

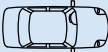
# Vehicle Integration of multiple ADAS HMI Concept and Architecture

Dr. J. Happe, M. Lütz  
2. Tagung "Aktive Sicherheit durch Fahrerassistenz"  
4. April 2006

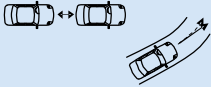
## Multiple Advanced Driver Assistance Systems **SIEMENS VDO** Main Topics

### Architecture/HMI

Multiple ADAS in  
one vehicle



1 vehicle  
n ADAS

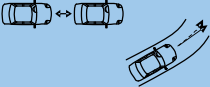


### Synergy

Multiple ADAS with  
one component

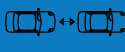


1 component  
n ADAS



### Fusion

Multiple components  
for one ADAS



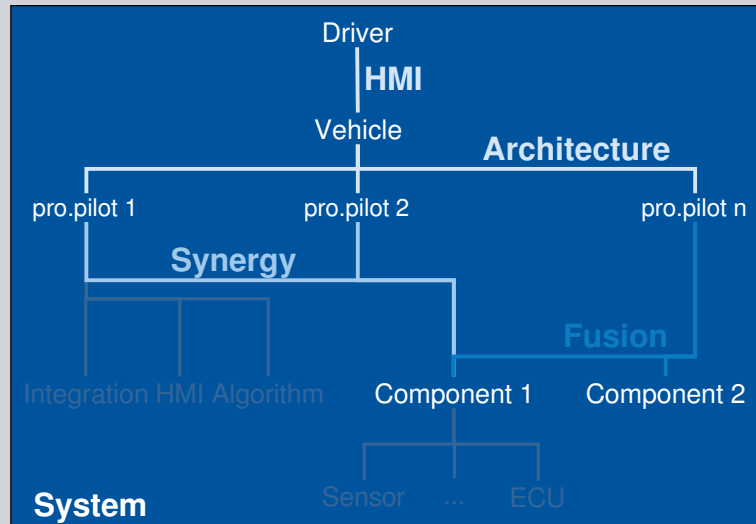
1 ADAS  
n components



### System

1 vehicle  
n components  
n ADAS

## Multiple Advanced Driver Assistance Systems **SIEMENS VDO** Main Topics



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## Questions to be answered for multiple Advanced Driver Assistance Systems (pro.pilot) **SIEMENS VDO**

§ **HMI:** How many information does the driver need and where do we put it?

§ **Architecture:** What are the requirements on a network of multiple Advanced Driver Assistance Systems (pro.pilot)?

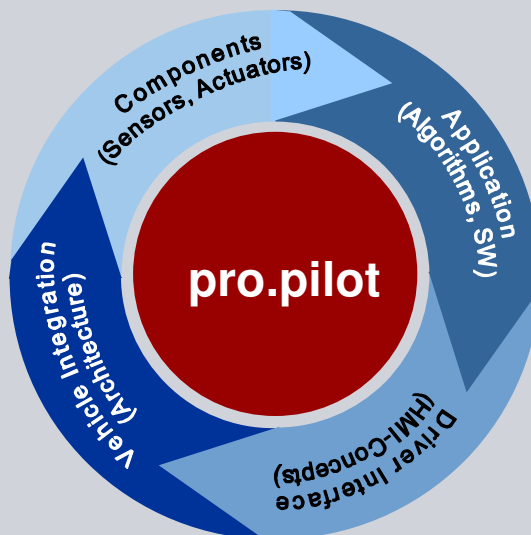
§ **Synergy:** How can sensors be used for multiple pro.pilot functions?

§ **Fusion:** What kind of fusion of different sensors can be made?

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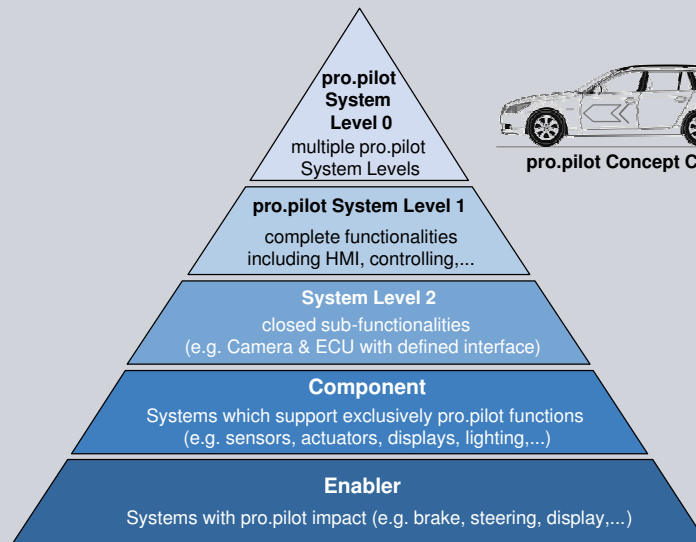
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## pro.pilot Concept Car System Level

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## pro.pilot Concept Car

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- Serial equipment:
- Head-up Display
  - Parking Aid
  - Navi-Professional
  - ACC



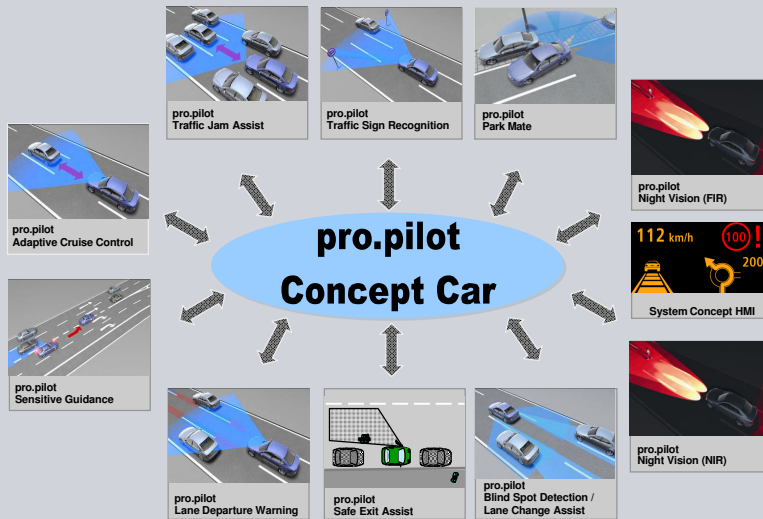
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## pro.pilot Concept Car Realized Applications

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## pro.pilot Concept Car Selected Sensor Technology

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pro.pilot functions	Camera			Radar		Lidar	US	Others
	HDR Camera (Front)	HDR NIR Camera (Front)	FIR Camera (Front)	Short Range Radar 24 GHz UWB (Side)	Short Range Radar 24 GHz NB (Side)	Long Range Lidar (Front)	Ultrasonic (Side)	Digital Map
Blind Spot Detection				X				
Lane Change Assist					X			
Lane Departure Warning	X							
Traffic Sign Recognition	X							
Park Mate							X	
Night Vision (FIR)			X					
Night Vision (NIR)		X						
Traffic Jam Assist	X							
ACC (Lidar based)						X		
Sensitive Guidance				X	X			X
Safe Exit Assist				X				

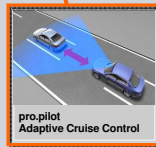
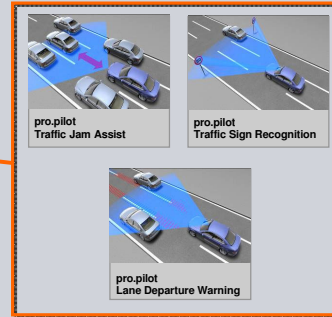
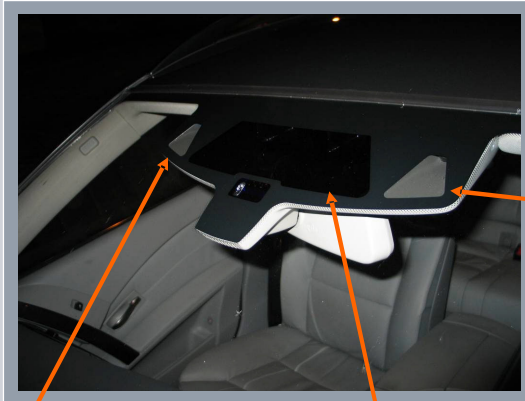
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## pro.pilot Concept Car Location of Sensor Technology

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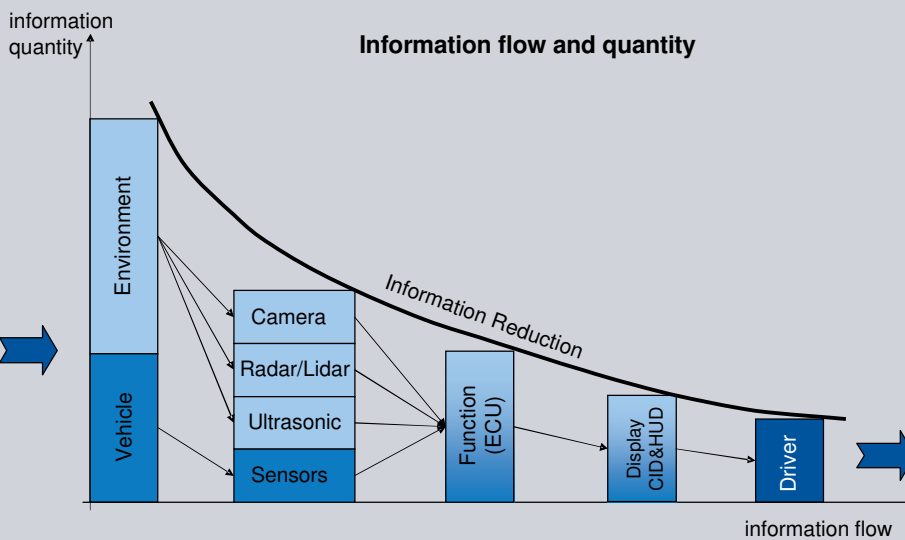


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## pro.pilot System HMI-Concept Reduction of Information

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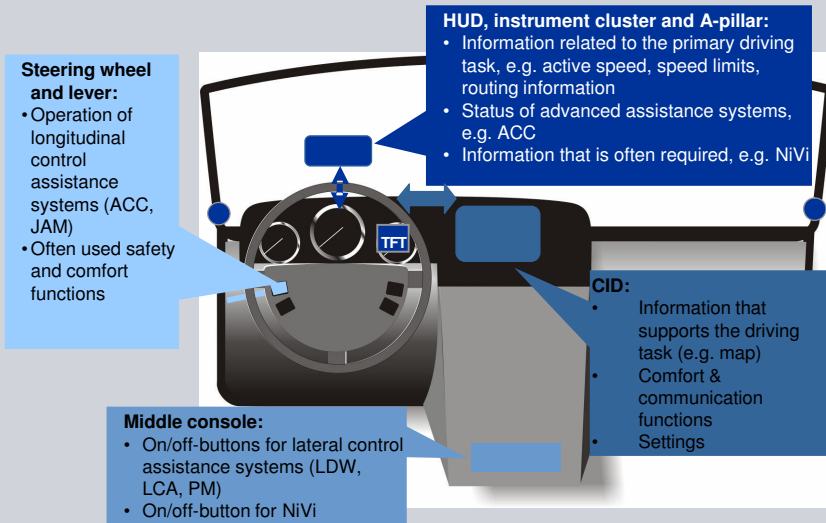


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## pro.pilot System HMI-Concept Possible Locations for Information

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## pro.pilot System HMI-Concept Selected locations for functions

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pro.pilot functions	HMI							
	Acoustic	Visual				Haptical		
	Acoustic Warning	Visual Warning (icons, LEDs, etc.)	Display / Instrument Cluster	HUD	CID	On/Off Button	Vibration Steering Wheel	Steering Intervention (Torque)
Blind Spot Detection		x				x	x	
Lane Change Assist		x				x	x	
Lane Departure Warning		x				x	x	x
Traffic Sign Recognition			(x)	x				
Park Mate	x				x	x		x
Night Vision (FIR)		x		x		x		
Night Vision (NIR)		x		x		x		
Traffic Jam Assist	x		(x)	x		x		
ACC (Lidar based)	x		(x)	x		x		
Sensitive Guidance					x	x		
Safe Exit Assist	x	x				x		

(x) if HUD is not available

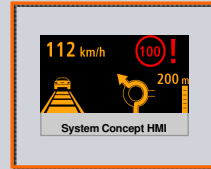
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**pro.pilot System HMI-Concept  
Realisation**

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**SIEMENS VDO**

**Advanced Driver Assistance Systems  
Summary**



## Summary

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**HMI:** Multiple ADAS in one vehicle

§ Problem: Complexity by number of components/ADAS and their interaction

§ Solution: System HMI-Concept

**Architecture:** Multiple ADAS in one vehicle

§ Problem: Complexity by number of components/ADAS and their interaction

§ Solution: Framework

**Fusion:** Multiple sensors for one ADAS

§ Problem: Unreliable Information by one sensor

§ Solution: Use of many sensors for one application

**Synergy:** Multiple ADAS with one sensor

§ Problem: Too many sensors => Package, Costs

§ Solution: Use of one sensor for many applications

## Definition and Vision of SV

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### **pro.pilot (Advanced Driver Assistance Systems)**

pro.pilot uses environmental sensing in order to assist the driver in his driving task to increase safety and comfort

**pro.pilot**

**Assist but not patronize the driver!**