Mapping the road to autonomous driving

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Head of Autonomous Driving
AUTONOMOUS DRIVING IS HAPPENING

SAFETY  COMFORT  EFFICIENCY
The pillars of autonomous driving
TomTom maps for ADAS & AD

<table>
<thead>
<tr>
<th>LEVEL 0</th>
<th>LEVEL 1</th>
<th>LEVEL 2</th>
<th>LEVEL 3</th>
<th>LEVEL 4</th>
<th>LEVEL 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver controls all aspects of driving</td>
<td>Automated subsystems</td>
<td>Combined automated subsystems</td>
<td>Hands-off conditionally</td>
<td>Automated on certain roads</td>
<td>Automated on all roads</td>
</tr>
</tbody>
</table>

- **ADAS Map**
- **ADAS Map**
- **ADAS / HD**
- **HD Map**
- **HD Map**

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The perception challenge for automated vehicles
The localization challenge for automated vehicles
The path planning challenge for automated vehicles
How do we make HD maps?
Centimeter-level accuracy + Millions of sources
AutoStream
Map Delivery for Autonomous Driving
Start
Large opportunity, first in private vehicles, later in robotaxis

Market value (€ billion) - all products (ADAS Map, HD Map, Hazards Service)

- **Private vehicle automation**: 0.1 (2020), 0.8 (2025), 3.0 (2030)
- **Shared vehicle automation (‘robotaxis’)**: 0.1 (2020), 0.3 (2025), 5.0 (2030)
- **Government (asset management)**: 0.3 (2020), 0.3 (2025), 0.5 (2030)

Rising volumes in levels of automation

Technology developments bringing new and improved features into the car and driving costs down for consumers

Vehicle volumes & ADAS and HD take rates

<table>
<thead>
<tr>
<th>Customer experience</th>
<th>Leading technology</th>
<th>Most complete product portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive sales force</td>
<td>Transactional map making</td>
<td>AutoStream</td>
</tr>
<tr>
<td>Cumulative domain knowledge</td>
<td>Shortest cycle times</td>
<td>SD Map</td>
</tr>
<tr>
<td>Global presence</td>
<td>Technology built up over the years (AI, computer vision)</td>
<td>Real-time service capability (Live Map)</td>
</tr>
<tr>
<td>Independence</td>
<td></td>
<td>Automotive system integration services</td>
</tr>
</tbody>
</table>
Navigable maps for automated driving are powering over > 1 million SAE L1 & L2 vehicles on the road today.
MARKET SHARE IN AWARDED DEALS AS MEASURED BY TOTAL CAR VOLUME

ONLY GLOBAL MAPPING COMPANY THAT HAS FULL AUTONOMOUS STACK IN HOUSE FOR TESTING AND DEMONSTRATION

TOMTOM LEADS IN HD MAPS
MARKET SHARE IN AWARDED DEALS AS MEASURED BY TOTAL CAR VOLUME

>60%

GLOBAL MAPPING COMPANY THAT HAS FULL AUTONOMOUS STACK IN HOUSE FOR TESTING AND DEMONSTRATION

ONLY

OUT OF THE GLOBAL TOP 5 OEMS ARE WORKING WITH TOMTOM HD MAP

4

TO COVER HIGHWAYS IN EUROPE, US, JAPAN, SOUTH KOREA

FIRST
Important Notice

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Thank you