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Webinar Introduction to FESTA

Performance indicators, study design, sensors and measures

Examples from UDRIVE (first European NDS)

Fabian Utesch (DLR)

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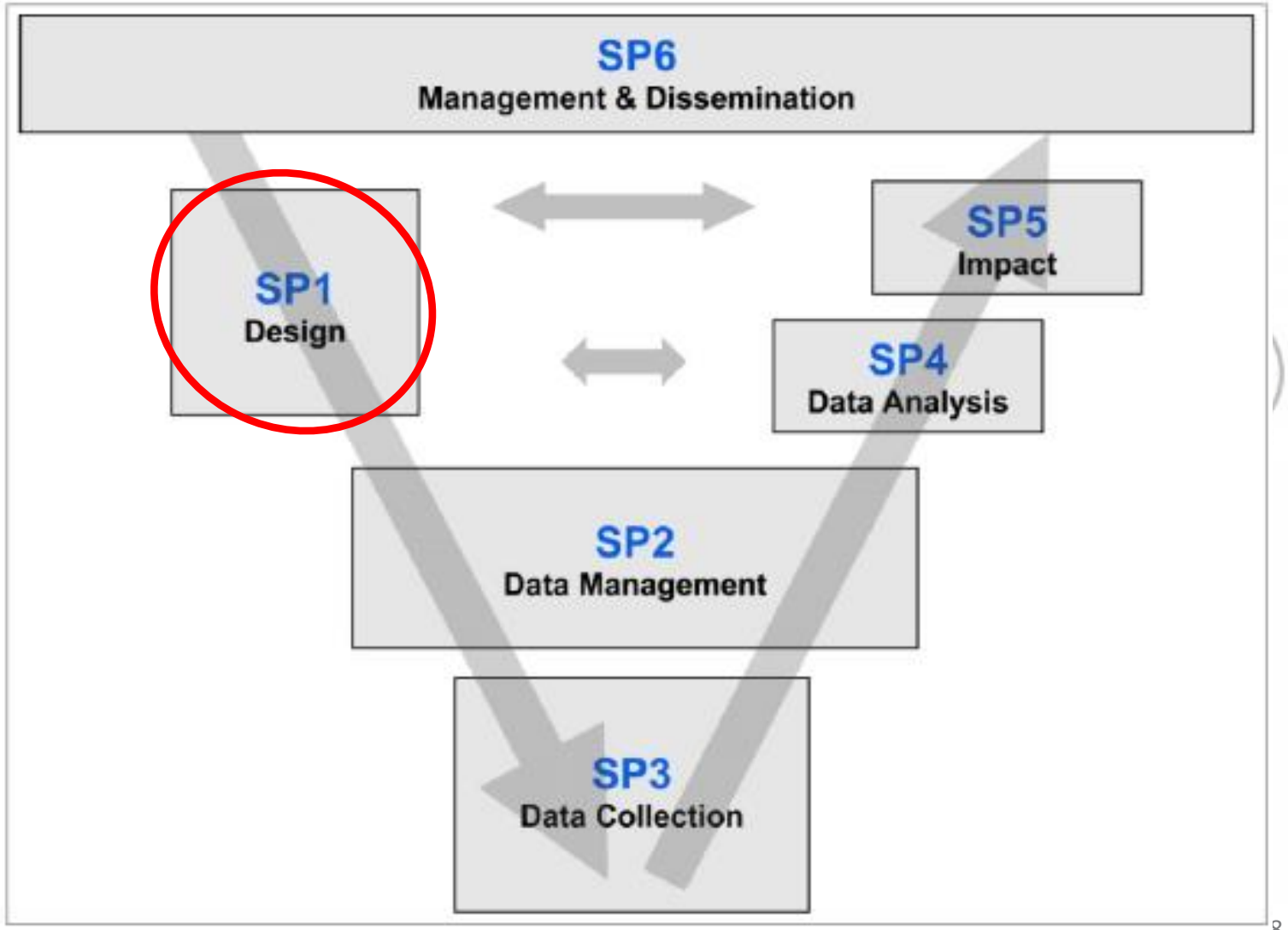
The FESTA-V methodology



Performance indicators

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- Performance indicators are quantitative or qualitative indicators
- Derived from one or several measures, agreed on beforehand
- Expressed as a percentage, index, rate or other value

- Risk analysis
  - Tailgating
  - Speeding
  - Driver distraction
  - Lane change
  - Overtaking manoeuvre
- Eco-driving
  - Degree of congestion
  - High engine speed
  - Close following
  - Free flow situation
  - High fuel consumption

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Performance indicators

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Performance Indicator	Needed Measures	Algorithm (sort of)
Speeding	- Speed - Speed limit	IF Speed > Speed limit THEN speeding = TRUE
Tailgating	- Distance to front vehicle - Speed front vehicle - Speed	IF TTC < 1 s FOR MORE THAN 10 s THEN tailgating = TRUE
Amount of high engine speed (%)	- Speed - Engine speed	Signal processing of the velocity in combination with the engine speed
Amount of braking energy (%)	- Longitudinal acceleration - Lateral acceleration	Signal processing of the velocity in combination with the engine speed

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Study design

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- Develop study design in order to be able to test hypotheses
- (A hypothesis is a specific statement which can be tested with statistical means)

- Experimental design:
  - Within-subjects
  - Between-subjects
  - Longitudinal
  - Baseline
- Threats to validity and interfering effects:
  - History, unplanned events
  - Maturation, experience
  - Selection, bias
  - Drop-out

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Study design – NDS example

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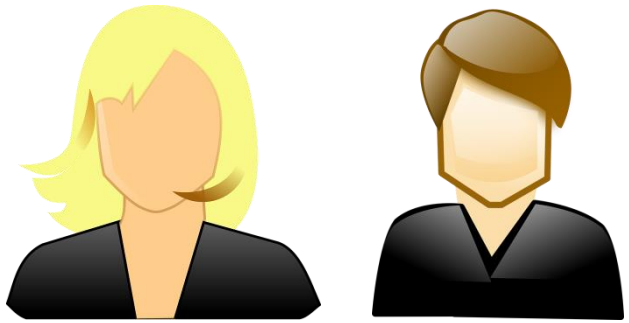

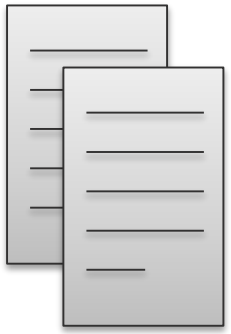

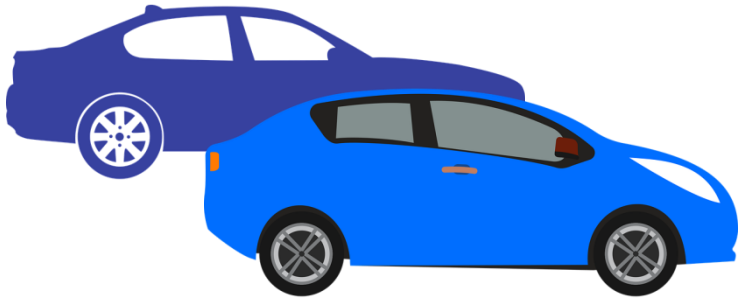

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What drivers are needed?

- Age
- Gender
- Driving experience
- Exposure on road type

What questionnaires are needed?

- Sensation seeking
- Locus of control
- Driving style

What vehicles are needed?

- Type (car, truck, Powered Two Wheelers)
- Number of vehicles needed
- Fuel type
- Size (small, medium, premium)

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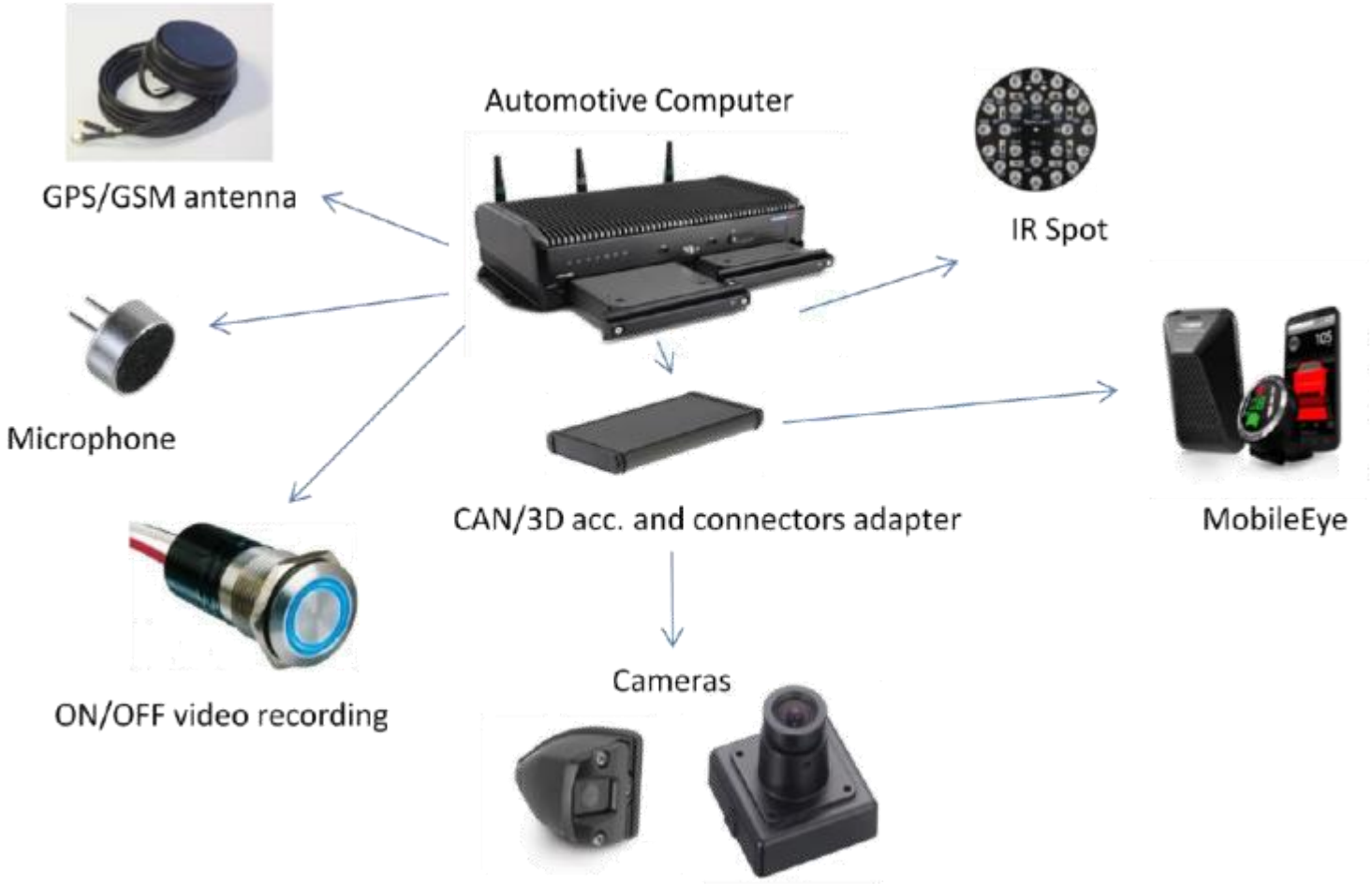
Sensors


GPS/GSM antenna
Automotive Computer
IR Spot
Microphone
CAN/3D acc. and connectors adapter
MobileEye
ON/OFF video recording
Cameras

Measures

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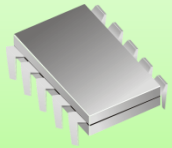
CAN data
- Brake pedal
- Acceleration pedal
- Steering wheel
- Turn signal
- HMI usage



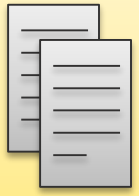
Map data
- Road type
- Legal speed limit
- Slope
- Is bridge / tunnel
- Is intersection
- Is one-way-street

Video annotation
- SCE verification
- Driver ID
- Secondary tasks

DAS data
- Speed
- GPS
- Lat/long acceleration
- Yaw, gyroscope, compass

Microphone
- Volume only

Questionnaires
- Demographic data
- Sensation seeking
- Locus of control
- Driver activity



Cameras
- Wide forward view
- Face cam
- Activity cam
- Cabin cam
- Feed cam
- Blind spot (Truck only)

Smart camera
- Lane position
- Position of other road users
- Distance to other road users

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Thank you!

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