Michigan Connected and Automated Vehicle Working Group

July 23, 2019

Meeting Packet

1. Agenda
2. Meeting Notes
3. Attendance List
4. Presentations

Michigan Connected and Automated Vehicle Working Group

July 23, 2019

NextEnergy
461 Burroughs Street, Detroit, MI 48202

Meeting Agenda

12:30 PM **Registration and Networking**

1:00 PM

Introduction and Update

Valerie Sathe Brugeman, Assistant Director, CAR

Next Energy Welcome Remarks

Jim Saber, President and CEO, Engineering & Advanced Technology, NextEnergy

AV Regulation Update

Catherine Barrett, Chief Legal Counsel, United States Senator Gary Peters

An Introduction to the International Alliance for Mobility Testing and Standardization: A Global Approach to Testing Advanced Mobility Systems and Services

John Tintinalli, Director of Innovation, SAE International

PlanetM - Global Mobility Events and Technology Activations

Kathryn Snorrason, Director of Strategic Accounts, PlanetM

2:20 PM **Networking Break**

2:40 PM **Hot Topics Discussion**

Frank Perry, Principal Consultant, CAV Program Manager, WSP

Update on MDOT CAV Activities

Elise Feldpausch, Connected Vehicle Specialist, Michigan Department of Transportation

HD Maps: Key Enabler of Autonomous Driving

Praveen Chandrasekar, Senior Product Manager, Autonomous Driving, TomTom

Electric Vehicle Strategy at Consumers Energy

Scott Weber, Director of Alternative Energy Solutions, Consumers Energy

4:00 PM **Meeting Adjourned**

Michigan Connected and Automated Vehicle Working Group
July 23, 2019

Meeting Notes

The Summer 2019 meeting of the Michigan Connected and Automated Vehicle Working Group was held on July 23, 2019, and hosted by NextEnergy located at 461 Burroughs Street, Detroit, MI 48202.

Valerie Sathe Brugeman, Assistant Director of Transportation Systems Analysis, CAR welcomed the Michigan CAV Working Group attendees, reviewed the meeting agenda and mentioned noteworthy CAV (and related) news.

Jim Saber, President and CEO, Engineering & Advanced Technology, NextEnergy, also welcomed all attendees to NextEnergy. Mr. Saber highlighted NextEnergy's initiatives related to cleaner energy, vehicle infrastructure, and partnership opportunities in Detroit and Michigan.

Catherine Barrett, Chief Legal Counsel, United States Senator Gary Peters, participated remotely and provided an update on federal automated vehicle (AV) regulations. Ms. Barret talked about the goal of federal AV regulations, which is to advance new technologies, improve safety, and mobility. House and Senate committees are working closely to develop a bipartisan bill that can be incorporated into the new transportation bill scheduled for discussion next year.

John Tintinalli, Director of Innovation, SAE International, presented "An Introduction to the International Alliance for Mobility Testing and Standardization (IAMTS): A Global Approach to Testing Advanced Mobility Systems and Services." IAMTS is a global, membership-based association of stakeholders focused on the testing, standardization, and certification of advanced mobility systems and services. IAMTS' mission is to join testing consumers and providers at a global scale to help develop a commonly accepted framework of test scenarios, validation and certification methods, and terminology. Another goal is to develop and grow an international portfolio of advanced mobility testbeds and service providers that meet the highest quality implementation and operational standards. CAR is a core member of IAMTS and will lead North America engagement efforts for IAMTS.

Kathryn Snorrason, Director of Strategic Accounts, PlanetM, presented "PlanetM - Global Mobility Events and Technology Activations." The purpose of the PlanetM Platform is to strengthen Michigan's position as the center for global mobility by leveraging assets, companies, and technology. It has made more than 3,400 company connections and created more than 200 jobs. Upcoming events include CAR MBS, PlanetM Mobility Meetup, and LA Automobility in California. Ms. Snorrason also gave a summary on activities related to Mobility Grant Pilots, Israel Innovation Grant, and 2020 NAIAS Michigan Mobility Challenge.

After the networking break, **Frank Perry, Principal Consultant, CAV Program Manager, WSP,** continued the meeting with the Hot Topics Discussions. Mr. Perry discussed two topics: 1) Provider Service Identifiers (PSID) and Service Specific Permissions (SSP); and 2) OmniAir & USDOT Map Tool Updates. PSID is a hexadecimal value assigned to CV messages and services and needs to be consistent across deployments for interoperability. SSPs provides an additional level of "permissions" within a message or service. OmniAir is developing testing cases for DSRC, C-V2X, and ETSI testing standards, while the U.S. DOT map tool are in beta testing.

Elise Feldpausch, Connected Vehicle Specialist, Michigan Department of Transportation, provided an update on MDOT's statewide CAV activities, including Security Credentials Management System (SCMS) procurement status, Central Signal Control System project, and TerraForm Manager system. Ms. Feldpausch indicated that MDOT is continuously evaluating its CAV activities and strategically moving forward in order to balance and maximize investment outcomes, considering the rapid evolvement of new technologies.

Praveen Chandrasekar, Senior Product Manager, Autonomous Driving, TomTom, presented "HD Maps: Key Enabler of Autonomous Driving." Mr. Chandrasekar highlighted how automated vehicles see beyond the range of sensors and the role of HD maps in automated driving, followed by examples of HD map lane models, map delivery methods, as well as updating and maintenance requirements and approaches.

Scott Weber, Director of Alternative Energy Solutions, Consumers Energy, spoke about electric vehicle strategies at Consumers Energy. Mr. Weber indicated that Consumers Energy started a new era for renewable energy in Michigan with approval of its Clean Energy Plan in 2019. The "Power MI Drive" includes a three-year program to make it easier for electric vehicles (EV) owners to charge their EVs, and to ensure the electric grid is prepared to capture the benefits from the growing EV market. Specific options for consumers include enhanced website options and other electrification support.

The meeting adjourned at 4:00.

MDOT maintains a webpage dedicated to its work related to CAV technologies (http://www.michigan.gov/mdot/0,1607,7-151-9621_11041_38217---,00.html). The page includes documents, presentations, and other materials that may be of interest to CAV stakeholders. Meeting packets containing materials (agenda, meeting notes, attendance, and presentation slides) from past Michigan Connected and Automated Vehicle Working Group meetings are also available on this page.

Michigan Connected and Automated Vehicle Working Group

July 23, 2019

Attendance List

First	Last	Organization
Al	**Lecz**	Washtenaw Community College
Anthony	**Magnan**	Verizon Wireless
Barb	**Land**	Square One Education Network
Ben	**Miners**	IMS
Bert	**Baker**	Great Wall Motors
Bill	**Shreck**	MDOT
Christyn	**Lucas**	Detroit Regional Chamber
Corri	**Wofford**	Senator Gary Peters
Cyrilla	**Menon**	Danlaw
Daniel	**Lindenmeyer**	ON Semiconductor
Edwin	**Marples**	CAR
Elise	**Feldpausch**	MDOT
Eric	**Gannaway**	Siemens Mobility
Frank	**Perry**	WSP
Frank	**Sgambati**	Robert Bosch LLC
Gary	**Streelman**	Magneti Marelli

First	Last	Organization
Heidi	**Pfannes**	Albert Kahn Associates
Heinz	**Mattern**	Visteon
Howard	**Abbey**	SBD Automotive
Jason	**Rouse**	Sekisui
Jenya	**Abramovich**	SEMCOG
Jim	**Ohlinger**	PPG
Jim	**Saber**	NextEnergy
John	**Tintinalli**	SAE International
Joseph	**Gorman**	CAV Engineer
Karista	**Gallick**	WIN
Kathryn	**Snorrason**	PlanetM
Kellie	**Treppa**	ON Semiconductor
Kevin	**Taylor**	IEEE
Kristie	**Pfosi**	Mitsubishi Electric Automotive America
Madhu	**Posani**	RIDE Technologies
Mahendra	**Muli**	dSPACE Inc
Marc	**Rosenmayr**	Motherson Innovations
Mark	**Peters**	Qualcomm
Matt	**Bell**	SBD Automotive
Mike	**Miller**	Orion Measurement Solutions
Richard	**Murphy**	Michigan Municipal League
Nelson	**Kelly**	Macomb Community College
Prajakta	**Pimple**	Mercedes-Benz Research & Development, NA
Praveen	**Chandrasekar**	TomTom

First	Last	Organization
Qiang	**Hong**	CAR
Rachel	**Jones**	The Road Commission For Oakland County
Ross	**Sanders**	Lawrence Technological University
Savan	**Adeshra**	Kettering University
Scott	**Hotz**	Southwest Research Institute
Scott	**Weber**	Consumer Energy
Sean	**Kelley**	mannik smith group
Stephen	**Selander**	Miller Canfield
Steven	**Litz**	Powerlink Systems
Ted	**Sadler**	Integral Blue
Terrence	**Hicks**	Metro Strategies, Inc.
Terry	**Croad**	City of Southfield
Terry	**Woychowski**	LINk Engineering
Thomas	**Doran**	Hubjects
Tom	**Richer**	MDOT
Tony	**Gioutsos**	Siemens
Valerie	**Brugeman**	CAR
WAYNE	**SNYDER**	NextEnergy Center
Willliam	**Tansil**	Life is Great
Yogesh Tony	**Hadrine**	Kettering University
Zahra	**Bahrani Fard**	CAR

Michigan Connected and Automated Vehicle Working Group

Presentations

Michigan Connected and Automated Vehicle Working Group

Valerie Sathe Brugeman, Assistant Director, CAR

July 23, 2019

NextEnergy, Detroit

Meeting Agenda

1:00 PM

Introductions and Update
Valerie Sathe Brugeman, Assistant Director, CAR

Next Energy Welcome Remarks
Jim Saber, President and CEO, NextEnergy

AV Regulation Update
Catherine Barrett, Chief Legal Counsel, U.S. Senator Gary Peters

An Introduction to the International Alliance for Mobility Testing and Standardization: A Global Approach to Testing Advanced Mobility Systems and Services
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PlanetM - Global Mobility Events & Technology Activations
Kathryn Snorrason, Director of Strategic Accounts, PlanetM

2:20 PM

Networking Break

2:40 PM

Hot Topics Discussion
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Praveen Chandrasekar, Senior Product Manager, Autonomous Driving, TomTom

Electric Vehicle Strategy at Consumers Energy
Scott Weber, Director of Alternative Energy Solutions, Consumers Energy

4:00 PM

Meeting Adjourned
Tour of NextEnergy

Working Group Mission

Cooperatively pursue projects and other activities that are best accomplished through partnerships between multiple agencies, companies, universities, and other organizations and that ultimately advance Michigan's leadership position in connected and automated vehicle research, deployment, and operations.

Goals

- Benefit our state and our industry (automotive and more)
- Enhance safety and mobility in Michigan and beyond

Upcoming CAV Events

- **SAE CyberAuto Challenge**
  July 21-26, 2019 | Warren, MI
- **CAR Management Briefing Seminars**
  August 6-8, 2019 |Traverse City, MI
- **Autonomous Vehicles Detroit 2019**
  August 21-23, 2019 | Novi, MI
- **The Battery Show**
  September 10-12, 2019 | Novi, CA
- **Automated Bus Consortium**
  September 12, 2019 | Detroit, MI
- **Others?**

Thank you to our hosts!

PURE MOBILITY

planetm

WHAT IS PLANETM?

In spring 2016, the PlanetM **brand** was born to represent collective mobility efforts and assets across the state.

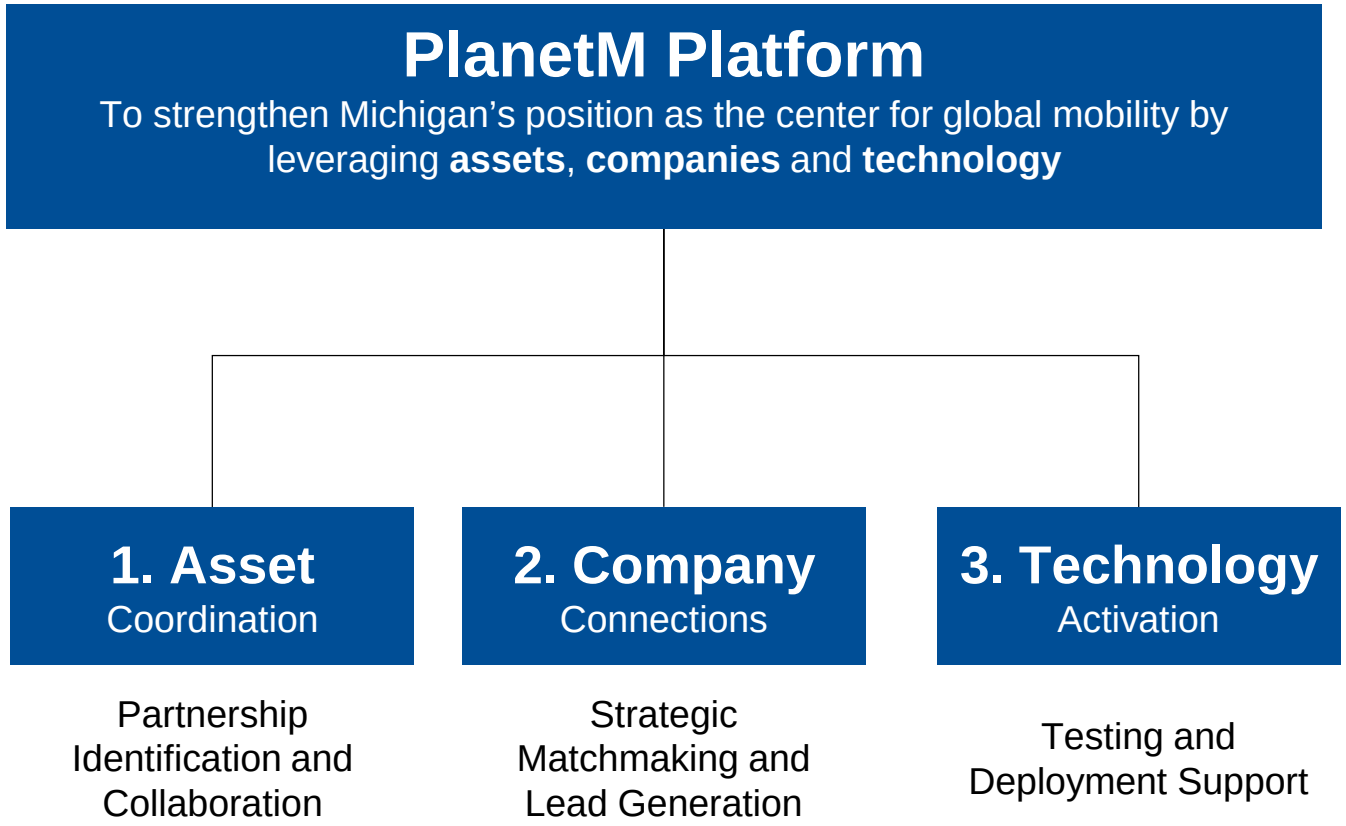
Michigan. Where big ideas in mobility are born.

A year later, the State built on the early success of PlanetM by growing beyond its awareness-focused advertising campaign into a full-service statewide **business development** program.

Michigan. Leading the transportation revolution.

Today, we do **three things**.

THREE CORE BUSINESS DEVELOPMENT OFFERINGS



PLANETM IMPACT

45,000,000
Facilitated Revenue

37
Technology Activations*

200+
Jobs

3,400+
Company Connections

**37 technology activations by the end of 2019*


planetM
COMPANY
CONNECTIONS

PAST EVENTS

ECOMOTION (ISRAEL)

Date: June 11, 2019

Objective: Launch the Israel-Michigan startup grant and facilitate meetings between local Israeli startups and Automotive Corporate Partners/Investors

Attendees*: 3,800+ attendees from 44 countries, 1800 companies, 135 exhibiting startups

Match Meetings: 46 Meetings were held between startups and technology seekers

**Approximately 400 people stopped by the PlanetM booth.*

HARDWARE TECH SUMMIT (DETROIT)

Date: June 19, 2019

Objective: Highlight and further strengthen Michigan as a global leader in designing, building, and deploying innovative products

Attendees: 350+

Match Meetings: 200+ Meetings were held between startups, accelerators, manufacturers and corporate automakers

TECHCRUNCH MOBILITY (CALIFORNIA)

Date: July 10, 2019

Objective: Innovation Break for 20 minutes on the main stage and a one hour Breakout Session in the afternoon

Attendees: 800+ at the conference and 85 attendees at the Breakout Session

UPCOMING EVENTS

CAR MBS (MICHIGAN)

Date: August 6-8, 2019

Objective: Sponsoring Techstars startups to attend CAR MBS, hosting match meetings at CAR MBS and hosting a networking reception at 20 Fathoms

Request: If you plan on attending CAR MBS, you will receive an invite to participate in match meetings to meet mobility startups

PLANETM MOBILITY MEETUP (MICHIGAN)

Date: August 12, 2019

Objective: Designed to bring together dynamic startups in the automotive technology space with Michigan's automotive and mobility industry stakeholders to help create a cohesive and robust ecosystem to connect, share and collaborate

Request: Visit https://www.planetmlandingzone.com/mobility-meetup-august and register

LA AUTOMOBILITY (CALIFORNIA)

Date: November 19, 2019

Objective: Facilitate one-on-one match meetings between corporates (OEMs, Tier Is, Investors) and mobility startups

Request: If you plan on attending LA Automobility, you will receive an invite to participate in match meetings to meet mobility startups

planetM

PLANETM LANDING ZONE

BOSCH
Invented for life

Ford

DENSO
Crafting the Core

ZENUITY
Make it real.

Autoliv

:DS :DriveSmart

lyft

Vibracoustic

RÖCHLING

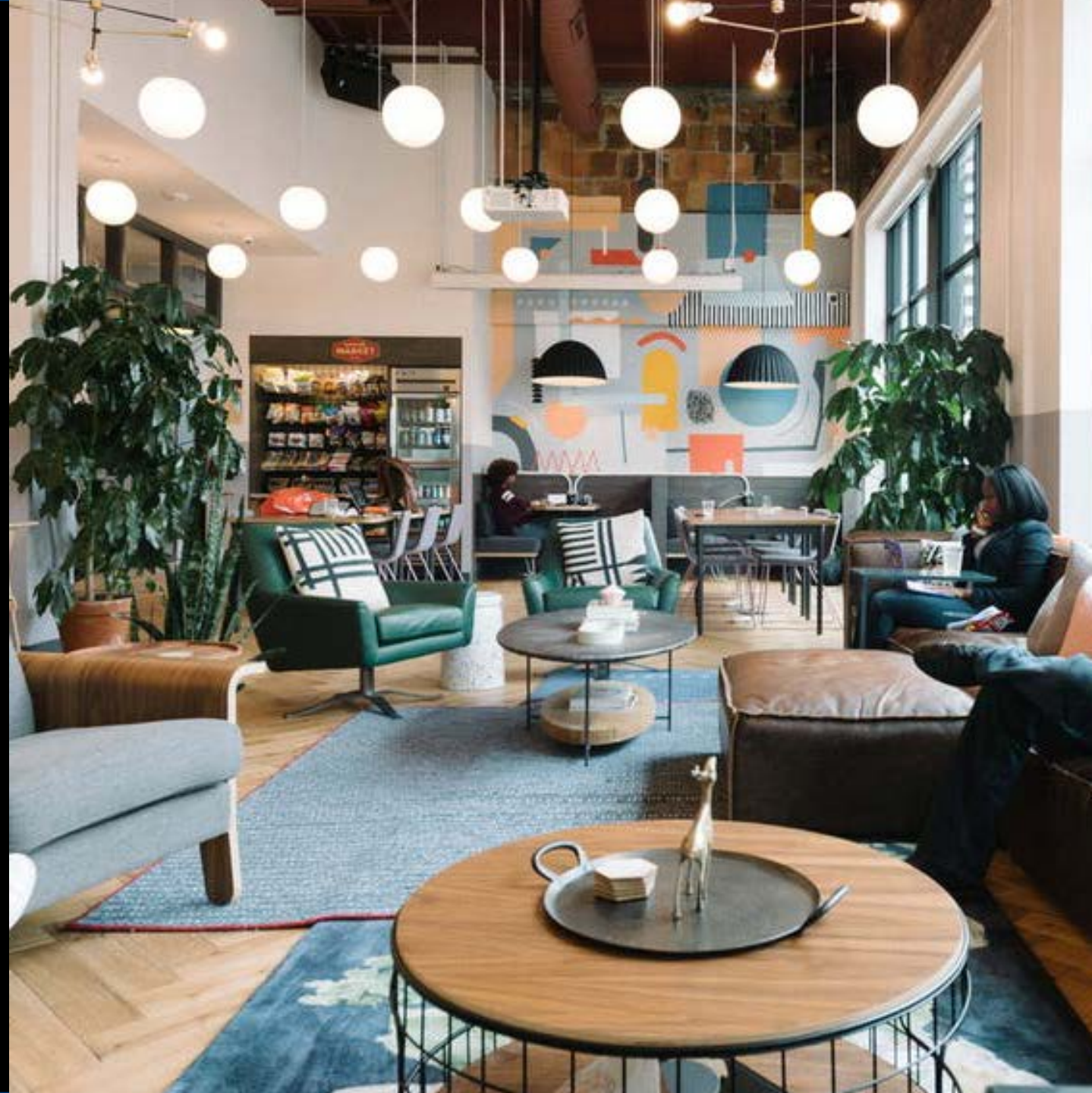
VOXEL[51]

Trillium

DERQ

mapbox

ASX™
AIRSPACE EXPERIENCE TECHNOLOGIES




planetM
TECHNOLOGY
ACTIVATION
Grants | Challenges | City Pilots

MOBILITY GRANTS

PLANETM MOBILITY GRANT

$1.9M in grant funding to encourage mobility companies to deploy their technologies in Michigan or test at Michigan's state-of-the-art facilities

Kettering University

Michigan Technological University

American Center for Mobility

M | city
University of Michigan

MichiganUAS
Michigan Unmanned Aerial Systems Consortium

ISRAEL INNOVATION GRANT

New partnership with Israel Innovation Authority (IIA) to test and deploy new technologies in Michigan

רשות החדשנות
Israel Innovation Authority

MOBILITY GRANT PILOTS

ROUND 1

Ann Arbor
Bus driver alerts for predicting vulnerable road user actions

HUMANISING AUTONOMY

Grand Rapids
First-ever digital alerts between fire, police & EMS

HAAS ALERT

Detroit
Road condition evaluation & early crack detection

RoadBotics

Detroit
AI intersection safety

DERQ

ROUND 2

Detroit
AV paratransit shuttle at DMC with local community

navya

SE Michigan
Software-based GPS testing that could significantly reduce costs in AVs

NAVENTIK

Royal Oak
Automated delivery inside hospital

BEDESTRIAN

Battle Creek
Secure RX delivery in rural area w/underutilized vans

HiHoMobility.com
shared work fleets

Rochester
AV shuttle at OU as part of STEM program

easyMILE

planetM CHALLENGES

NAIAS 2020 MICHIGAN MOBILITY CHALLENGE

Overview: Deploy level 3+ shuttle demonstrations during NAIAS 2020, 1. Airport to downtown and 2. Downtown circulator

Workshop: June 17, 2019

RFP: RFP due July 29, 2019

App Provider: Moovit

Partners: Governor's Office, MEDC/PlanetM, MDOT

CITY:ONE MICHIGAN CENTRAL STATION CHALLENGE*

Overview: An invitation for Detroit residents to design, plan and pilot new solutions to improve mobility surrounding the Michigan Central Station

Pilots: $250,000 will be awarded to up to 5 teams to pilot their ideas

Partners: Ford, City of Detroit, MEDC/PlanetM

**Formerly known as the City of Tomorrow Challenge.*

AUTOMATED BUS CONSORTIUM

Overview: Joint procurement of up to 100 automated, electric buses. Will select two locations in Michigan (between GR, MSU and Huron County)

Summit: September 12, 2019

Partners: MEDC/PlanetM, MDOT, AECOM and a dozen transportation agencies across the US

planetM CITY PILOTS

PROJECT KINETIC

- **MicroTransit**: Dynamically routed buses
- **Car4You**: Low-income car-sharing
- **ParkDetroit**: Perks, reservations program
- **ChargeD**: EV education in public spaces
- **Busority**: Signal priority for public transit
- **CTI**: Hub that sources infrastructure data

ANN ARBOR MOBILITY TRANSFORMATION PROGRAM

- Enhanced simulation that will allow for scenario-planning to understand the use and impact of new and emerging mobility modes.
- Autonomous shuttle in downtown AA or at UM hospital

International Alliance for Mobility Testing and Standardization

A Program of SAE ITC

Impact of transformation towards a smart mobility ecosystem

Source: Toyota

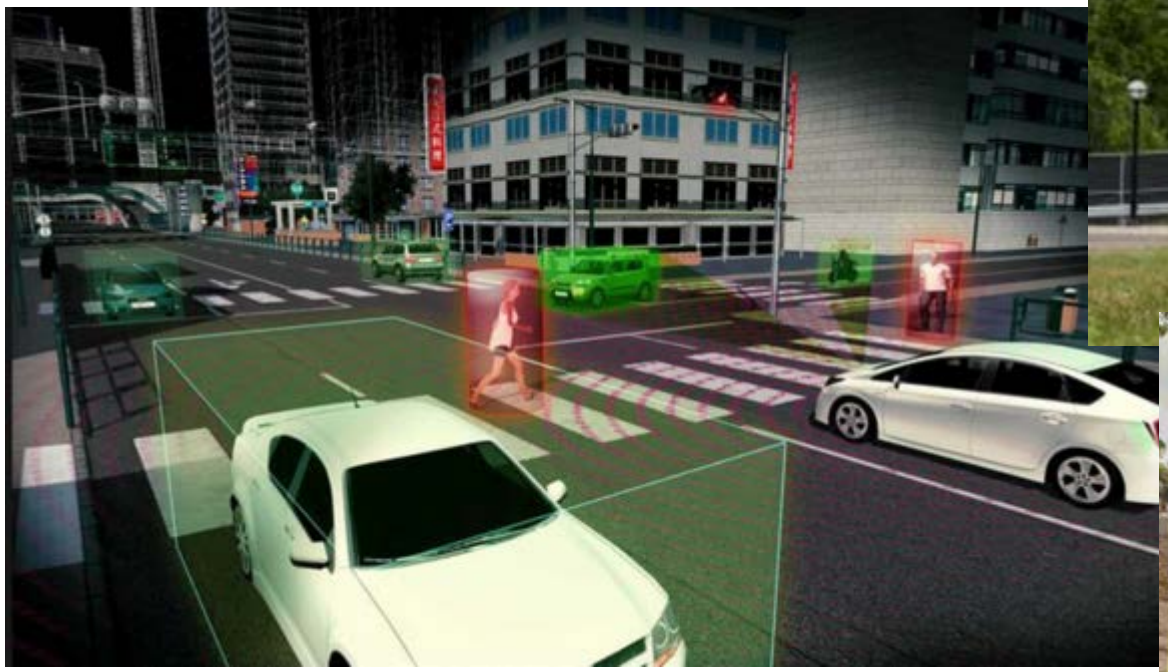
Redesign of urban cores to support smart mobility

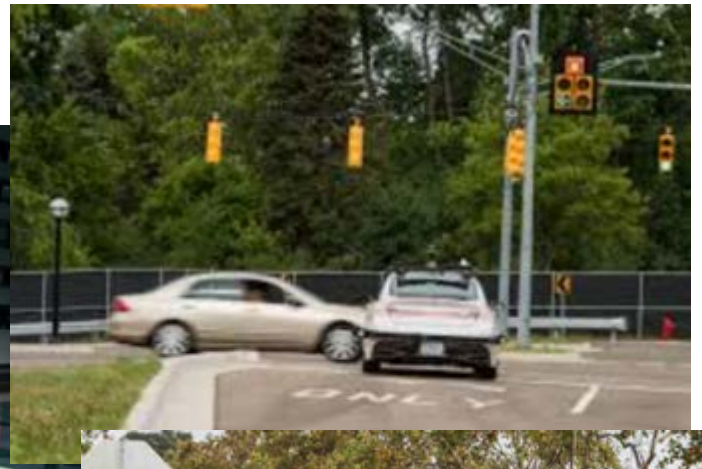
Develop new smart mobility ecosystems

Rethink V2X infrastructure development for large scale CV/AV/EV adoption

An important driver of the transformation will be the implementation of new international standards and regulations for CV/AV/EV mobility solutions which are both vehicle and infrastructure based

Testing in Virtual Environments, Open Environments



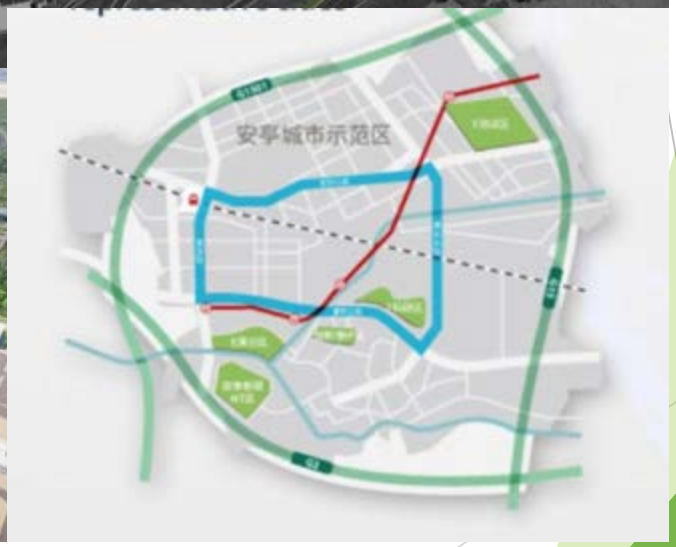


Growing AV test facilities worldwide

BMW, Czech Republic

Suntrax, Florida

ZALA ZONE, Hungary



NICE CITY, Shanghai

Problems IAMTS Aims to Solve

- Growing complexity of potential risks and testing needs
- No measuring stick for what tests should be conducted and how they should be conducted
- Lack of global harmonization of standards, regulations and approaches regarding testing
- Need to match rapidly evolving technologies with a process for creating standards that is equally rapid and flexible
- Difficulty with comparability and replicability of tests across facilities, geographies and physical/virtual boundaries
- Issues with test data portability and compatibility
- Validating simulation fidelity
- Optimizing simulation and physical testing

Scope

A global, membership-based association of organizations that are stakeholders in the testing, standardization and certification of advanced mobility systems and services.

Mission

Bring together testing consumers and providers at a global scale to help develop a commonly accepted framework of test scenarios, validation and certification methods, and terminology.

To develop and grow an international portfolio of advanced mobility testbeds and service providers that meet the highest quality implementation and operational standards.

Vision

Create a global community comprised of advanced mobility testing service providers and companies, organizations and agencies in need of such services.

Learn, develop and share best-practices to ensure consistent, replicable and reliable testing.

Maintain a global directory of physical, virtual and cyber-physical testbeds and support and promote their audited capabilities.

Promote the rapid evolution of globally harmonized standards and certifications to ensure reliable deployment of advanced mobility systems and services.

Example Domains

- ADS (Automated Driving System) Testing
- V2X Communication, particularly in complex environments
- Vehicle and infrastructure cybersecurity
- Multi-modal testing (e.g., air-ground)
- Multi-system staging and testing (e.g., urban street with rideshare, bike share, electric scooter, L4 shuttles and human drivers)
- Dynamic wireless charging
- Automated or remote-controlled ground control systems

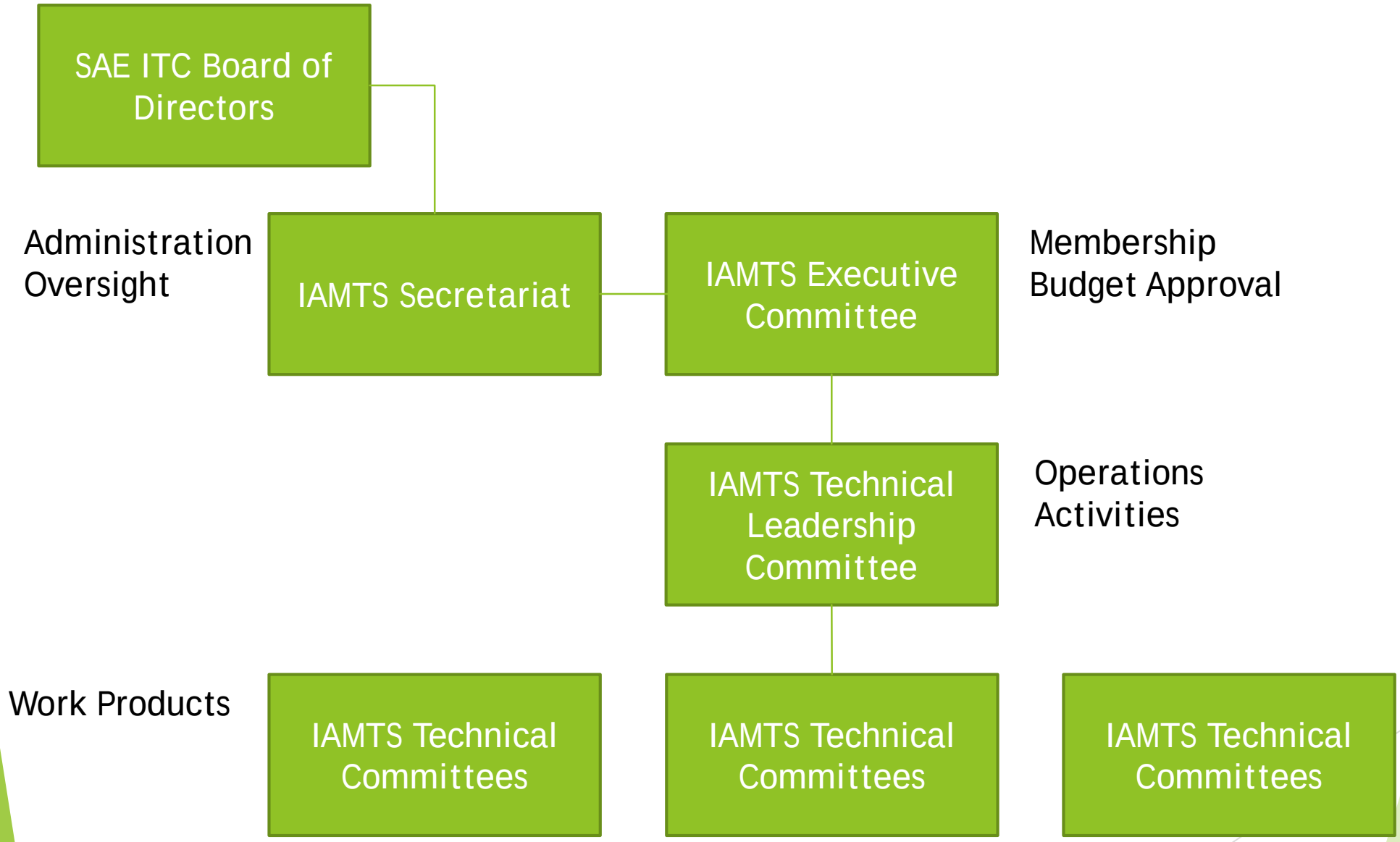
Organizational Structure

Corporate Structure

IAMTS is established as a program under SAE Industry Technologies Consortia ("SAE ITC"). SAE ITC is a 501(c)(6) non-for-profit trade association that enables new or existing consortia programs to successfully impact their industry through widespread adoption of industry practices or procedures.

IAMTS is made up for member organizations which are engaged in the smart mobility ecosystem. IAMTS offers memberships to both public and private, large and small organizations.

Governance


SAE ITC Board of Directors
Administration Oversight
IAMTS Secretariat
IAMTS Executive Committee
Membership Budget Approval
IAMTS Technical Leadership Committee
Operations Activities
Work Products
IAMTS Technical Committees
IAMTS Technical Committees
IAMTS Technical Committees

	Membership Level					
	Strategic Partner	Strategic Member	Core Member	Basic Member	Affiliate Member	Expert
Regulation, Standards and Certification Providers	• Non-Profit SDO	• SDO • CTO	• SDO • CTO • Government	• SDO • Small CTO	• Government • Small Non-Profit	
Testing Service Providers		• Academic • Insurer • RECS	• Test Facility • Operator • Simulator • RECS • ICT • Academic • Government	• Test Facility • Operator • Simulator • Small RECS • SmB*	• Academic • Government • Small Non-Profit	• SmB*
Testing Service Consumers		• Manufacturer • Insurer • MaaS • RECS • ICT	• Manufacturer • Insurer • MaaS • RECS • ICT • Academic • Government	• MaaS • RECS • ICT • SmB	• Academic • Government • Small Non-Profit	• SmB
Other		• Other**	• Other**	• Other**		

SDO =Standards Development Organization
CTO = Certification & Testing Organization
RECS = Research, Engineering and Consulting Services firm
ICT = Information and Communications Technology firm
MaaS = Mobility as a Service Provider
SmB = Small Business / Startup
Manufacturer = OEM or Tier 1-2 Supplier
Academic = Non-Profit Academic or Academic-Affiliated Research Institution
Operator = Testbed Operator or Test Operator
Government = Local, National, Regional and Regulatory
Other = Other organization whose products, services or interests are relevant to the IAMTS mission, vision and scope

*Must be vetted by IAMTS
**Must have Executive Committee approval

Current Members

TÜV SÜD

AVL

SAE INTERNATIONAL

CATARC

DIN

CAR CENTER FOR AUTOMOTIVE RESEARCH

ANICE CITY
国家智能网联汽车（上海）试点示范区
National Intelligent Connected Vehicle (Shanghai) Pilot Zone

iTiC
International Transportation Innovation Center

Key Objectives

- Provide an audited directory of shared use mobility testbeds and simulation providers worldwide
- Aggregate lessons-learned, and when possible anonymized data, to identify critical scenarios and best practices for testing those scenarios
- Educate members and learn together to achieve common goals
- Provide shared services to testbeds to alleviate their overhead
- Publish research, opinions, and white papers
- Participate in the development of specifications and standards through appropriate bodies
- Advocate for members
- Advocate for voluntary or regulatory adoption of testing standards

Example Activities, Services and Benefits Provided by and for the IAMTS Community and External Clients

Membership Service	Examples
Training	- AV verification & validation methods - Mobility related rules & regulations
Consulting	- Testbed design - Cybersecurity
Data	- Access to shared database - Analytics services
Testing	- Test operations
Certification	- Vehicles and systems - Test facilities, training, and methodologies
R&D Projects	- Best Practice Determination

Organizational Roadmap

Phase 1 – Q4/2018-Q1/2019	Phase 2 – Q2/2019-Q4/2019	Phase 3 – Q1/2020
Approval of membership model and fee structure by sponsoring entities	Commitment of founding members	Strategic review of implementation phase and membership feedback
Identification of and consultation with founding member candidates	Implementation of governance structure	Growth of membership portfolio
Identification of strategic testbeds	Initiate first projects	Optimization of membership service portfolio to ensure sustainable operation
	Building of membership base and service portfolio	

First Deliverable

DIN-SAE Spec 91381:
Terms and Definitions Related to Testing of Automated Vehicle Technologies

Upcoming Activities

August 5-6, Tianjin China

- Executive Committee Meetings and Technical Committee Meetings
- Establish Detailed Roadmap of Activities
- Host: CATARC

September 16, Munich Germany:

- Automated Vehicle Testing Symposium Europe
- Host: TÜV SÜD

More Info

Inquire through the Center for Automotive Research (CAR)
or email info@iamts.org

MDOT CAV Working Group Meeting

NextEnergy

July 23, 2019

Frank Perry

Sr. CAV Program Manager

WSP

Agenda

- Provider Service Identifiers (PSID) and Service Specific Permissions (SSP)
- OmniAir & USDOT Map Tool Updates

PSID & SSP

Provider Service Identifier (PSID)

- A Provider Service Identifier (PSID) is hexadecimal value assigned to CV messages and services

- Defined in 1609.3, PSIDs serve two (2) purposes:
  1. Filter messages for receiving applications
     - The lower (stack) layers only deliver relevant messages to applications
       - Ex: prevents a Red Light Violation application (that uses SPaT & Map) from receiving TIM messages

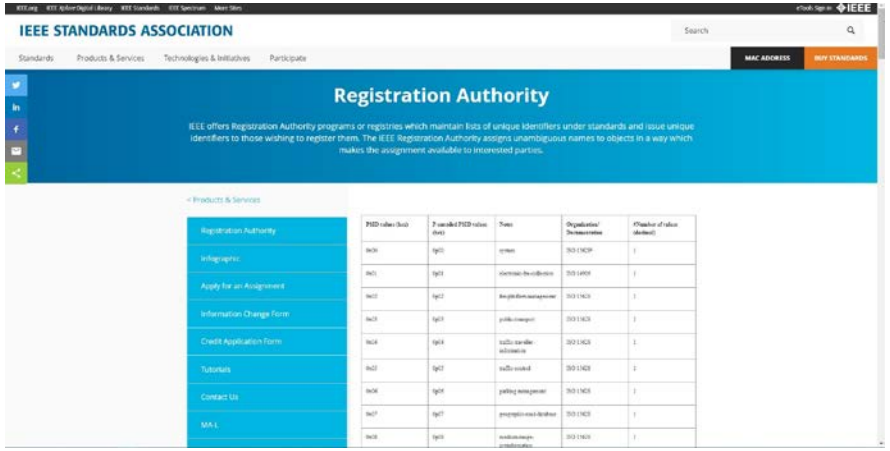
  2. Used in WSAs to announce available services at the roadside and/or back office.

Also, security certificates contain PSIDs which authorizes a device to broadcast specific messages.

Provider Service Identifier (PSID)

- A list of PSIDs and the owning organization is provided in IEEE 1609.12 as well as on IEEE Registration Authority (https://standards.ieee.org/products-services/regauth/psid/public.html)

PSID usage need to be consistent across deployments for interoperability



Service Specific Permissions(SSP)

- SSPs provides an additional level of “permissions” within a message or service
- Where PSIDs indicate **message** type, SSPs indicate **specific content** within the message
- Signal Request Message (SRM) Example:
  - The same (SAE J7235) Signal Request Message (SRM) (with PSID 0x20-40-96) is utilized to request Priority **and** Preemption.
  - Using just the PSID, any vehicle “authorized” to request priority could also request preemption
    - Clearly we would not want a transit or freight vehicle requesting **preemption**
  - An SSP is used to limit transit and freight vehicle types to only being able to request **priority**.
  - 2 SSP’s recommended for SRM:
    - 1 for only requesting priority (Transit/Freight)
    - 1 for requesting priority or preemption (First Responders)

Service Specific Permissions(SSP)

- As of now SSP values are defined by the system designer (not standardized)
- Some SSPs should be standardized to enable cross (deployment) boarder interoperability
  - SPaT, Map, TIM
- Some SSPs don’t necessarily need to be standardized
  - SRM
    - Agencies may not want transit and emergency vehicle SRM interoperability

Security Profiles

- PSIDs and SSP are defined in a “Security Profile” document
- A Security Profile should be developed for each message utilized within the CV system
- USDOT CV Pilots have Security Profiles for BSMs, SPaT, Map, TIM, SRM, and SSM

PSID/SSP

Examples:

RSU Message PSIDs

Message	PSID	SSP
SPaT	0x82	integer=19
Map	0x20-40-97	integer=18
SSM	0x20-40-95	integer=30
WSA	0x87	None

OBU Message PSIDs

Message	PSID	SSP
General Purpose Vehicle	0x20 & 0x26	None *Note: 0x20 is BSM and 0x26 is Misbehavior Detection and Reporting*
Snow Plow SRM	0x20-40-96	integer=29
Over-the-Air Firmware Update	0x20-40-89	TBD

Advertised in the WSA

Service	PSID
IPv6 Routing	0x10-20-40-7E
Misbehavior Detection	0x26
Over-the-Air Firmware Update	0x20-40-89
Snow Plow SRM	0x20-40-96

SCMS

- Certificates contain PSIDs and SSPs
- SCMS Providers need to know the PSIDs used in your system
- SCMS does not need to know SSP

OmniAir
&
USDOT

OmniAir

- Developing C-V2X Test Cases
  - Held a C-V2X Certification Workshop in Milpitas CA on June 27 hosted by Bureu Verita, an OmniAir Authorized Test Lab
- Summer Policy Series
  - Truck Platooning: V2X Technology in Action Scheduled for 07/25/19 in DC
- Next plugfest in Málaga Span hosted at DEKRA, an OmniAir Authorized Test Lab, the week of September 30th
  - will include DSRC, C-V2X, and ETSI Standards testing
- OmniAir and 3M are in discussions to transfer the rights of 3M DSRC "Sniffer" to OmniAir. Draft agreement targeted for end of August (2019)
- 3 Certified RSUs (Danlaw, Siemens, and Intersect)
- 3 Certified OBUs (Danlaw, Commsigna, and Lear)

USDOT

- Updates to the USDOT Map Tool are in Beta Testing
  - Includes integration with the CAMP Work Zone (WZ) Mapping Tool
    - Upload of RSM data from CAMP Work Zone Mapping Tool
  - Provides the CV stakeholder community to ability to use both features/tools in one platform.

Q&A

Frank Perry

Frank.perry@wsp.com

734.552.9638

MICHIGAN DEPARTMENT OF TRANSPORTATION

Michigan DOT Statewide CAV Program Update

MDOT Michigan Department of Transportation

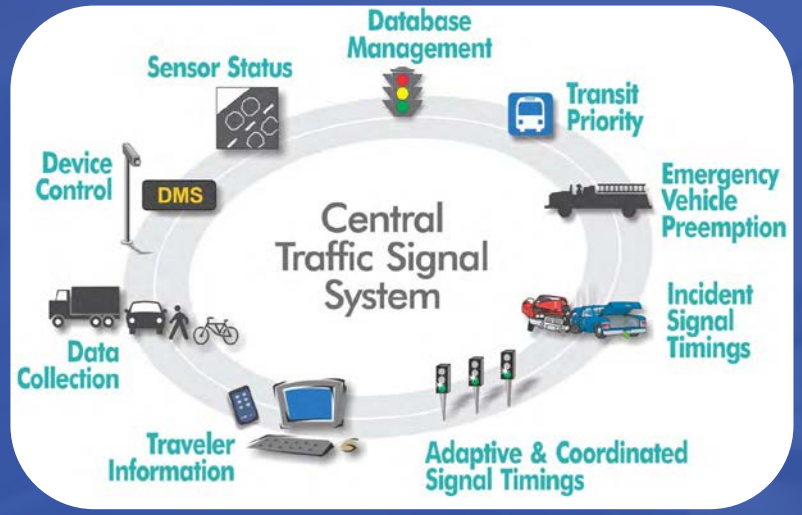
SCMS

Procurement

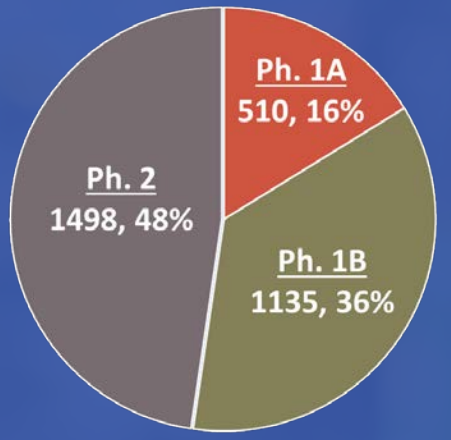
- Final phases of contracting with *Integrity Security Solutions*
- Roll out – Anticipated Sept 2019
- Solution applied to existing and future MDOT deployments

Central Signal Control System

1. Increase the efficiency of Michigan's roadways
   - Provide active and remote traffic signal monitoring
2. Streamline the management of a critical asset
   - Arterial performance (early identification of equipment failures, performance metrics)
3. Prepare for the future of traffic signal management



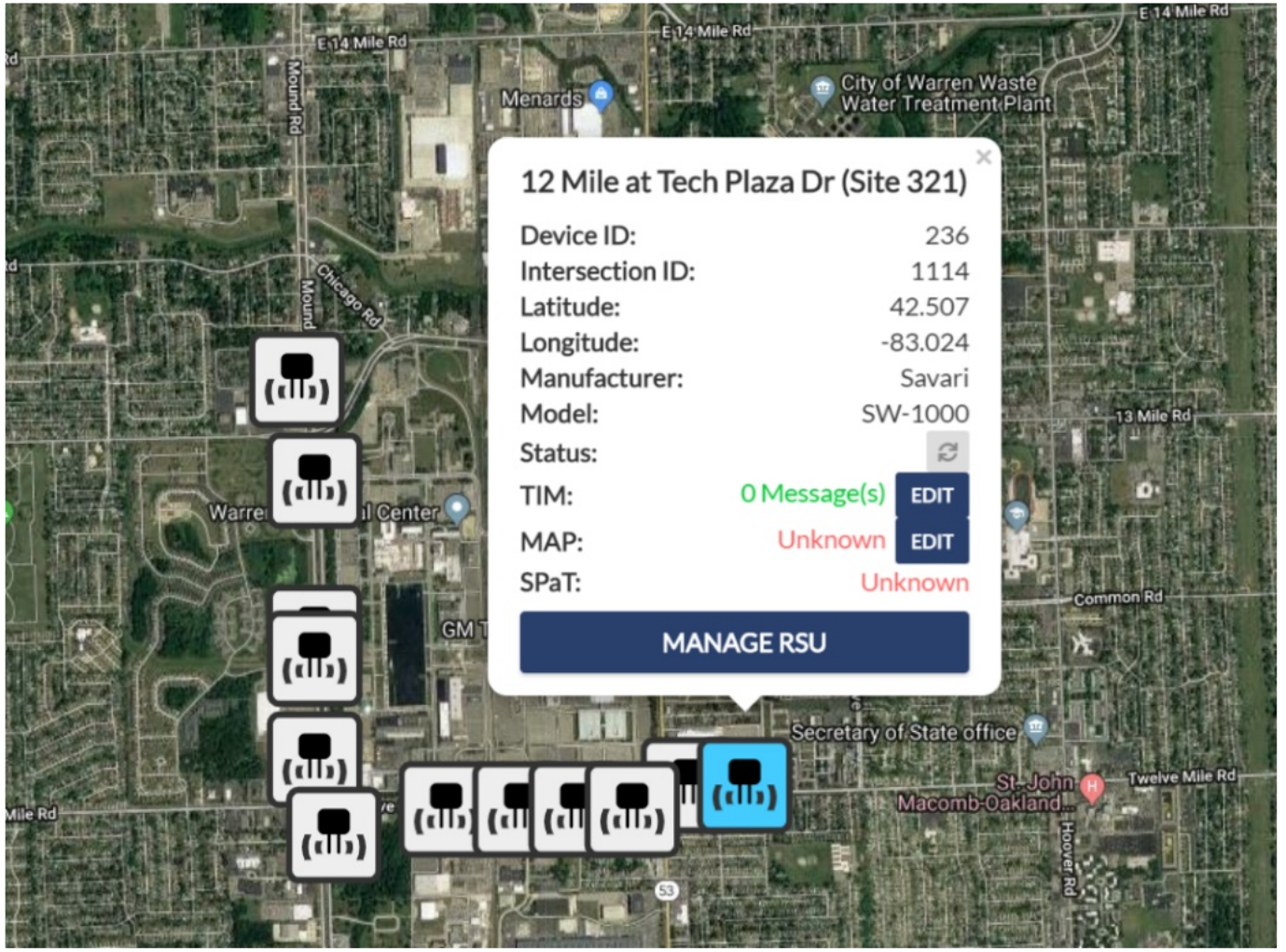
Source: DKS



TerraForm Manager

MIXON HILL
Forward Thinking In Motion®

Device Manager



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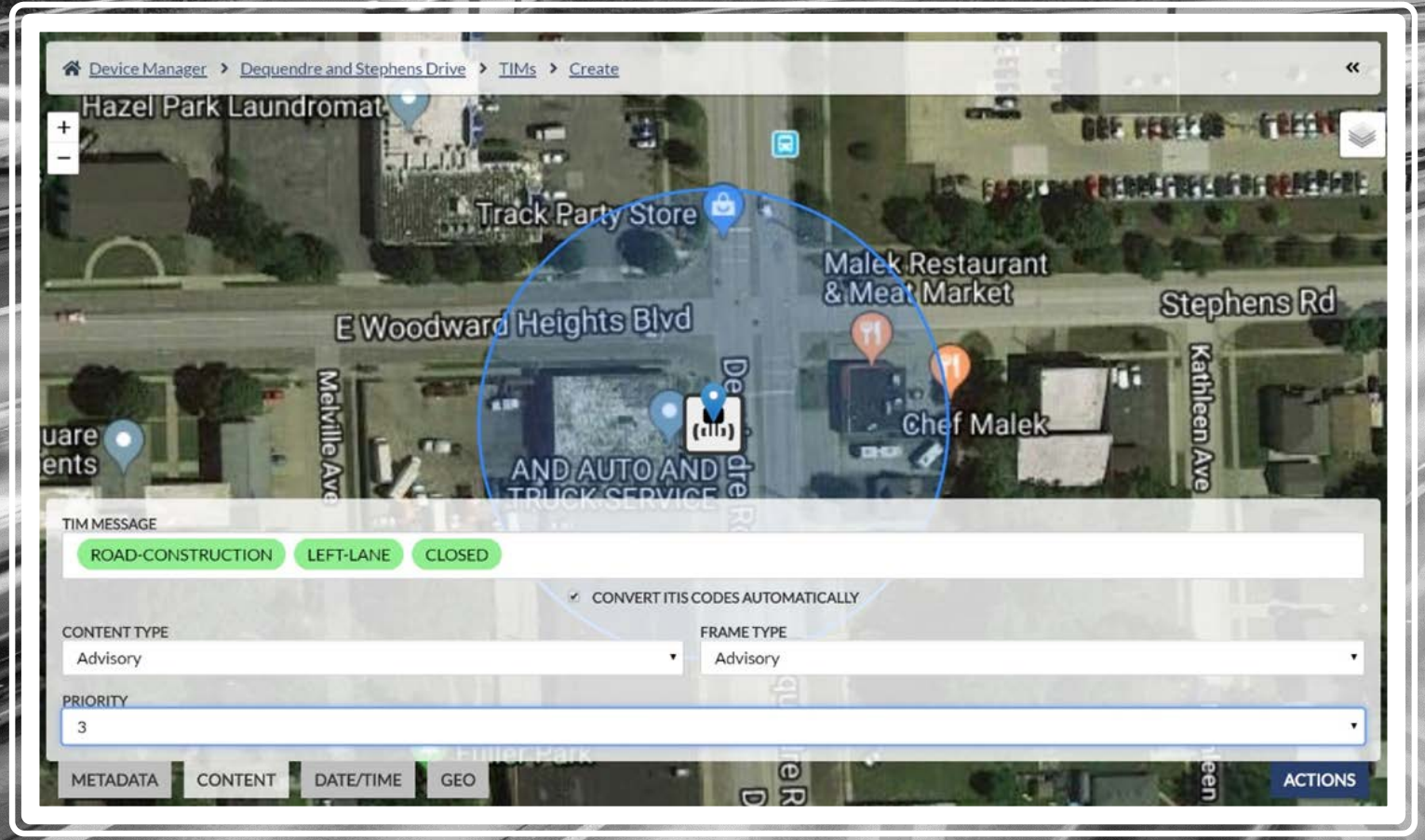
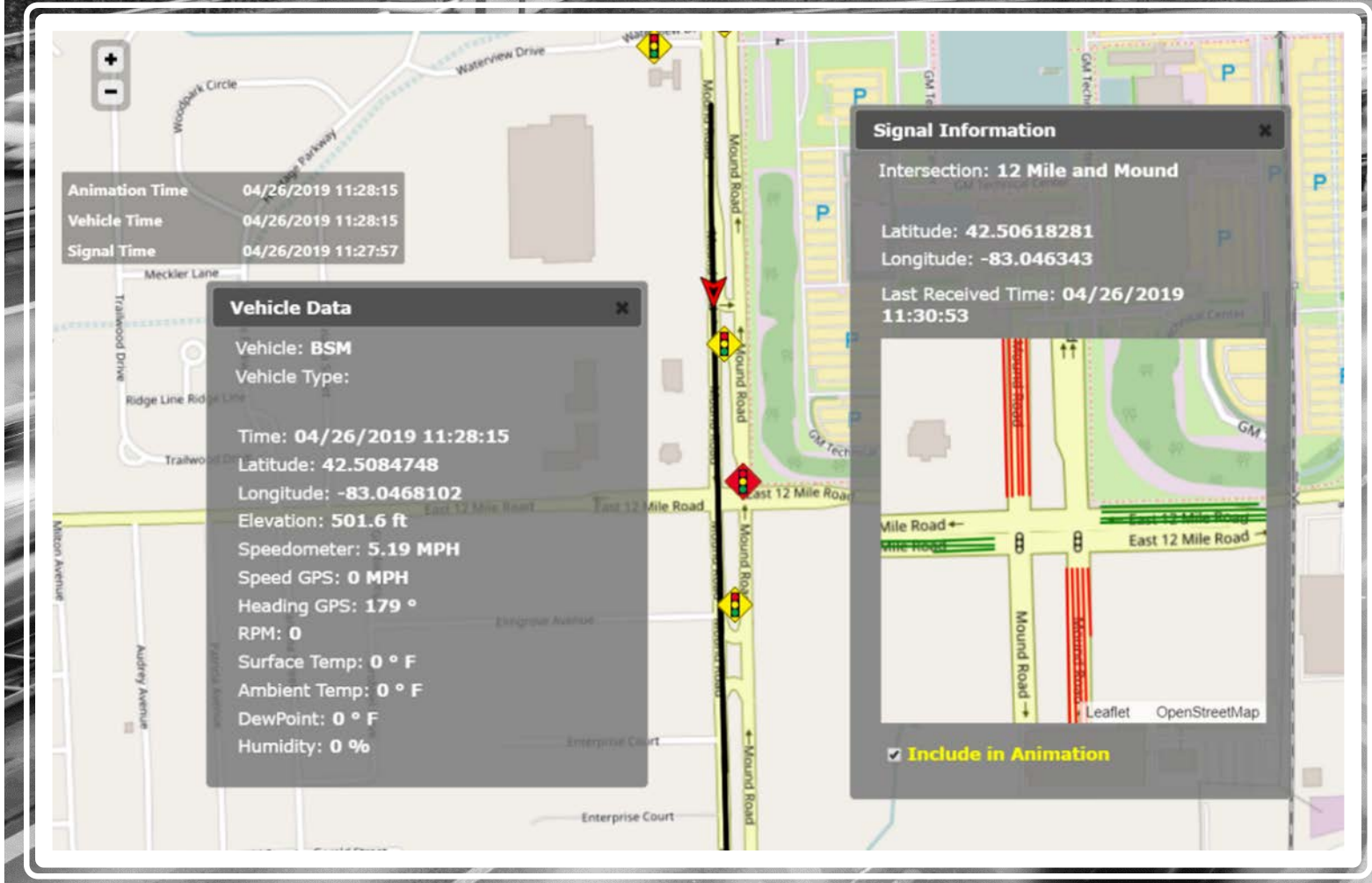
Forward Thinking In Motion®

TIM Creation

- Defining Data Parameters
  - TIM Description
  - Region Description
  - IDAS Code Time Message
  - Content Type
  - Frame Type
  - Priority
  - Geographic Limitations



BSM and Traffic Signal Controller



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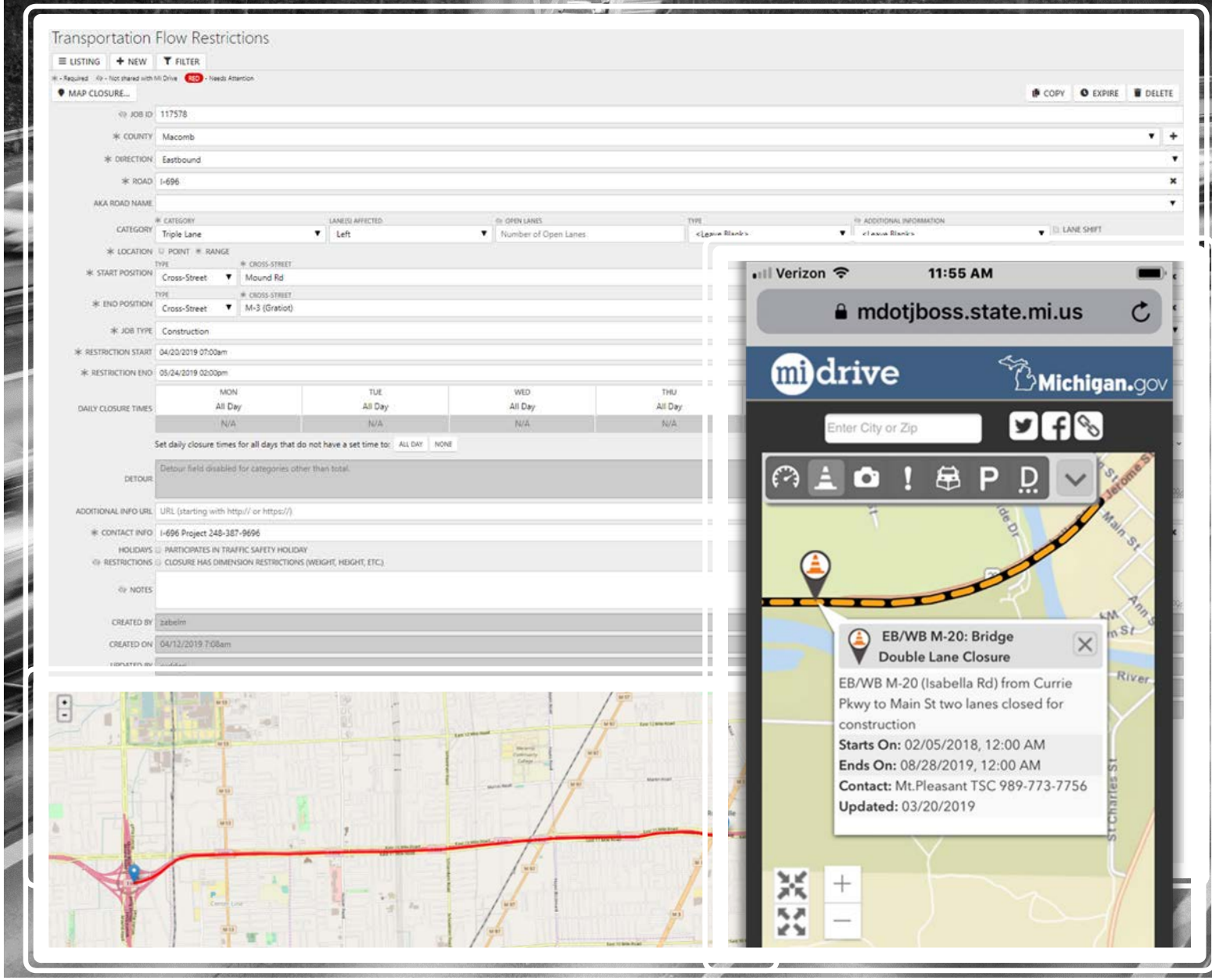
Traffic Flow Restrictions

- Engineering information vs public relations
- Provide info to Mi Drive and CAV
- Data soon to be incorporated into FHWA WZDx Feed



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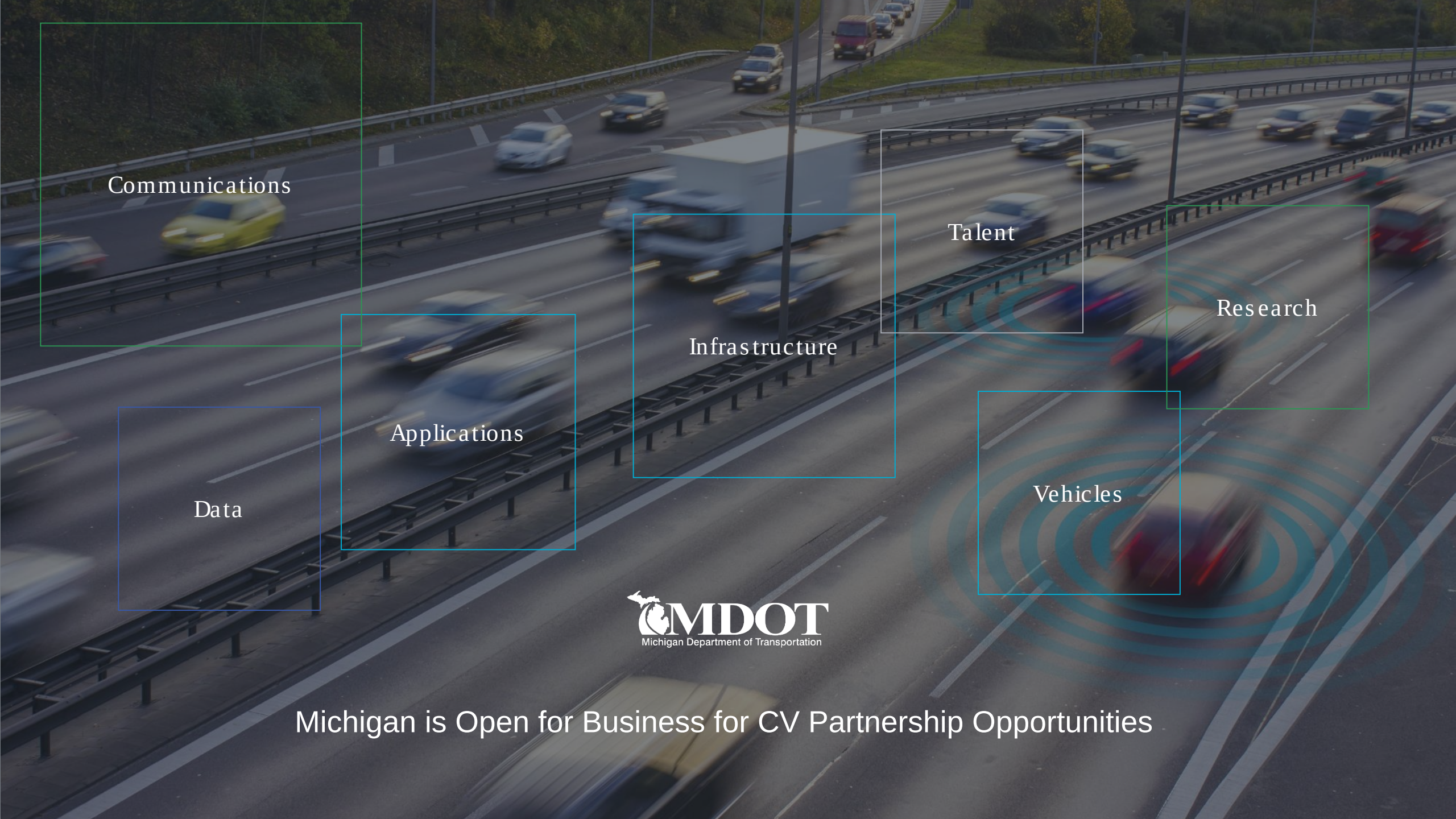

Communications
Talent
Research
Infrastructure
Applications
Data
Vehicles
MDOT
Michigan Department of Transportation
Michigan is Open for Business for CV Partnership Opportunities

HD MAPS: KEY ENABLER OF AUTONOMOUS DRIVING

Praveen Chandrasekar, Senior Product Manager

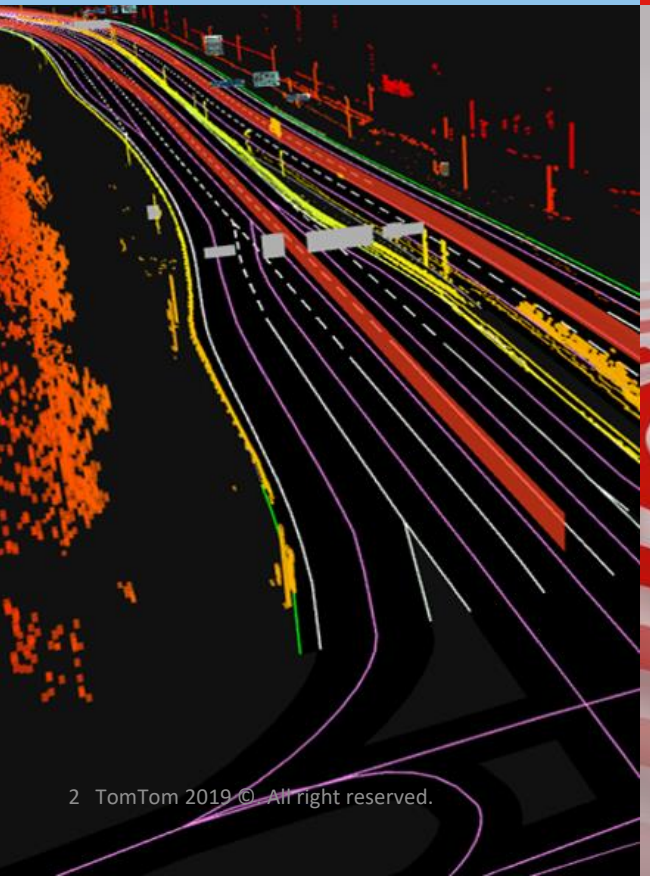
TomTom AD PU

July 2019

TOMTOM

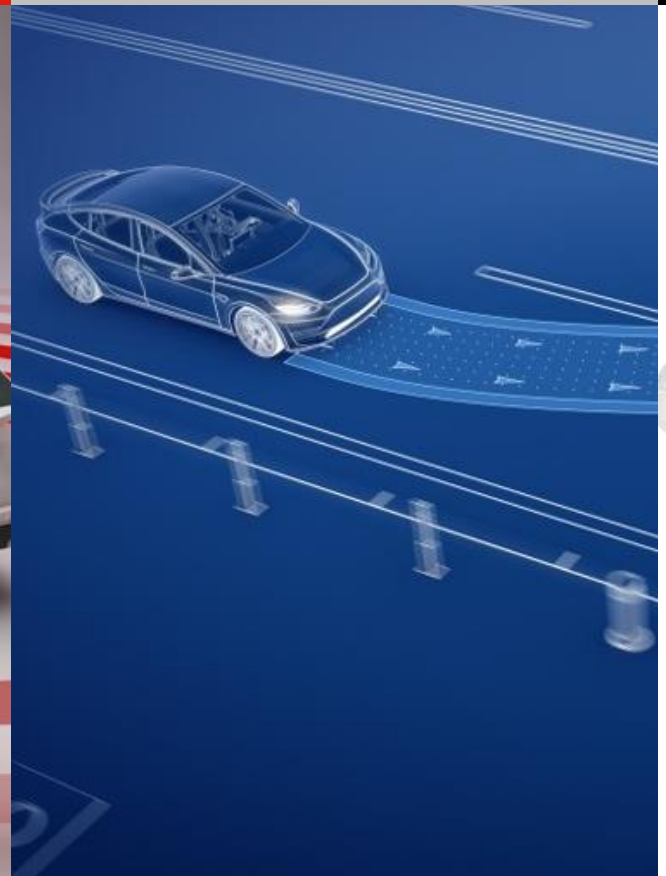
The Key Pillars of Automated Driving

Mapping

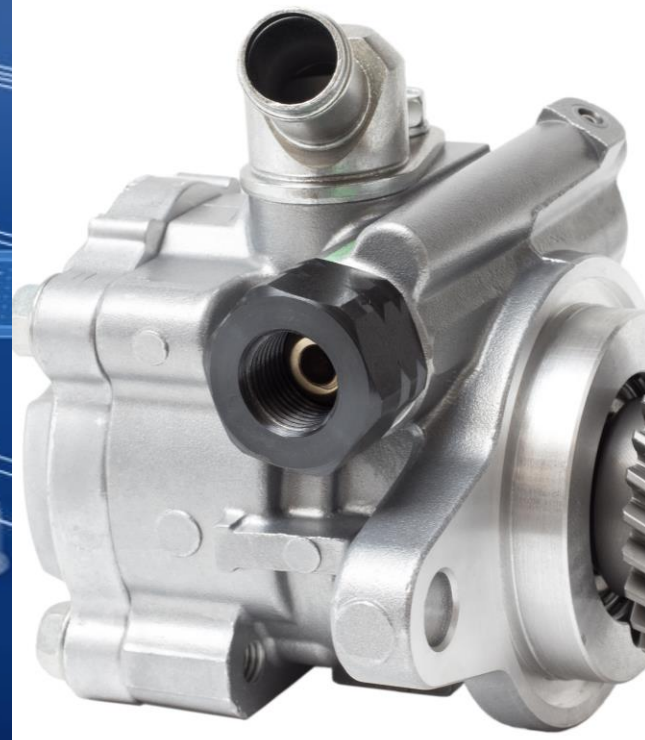


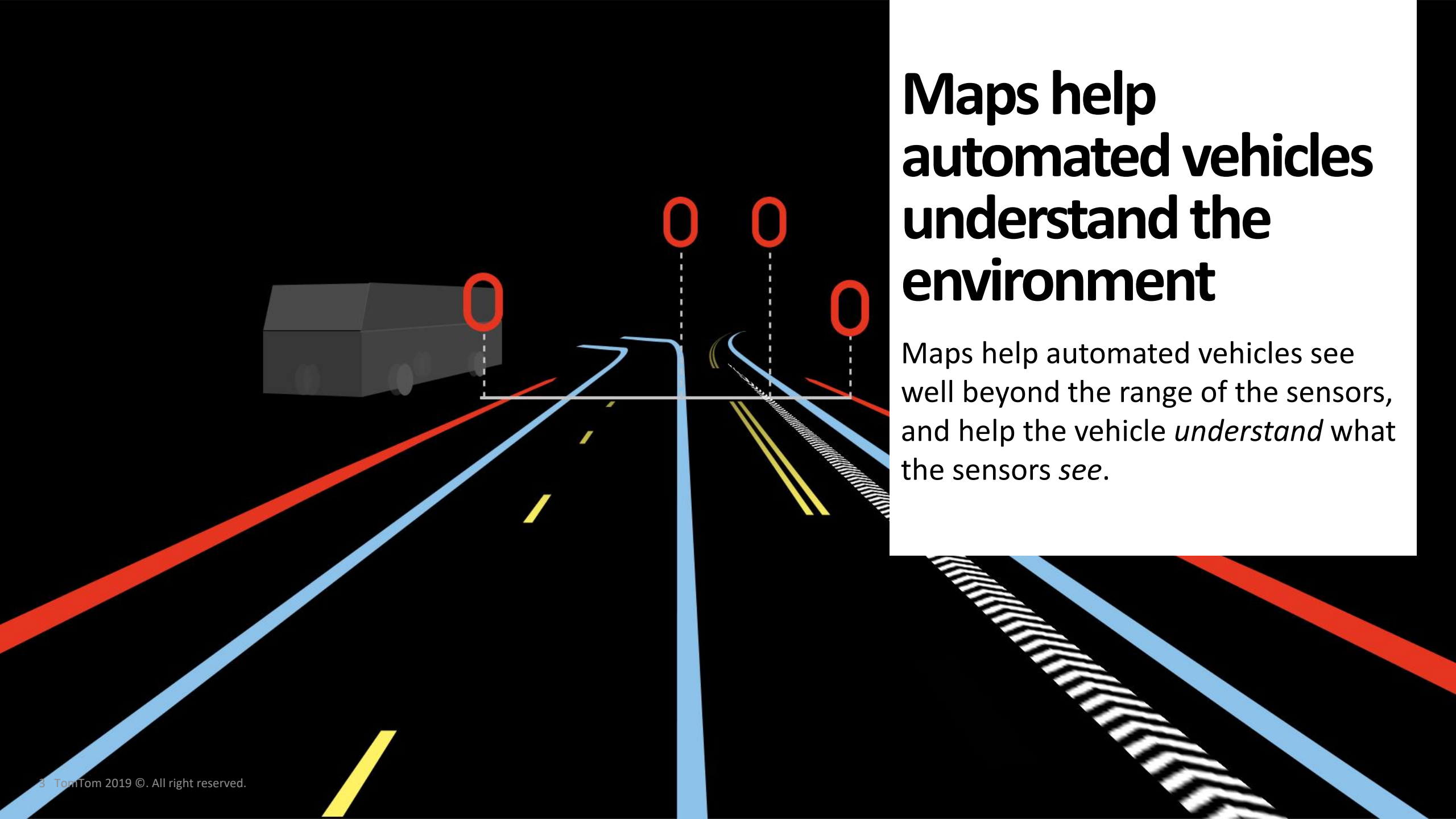
Sensing

Driving policy



Actuators





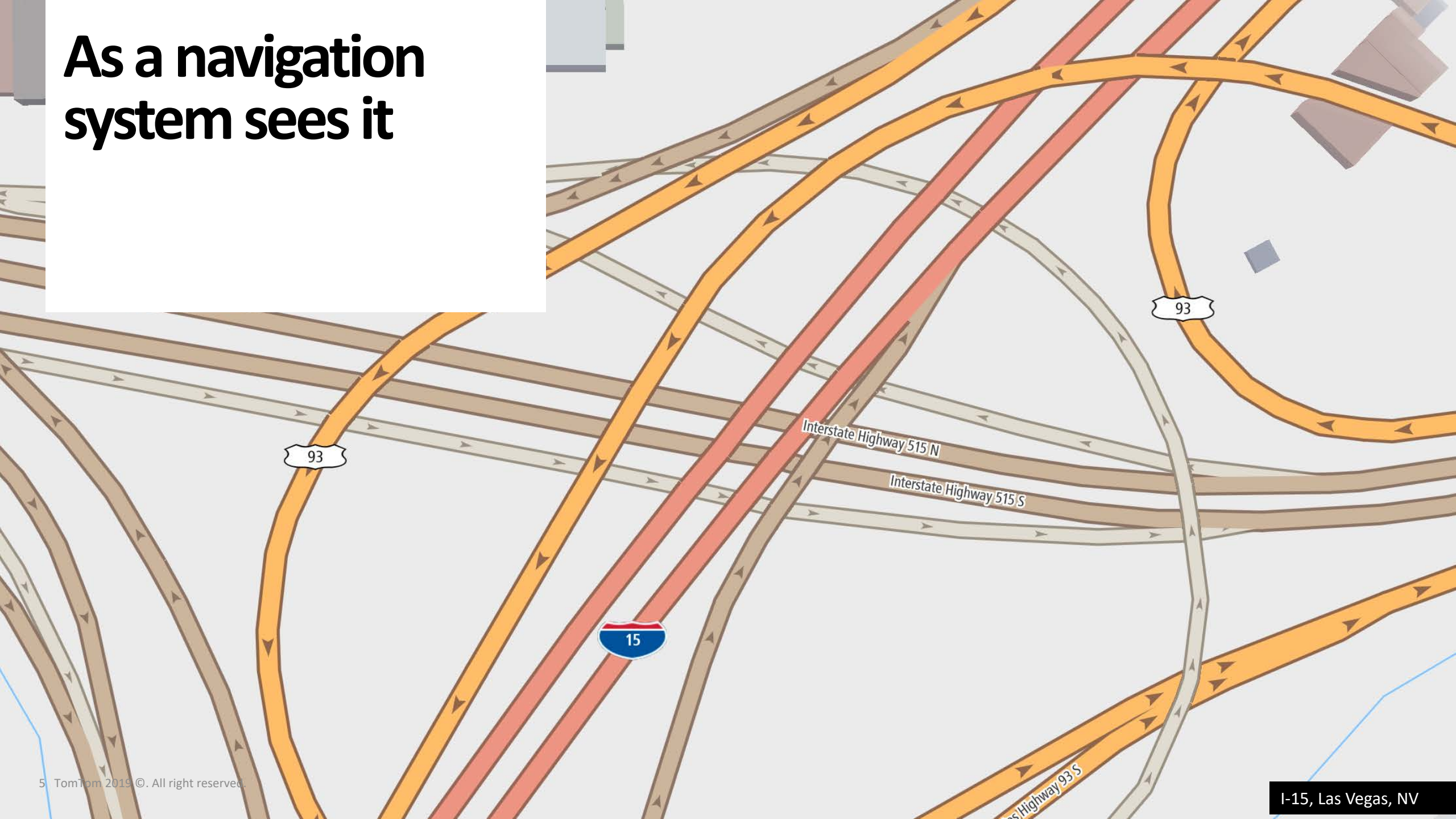
Maps help automated vehicles understand the environment

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

The road as we see it

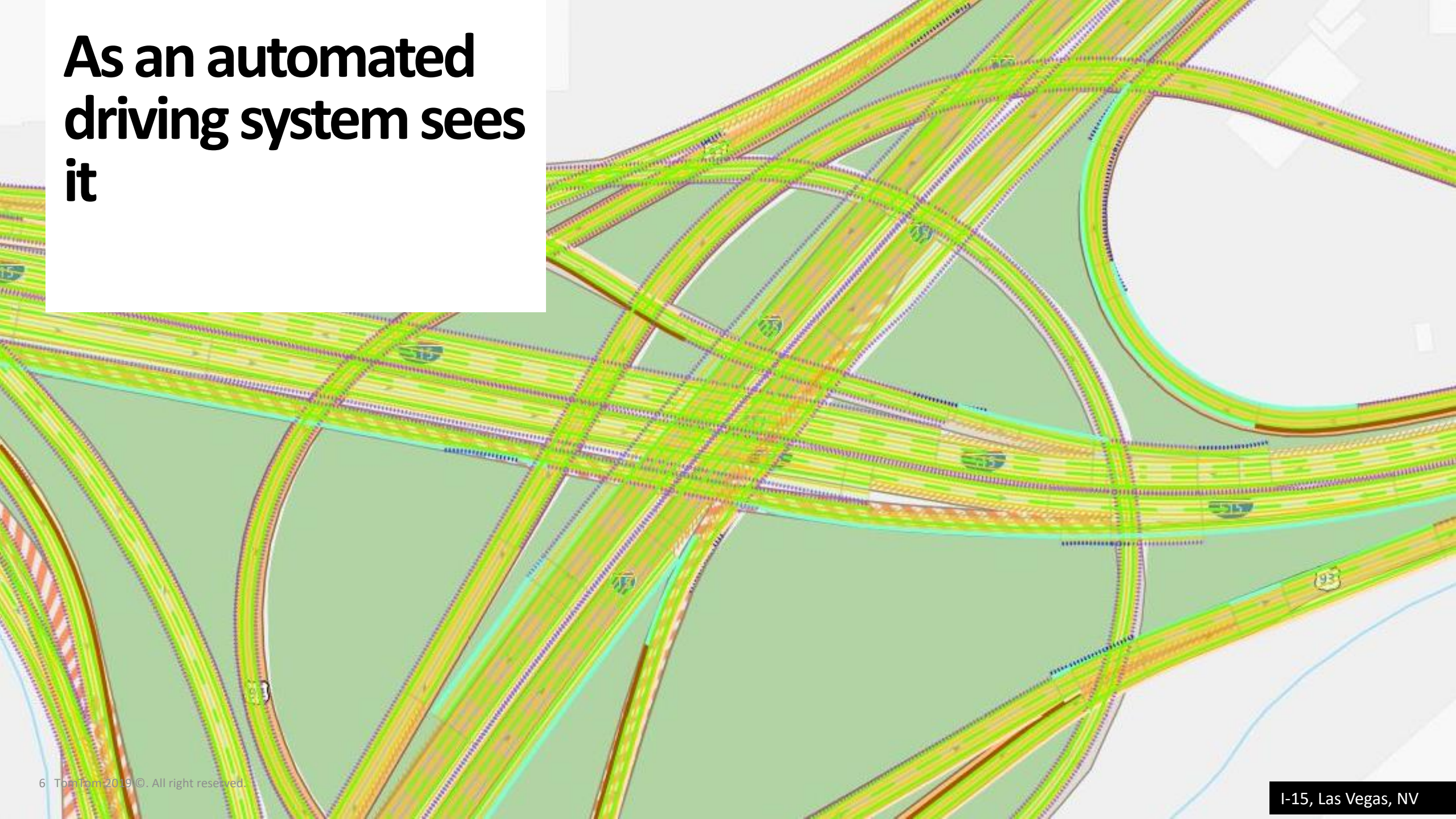
I-15, Las Vegas, NV

As a navigation system sees it



I-15, Las Vegas, NV

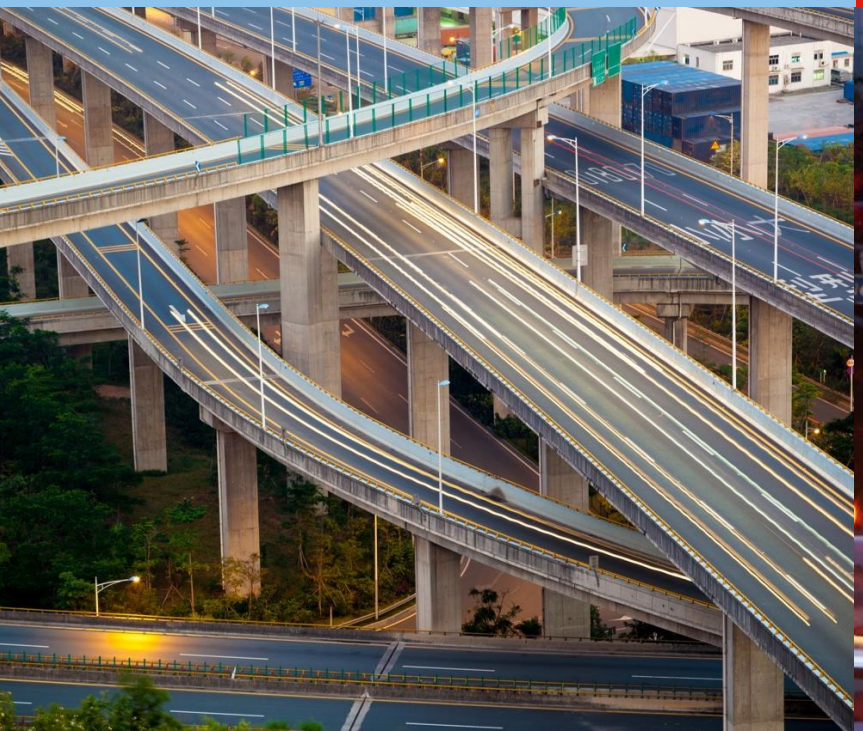
As an automated driving system sees it



I-15, Las Vegas, NV

The role of HD Maps in automated driving

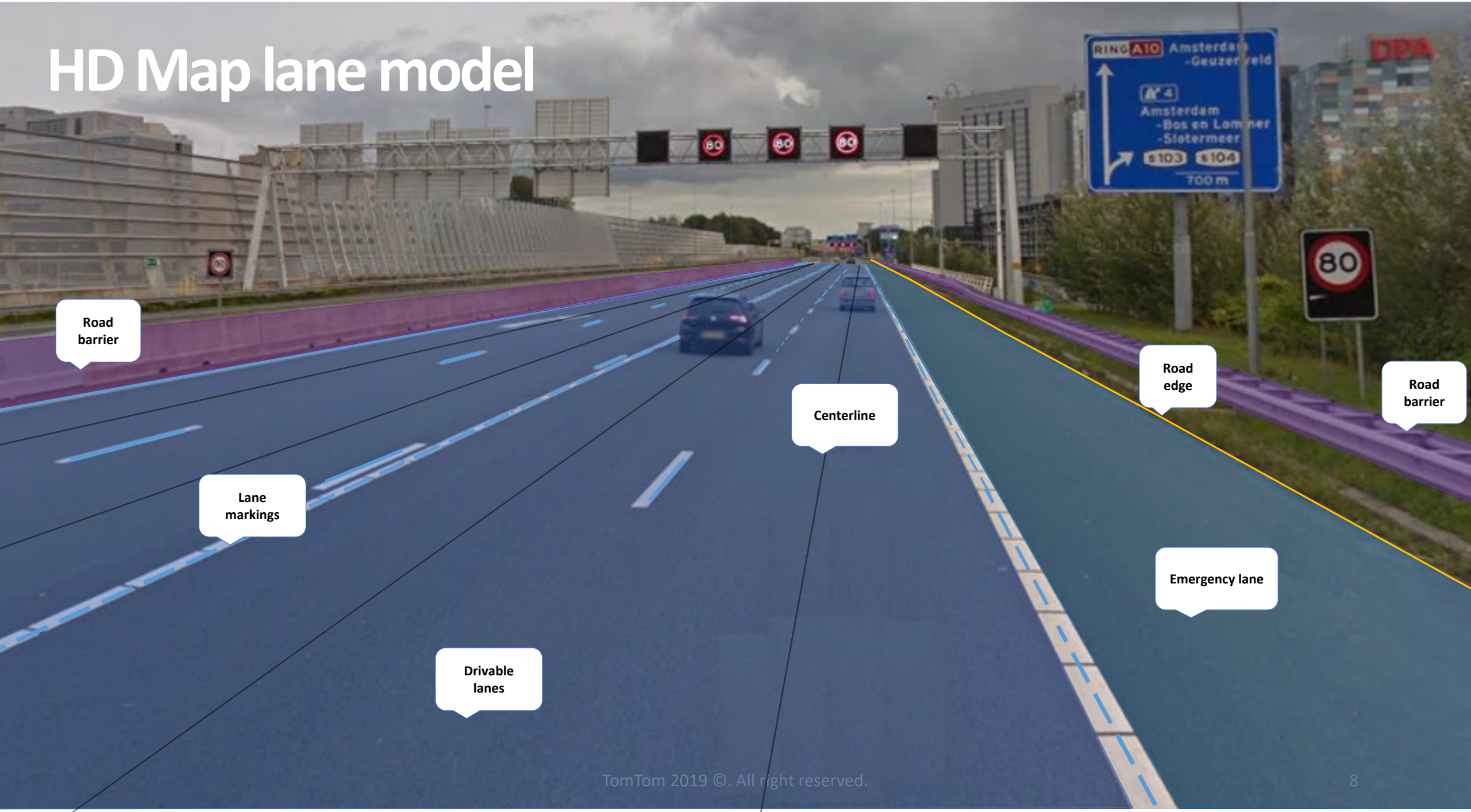
Localization



Perception

Path planning

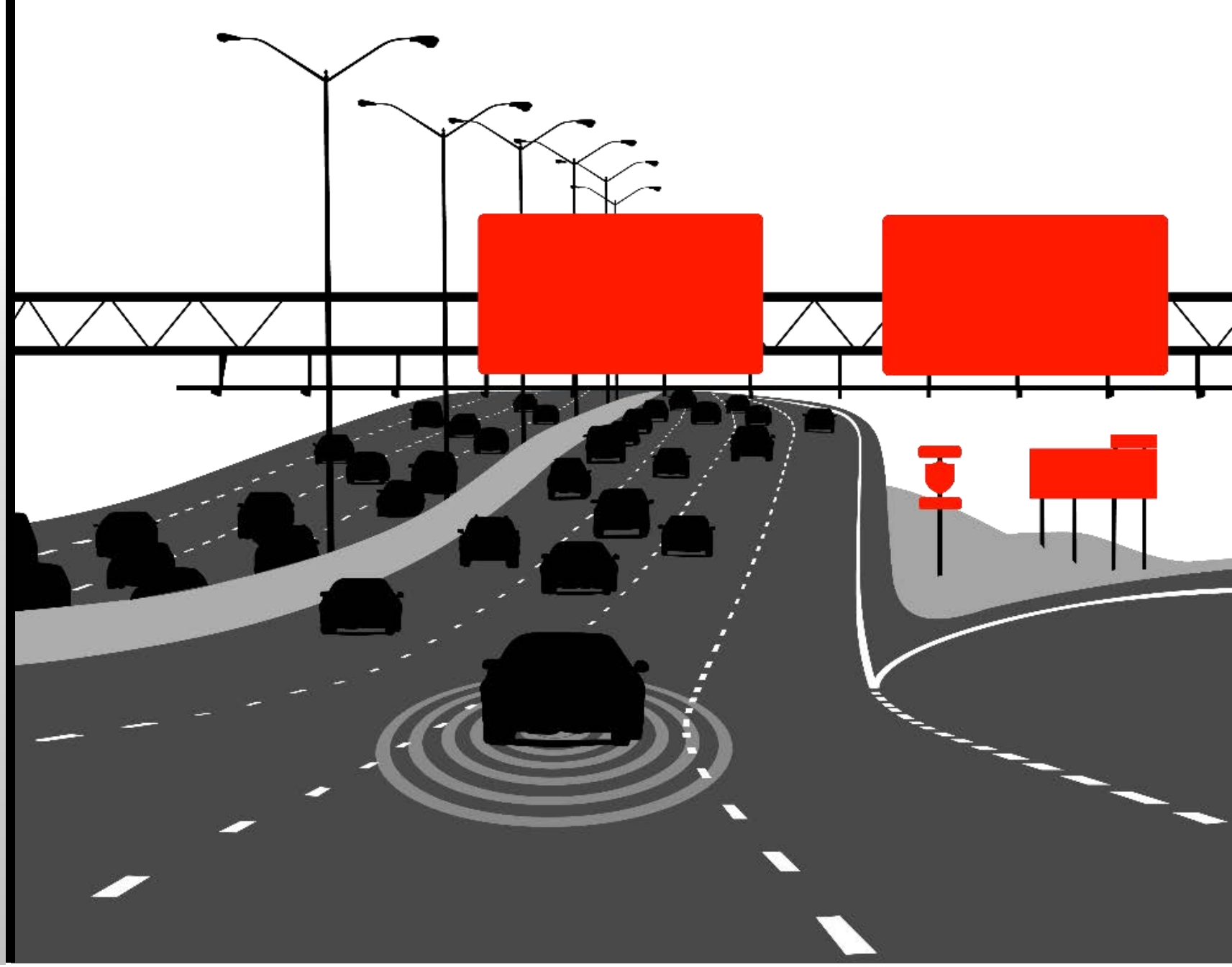
HD Map lane model



RoadDNA

Additional localization layers

- 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

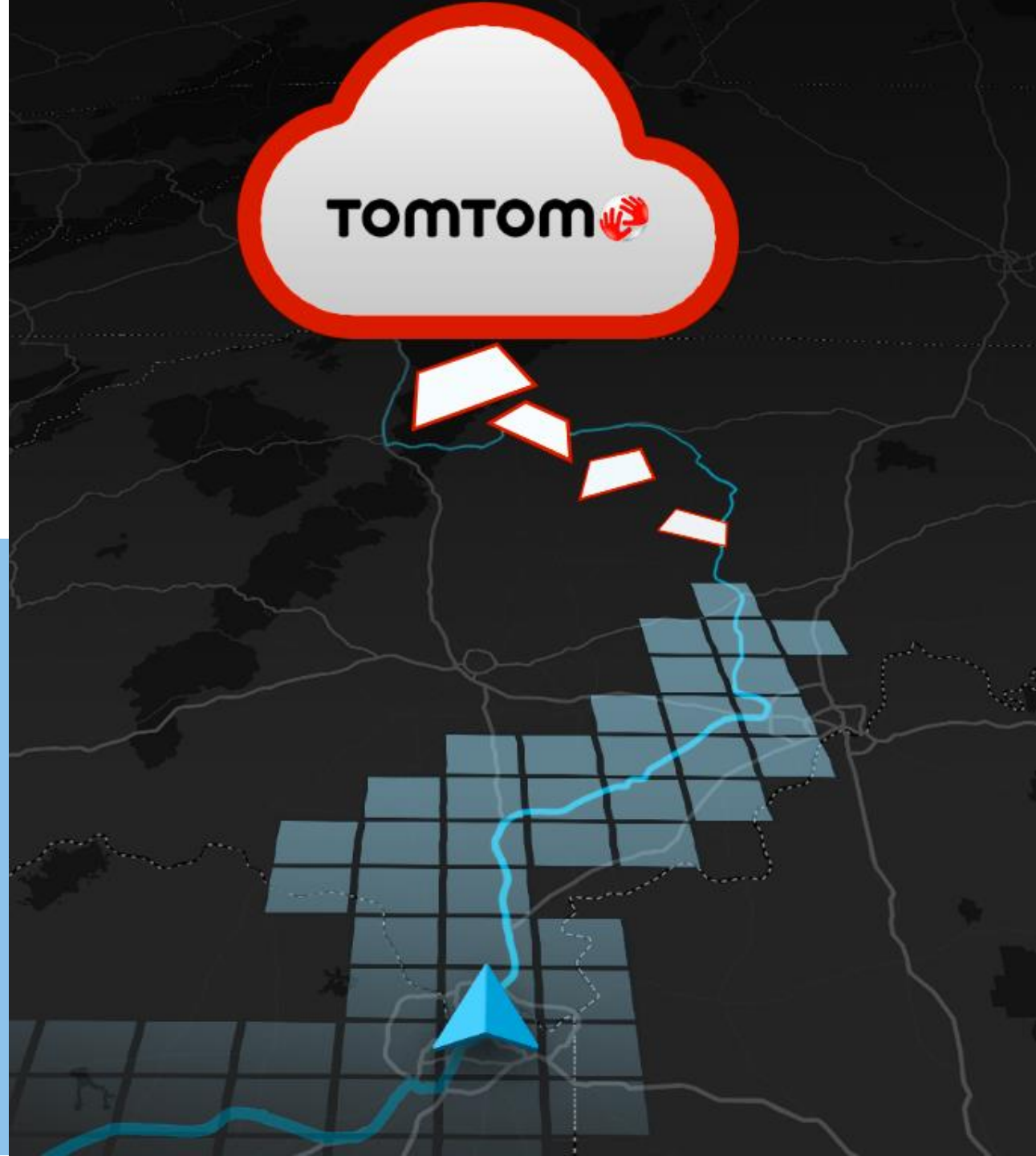
THE COMBINATION OF
2 DGPS ANTENNAS,
INERTIAL SENSORS AND
THE ODOMETER ENSURE
HIGHLY ACCURATE POSITIONING

3+
MILLION KM
DRIVEN BY MOBIILE
MAPPING VEHICLES
EACH YEAR

AutoStream: Innovative map delivery for automated driving

- AutoStream service streams map data in tiles and layers along route or MPP
- AutoStream onboard client integrates with Vehicle Horizon

- Reduces complexity and development time thanks to smart on-board client software
- Minimize data consumption with onboard cache

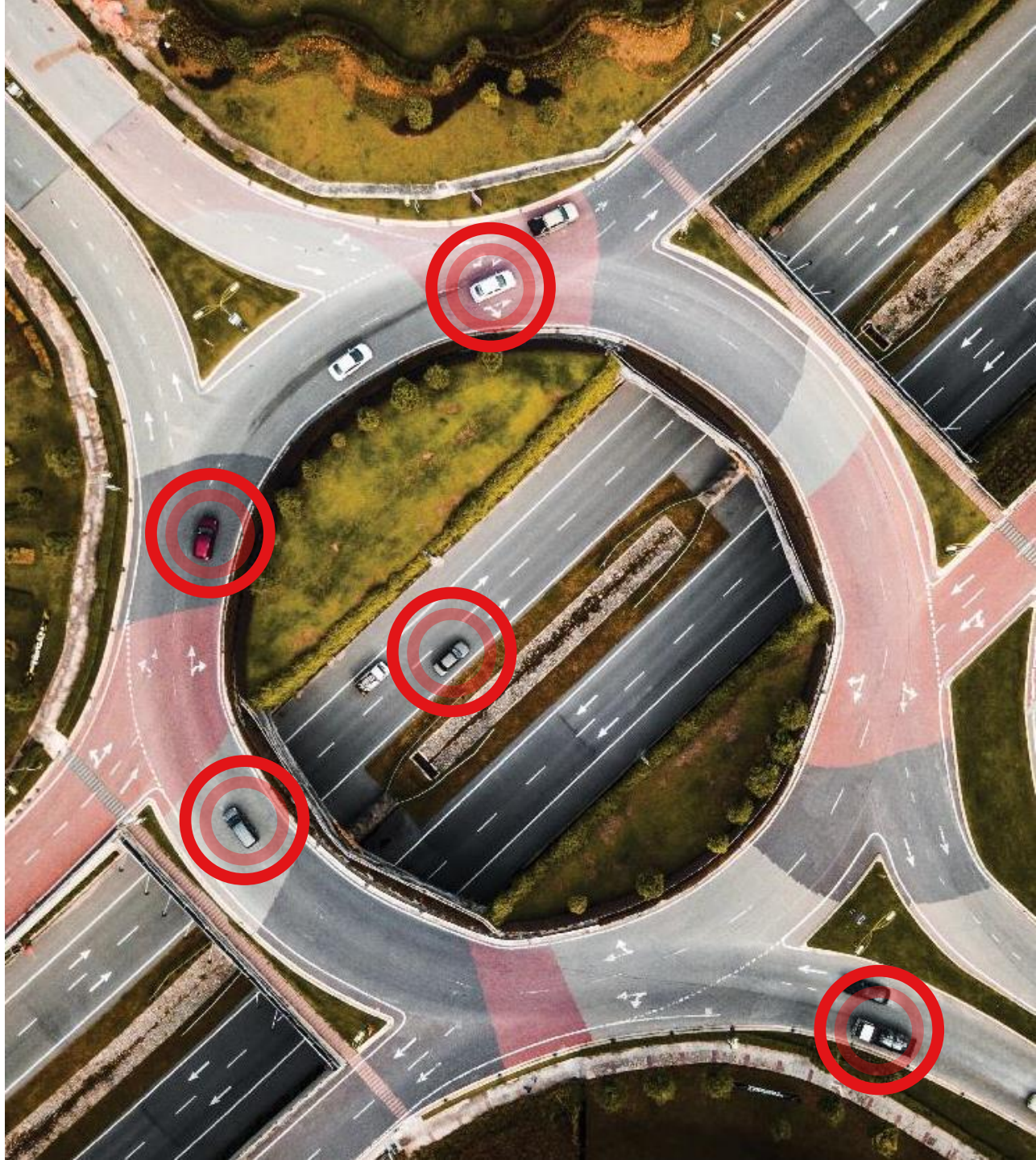


Crowdsourced sensor data is key for map maintenance

Data from onboard sensors is key for keeping the HD Map up-to-date.

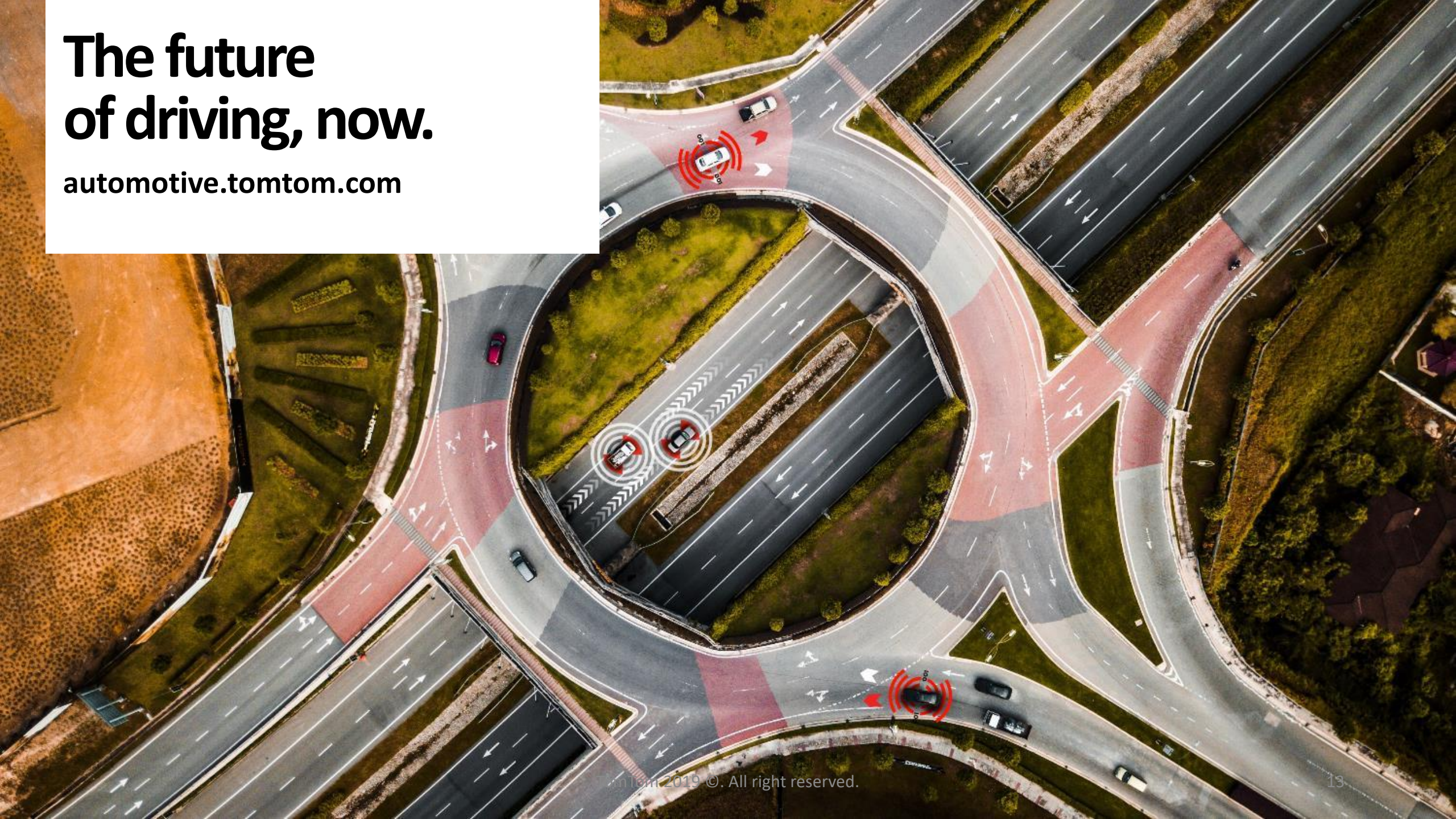
For this purpose, TomTom defined Roadagrams: a format for compressed snippets of camera data that can be used as input to update the HD Map.

TomTom will intake Roadagrams generated by vehicles on the road and use them as input for HD Map maintenance.



The future of driving, now.

automotive.tomtom.com



Michigan Connected and Automated Vehicle Working Group

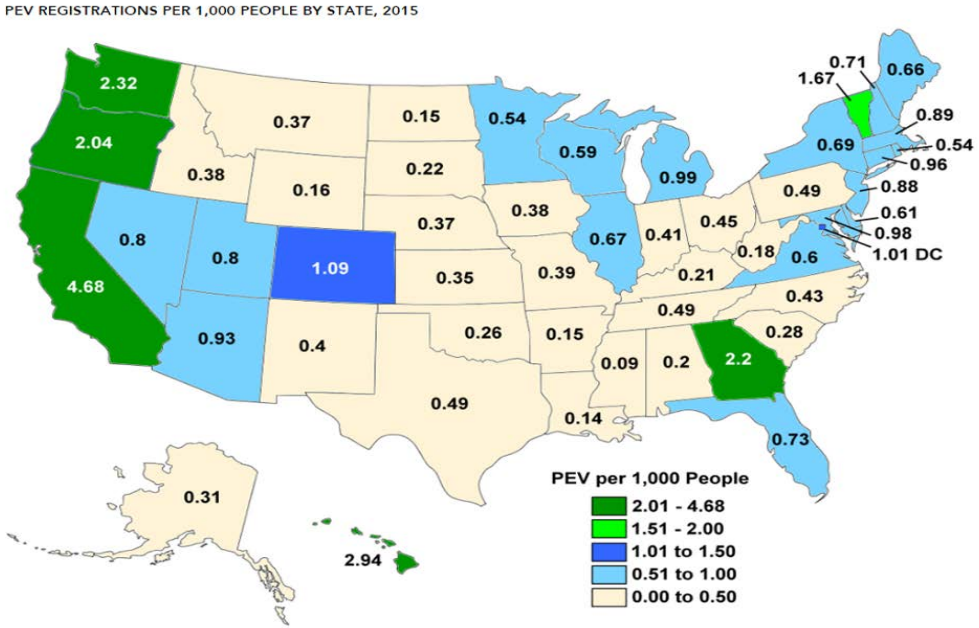
Consumers Energy
Electric Vehicle Strategy
July 23,2019

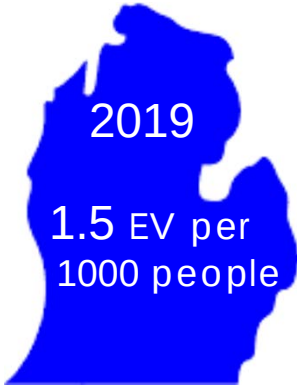
Scott A Weber
Director of Alternative
Energy Solutions
Renewable Energy & Electric Vehicles

Power MI Drive

Consumers Energy
Count on Us®

Michigan can take a leadership role in defining a scalable model for EV infrastructure and adoption





OUR VISION

Michigan leverages its energy and automotive legacies to develop customer-focused solutions for EV infrastructure that can be replicated across the U.S.

Source: US DOE

Consumers Energy Starts New Era for Renewable Energy in Michigan with Approval of Clean Energy Plan

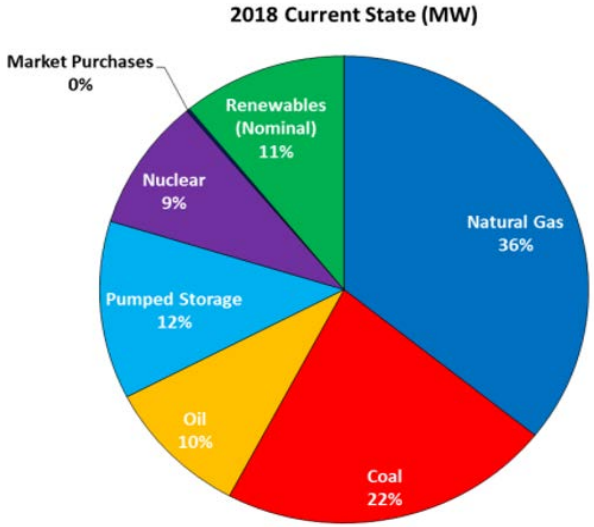
Jackson, Mich. Friday, June 07, 2019

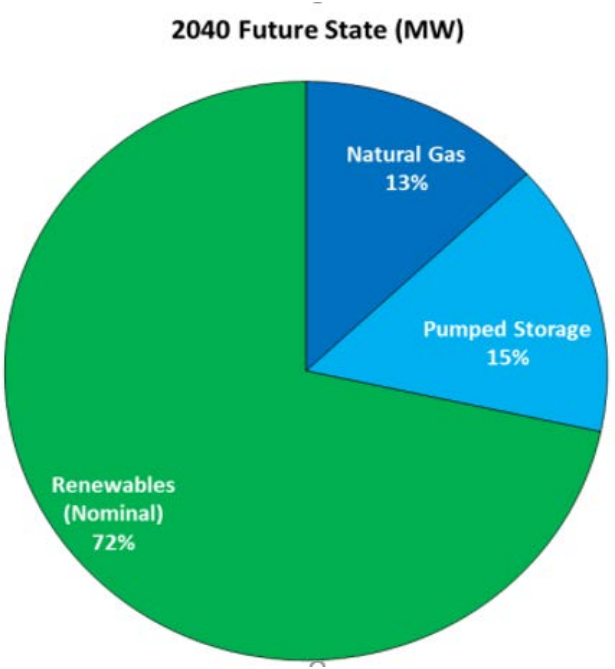
A New Energy Future for Michigan

TRANSITION TO ZERO COAL

MORE DEMAND REDUCTION

MORE RENEWABLE ENERGY

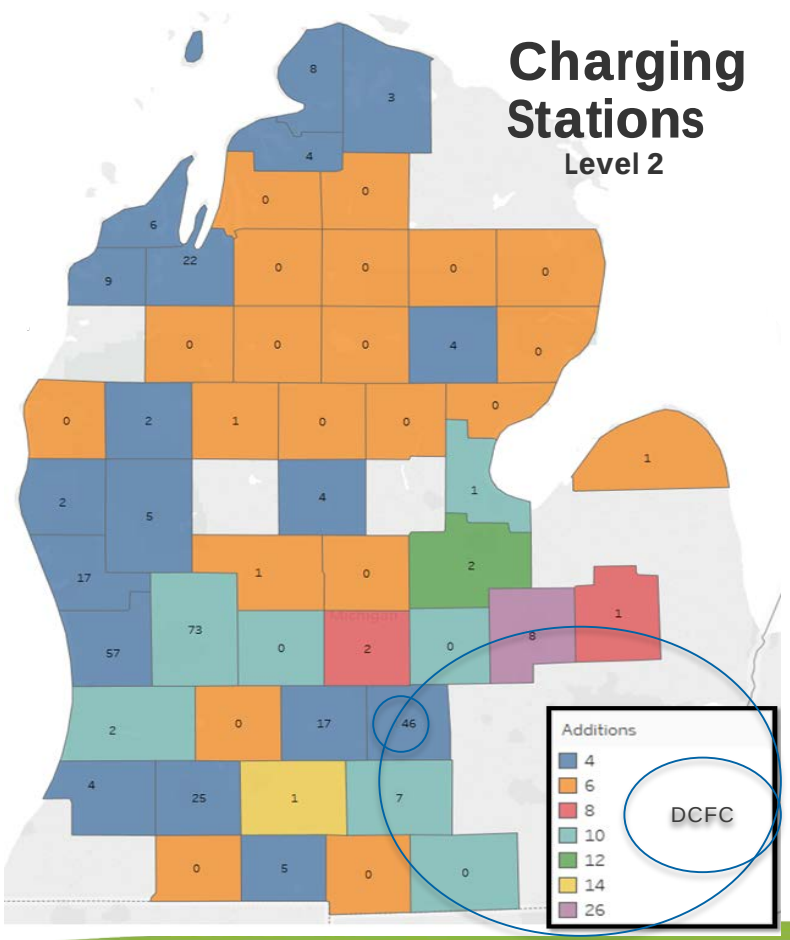




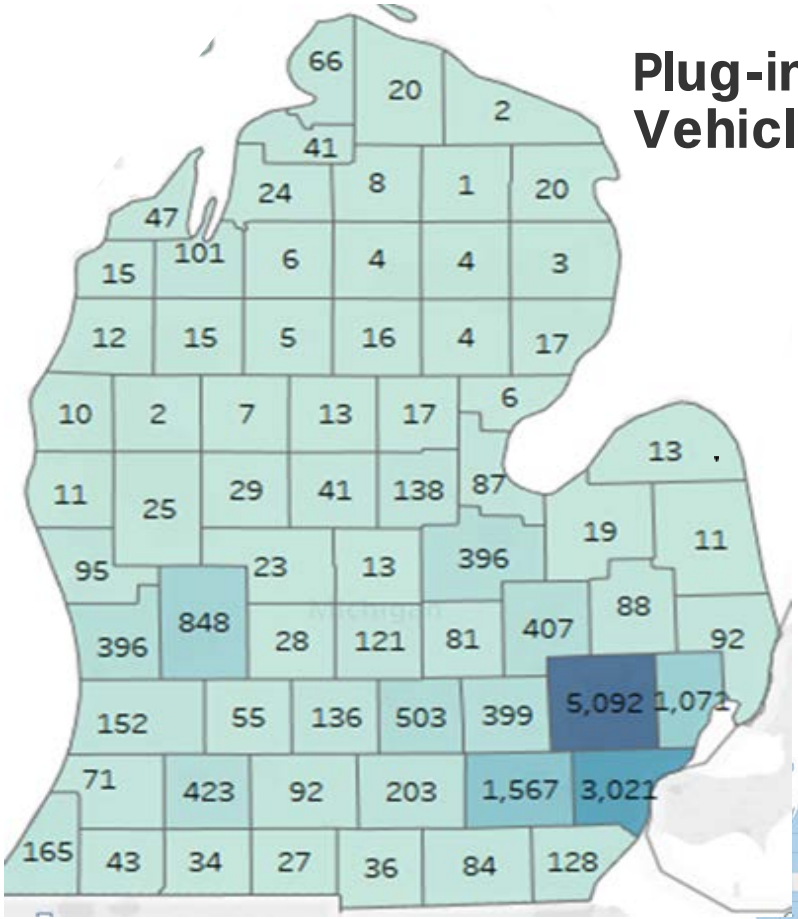
Affordable, Reliable, and Environmentally Responsible

Charging Stations

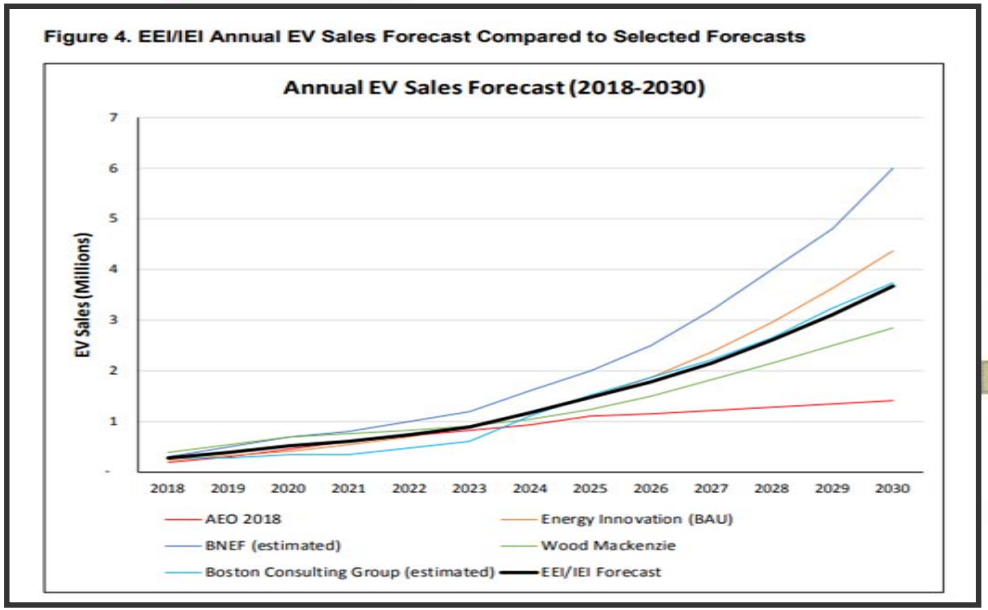
Level 2

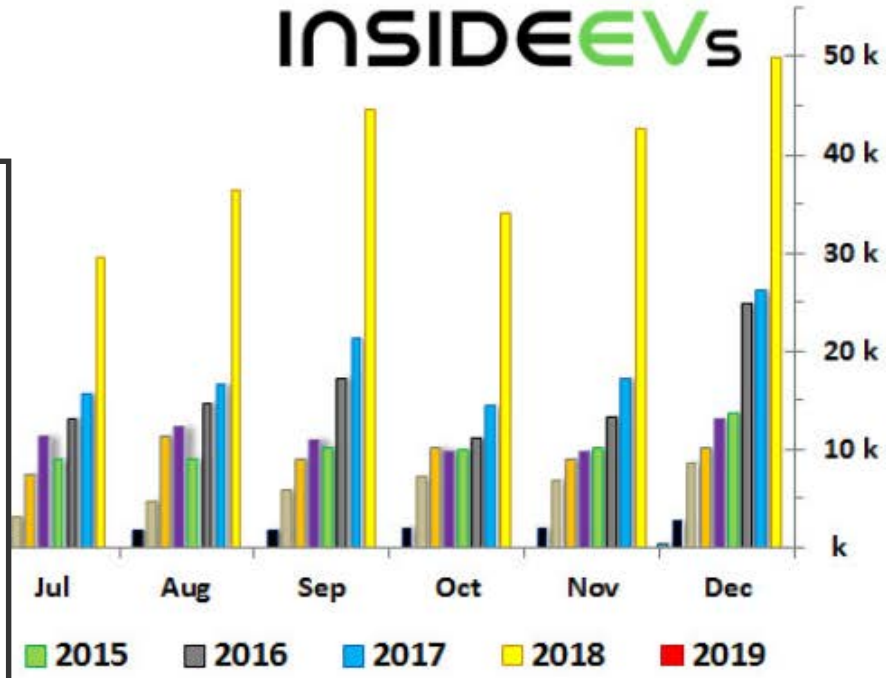


Plug-in Vehicles



Forecast and Actual PEV Sales





Three-year program to make it easier for electric vehicles (EV) owners to charge their EVs, and to ensure the electric grid is prepared to capture the benefits for our customers from the growing EV market

Includes:

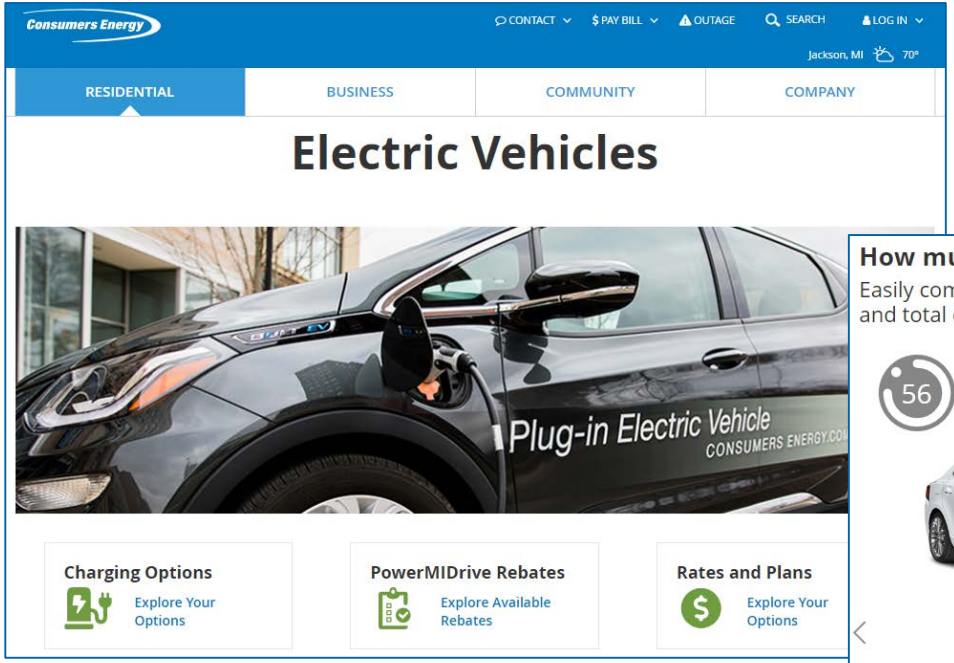
- **Rate options** to help EV owners maximize the value of their vehicle by charging off peak and at night
- **Education campaign** to build awareness and understanding

Power MI Drive | Consumers Energy Count on Us®

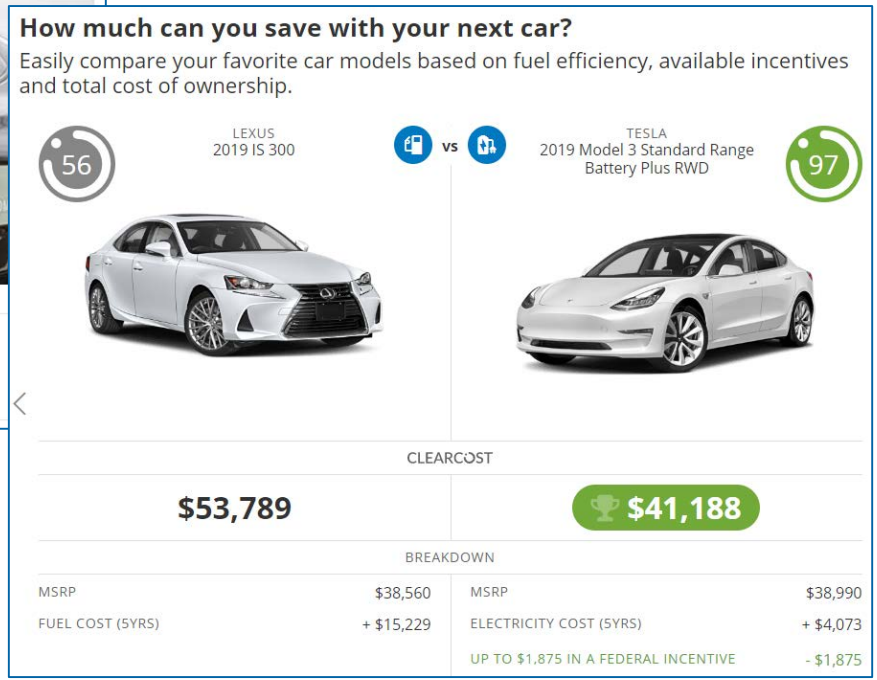
$400 for customers who install an approved Level 2 Charger at their residence, and sign up for our EV rate. *Additional savings available to low-income customers.*

Up to $5,000 for commercial customers who install an approved Level 2 Charger in public location. *Total number of rebates limited.*

Up to $70,000 for commercial customers who install an approved DC Fast Charger in public location. *Total number of rebates limited.*



Power MI Drive | Consumers Energy Count on Us®

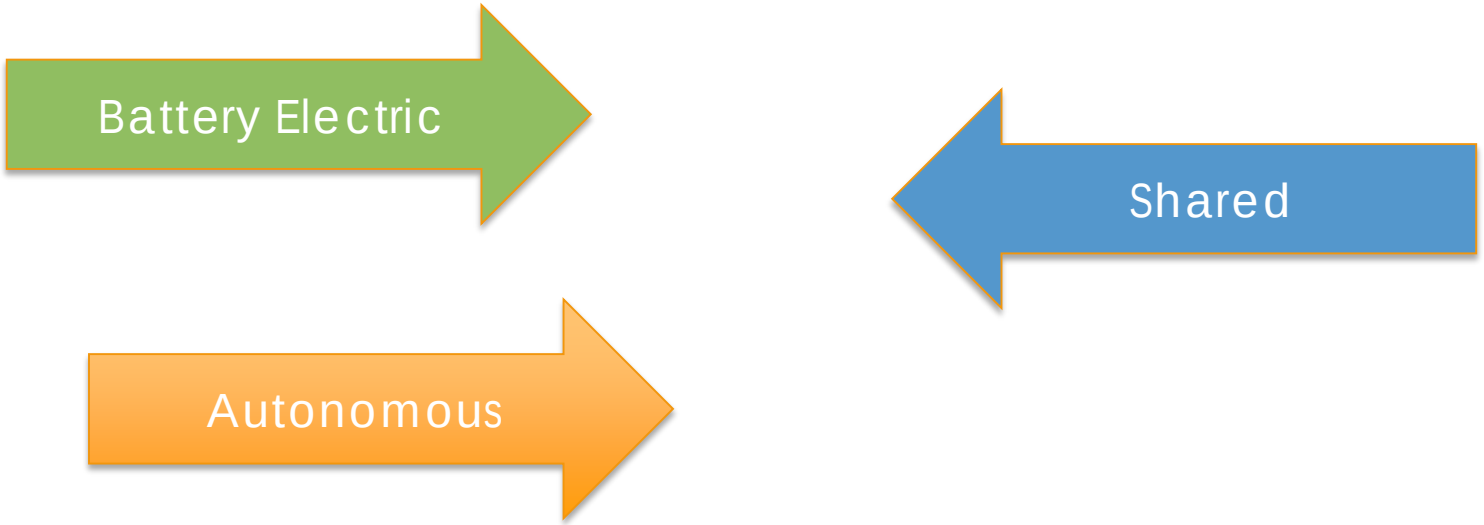


Enhanced Website Options

Electrification Strategy

EARLY UTILITY ROLE	Utilities have a role early in the customer journey, as a trusted voice and valuable resource for data and in-home touchpoints
ENABLING ADOPTION	Setting the foundational structure for Plugin vehicles, provide insight & education & positive customer experience
OBSERVE ADJUST & REACT	Modify programs to support adoption and influence behaviors that will provide positive outcomes for all customers

Maintain a pulse on market trends to define the leading drivers and influence of emerging mobility technologies and services.



Thank you

Scott A Weber
Director of Alternative
Energy Solutions
Renewable Energy & Electric Vehicles