

# First International Conference on Driver Distraction and Inattention

28-29 September 2009

**Development of a voice commanded HUD interface  
for an in-vehicle mobile phone application  
– exploring a technology transfer to the space industry**

*Master thesis conducted at Chalmers department of Product- and Production  
Development, division Human Factors & Design*

*Spring 2008*

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## Summary

Project background

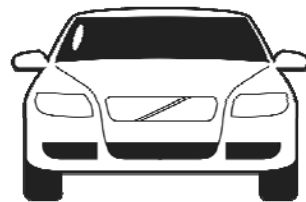
Finding the problem

Finding the solution

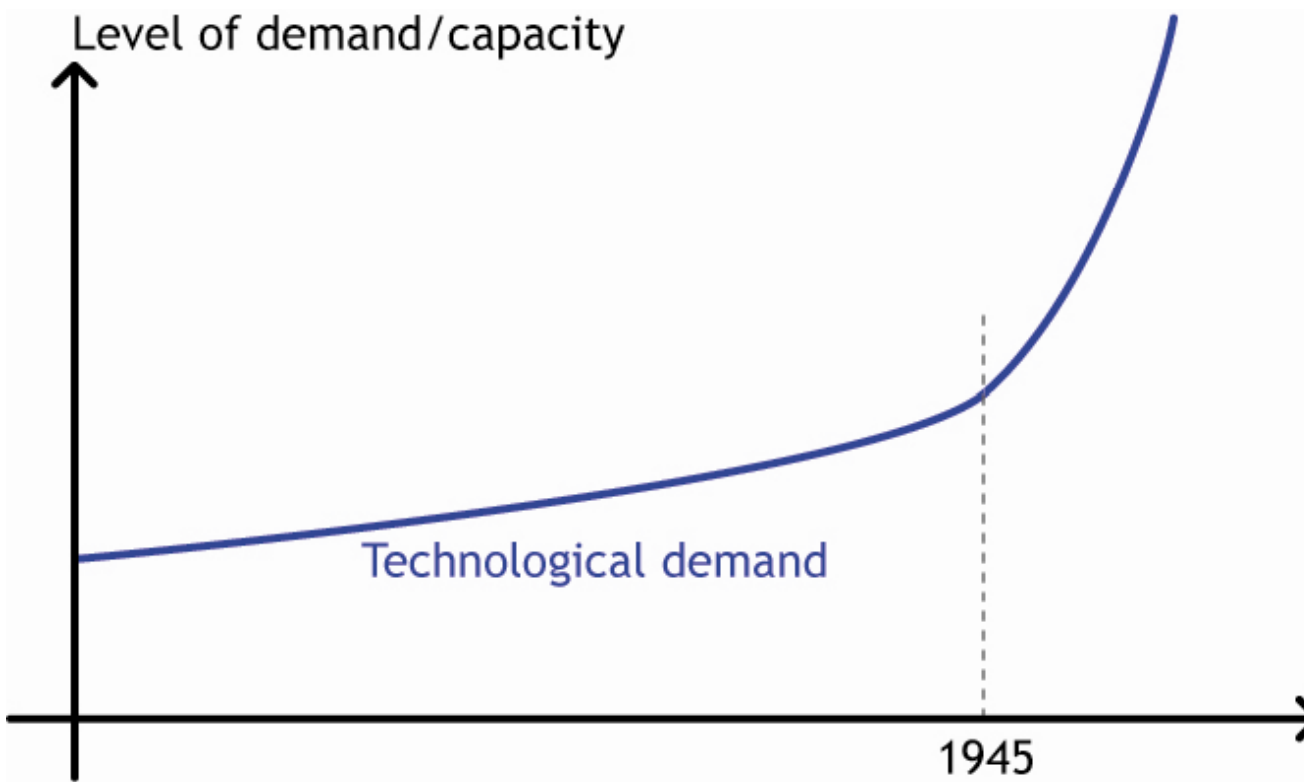
Presenting the solution

Evaluating the solution

How the project was born



## A glance back at history



[Reference Hollnagel, 2007]

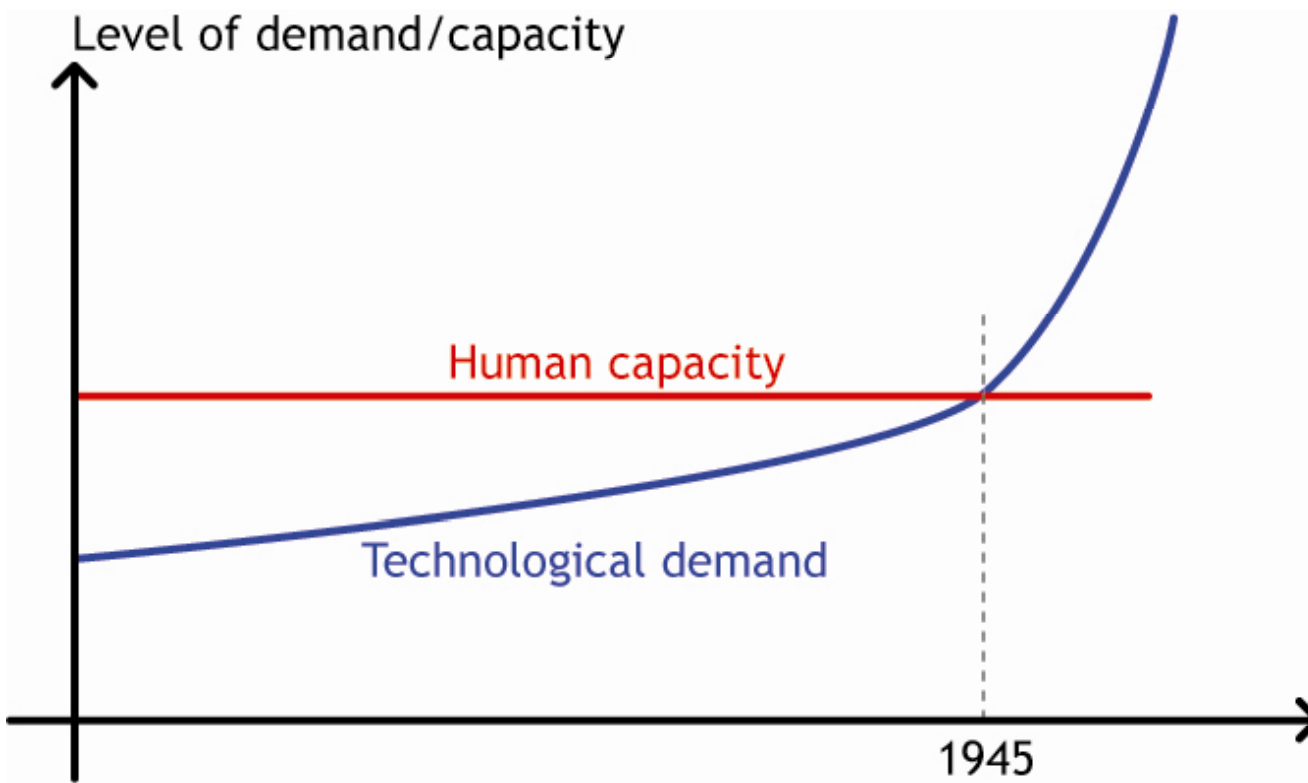
## Examples within the automotive industry

1968	1978	1988	1998	2008
Radio, Regulators	Radio, Tape, Regulators, Monochrome displays	Radio, Tape, CD, Regulators, Monochrome displays	Radio, Tape, CD-shifter, TV, TA, Navigation, CC Trip computer, Telephone, Regulators, Colour Displays	Radio, SAT Radio, CD-shifter, MP3 / CD / DVD, Com: USB / Bluetooth / AUX, Ext: Ipod, PDA etc, Internet, TV, Rear Seat Entertainment, TA, Navigation, Car to Car, Mobile Office (mail etc), Wlan etc, Trip computer, Config DIM, Integrated Telephone, Regulators: Haptic / Voice, Touch screen, Colour displays, HUD, <b>ADAS</b>

[Reference IVSS]

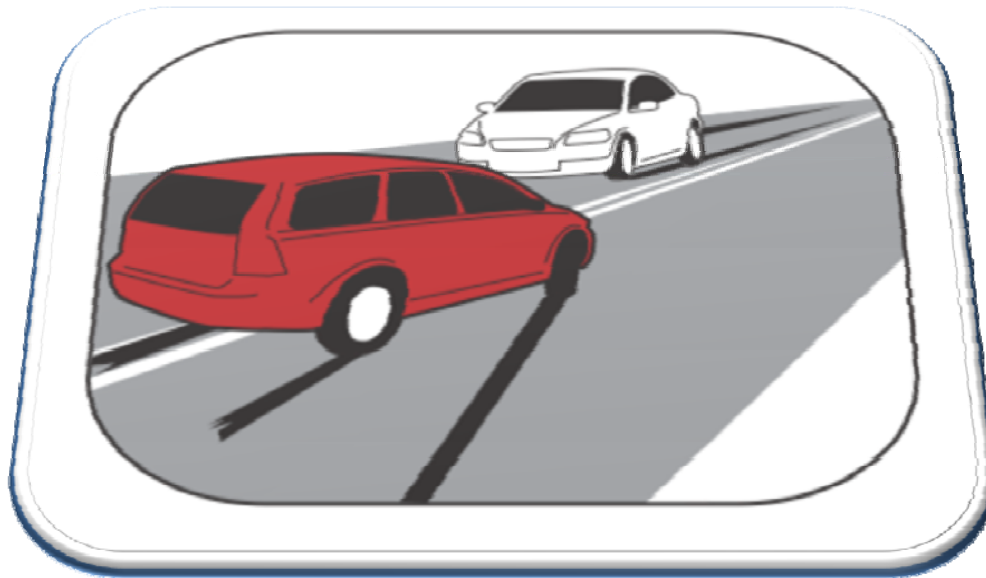


[Reference IVSS]



[Reference Hollnagel, 2007]

What happens when you are driving a car and get a cognitive overload?





High focus level

Second level

Third level

Fourth level

Chosen focus level

Minimize number of incidents with automobiles

Minimize number of incidents with...

...single vehicle

...lead-vehicle

...following vehicle

...object/obstacle

...parked vehicle

...animal

Vehicle turning in front of subject from opposite direction

...adjacent vehicle

...other

...oncoming traffic

...vehicle turning into subject path in same direction

...vehicle turning across subject path in same direction

...vehicle turning into subject path in opposite direction

...vehicle moving across subject path through intersection

...pedestrian

...merging vehicle

...pedalcyclist

...unknown

78 % of these accidents are caused by inattention

Secondary task engagement

Fatigue

Driving-related inattention to the forward road

Non-specific eye glance

Wireless Devices

Passenger related

Internal distractions

Dialing

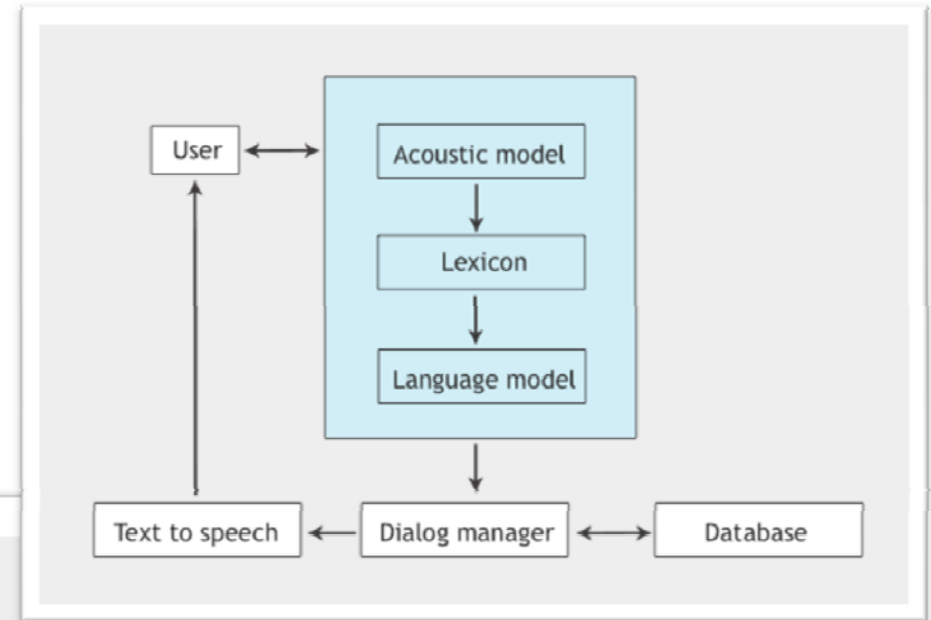
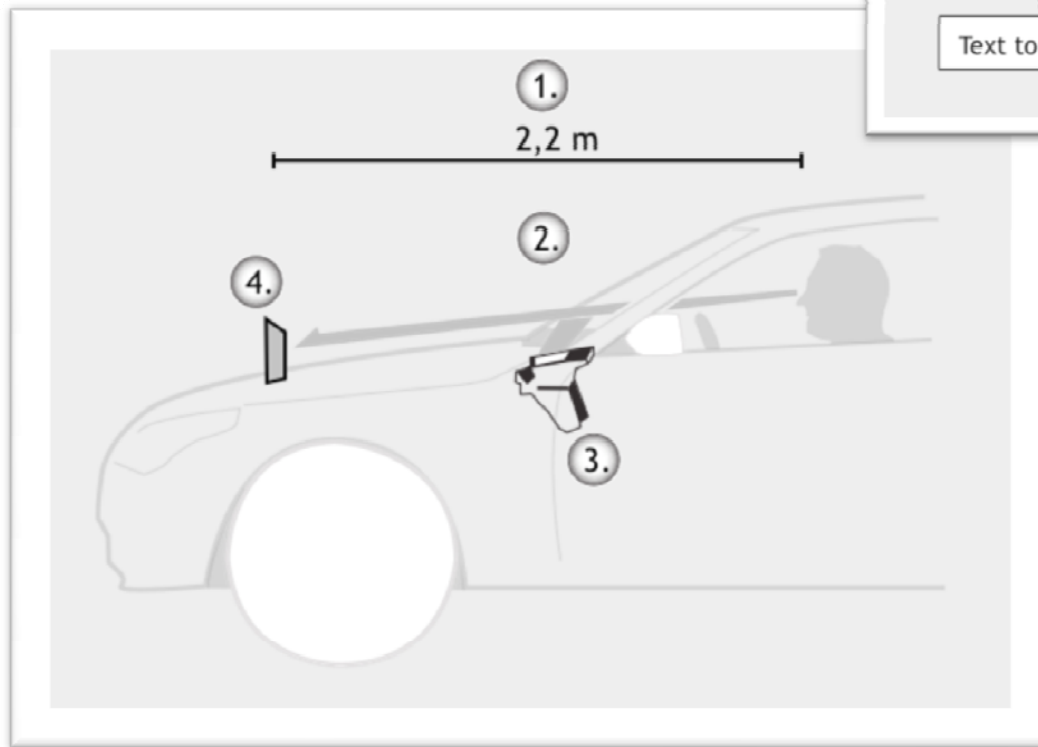
Listening/Talking

...

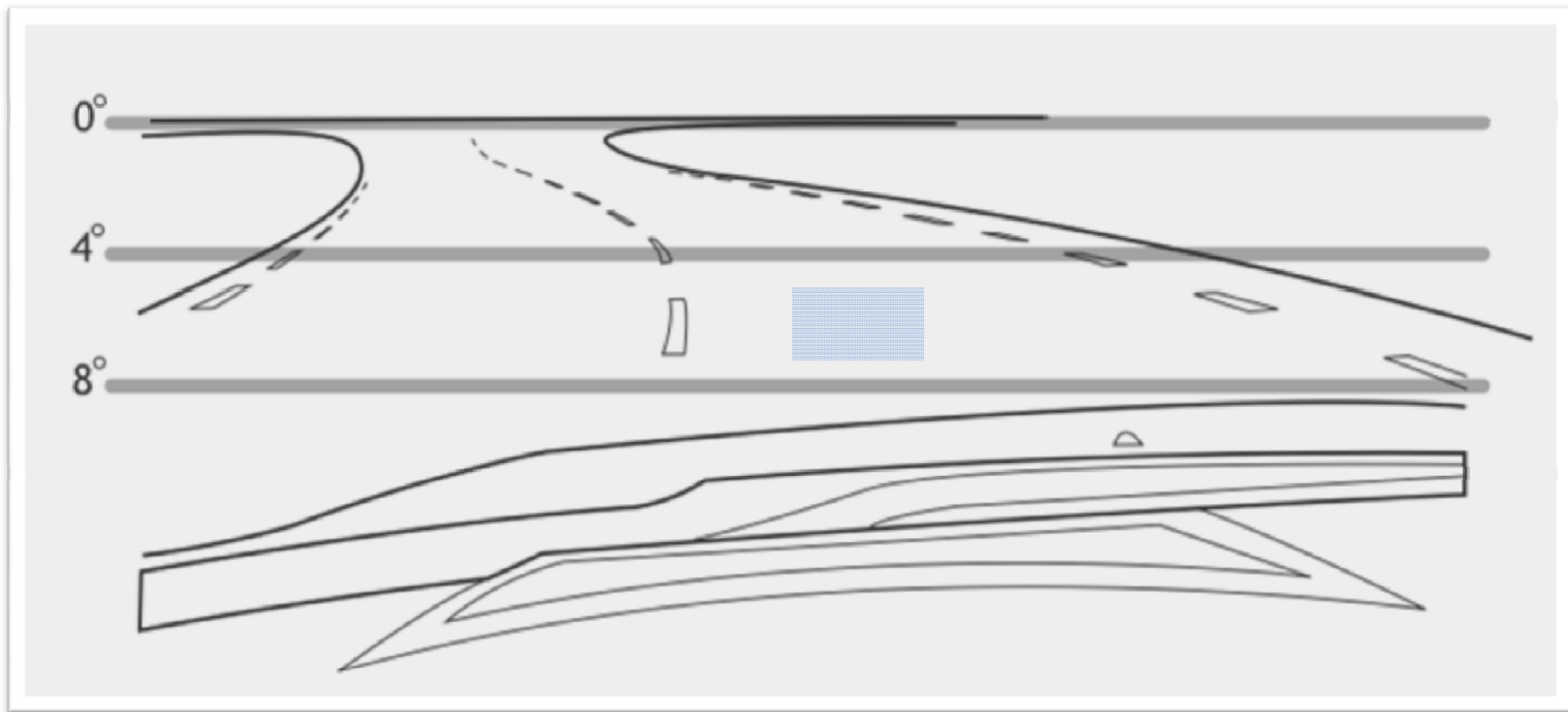
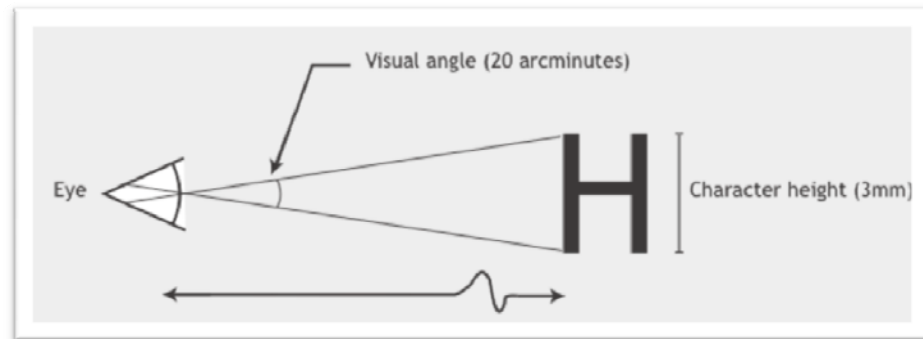
Looking at available technology communicating with the driver today



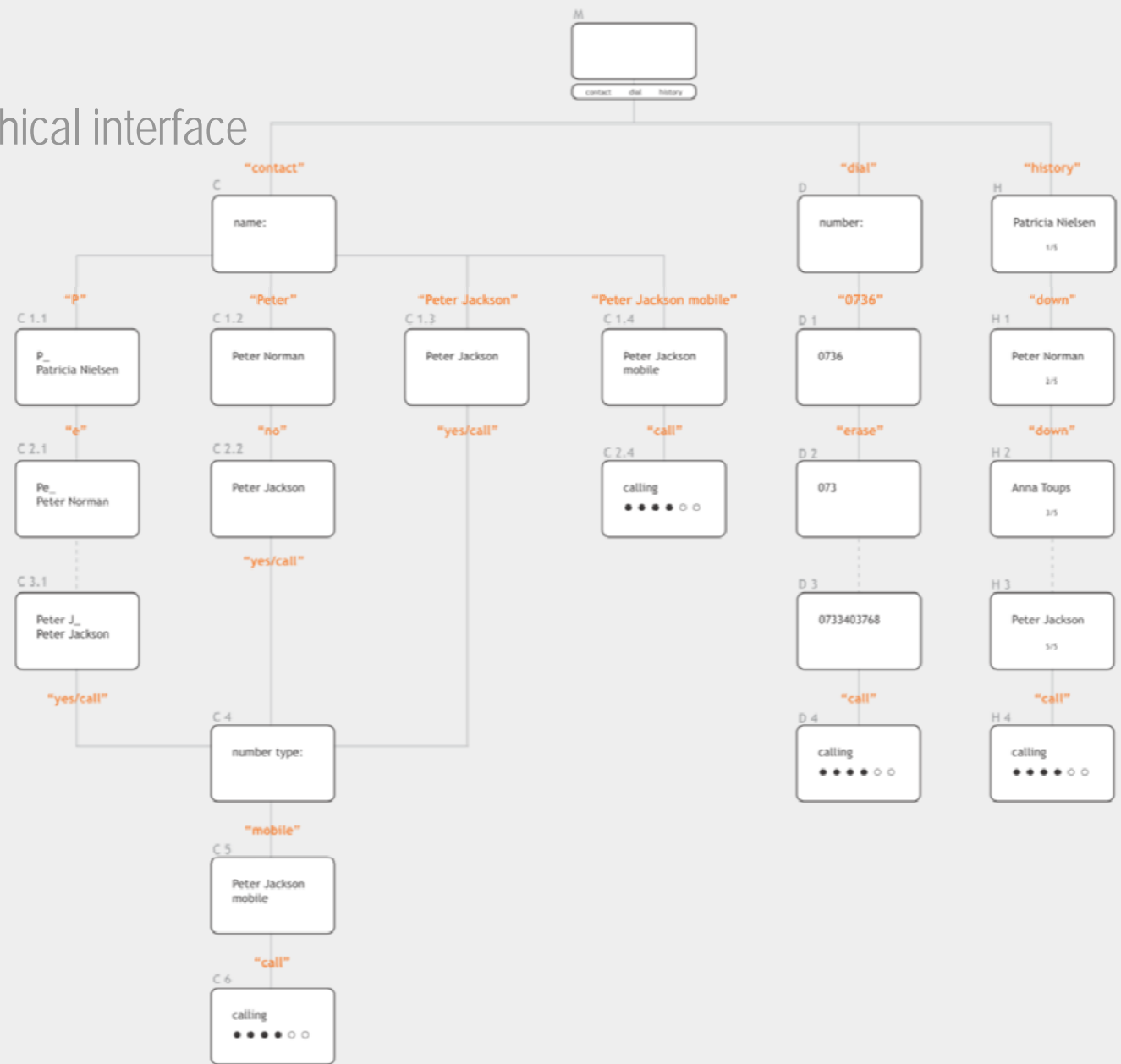
Why HUD and VUI?



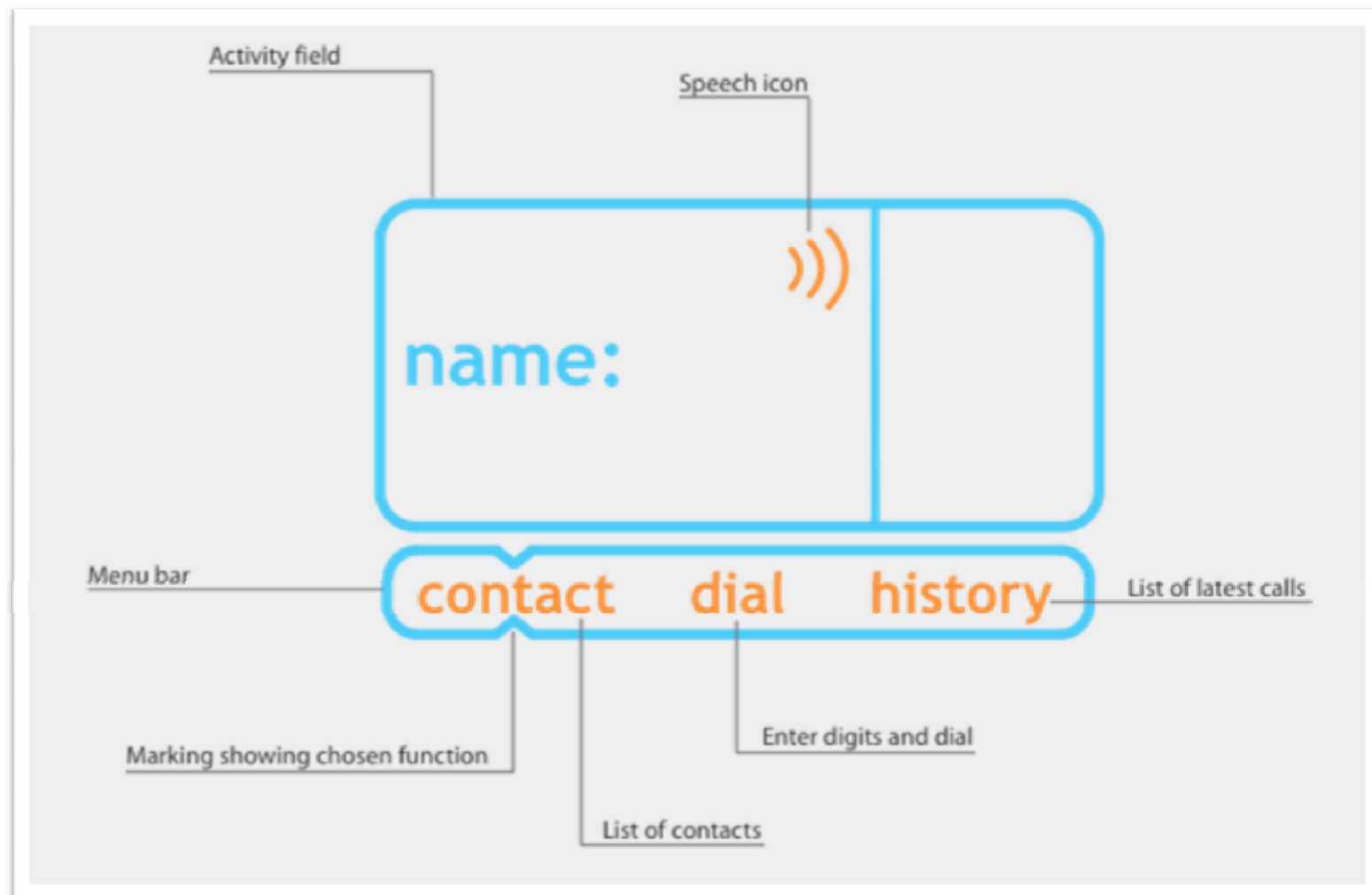
## HUD requirements



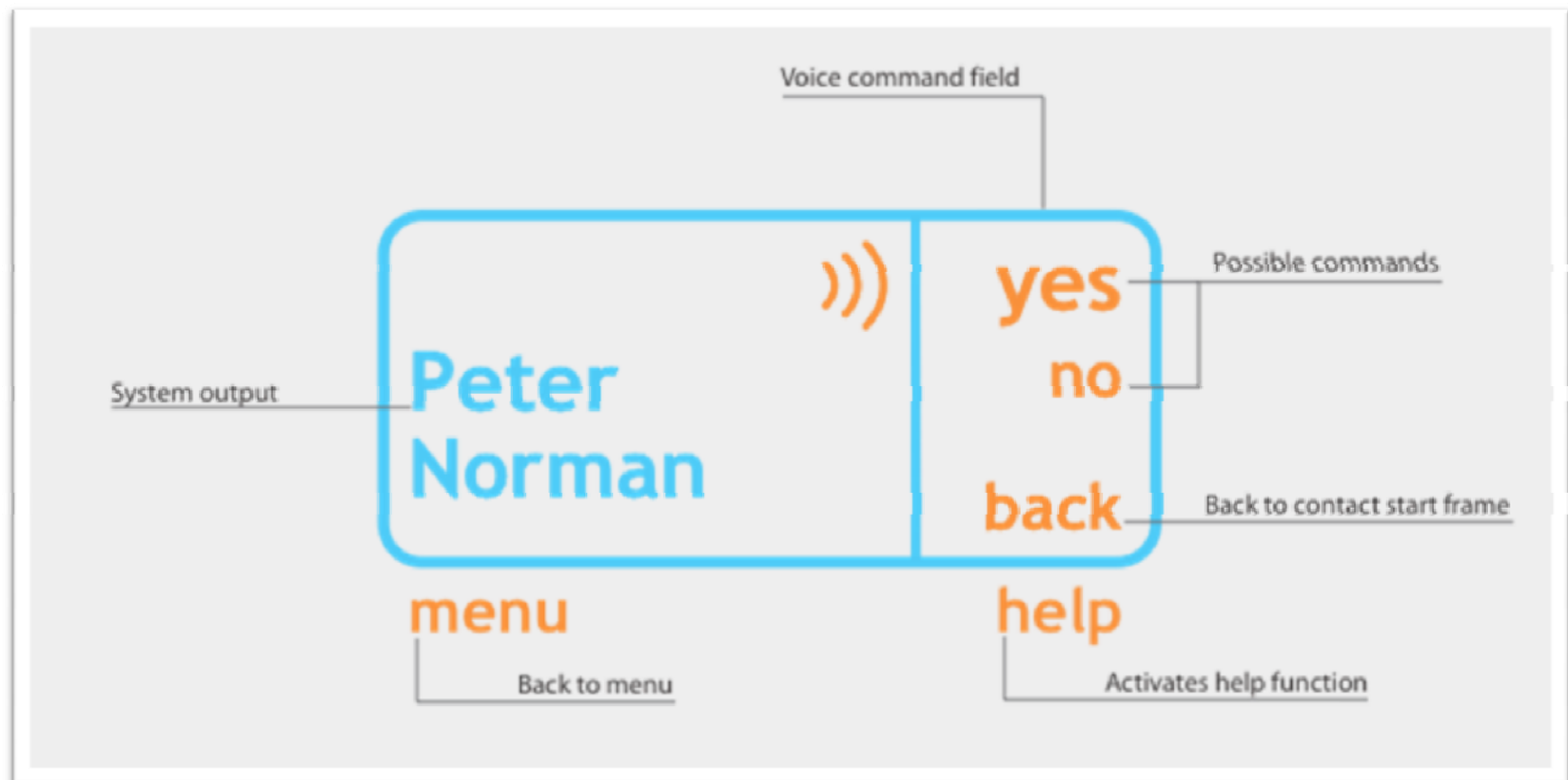
## Platform for the graphical interface



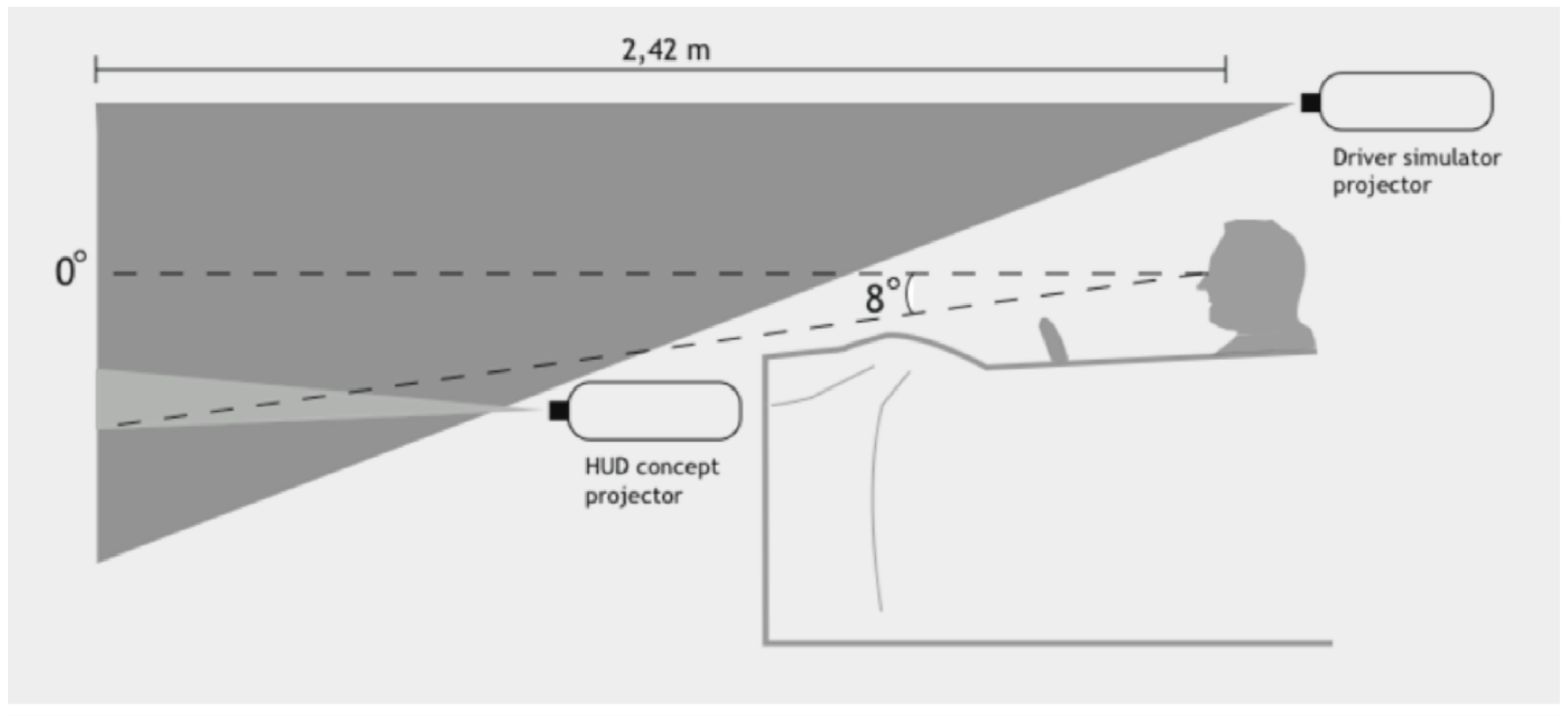
In more detail



In more detail



## Usability test





## Summary

