The role of maps as a major enabler towards automated driving

TomTom

5 myths about maps and map making…

1. Maps are not needed for Autonomous Driving

2. Maps can easily be made by using sensors only

3. Car OEMs will not give map makers access to car sensor data

4. Map freshness cannot be delivered with the required high quality in a scalable and efficient way

5. Market leaders in ADAS are automatically the future market leaders of maps for Autonomous Driving

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Historic evolution of using maps in the car

Radio
Paper Map

Radio- nav
Digital Map

Infotainment
Map with "API"

Connected/smart car
Live Map Layers

Automated Vehicle
HD Map

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Impact of "future trends" on map
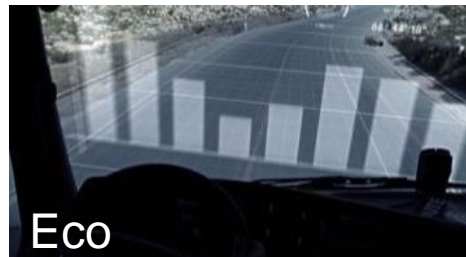
The Internet of Things and Automated Driving create

More Demand for maps

IoT

Shift of map **domain**

AD

Safety

Eco

Comfort

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The role of a map in automated driving

Navigation

Planning

Localization

Comfort

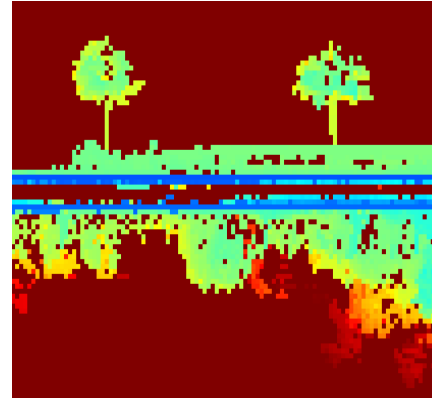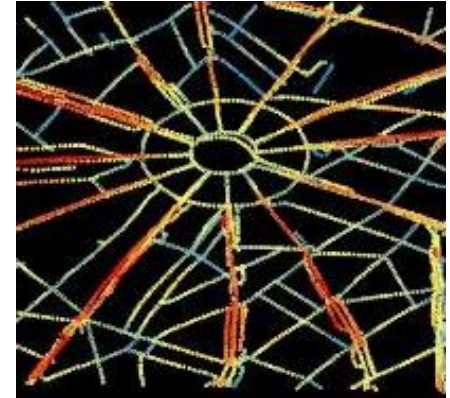Getting from
A to B

Planning the next
maneuver within
and beyond
sensor horizon

Complement
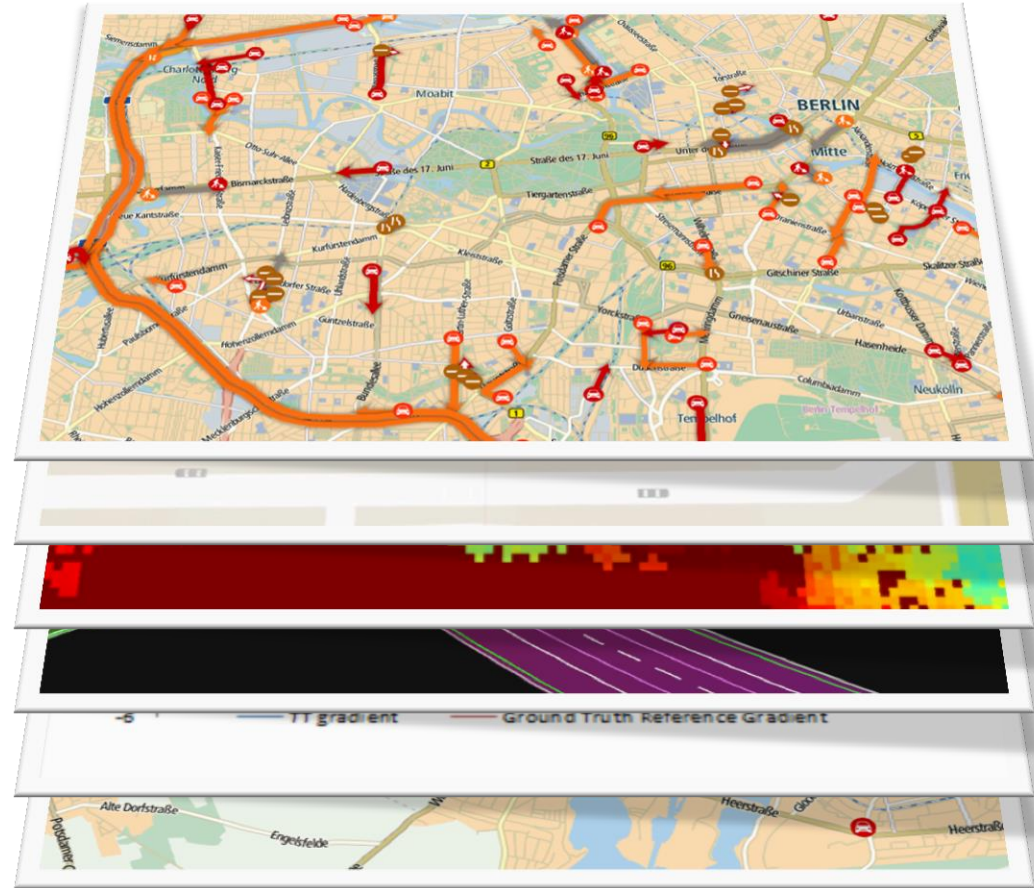sensors in
positioning
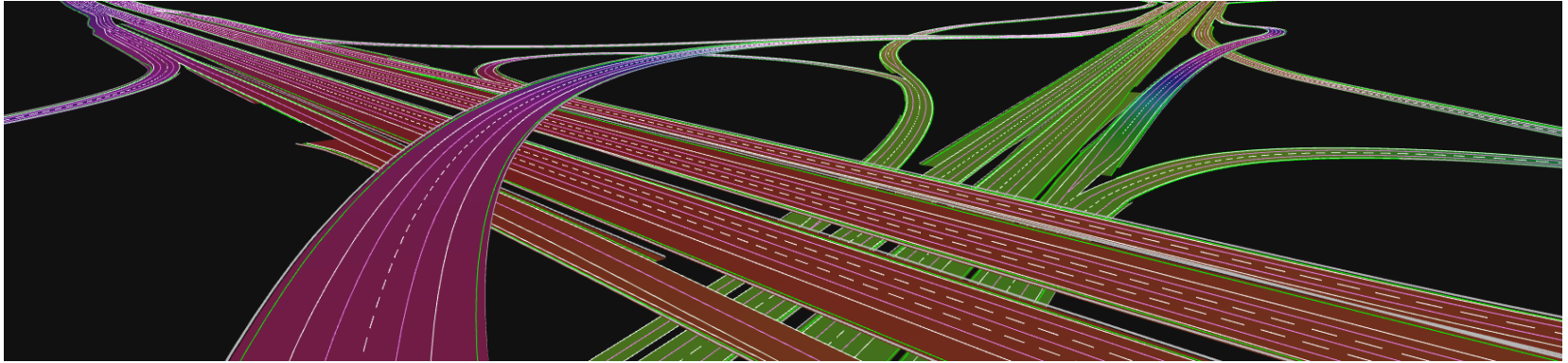
Making automated
driving feel
comfortable

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What is a map?

Several map layers

- Live map layers
- Real-time map updates
- Localization content
- HD Map
- ADAS content
- Navigation map

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Advanced Map for Automated Driving

Highly Detailed

3D Lane Geometry
- markings
- centerlines
- road boundaries

Highly Accurate
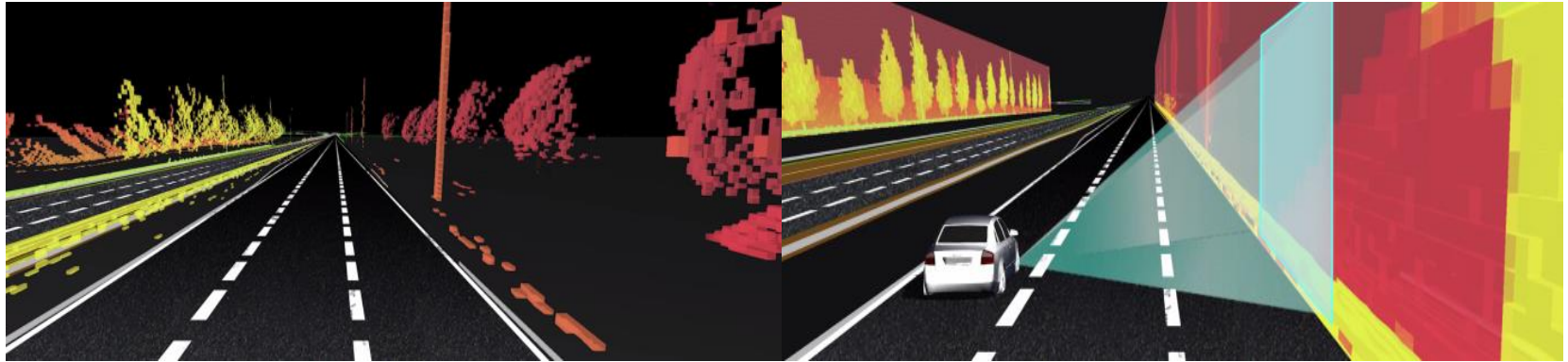
Sub-meter absolute
Decimeter-level relative

Richly Attributed

Lane-level attributes
- speed restrictions
- divider markings

Position Landmarks
RoadDNA

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RoadDNA provides robust & scalable positioning content
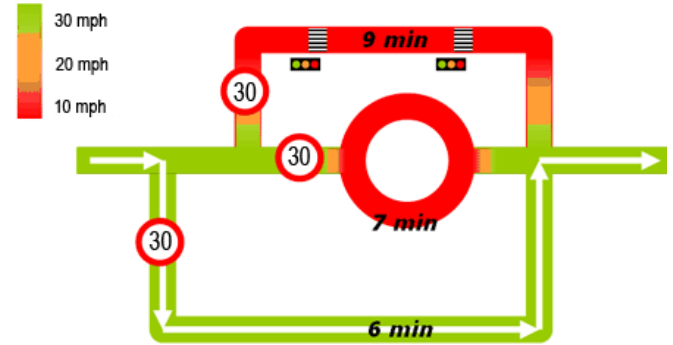

Robust
Tolerant regarding changes
in reality or map version

Scalable
Low storage
Low processing
Automated production

Highly accurate
<0.5 m longitudinal & <0.15m
lateral accuracy

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Driver behavioral data – Local Speeds (IQ Routes 2.0)

Big data
Pattern data mining of vehicle probes allows creation of predictive map layers
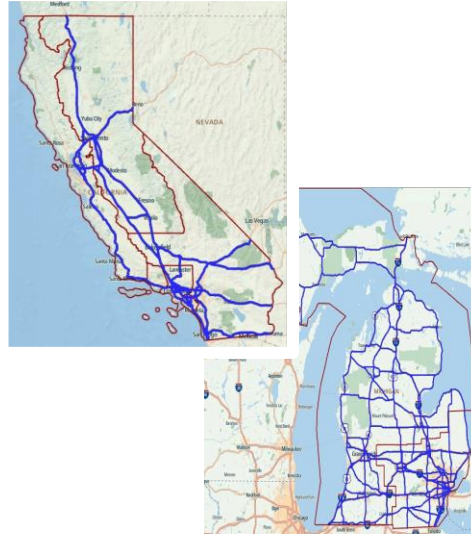
Scalable
Vehicle probe data is similar around the world

Comfort
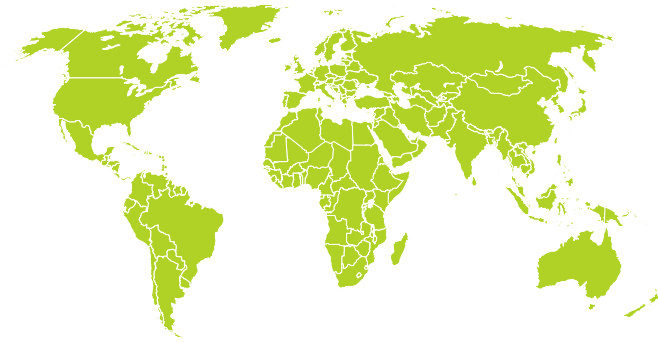These layers allow the automated car to drive in an intelligent human way

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This is not fiction...

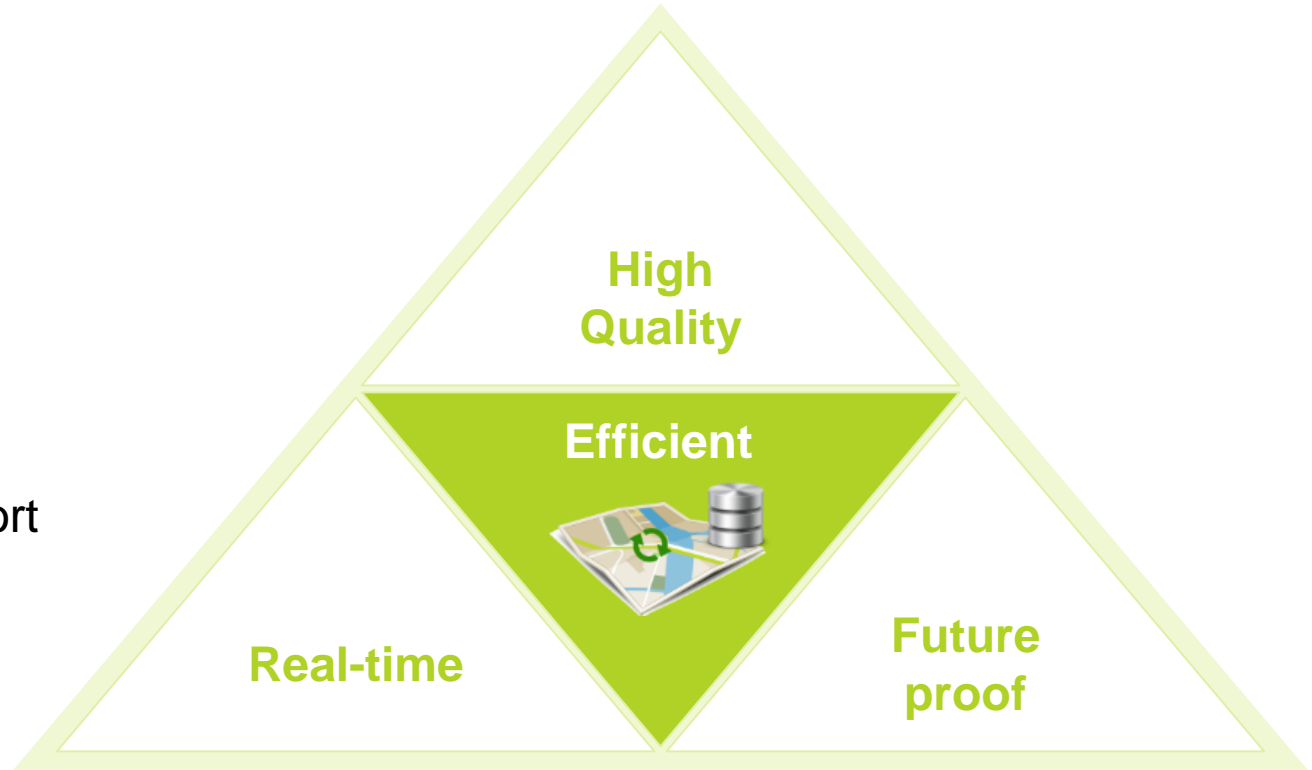Germany
~28,000 km

US: CA, MI + NV
~41,000 km

Roadmap
EUR and NAM

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Essential components of a mapmaking platform

- Highly Accurate
- Detailed
- Feature rich

- Up-to-date

- Prepared to support new layers
- Scalable

High Quality

Efficient

Real-time

Future proof

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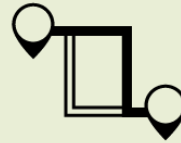## PROFESSIONAL MAPMAKING

Mobile Mapping Vans

Field Survey

Authoritative Sources

COMMUNITY INPUT

Probe Data
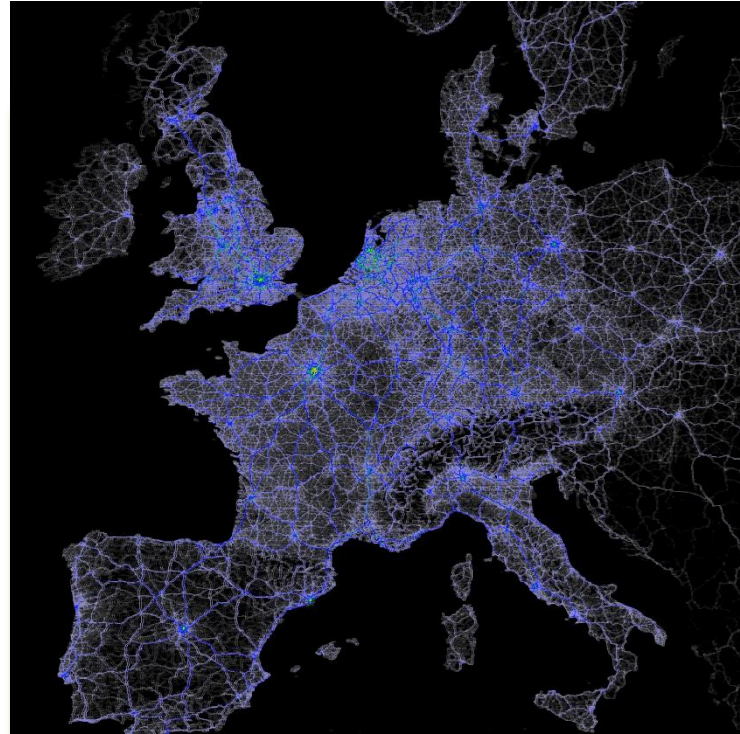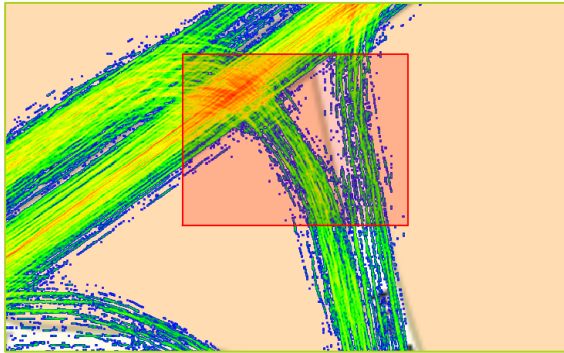
Active Community Input

Sensor Data

INTELLIGENT MAPMAKING

Perfected approach that combines professional mapmaking methods with community input.

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Intelligent map making in action

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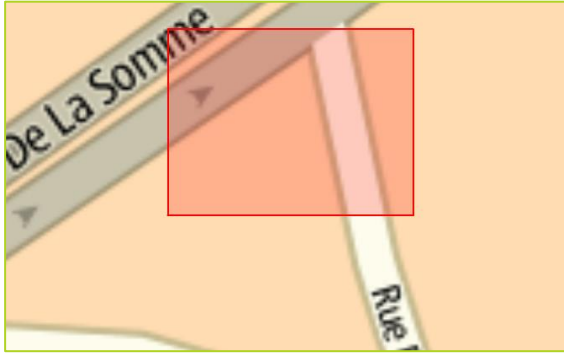
Mapping expertise on top of sensor data and machine learning

TOMTOM
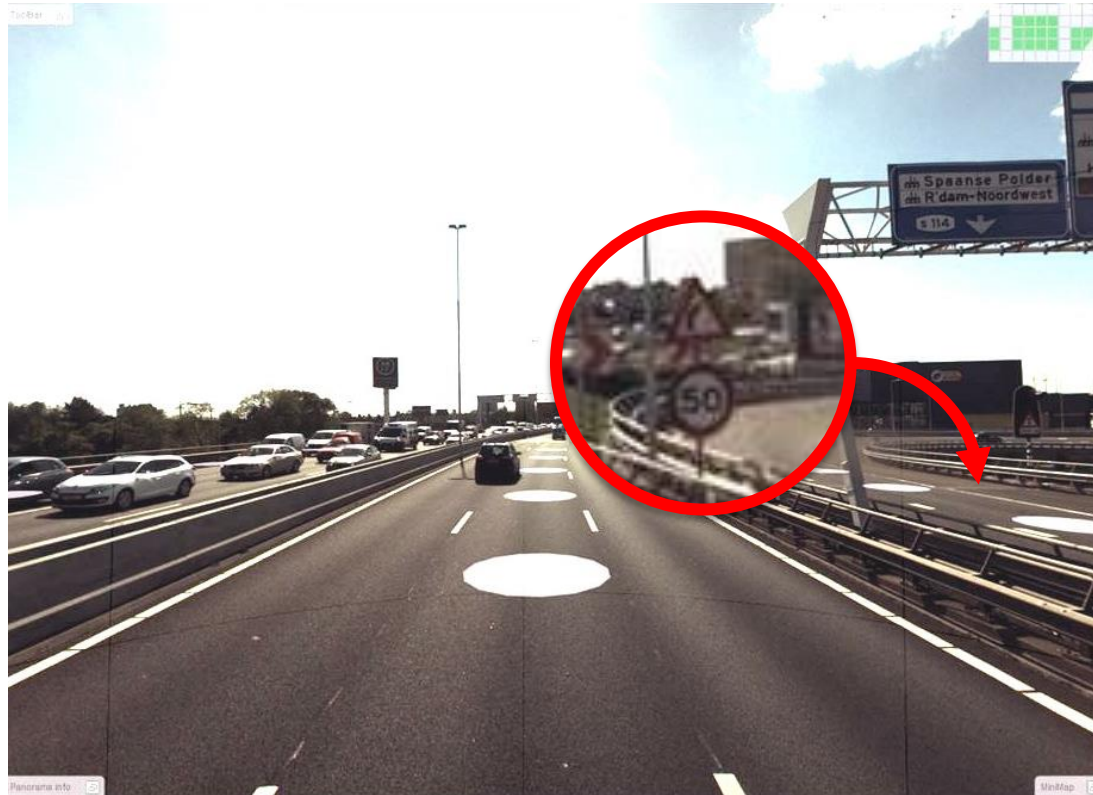
Real-time maps and Traffic and Travel services

Professional sources

Map & Service Production Platform

Incremental Map updates

GPS traces

Traffic & Travel services

Onboard map

Live map

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One day of community input

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Automated Driving requires an environmental model

Professional sources

NDS

Map & Service Production Platform
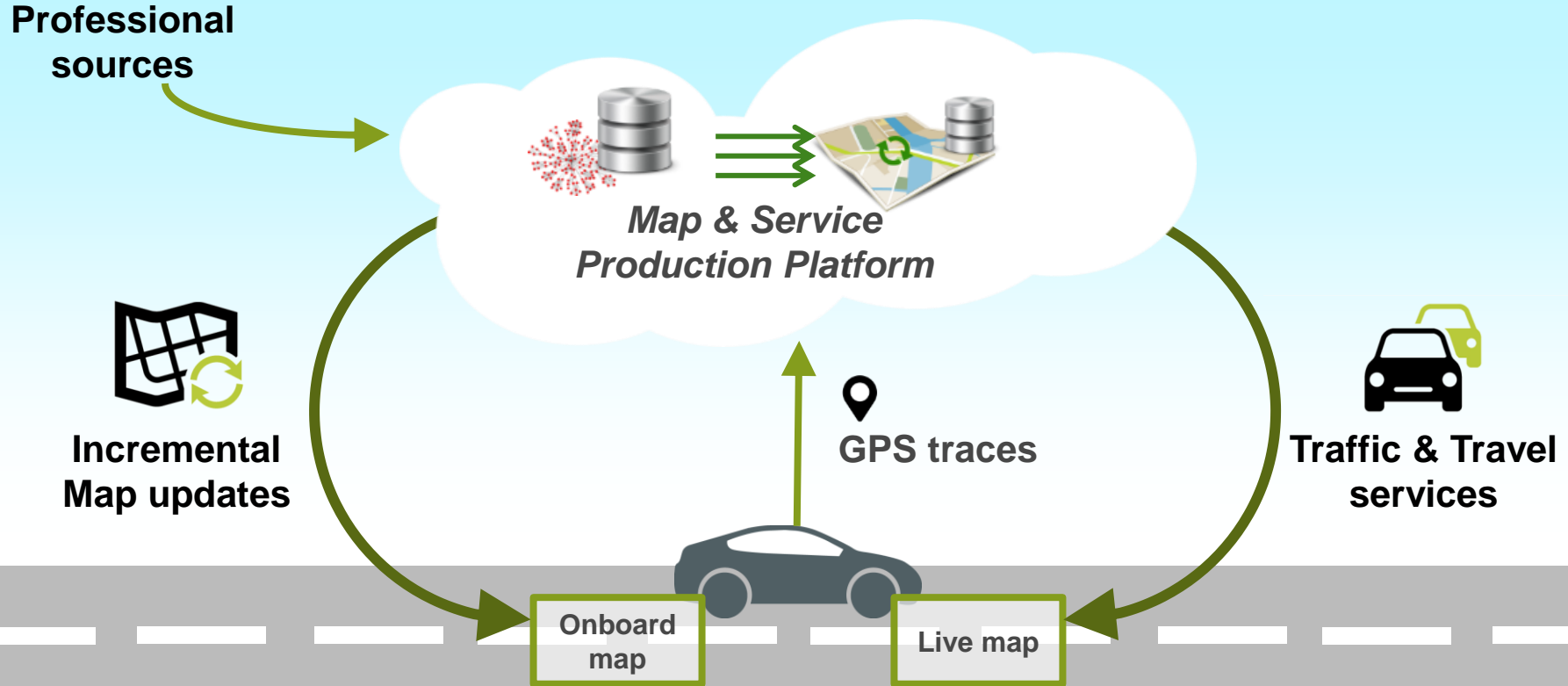
NDS / TISA

SENSORIS

Incremental Map updates

Environmental model

ADASIS

ADASIS

Onboard map

Sensors

Live map

Live Map data
- Slippery roads
- Road blocks
- Jams Ahead
- and more….

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5 myths about maps and map making…

BUSTED

1. Maps are needed for Autonomous Driving

2. Maps cannot easily be made by using sensors only

3. Car OEMs will share sensor data if it makes sense and does not impact users

4. Map freshness can be delivered with the required high quality in a scalable and efficient way

5. Market leaders in ADAS are not automatically the future market leaders of maps for Autonomous Driving

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THANK YOU

ANY QUESTIONS?

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