



Vehicle Safety Systems

An Outline of U.S. Status, Thinking and Policy Relative to Europe

eSafety Deployment Workshop –
November 14 2007

Knibb Gormezano & Partners

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International Management & Technology Consultants



- Global Management Consulting Firm
- Specialising in the automotive sector
- Founded in the UK in 1988
- Over 300 Associates world-wide
- Pro-active research in emerging technologies
 - Single client
 - Group-sponsored
 - Sponsors can include VMs, Component & Systems Suppliers, Govt. agencies et al

Group-sponsored Examples

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- Aluminium and Magnesium in Light vehicles (Europe)
- Transmissions in Light Vehicles (Europe)
- Commercial Vehicle Active Safety Systems & Forecasts (Europe)
- Light Duty Vehicle Active Safety Systems & Forecasts (Global)
- Light Duty Vehicle Engine Strategies (Global)
- Heavy Duty Vehicle Engine Strategies (Global)



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- Commercial Vehicle Active Safety Systems & Forecasts (Europe)
- **Light Duty Vehicle Active Safety Systems & Forecasts (Global)**
- Light Duty Vehicle Engine Strategies (Global)
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Today's presentation

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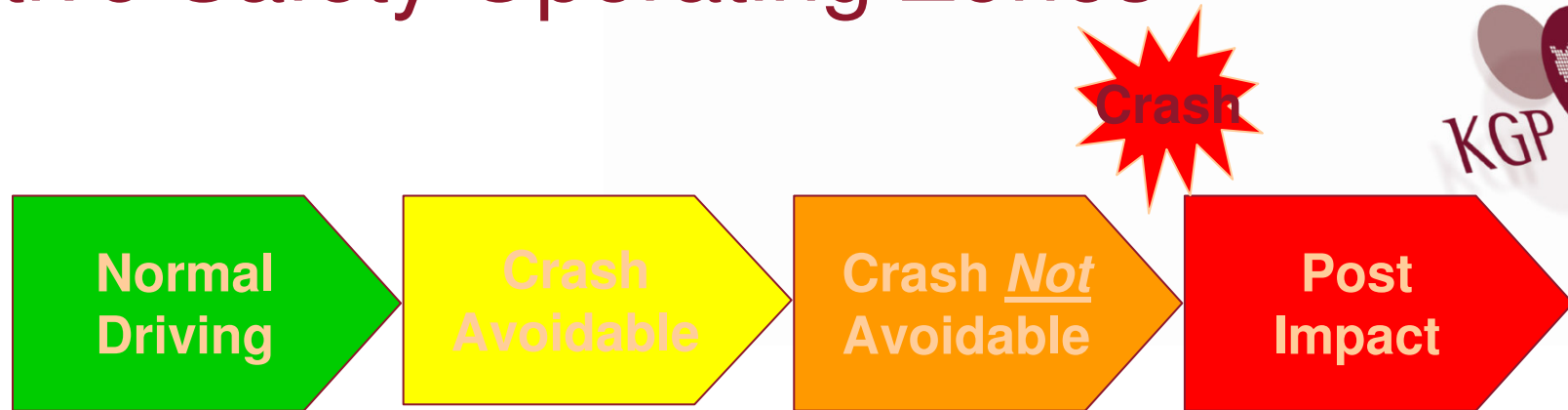
- Taken from the report to U.S. clients, updated through present knowledge and recent interviews with informed sources.

Scope



- Cars, SUV's , Pick-ups, Minivans
- USA, Europe, Japan
- 5 months research with c. 100 field interviews
- 29 Contributors:
 - 15 Global Vehicle Manufacturers
 - 9 Active Safety Suppliers
 - 5 Other safety-related organizations

Active Safety Operating Zones



Maximize

- Safety
- Fun
- Comfort

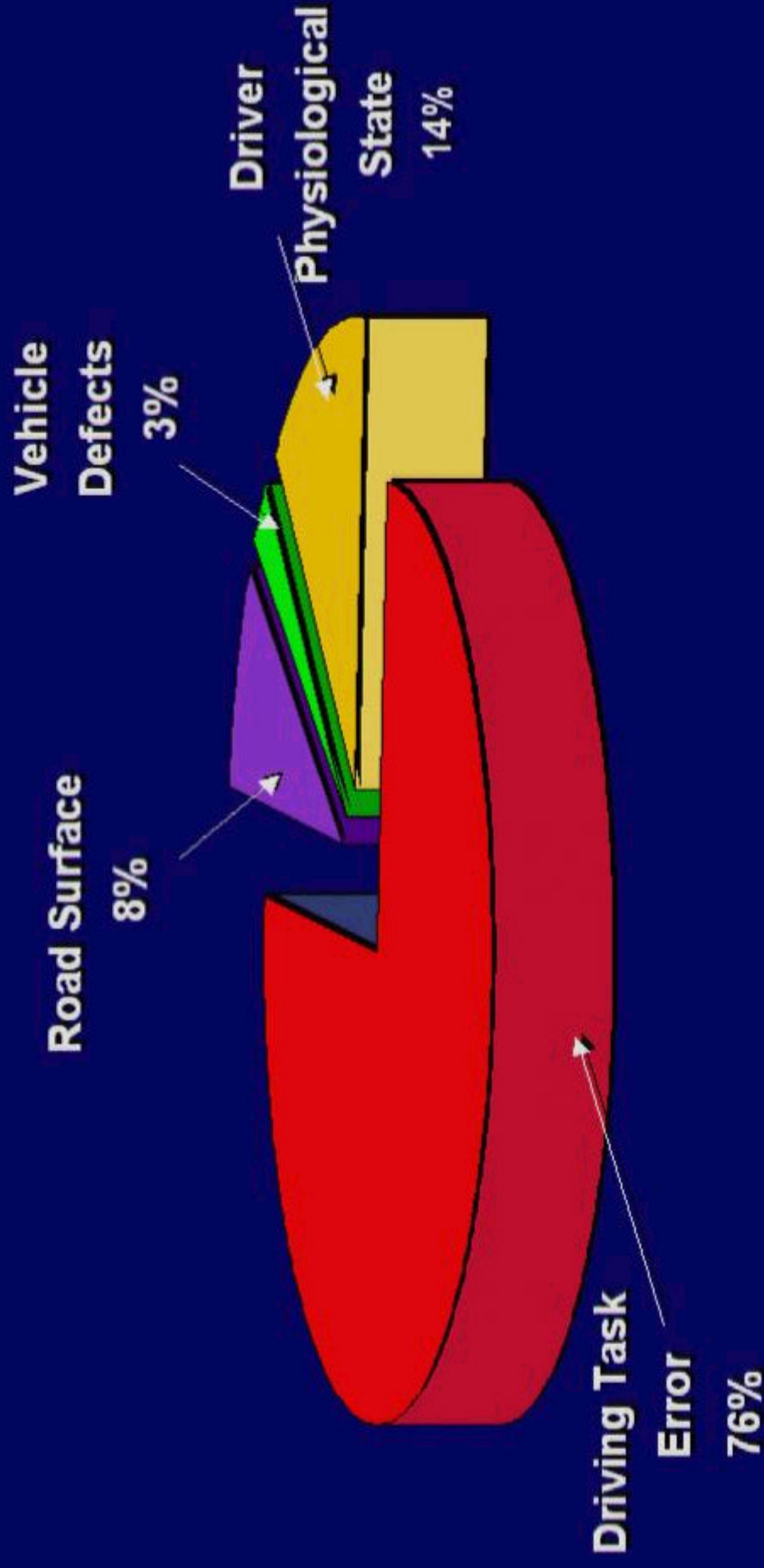
Assess

- Environment
- Vehicle/Driver states
- Warn Driver
- Take Control (if needed)

Take full control
Prepare for Crash

The Safety Problem

Causal Factor Distribution



Driving Forces for Active Safety

2005

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<u>Driving Force</u>	<u>USA</u>	<u>Europe</u>	<u>Japan</u>
• Government			
• Insurance Industry			
• Product Availability			
• Consumer Factors			
• Cost			
• Technology			
• Vehicle Integration			
• Litigation			

Driving Forces for Active Safety

2008

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<u><i>Driving Force</i></u>	<u><i>USA</i></u>	<u><i>Europe</i></u>	<u><i>Japan</i></u>
• Government	Green	Green	Green
• Insurance Industry	Yellow	Yellow	Yellow
• Product Availability	Green with diagonal stripes	Green	Green
• Consumer Factors	Yellow	Yellow	Yellow
• Cost	Yellow with diagonal stripes	Yellow with diagonal stripes	Yellow
• Technology	Yellow	Yellow	Yellow
• Vehicle Integration	Red	Yellow with diagonal stripes	Yellow
• Litigation	Red	Yellow	Yellow

Highest Growth -- Stability Control

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- ***USA***
 - **100% of SUV's**
 - **Moderate option take up on Cars but will increase**

Over 10% Installation by 2010

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- **Adaptive Cruise Control (USA)**
- **Blind Spot Monitor**
- **Lane Departure Warning**
- **Curve Adaptive Lighting**
- **Collision Mitigation Systems??**

Key Business Issues



- **Do drivers want Active Safety?**
- **How much will they pay?**
- **Which OEM's will lead the way?**
- **Which Suppliers will lead the way?**
- **Who will pay for development?**
- **Who will do Vehicle Integration?**

Do Drivers want Active Safety?

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USA -- Passive Safety Bias

- **Most people are “great drivers”**
- **Most view an accident as “the other guy’s” fault**
- **“Give me a big/safe car that will protect me from the other guy”**

How much will they pay? (US Market)

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← Less Than

- 10%+ option
- Possibly standard
- Viable for Mass market

“Option Price Magic Number”

About \$500

More Than →

- Low-volume option
- Competes with DVD, leather seats, etc.
- Need to prove value
- Mainly premium cars

Which OEM's will lead the way?

Japanese OEM's

- Experimenting widely in domestic market
- Export all the technology they can (to lower cost)

European OEM's

- Premium Brands will lead
- “Domestic” Europeans fast followers

US OEM's

- Slower followers (except SUV Rollover)

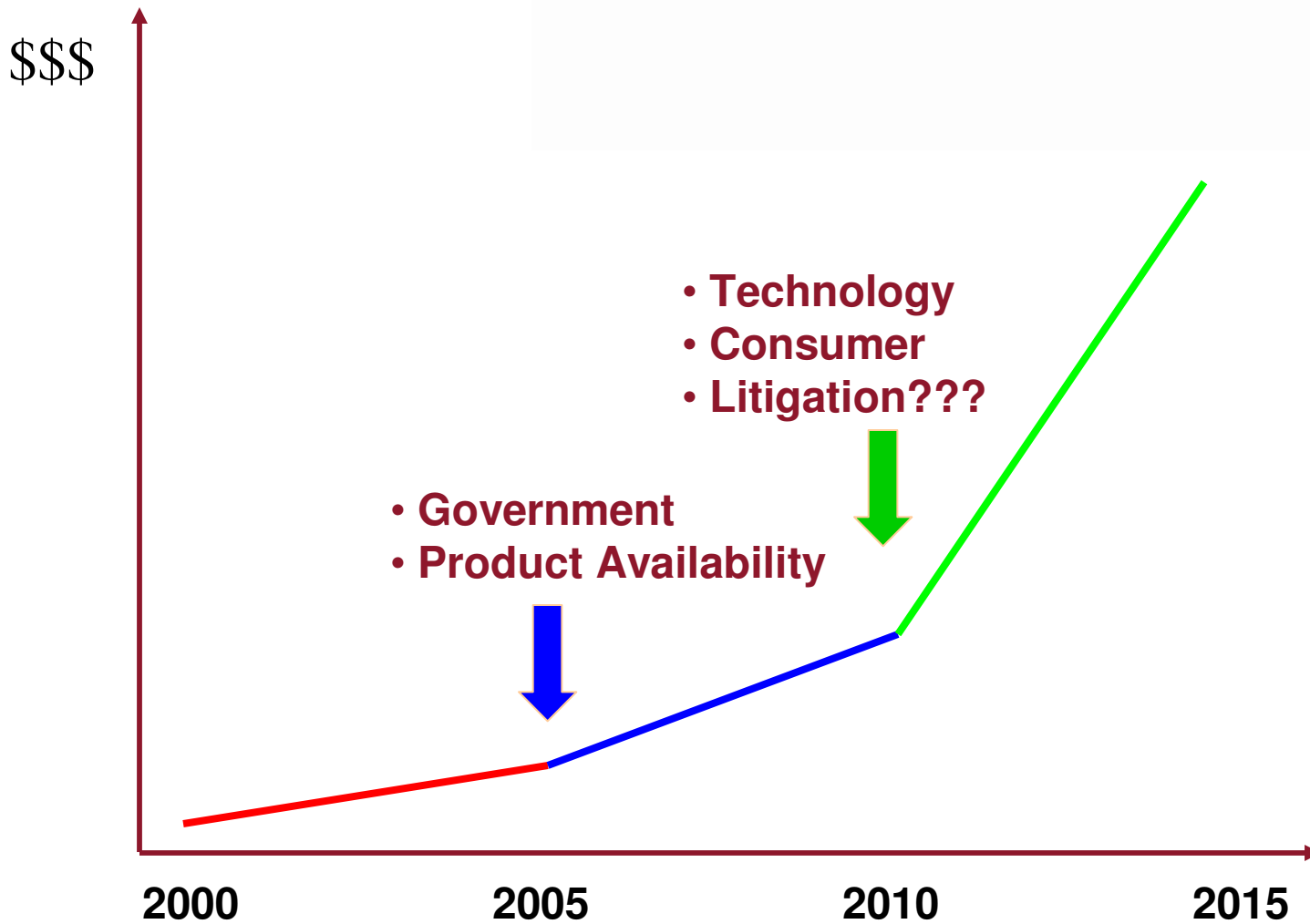


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Beyond 2010?

Active Safety Market Growth



Who will pay for development?

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- **Suppliers presently paying for R&D**
- **Technology changing fast**
- **Cost recovery difficult in short life-cycle**
- **R&D/Calibration costs increase unit price**
- **“Catch 22”:**
High Price = Low Volume = High Price



Who will do Vehicle Integration?

OEM?

- **Fundamental to “Brand”**
- **Resources stretched**
- **Wrong skills-mix**

Tier 1?

- **Resources stretched**
- **Competition and IP issues**

Or?.....

Active Safety Conclusions

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- **Exciting new growth market**
- **ButModerately high risk**
- **No huge \$\$\$'s before 2010**
- **Butimportant longer-term business**
- **Opportunities to expand clients' business scope**

Forecasts for Adoption – New Cars

Europe

Active safety system	Base case market penetration scenario Forecast installation rate (% of total West European new vehicles unless otherwise noted)		
	Short term 1 – 2 years	Medium term 2 – 5 years	Long term 5 – 10 years
Electronic Stability Control (ESC/RSC)	75% SUVs 50% passenger cars	90% SUVs 75% passenger cars	100% SUVs 90% passenger cars
Active AWD	3-5%	6%	7%
Curve adaptive lighting	<5%	12%	25 – 35%
ACC	<2%	7%	20 – 25%
CMS	<1%	3%	15 – 20%
Side blind spot monitor	<1%	7%	15 - 20%
Lane departure warning	<1%	12%	20 – 25%
Active Suspension Geometry	0%	<2%	2 - 5%
Vision enhancement systems	0%	1-2%	10 – 20%
Electronically Controlled Dampers	2-5%	12%	15-30%
TPMS	15-25%	42%	>80%

U.S.A

Active safety system	Base case market penetration scenario Forecast installation rate (% of total US new vehicles unless otherwise noted)		
	Short term 1 – 2 years	Medium term 2 – 5 years	Long term 5 – 10 years
Electronic Stability Control (ESC/RSC)	100% SUV segment 70% sport segment 15% passenger cars	100% SUV segment 65% luxury segment 30% passenger cars	100% SUV segment 70% passenger cars
Active AWD	1-2%	7%	15%
Curve adaptive lighting	<5%	7%	25%
ACC	1-2%	12%	20%
CMS	1-2%	3%	12%
Side blind spot monitor	<1%	7%	35%
Lane departure warning	<1%	7%	20%
Active Suspension Geometry	<1%	3%	12%
Vision enhancement systems	<1%	3%	15%
Electronically Controlled Dampers	<1%	3%	12%

Source: KGP research 2005



Since 2005 and looking forward

- Most vehicles now getting 5 Stars for passive safety
- ESC mandated for all light vehicles
- TPM mandated for all light vehicles
- LDW and CMS adoption increasing gradually
 - Now pressure for rating systems as with ESC
- “With regard to ‘intelligent’ collision prevention or mitigation systems generally, a regime of mandatory application is probably not the best answer
 - Situation is always a combination of Driver + Vehicle + Infrastructure
 - Better if we can get empirical evidence to set up a realistic rating scheme.”

Looking forward



- Current focus on establishing test procedure & standards for intelligent systems to set up a rating system
 - Key is to get something from empirical evidence that realistically mirrors real-life
- NHTSA currently analysing its database of real-world accidents with a view to
 - identifying scenarios for testing regimes
- Product liability still a key concern
 - Japanese perceived to be introducing in Japan, then Europe, then de-bug, then USA



Big Issues (for further advancement)

- Teenage drivers (and the elderly), both politically sensitive.
- Alcohol use
- Drowsiness
- Compatibility between 'big' and 'small' vehicles – at least in the public perception
- Lack of public awareness regarding technologies & benefits
- Different regimes in different states (particularly in the fields of speed control and in-service testing)
 - NHTSA has no control over these areas
- Poor dealer knowledge, enthusiasm, competence



Conclusions – USA v Europe

- Same problems and issues:
 - People
 - Business case
 - Caution regarding mandatory changes
 - Desire to formulate ratings through field testing
- Somewhat higher concerns regarding product liability
- Moving in a similar direction from a product technology standpoint
- Concerns about resource requirements, availability and conflicting demands from other driving forces such as cost reduction and environmental improvements

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