

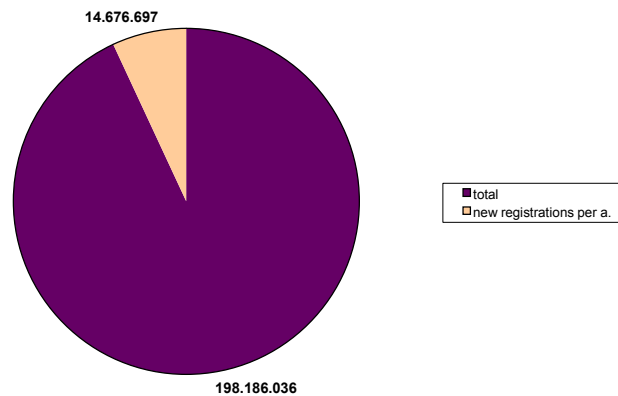
## Realism of the future



### eSafety realism

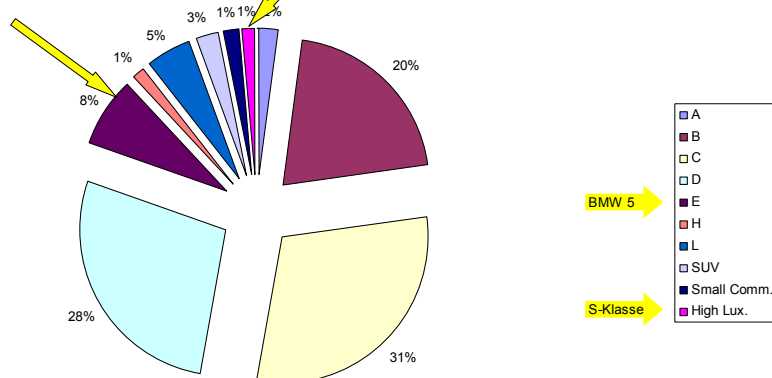
#### Market capacity Aftermarket

Passenger cars in western Europe



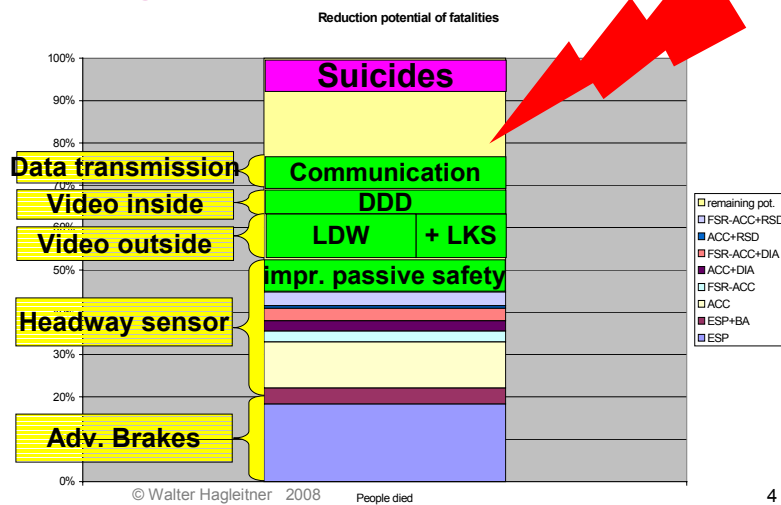
**Market capacity OEM**

New registrations in Europe per year  
by vehicle segments  
(14'676'950)



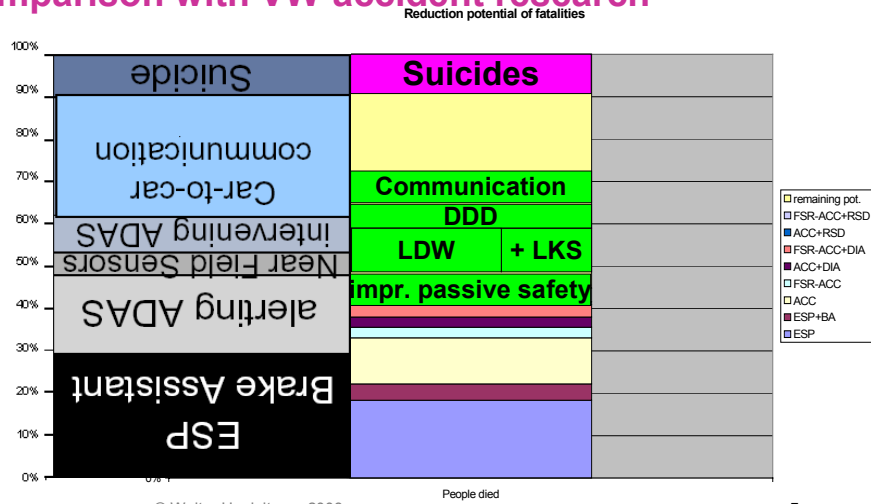
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**Key enabling components**

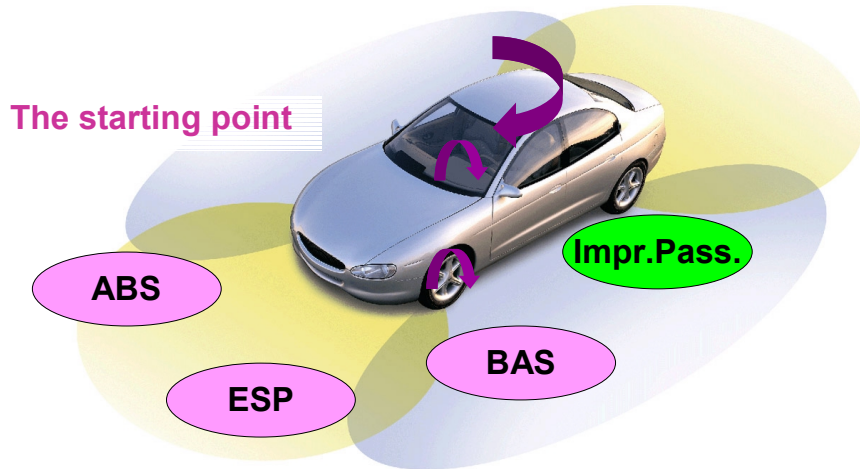


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**Comparison with VW-accident research**



**Active safety options – Autonomous systems**

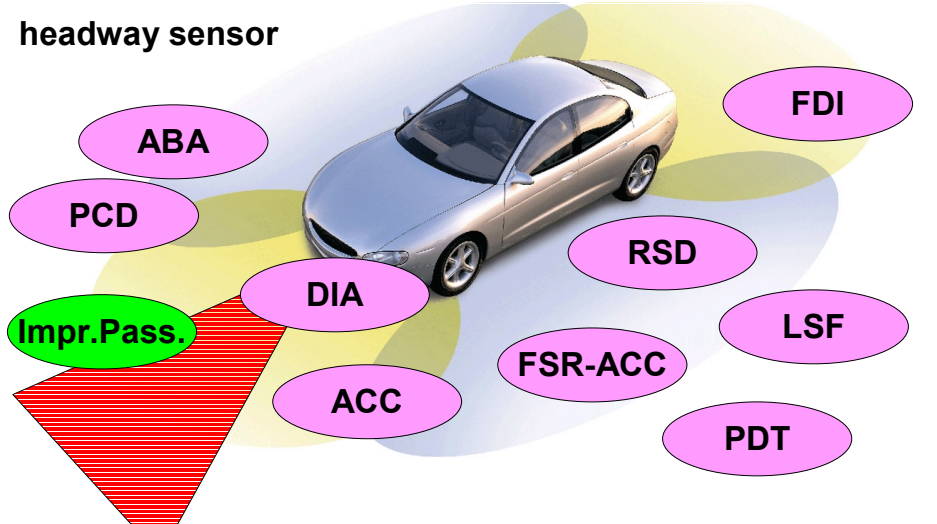


eSafety realism

**ADAS\_Management\_Consulting**  
Advanced Driver Assistance and Safety

### ADAS options – Autonomous systems

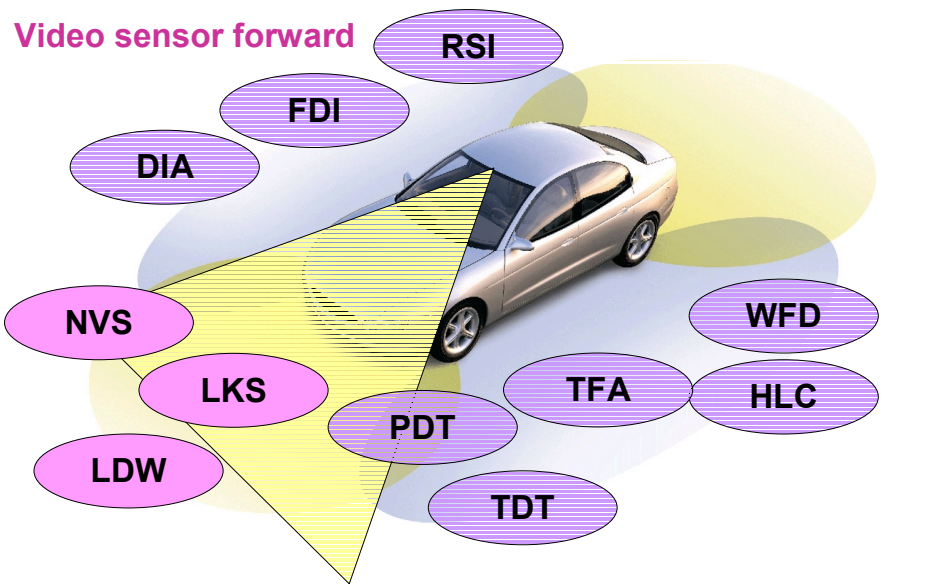
headway sensor



eSafety realism

**ADAS\_Management\_Consulting**  
Advanced Driver Assistance and Safety

Video sensor forward





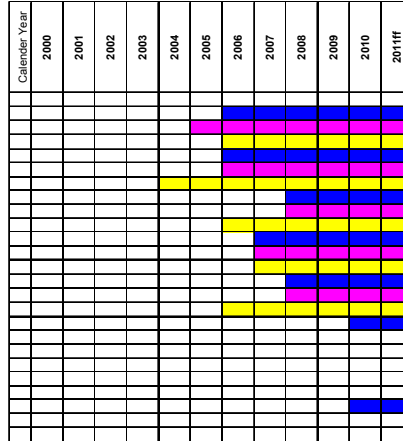
eSafety realism

**ADAS\_Management\_Consulting**  
Advanced Driver Assistance and Safety

**ACC in PKW**

Function: **Adaptive Cruise Control**  
**ACC**  
Enhanced Cruise Control, keeps adjusted distance to car ahead using Radar or Laser based Sensor, speed range 30-180 kph

OEM	Brand	Model	Segment	Market
GM	Cadillac	STS/XLR	Highlux	Europe
				NA
				Asia
Honda	Honda	Legend	E	Europe
				NA
		Accord	D	Europe
				NA
		CRV	MPV	Europe
				NA
				Asia
Hyundai	Hyundai	Sonata	E	Europe
				NA
				Asia
PSA	Citroen	C5	E	Europe
				NA
		C4	D	Europe
				NA
Peugeot	Peugeot			Europe
				NA
				Asia



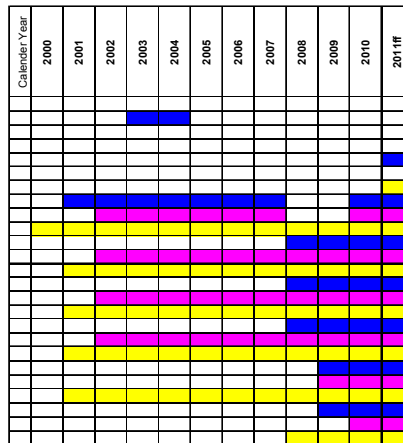
eSafety realism

**ADAS\_Management\_Consulting**  
Advanced Driver Assistance and Safety

**ACC in PKW**

Function: **Adaptive Cruise Control**  
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OEM	Brand	Model	Segment	Market
Renault/Ni	Renault	Velisats	E	Europe
				NA
		Laguna	C	Europe
	Nissan	Primera / u.a.	D	Europe
				NA
				Asia
Infiniti	Infiniti	FX	SUV	Europe
				NA
				Asia
	EX		E	Europe
				NA
				Asia
	G		E	Europe
				NA
				Asia
Subaru	Subaru	Legacy	E	Europe
				NA
				Asia
Ssangyong	Ssangyong	SUV	SUV	Europe
				NA
				Asia





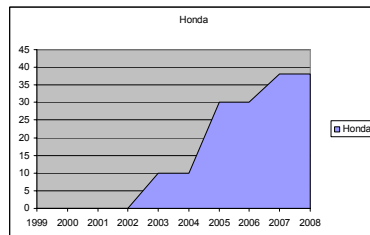
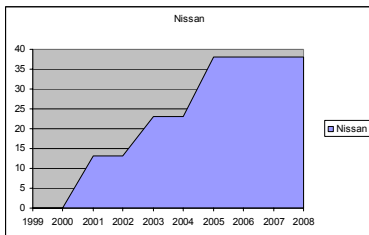
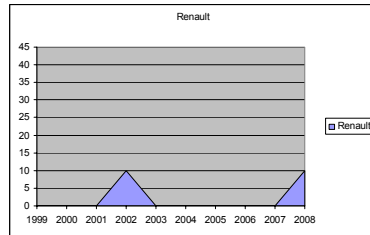
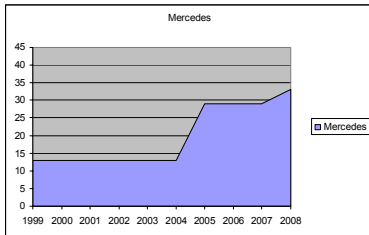
**ACC in PKW**

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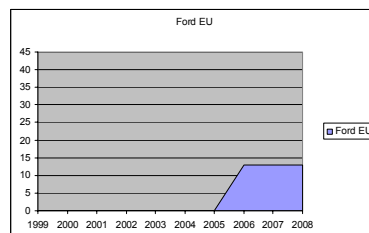
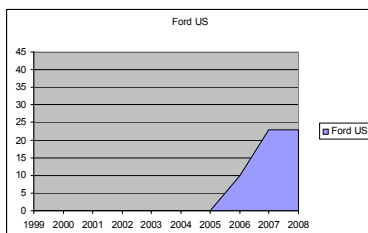
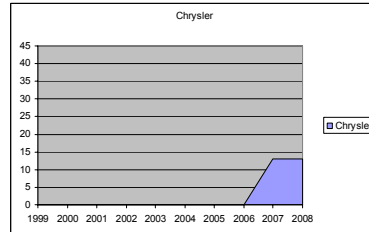
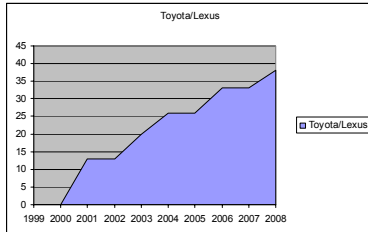
OEM	Brand	Model	Segment	Market
Fata	Jaguar	XK	Highlux	Europe
				NA
				Asia
		XF	Highlux	Europe
				NA
LandRover	Discovery		SUV	Europe
				NA
				Asia
				Europe
				Asia

Calendar Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011ff
Fata Jaguar XK												
Fata Jaguar XF												
LandRover Discovery												

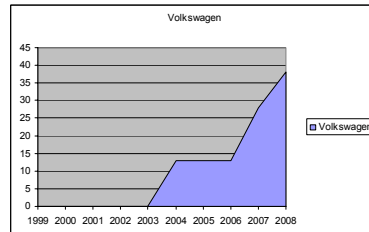
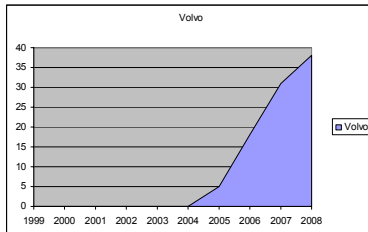
**Active safety beyond ESC and BA**



**Active safety beyond ESC and BA**

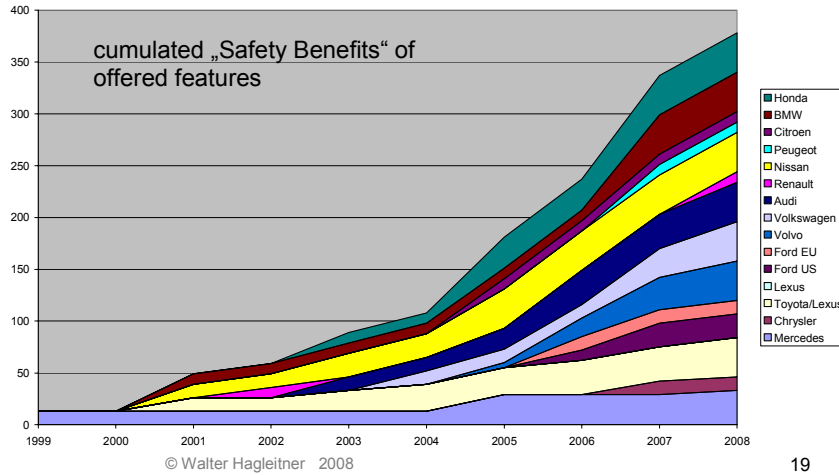


**Active safety beyond ESC and BA**

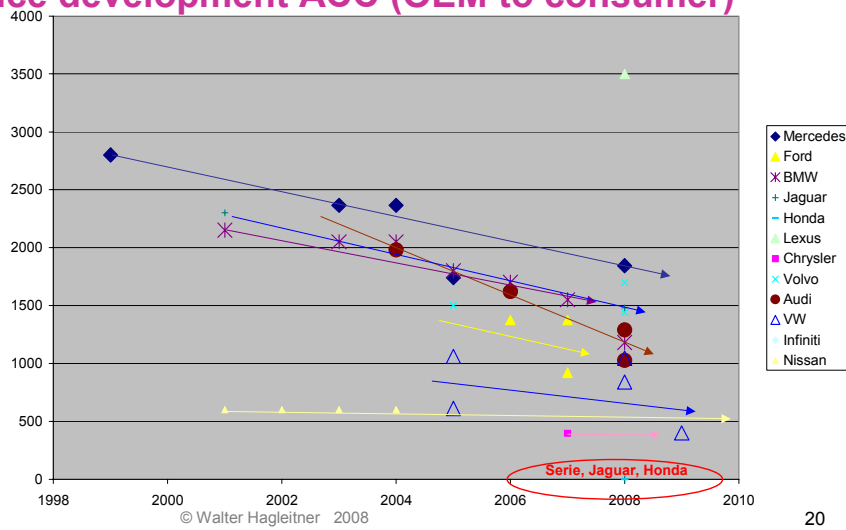


**Active safety beyond ESC and BA**

Active Safety Level



**Price development ACC (OEM to consumer)**



**Market prices [www.bester-beifahrer.de](http://www.bester-beifahrer.de)**

Fahrzeugmarke, Modell FAS serie optional Preisinfo \*

Audi, A3	Abstandsregler	1.025 EUR
Audi, A4	Abstandsregler	1.025 EUR
Audi, A5	Abstandsregler	1.290 EUR
Audi, A6	Abstandsregler	1.335 EUR
Audi, A8	Abstandsregler	1.950 EUR
Audi, Q7	Abstandsregler	1.385 EUR
BMW, 3er	Abstandsregler	1.180 EUR
BMW, 5er	Abstandsregler	1.550 EUR
BMW, 6er	Abstandsregler	1.850 EUR
BMW, 7er	Abstandsregler	1.850 EUR
Cadillac, STS	Abstandsregler	2.920 EUR
Ford, Galaxy	Abstandsregler	945 EUR

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**Campaigns ([www.fahrer-assistenz-systeme.de](http://www.fahrer-assistenz-systeme.de))**

**FAHRER-ASSISTENZ-SYSTEME**
**SICHER. FÜR DICH. FÜR MICH.**


BGF



BGL



KRAVAG

**Fahrer-Assistenz-Systeme**

Moderne Fahrerassistenzsysteme lassen technische Lösungen, die lange Zukunftsmusik waren, Wirklichkeit werden. Sie unterstützen und entlasten den Fahrer, senken die Unfallrate, vor allem die Zahl schwerer Unfälle, und erhöhen dadurch nachhaltig die Verkehrssicherheit.



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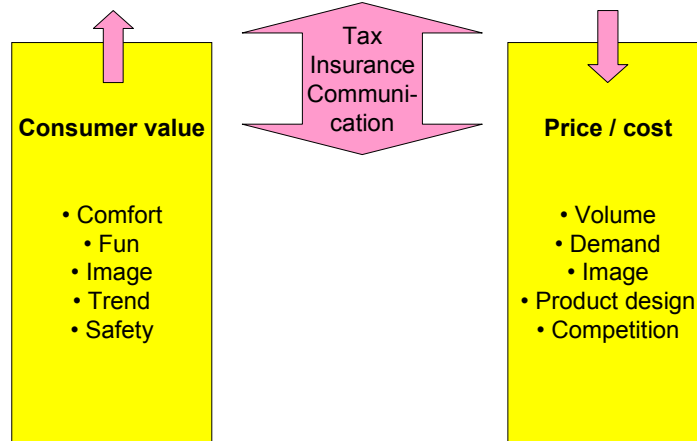
### Trends in car market

- **Active Safety becomes a sales argument**
- **Comfort begins to be perceived**
- **Insurance-Incentives are now reality**
- **EuroNCAP works on „active safety rating“**
- **Trend from warning toward assisting systems (LDW > LKS)**
- **Extension of functionality with existing sensors (ACC > FSR-ACC)**
- **Some models offer eSafety as standard**
- **Lowcost Version of ADAS is Video-Camera (Opel)**
- **Functional extension towards autonomous braking**
- **Lighting-functions can promote Video-Camera**

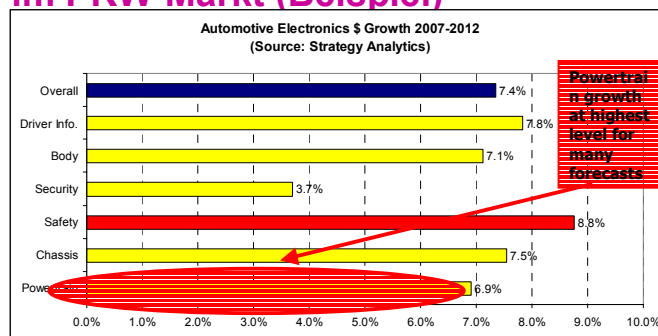
### Buying criteria (age ?!)

- **Styling / Prestige**
- **Comfort / Convenience**
- **Fun**
- **Economy**
- **Fashion / Trend**
- **Handycap compensation**
- **Safety (passive / active)**

**Market acceleration**

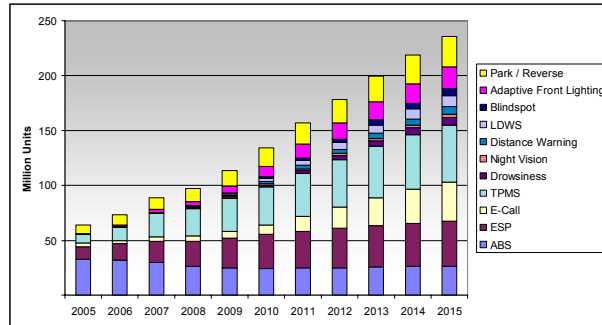


**Trends im PKW-Markt (Beispiel)**



- Legislation driving safety growth in some areas
  - TPMS, Occupant detection
- Sensing & data processing technologies key to future safety growth
  - Radar, lidar, cameras etc,
- Powertrain growth rate has been increasing: hybrid / CO<sub>2</sub> reduction / advanced transmissions

### Active Safety Growth – Global (example)



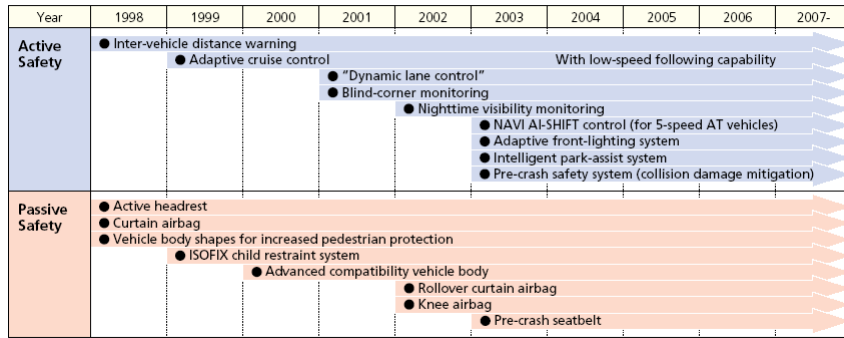
- Some systems (e.g. night vision) will remain very niche
- Parking/reverse systems expected to dominate amongst exterior environment sensing systems

Data from Strategy Analytics' AES Service. Based on NAFTA, Europe, Japan, S. Korea, India & China Vehicle Production

# Japan Insights

**eSafety in Japan**

● VEHICLE SAFETY FEATURES & YEAR OF INTRODUCTION



Source: Japan Automobile Manufacturers Association

● SAFETY FEATURE ONBOARD INSTALLATION STATUS (for passenger cars produced in 2006 for home market)

Safety Feature	Installation Status				
	In nos. of models (see Note 1)	In % (see Note 2)	In vehicle units	In % (see Note 2)	
Active Safety	Anti-lock brake system (ABS)	183 (148)	100.0	3,895,818	88.1
	Brake-assist system for ABS	165 (134)	90.2	3,806,926	86.1
	Unfastened seatbelt warning (driver's seat)	134 (131)	73.2	3,135,018	70.9
	Unfastened seatbelt warning (front passenger's seat)	35 (35)	19.1	839,382	19.0
	High-intensity discharge headlamp	131 (53)	71.6	1,570,272	35.5
	Adaptive front-lighting system	30 (12)	16.4	245,905	5.6
	Back-up monitoring (rear obstacle detection)	88 (12)	48.1	494,659	11.2
	Panoramic-view drive-assist system	19 (2)	10.4	144,722	3.3
	Variable-assist power steering	25 (1)	13.7	68,051	1.5
	Blind-corner monitoring	14 (2)	7.7	37,645	0.9
	Nighttime visibility monitoring	5 (0)	2.7	1,003	0.0
	Intelligent night vision	1 (0)	0.5	268	0.0
	Curve detection	13 (1)	7.1	81,882	1.9
	Tire pressure monitoring	8 (4)	4.4	70,841	1.6
	Driver inattention warning	12 (1)	6.6	117,794	2.7
	Lane deviation warning	12 (0)	6.6	26,933	0.6
	Collision warning-equipped headrest control	1 (0)	0.5	794	0.0
	Pre-crash safety system (collision damage mitigation)	26 (1)	14.2	15,223	0.3
	Inter-vehicle distance warning	35 (2)	19.1	19,669	0.4
	Adaptive cruise control with low-speed following capability	5 (0)	2.7	3,372	0.1
	Full speed range adaptive cruise control	2 (0)	1.1	1,369	0.0
	"Dynamic lane control"	12 (0)	6.6	4,893	0.1
	Back-up monitoring (parking assistance)	9 (0)	4.9	107,202	2.4
	Car navigation system-based shift control	20 (5)	10.9	75,571	1.7
Emergency locking retractor	43 (32)	23.5	30,582	0.7	
Electronic stability control	88 (24)	48.1	321,599	7.3	
Traction control with ABS	90 (23)	49.2	388,297	8.8	
Passive Safety	Side airbag	114 (17)	62.3	293,510	6.6
	Curtain airbag	105 (19)	57.4	207,635	4.7
	Active headrest	110 (102)	60.1	2,438,494	55.2
	ISOFIX child restraint system	130 (116)	71.0	3,519,725	79.6
	Three-point seatbelt for rear center seat	56 (49)	30.6	640,804	14.5
Total		183		4,420,769	

Notes: 1. "In nos. of models" indicates the number of models in which the safety feature is installed as standard or optional equipment. Figures in parentheses indicate the number of models in which the safety feature is standard equipment. 2. "In %" means as a percentage of the total number of passenger cars produced. 3. Here, passenger cars include minicars. Source: Japan Automobile Manufacturers Association

**eSafety in Japan**

● JAMA'S ROAD SAFETY INITIATIVES IN EIGHT PRIORITY AREAS

Priority Area	Road Users: Public Awareness Campaigns	Vehicles: Safety Measures	Road Infrastructure: Proposals to Government
① Accidents involving pedestrians or cyclists	• Continued implementation of road safety public awareness campaigns, based on the results of accident causation studies.	• More widespread application of AFS (*1), ABS (*2), BA (*3), and stability control.	• For infrastructural improvements, based on the results of accident causation studies.
② Special measures for the elderly	• Development of road safety educational programs specifically for the elderly.	• Development of technologies specifically geared to aging-related physical changes.	• For more widespread roadway/sidewalk demarcation and greater barrier-free mobility.
③ Greater use of seatbelts	• Public awareness campaigns to promote the use of seatbelts.	• More widespread application of warning devices that remind vehicle occupants to buckle up.	
④ Delays in driver recognition and incorrect vehicle control	• Campaigns aimed at preventing faulty driver recognition and incorrect vehicle control.	• Research into the mechanisms of accident causation and human-machine interface conditions using data recorders, etc.	
⑤ Accidents occurring at twilight/nighttime	• Campaigns to promote the early lighting of automobile headlamps.	• More widespread application of AFS.	• For improved nighttime road illumination.
⑥ Accidents occurring at intersections	• Public awareness campaigns to encourage drivers to exercise greater caution at intersections, where the majority of fatal road accidents occur.	• More widespread application of ABS, BA, and stability control. • Improvement of side-impact protection performance.	• For road infrastructure regulations for effective utilization of ITS technologies.
⑦ Collision with stationary objects		• Improvement of side-impact and vehicle occupant protection performance and of side-curtain airbags.	• For expanded provision of underground power lines and impact-absorbing road installations.
⑧ Compatibility		• R&D on crash-compatible vehicle bodies and compatibility evaluation methods to improve vehicle performance.	

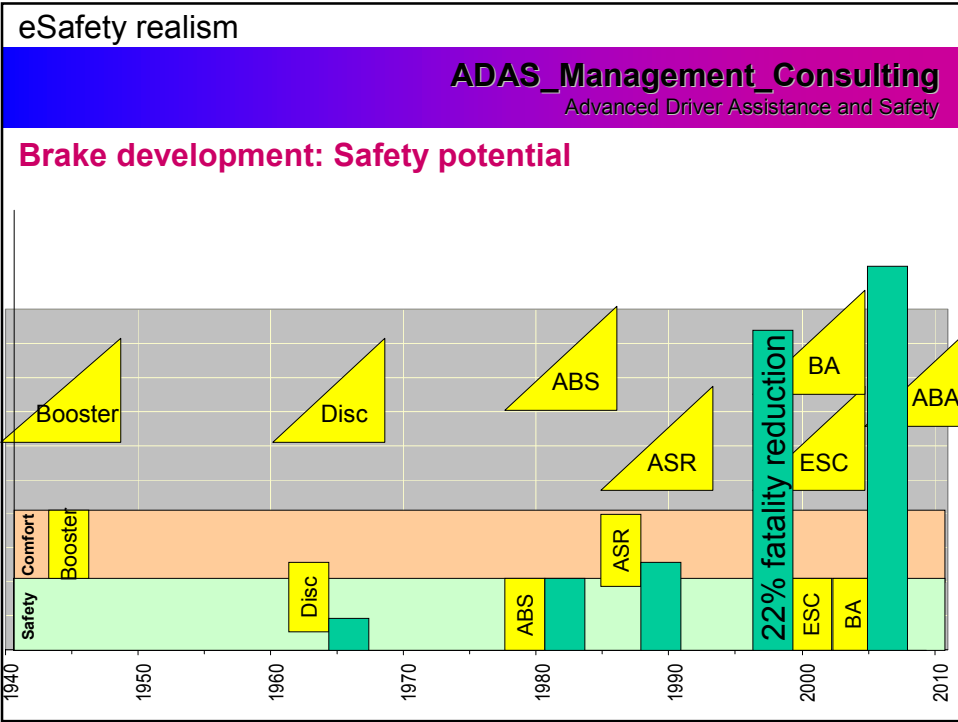
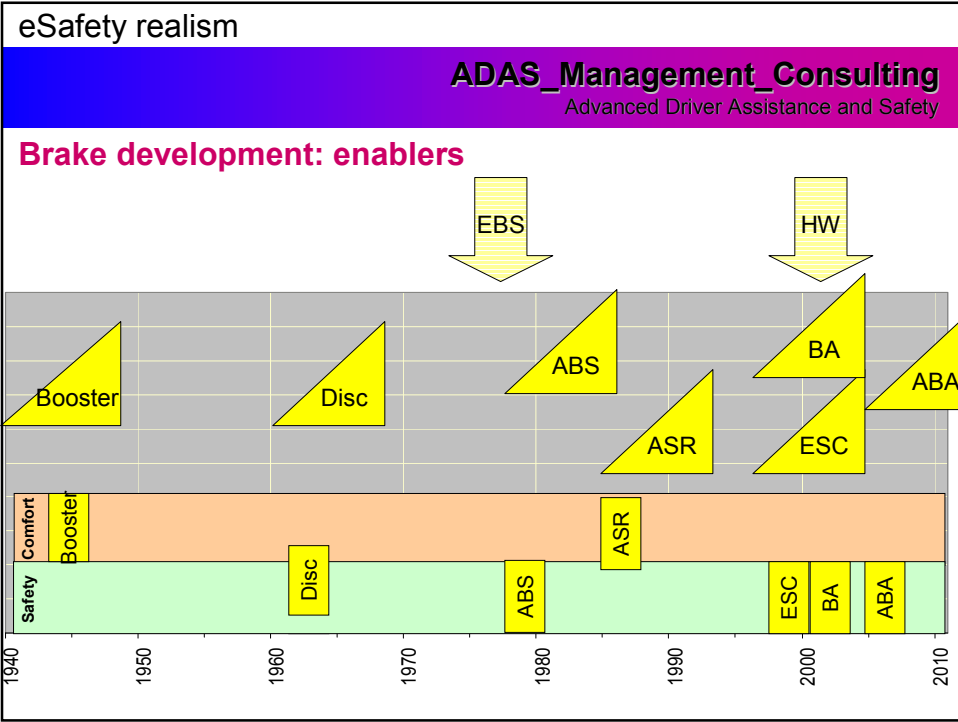
\*1. Adaptive front-lighting systems. \*2. Anti-lock brake systems. \*3. Brake-assist systems.

**eSafety in Japan**

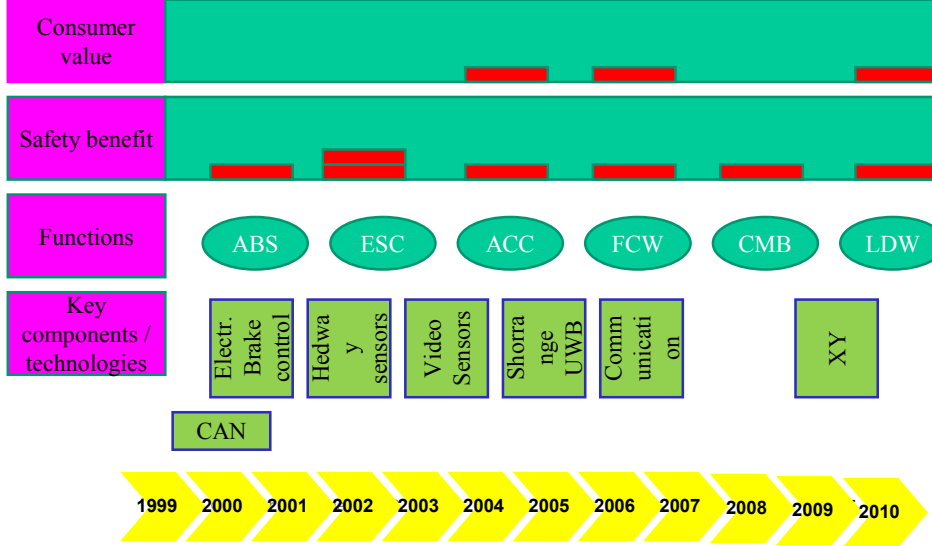
● EIGHT MAJOR AREAS OF ROAD SAFETY PROMOTIONAL ACTIVITY

<b>Road Infrastructure Improvements</b> - Sidewalk construction/upgrades, especially in school zones - More pedestrian routes - Measures to deal with accident black spots - Increased use of ITS	<b>Road Safety Public Awareness Campaigns</b> - Promotion of "hands-on" awareness activities - Promotion of road safety education for the elderly - Promotion of the greater use of rear seatbelts - Promotion of road safety activities in local communities with the participation of residents
<b>Promotion of Safe Driving</b> - Implementation of special driver-education programs for the elderly - Promotion of the greater diffusion of automotive video-equipped data recorders	<b>Enhancement of Vehicle Safety</b> - Promotion of the development and diffusion of advanced safety vehicles - Implementation of improvements to the national vehicle recall system
<b>Enforcement of Road Traffic Laws</b> - Dissemination of guidelines for cyclists and enforcement of related regulations - Stronger crackdowns on "hot-rodding" motorcyclists	<b>Reinforcement of Emergency Rescue Operations Infrastructure</b> - Improved training and deployment of emergency rescue personnel - Upgrading and expansion of emergency call systems - Promotion of doctor-staffed ambulances/helicopters
<b>Provision of Fair Compensation for Road Accident Victims</b> - Enhanced support for the provision of fair "damages" compensation	<b>Promotion of Road Safety Research and Analysis</b> - Promotion of further safe-driving research - Promotion of comprehensive analysis of road accident causation

Source: Japan's 8th Basic Plan for Road Safety



**Roadmap ideas (example for layout)**



**Thank you  
for your  
attention**

## Market acceleration

**Everybody who has a good business case, will help to accelerate dissemination of eSafety**

- Consumer
- Vehicle dealers
- Vehicle manufacturers
- Insurance companies
- Society

(Trucks, a specific market)

## Key business cases

- 1. Consumer / Car buyer**
- 2. System supplier**
- 3. Vehicle manufacturer**
- 4. Sales person**