Fahrerassistenz: Trends in der Fahrerakzeptanz
- Kundennutzen, Bekanntheitsgrad und Kaufbereitschaft -

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Garching, 8.4.2008
**Introduction**

**Division Chassis & Safety**

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**Chassis & Safety**

### Electronic Brake Systems
- Hydraulic-Electronic Control Units (HECU)
- ABS
- ESC
- Software Functions:
  - Adaptive Cruise Control
  - Regenerative Brake System
  - Active Front Steering
  - Hill Start Assist, Hill Descent Control
  - Deflation Detection System
  - Hydraulic Brake Assist
  - Trailer Stability Program

### Hydraulic Brake Systems
- Calipers & Discs
- Drum Brakes
- Brake Hoses
- Boosters
- Tandem Master Cylinders
- Electric Parking Brakes
- Pedal Modules
- Brake Pressure Regulators

### Sensorics
- Steering Angle & Torque Sensors
- Wheel Speed Sensors
- Engine/Transmission Speed and Position Sensors
- Buckle Switch Sensors
- Chassis Sensors
- Sensor Clusters

### Passive Safety & ADAS
- Airbag Control Units (ACUs)
- Front/Side Satellites
- Hybrid Gateways
- Occupant Classification Systems (OCS)
- Pre Crash Sensors
- Driver Assistance Systems
  - Radar
  - Lidar
  - Camera

### Chassis Components
- Chassis Electronics (1st tier customers)
- Electric Power Steering
- Washer Systems
- Suspension Systems
- Chassis Electronics
Introduction
Business Unit Passive Safety & ADAS

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Layout of survey and questionnaire
Survey motivation
Advanced Driver Assistance Systems

ADAS

Comfort
Informing
Single Sensor
stand alone

ACC
ACC S&G
preCrash
LDW
Lane Keeping

Safety
Intervening
Fusion
Network

2005 2007 2009 2011

Consumer

publicity
acceptance
advantages and disadvantages

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Introduction
Survey

Location of the survey:
IAA in Frankfurt, TÜV-Süd, DEKRA and Donaueinkaufszentrum in Regensburg

boundary conditions/constraints
- today ADAS is market is not fully penetrated (technical and commercial)
- limited experience of some interviewed persons with ADAS (simulation only)

Goal of the survey:
- The publicity of ADAS in the public (including sources of information)
- The individually estimation of the usefulness of ADAS
- The attitude towards ADAS (advantages, disadvantages and consumer acceptance)
Fragebogen IAA September 2007
Marktanalyse Fahrerassistentensysteme

Was sind Fahrerassistentensysteme?
Das Fahrzeug sammelt umfassende Informationen über seine Umgebung, woraus dieses aus und gibt dem Fahrer eine unterstützende Unterstützung ohne ihm die Verantwortung zu nehmen.

Geschlecht: □ männlich □ weiblich
Alter: □ 16-25 □ 26-45 □ 45-65 □ >65

Frage 1: Welches Fahrzeug fahren Sie?
(Fahrzeugmerkmalen und Fahrzeugtyp)
□ Kein eigenes Fahrzeug

Frage 2: Welchen Zustand hatte Ihr Fahrzeug beim Kauf?
□ Neufahrzeug □ Gebrauchtfahrzeug

Frage 3: Was ist Ihre durchschnittliche Fahrleistung pro Jahr?
□ Autobahn □ Landstraße □ Innenstadt

Frage 4: Zu welcher Tageszeit fahren Sie vorwiegend?
□ Morgen □ Nachmittag □ Abend

Frage 5: Falls interessiert, welche Quellen wurden Sie über neue Fahrzeugausstattungen informiert? (Mehrfachnennung möglich)
□ Presse □ Radio/TV □ Internet □ Bekannte/Freunde □ Händler/Probefahrt

Frage 6: Welche Fahrerassistentensysteme kennen Sie?
□ Adaptive Cruise Control (ACC) (dynamische Geschwindigkeitsregelung)
□ Traffic Sign Recognition (TSR) (Verkehrszeichenerkennung)
□ Night Vision (NV) (Nachtfahrerstabilisierung)
□ Blind Spot Detection (BSD) (Toter Winkel Erkennung) & Lane Change Assist (LCA) (Spurwechselhilfe)
□ PreCRASH (Notbremsassistent)
□ Lane Departure Warning (LDW) (Fahrspurverlassenwarnung)
□ Halbautomatisches Einparken (Parkhilfe)

Frage 7: Ist Ihr Fahrzeug mit einem oder mehreren Fahrerassistentensystemen ausgestattet?
□ Nein □ Ja

Frage 8: Sind Sie bereit andere Fahrzeuge mit einem bzw. mehreren Fahrerassistentensystemen zu kaufen?
□ Nein □ Ja

Kommentare und Anmerkungen:

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Demographic Data
Gender and Age

2005

- 76% Female
- 24% Male

2007

- 66% Female
- 34% Male

Age Distribution

- 2005:
  - 18 - 25: 22%
  - 26 - 34: 18%
  - 35 - 50: 25%
  - > 51: 35%

- 2007:
  - 18 - 25: 16%
  - 26 - 45: 8%
  - 46 - 65: 19%
  - ≥ 66: 57%
Demographic Data
Vehicle Type and Mileage

### 2005

- **Subcompact**: 24%
- **Compact**: 17%
- **Mediumclass**: 2%
- **Upper Mediumclass**: 2%
- **Upperclass**: 6%
- **Van**: 11%
- **Sports car**: 24%
- **Convertible**: 6%

### 2007

- **Subcompact**: 31%
- **Compact**: 17%
- **Mediumclass**: 5%
- **Upper Mediumclass**: 5%
- **Upperclass**: 3%
- **Van**: 4%
- **Sports car**: 6%
- **Convertible**: 5%
- **Other = 290**

#### Mileage Distribution

- **< 10000 km/year**: 32%
- **10000-20000 km/year**: 27%
- **> 20000 km/year**: 41%

#### Mileage Distribution

- **< 10000 km/year**: 37%
- **10000-20000 km/year**: 10%
- **> 20000 km/year**: 53%
Road Use
Time of Road Use

2005

On which type of road do you drive mainly?
- Motorway
- Country road
- City

26%
37%
37%

2007

On which type of road do you drive mainly?
- Motorway
- Country road
- City

12%
34%
54%

At which time of day do you drive mainly?
- At day
- At night
- At day and at night

44%
5%
51%

2007

At which time of day do you drive mainly?
- At day
- At night
- At day and at night

35%
2%
63%
Vehicles equipped with ADAS
Experiences with ADAS

Do you find any of those ADAS in your own car?

- 2005: 3% Yes, 97% No
- 2007: 13% Yes, 87% No

Did you already drive a car equipped with an ADAS?

- 2005: 20% Yes, 80% No
- 2007: 34% Yes, 66% No
Usefulness of the systems
Consumer Acceptance
Advantages and disadvantages of the systems
Overview

**How useful do these Advanced Driver Assistance Systems appear to you?**
- Extremely useful
- Very useful
- Useful
- Less useful
- Useless

**Which advantages do you see in these systems?**
- More safety
- More comfort
- More orientation
- No advantages

**Would you buy one of these Advanced Driver Assistance Systems (→acceptance)?**
- yes
- no
- Maybe (depends on price)

**Which disadvantages do you see in these systems?**
- Unconcentrated driving
- Distraction
- Patronized by systems
- No disadvantages
Adaptive Cruise Control

Ø 2007: 2,27
Ø 2005: 2,74

Would you buy one of these Systems?

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Traffic Sign Recognition

Ø 2007: 2.81
Ø 2005: 2.94

Would you buy one of these Systems?

More safety More comfort More orientation No advantages

Unconcentrated driving Distraction Paternalism by systems No disadvantages

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Blind Spot Detection, Lane Change Assist

Ø 2007: 2.40  
Ø 2005: 2.42

Would you buy one of these Systems?

Unconcentrated driving  
Distraction  
Paternalism by systems  
No disadvantages

More safety  
More comfort  
More orientation  
No advantages
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Conclusion

Publicity

- Highest name recognition for systems already in the market: Adaptive Cruise Control and Semiautomatic Parking

- Increasing publicity of the systems

- Increasing number of cars equipped with Advanced Driver Assistant Systems:
  3 % in 2005 -> 13 % in 2007

- Increasing experience with ADAS
  20 % in 2005 -> 34 % in 2007

Usefulness

- Highest usefulness for preCrash and ACC

Advantages

- ADAS still can't be separated in Comfort-Systems and Safety-Systems, but trend to Safety-Systems