Virtual Reality Experiment

- Visit of Welly
- 360° recordings with a dedicated camera
- VR glasses

Nunez Velasco et al (in prep)
Trust?  
Expectations?  
Behavior?
Current Commuting Mode

- Car only
- Car & walk/bike
- Walk/bike only
- Public transport only
- Car & public transport
- Public transport & car
- Other

Estimated Modal Split

- Car
- Bus
- FFCS
- Taxi
- SAV

840 respondents
Amsterdam, Utrecht, The Hague, Rotterdam

### When will automated cars be available?

<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
<th>Narrative definition</th>
<th>SDD</th>
<th>DDT</th>
<th>ODD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Driving Automation</td>
<td>The performance by the driver of the entire DOT event is enhanced by active safety systems.</td>
<td>Driver</td>
<td>Driver</td>
<td>Driver</td>
</tr>
<tr>
<td>1</td>
<td>Driver Assistance</td>
<td>The system provides driver assistance to the driver of the vehicle based on the context of the DOT event.</td>
<td>Driver and System</td>
<td>Driver</td>
<td>Driver</td>
</tr>
<tr>
<td>2</td>
<td>Partial Driving Automation</td>
<td>The system provides partial driving assistance to the driver of the DOT event.</td>
<td>System</td>
<td>Driver</td>
<td>Driver</td>
</tr>
</tbody>
</table>

**SAEJ3016 - Sept 2016**

- ADS: automated driving system
- DDT: dynamic driving task
- OEDR: object and event detection and response
- ODD: operational design domain

---

**The leading automation definition**

**NOW**

- **2020**

- **Driverless**

---

**The Autonomous Future**

19-04-18
When will automated cars be available?

**Time-table**

[Opinions collected at AUVSI 2016]

<table>
<thead>
<tr>
<th>Everywhere</th>
<th>Some urban streets</th>
<th>Campus or pedestrian zone</th>
<th>Limited-access highway</th>
<th>Fully Seggregated Guideway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 (ACC)</td>
<td>Level 2 (ACC+LKA)</td>
<td>Level 3 Conditional Automation</td>
<td>Level 4 High Automation</td>
<td>Level 5 Full Automation</td>
</tr>
<tr>
<td>Color Key:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Now</td>
<td>~2020s</td>
<td>~2025s</td>
<td>~2030s</td>
<td>~2075</td>
</tr>
</tbody>
</table>

Public transport offers the quickest development path to full autonomy because it can start operating in a limited area.

1. NO AUTONOMY
   - Driver has control
2. VEHICLE GIVES DRIVER WARNINGS/INFO
   - Driver has informed control
3. VEHICLE INTEGRATES DETECTION / RESPONSE
   - Driver ready to take control
4. VEHICLE FULLY AUTONOMOUS
   - Driver takes control in emergency
5. VEHICLE FULLY AUTONOMOUS
   - Occupants do not need ability to drive

Source: UTIP / TomTom
**Technical challenges**

- Routing
- Detecting
- Interpreting
- Reacting
- Actuation

What can a company/start-up contribute to this?

**Implementation**
Development routes

- Driving assistance → AV’s
- Rail vehicles → Automatic shuttles
Implementatie

**Use case**
- Personenvervoer van parkeerterrein - terminal vliegveld
- Naast personen ook reisbagage
- Per pax per week (x 150% in piek)
- 24/7 operationeel met betrouwbaarheid 95%
- Op afroep (vraaggestuurd)
- Reistijd (max 1,5 x reistijd confissionele bus)

**Infrastructuur**
- Deur tot deur: @ km waarvan @ km vrij liggende route en @ km gemengd verkeer
- @ km op openbare weg
- # kruisingen

**Systeemkenmerken**
- # voertuigen met capaciteit @ personen en @ koffers
- Actieradius voertuigen en inzetbaarheid (laden)
- Ladingfaciliteiten
- Beheer & onderhoud
- Stewards en Back office
- Datawinning, opslag en verrijking

**Business case**
- Initieel investering (aanpassing infra)
- Exploitatie (ADaaS)
- Projectmanagement
- IP en data

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19-04-18

The Autonomous Future
Versnelling: voorstel voor aanpak

Nog niet aangemelde initiatieven

Van lang naar short list (2018)

Approval Requests

Product Market combinations CAV

Screening / functionele clustering naar PMC's

Road Readiness (RDW test-week)

Market scan (capacity, speed etc)

Conditions (regulations etc)

Implementatieplannen ('go' en 'life' in 2018)

Implementation plan ('go' in 2018, 'life' 2018/19)

Targets (3-5 jaar)

25-50 vehicles (shuttles)

25-50 vehicles (shuttle/robottaxis)

50 - 100 voertuigen

19-04-18

The Autonomous Future
The Autonomous Future

A realistic perspective

Thank you!

For more information: www.thefuturemobility.network