Smart Vehicle Lab: research with vehicles

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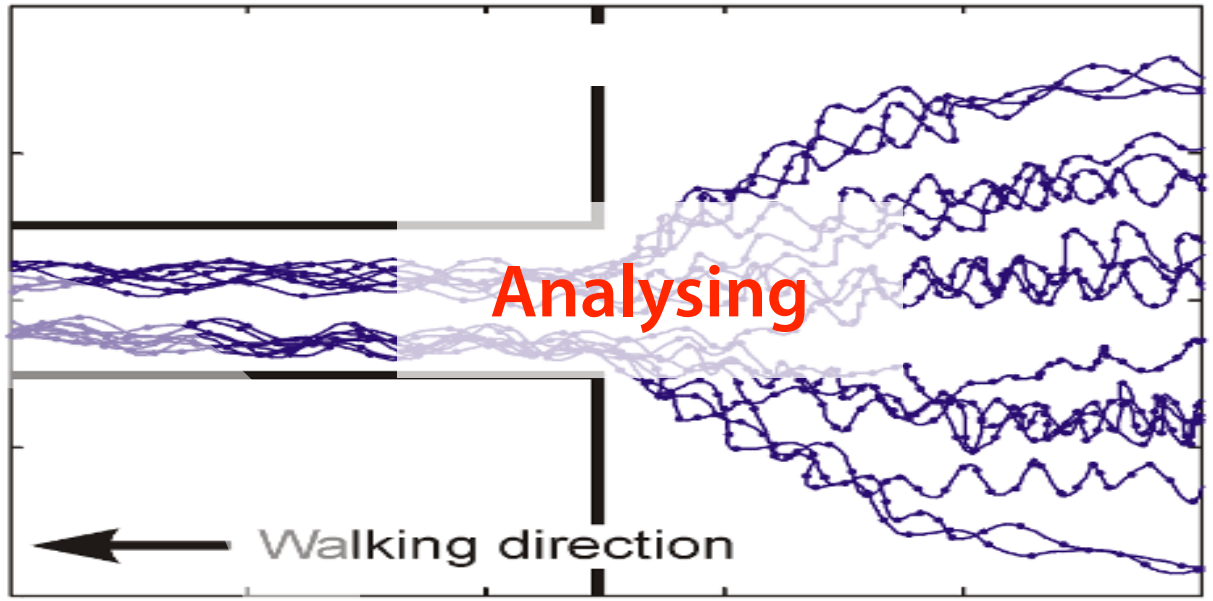
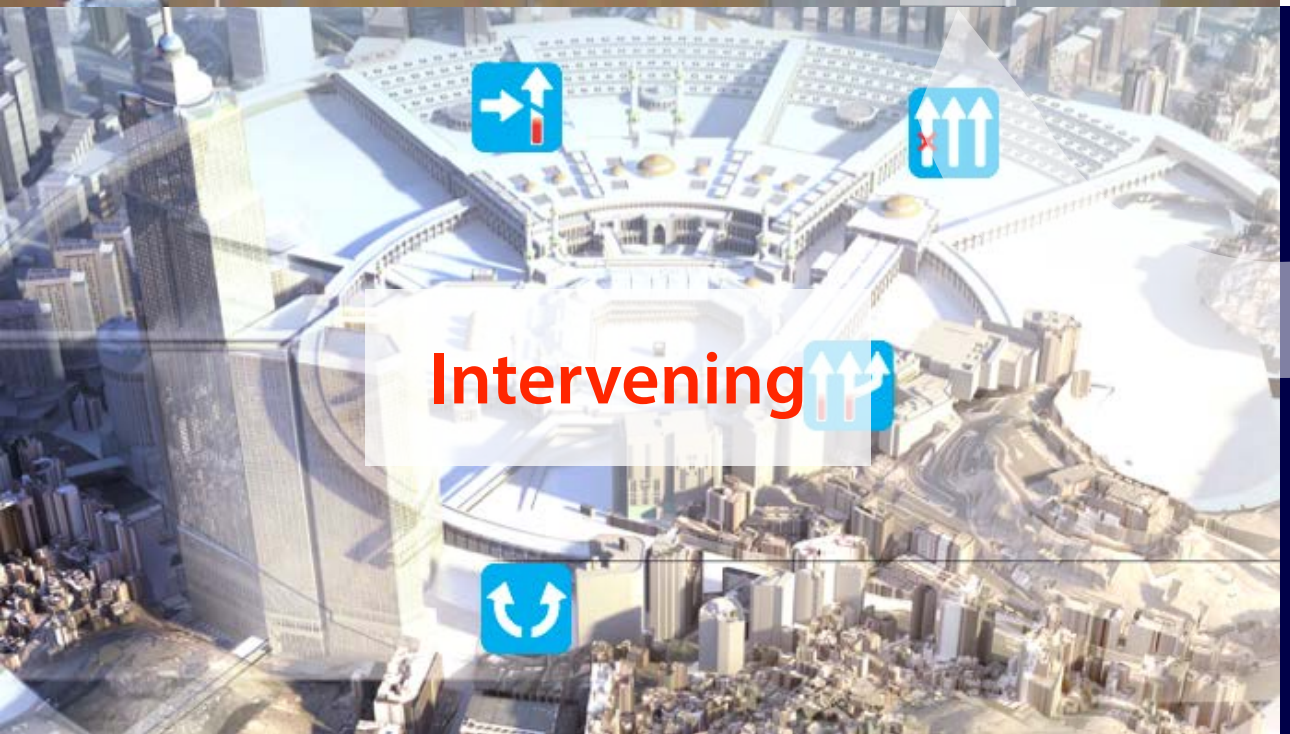
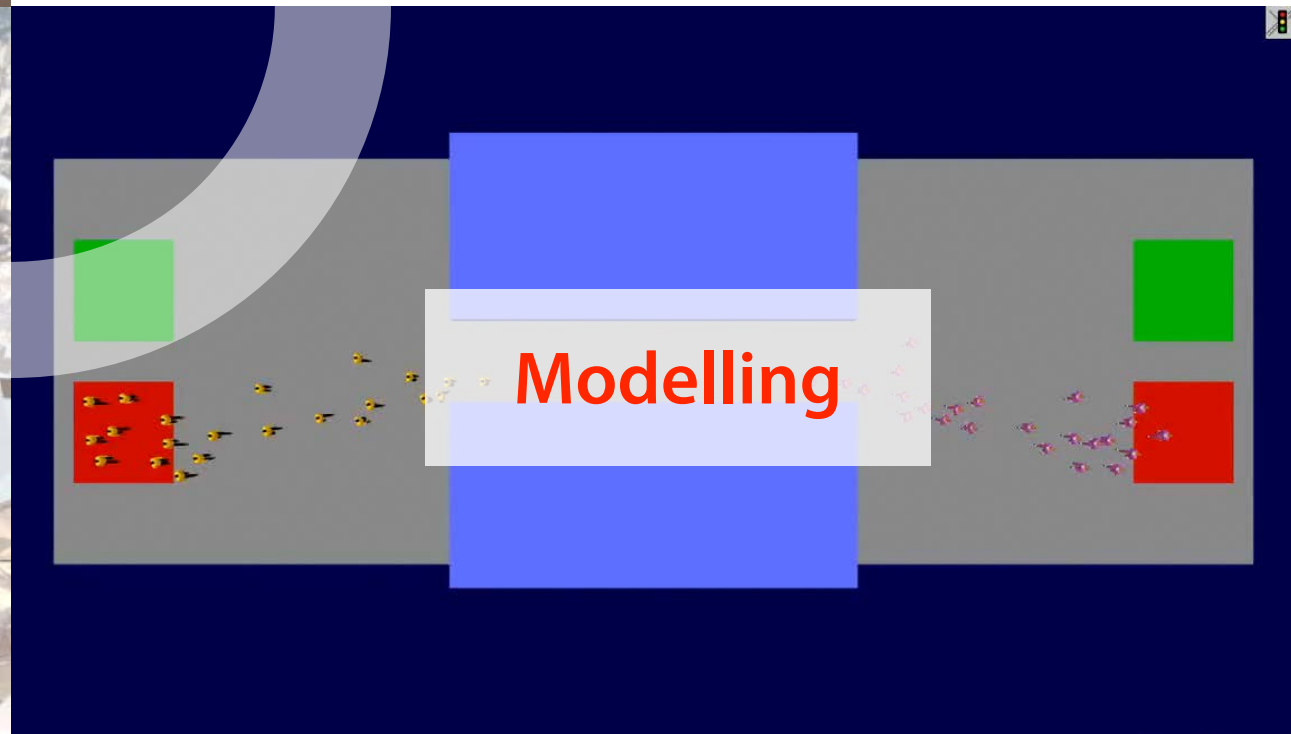
TU Delft


Observing


Analysing
Walking direction


Intervening


Modelling

Vehicles in the SVL

Toyota Prius

Renault Twizy

Nissan Evalia

Smart bike

Toyota Prius

- Hybrid passenger car
- Manual driving with support tools
- Equipped with monitoring sensors
- Platoon driving
- Joystick driving

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“Wizard of Oz” experiment

- Field study with AV and traditional vehicles
- Crossing decisions of pedestrians -> gap acceptance
- Perceived safety

Rodriguez Palmeiro et al 2018

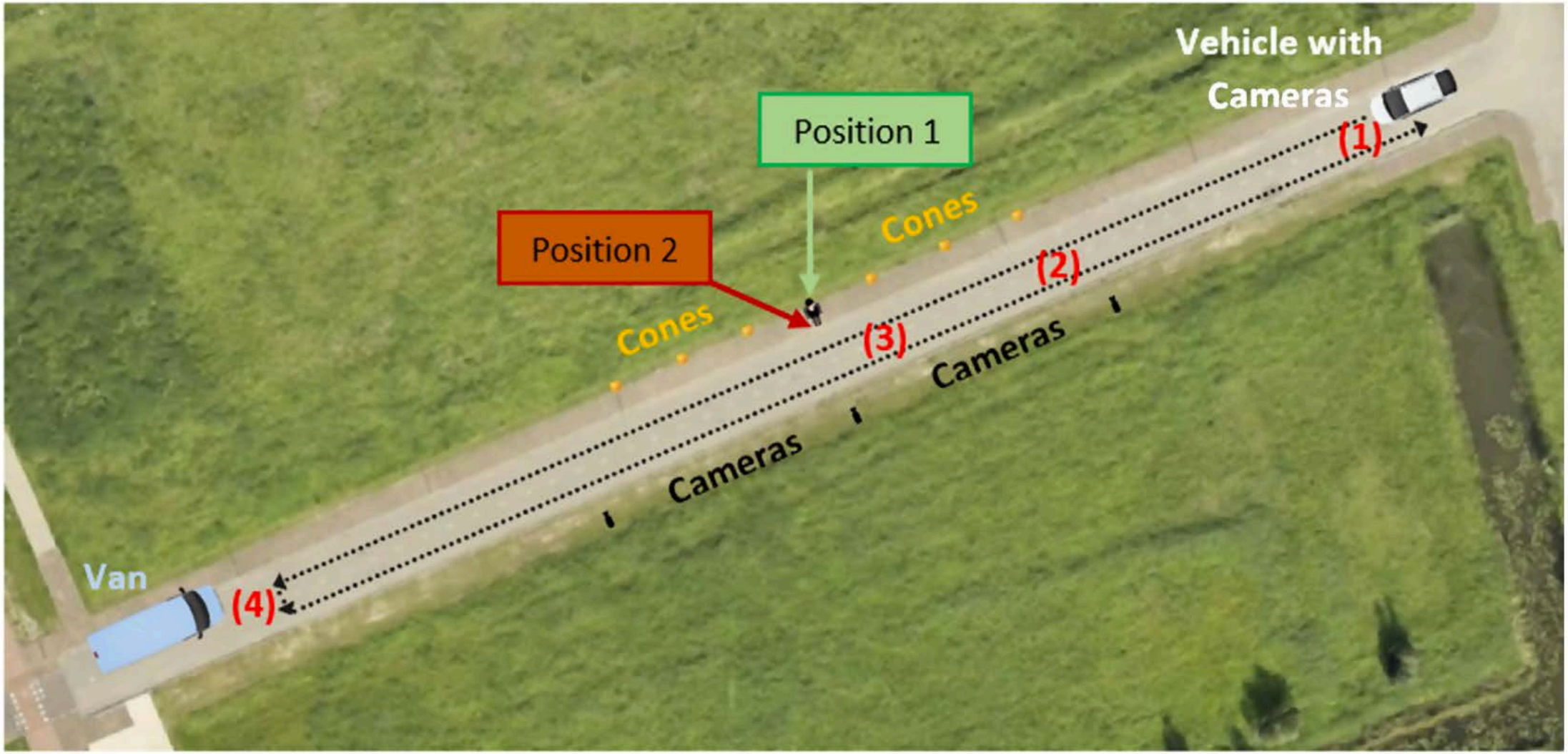

Fig. 4. Top view illustration of the experiment. (1) Start driving at 25 km/h (70 m from the participant); (2) Reduce speed to 10–15 km/h (around 20 m from the participant); (3) Stop/not stop before the participant; (4) Change signs and turn around to start driving on the lane corresponding to the following scenario. Position 1 is about 2 m away from the curb; Position 2 is near the edge of the curb.

Rodriguez Palmeiro et al 2018

Rodriguez Palmeiro et al 2018

a) Traditional vehicle (TV): Manually driven – No signs – Attentive driver

b) Non-recognizable automated vehicle (AV): Joystick driven – No signs – Newspaper driver

c) Automated vehicle with magnetic signs on the hood and door (AVM): Joystick driven – Hood & door sign – Inattentive driver.

d) Automated vehicle with signs on the roof (AVR): Joystick driven – I ttentive driver

Screenshot

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UNDERSTANDING BEHAVIOURAL ADAPTATIONS OF HUMAN DRIVERS INTERACTING WITH AUTOMATED VEHICLES

FIELD TEST EXPERIMENT

Shubham Soni

Royal HaskoningDHV
Enhancing Society Together

TU Delft

SAMEN
Safe and Efficient OperAtion of AutoMated and Human DrivEN Vehicles in Mixed Traffic

Data collection technique

- Point LiDARs and cameras equipped around data collection vehicle
- Video Footage from Field cameras
- GPS location of vehicles

Shubham Soni

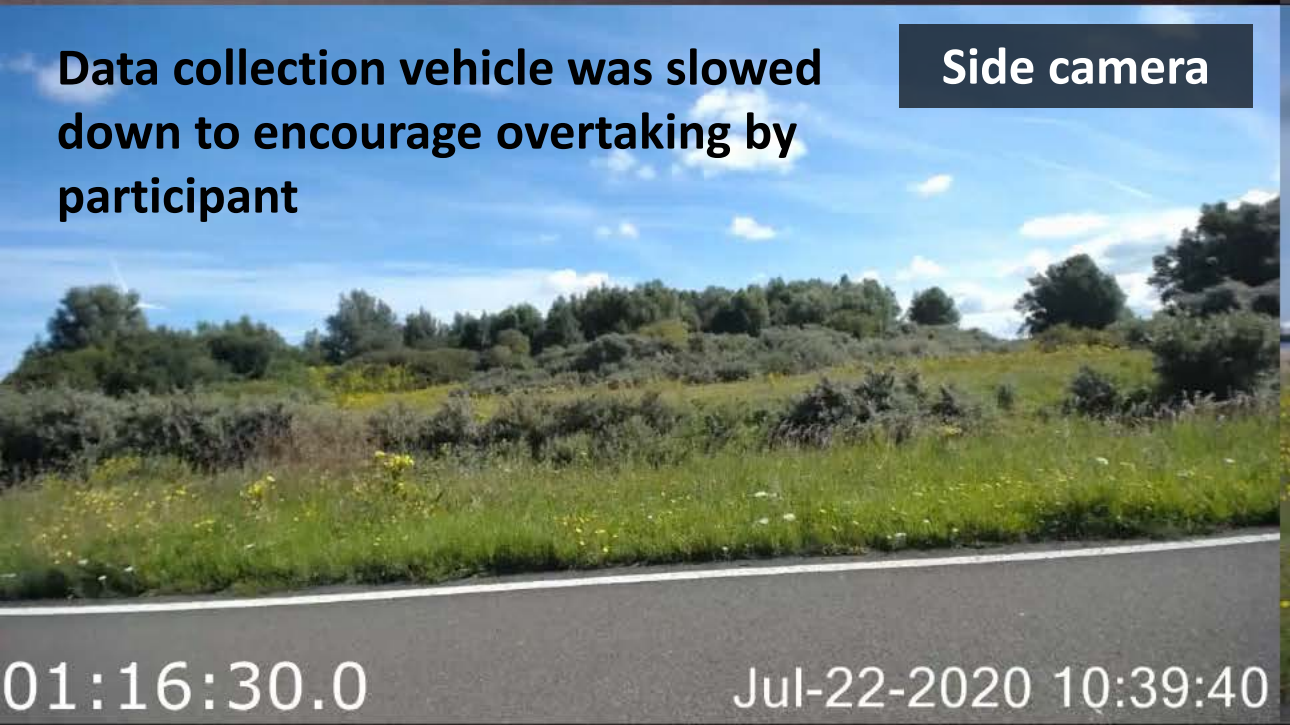
Experiment steps: Gap acceptance

Participants indicated last moment safe to cross by a hand gesture

Experiment steps: Overtaking

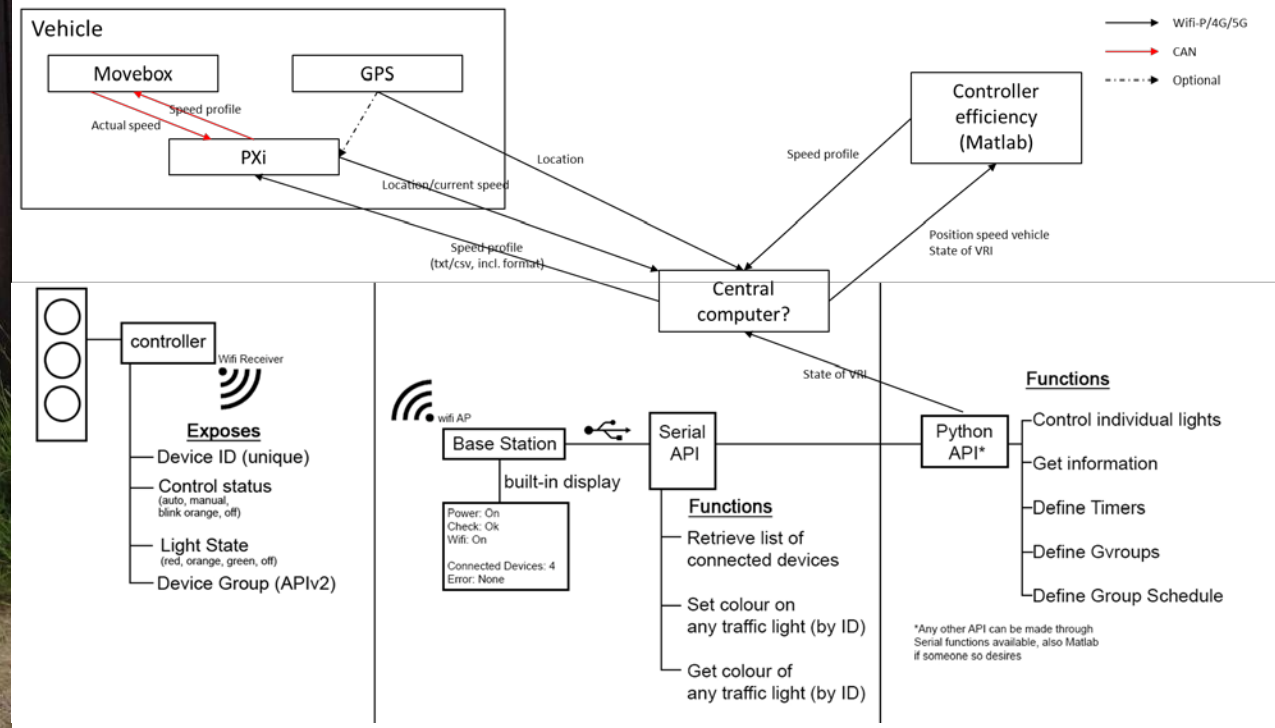
Shubham Soni

Data collection vehicle was slowed down to encourage overtaking by participant



Driver disguised as chair

iVRI: intelligent traffic light



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Twizy

- Electric dual-mode
- 1 person
- Manually driven on standard roads
- Drive-by-wire
- Automated driving on bicycle paths

Meet the Twizy ..

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GX
084-F

Nissan e-NV200 EVALIA

Smart bike

- Equipped with
  - Cameras
  - GPS
  - Lidar
  - Rotation/acceleration

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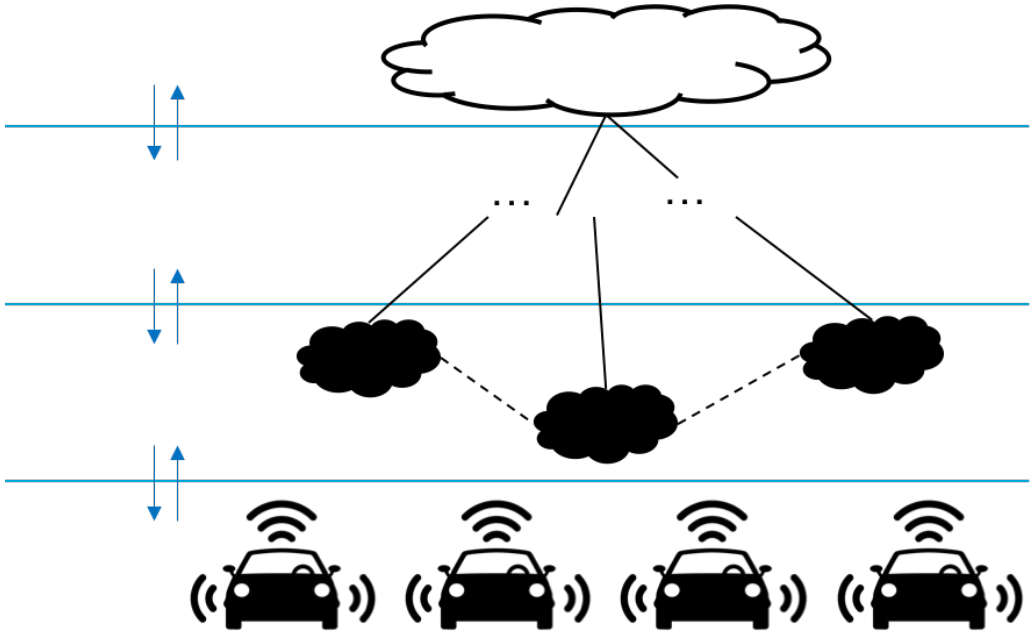
Smart bike

- To collect data on naturalistic driving
- An example in Amsterdam

Sensing vehicles as connected mobile sensing platforms

Adapted from https://unsplash.com/photos/eySzBaaIHAw



Leeghwaterstraat, campus TU Delft

- 450 m long street
- Equipped with cameras
  - Starlight cameras
  - Dome cameras

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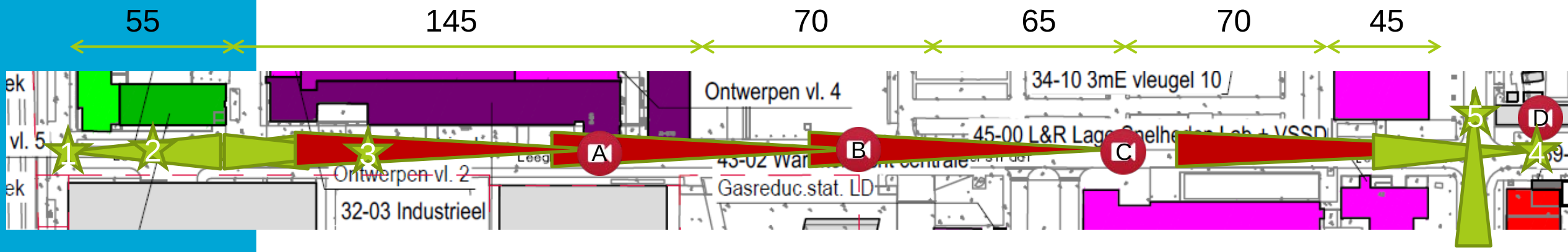
Leeghwaterstraat, sensor plan

Star light camera – 5, afstand 55m

Overzichtscamera – 4, afstand 100 m

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Leeghwaterstraat, cycling experiment

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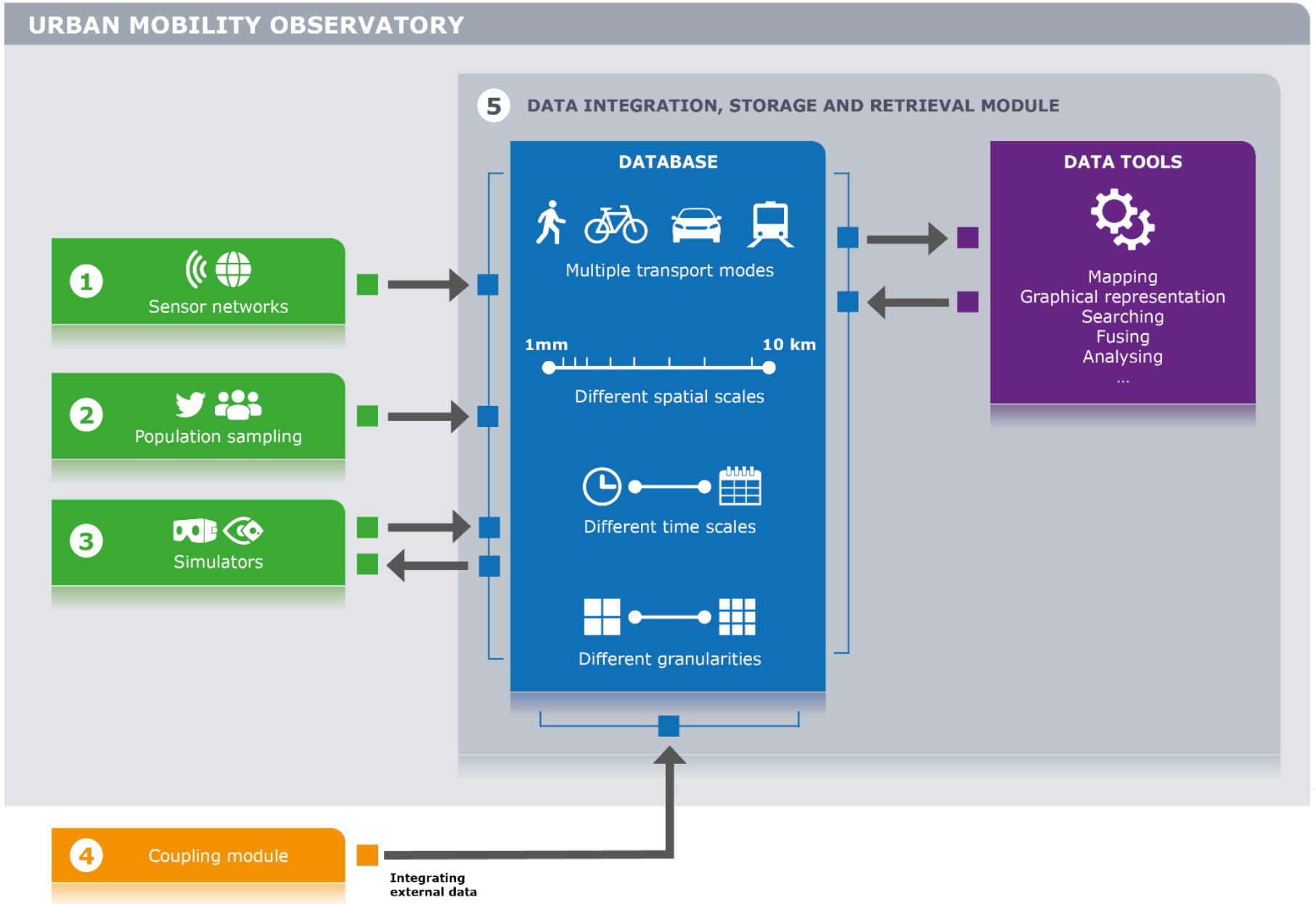

Urban Mobility Observatory

Smart Vehicle Lab

Questions?