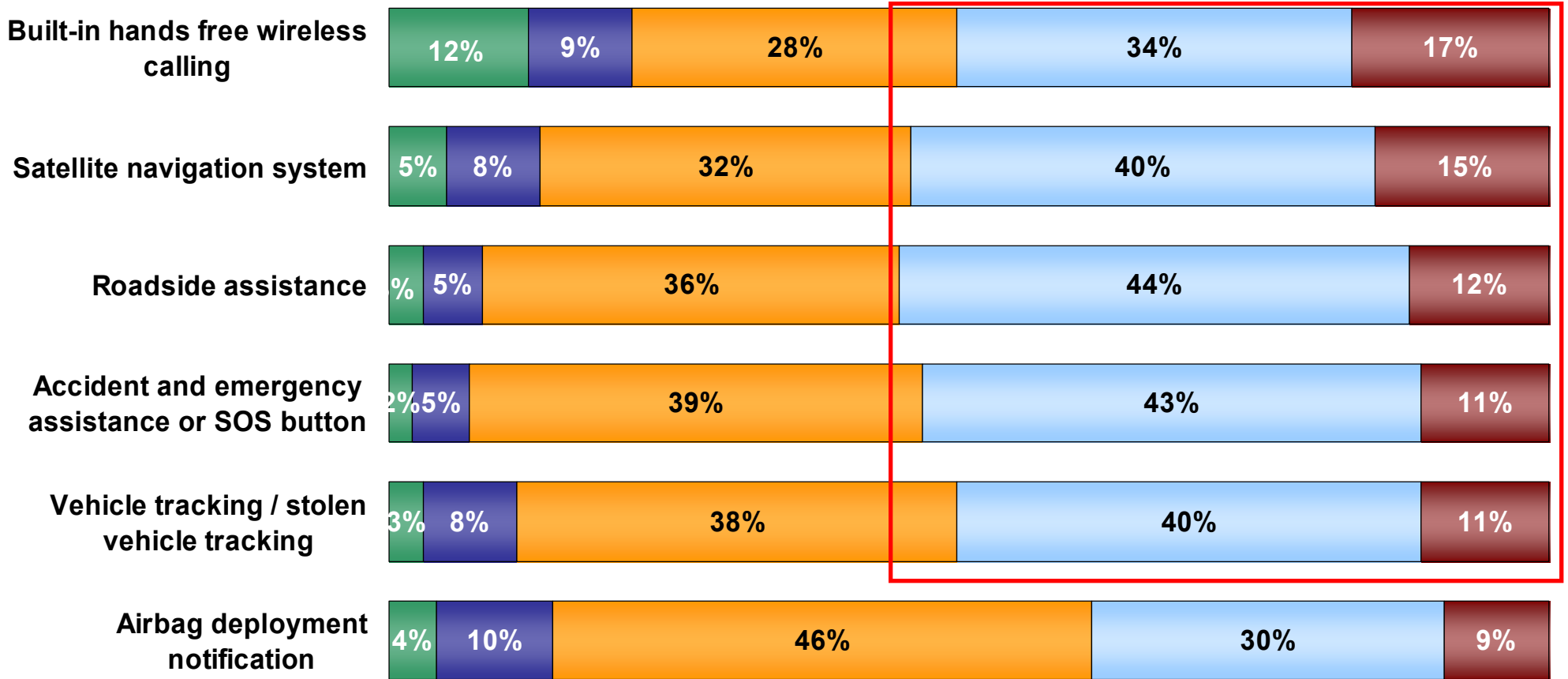
EU E-Call Requirements

- Emergency Call ([E-Call](#))
 - Notifies ambulance, fire dept., or police
 - Supports voice and data calls
 - Mechanisms that ensures 100% voice to data call match.
 - Transmits time, location, vehicle descriptor information, and breakdown status
 - Optionally transmits additional information
 - Number of passengers, cargo, ASCII text, ...

Current Customer Survey

How important are the following features to you when you are considering a package of features for your vehicle purchase?

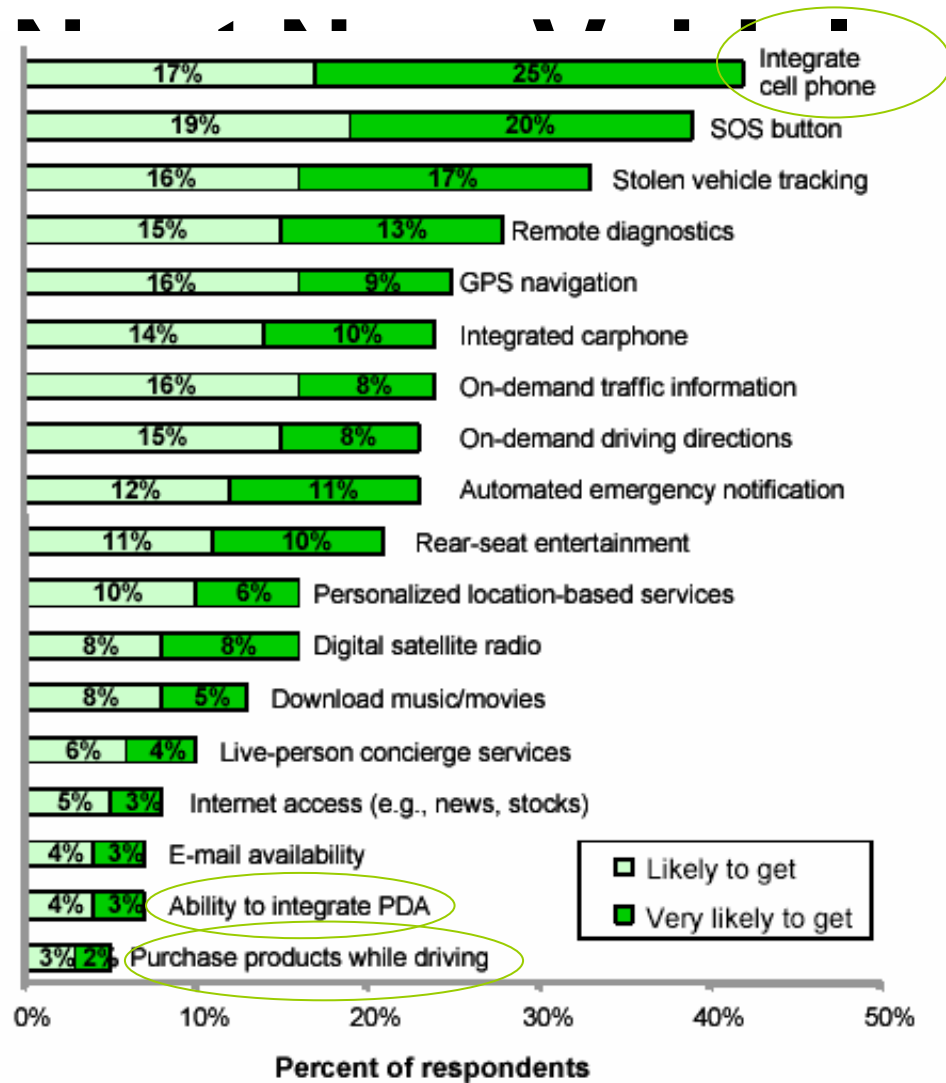
■ Do not want feature
 ■ Neutral
 ■ Nice to have
 ■ I want this feature
 ■ Will only consider this feature



Base: n=1,050

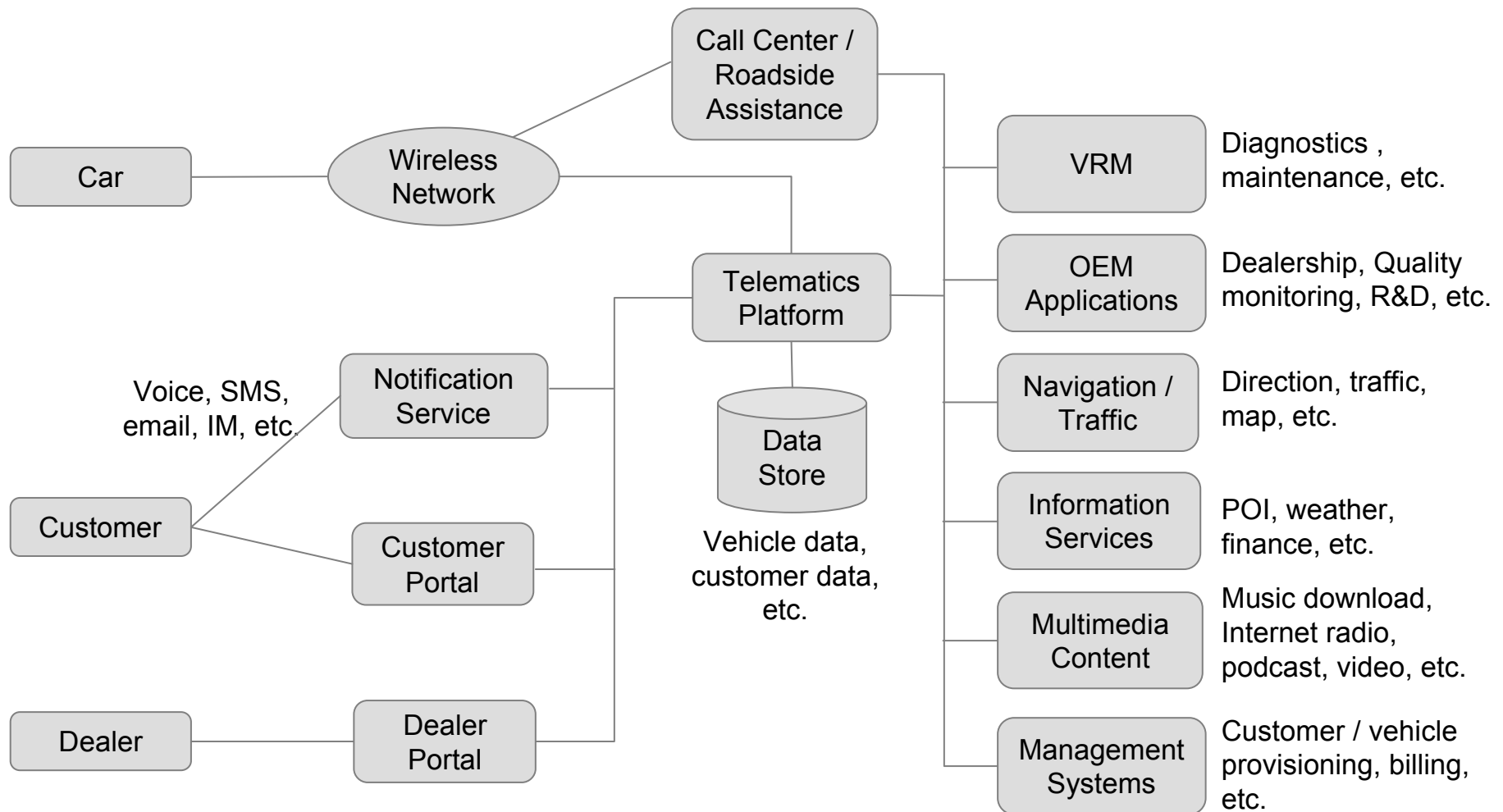
Source: Frost & Sullivan Telematics Survey 1/2008

Previous Survey – Consumer Likelihood to Get Telematics in

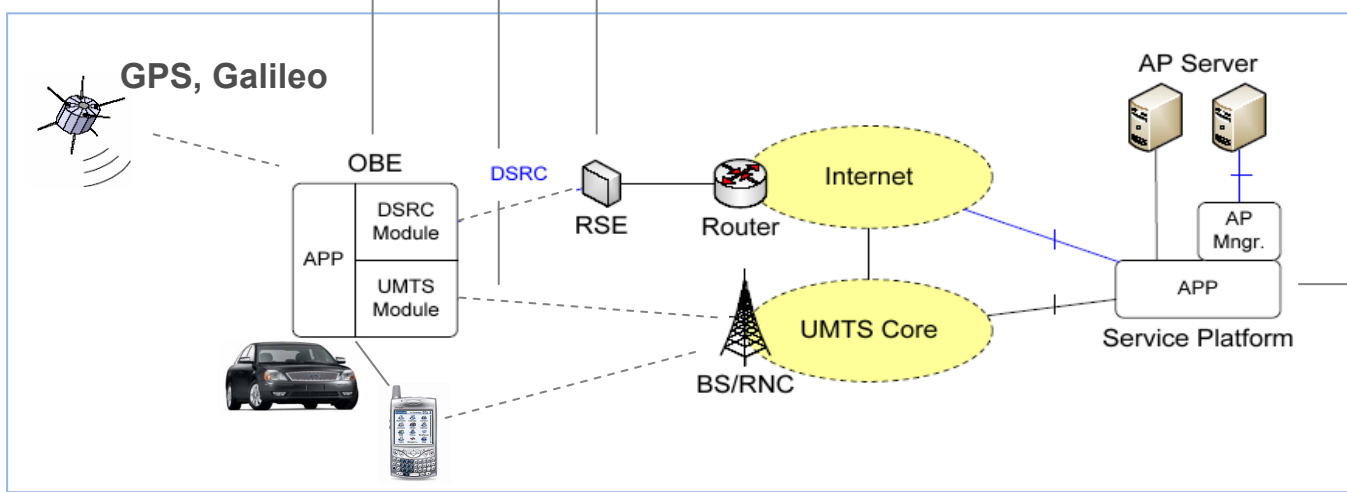
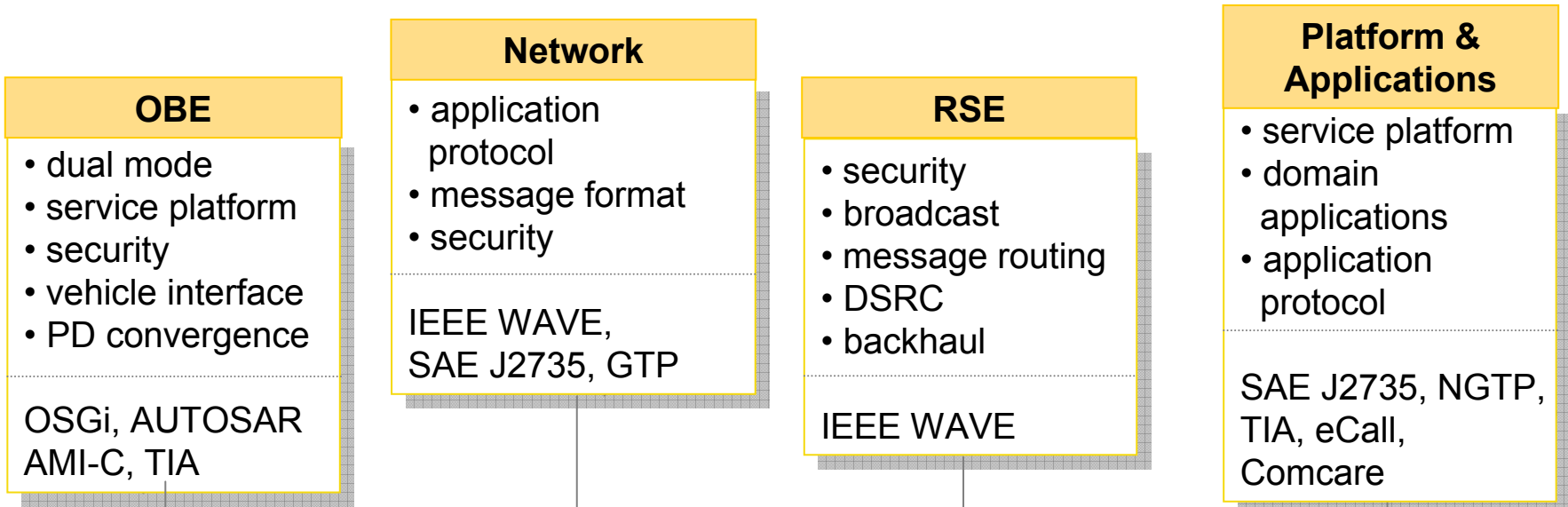


Source: GartnerG2, "Telematics Industry Outlook: Think 'Outside the Vehicle'," September 2002

Telematics Solution Architecture



Technologies and Standards



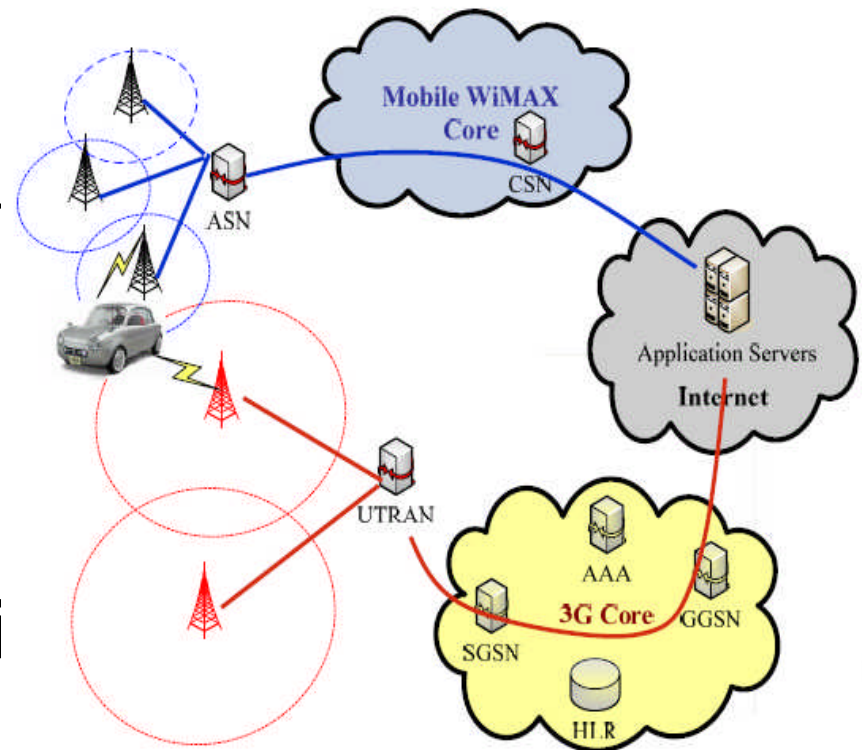
Communications

- Air
 - In-band data communications
 - Airbiquity (Onstar solution provider)
 - DSRC
 - IEEE WAVE
- In-vehicle
 - Optical network (Flexray, GbE)

Seamless Mobility

- Seamless network mobility

- DSRC, 2G/3G, WiFi
- PHY: cognitive radio, SD
- MAC: fast handover, authentication
 - 802.21 (MIH)
- Network: IP mobility



- Seamless device mobility

- PND
- Cell phone
- OBU

Standards

- ISO TC204 (general)
 - ITS technical committee
- TIA TR-48 (telecom)
 - Telematics engineering committee
- SAE (automotive)
 - ITS application message formats
- OSGi (software)
 - OBU software platform
- Others
 - IEEE WAVE, GST, CVIS, NGTP, eCall, Comcare, Car2Car Comm. Consortium, OmniAir