



Johann Kelsch

Aachen, Germany
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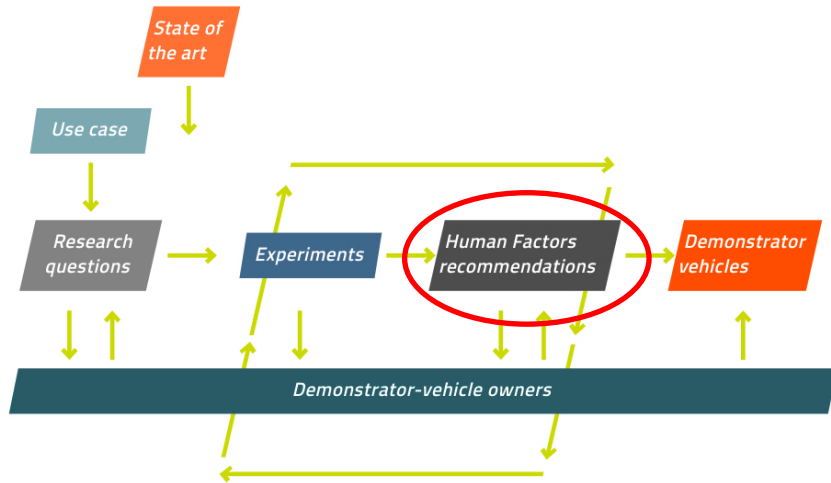
Adapt!Ve

*Automated Driving Applications and
Technologies for Intelligent Vehicles*

*Human Factors Recommendations
in Adapt!Ve*



// Introduction



- Why is the design of human-vehicle integration important?
 - Who can support the designer and how?
- 4A Structure
- Human Factors recommendations catalogue
 - with an example
- Summary and outlook

// Why is the design of human-vehicle integration important?

- Think of traffic accidents with humans involved
- Don't blame the human,



support the HMI designer!

// Who can support the HMI designer and how?

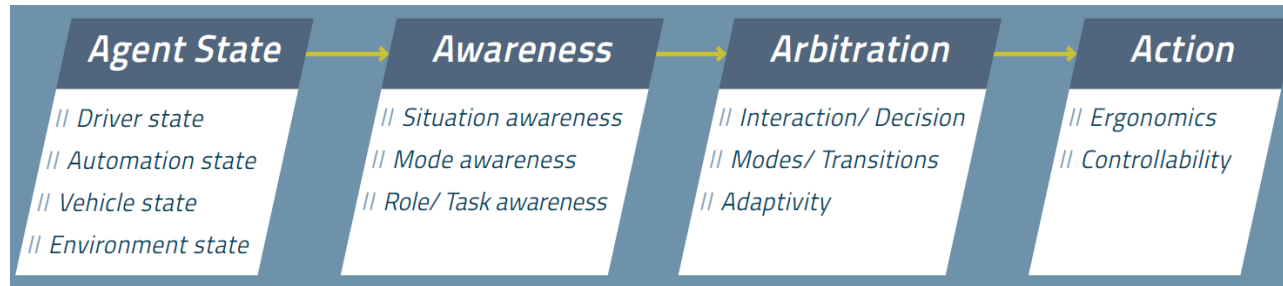
- Involved expert groups and tasks
 - Engineers
 - doing complicated things
 - HMI designer
 - designing HMI
 - Human Factors people
 - researching Human Factors



Provide Human Factors related recommendations

// How we organise Human Factors recommendations?

- Developed a structure for organising Human Factors recommendations
- Based on informational processing within cognitive multi-agent systems, such as driver-vehicle systems
- 4A Structure



look for...



find...



formulate as...



// Towards Human Factors recommendations catalogue

- Use 4A Structure for organising Human Factors recommendations
- Collect already existing recommendations from literature
- Formulate new recommendations from experiments
- Describe examples from experiments and implemented demonstrators
- Integrate all information in a catalogue


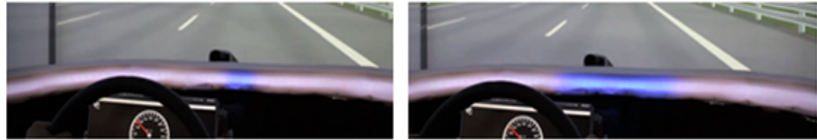








// Human factors recommendations catalogue

ID	Name			
Unique ID →	← Name of the recommendation derived from its related topic			
Addressed SAE Level →	Related SAE Levels:			
	SAE0	SAE1	SAE2	SAE3
Application scenario →	Related to 4A subcategories:			
	Automation State	Vehicle State	Environment state	Driver State
	← Related 4A sub-category			
Application scenario →	Related to the following applications			
	Highway	Urban	Close-Distance	
Human Factors functional recommendation →	Human Factors challenge			
	← Human Factors Challenge			
Human Factors functional recommendation →	Human Factors recommendation			
	← Human Factors non-functional recommendations			
Human Factors functional recommendation →	Already existing approaches and examples			
	← Examples			
Human Factors functional recommendation →	References			
	← References			

// A recommendation example

ID	Name			
FR2A_AOA	"Availability of the automation"			
Related SAE Levels:				
SAE0	SAE1	SAE2	SAE3	SAE4
x	x	x	x	x
Related to 4A subcategories: AWARENESS				
Mode awareness	Situation Awareness			
x				
Related to the following applications				
Highway	Urban	Close-Distance		
x	x	x		
Human Factors challenge				
The driver does not know if the automation is available or not.				
Human Factors recommendation				
The automation should display to the driver if the functionality is available for activation.				
NFR2A_AOA.1: Available step-ups in automation should be restricted to the minimum possible number, and displays should reflect this				
NFR2A_AOA.2 If available, use local visual feedback (blue-blinking transition button) and/or peripheral visual feedback (animation on a frontal LED Stripe) to signalize that automation is available (Reference: AdaptIVeD3.2, DLR, Exp.1)				
NFR2A_AOA.3 If available, change symbol colours and use flashes to indicate that automation is available/unavailable (Reference: AdaptIVeD3.2, LEEDS, Exp.1)				

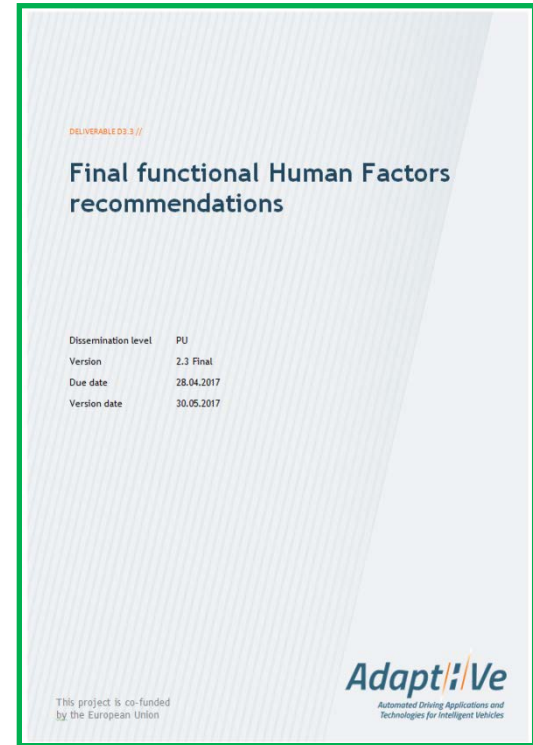
Already existing approaches and examples						
FR2A_AOA.E1: Automation mode display from InteractiveV						
						
FR2A_AOA.E2: Example of DLR peripheral visual feedback on Ambient light display for automation availability (Reference: AdaptIVeD3.2, DLR, Exp.1)						
						
FR2A_AOA.E3: Example of Leeds HMI display for showing automation availability (Reference: AdaptIVeD3.2, LEEDS, Exp.1)						
<table border="1"> <thead> <tr> <th>HMI</th> <td></td> <td></td> </tr> <tr> <th>Description</th> <td>Automation not Available</td> <td>Automation Available</td> </tr> </thead> </table>	HMI			Description	Automation not Available	Automation Available
HMI						
Description	Automation not Available	Automation Available				
References						
HAVEit D33.2; InteractIVe D3.2; Gordon & Lidberg (2015); Flemisch et al. (2014); Tellis et al. (2016)						

// Summary and Outlook

- 4A-categories: 4
- 4A-sub-categories: 12
- Functional recommendations: 27
- Non-functional recommendations: 80
- Examples: 364

to be continued...

- basis for future projects
- collecting further recommendations



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Johann Kelsch
johann.kelsch@dlr.de

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Thank you.

