



MICHIGAN IS AUTOMOBILITY



MICHIGAN ECONOMIC
DEVELOPMENT CORPORATION



THE INDUSTRY AT A GLANCE

Michigan: Global Leader in Next-Generation Mobility

Rooted in a century of design engineering and manufacturing expertise, Michigan is leading the automotive industry's evolution from traditional manufacturer to the research, testing, and deployment of next-generation mobility technology. Comprised of top-notch manufacturers, technology companies, access to the global supply chain, a highly skilled workforce, and best-in-class research institutions, Michigan is home to the world's most dense automotive industry cluster and is well-positioned to drive the industry's transformation and growth into the next century.

#1

for operational U.S. Department of Transportation funded and connected vehicle deployments with 11 projects.

\$12 billion

business funded automotive R&D occurs in Michigan annually.

19

universities and colleges in Michigan offer nationally-ranked undergraduate engineering programs and four offer nationally-ranked graduate programs.

22

vehicle models were assembled in Michigan in 2018.

500+

miles of roadway equipped for connected vehicle testing by 2020.

18

original equipment manufacturers (OEMs) have headquarters or technology centers in Michigan.

96

of the top 100 automotive suppliers to North America have a presence in Michigan and 60 are headquartered here.

17%

of all 2018 U.S. vehicle production and 11% of all North American vehicle production occurred in Michigan.

\$29 billion

in OEM and supplier investment in Michigan since 2009, more than three times any other state.

DRIVING MICHIGAN BUSINESS GROWTH

Michigan's robust business climate has added more than 560,000 private sector jobs over the past eight years, resulting in a nearly 9% gain in median household income and an unemployment rate dropping as low as experienced in 2000. In addition, Michigan is a top 15 state for business tax climate and continues to streamline regulations, grow its workforce, and improve the overall environment for investment and economic growth.

Rankings

11th most robust economic climate in 2018.

3rd in the nation for technology and innovation.

4th in the nation for cost of living.



Talent

The average salary for employees is **\$50,649**.

Michigan is home to **9.9 million** people.

The civilian labor force is made up of **4.9 million** people.

The median household income is **\$52,668**.



Job Growth

Automotive manufacturing jobs have grown by **7%** from 2014 to 2018.

In 2017, automotive manufacturing jobs rose by **1.1%** or approximately **1,300 jobs**.

From 2016 to 2018, Macomb County (#1), Wayne County (#20), and Oakland County (#28) **led the nation** in new manufacturing jobs.



Taxes and Regulations

Michigan has a flat **6%** corporate income tax.

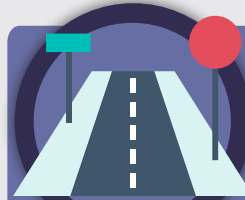
Michigan eliminated the personal property tax in 2014, saving businesses **\$5 million** annually.

GLOBAL MOBILITY LEADER

When it comes to mobility innovation, Michigan is leading the world in connected and automated vehicle (CAV) legislation and infrastructure investment. From key public-private partnerships to being nationally competitive in mobility-related patents, Michigan is the place for testing and deployment of connected, automated, and electric vehicles.

58%

of Michigan automotive suppliers conduct automated vehicle testing in the state.



Home to the **largest deployment of V2I** (vehicle-to-infrastructure) technology in the United States, with plans for more than 350 infrastructure miles compatible with V2I.

65%

of Michigan suppliers engage in connected vehicle technology development.





Over **115**
Roadside
Units (RSU)
for connected
vehicles
throughout the
state.

#1

in the nation
for engineering
talent
concentration.



Home to two
**unique-in-the-
nation** automated
testing sites,
Mcity in Ann Arbor
and the American
Center for Mobility
in Ypsilanti.



Michigan
ranks **sixth
in the nation**
for number
of inventors,
with more than
10,000, that
were issued
patents in 2017.

Home to the
second-largest
system of
adaptive traffic
signals in
the nation.



BUSINESS CLIMATE

Government Partnerships

Recognizing that other states and countries have a key role in the development of automated vehicle safety, testing, and deployment, Michigan has entered into agreements with five countries and three states, including:



Australia



Canada



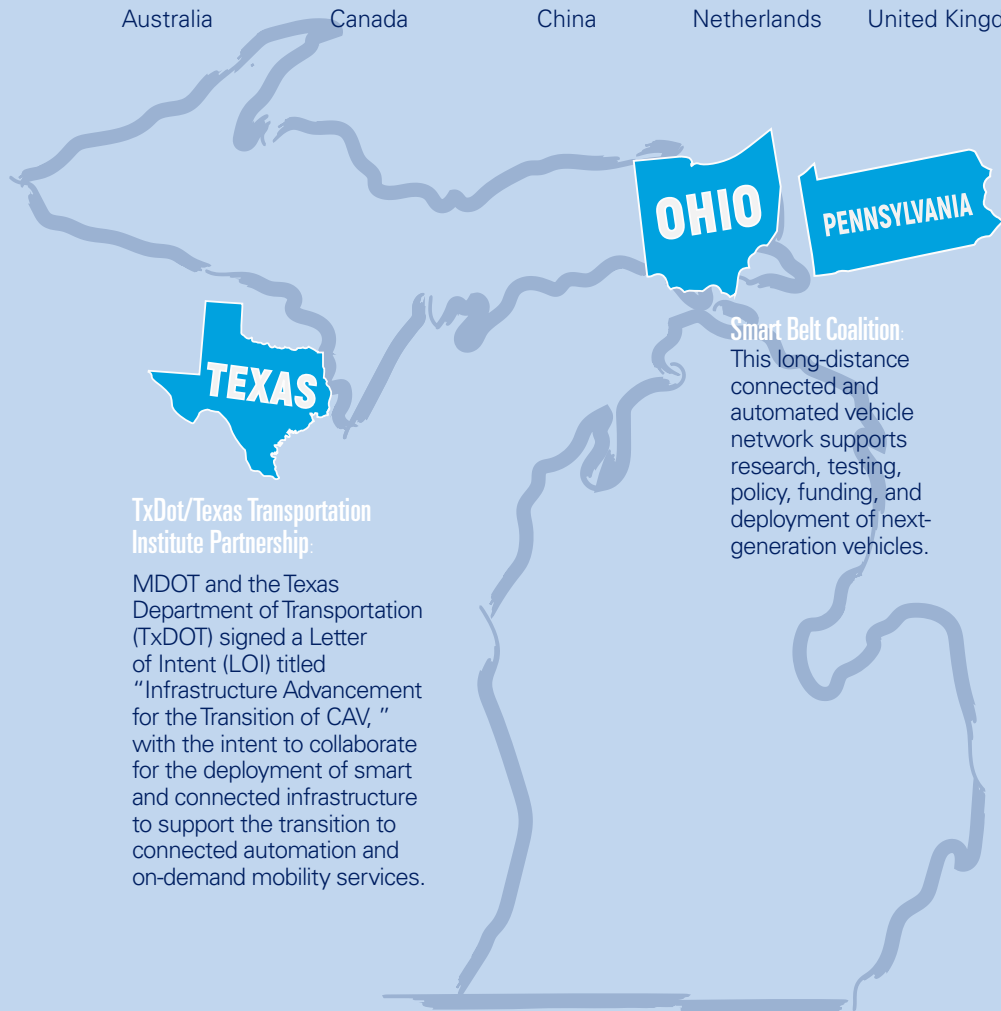
China



Netherlands



United Kingdom



TxDOT/Texas Transportation Institute Partnership.

MDOT and the Texas Department of Transportation (TxDOT) signed a Letter of Intent (LOI) titled "Infrastructure Advancement for the Transition of CAV," with the intent to collaborate for the deployment of smart and connected infrastructure to support the transition to connected automation and on-demand mobility services.

Smart Belt Coalition.

This long-distance connected and automated vehicle network supports research, testing, policy, funding, and deployment of next-generation vehicles.

Michigan Council on Future Mobility

The Council provides the governor and Legislature recommendations regarding state policy to ensure Michigan continues to be the global leader in automated, driverless, and connected vehicle technology.

Cybersecurity

Provides feedback on issues related to automated vehicle cyberattacks, infrastructure, data sharing, and penalties for malicious sharing of data.

Legal Insurance

Reviews the Michigan Compiled Laws, especially the Vehicle Code and Insurance Code and established the "Michigan Journal of Mobility Law" at the University of Michigan Law School.

Strategy

Recommends how the state can lead in areas of technology associated with connected and highly automated vehicles, creates benchmarks for research and development of CAVs, and determines how to facilitate the integration of connected vehicles in communities.

MICHIGAN: GATEWAY TO THE WORLD

Michigan is one of the most globally connected regions in the nation. Sharing an international border with Canada, it is the sixth largest export market and is home to the third best airport for customer satisfaction.

Michigan companies exported **\$59.8 billion** in goods with \$29.2 billion allocated to transportation equipment in 2017.

#1 exporter of transportation equipment in the United States.

6th in the nation for exports in 2017.

One of two states among the top 10 largest exporters to post positive five-year export growth.

10.5% of U.S. transportation equipment manufacturing exports come from Michigan companies.



Foreign Direct Investment

Investment from foreign-held companies is critical to Michigan's economy. For the second straight year, the state received more than 70 foreign direct investment (FDI) projects totaling more than \$2 billion, an increase of \$500 million over 2016. With 1,400 foreign subsidiary locations in the region, Southeast Michigan's proven track record of moving goods globally is a magnet for companies looking to do business with the automotive industry.

Top Five Countries Investing in Michigan (by ranking)



Germany



Japan



Canada



China



United Kingdom

Ranked **9th** in the nation for number of FDI projects announced over the past 10 years among all states.

9,527 jobs were added through FDI.

\$500 million
more in investments were announced over 2016.

More than **\$2 billion** in investments were announced for a second straight year.

54% of investment by industry cluster was dedicated to transportation equipment.

Global Impact of the 'Detroit Three'

Combined, Detroit's largest automakers – FCA US LLC, Ford Motor Company, and General Motors Co. — operate 88 international assembly plants.



FIAT CHRYSLER AUTOMOBILES

Total: 25



Total: 26



Total: 37

GLOBAL LEADER

MICHIGAN'S TALENT PIPELINE

The state's workforce and talent pipeline drive the innovation and growth necessary for the automotive and mobility industry's transformation. From access to top engineering graduates across the state to the high-skill jobs powering Michigan's legacy industry, talent is the lifeblood of Michigan's growing economy.

8,000+

engineering degrees were awarded by Michigan education institutions in 2017, with 41% masters' degrees or higher.

19

Michigan universities and colleges have nationally ranked undergraduate engineering programs. Four have ranked graduate programs.

121,468

total degrees were awarded by Michigan educational institutions in 2017.

Top 10 Engineering Graduates

Institution	City	Degrees Conferred (2017)
University of Michigan	Ann Arbor	2,502
Michigan Technological University	Houghton	1,066
Michigan State University	East Lansing	898
Wayne State University	Detroit	748
University of Michigan	Dearborn	467
Lawrence Technological University	Southfield	454
Western Michigan University	Kalamazoo	432
Oakland University	Rochester	409
Kettering University	Flint	333
Grand Valley State University	Allendale	141

Community College Programs



**Advanced
Transportation Center**

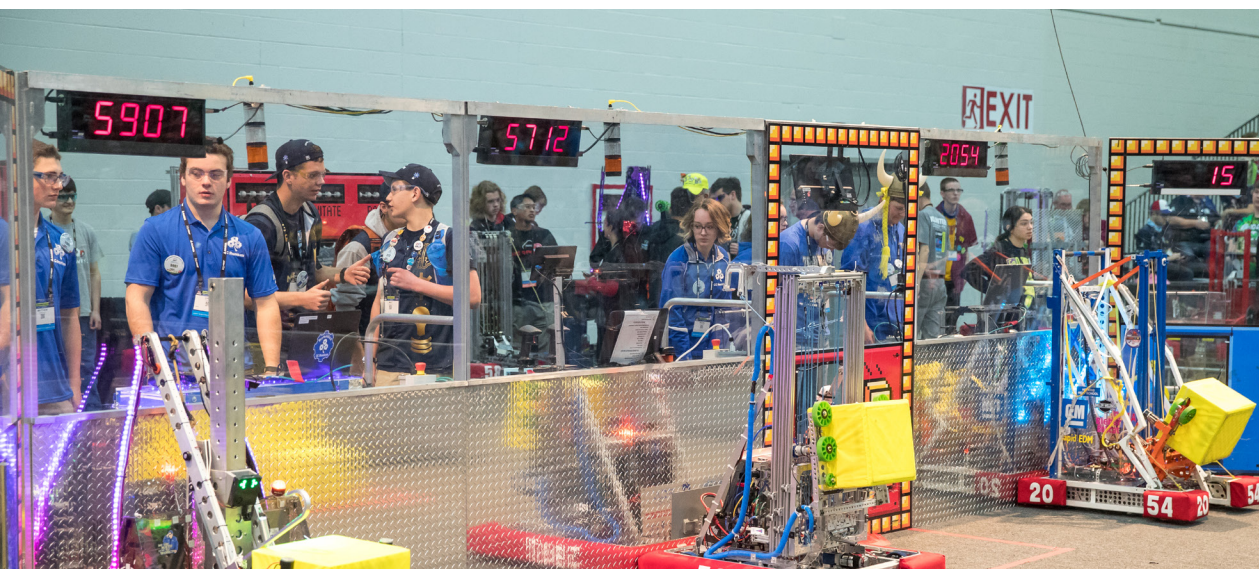


**Macomb
Community College**

**Center for Advanced
Automotive Technology**



NEXT-GENERATION OF TALENT



FIRST Robotics

Michigan ranks No. 1 in the amount of high school and elementary teams in the country. The global FIRST Robotics championship will be held annually in Detroit through 2020.

- 540 high school teams
- 808 early elementary teams

Intelligent Ground Vehicle Competition

Held annually at Oakland University, the event offers cutting-edge competition among college students encompassing a wide range of disciplines focused on the latest technologies, from electrical engineering and computer science to intelligent vehicle systems.

Cyber Training Institute

First in the nation, this cybersecurity program held at Pinckney Community High School, allows students and adults to enroll in cybersecurity courses, earn state-approved certifications, and engage in cybersecurity training exercises.

Autonomous Innovative Vehicle Challenge

Hosted by Square One Network, the event is held on the campus of Kettering University in Flint and challenges students to re-engineer a Power Wheels Jeep into an autonomous vehicle utilizing next-generation technology, GPS, and sensors.

Formula SAE Michigan Competition

Held at the Michigan International Speedway, students enhance their engineering design and project management skills by developing and constructing a single-seat race car with the best overall design, construction, performance, and cost. In 2018, 2,567 students participated in the competition.

Michigan Mobility Institute

This educational institute offers academic, professional, executive, retraining, and skilled-trades programs to develop talent in fields such as artificial intelligence, robotics and cybersecurity. A Master of Mobility degree will be developed with university partners, starting in 2021.

University Research Corridor (URC)



WAYNE STATE
UNIVERSITY

\$18.7 billion

in economic impact with
140,285 students and
\$2.3 billion in research
and development spending.

1.2 million

graduates worldwide
attended URC colleges,
with 669,274 graduates
residing in Michigan.

EDUCATION PIPELINE

TALENT ADVANTAGE

Michigan ranks **#1** among all states in number and concentration for the following occupations:

44,680

mechanical engineers

1,630

model makers
(metal and plastics)

28,460

industrial engineers

5,690

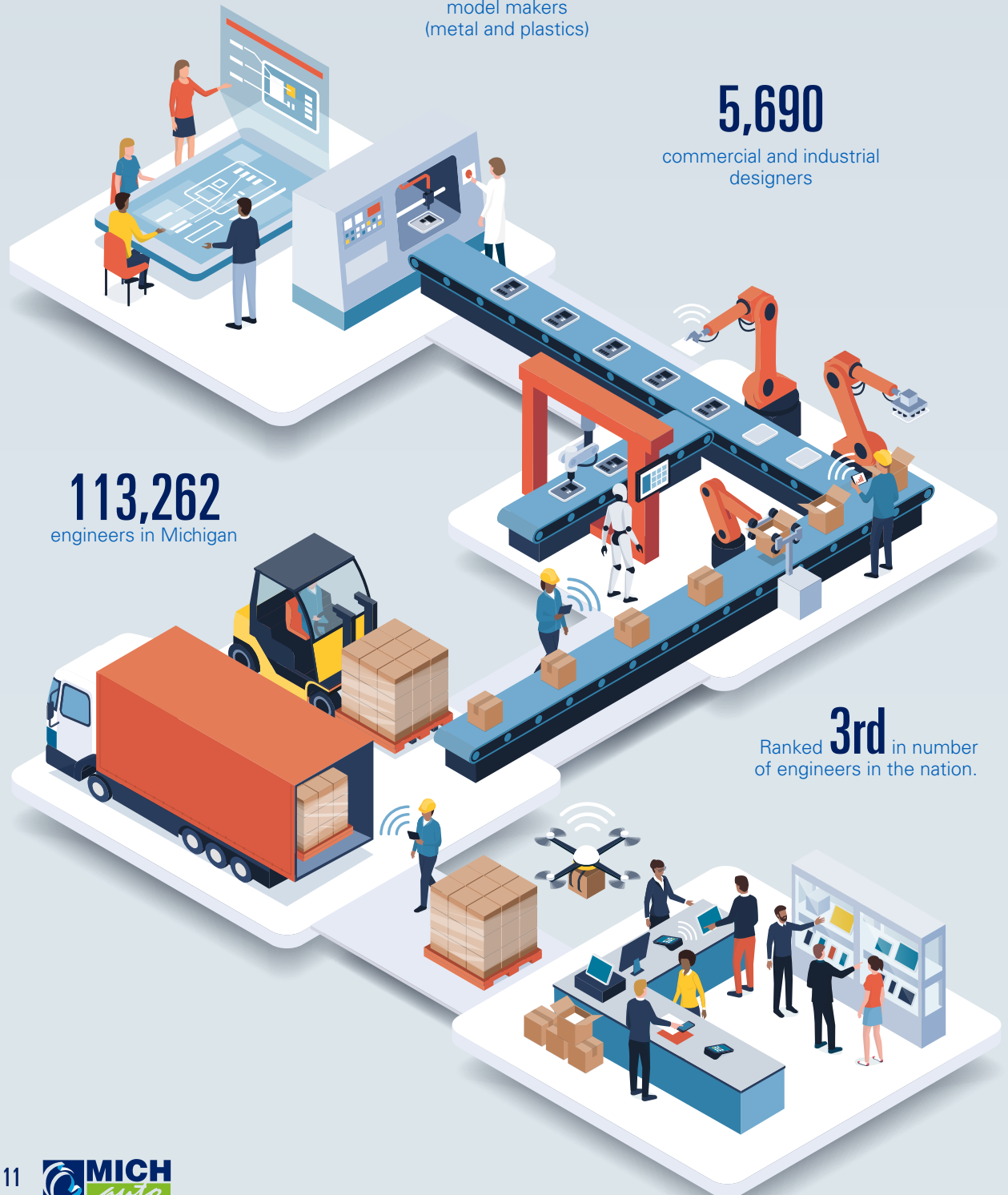
commercial and industrial
designers

113,262

engineers in Michigan

3rd

Ranked in number
of engineers in the nation.



Skilled Trades

Skilled trades workers comprise 1.1 million people across the state. Michigan's national competitive advantage includes high concentrations of numerous skilled trade occupations, including:

- Model makers (nine times the national average)
- Tool and die makers (six times the national average)
- Machine setters, operators, and tenders (three times the national average)
- Computer numerically controlled machine tool programmers (three times the national average)

Michigan's more than 108,000 highly-skilled assemblers and fabricators, working in mobility-related occupations, produce the world's most complex and highly technical product.

Job Postings



3,755

average monthly hires in engineering in Michigan.



53,867

unique engineering job postings were available in Michigan in 2018.

Michigan is ranked **4th** for active engineering job postings (13,760), after California, Texas, and Florida.



Top-Engineering Job Postings in Michigan

Note: 2018 unique postings.

• Design engineers	5,797
• Controls engineers	2,740
• Quality assurance engineers	2,594
• Product engineers	2,282
• Quality engineers	2,198

Top Counties Posting Automotive Engineering Jobs

Oakland, Wayne, and Macomb

Top Cities Posting Automotive Engineering Jobs

Detroit, Troy, and Auburn Hills



MICHIGAN'S ENTREPRENEURIAL ECOSYSTEM

Through its vast network of accelerators and venture capital firms, Michigan is nationally recognized as a place to launch and grow a business due to its strong pipeline of capital, talent, and research institutions. This well-developed startup and venture capital community ensures the technologies solving the world's mobility-related challenges are being created and developed in the state.

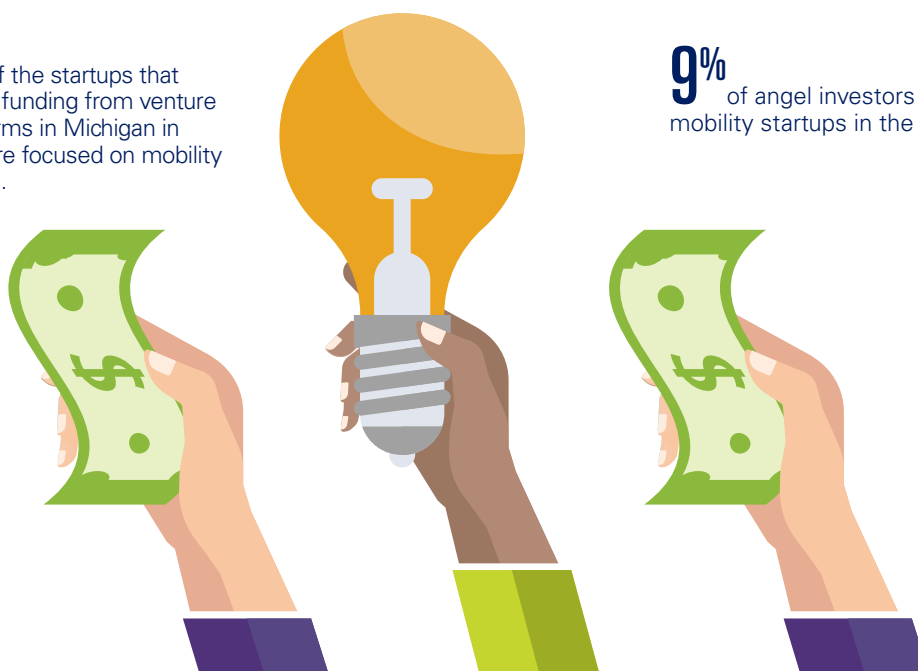
Venture Capital

21 venture capital firms and eight angel investors funded mobility technology startups in Michigan, while another 61 provided entrepreneurial support.

9% of the startups that received funding from venture capital firms in Michigan in 2017 were focused on mobility solutions.

10% of venture capital investments in Michigan were dedicated to the mobility sector in 2017.

9% of angel investors fund mobility startups in the state.



planetm

A Commitment to Startups

\$20 million in funding was earmarked by the state of Michigan for investment in next-generation mobility technology companies and pilot programs during the 2019 fiscal year to help strengthen Michigan as the nation's hub for advanced automotive and mobility research.

PlanetM Startup Grants:

11 pilots in total to be deployed by fall 2019. Four mobility startups already awarded and deployed real-world solutions to transportation challenges, include: Derg, HAAS Alert, Humanising Autonomy, and RoadBotics.

PlanetM Testing Grant:

Providing mobility startups opportunities to access advanced testing facilities with grant funding.

Michigan Mobility Challenge:

13 pilots have been announced and will be deployed in 2019 as part of the \$8 million fund for transportation projects that solve mobility gaps for seniors and persons with disabilities.



This joint initiative of the Detroit Regional Chamber and Michigan Economic Development Corp. provides a physical entry point for global mobility startups to access the vast network of automotive companies, testing infrastructure, talent, and R&D centers Michigan offers.

30 startups from six countries,
representing seven U.S. states.

11 industry partners



Innovation Collaborations

Techstars Detroit: This accelerator invested in 44 startups that have raised \$80 million and are valued at \$215 million. Techstars connects startups to corporate accelerators, network sponsorships, the Techstars network engagement program, and an innovation bootcamp.

Detroit Mobility Innovation Initiative: This business and nonprofit initiative led by the city of Detroit and state of Michigan, aims to create mobility-focused solutions for neighborhood mobility, downtown accessibility, and electric vehicle utilization and education.

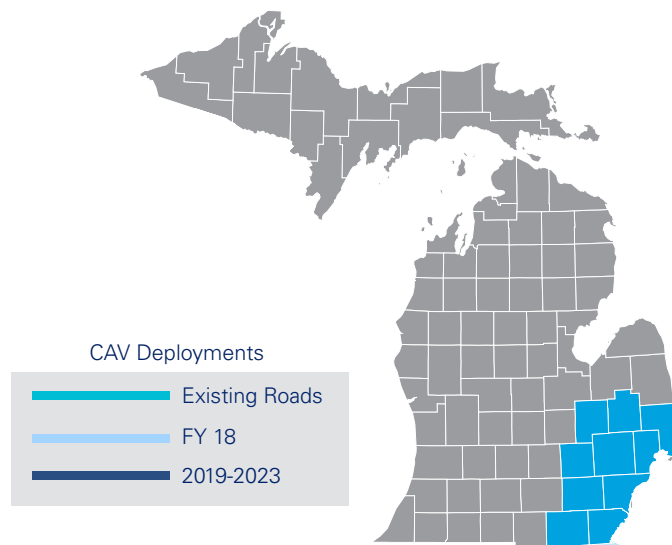
World Economic Forum's SIMSystem: This project provides support through design workshops focused on increasing mobility efficiency in Detroit, Ann Arbor, and Windsor, Canada.

Detroit Moves: Located in downtown Detroit, the event includes live demonstrations and activations that showcase the innovative mobility technology being designed and produced across the state.

2030 Detroit Equitable Mobility: A joint project of the College for Creative Studies, Design Core Detroit, Ford Motor Company, and GTB, this effort focused on mobility equity in Detroit and creating solutions for how mobility effects health, employment, education, and socialization.

May Mobility Deployments: This startup deployed self-driving shuttle fleets in Detroit and Grand Rapids through public and private partnerships.

THE INTERSECTION OF AUTOMOTIVE AND TECHNOLOGY

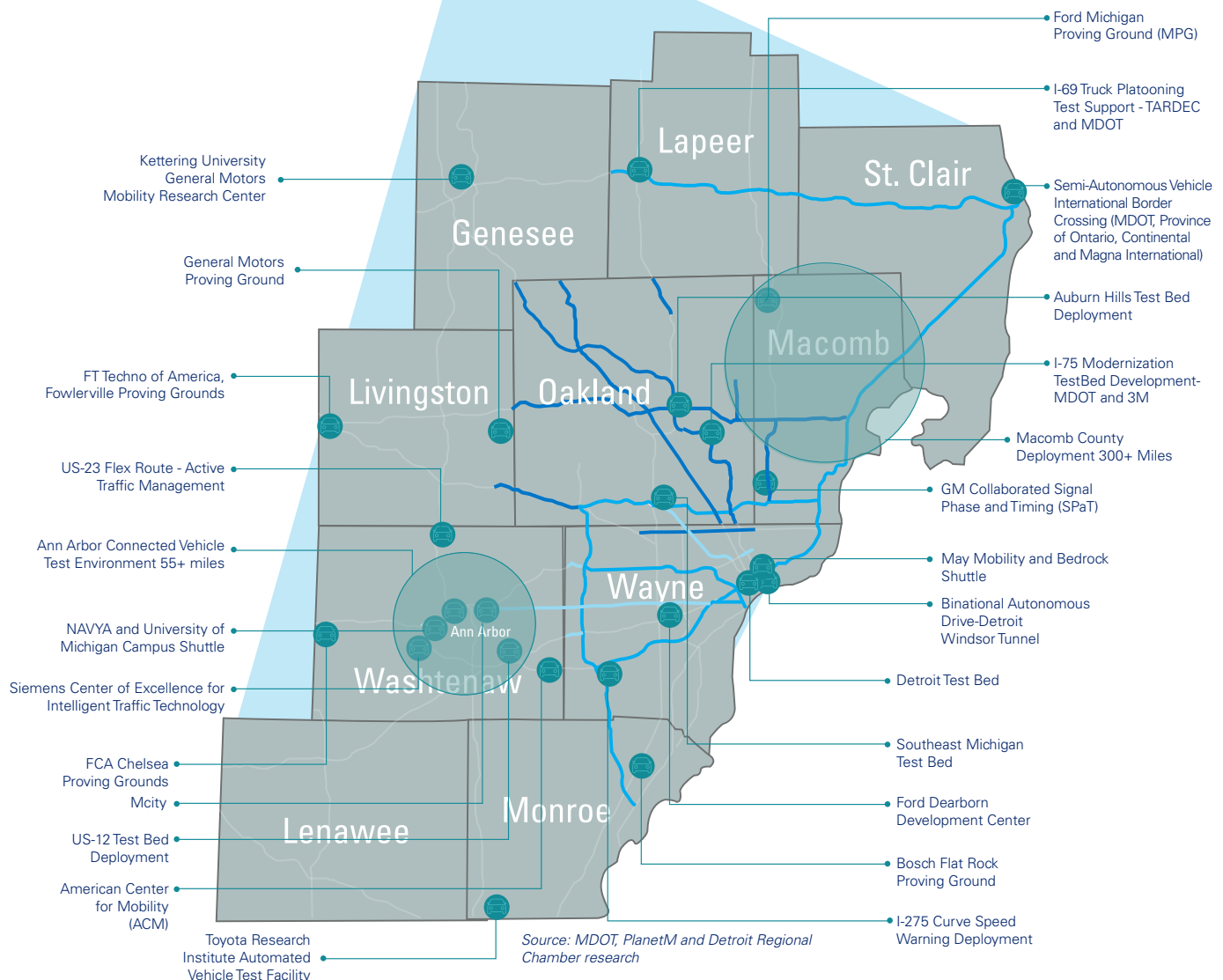


As the technology and automotive industries converge, Michigan automakers are actively engaged in partnerships with companies around the globe driving innovation around electrification, autonomous driving, mobility, and connectivity.

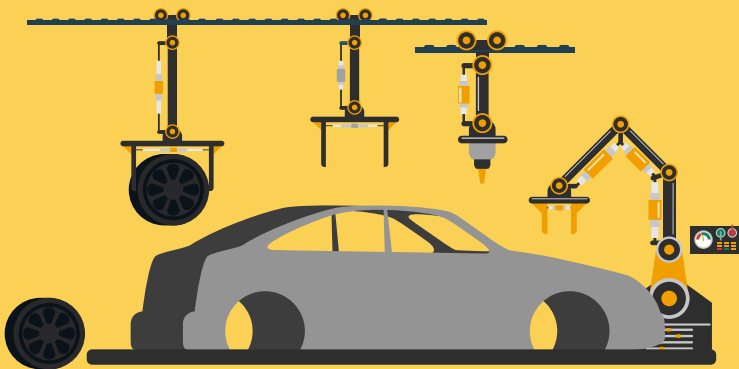
Connected Vehicle Deployments

The Detroit region leads the nation with a mix of private and public proving grounds, road initiatives, and CAV investments. Additional Michigan investments include statewide CAV data acquisition and weather-responsive information systems, along with signalized intersections in Ingham County.

Cold weather testing facilities in the Upper Peninsula of Michigan include the Keweenaw Research Center, engaged in testing for over 60 years, and the Continental Brimley Development Center.



Michigan is home to **2,200+** facilities, with engineering, design, testing, and validation capabilities.



PlanetM Pilot Programs

Ann Arbor Mobility Transformation Program: A public-private partnership consisting of Ann Arbor SPARK, the city of Ann Arbor, Deloitte, Ford Smart Mobility, PlanetM, and the University of Michigan, this program aims to integrate data from mobility solutions into a centralized digital platform for city planners and transportation users to make more informed decisions.

Project Kinetic: This unique 12-week collaboration between the public, private, and philanthropic sectors resulted in more than 120 innovative solutions to tackle some of the most pressing mobility challenges facing Detroit. Six pilots were selected to launch in 2018.

City of Tomorrow Challenge: Co-hosted by the city of Grand Rapids, Ford Motor Company, Mobile GR, PlanetM, and The Right Place, the Challenge awarded Kaizen Health a \$100,000 prize to fund a pilot program aiming to eliminate transportation as a barrier to good medical care.

Labs/Research Centers



Opened in 2017, the American Center for Mobility (ACM) is a national center for CAV research, testing, product development, validation, and certification.

- 500 acres with 12 configurable test environments utilized by government, industry, and academia.
- 23-member academic consortium enabling Michigan colleges and universities to collaborate on workforce transformation.
- Awarded \$2.4 million for research involving fuel-efficient platooning on highways by the U.S. Department of Energy.



EPA National Fuel and Vehicles Lab: State of the art facility that provides emission testing services, along with developing, designing, and fabricating new and cost-effective technologies and components to reduce vehicle or engine emissions and increase fuel efficiency.



Industry-led public-private partnership, operated by the American Lightweight Materials Manufacturing Innovation Institute (ALMMII), to develop and deploy advanced lightweight materials manufacturing technologies and implement education and training programs to prepare the workforce.



Battery Lab: This initiative is part of the Energy Institute public lab developed with MEDC and Ford Motor Company to work with the industrial and academic energy storage user community, including suppliers and manufacturers, to prototype, test, and analyze batteries and the materials that go into them.

Mcity: This mock city is a test environment created to cultivate diverse expertise and resources required for emerging technologies, with 60 industry partners, 50 faculty, more than 100 students involved in research activities, and \$20 million invested in 40 R&D projects.

Robotics Institute: This \$75 million building includes 140,000 sq.ft. of specialized labs, collaboration space, and a fourth floor leased to Ford Motor Company robotics engineers. Includes M-Air test facility, the autonomous aerial vehicle outdoor lab.

Transportation Research Institute (UMTRI): Operating since 1965, UMTRI is dedicated to achieving safe and sustainable transportation for a global society. There are more than 1,000 interdisciplinary research projects focused on increasing driving safety and transportation systems knowledge.



U.S. Army Tank Automotive Research, Development, and Engineering Center (TARDEC), a TACOM partner, is responsible for maximizing research, development, and sustainment of technologies and integration across systems. In cooperation with MDOT, platooning technology tests have occurred on Michigan roads and across the region's international border.



Testing and Validation Centers

9 proving grounds

American Center for Mobility: **500** acres and \$135 million investment.

Mcity: **60** industry partners and \$20 million in research projects.

Entrepreneurs

21 venture capital firms and eight angel investors in mobility space and another 61 provide entrepreneurial support.



Talent Advantage

113,000 engineers in Michigan, ranking the state third in the nation.

19% of U.S. automotive manufacturing jobs are in Michigan.

#1 in the nation:

Mechanical engineers (45,000); Industrial engineers (28,000); Commercial and industrial designers (5,000)

Next-Generation Mobility



Global Automotive Center



18 OEM world headquarters or technology centers.

1.8 million vehicles assembled at plants, producing 22 models in 2018.

Deployments and Pilot Projects

#1 in number of U.S. DOT-funded operational connected vehicle deployments.

Ann Arbor Connected Vehicle Test Environment: **27-square-miles**, 5,000 test vehicles, and largest real-world deployment of CAV infrastructure.

1st CAV international border crossing with U.S. Army/TARDEC, and MDOT Truck Platooning Test.

MOBILITY ECOSYSTEM

Legislation

Michigan CAV legislation leads the nation, allowing driverless cars and vehicle platoon testing on public roads.

Education Pipeline

8,000 engineering degrees conferred annually.
19 nationally-ranked undergraduate engineering programs and four nationally-ranked graduate programs.



WAYNE STATE
UNIVERSITY

#1 in the nation for high school and early elementary FIRST robotics teams.

Industry 4.0

Cybersecurity

Michigan Cyber Range operates **12** sites and hubs.

1st high school in the nation, Pinckney Community High School, with a dedicated cybersecurity program.

Robotics

28,000 industrial robots, more than any other state.

140,000 sq. ft. University of Michigan Ford Robotic Facility opens in 2020.

Transportation, Distribution, and Logistics Supply Chain

#1 northern international border crossing.

100+ years of transportation, distribution, and logistics expertise.

Michigan State University ranked **#1** graduate program for supply chain management.

Defense

4,000 companies employing over 100,000 people.

\$3 billion in defense contracts.

KEY MILITARY INSTALLATIONS:



Culture

New and historic automotive culture is demonstrated at:

Automotive Hall of Fame

Chevrolet Detroit Grand Prix

The Henry Ford

Michigan International Speedway

North American International Auto Show and AutoMobili-D

Woodward Dream Cruise



MICHauto.org

Promote. Retain. Grow.

MICHauto, Michigan's automotive and mobility cluster association, provides a platform for industry leaders and stakeholders to engage in advocacy, build awareness, increase access to talent, and foster next-generation mobility.

120 investors working together through MICHauto to promote the industry and tackle industry issues.

135 CEOs engaged through MICHauto initiatives, events, and strategic convening.

1,500+ students engaged annually through MICHauto events and initiatives.

30 mobility startups have found a home in Detroit's PlanetM Landing Zone, a partnership between the Detroit Regional Chamber, MICHauto, and Michigan Economic Development Corp.

100+ Michigan legislators engaged and educated on industry issues through MICHauto and the Michigan Auto Caucus.



The artwork featured on the cover of this publication was created by student illustrator, Tyler Osgood, in partnership with the College for Creative Studies (CCS). For more information visit TylerOsgoodArt.com.



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