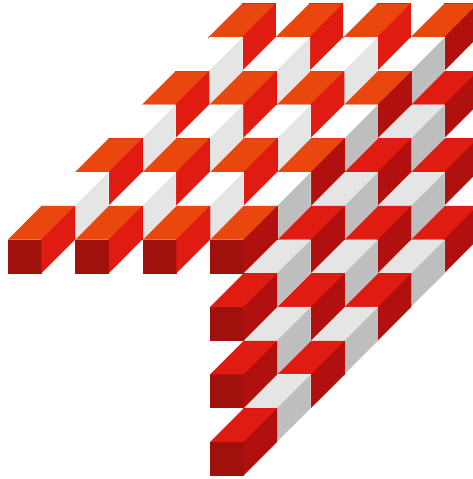


Mapping the road to autonomous driving



Willem Strijbosch
Head of Autonomous Driving

AUTONOMOUS DRIVING IS HAPPENING

A close-up photograph of a person's hand resting on the keyboard of a Dell laptop. The laptop screen displays a 3D simulation of a multi-lane highway with several cars, including a white car in the center lane and several orange and yellow cars in the adjacent lanes. The simulation appears to be a self-driving software interface.

SAFETY

COMFORT

EFFICIENCY

The pillars of autonomous driving



MAPPING



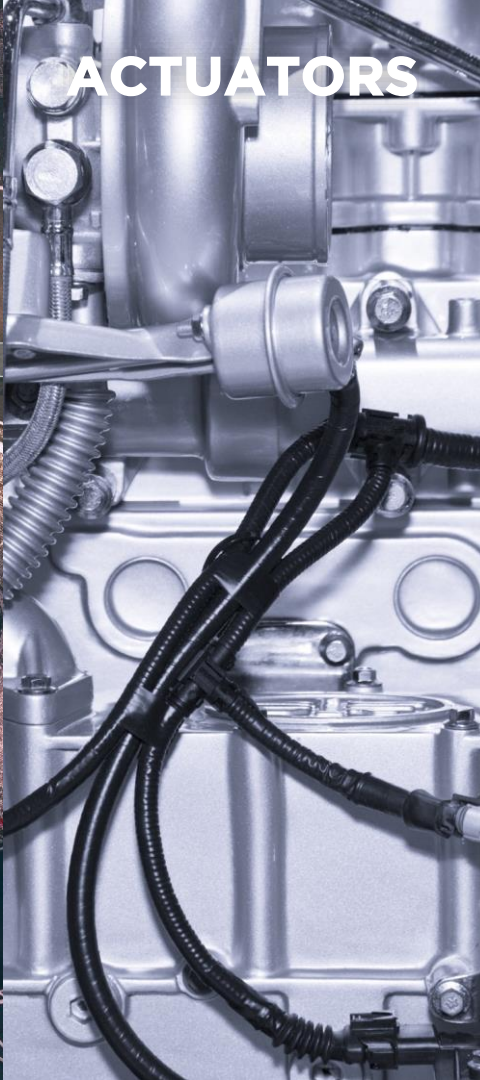
SENSING



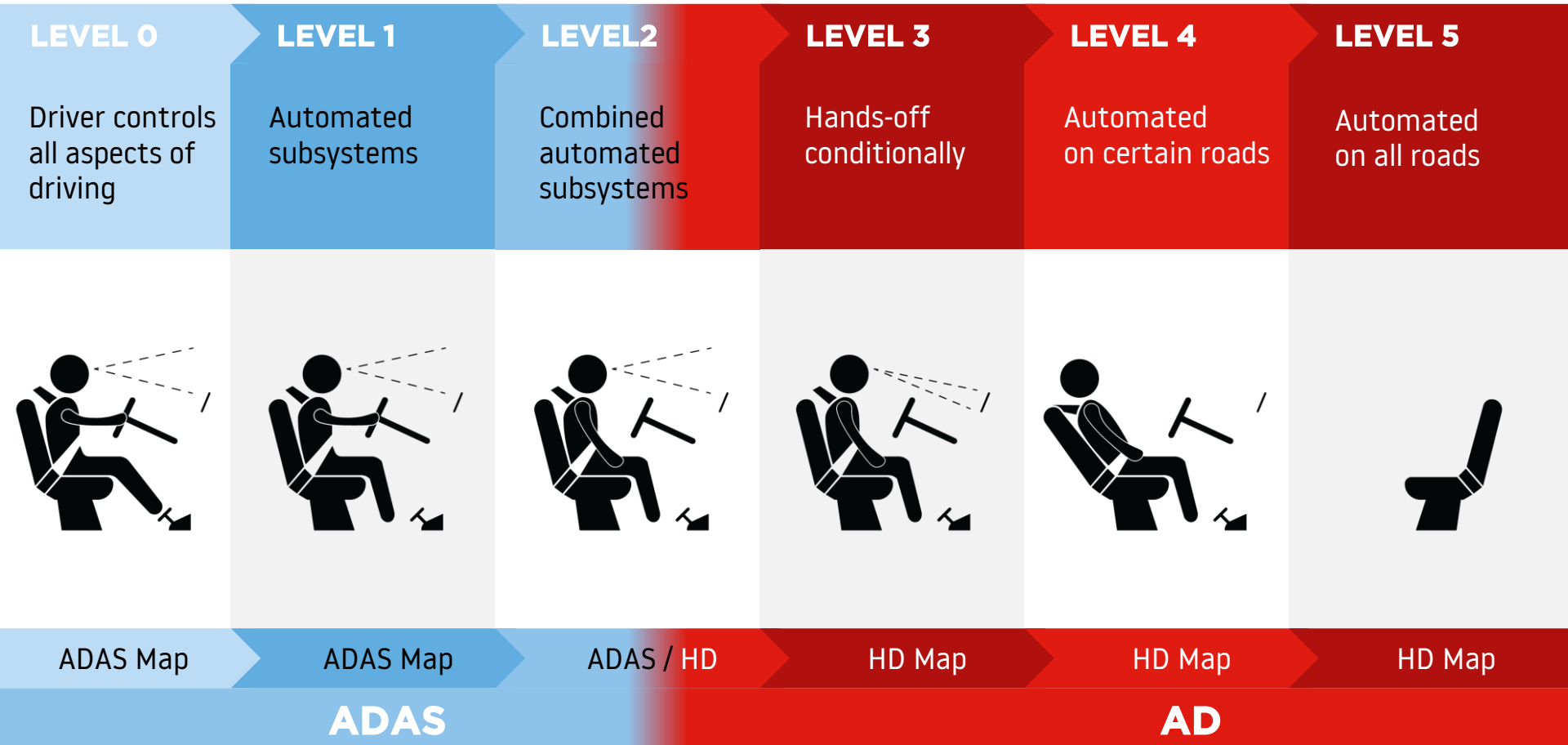
**DRIVING
POLICY**



ACTUATORS



TomTom maps for ADAS & AD





**The perception
challenge for
automated vehicles**



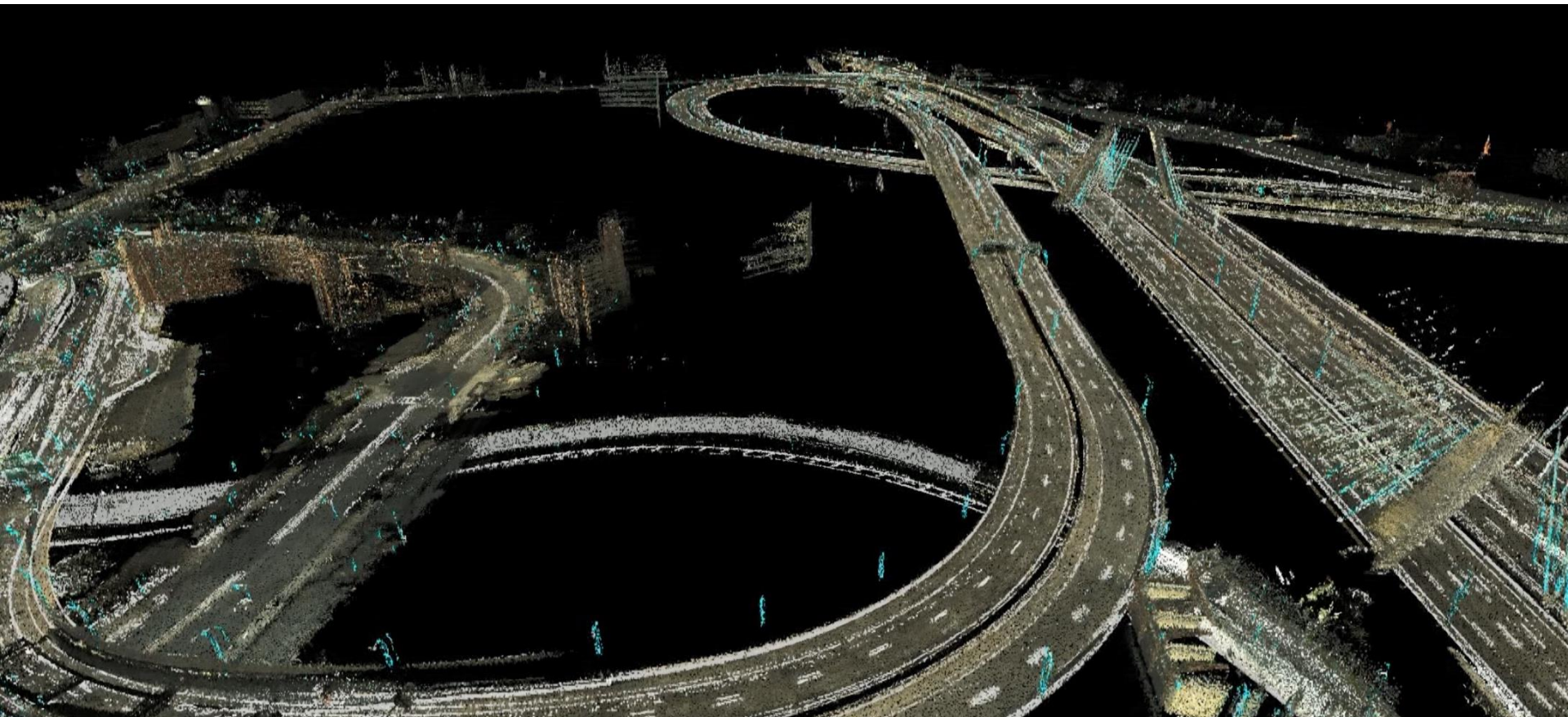
The localization challenge for automated vehicles



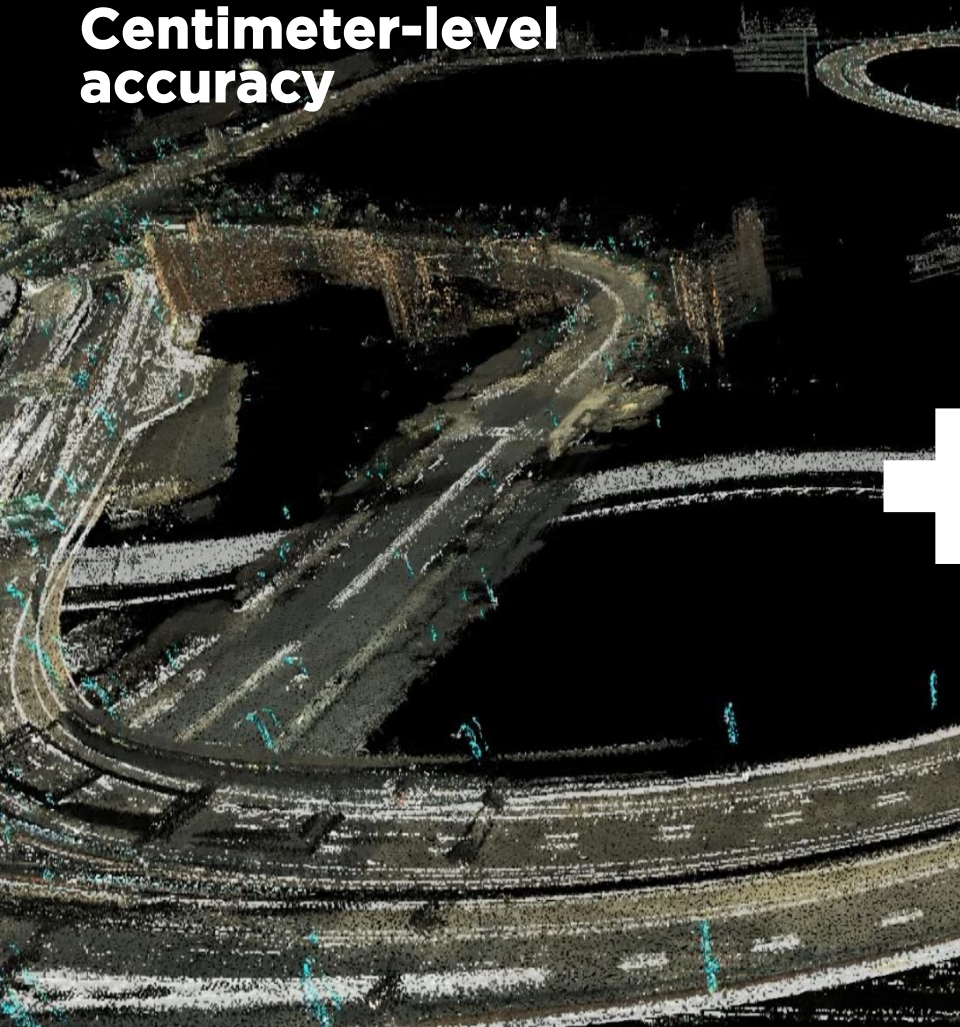
The path planning challenge for automated vehicles



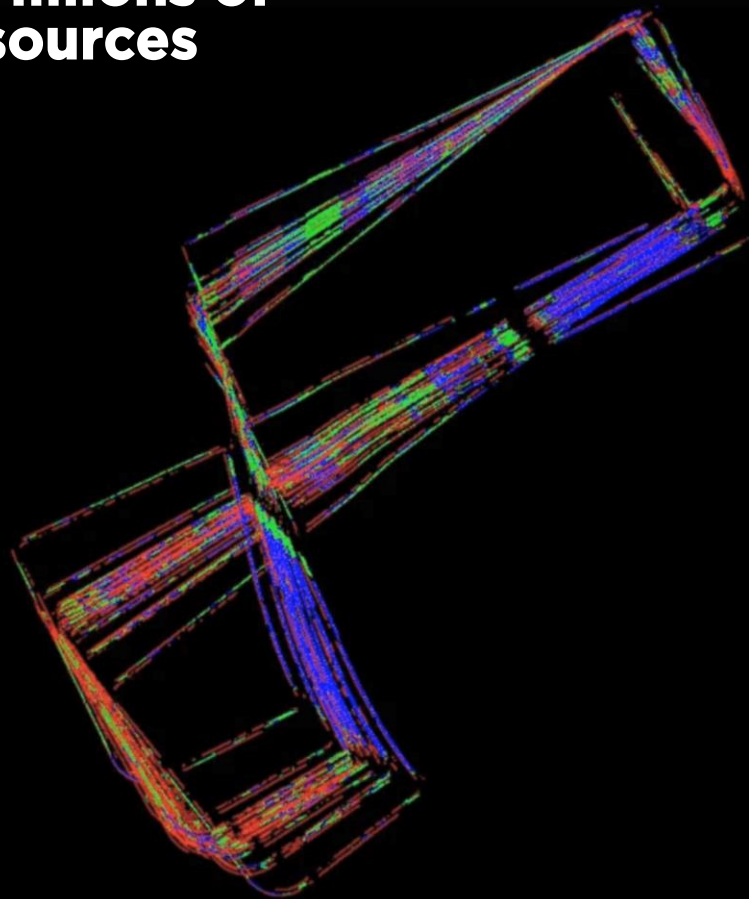
How do we make HD maps?



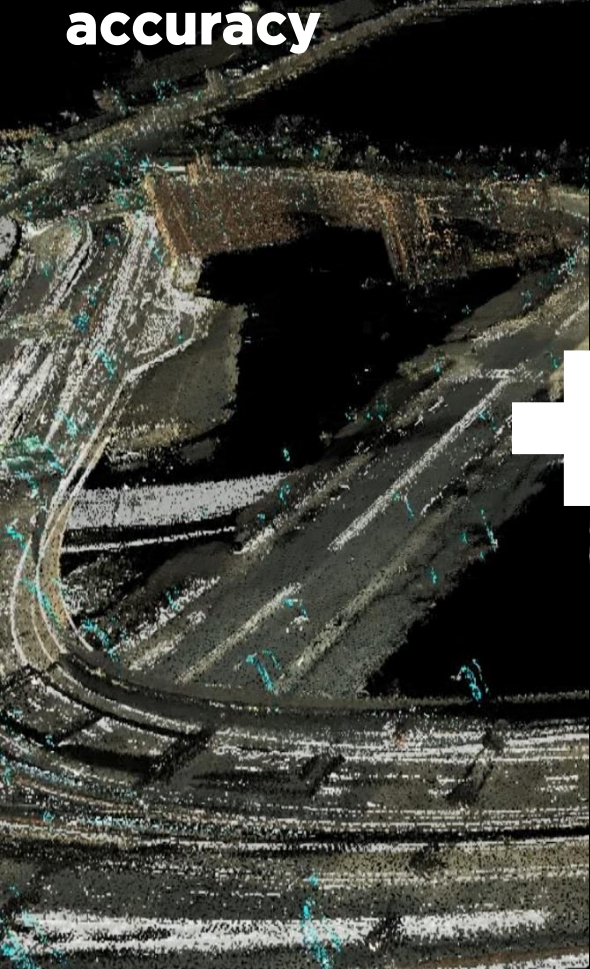
**Centimeter-level
accuracy**



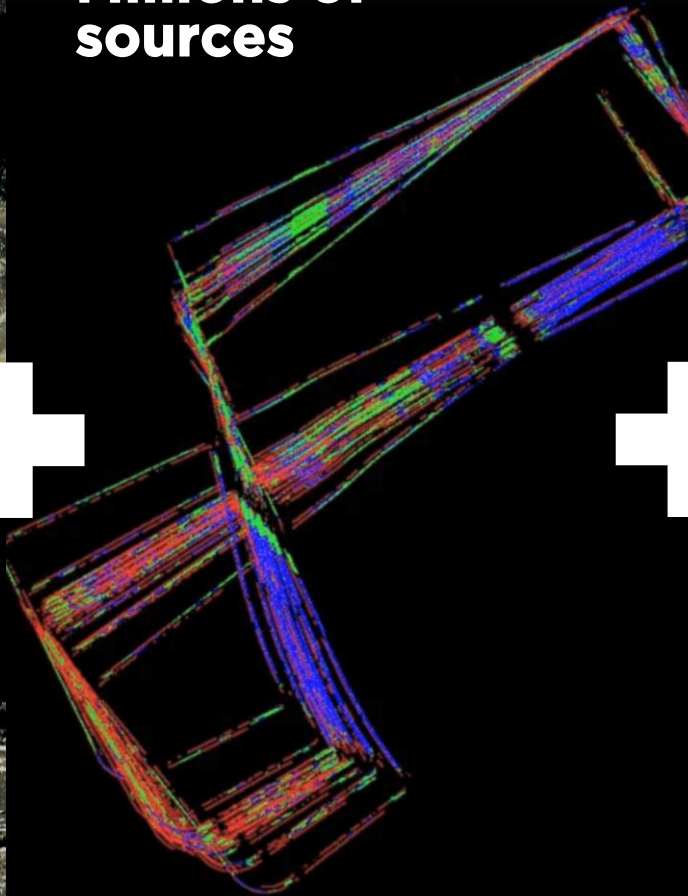
**Millions of
sources**



**Centimeter-level
accuracy**

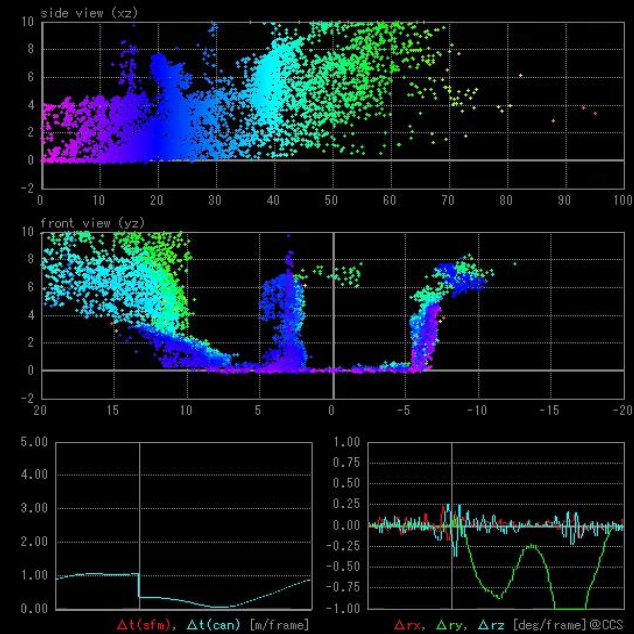
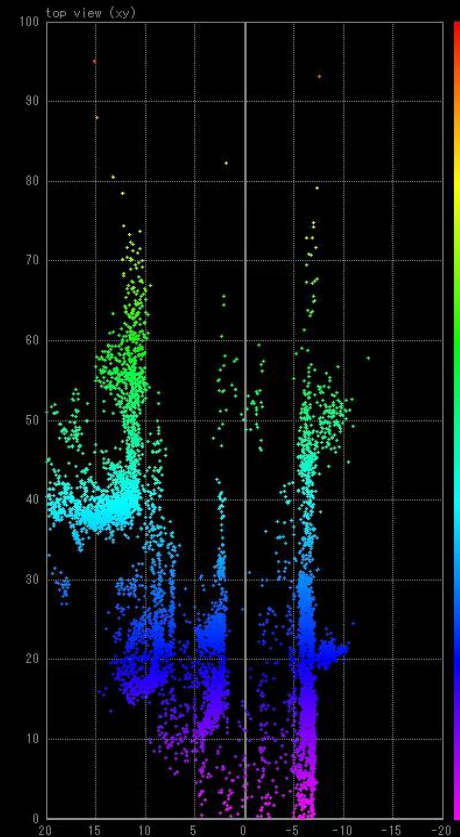
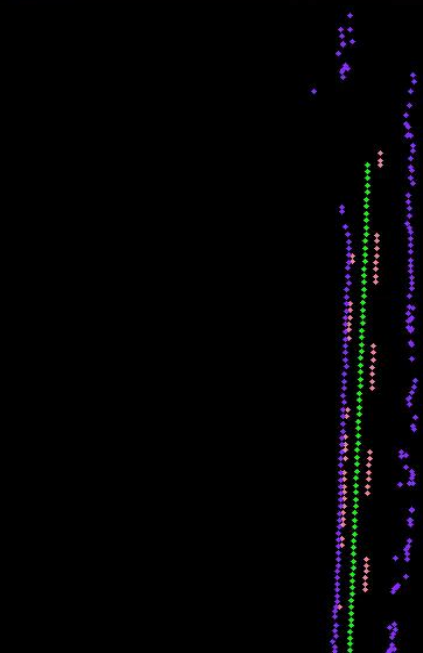
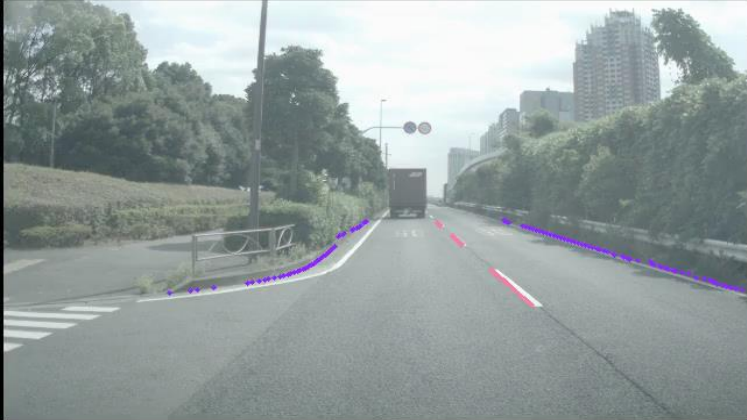


**Millions of
sources**



**Real-time
processing**





< DISPLAY AREA >

x[m] : [0.0, 100.0]
y[m] : [-20.0, 20.0]
z[m] : [-2.0, 10.0]

< COLOR MODE >

[] height
[/] depth
[] horizontal
[] segment

< 3D POINTS >

pts in image : 8614
pts in buffer : 10000 / 10000
noise pts : 0
th of cv : 0.050000
th of parallax : 10.000000

< CAMERA POSE (CCS) >

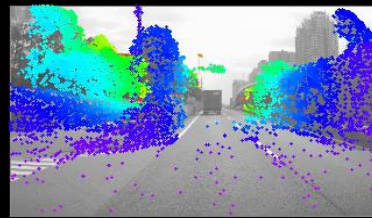
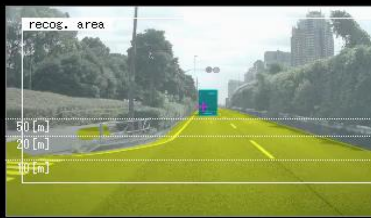
Δtx : +0.03[m] Δrx : -0.05[deg]
 Δty : -0.01[m] Δry : +0.00[deg]
 Δtz : +1.05[m] Δrz : +0.17[deg]

< CAR INFO >

speed : 37.84[km/h]
yrate : +0.00[deg/s]

< EGO CONF >

crpt flag : 0
stage num : 3
2nd score : 0.000
2nd feat : 49
3rd score : 0.000
3rd feat : 4



AutoStream

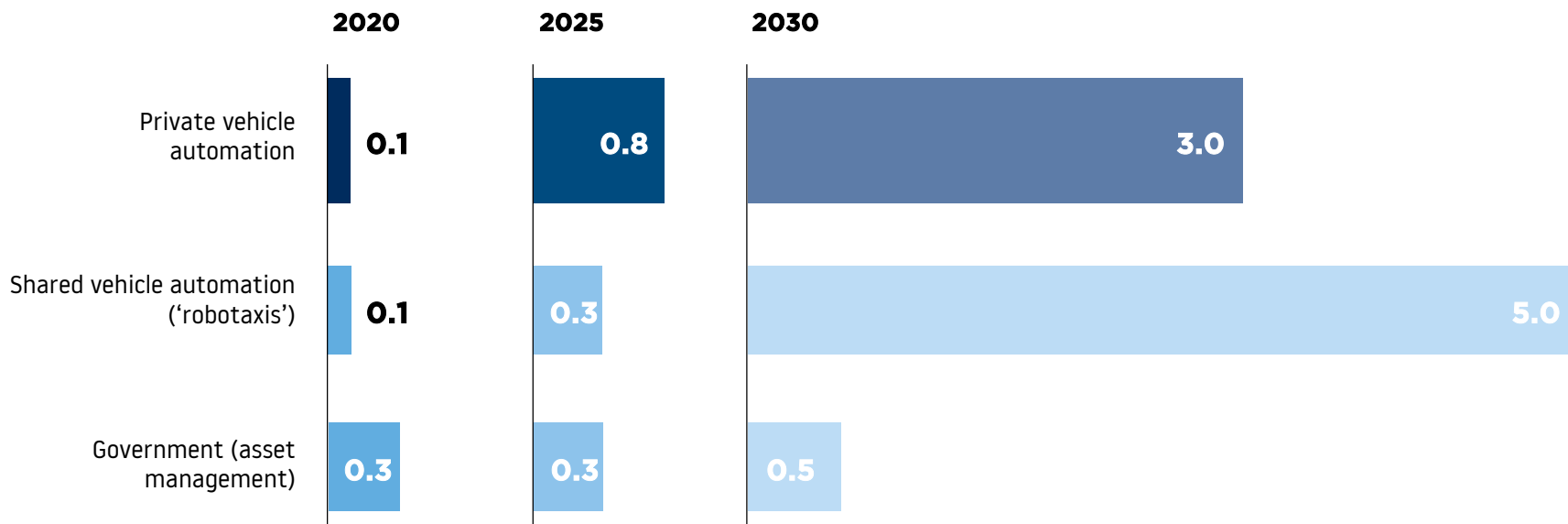
Map Delivery for Autonomous Driving

Start

TOMTOM 

Large opportunity, first in private vehicles, later in robotaxi

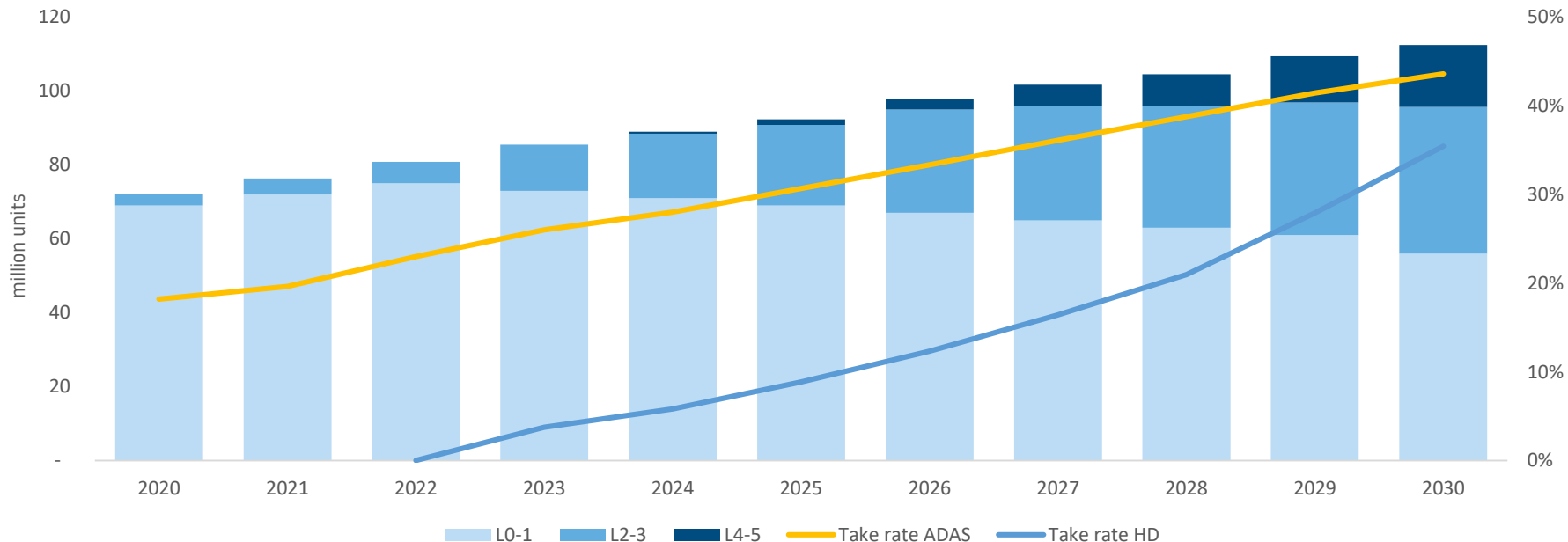
Market value (€ billion) - all products (ADAS Map, HD Map, Hazards Service)



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



Competitive advantage

Customer experience

- Automotive sales force
- Cumulative domain knowledge
- Global presence
- Independence

Leading technology

- Transactional map making
- Shortest cycle times
- Technology built up over the years (AI, computer vision)

Most complete product portfolio

- AutoStream
- SD Map
- Real-time service capability (Live Map)
- Automotive system integration services

TomTom ADAS Map

Navigable maps for
automated driving
are powering over

> 1 million

SAE L1 & L2 vehicles
on the road today



TOMTOM LEADS
IN HD MAPS



>60%

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



4

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



FIRST

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

Thank you

TomTom 

