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European Telematics

Current Status and Latest Trends

Services, Systems and Standards

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Conference
October 14, 2008



Introduction

- 1969 Bachelor and 1972 Master Degrees from Princeton University in architecture and urban planning
- 1972 – 1977: London and Boston – Computer-aided design and planning
- 1978 – 1982: Boston and Stockholm - Digital cartographic production
- 1983 – 1992: Matrix Consultants - Consulting in digital map production for cartography and navigation applications to map publishers (Rand McNally, K+F, others) and automobile travel clubs (AAA, AA, Michelin)
- 1993 – 1996: Volvo Technological Development Corporation. Director of navigation and traffic map data; strategy for telematics introduction; expert on CEN and ISO digital map working groups
- 1997 – Present: Michael L. Sena Consulting AB – Consulting in navigation systems and applications; strategic consulting and project management in telematics. Project manager for implementation of Volvo On Call telematics system in 15 European countries.



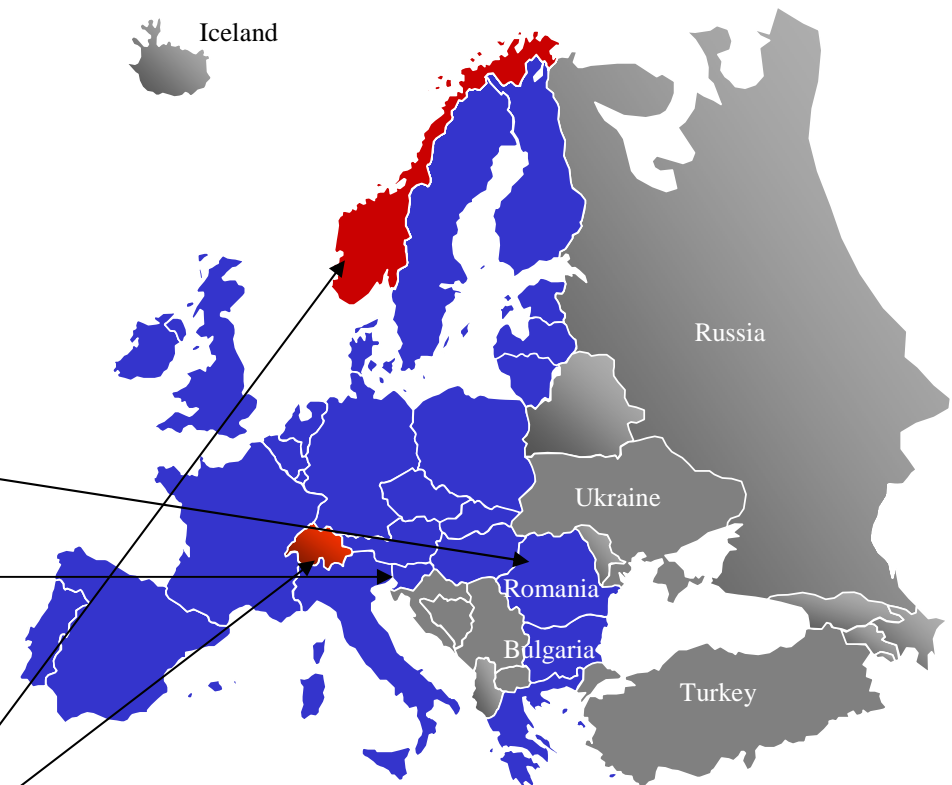
Presentation Objectives

- Review progress to-date of European Telematics Market
- Describe services offered, systems in use and standards.
- Allow time for questions and discussion
- Understanding of Europe
 - Europe is the sixth-largest of seven continents, extending west from the Dardanelles, Black Sea, and Ural Mountains to Iceland.
 - In etymology one theory suggests the name *Europe* is derived from the Greek words meaning **broad** (*eurys*) and **face** (*opsis*)—*broad* having been another word for Earth in the reconstructed Proto-Indo-European religion.



Europe in 2008

- 27 of Europe's 48 countries are now members of the European Union. Romania and Bulgaria joined in 2006.
- 13 of these countries are members of the European Monetary Union
- Slovenia is the latest country to join the EMU.
- R&D programs are supported both at the EU and national levels, and they are not always coordinated.
- Switzerland and Norway have special trading status with the EU.



European Monetary Union countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Portugal, Slovenia, Spain, The Netherlands. EU countries outside of the EMU include UK, Denmark and Sweden plus the eleven of the twelve new countries.

1.1.Austria

Country Issues

- There are special issues that must be addressed in each country.
- Language, business practices, regulations effect all aspects of telematics delivery.
- Emergency call (eCall)
- Breakdown assistance (bCall)
- Theft Notification
- Stolen Vehicle Tracking
- Remote Door Controls
- Information Services
- Vehicle Diagnostic Services

Population (2007) ¹	8,205,533 (July 2008 est.)
Cars Sold/Year (2007) ²	298,192
Capital	Vienna
Area	83,870 square kilometres
Form of Government	Federal Republic
Political Subdivisions	9 states
Roads (km) ¹	
Total	133,718
Paved	133,718
Expressways	1,677

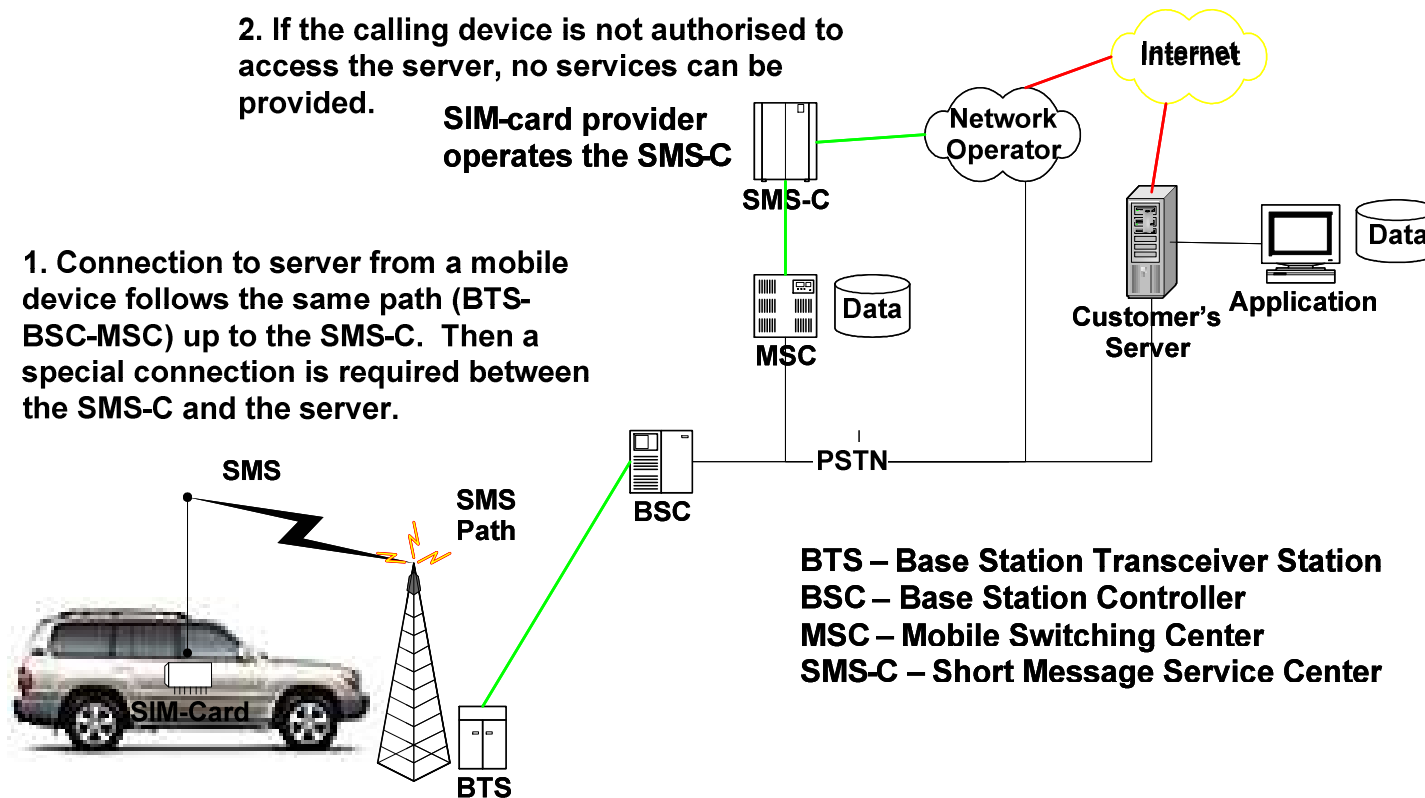
1. CIA The World Fact Book
2. ACEA 2007



Country Issues

Sending SMS Data Messages

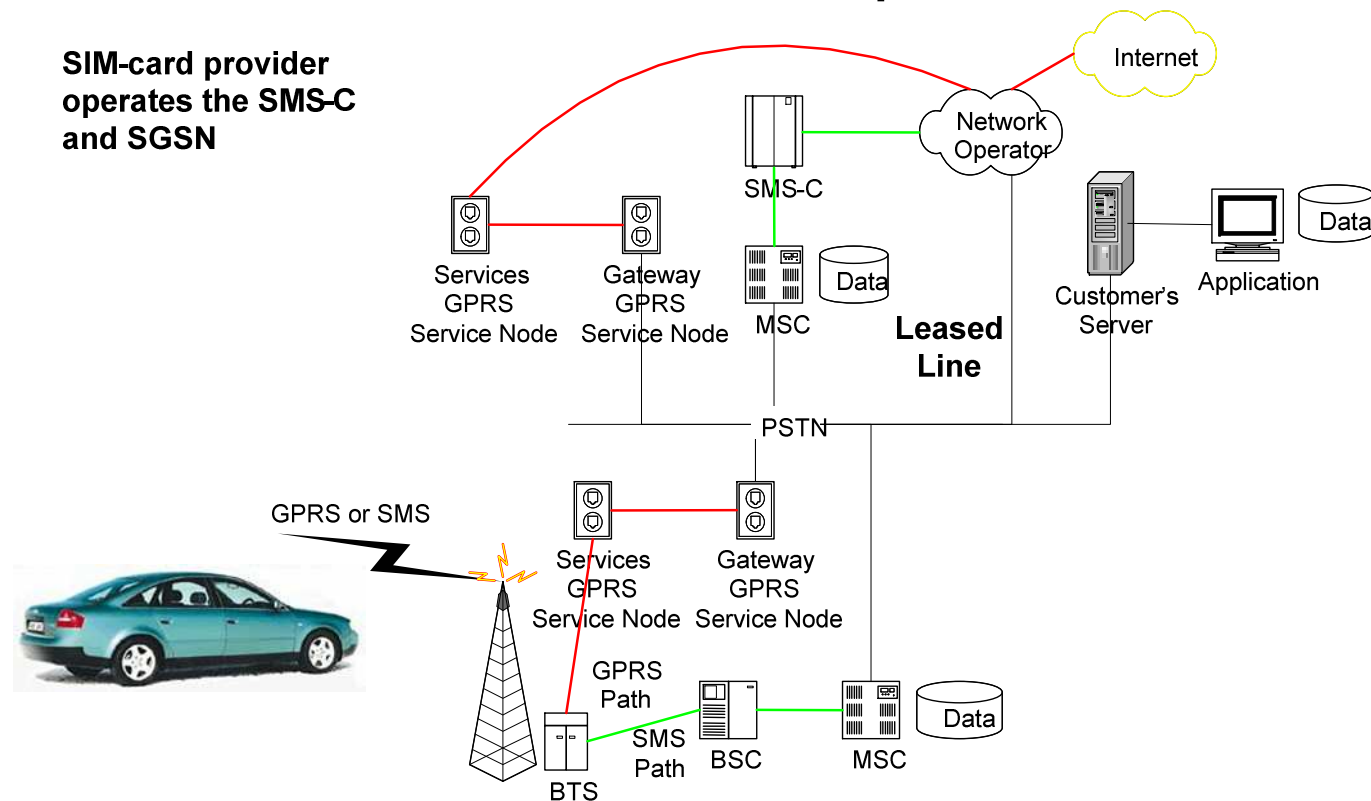
SMS Path to Server



Country Issues

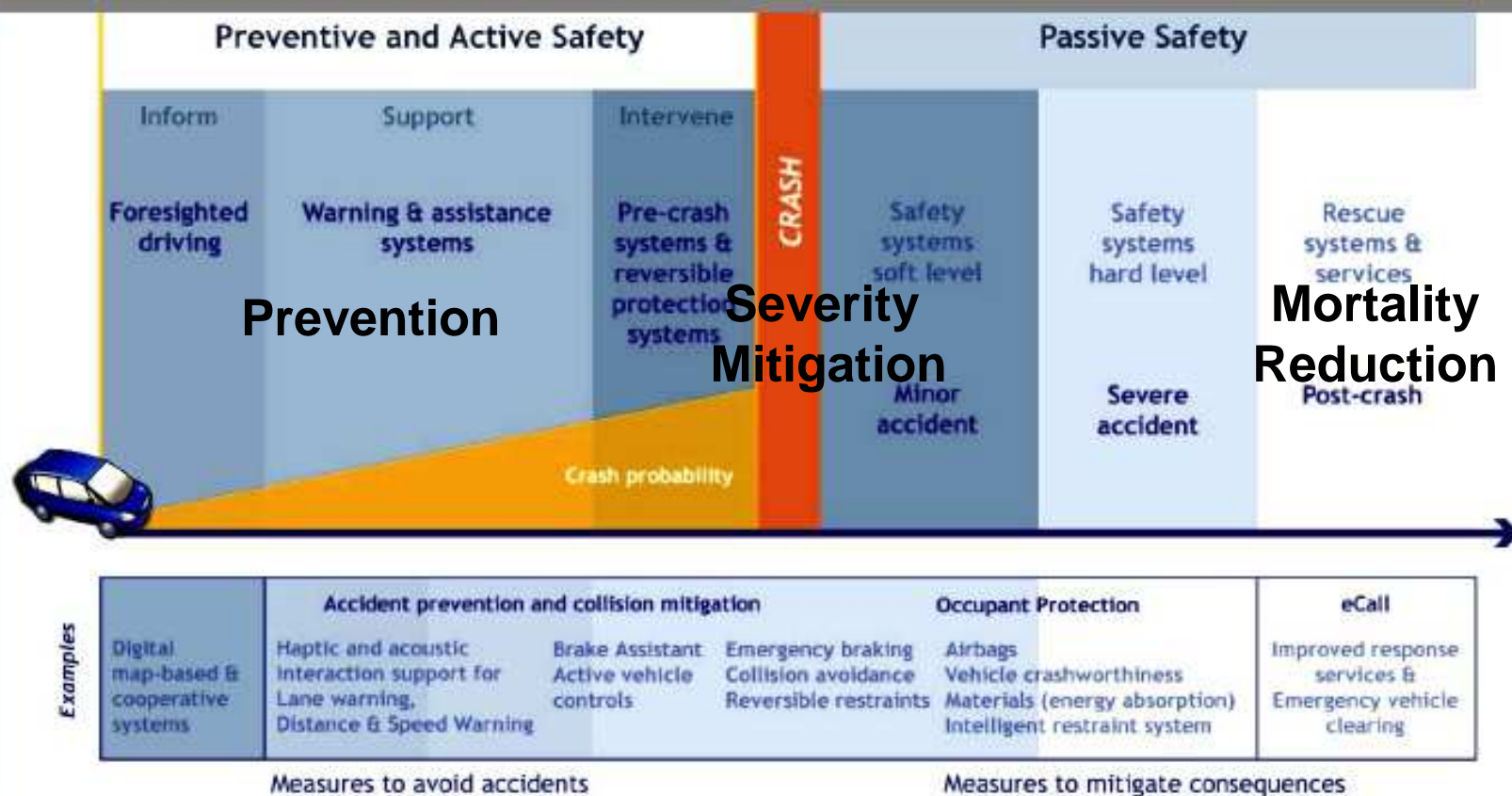
Communications Links

**SIM-card provider
operates the SMS-C
and SGSN**



European industry view on safety

Harmonised progression of interventions and integration of preventive, active and passive safety



European Telematics: Key Issues

- eCall regulations
- Government investments in infrastructure
- Implementation of inner city congestion charging and highway tolling systems
- Legal restrictions on in-vehicle systems (phones, navigation)
- Insurance company investments in pay-per-use insurance
- Consumer electronics trends
- Network operator offerings
- Traffic information systems



Principal Product Areas for Europe

Needs	Description	Telematics services
Safety & Security	<ul style="list-style-type: none"> • Telematics services that enhance passengers safety and vehicle security <ul style="list-style-type: none"> - Improvement of emergency service response - Tracking stolen cars position 	<ul style="list-style-type: none"> • eCall • Stolen Vehicle Tracking • Remote door unlock • Real time intelligent speed adaptation
Information	<ul style="list-style-type: none"> • Connected services that provide up-to-date information and entertainment applications for vehicle passengers 	<ul style="list-style-type: none"> • In-vehicle internet, email, OEM portal • Traffic info., Points of Interest, toll info • Download files, games • Social networking • bCall
Comfort & Convenience	<ul style="list-style-type: none"> • Technological tools that ease driver's and passengers' experience 	<ul style="list-style-type: none"> • Remote diagnosis, flexible maintenance • Find my car • HVAC remote control
Total Cost of Ownership	<ul style="list-style-type: none"> • Distance based charging through innovative communication tools 	<ul style="list-style-type: none"> • Pay as you drive insurance • Distance charging

The European Customers

- Safety Systems and Services – Automotive OEMs, insurance companies, travel clubs, end user
- Security – Automotive OEMs, insurance companies, theft notification system suppliers, end user
- Convenience – Automotive OEMs, network operators, content suppliers, advertisers, end user
- Vehicle Services – Automotive OEMs, end user
- Pay-per-Use Insurance – Insurance companies, end user

What is the market today in Europe

- Safety Systems and Services – Four automotive OEMs offering services, but most waiting for final directive on eCall
- Security – High-end cars in some European markets equipped with tracking systems, but take up of medium- and low-priced models is very low. Also, personal security devices, like mobile tracking on phones, are beginning to be purchased in large numbers. Volvo only OEM system.
- Convenience – Navigation systems have taken hold on high-end vehicles and in the mass market with portable systems. OEMs will have to offer more services to stay competitive with the lower-cost systems.
- Vehicle Services – Just getting started in some brands (BMW).
- Pay-per-Use Insurance – UK and Italy are the major markets. Other markets just getting started. Allianz, the largest insurer in Europe, will eventually be the biggest player.

Status of Telematics Implementation

BMW Assist




















PSA Urgence

Fiat Blue&Me Nav

Volvo On Call



BMW, Volvo, Fiat and PSA already offer telematics services. Mercedes will introduce in 2009.

					
Accident & Breakdown					Planned for 2009 
Stolen vehicle tracking	Aftermarket solution in Italy only 			Supplier Selected for Italy 	
Distance based charging				Supplier Selected for Italy 	
Connected navigation			France 		
Comfort & Entertainment					
System Coverage	AU, DE, FR, IT, UK	AU, BE, CH, DK, DE, ES, FR, IT, LX, NL, NO, PO, RU, SE, UK	BE, DE, ES, FR, IT, NL	DE, ES, FR, IT, UK	DE



Available

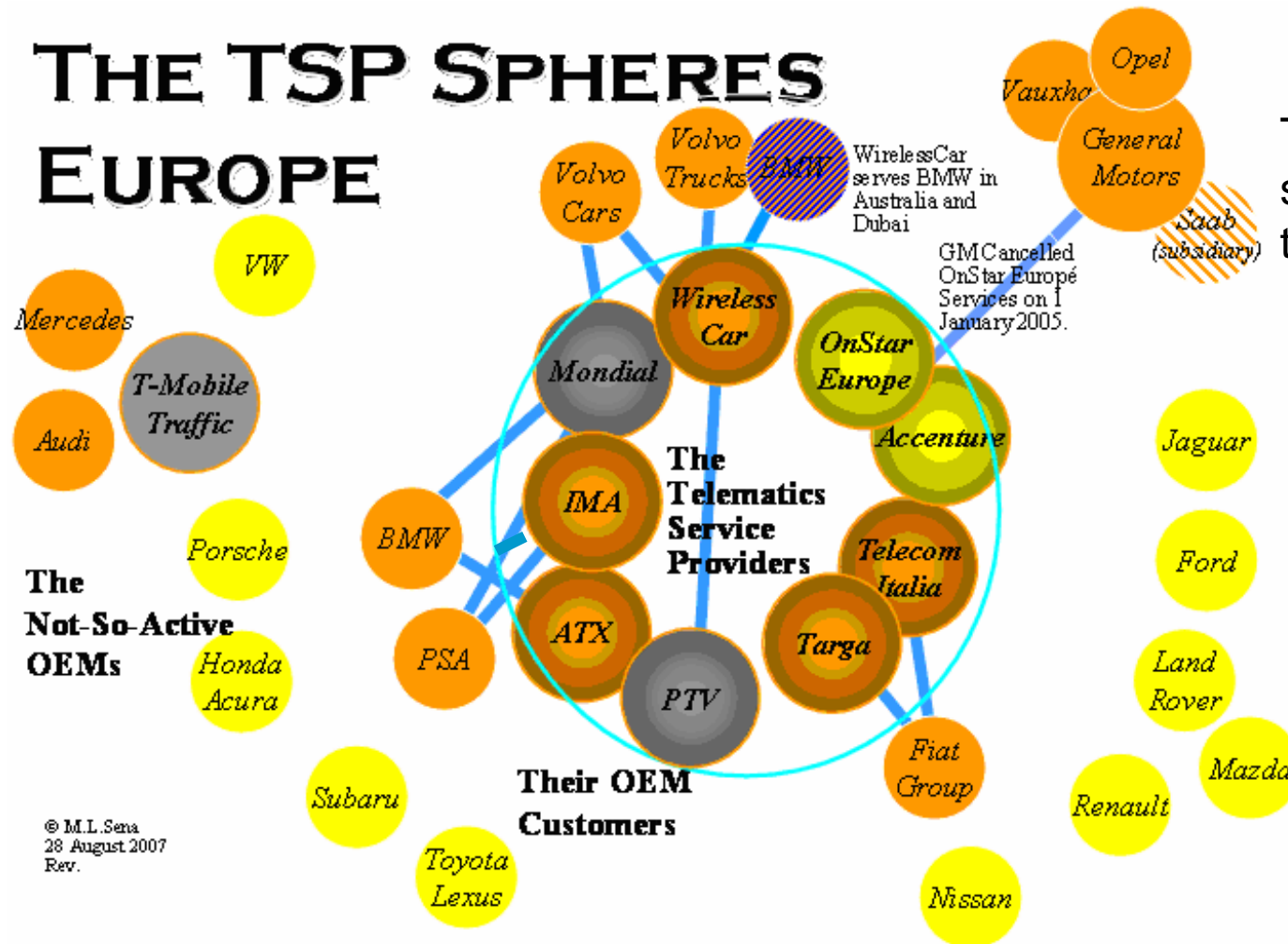


Planned

Status of Telematics Implementation

Vehicle OEMs	Volvo	BMW	PSA	Fiat	
System Name	Volvo On Call	BMW Assist/Online	Urgence	bCONNECT	Blue&Me Nav
In-vehicle hardware	Autoliv	Continental	Magneti Marelli Autoliv	Magneti Marelli	Magneti Marelli
In-vehicle Software	Autoliv/Volvo	Continental	Magneti Marelli Autliv	Mageti Marelli	Magneti Marelli
Telephone Module	Wavecom	Continental	Wavecom		
SIM-card	Telenor	T-Mobile		Personal	Telecom Italia
Connectivity/TSP	WirelessCar	ATX	IMA ATX	Targa Infomobility	Telecom Italia
eCall Service – First Contact	Mondial Viking SOS International AutoLocator BT999 (UK)	ATX Mondial Europ Assistance BT999 (UK)	IMA	Targa Infomobility	ACI Europ Assistance AvD AA
bCall Service – First Contact	Mondial Viking SOS International AutoLocator	ATX Mondial Europ Assistance	Mondial	Targa Infomobility	ACI Europ Assistance AvD AA
SVT Service	Mondial Viking SOS International AutoLocator	NA	NA	NA	NA
Information Service	NA	ATX Mondial Europ Assistance	NA	NA	NA
Remote Diagnostic Service	NA	Mondial	NA	NA	NA

THE TSP SPHERES EUROPE

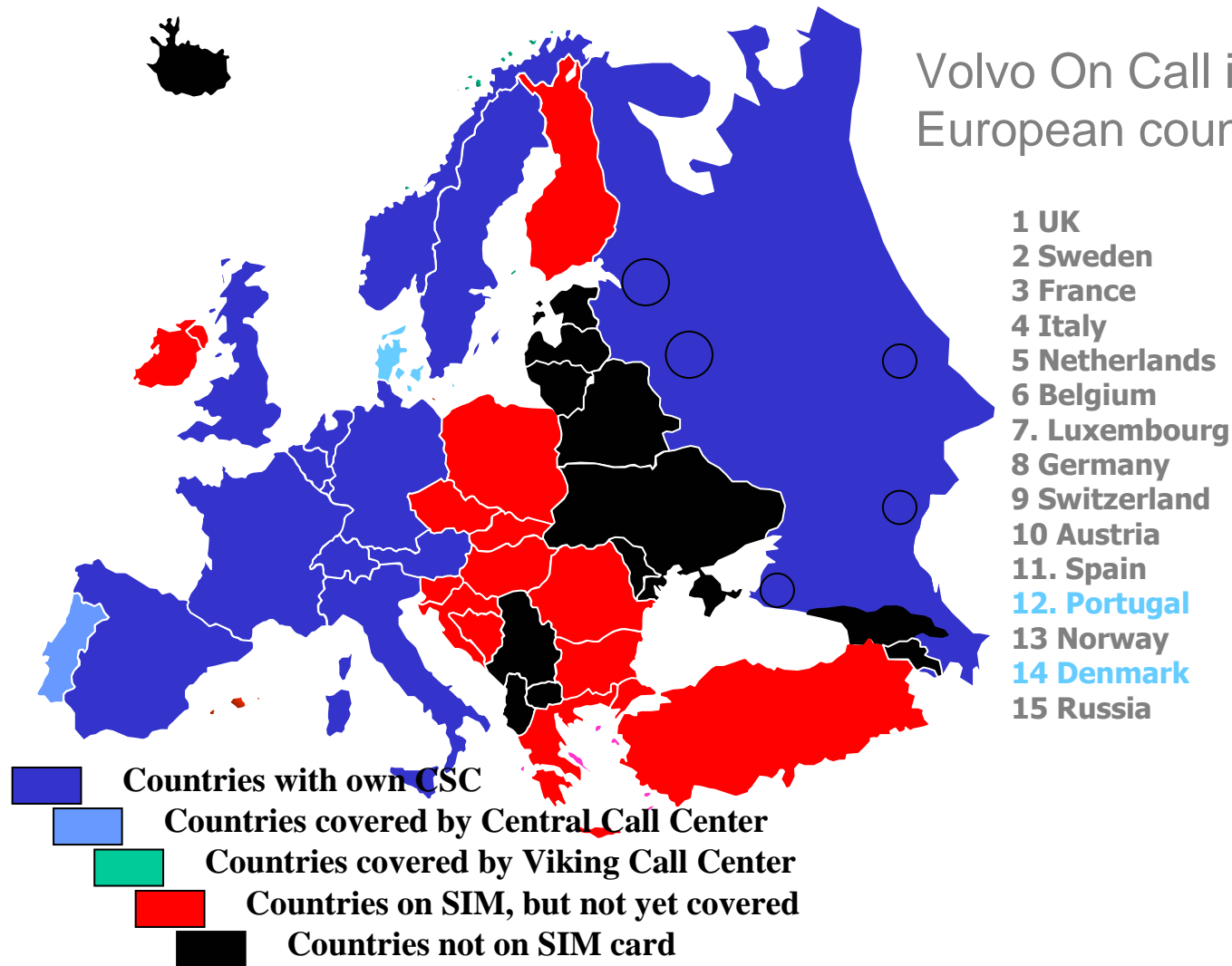


The three foundation stones for European telematics services:

- Safety – eCall, bCall
- Security – theft notification, tracking and remote door locking
- Convenience – concierge, facility location, information provision

Status of Telematics Implementation

Volvo On Call in fifteen
European countries





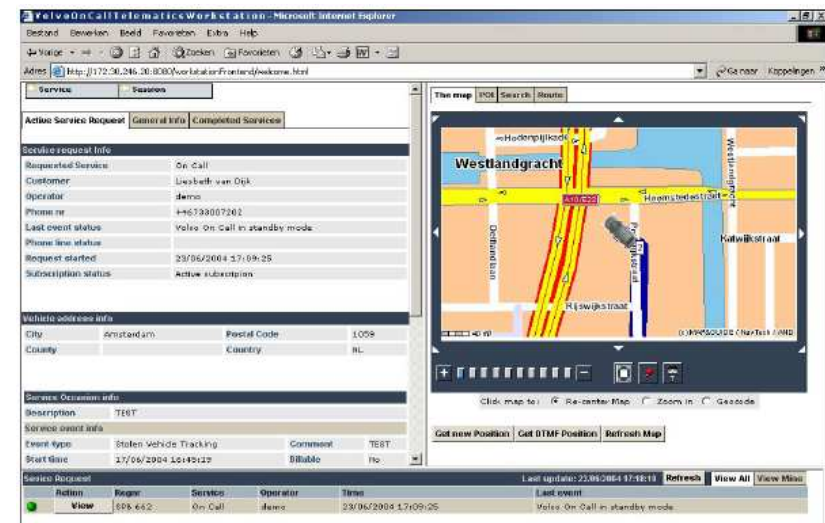
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Safety

Vehicle-related Safety and Security Services

- Emergency assistance
- Roadside assistance

Personal Safety and Security Services

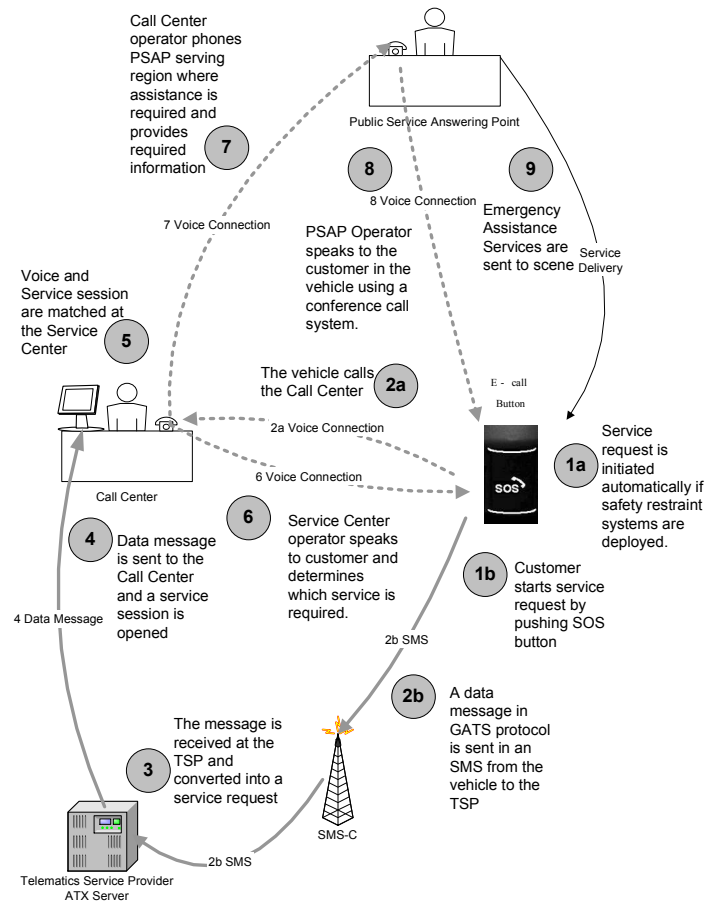


Volvo On Call System and Customer Service Center Workstation

Emergency Services

BMW: BMW Assist Emergency Assistance

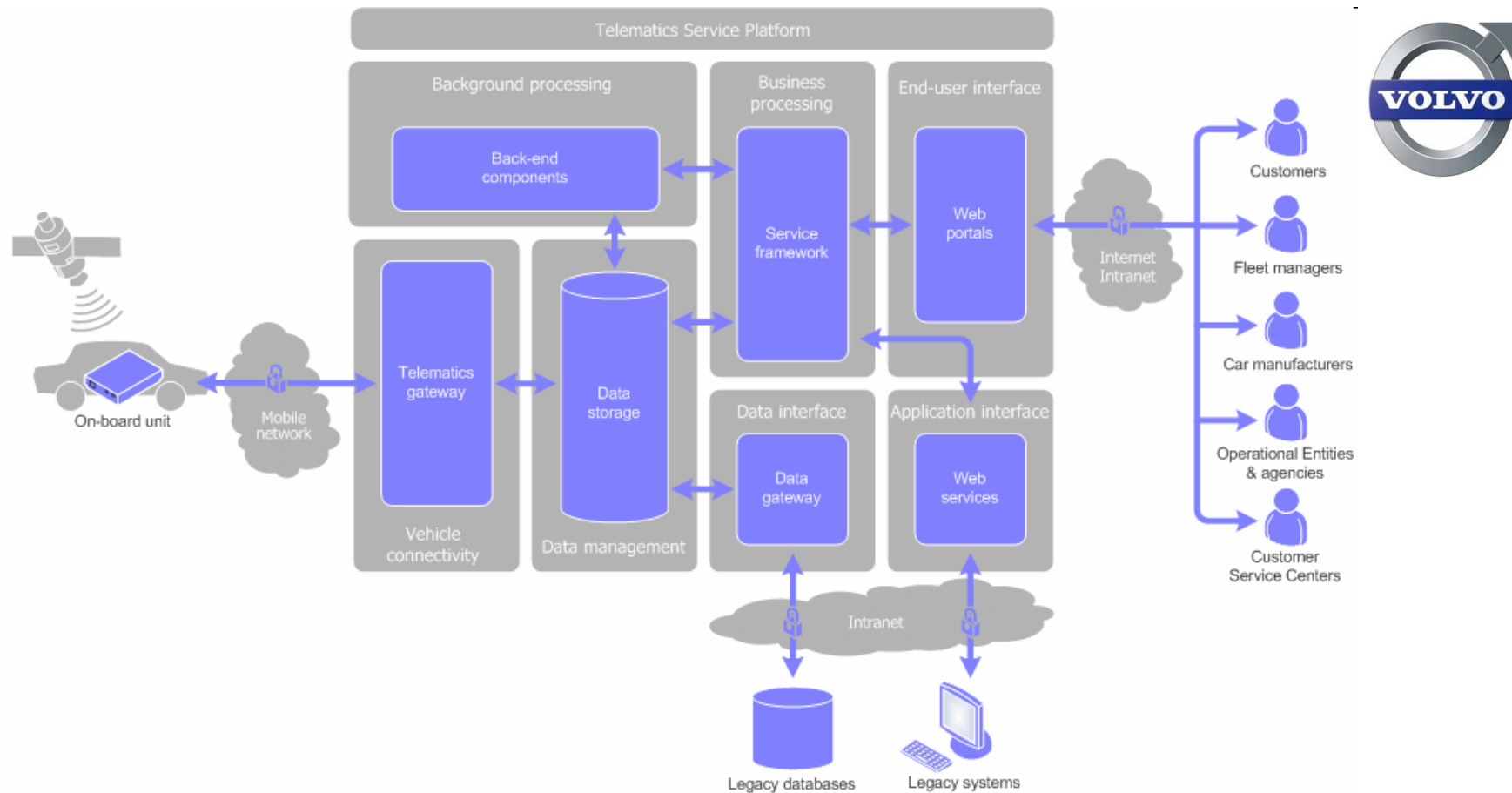
REF: BMW_EmergencyAssistance



	UK	DE	AU	IT	FR
eCall					
Voice	BT999	ATX	ATX	Europ Assistance	Mondial GTS
Data	ATX-BT999	ATX	ATX	ATX-EA	ATX-GTS
bCall					
Voice	Mondal, UK	BMW Assist, DE	BMW Assist, DE	EA, IT	Mondial, FR
Data	ATX-Mondial	ATX-BMW	ATX-BMW	ATX-EA	ATX-Mondial
iCall					
Voice	Mondial, UK	ATX, German	ATX, German	ATX, Italian	ATX, French
Data	ATX-Mondial	ATX	ATX	ATX	ATX

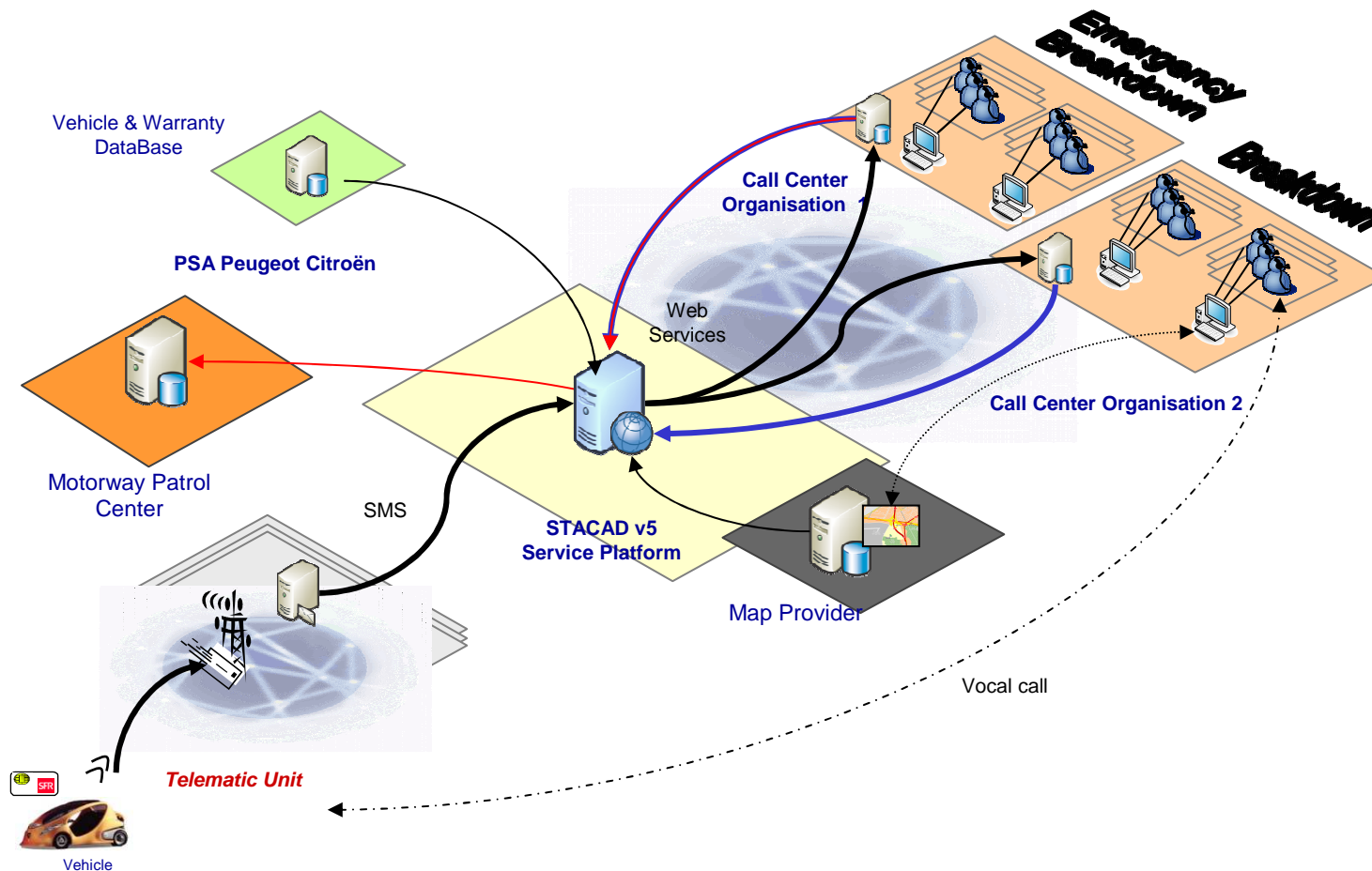


The Volvo On Call Telematics Platform



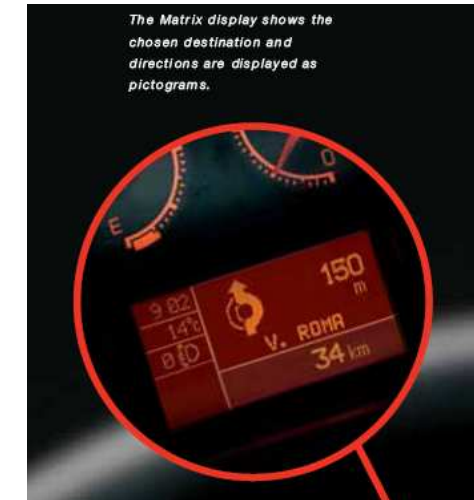
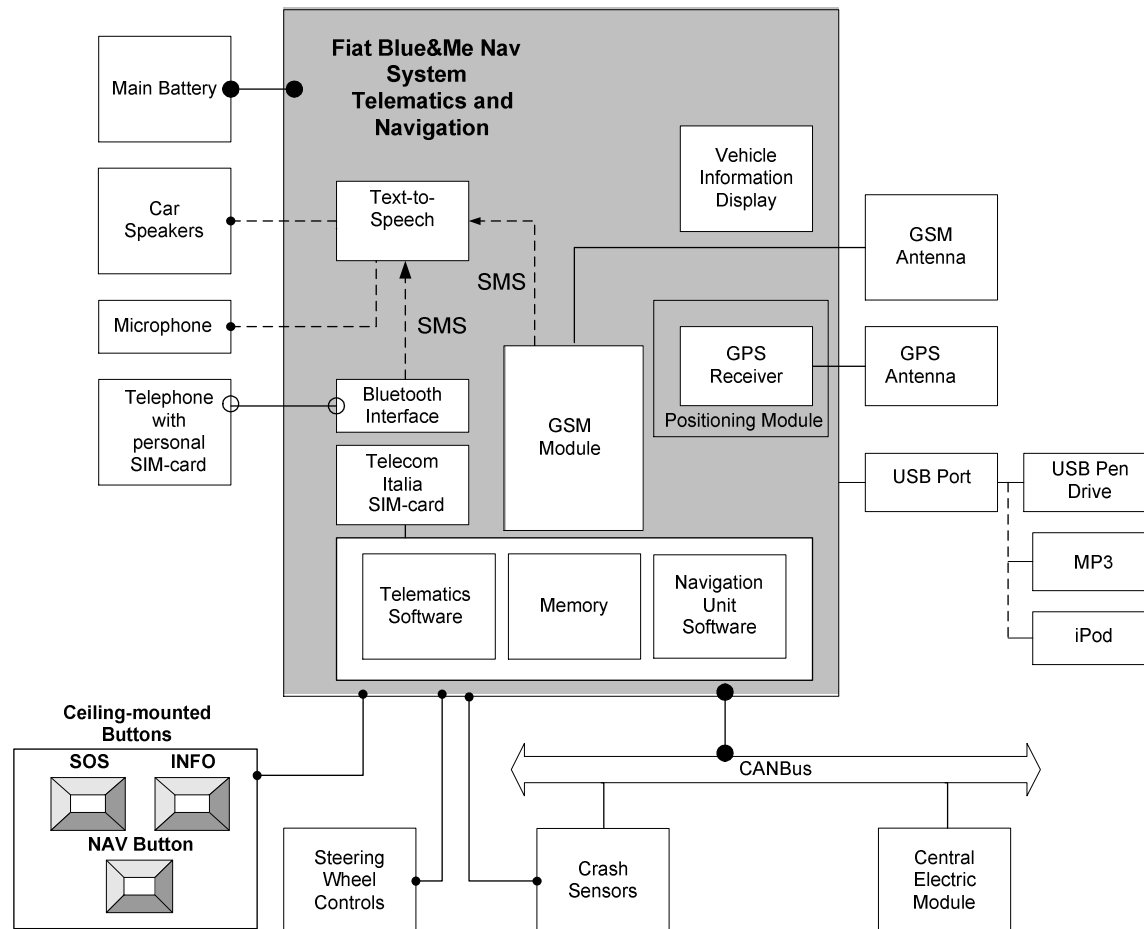
Telematics Architecture

Convergence on connectivity provision by TSP

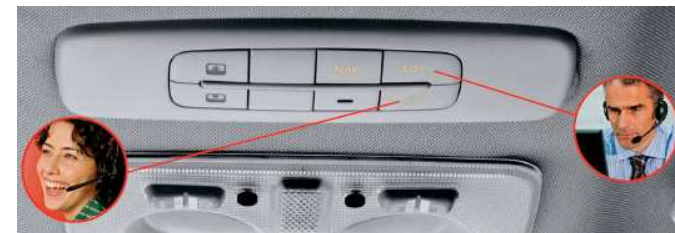


Telematics Architecture

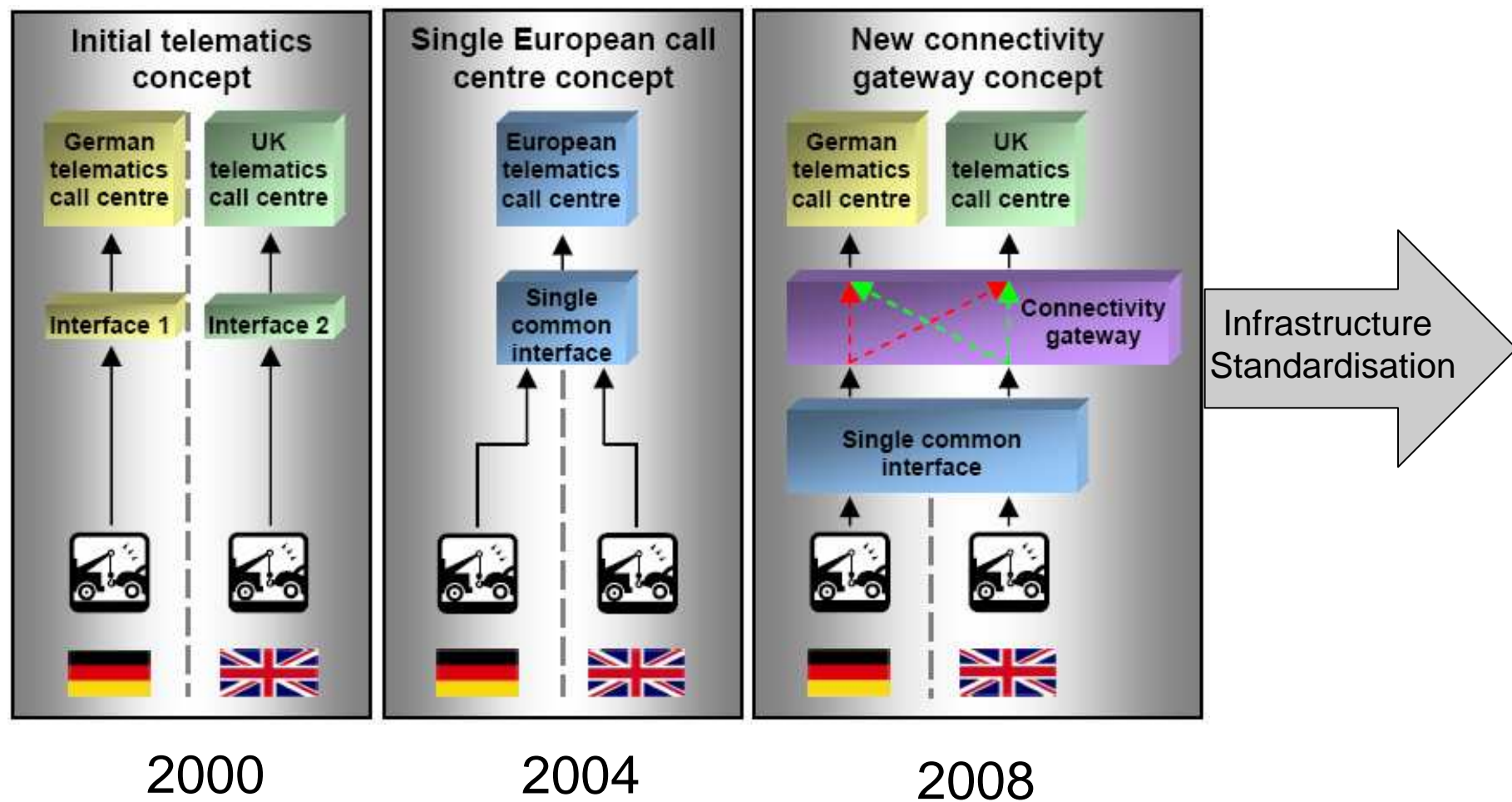
First Generation Fiat Blue&Me Nav Telematics System



Navigation Kit
USB Pen with
Map + Back-up
CD



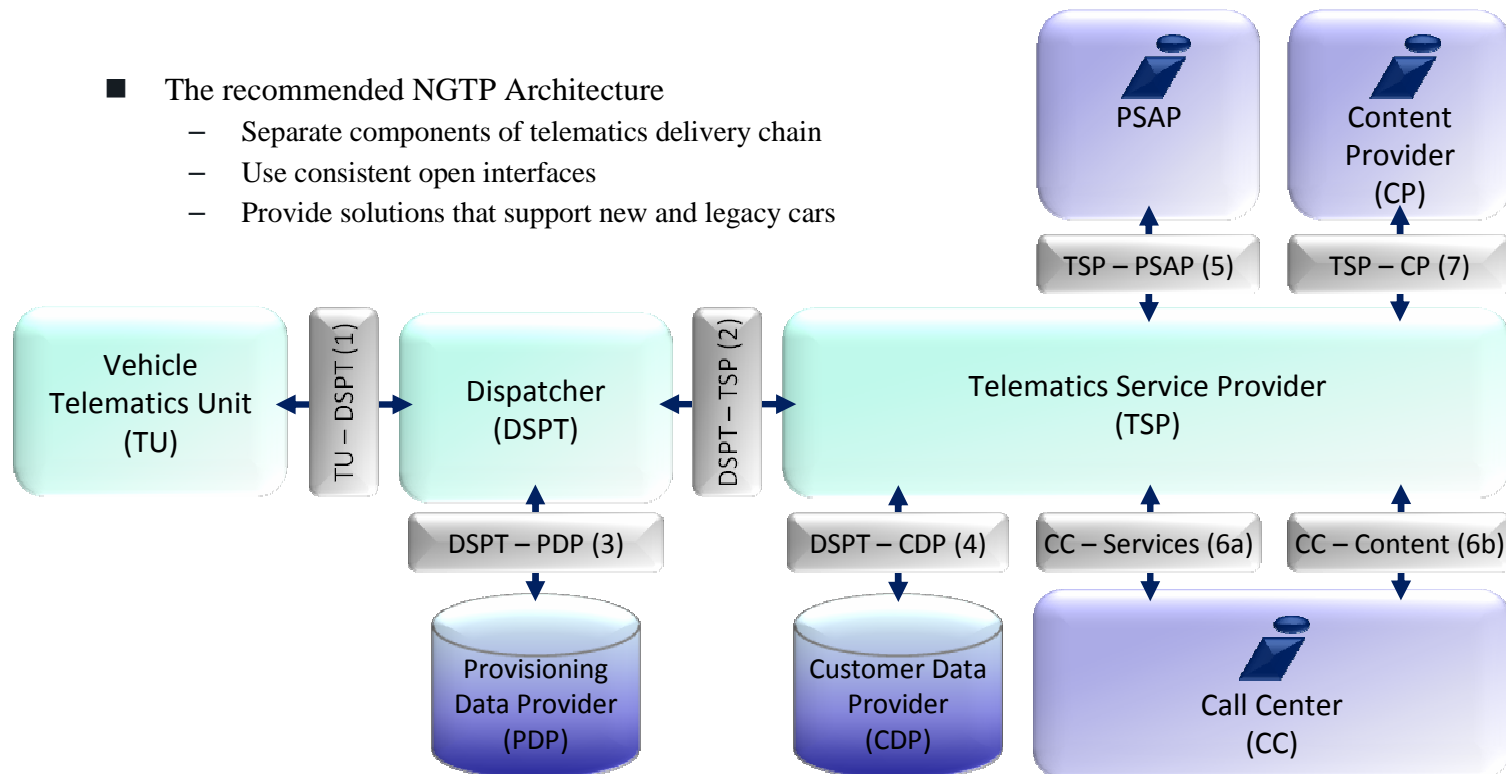
Infrastructure: Telematics Service Delivery Platform Evolution



BMW Proposal for Standardisation Next Generation Telematics Protocol (NGTP)

- The targeted goals of NGTP
 - More flexibility to add providers
 - Faster to market with new services
 - Easier implementation across multiple countries
 - Ability to manage legacy generations of Telematics Units

- The recommended NGTP Architecture
 - Separate components of telematics delivery chain
 - Use consistent open interfaces
 - Provide solutions that support new and legacy cars



Update on eCall – Previous Standards

EC Directives

- Decision 91/396/EEC introduced the single European emergency call number 112 (effective from 1992)
- Directive 2002/22/EC, the Universal Service Directive, requires operators to make caller location information (CLI) available to authorities handling emergencies, to the extent technically feasible, for all calls made to the single European emergency call number 112.
- Directive 2002/58/EC, the Directive on privacy and electronic communications establishes exemption to privacy protection for organizations dealing with emergency calls

Status of EC's public eCall initiative

Decision	Current status
<i>Manufacturer position</i>	ACEA made voluntary fitment offer to EC – with many requirements
<i>Member States position</i>	Finland & Netherlands likely to be early adopter Other countries stalling
<i>Technology</i>	In-band modem to be selected by end October 2008 Standardisation by mid-2009
<i>Timing</i>	Earliest possible start date for voluntary fitment is 2012 (3 years after technology is decided)
<i>Conclusion</i>	Market driven roll-out of eCall is starting This is likely to be sufficient to avoid regulation and to avoid stringent voluntary fitment requirements

eCall - European vs. US and Japan

	Europe	US	Japan
OEM Engagement	Four engaged Others watching	All except Ford Group engaged GM Heavily	All engaged
Telmatix Service Providers	ATX WirelessCar Telecom Italia	OnStar ATX	HelpNet by Japanese OEMs
Emergency Services	No real coordination	All in agreement •6124 PSAPs	All in agreement •Screening saves 90% of calls
Government Involvement	Trying to dictate a solution •eCall by 2010 •Mandatory ESC	Assisting the private sector by implementing infrastructure	Working with the private sector •CarWings •Gbook •InterNavi

Approaches Across the Atlantic

US

- Engage stake holders
- Establish vision
- Define the future

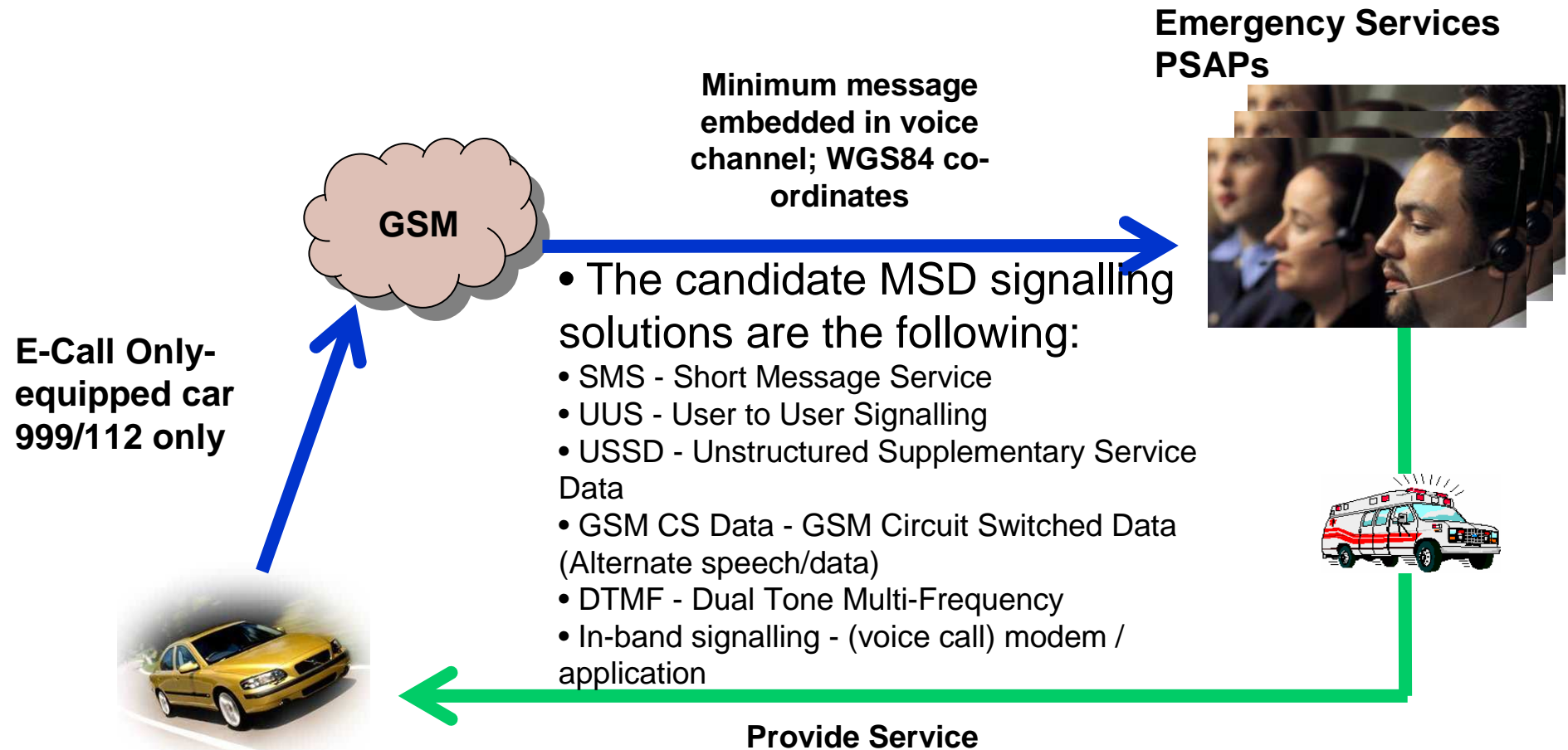
Europe

- Define the future
- Establish the vision
- Engage the stake holders



The EC has called for all cars to be equipped with eCall systems by 2010. Instead of messages and voice calls being routed through a private call centre for screening, they would be sent directly to the PSAPs.

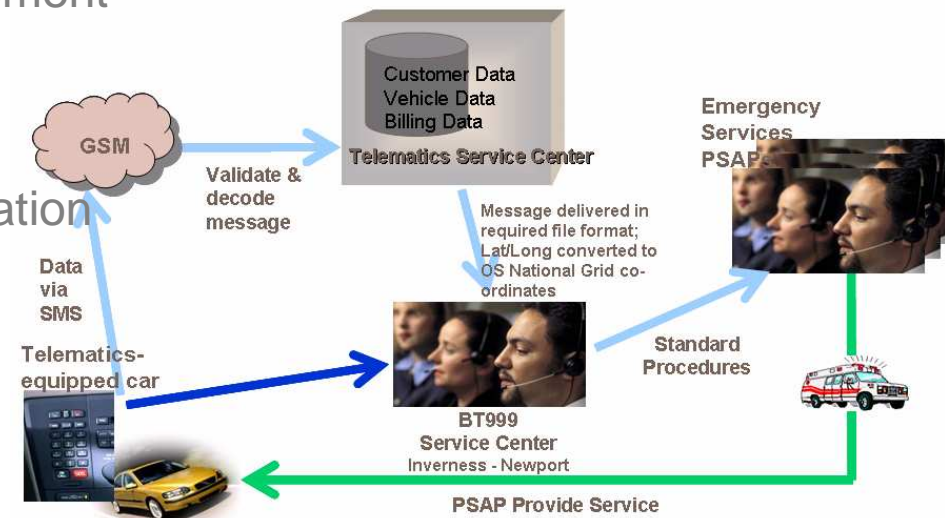
Proposed EC eSafety Solution



Country-specific implementations of eCall

- Customer call service handling
- Customer and vehicle data management
- SIM-card and telecommunications services provision
- Data message handling and routing
- Automotive National Sales Organisation (NSO) responsibilities
- Billing and commission payments

eCall - Volvo On Call Solution in the UK



Telematics System Comparisons

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Vehicle OEMs	Volvo	BMW	PSA	Fiat	
Services Offered	Volvo On Call	BMW Assist/Online	Urgence	bCONNECT	Blue&Me Nav
eCall: Manual	Yes	Yes	Yes	Italy only	Yes
eCall: Automatic	Yes	Yes	Yes	Italy only	Yes
bCall	Yes	Yes	Yes	Yes	Yes
Remote Door Unlock	Yes	No	No	No	No
Theft Notification	Yes	No	No	No	Yes
Stolen Vehicle Tracking	Yes Part of Volvo On Call	No Separate system	No	No	Yes
Information Services	No	Yes	No	Yes	Yes
Remote Diagnostics	(Planned)	Yes (TeleServices)	No	No	Yes
Other		On-line connectivity	No	No	SMS connectivity Pay-as-you-Drive

Telematics System Comparisons

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Vehicle OEMs	Volvo	BMW	PSA	Fiat	
Markets where system is sold (2007-09-30)	BE, CH, DE, ES, FR, IT, LX, NL, NO, SE, UK	AU, DE, IT, UK	BE, DE, FR, IT, LX, UK	AU, BE, CH, DE, ES, FR, IT, NL, UK	IT, FR, DE, ES, UK
Markets where services are offered (2008-09-30)	AU, BE, CH, DE, DK, ES, FR, IT, LX, NL, NO, PO, RU, SE, UK,	AU, DE, IT, UK	BE, DE, FR, IT, LX, UK	Italy – eCall, bCall and Information Other – bCall and Information	IT, FR, DE, ES, UK
Cross-border services available?	Yes	Yes	No (Yes in new)	eCall and Information	Yes
Pricing Model	Purchase VOC unit, includes telephone	Purchase Connected Drive	Purchase eCall unit	Purchase Navigation Unit	Purchase combined unit
System Price	11.000 SEK	€4000	€1500	€2500	€249
Service Prices	Security additional	€150-300	NA	NA	Varies
Number of Customers to-date (Oct. 2007)	10 000	50 000	300 000	100 000	New
Total OEM's European Vehicle Registrations (2006)	243 792	678 745	2 019 540	1 156 152	

Telematics System Comparisons







Vehicle OEMs	Volvo	BMW	PSA	Fiat		Daimler	Audi	Renault	VW
Number of European Customers to-date (Oct. 2007)	10 000	50 000	300 000	100 000	New				
2008*	5 000	50 000	100 000	10 000	50 000				
2009	7 000	100 000	150 000		150 000			10 000	
2010	10 000	300 000	250 000		250 000	50 000	50 000	50 000	100 000
2011	20 000	350 000	500 000		500 000	100 000	75 000	100 000	250 000
2012	30 000	400 000	750 000		750 000	250 000	150 000	250 000	500 000

*Projected sales per year for Volvo, BMW, PSA and Fiat based on previous performance and known plans for rollouts.

*Projected sales per year for Daimler, Audi, Renault and VW based on likely response to European eCall.

Additional Telematics Service

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	Country	Insurer	Take-up / Trial size	Insurance policy summary
	Austria	UNIQA	≈ 300 policies	'NoVi' ~ this pilot scheme started in 2007; the insurance cost of this trial policy will be based on vehicle mileage (and the type of roads used)
	Germany	WGV	≈ 1,500 policies	'Young and safe' ~ this pilot scheme runs from 2007 to 2009 and is open to young newly-qualified drivers; if the speed limit is exceeded more than 12 times in one year, the 30% policy discount will be rescinded
	Netherlands	Interpolis	≈ 500 policies	'Save driver' ~ this pilot scheme is for young (less than 24 years) drivers; the insurance cost will be based on mileage, speed and whether the vehicle is driven at night
	Ireland	AXA	> 1,000 policies	'Traksure' ~ insurance scheme for young (aged 17-25) drivers that ran from 2001 to 2006; 40% discount applied if driver did not exceed speed limit more than 3 times; policy recently withdrawn due to lack of market demand
	Italy	AXA Carlink	not known	'Autometrica' ~ policy introduced in 2003 – insurance cost is based on mileage driven; an additional discount is applied to the theft premium if required
		Sara	not known	'SaraFreeKm' ~ policy introduced late 2005 - insurance cost is based on mileage driven; an additional discount (40-60%) is applied to the theft premium if required
		Unipol (& Aurora)	≈ 3,000 policies (original trial) Now full product with ≈ 300,000 policies sold	'Unibox Sure Road' (& 'Aurobox') ~ a 2-year pilot scheme started in 2003 led to the introduction of a full policy in May 2005; 20% reduction in insurance and 50% theft reduction are benefits (available to all customers) as well as emergency (crash) assistance; mileage-based premiums are intended to be introduced in early 2008;
	United Kingdom	Norwich Union (AVIVA)	5,000 policies (original trial) Now full product	'Pay as you drive' ~ two different policies available, for 18-23 and 24-70 year-olds respectively; time and length of journeys used to calculate monthly policy cost
		More Than (Royal & Sun Alliance)	≈ 2,000 policies	'Drive time' ~ a current pilot scheme for young drivers (aged 18-25); journeys made between 11pm and 6am will result in extra cost
			≈ 1,000 policies	'Eco-insurance' ~ a pilot scheme to be launched in late 2007; a telematics device monitors driving style and users receive regular feedback to improve 'green' driving

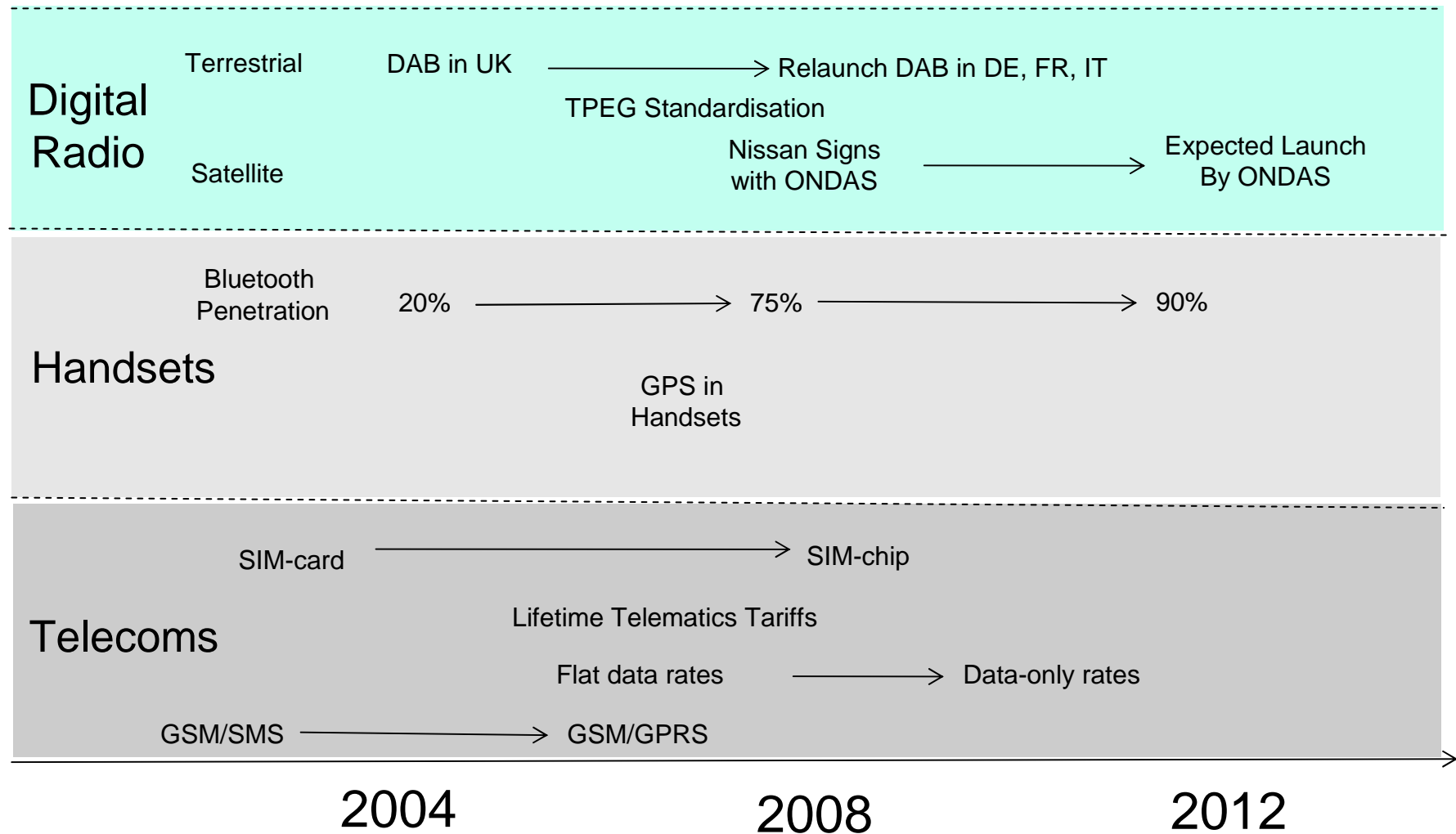
Source: SBD, 2007

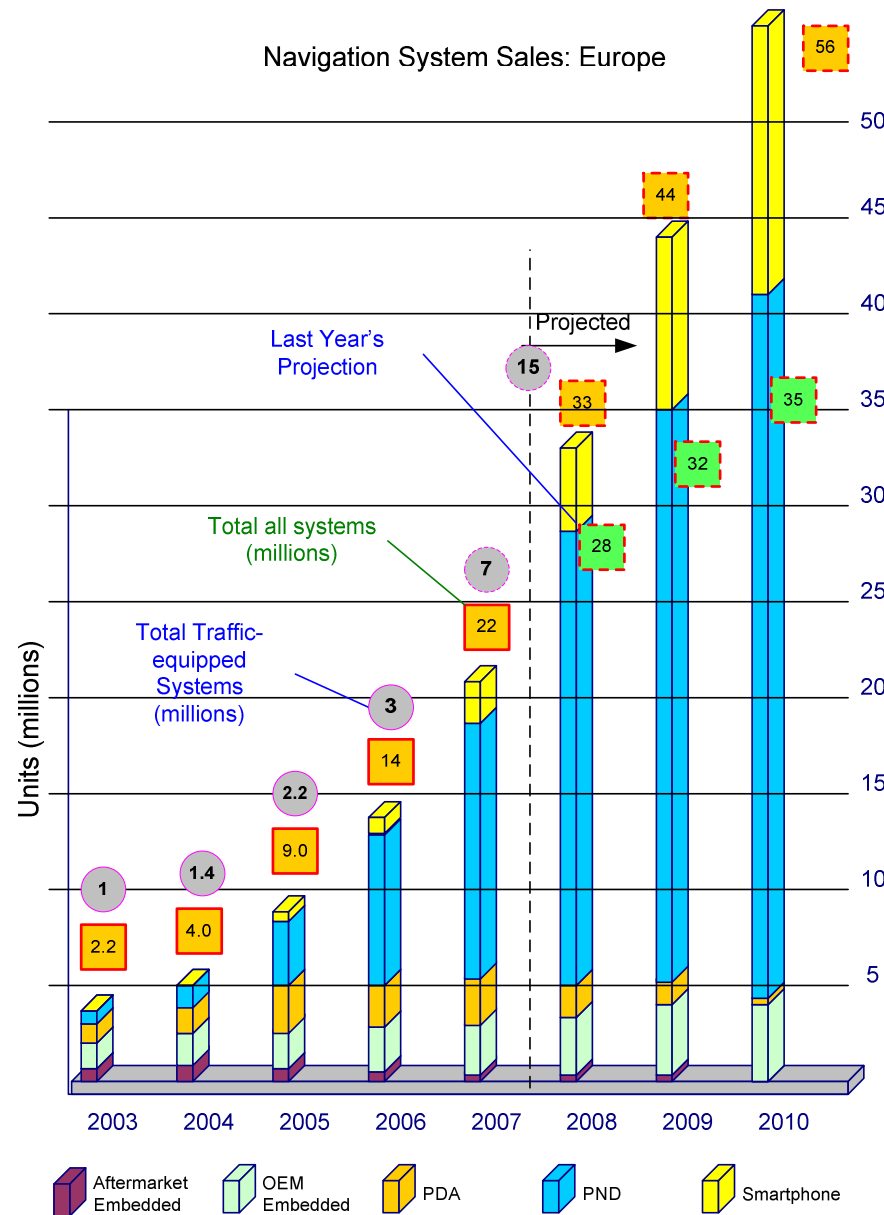
Pay-as-you-Use

- The concept is being trialed in a number of markets, as this chart shows.
- The principal target customers are high risk groups: young and poor record drivers.
- Monitoring and processing the data that will be generated by these systems is a task that may be outsourced to third party providers, such as Securitas.

Telematics-enabling Technology: Readiness and Evolution

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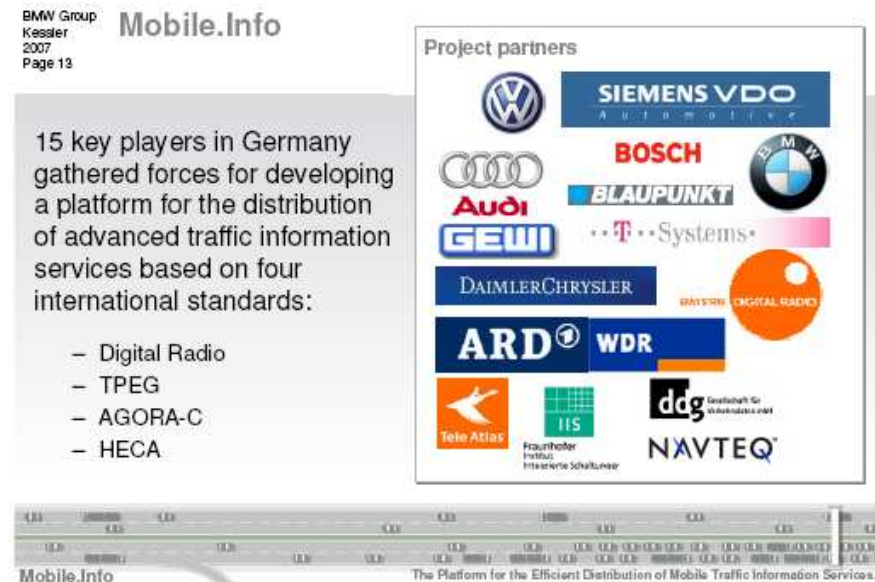


- There has been steady but low growth of integrated navigation systems since early 2000.
- PNDs began their hockey stick growth in 2005 when the inflection point was reached.
- Aftermarket, integrated systems are gradually disappearing from the market. The same is true of the non-connected mobile devices (PDAs)
- Smartphone (including BlackBerry-type devices, are beginning their growth spurt.

TPEG – Transport Protocol Expert Group Next Generation Traffic Data Format

- The German automotive companies are co-operating on making TPEG work with Terrestrial-DAB. The rest of the car industry will follow along the TPEG and digital.
- The main advantages of TPEG over RDS-TMC are:
 - There are no TMC Location Code Tables to maintain
 - Detailed coverage can extend to urban areas
 - Messages are more comprehensive, not just traffic

Language independence is maintained in TPEG through the ability to use of the event codes from RDS-TMC

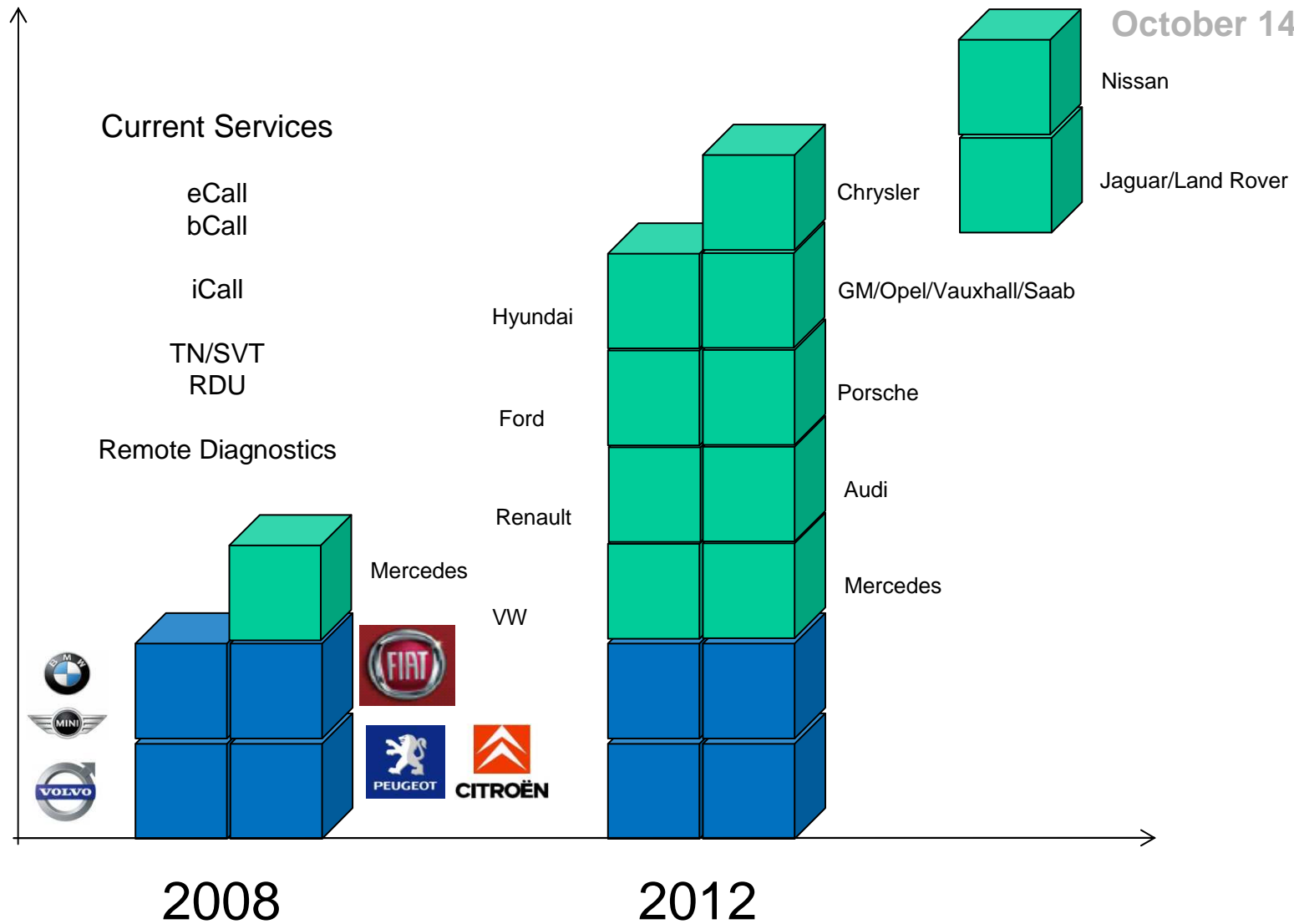


BMW and a group of German companies have cooperated in Mobile.Info to prove the value of a digital radio traffic information service.

The next five years

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Questions

Thank you.
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