

The Future of Transportation Technology

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Technology Shifts

- Transportation transformations have happened before
 - Railroads – changed the world so much that time zones were created
 - Paved Roads – got us out of the mud & expanded local commerce
 - Interstate System – created commerce & industry of today



The Transformation of Transportation Technology



- Potential paradigm shift in how we travel
- How goods are shipped on land, sea, air
- Greater mobility and access for those underserved
- How society interacts with its built environments

Michigan Traffic Fatalities



Future of Transportation - NOW

- Connected & Automated Vehicles
 - Not just passenger vehicles
 - Semi-trucks
 - Freighters
 - Farming Equipment
 - Onsite- vehicles in shipping yards, mines, ports
 - Delivery Vehicles
- The potential change is enormous & could impact all aspects of transportation & commerce



The New Mobility

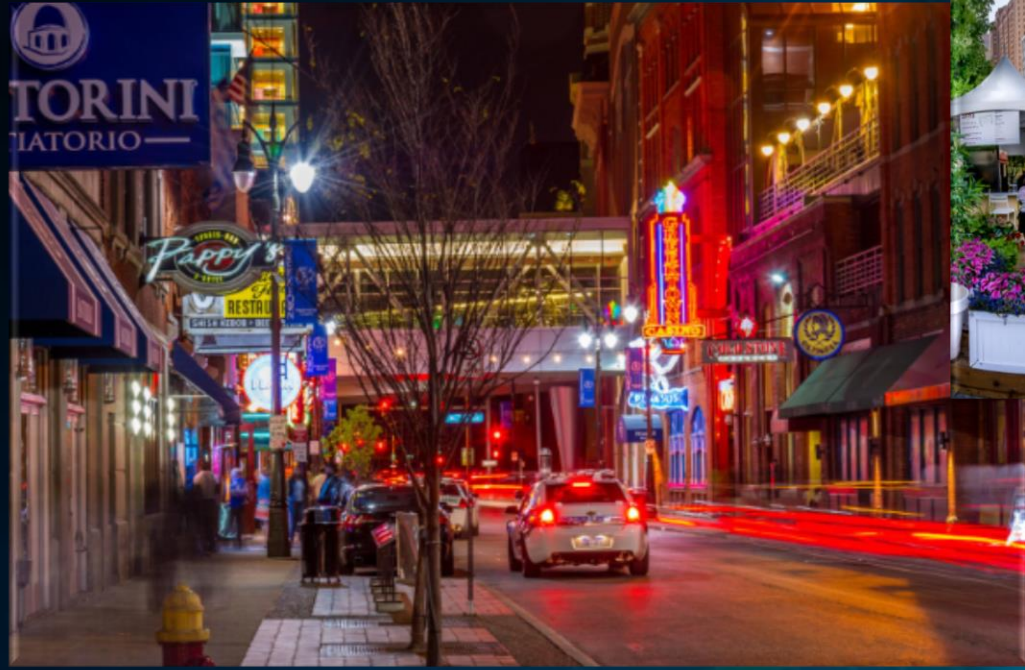


Vehicle Ownership



Freeways of the Future





Citylife



Unlimited Mobility

Safety



Toward Zero Deaths™

National Strategy on Highway Safety



The Military



The Truck Driver

I-69 freight vehicle platooning



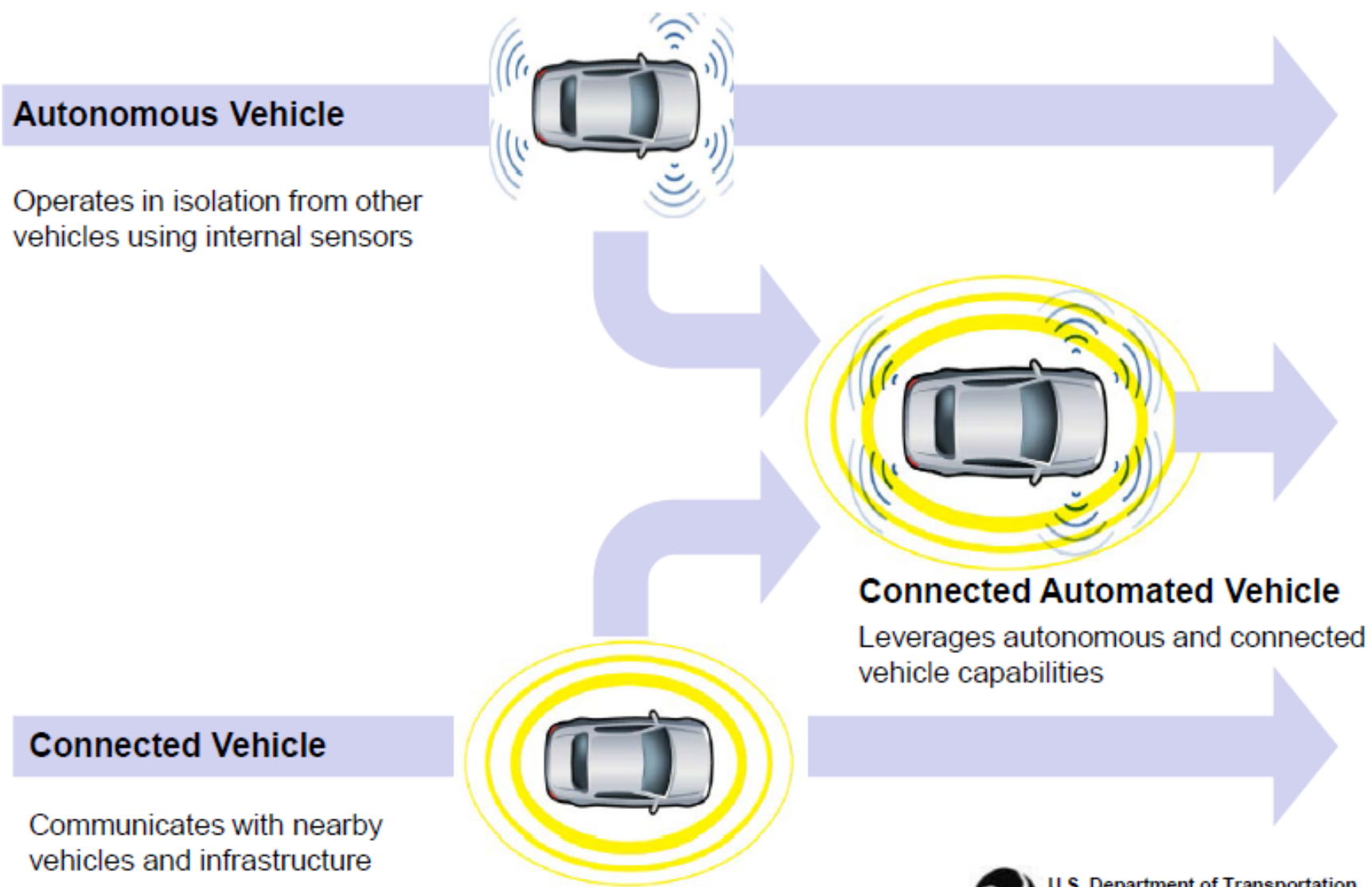
I-69 freight vehicle platooning



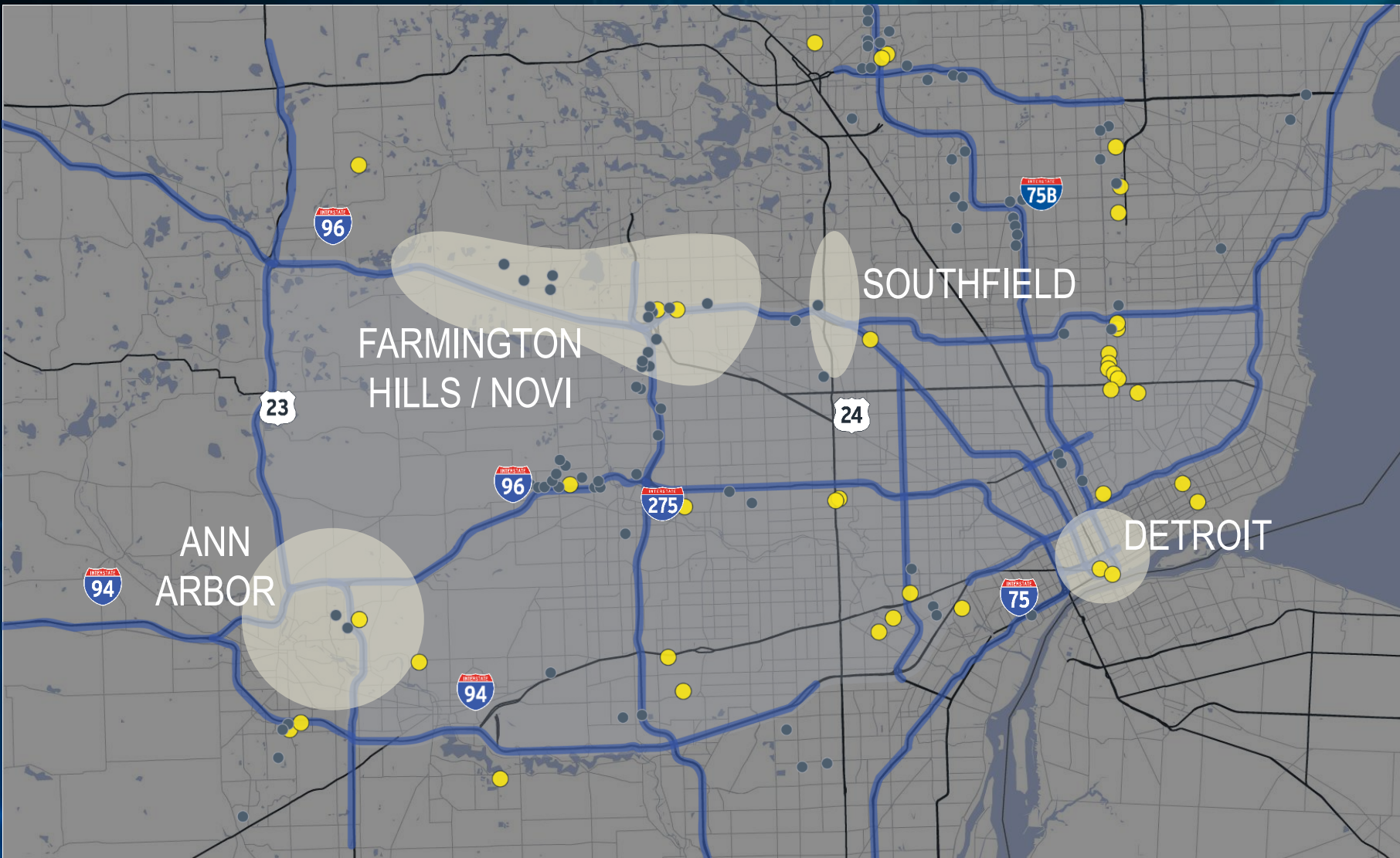




The Commuter

Connected Automation for Greatest Benefits



Southeast Michigan's Legacy



-  Connected Vehicle Environment
-  Connected Vehicle Test Beds
-  Tier 1 Automotive Suppliers
-  Major OEM Facilities
-  MDOT Roadway ITS Coverage

Initial Applications



Red Light Violation
Warning



Work Zone Warning/
Management

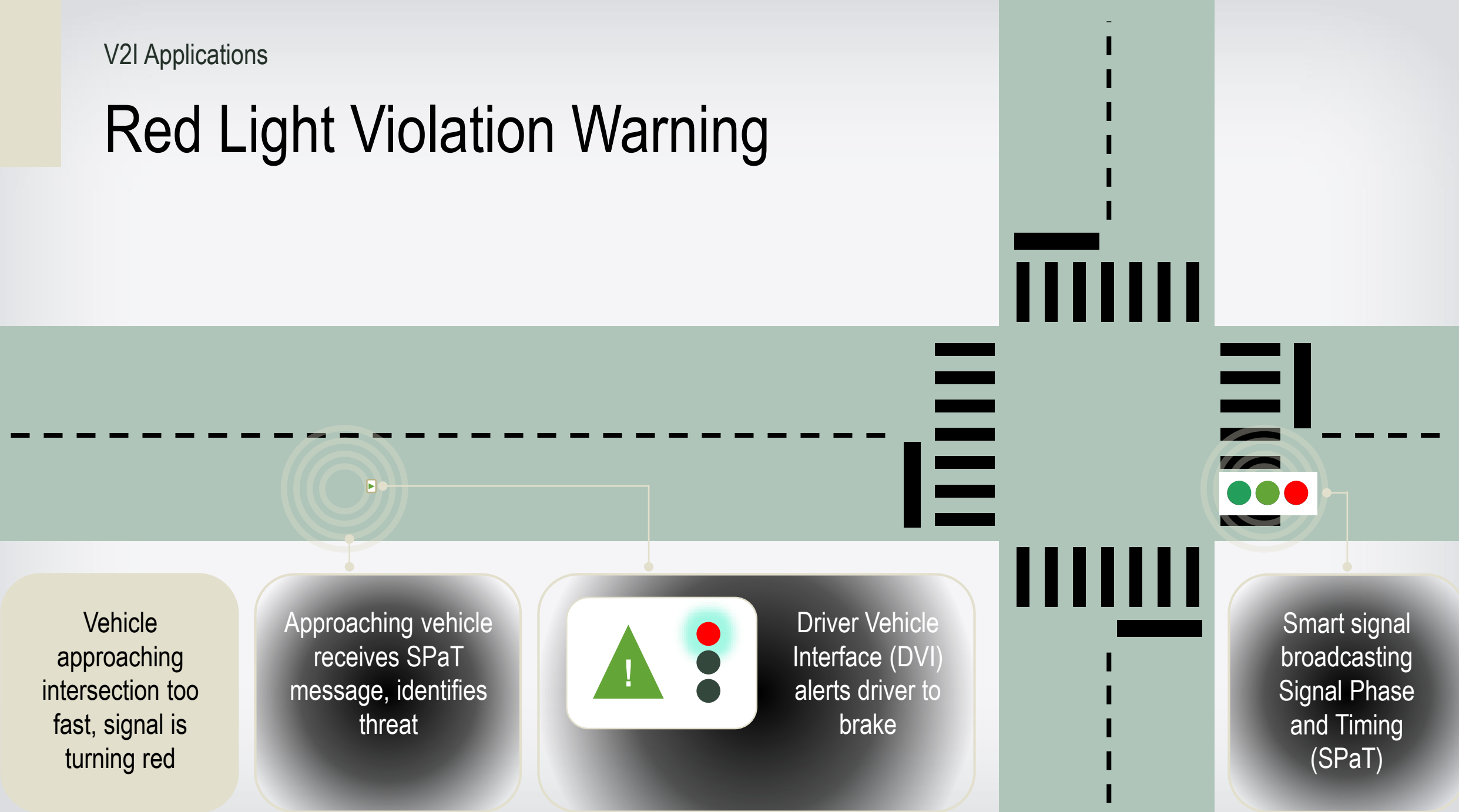


Road Weather
Management



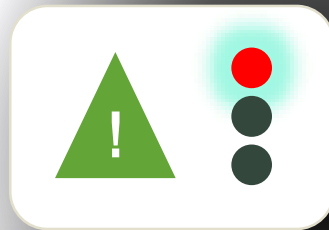
Pavement
Condition

Red Light Violation Warning



Vehicle approaching intersection too fast, signal is turning red

Approaching vehicle receives SPaT message, identifies threat

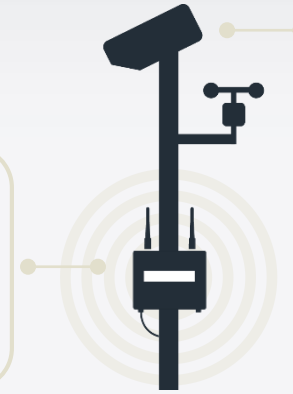


Driver Vehicle Interface (DVI) alerts driver to brake

Smart signal broadcasting Signal Phase and Timing (SPaT)

Road Weather Management

Portable Road Side Unit (RSU) sends weather warning to vehicle



Road weather station detects icing conditions, reports conditions to weather office



Vehicle is approaching hazardous weather conditions area

Approaching vehicle receives message of road ice in area from **RSU and/or cellular network**



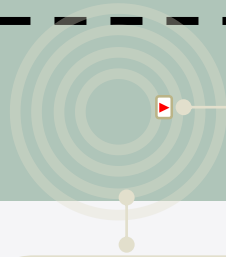
Driver Vehicle Interface (DVI) example

Driver reduces speed in response to warning

Work Zone Warning/ Management



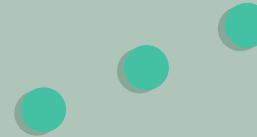
Portable RSU sends work zone info to vehicle



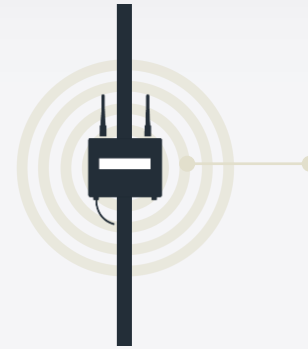
Vehicle is approaching work zone too fast

Approaching vehicle receives message from **RSU** with work zone information

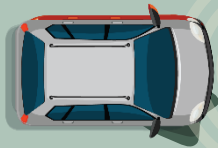
Driver Vehicle Interface (DVI) provides warning of lane closure



Pavement Condition Monitoring



roadside unit sends pothole data to operations center



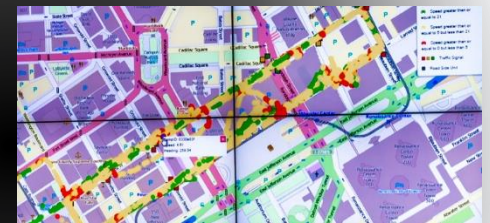
Vehicle drives over pothole in pavement

Sensors in vehicle detect acceleration at that location the pothole strike, stores data

Maintenance crews respond to fix pothole

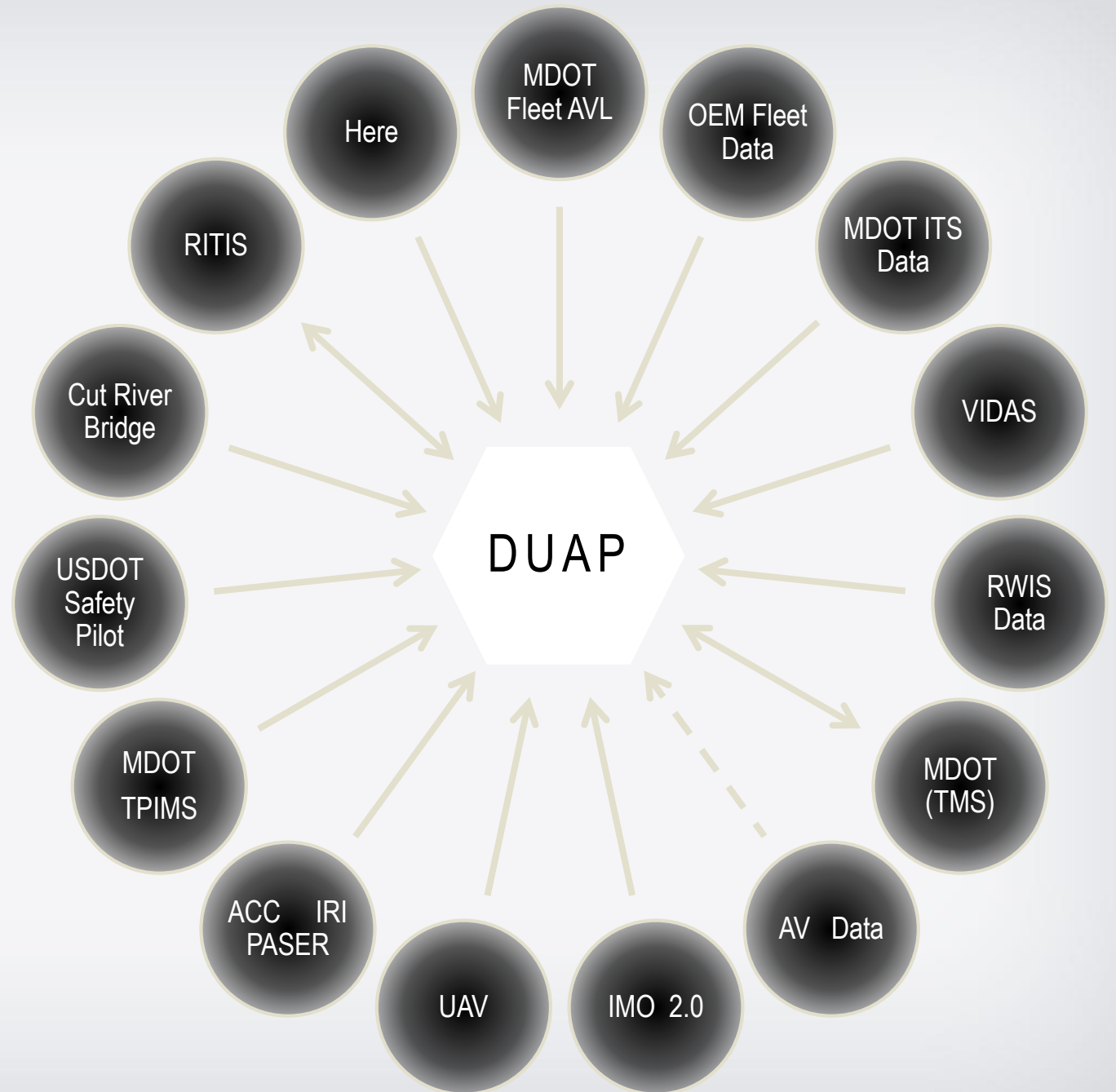
Vehicle broadcasts message to roadside unit as it drives

DOT receives data from that vehicle (and lots of others), dispatches maintenance crew



Heat map of pavement conditions

MDOT's Data Use Analysis and Processing (DUAP) program is pioneering the collection and fusion of CV data with a wide range of data sources.



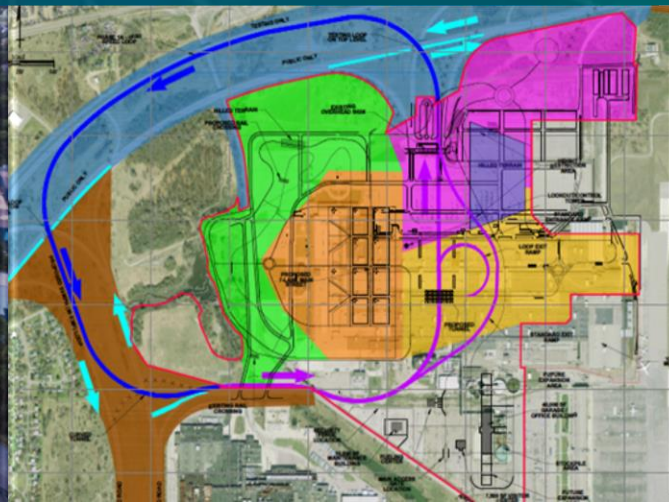
Government on Board

- Guidance from Feds
 - USDOT
 - NHTSA
- Role of Licensing Agencies and Economic Development
- MDOT's considerable support & role



Partnerships

- Automobile manufacturers and suppliers
- Technology companies
- Communications companies
- National organizations



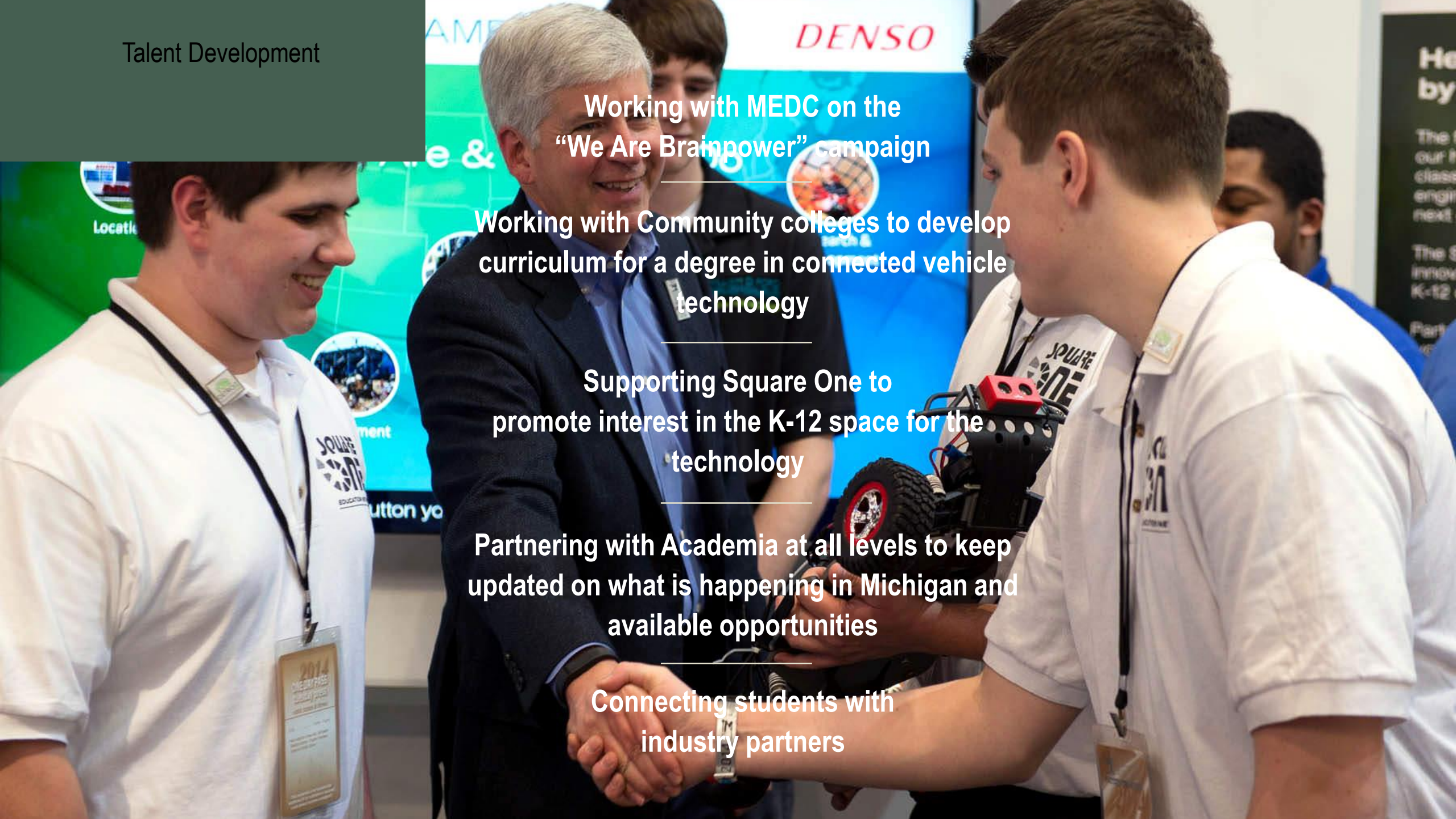
Working with MEDC on the
“We Are Brainpower” campaign

Working with Community colleges to develop
curriculum for a degree in connected vehicle
technology

Supporting Square One to
promote interest in the K-12 space for the
technology

Partnering with Academia at all levels to keep
updated on what is happening in Michigan and
available opportunities

Connecting students with
industry partners



Communications

Talent

Research

Infrastructure

Applications

Data

Vehicles

Get Engaged

Michigan is Open for Business for CAV Partnership Opportunities