HUMAN-MACHINE-
INTERACTION

Ko-HAF
KOOPERATIVES
HOCHAUTOMATISIERTES FAHREN

Effects of prolonged automated driving on take-over performance

MOTIVATION

- Longer automated drives could lead to an increase in drowsiness and fatigue.
- What effects can be seen resulting from **longer automation on driver state** and how do they affect the **take-over performance** in different scenarios compared to a **manual baseline**?

METHOD

- Driving simulator (static) study
- n = 57, mean = 33 years (SD = 13y)

Experimental design

- Between subject factors: group
  (level of automation and traffic density)

	Automation level	Traffic density
HAD0	HAD	0 Veh./km
HAD20		20 Veh./km
Manual	Manual	

- Within subject factor:
  duration of automated driving (2x5 min vs. 30 min)

30 min	5 min	5 min

- Within subject factor: situation

Construction site	Crash Site	Autobahn interchange
		

Measures


Eye-tracking

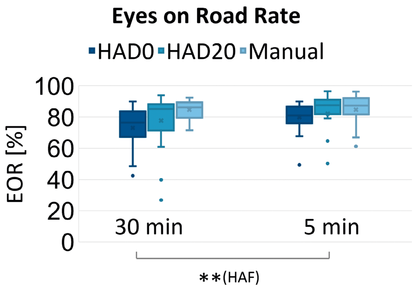

Seat pressure mats

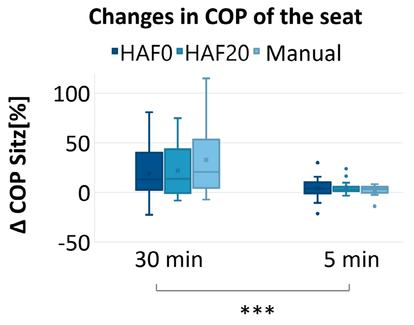

Vehicle dynamics

RESULTS

Driver state: longer automated driving has a significant influence on

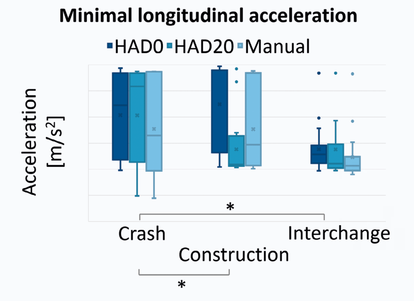
- Eyes on Road Rate (EOR)
- Pupil diameter
- Center of Pressure (COP) (activity of the driver)





Significant differences between the take-over situations concerning

- Minimum longitudinal acceleration
- Maximum lateral acceleration
- Take-over time



SUMMARY

Prolonged automated driving (30 min)

- significantly influences the driver state,
- but does not affect take-over performance.

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