

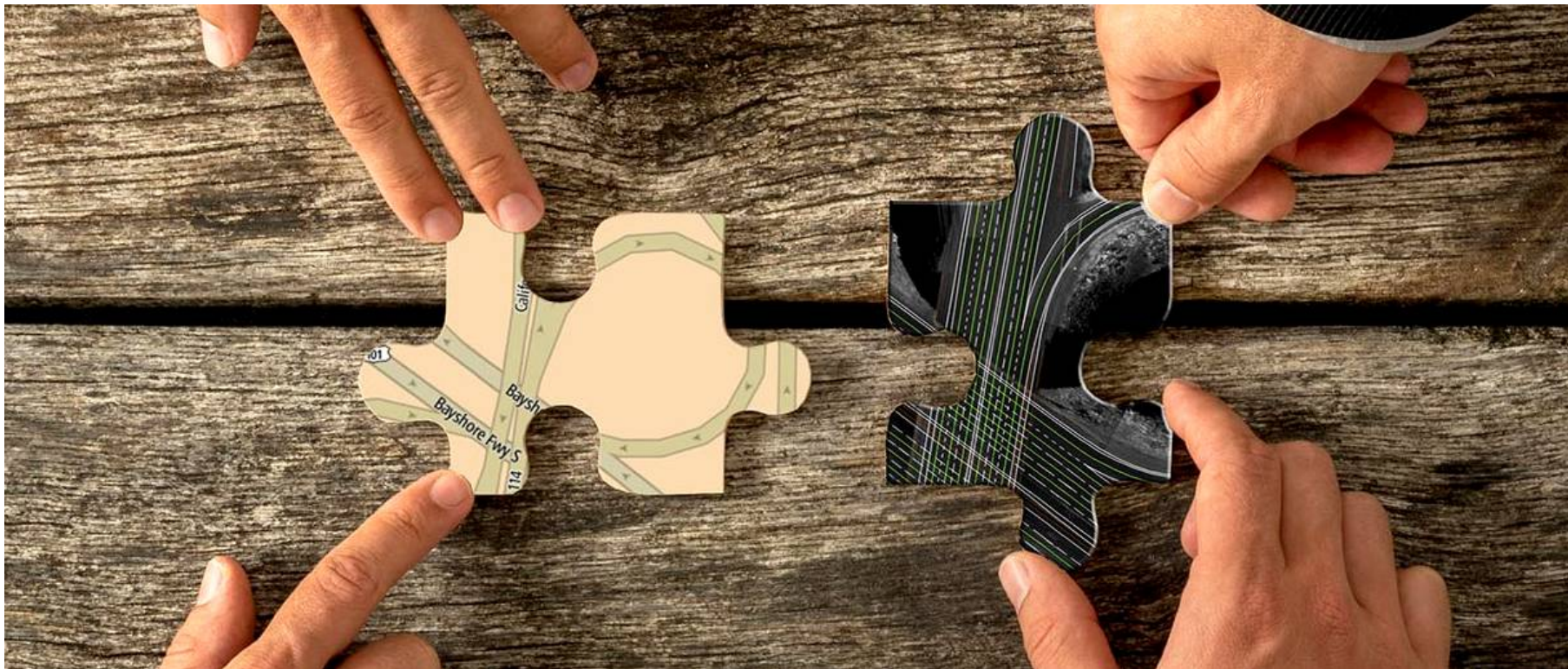
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Connected and Automated Driving

TOGETHER, SHAPING THE FUTURE



Day 1 Physical and Digital Infrastructure



TOMTOM 

Stephen T'Siobbel

Sr. Partner Development Manager, TomTom Maps

President TN-ITS

03-04

April 2017

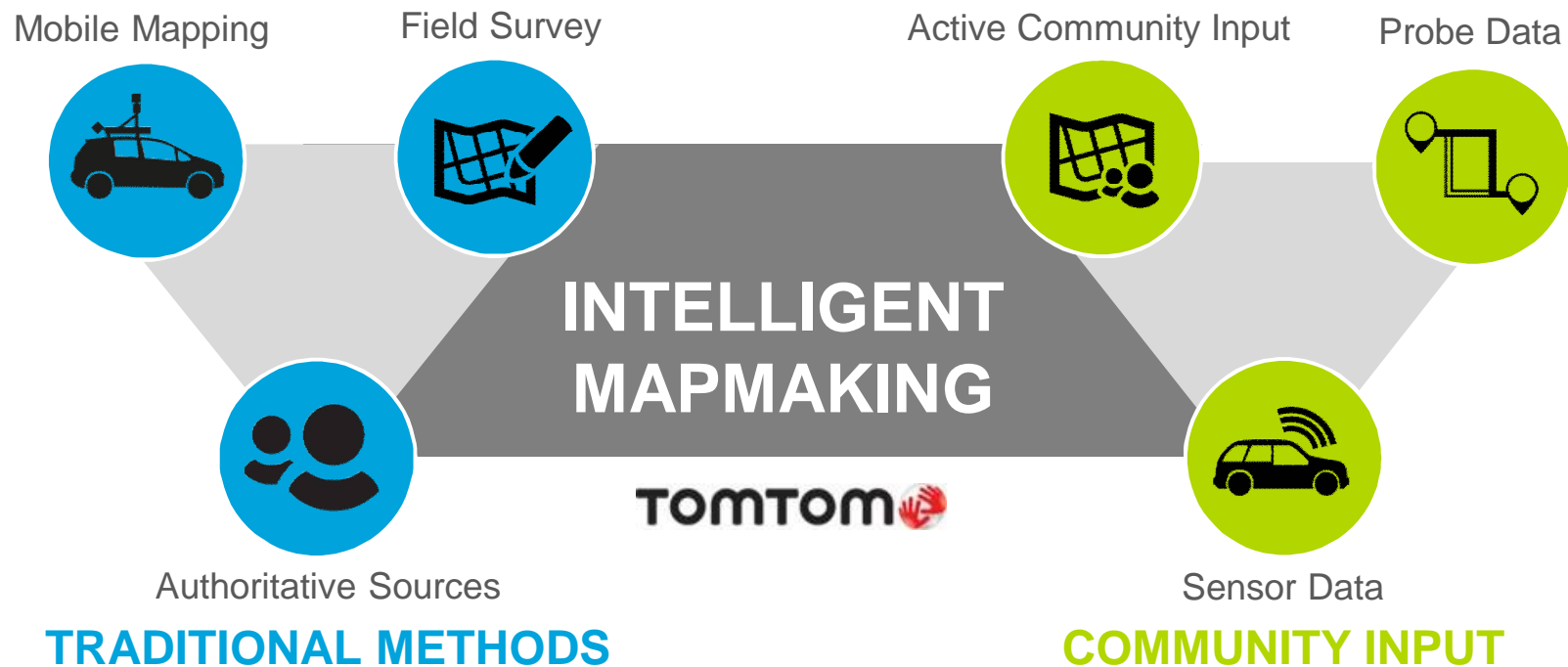
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BUILDING AND MAINTAINING THE DIGITAL INFRASTRUCTURE REQUIRES AN INTELLIGENT & HOLISTIC APPROACH



03-04

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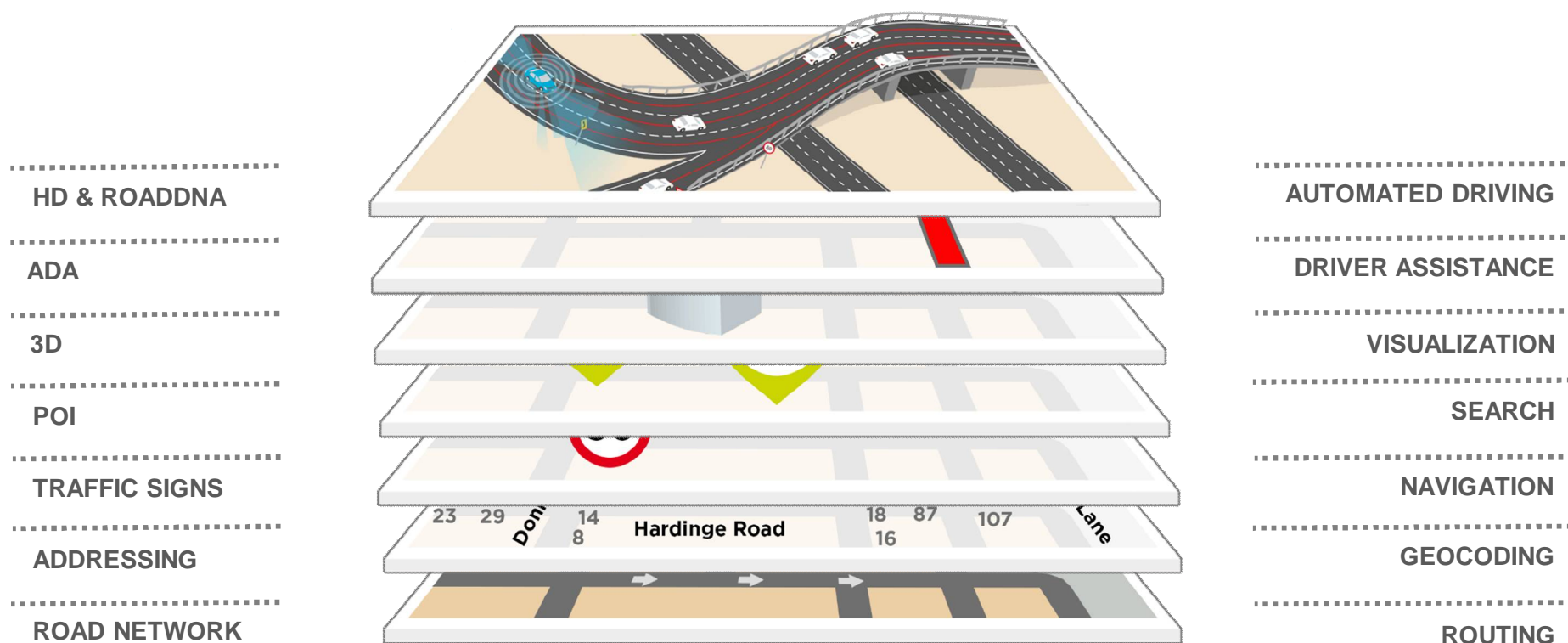
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CONNECTED & AUTOMATED DRIVING FUELS THE NEED FOR MORE SOPHISTICATED & DETAILED MAPS



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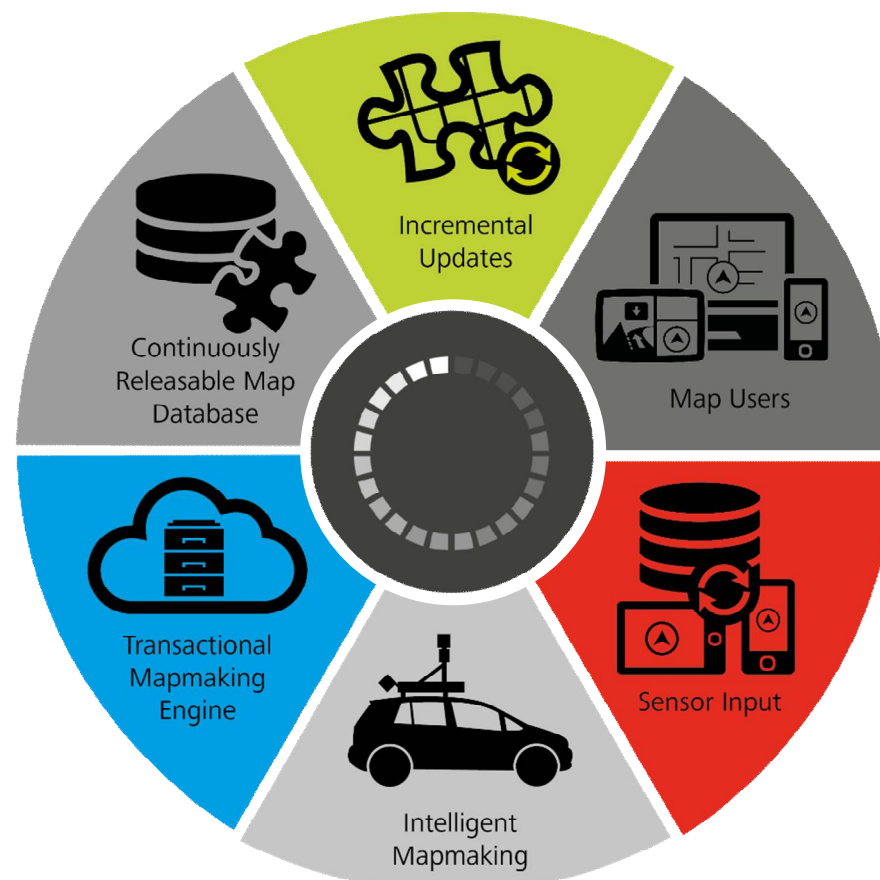
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PREREQUISITE:

**TRANSACTIONAL
MAPMAKING
PLATFORM**

**PUSHING THE
BOUNDARY TOWARD
THE MOST REAL-TIME
MAPS**



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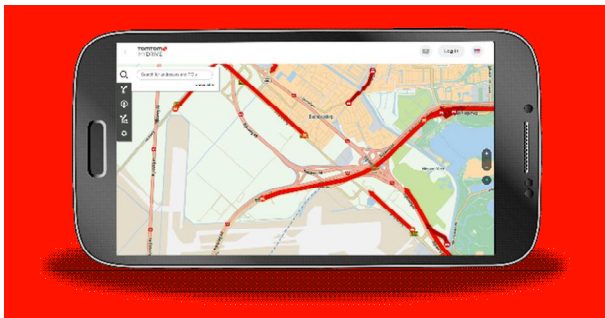
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TOMTOM'S DIGITAL INFRASTRUCTURE EMPOWERS SYSTEMS & USERS TO MAKE SMARTER MOBILITY DECISIONS



Mobile Usage



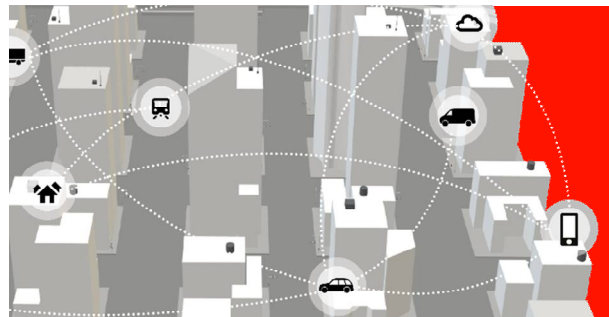
Navigation



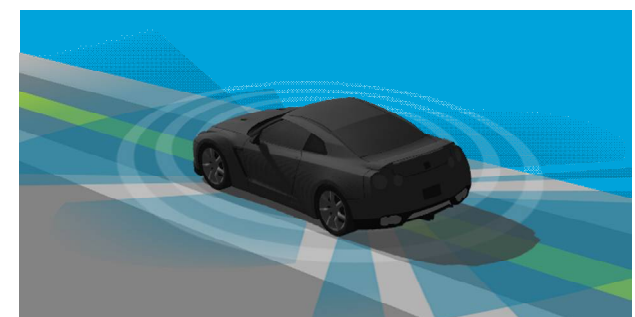
Ride Planning



Drive Range Calculation



Internet of Things



Autonomous Driving

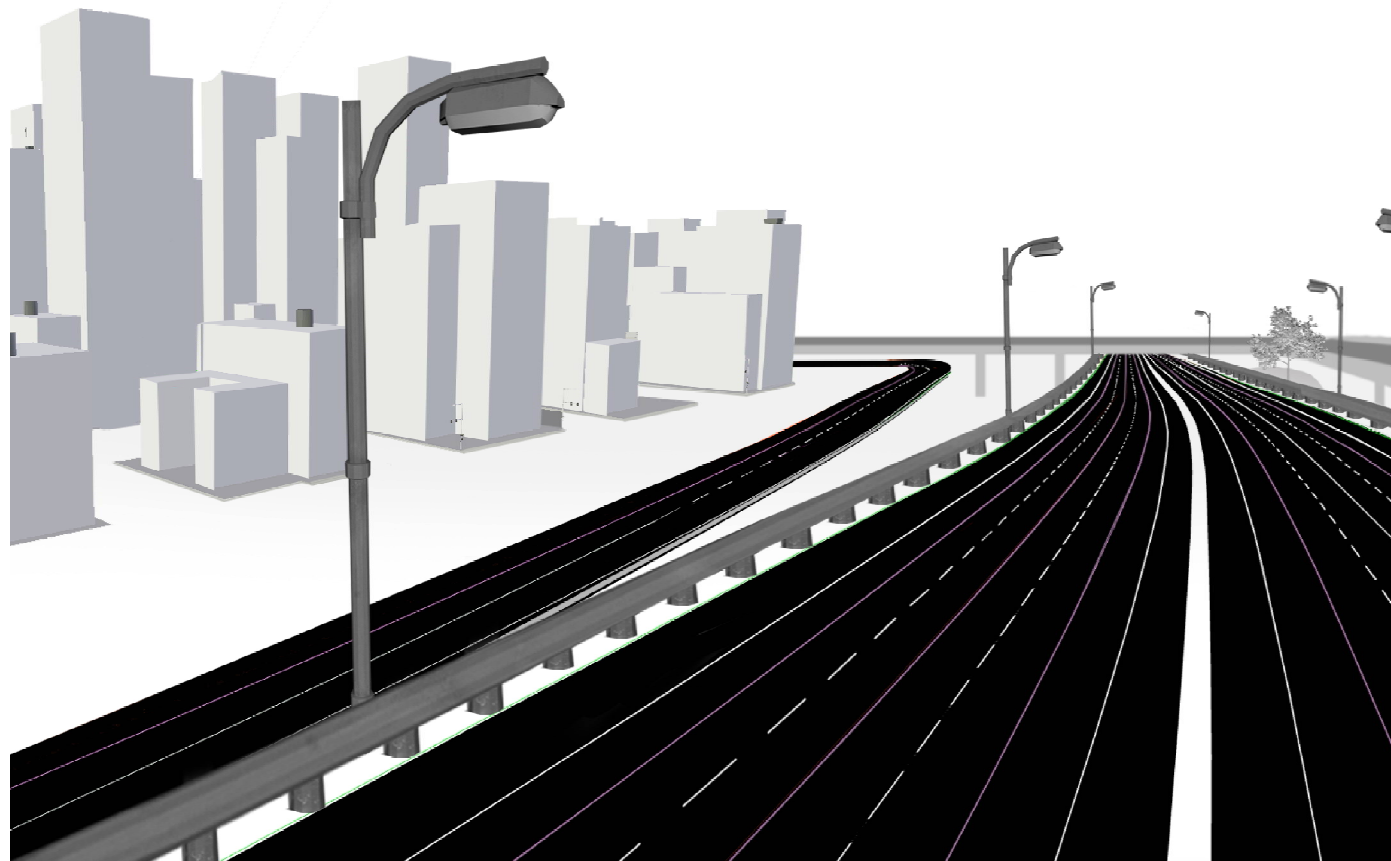
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HD MAP DELIVERS HIGH ACCURACY & FULL ATTRIBUTION



Highly Detailed
(objects which can be seen)
3D lane geometry:
Lane markings
Drivable surface borders
Road boundaries

Highly Accurate
Sub meter absolute
Decimeter level relative

Richly Attributed
(including inferred attributes)
Lane level attributes:
Speed restrictions
Lane centerlines
Lane widths

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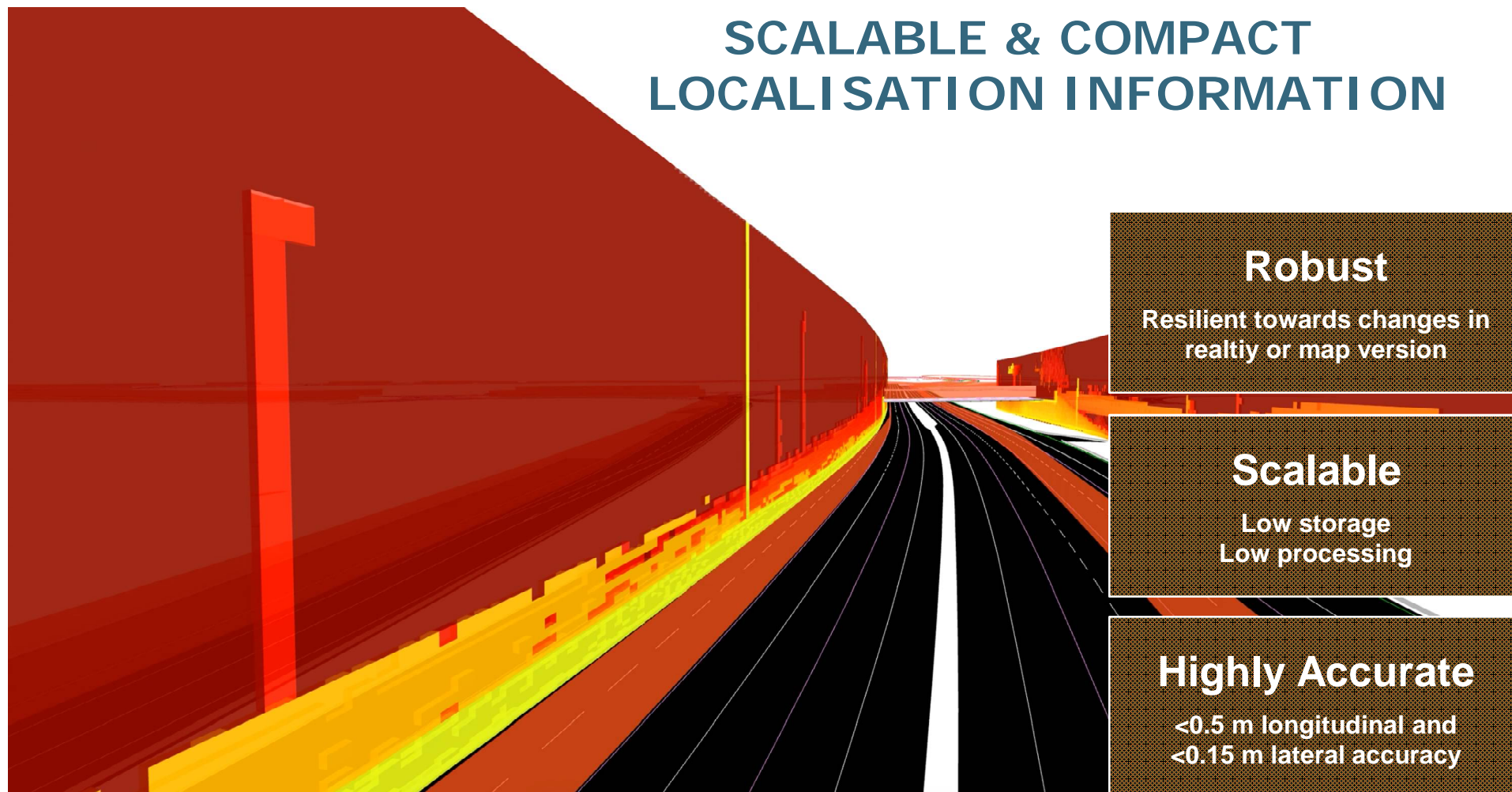
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SCALABLE & COMPACT LOCALISATION INFORMATION



Robust

Resilient towards changes in
reality or map version

Scalable

Low storage
Low processing

Highly Accurate

<0.5 m longitudinal and
<0.15 m lateral accuracy

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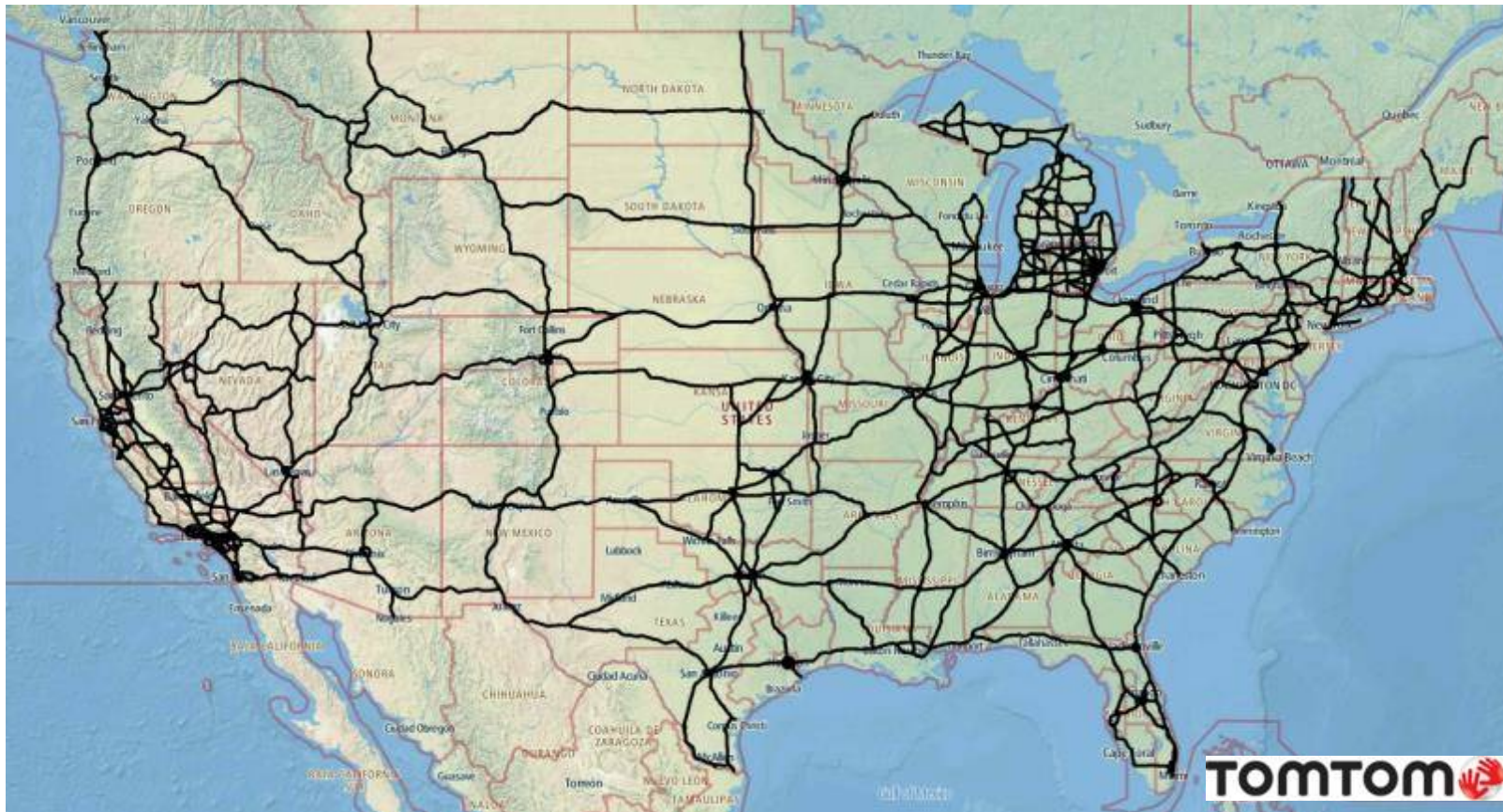
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HD & ROADDNA US MAINLAND INTERSTATES COVERED! EU to follow!



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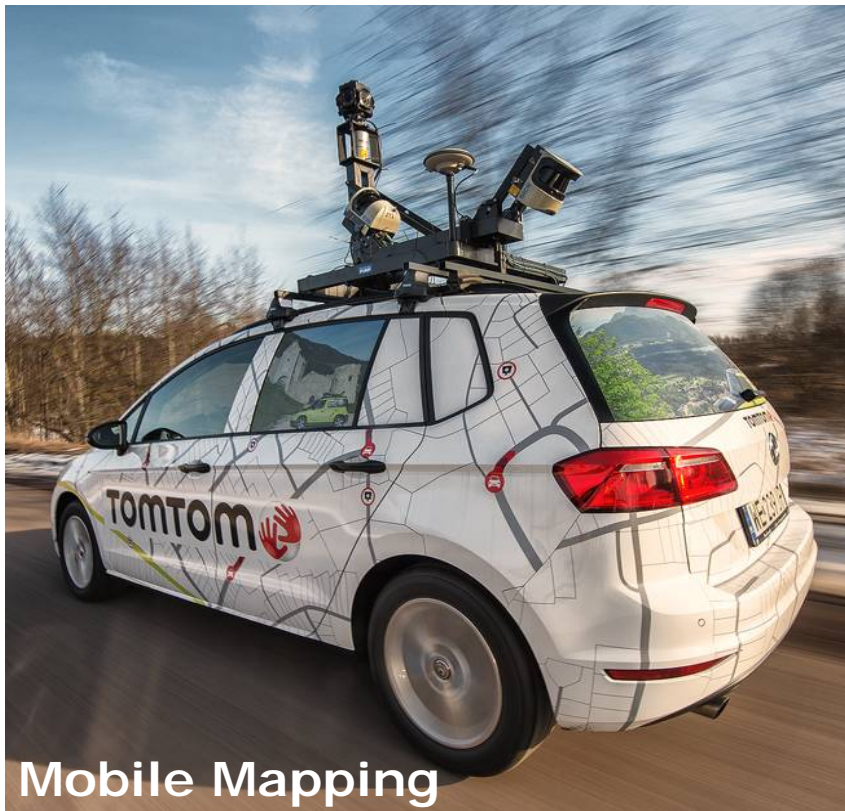
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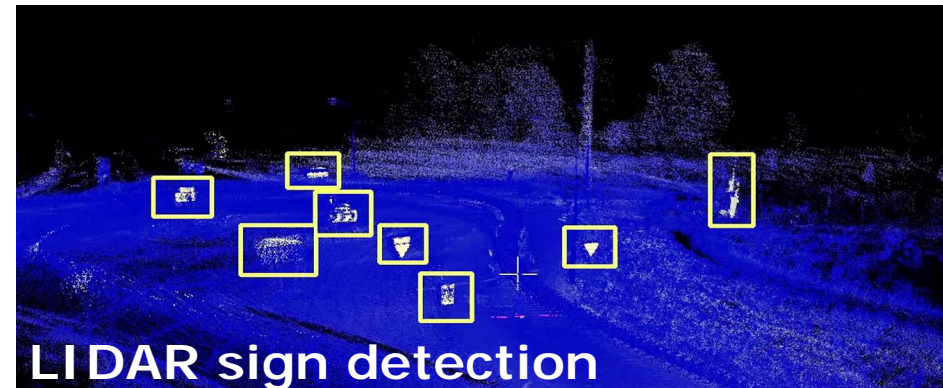
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USING AI FOR TRAFFIC SIGN COLLECTION – step 1



Mobile Mapping



LIDAR sign detection



Human classification

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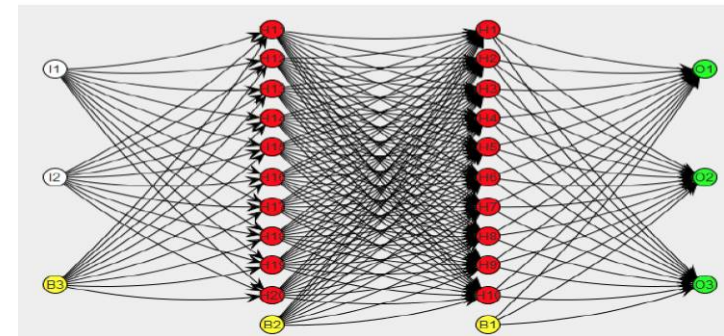


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USING AI FOR TRAFFIC SIGN COLLECTION – step 2

- 100M classified traffic signs
- 100 traffic sign categories
- Allows to apply **Supervised Learning** & DNN
- Training Classifiers by changing parameters until an error is corrected
- Applying the DNN results in high accuracy level for classification
- Unclassified – Misclassified observations are revised by humans & serve to improve the DNN
- High quality: low false positives/negatives
- Reliable reference layer in a Digital Infrastructure





MAINTENANCE OF A DIGITAL INFRASTRUCTURE WILL REQUIRE HARMONISATION & COOPERATION

- Hence TomToms active involvement in (pre) standardization

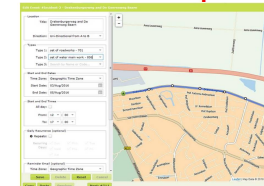
- Industry: NDS  SENSORIS 



- Authorities:



Road Event Reporter



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What is **TN-ITS**

Why?



TN-ITS helps road users get fresh map data from the road operators to the vehicle's navigation systems

How?



By bringing together map makers and public authorities and supporting EC policy to update static road data effectively and ensure a seamless data chain

What?



Implementation
Provide guidelines, tools and services supporting pioneers of implementation including Belgium, Finland, France, Ireland, Norway, Sweden, and United Kingdom.



Standardisation
Define & maintain TN-ITS specification in CEN/TC 278/WG7

Rolling out TN-ITS Service in Europe - Status

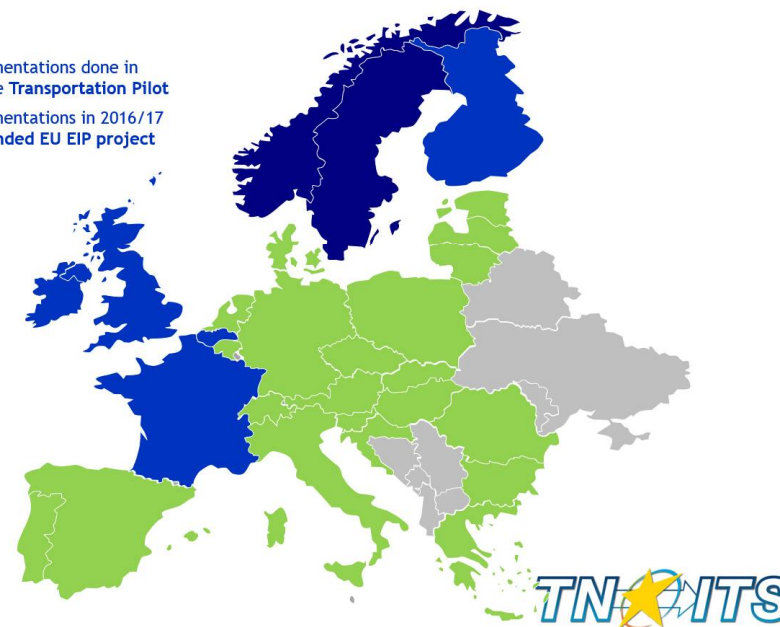
Dark blue: TN-ITS implementations done in 2014/15 in the **Transportation Pilot**

Light blue: TN-ITS implementations in 2016/17 in the CEF-funded EU EIP project

here

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Join us!



Learn more on tn-its.eu or
get in touch with us at
info@tn-its.eu



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THANK YOU

Any questions?



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