Human Factors for Automated Driving

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here
Maps for Life

Powering the next generation of mobility with maps, dynamic data, and analytics

here

The Evolution of Vehicle Automation

Driver Only

- No assistance system
- Driver fully executing driving maneuvers and vehicle controls

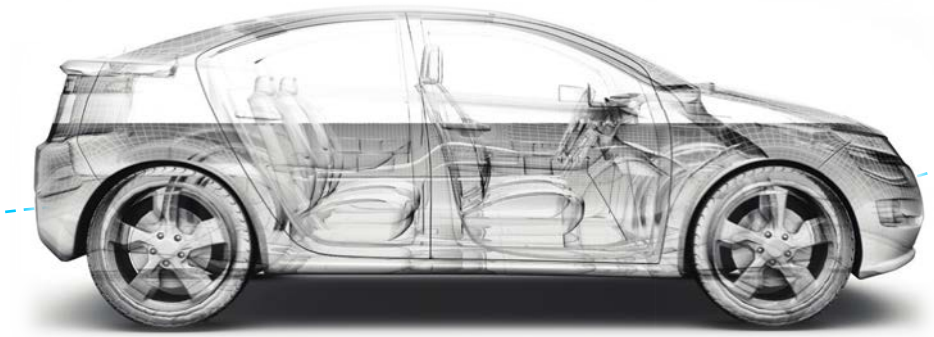
Level 0

Driver Assisted

- Driving assistance in longitudinal or lateral driving activity
- Park Assist / Collision Prevention

2000

Level 1



2013

- Car has limited control
- Driver must observe at all times and be ready to take control instantly (Traffic Jam Assist)
- "Hands on"

Partially Automated

Level 2

2015

- HERE HD Live Map 1.0
- Realtime Map updates
- Closed loop between vehicle sensor data and ADAS Map

Connected

2018 - 2020

- Car has partial control
- Under controlled circumstances the vehicle can take over driving controls
- "Hands off"

Highly Automated

Level 3

2025

- Car has full control
- No driver – only passengers

Fully Automated

Level 4

2025+

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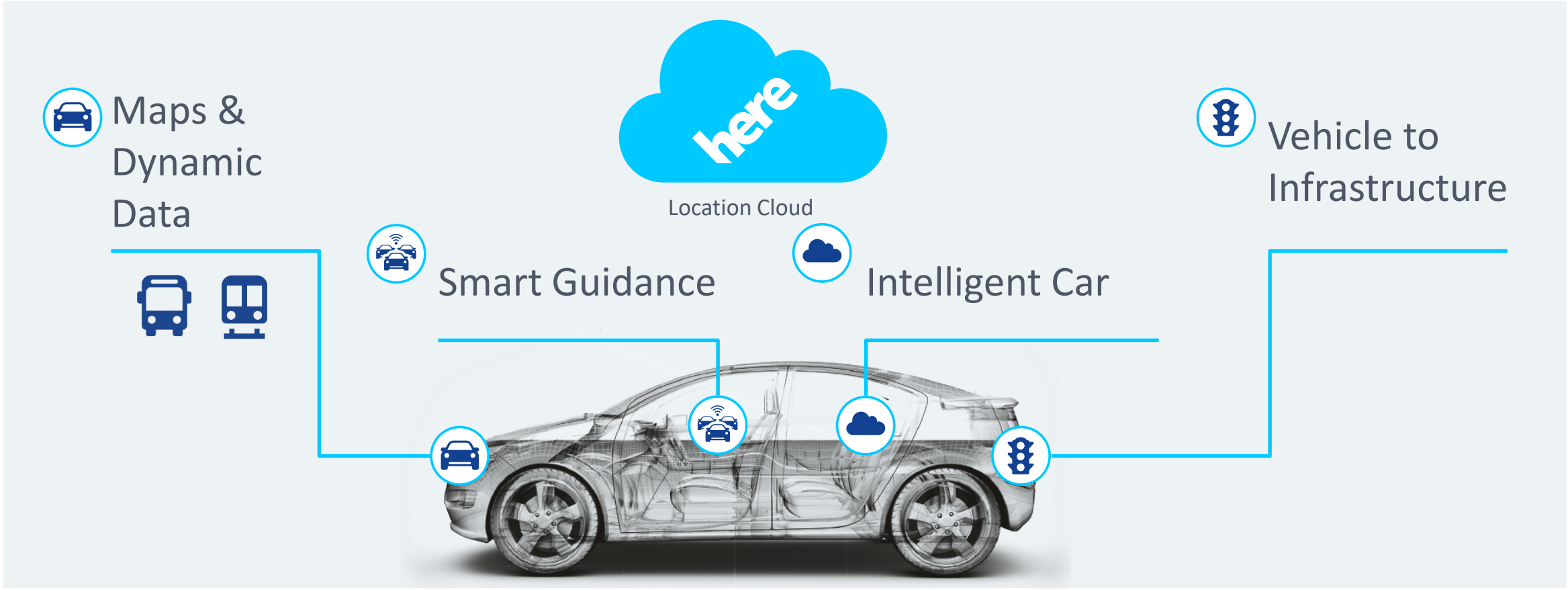
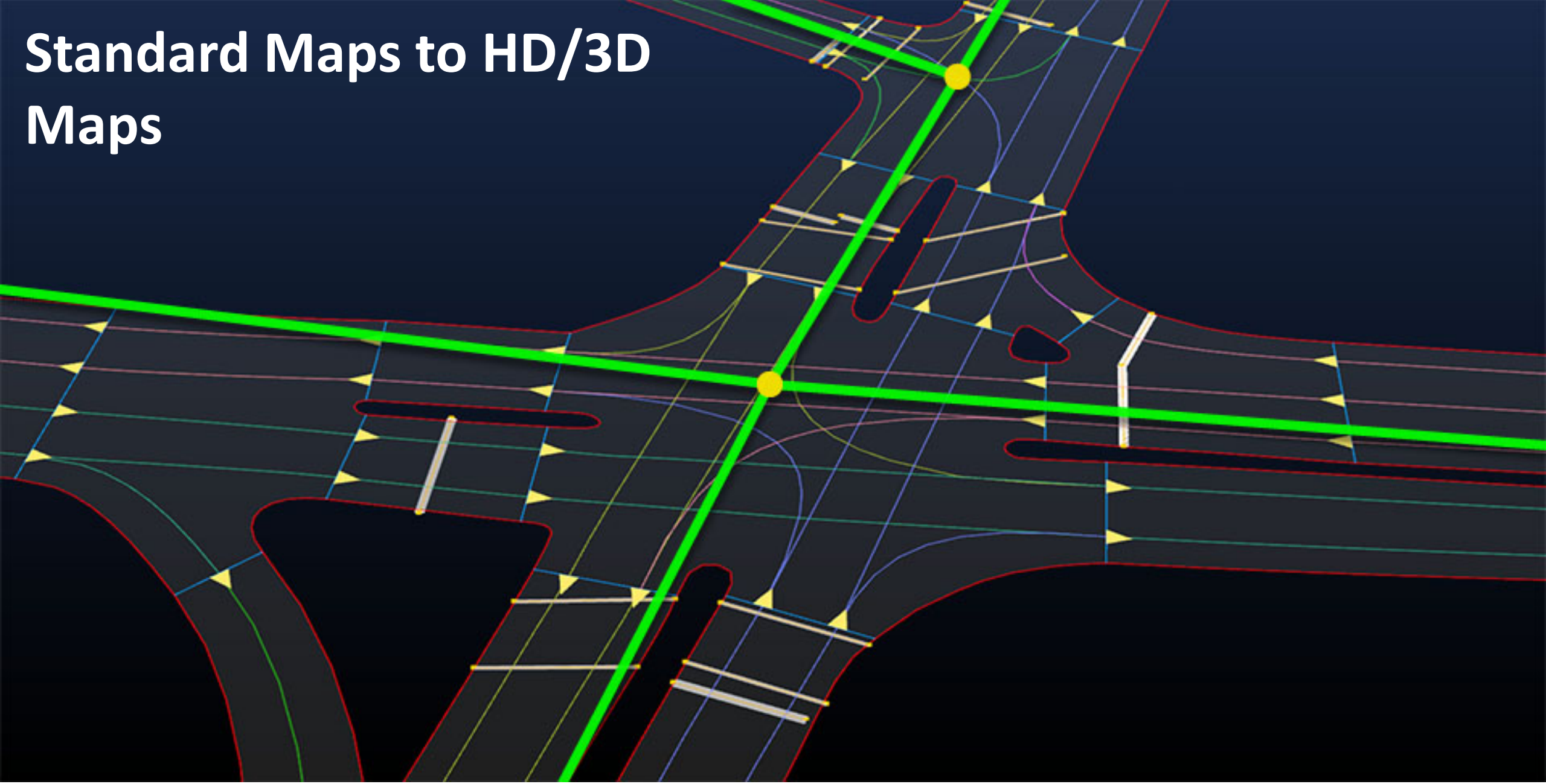
Connecting Travelers, Vehicles, Infrastructure

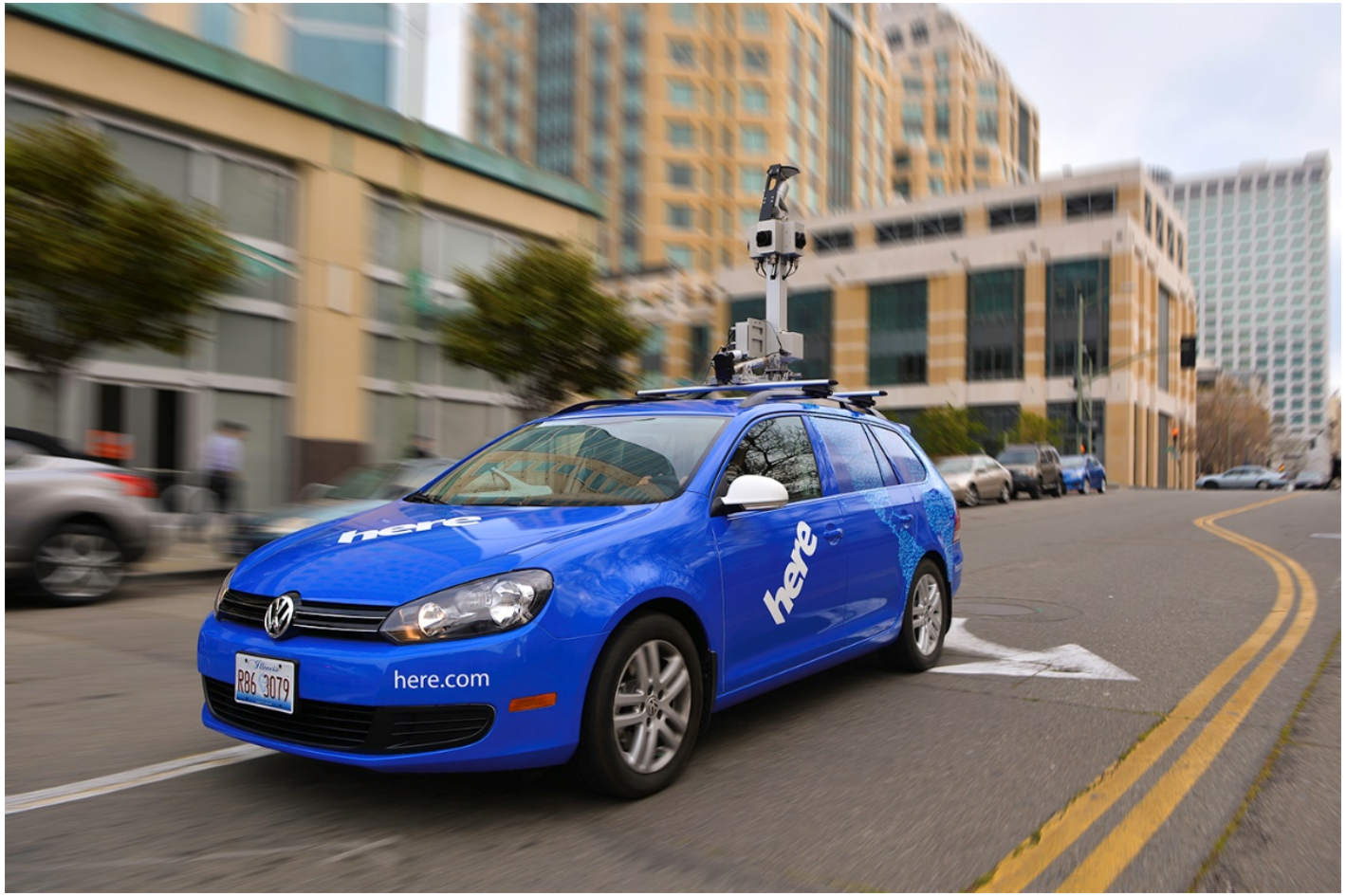
…via cloud-based data management and analytics
to enhance safety, mobility, environmental and economic efficiency

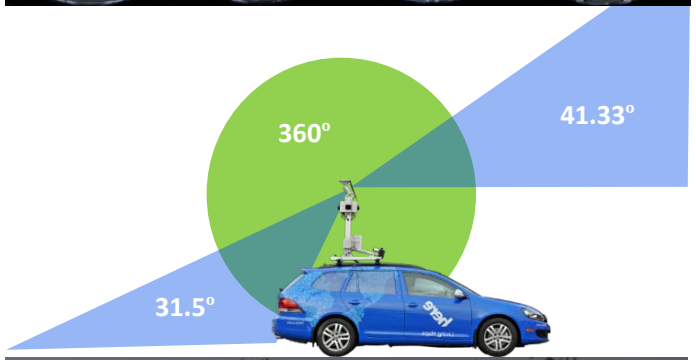


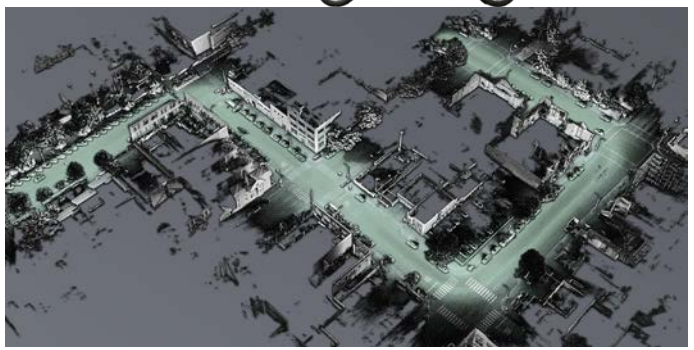
Standard Maps to HD/3D Maps



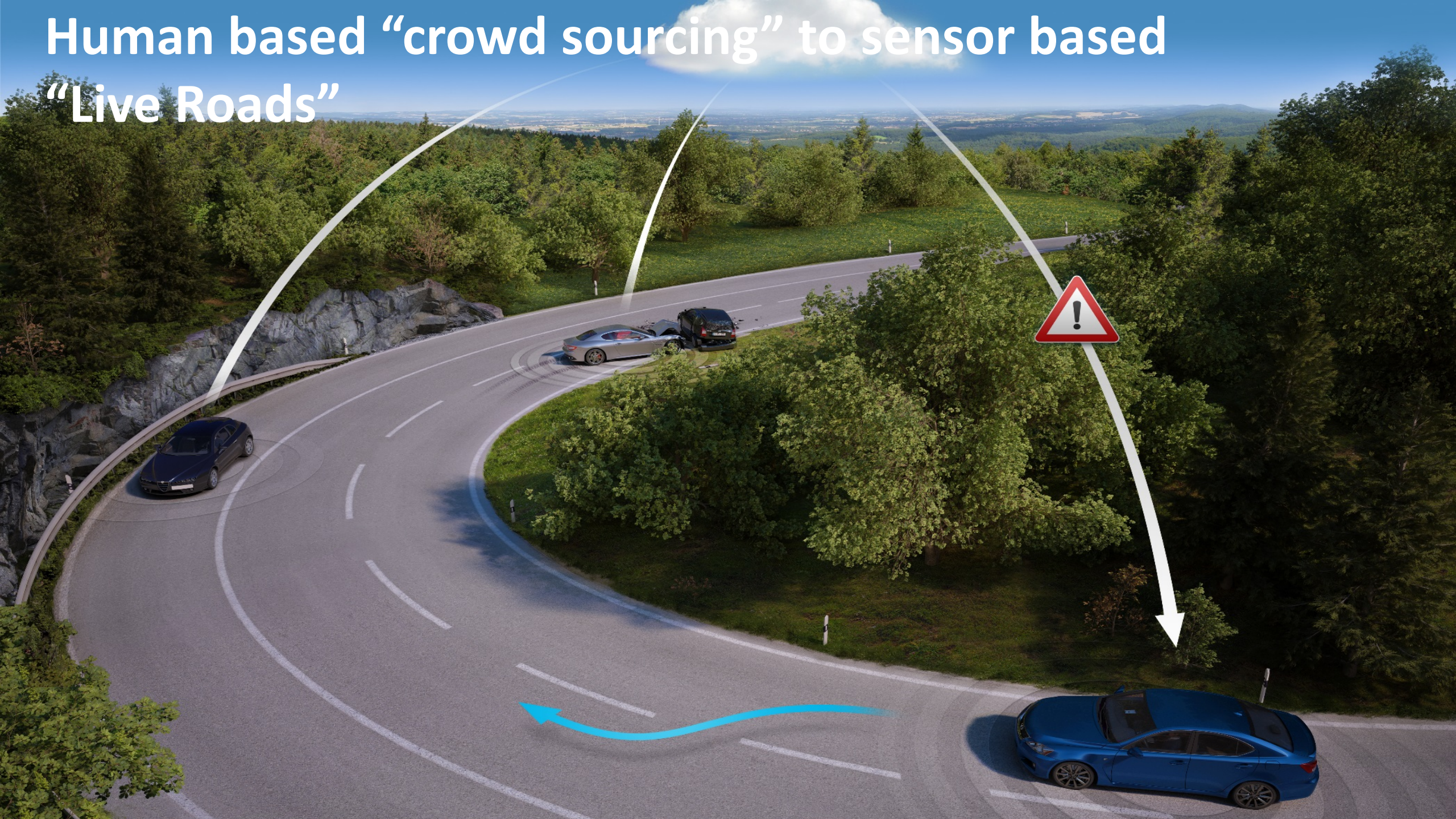
Leveraging HERE True System technology







Human based “crowd sourcing” to sensor based “Live Roads”



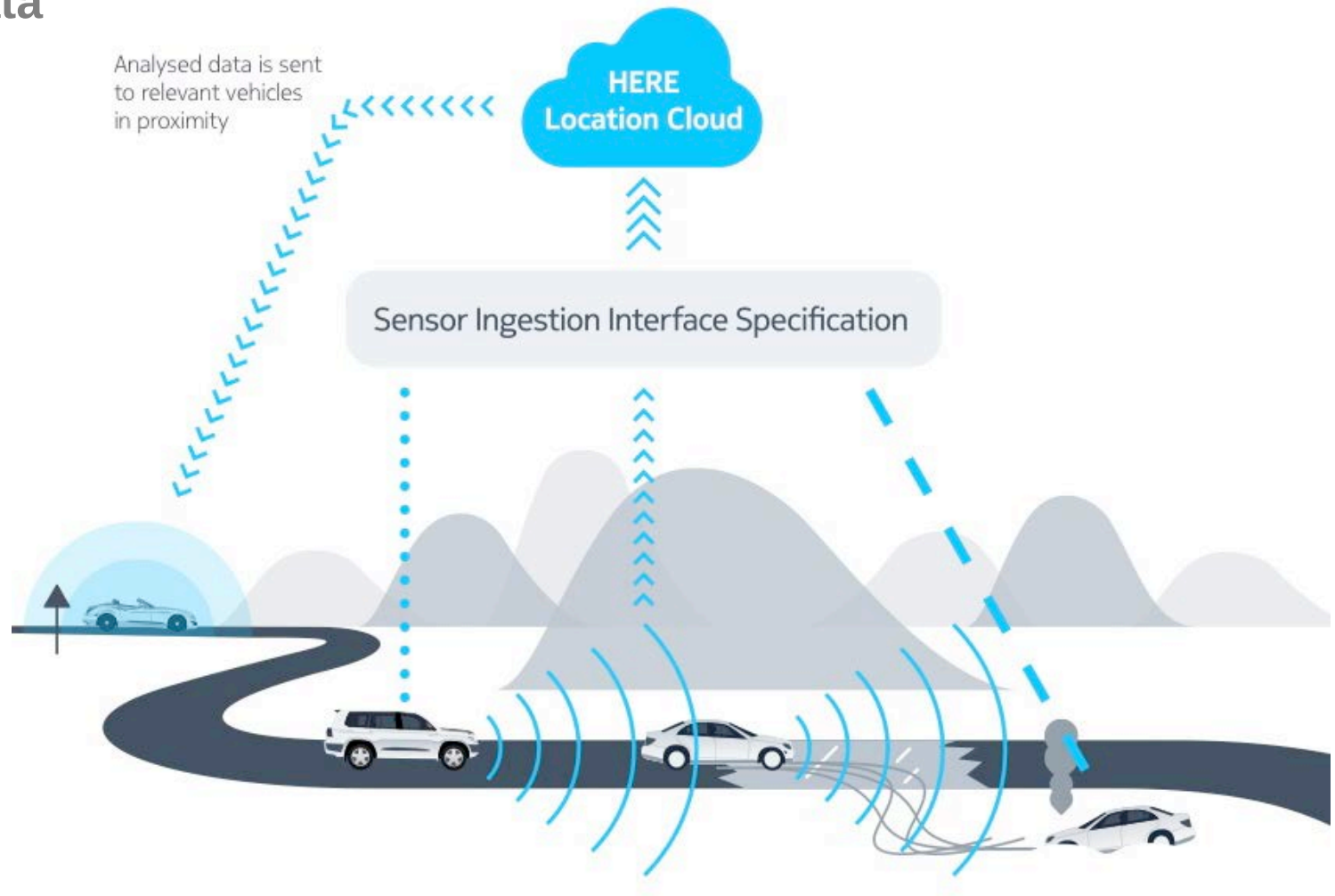
Data from Vehicle Sensors

HERE created a common standard across automotive companies

HERE published an open specification for integrating vehicle sensor data and has a platform to process this data

Analytical data

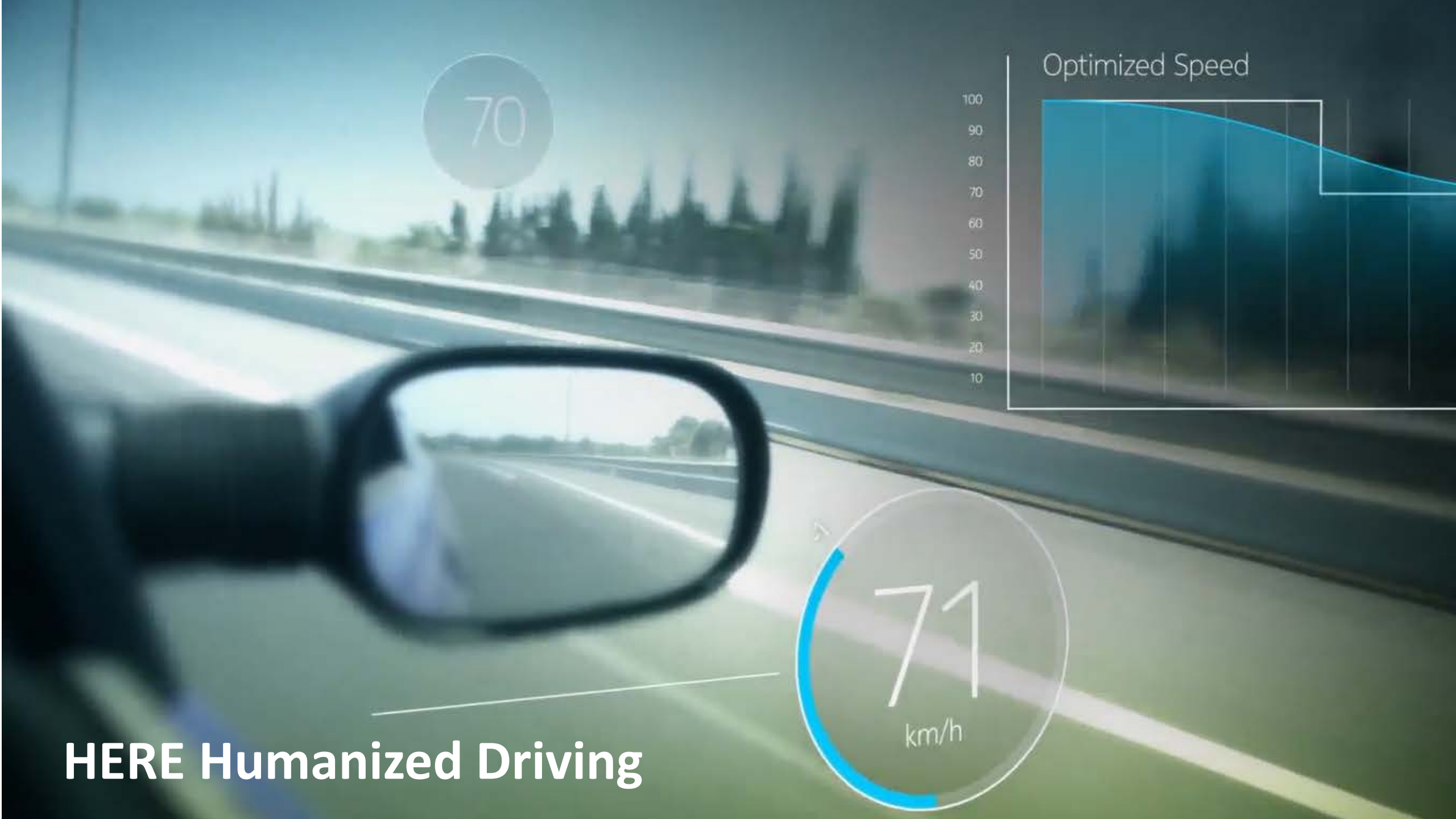
- Inform drivers of conditions ahead
- Decisions for automated vehicles
- Maintenance data for road authorities



A Dynamic Engine | The Learning Platform

Profiling Traffic Behavior

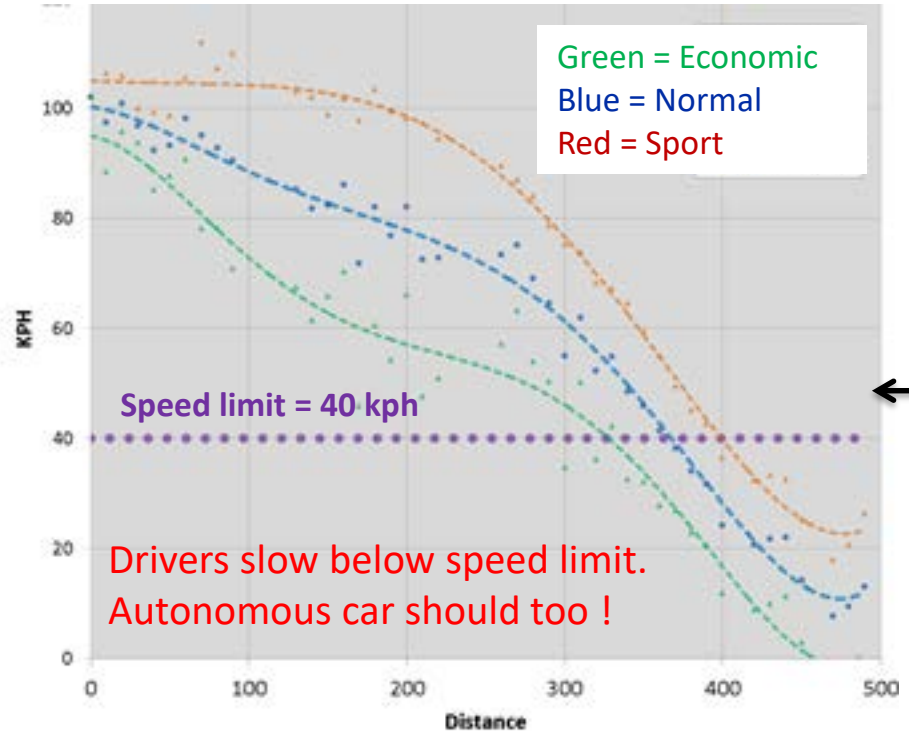
- Heavily invested in quantifying traffic behavior in our Learning Platform
- Developed traffic behavior profiles using machine learning techniques
- Learning Platform built to scale as more profiles are detected

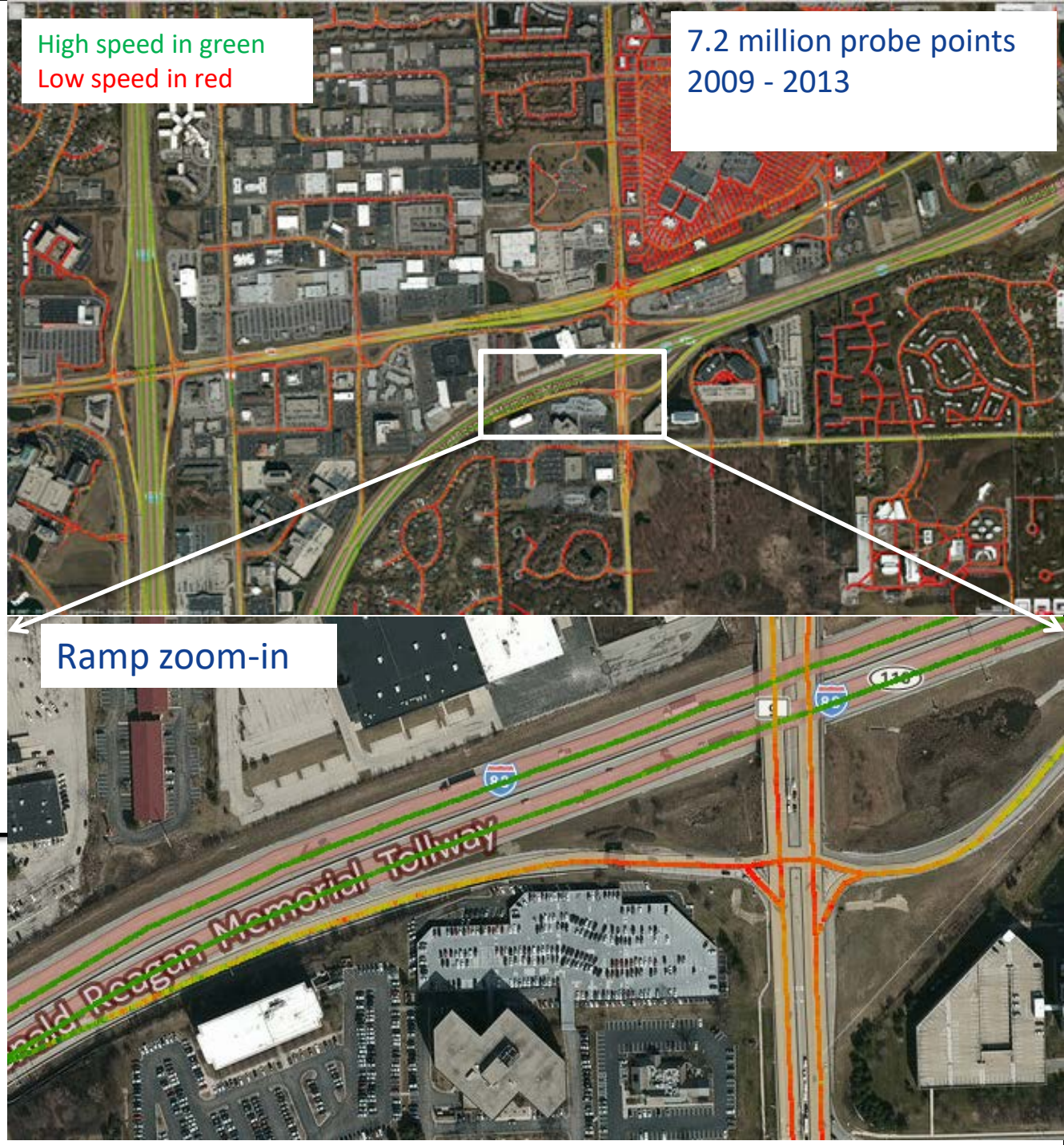


HERE Humanized Driving

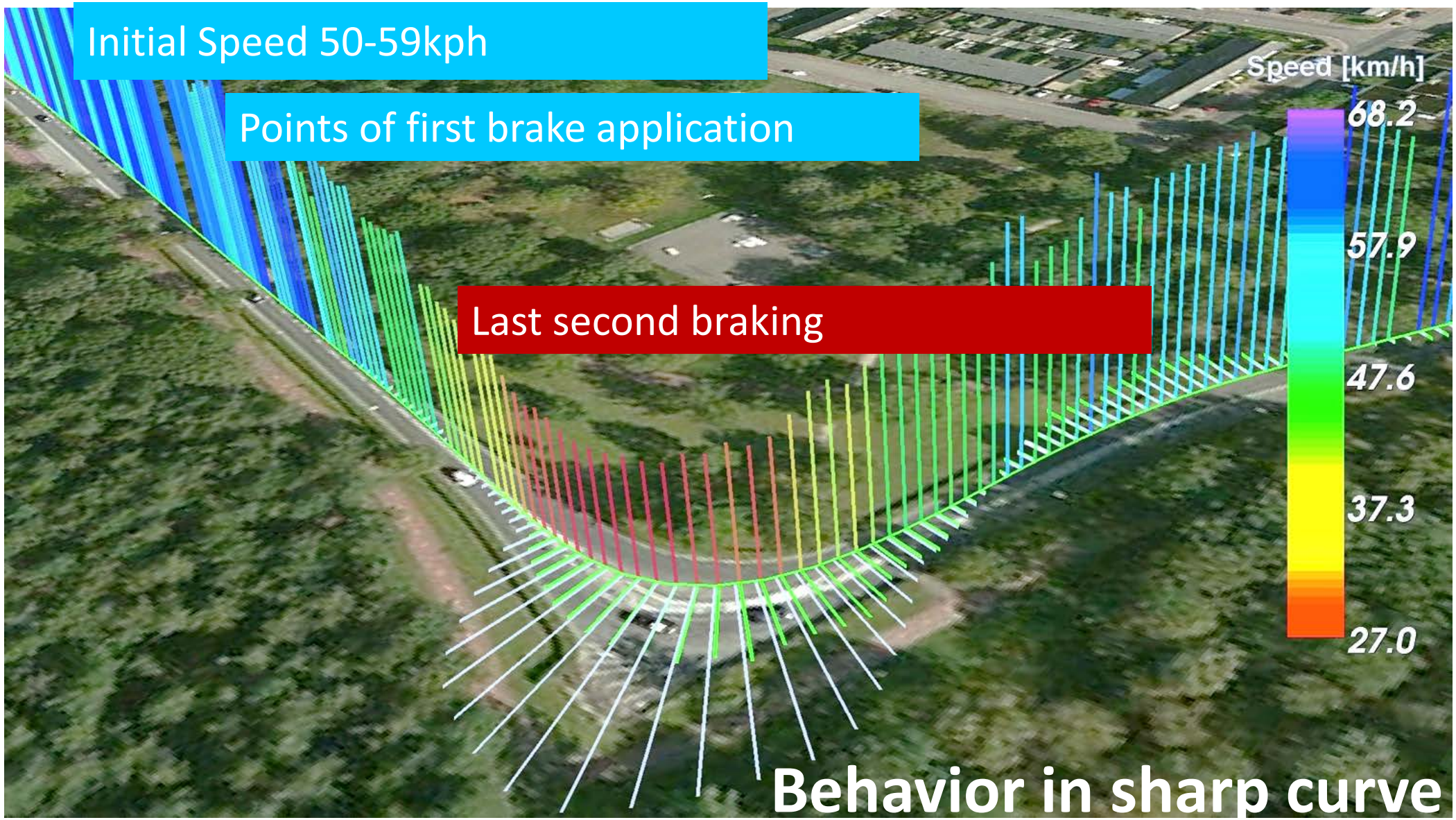
Speed Profiles

- Define driving behavior as
  - Normal (50 percentile)
  - Economics (25 percentile)
  - Sport (75 percentile)
- User can tune autonomous driving style





Data Analytics: Aggregated Braking Patterns



Key Take Aways

- AV innovation is creating new opportunities for driver safety
  - Maps today are designed for human use but moving to machine compatible HD maps
  - Real-time traffic and vehicle sensor data is critical to understand driving behaviors
  - Big data processing across a mixed network of drivers and vehicles creates tremendous opportunities for understanding travel behavior and providing predictive information to drivers