VON DER KARTE ZUM AUTONOMEN FAHREN

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SiteOwner TomTom Berlin

2. Forum "Neue Mobilitätsformen“
07. März 2019

Technische Hochschule Wildau [FH]
Technical University of Applied Sciences
WILDAU

TOMTOM

Freie Universität Berlin

AUTONOMOS

a TOMTOM company

Autonomos History Overview

2007
DARPA Grand Challenge
FU Berlin

2010
Autonomos Labs
FU Berlin

2012
Smart Safety Systems
Autonomos GmbH

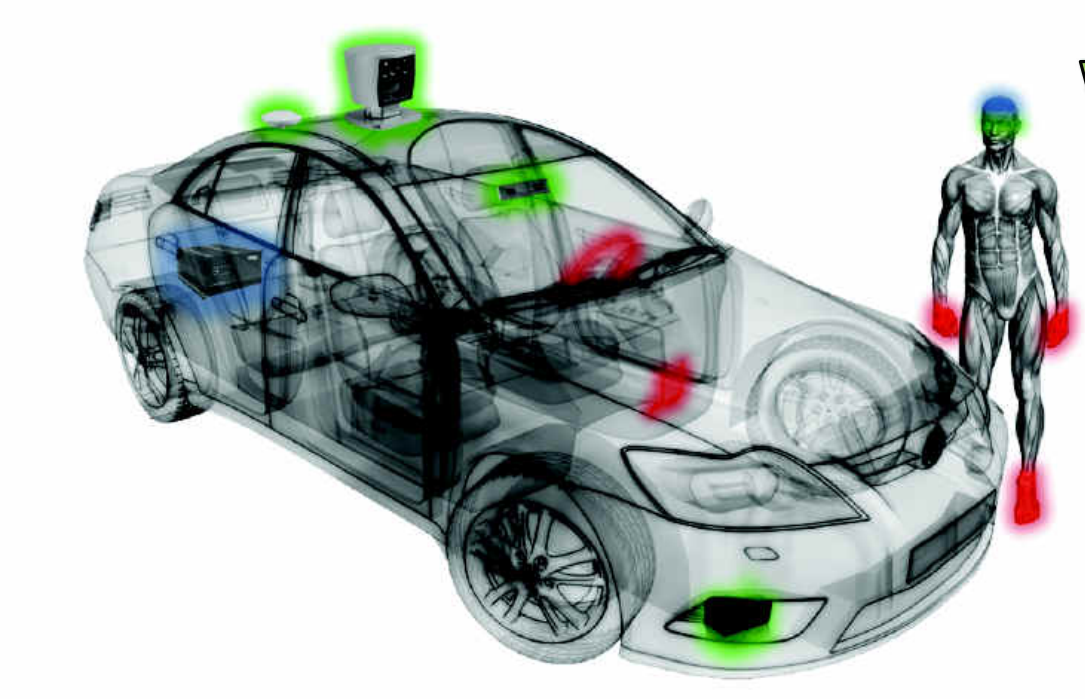
2015
Maps for AD

2017
Part of the
TomTom Family

Bundesministerium für Bildung und Forschung

ForMaT UNTERNEHMEN REGION
Die BMBF-Innovationsinitiative Neue Länder

Grundprinzip der Robotik
Sense – Plan - Act



Wahrnehmen

Augen
Sensoren

Planen

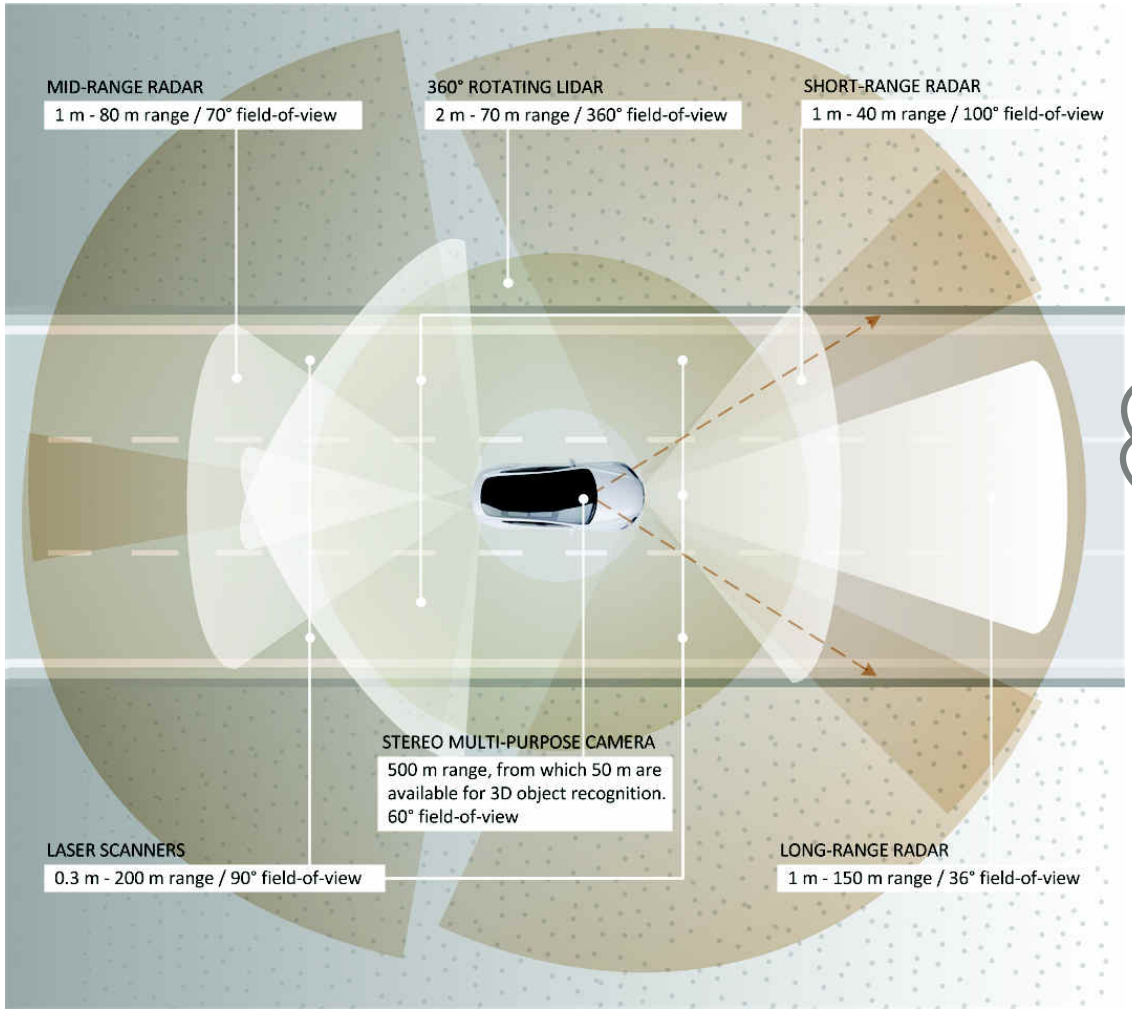
Gehirn
Computer

Ausführen

Muskeln
Aktorik (Lenken, Gas, Bremse)

Picture from: Dr. Miao Wang – Dissertation 2012, Page 21

Was ist hinter dem eigenen Horizont?



HD Maps
& C2X

Die Säulen des automatisierten Fahrens

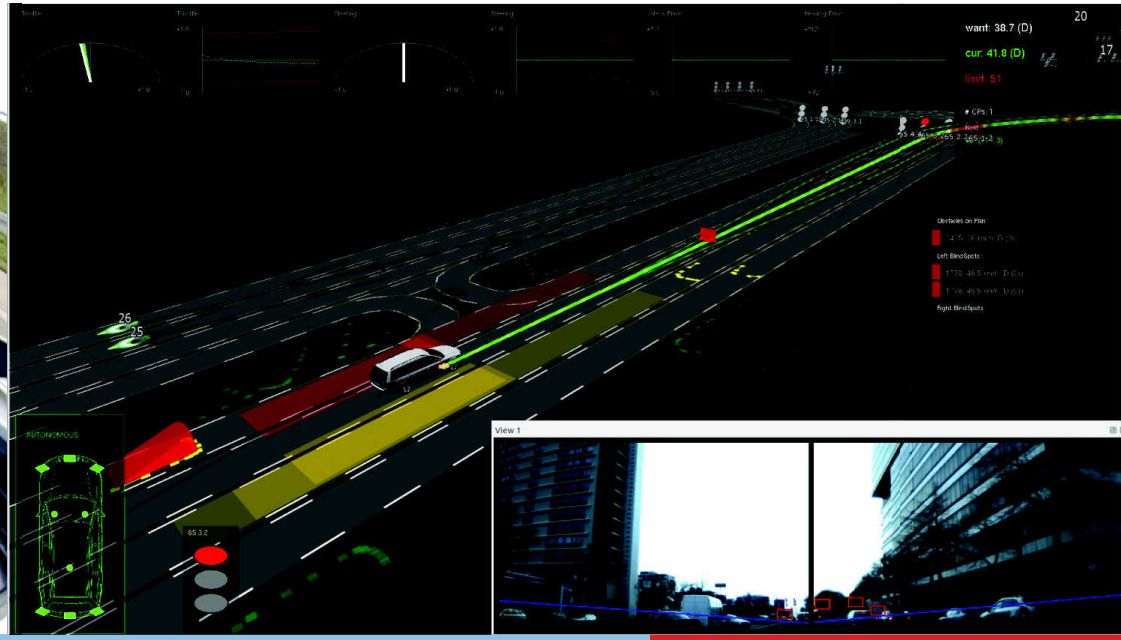
Sensing

Driving policy

Actuators

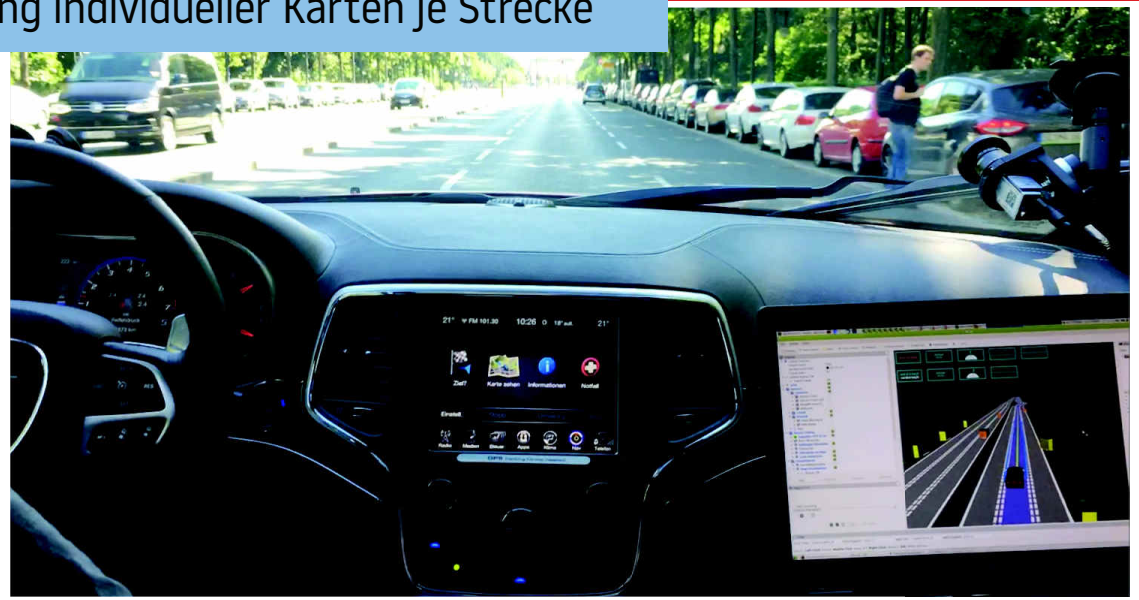
Tom

Erprobungen auf geschlossenem Areal – Verhalten des Fahrzeugs optimieren

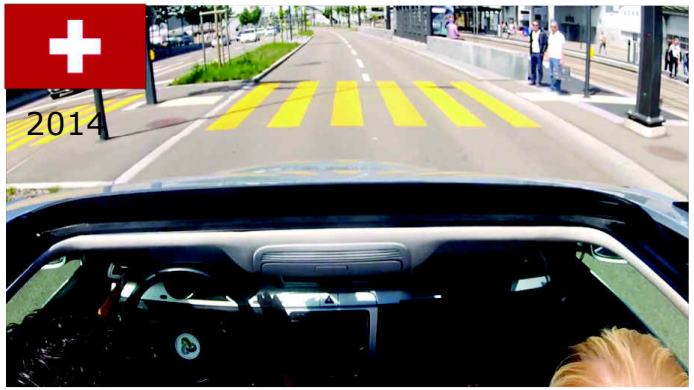


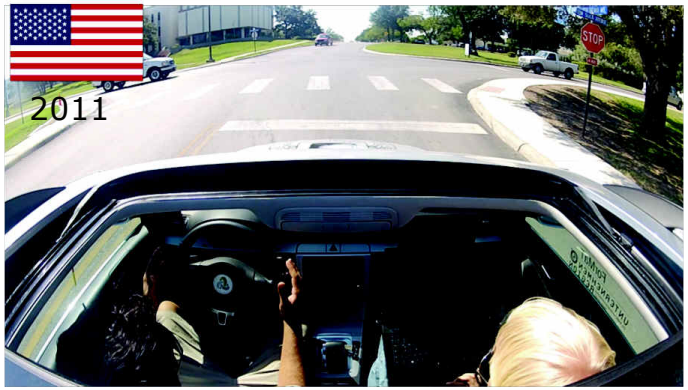
Straßentests in Berlin – Vorbereitung individueller Karten je Strecke

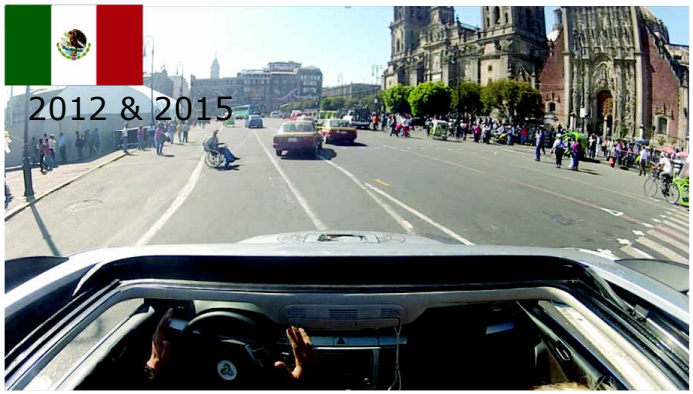
AUTOMATISIERTES FAHREN IST NUN REALITÄT



Ausnahmegenehmigungen für Straßentests





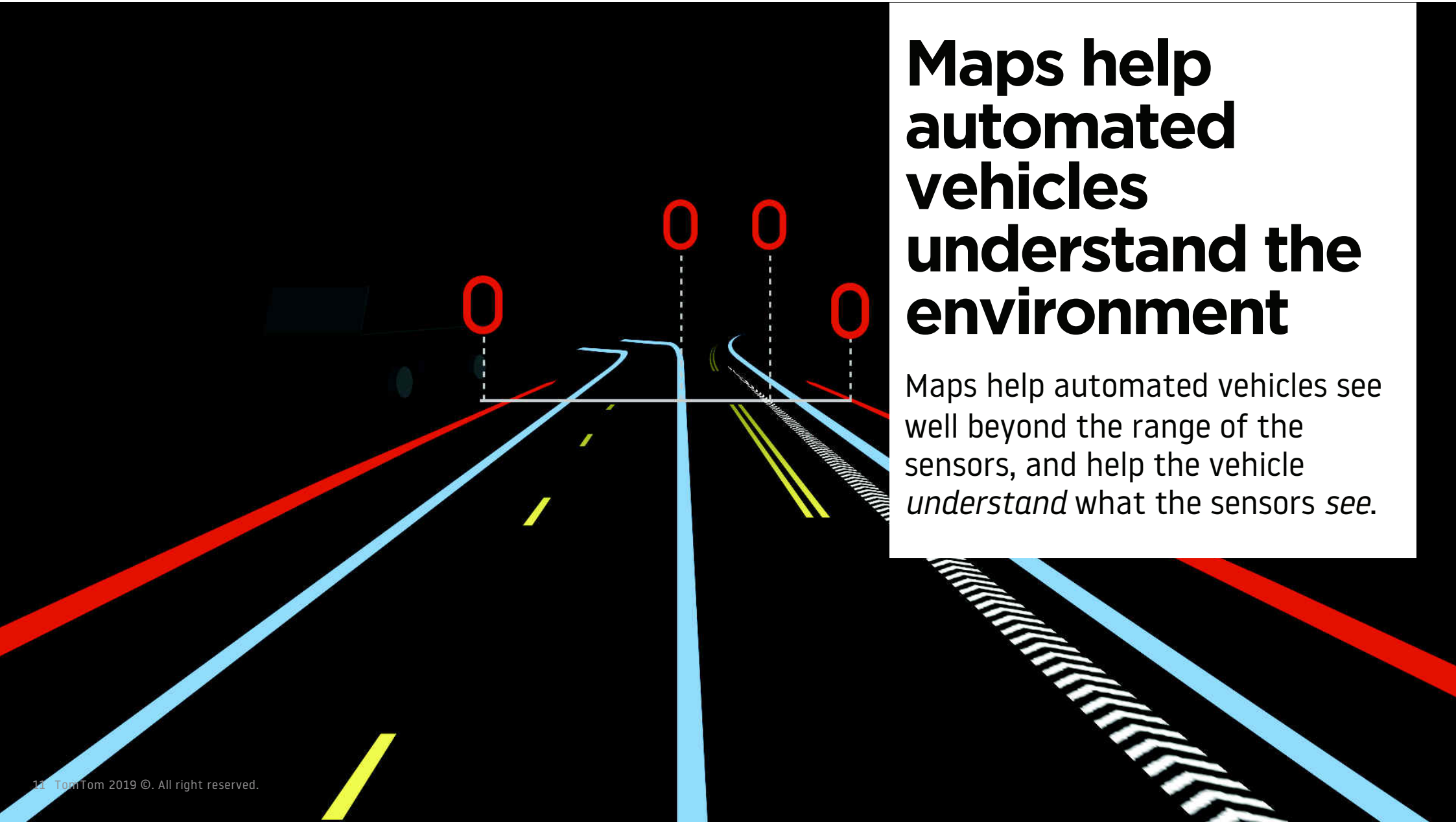


Straßentests Mexiko City 2012

Andere Länder andere Sitten

Maps complement sensors to ensure high reliability

Maps are not affected by adverse weather conditions, working even when sensors can’t function properly, for greater safety

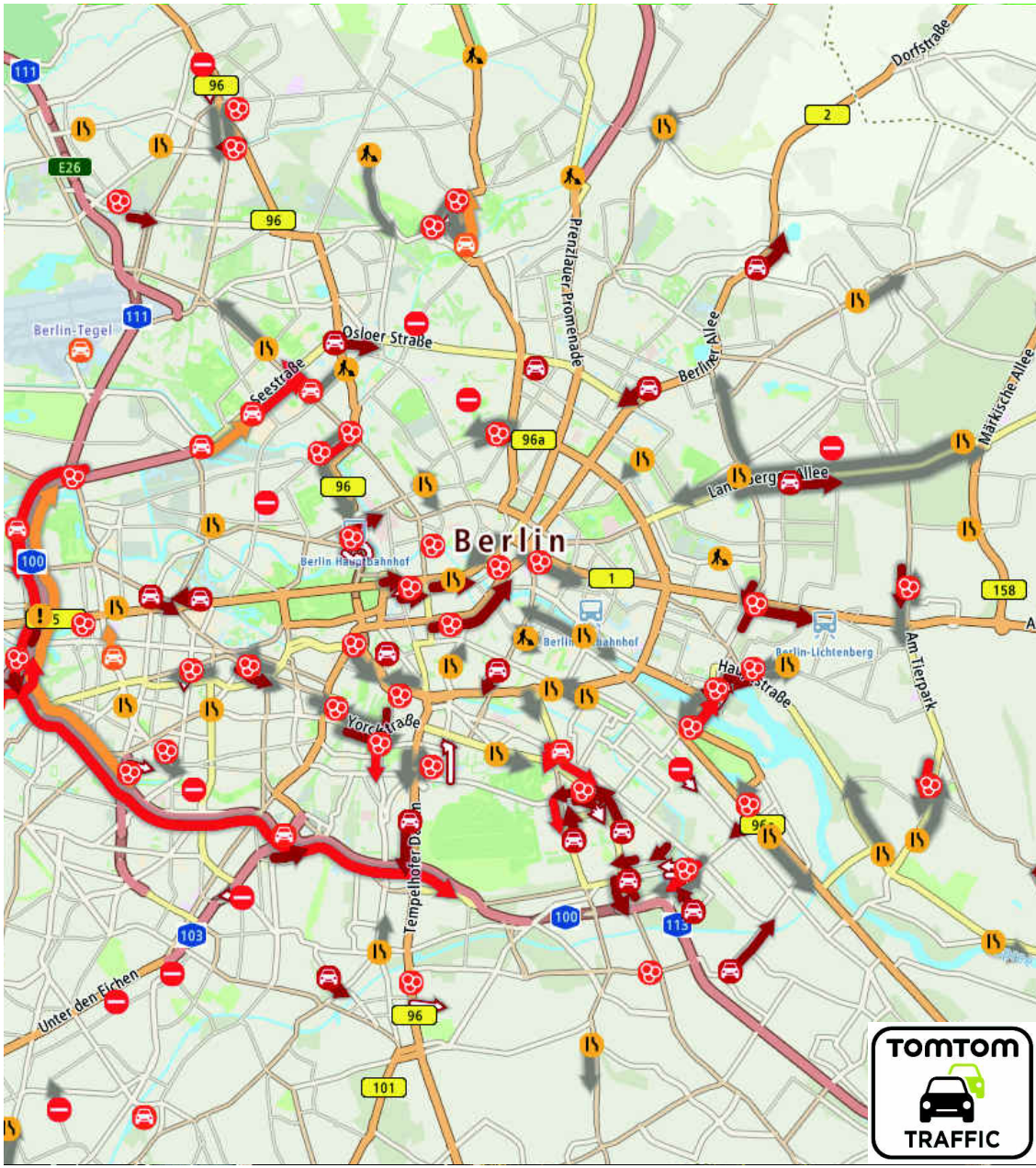


Maps help automated vehicles understand the environment

Maps help automated vehicles see well beyond the range of the sensors, and help the vehicle *understand* what the sensors *see*.

Maps form the basis for sensor data aggregation

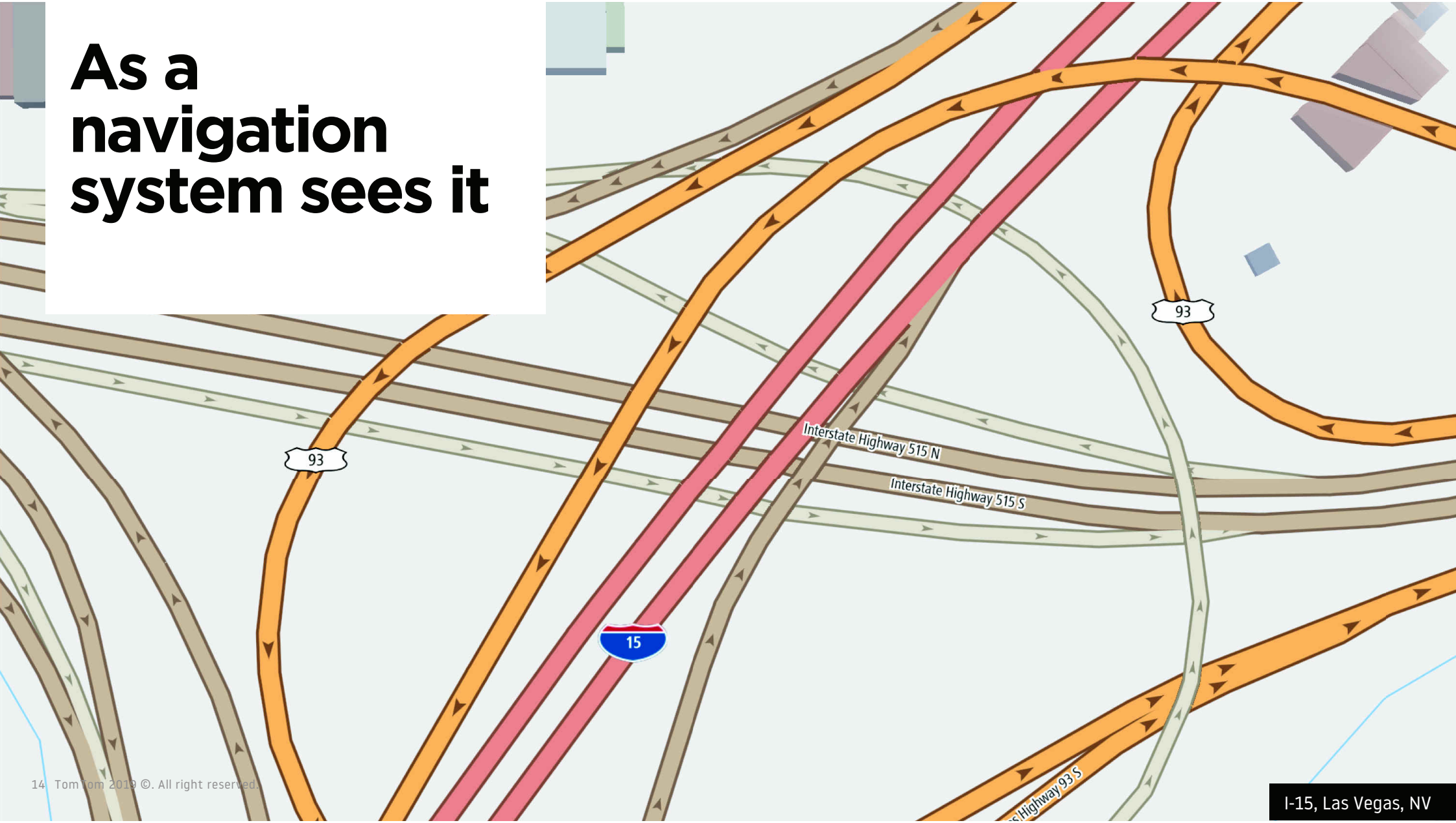
Maps act as the foundation to aggregate and derive value from sensor data crowdsourced from vehicles



The road as we see it

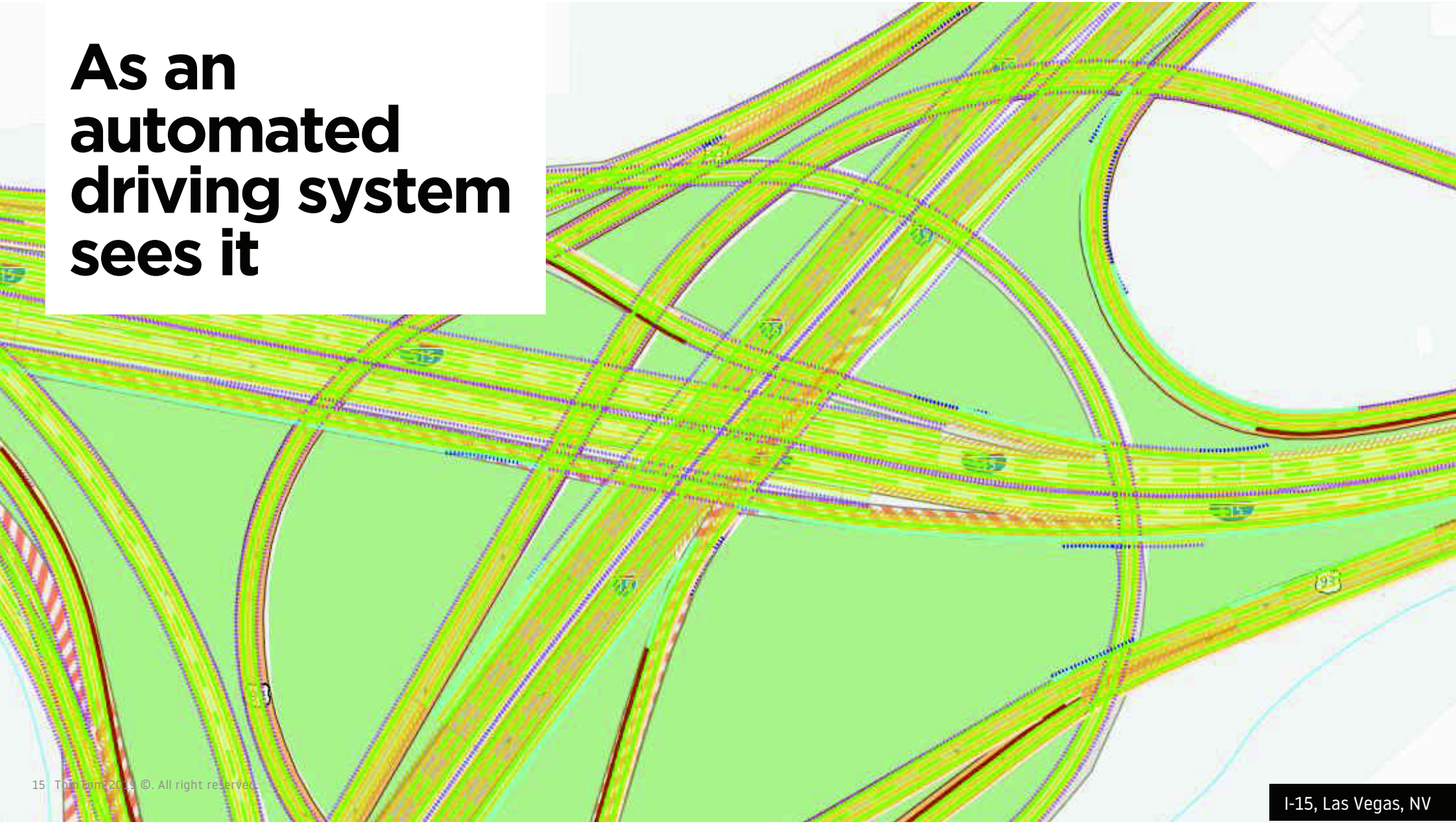
I-15, Las Vegas, NV

As a navigation system sees it



I-15, Las Vegas, NV

As an automated driving system sees it

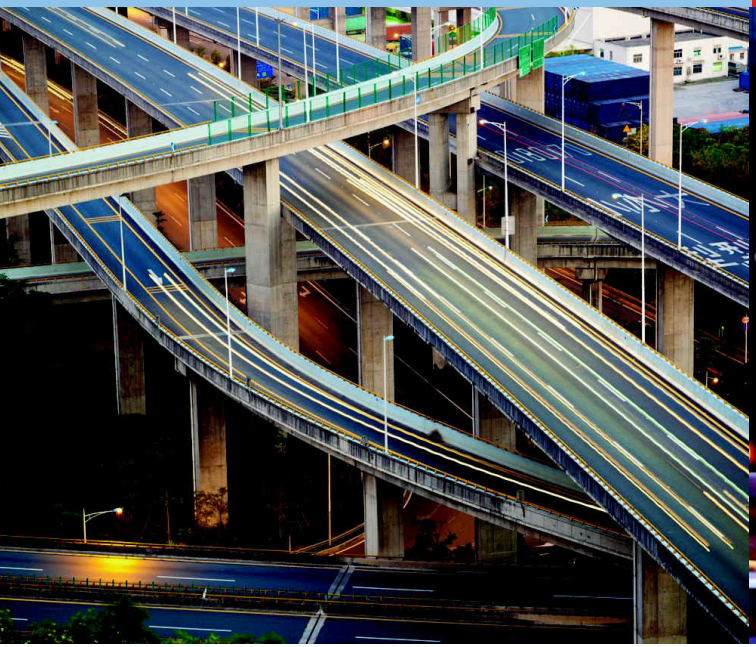


I-15, Las Vegas, NV

TomTom focuses on mapping for autonomous driving

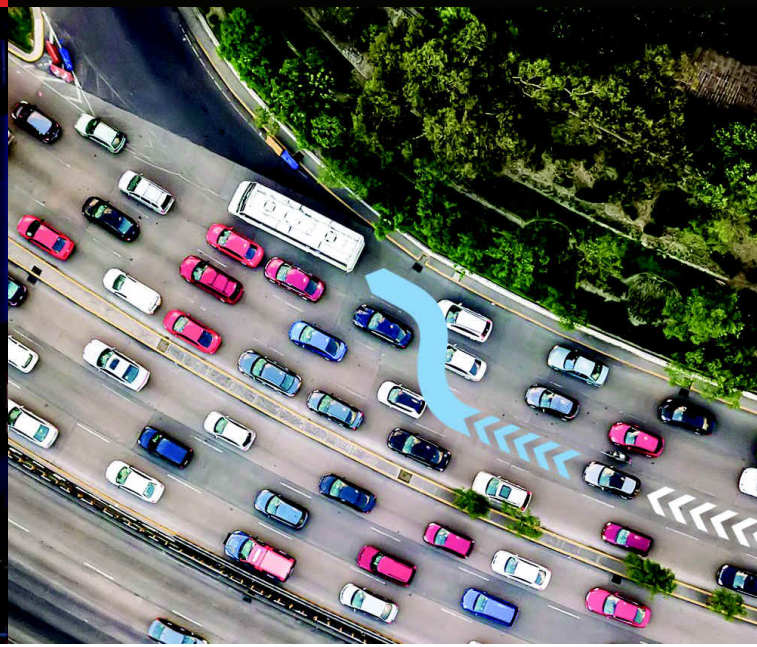
The role of HD Maps in automated driving

Localization



Perception

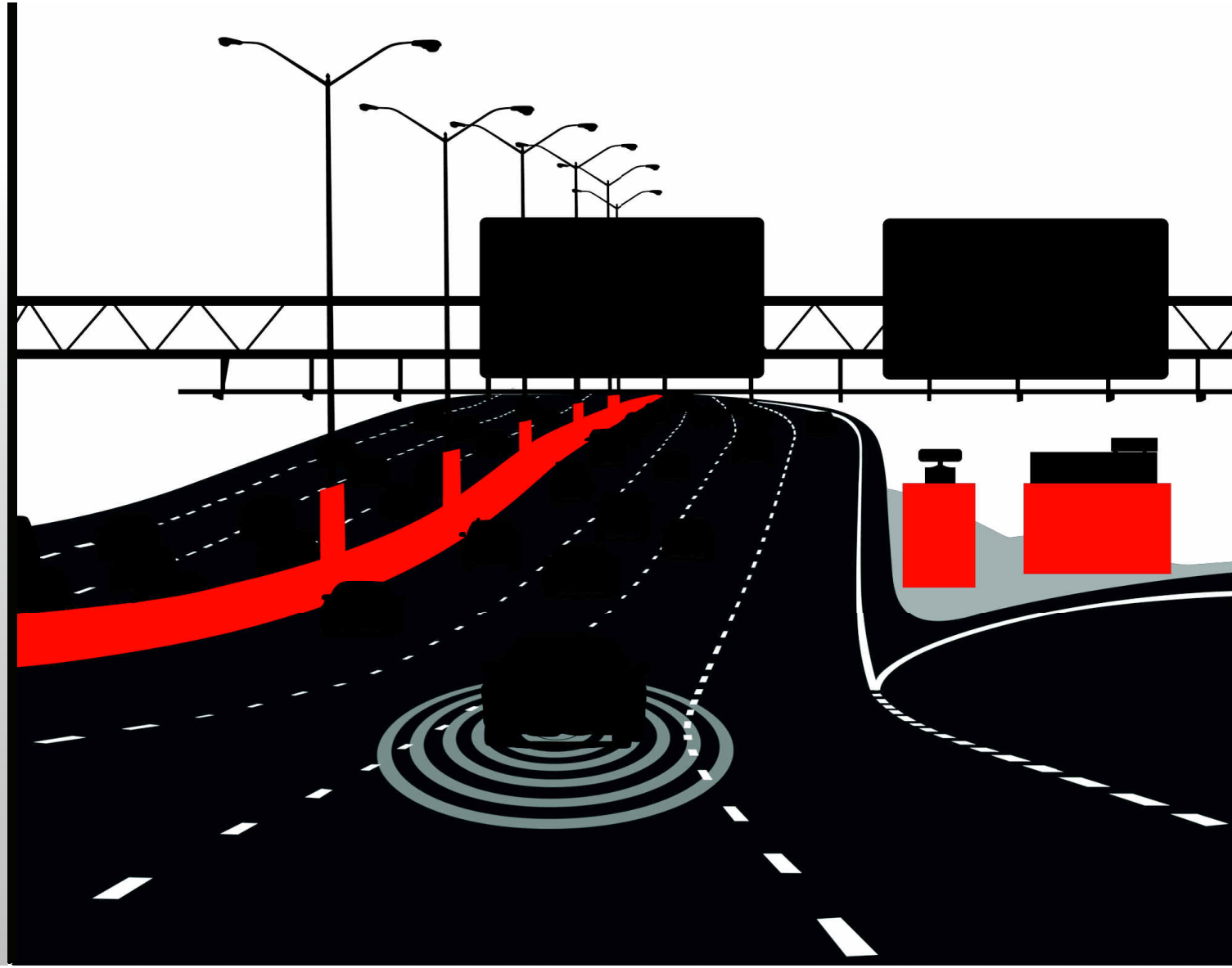
Path planning



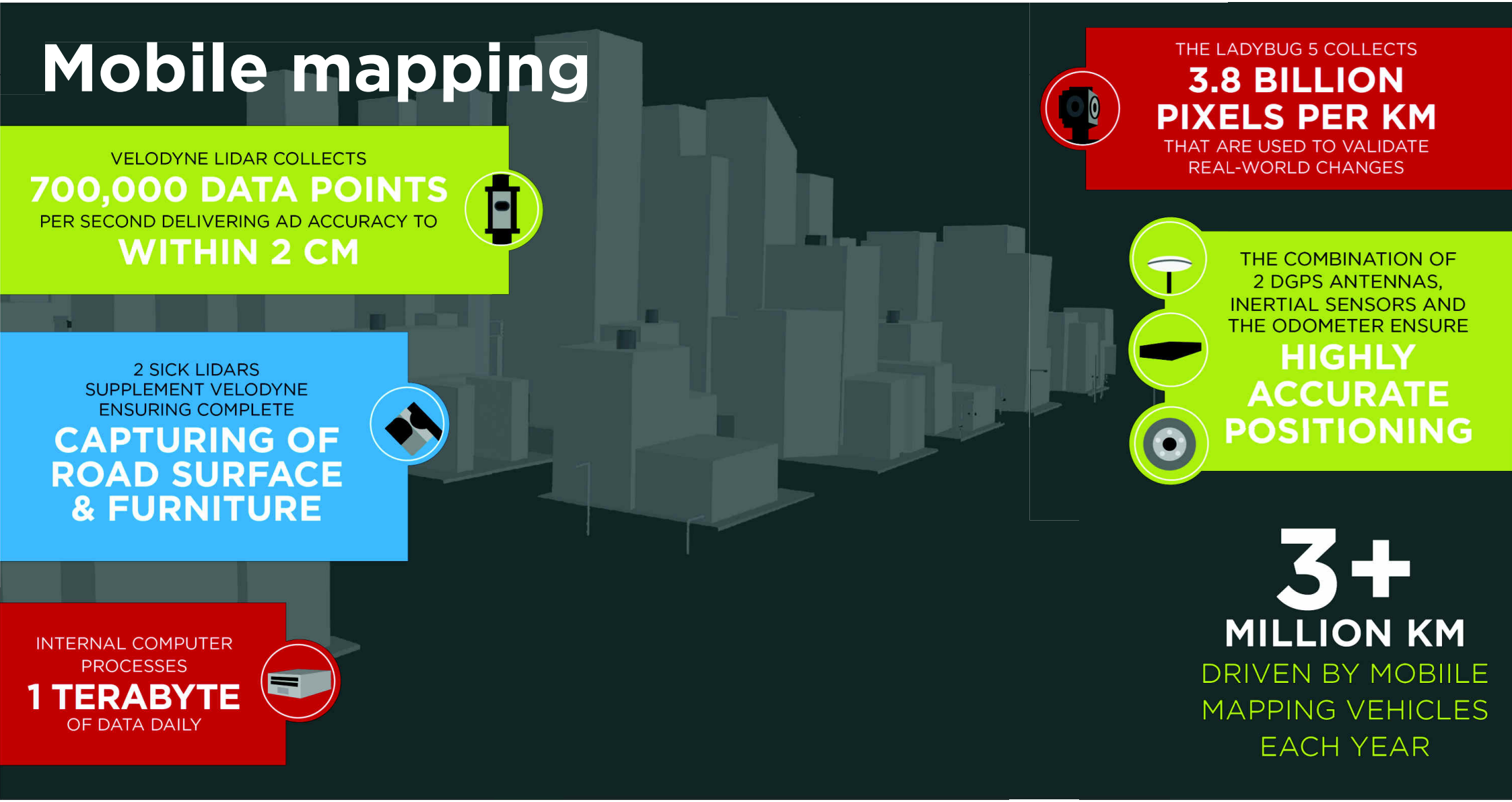
RoadDNA Suite

Powers sensor-agnostic localization

- SIGNS
- ROADSIDE
- POLES
- MARKINGS
- REFLECTIVITY
- **RADAR**



Mobile mapping



VELODYNE LIDAR COLLECTS
700,000 DATA POINTS
PER SECOND DELIVERING AD ACCURACY TO
WITHIN 2 CM

2 SICK LIDARS
SUPPLEMENT VELODYNE
ENSURING COMPLETE
CAPTURING OF ROAD SURFACE & FURNITURE

INTERNAL COMPUTER
PROCESSES
1 TERABYTE
OF DATA DAILY

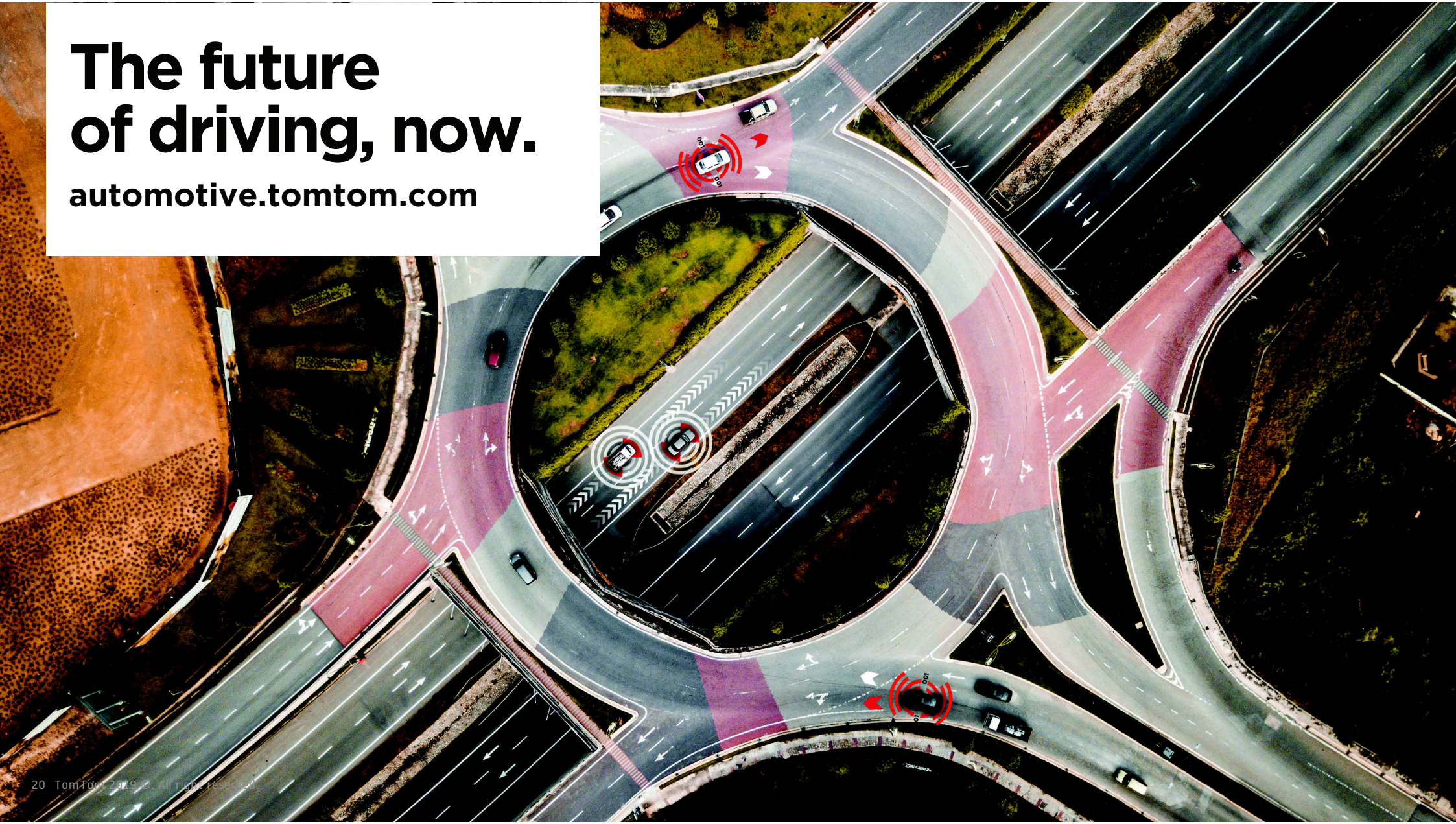
THE LADYBUG 5 COLLECTS
3.8 BILLION PIXELS PER KM
THAT ARE USED TO VALIDATE
REAL-WORLD CHANGES

THE COMBINATION OF
2 DGPS ANTENNAS,
INERTIAL SENSORS AND
THE ODOMETER ENSURE
HIGHLY ACCURATE POSITIONING

3+
MILLION KM
DRIVEN BY MOBIILE
MAPPING VEHICLES
EACH YEAR

The future of driving, now.

automotive.tomtom.com



Our 27-year focus on navigation technologies

1991 — Founded

1996 — First navigation software launched

2001 — Fully focused on car navigation

2004 — Introduction of the portable navigation device

2005 — Acquisition of fleet management company, DataFactory

2006 — Acquisition of HD Traffic technology

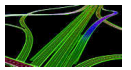
2007 — Set up Automotive Division to service OEMs

2008 — Acquisition of mapping company, Tele Atlas

2009 — First line fitted Automotive product with Renault

2010 — HD Traffic available across Europe

2015 — Launch of TomTom HD Map for AD



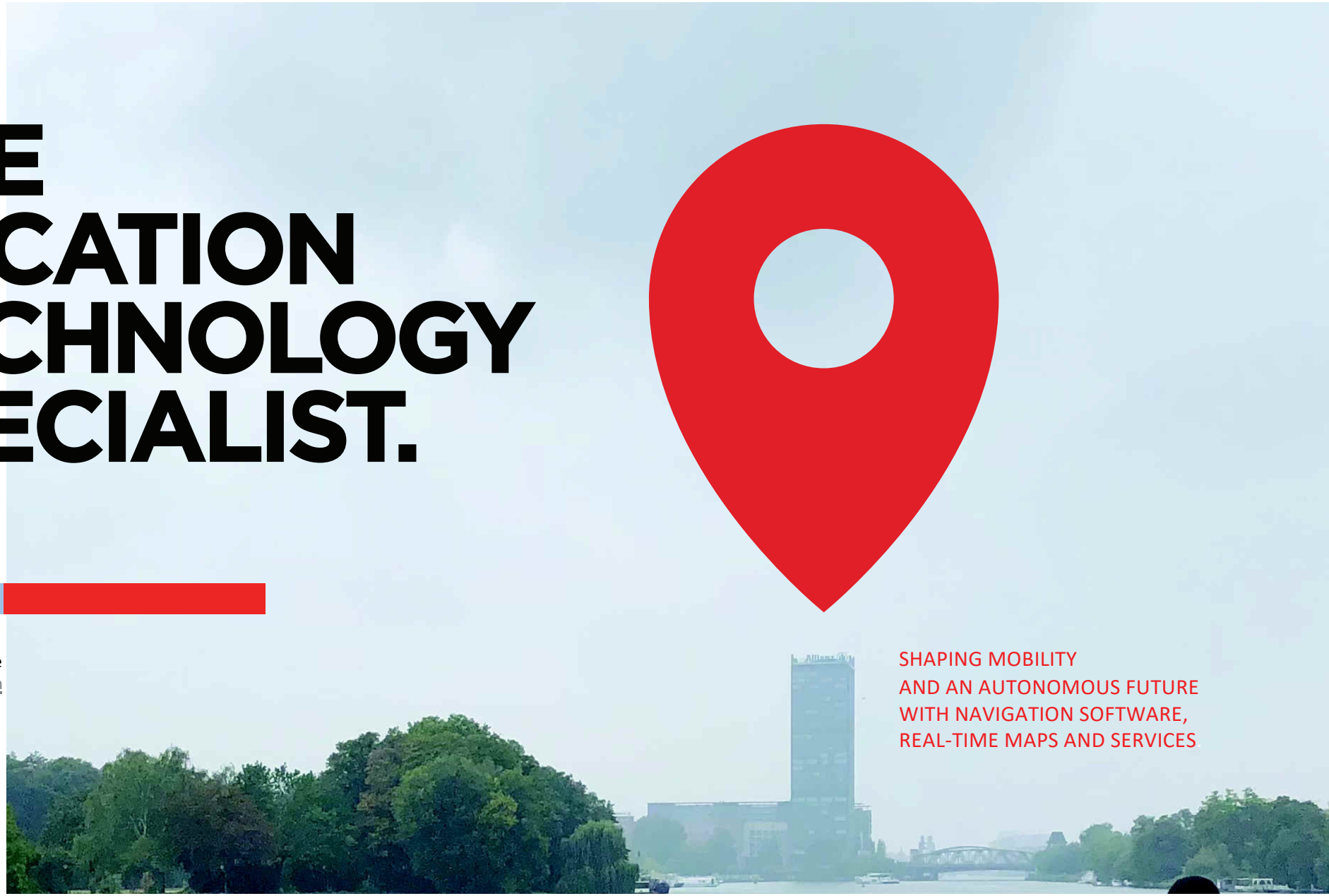
2017 — Acquisition of autonomous driving company, Autonomos

2018 — Launch of AutoStream, MotionQ

Our vision

is to build the most advanced map-as-a-service to help make autonomous driving a reality

THE LOCATION TECHNOLOGY SPECIALIST.



SHAPING MOBILITY
AND AN AUTONOMOUS FUTURE
WITH NAVIGATION SOFTWARE,
REAL-TIME MAPS AND SERVICES.

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