

INNOVATING FUTURE MOTION

We are reinventing mobility. By harnessing technology and driving innovation, we are striving to address global transportation challenges and help people move more confidently, freely and safely.

We strive to provide our customers with vehicles they love and trust.

Our belief, that freedom of movement drives human progress, lies behind our commitment to become the world's most trusted company, and fuels our passion for designing smart vehicles for a smart world.

We are committed to addressing today's most pressing issues through our vehicles and services.

Through advances in connectivity and cleaner fuels, our new generation of vehicles and services will reduce air pollution and reduce congestion in urban centers.

We continue to adapt our business to meet demand for a growing range of mobility solutions.

Emerging opportunities in electrified vehicles, self-driving vehicle technology and other mobility solutions and services are a strategic priority for Ford, as they offer the potential for significant growth.

Highlights

\$11b

GLOBAL INVESTMENT IN ELECTRIFIED VEHICLES BY 2022

10+

YEARS OF EXPERIENCE IN DEVELOPING SELF-DRIVING VEHICLE TECHNOLOGY

Sustainable Development Goals

THROUGH OUR WORK IN INNOVATING FUTURE MOBILITY, WE ARE CONTRIBUTING TO THE UN SDGS:



Our Aspirational Goal



We aspire to drive human progress by providing mobility and accessibility for all.

SCALING UP ELECTRIFICATION

We remain focused on delivering affordable electric vehicles at scale, by electrifying our most popular and iconic vehicles. With around 20 years of experience in the field, we have committed to invest \$11 billion in electric vehicles and the infrastructure they require over five years.

OUR ELECTRIFICATION STRATEGY

Global demand for cleaner transportation is rising. China, India, France and the U.K. have all announced plans to phase out vehicles powered solely by combustion engines and fossil fuels between 2030 and 2040. To help them progress toward that goal, we plan to deliver affordable electric vehicles at scale, particularly in China, Europe and North America.

Electrifying Our Vehicles

As part of our vision of smart vehicles for a smart world, we have adopted a holistic approach to electrification. This includes electrifying our most popular nameplates, such as SUVs, commercial vehicles and trucks, to provide a profitable portfolio of hybrids, plug-in hybrids and all-electric vehicles to meet our customers' evolving needs and preferences.

Enhancing the Owner Experience

To drive our strategy further, we have created a dedicated global electric vehicle organization, Ford Team Edison, based in Detroit's historic Corktown neighborhood. The team is moving quickly to deliver electric vehicles that offer exciting ownership experiences and enhanced capabilities.

As we drive electric innovation, we will continue to focus on human-centric design. As well as exploring customer trends, we will draw on feedback from the public to fully understand what our customers are looking for in electric vehicles, such as how to use the extra space created by not having a conventional engine.

Supporting Charging Infrastructure

Our approach is to help make charging an effortless experience, at home and on the road. In Europe, we are a founding member of the [IONITY consortium](#) that aims to build 400 fast-charging stations across the continent locations by 2020, and in the United States, we are developing an extensive set of charging solutions to support our customers.



SCALING UP ELECTRIFICATION CONTINUED

OUR BIG PUSH IN CHINA

We will create a new energy vehicle center of competence in China to deliver on – and accelerate – our commitment to introducing a broad range of electric vehicles to the world’s largest auto market. This will include plug-in hybrids and all-electric vehicles, leveraging our global and local relationships and resources. By 2021, we will launch more than 10 new electrified vehicles from Ford and Lincoln, including the all-new Ford Territory BEV SUV and the all-new Lincoln Aviator PHEV SUV in 2019.

Advancing Electric Vehicle Technologies Through Innovation and Cooperation

As part of our commitment to reducing CO₂ emissions, our work to electrify our most popular nameplates will see all-new Explorer and Escape hybrids in 2019, and an all-new F-150 hybrid in 2020 that will include a mobile generator.

We are also on track to launch our

new Mustang-inspired, fully electric performance utility in 2020 with a range of 300 miles, and we have started developing an all-new, all-electric F-150 that will be our first full-size electric pickup truck.

Committed to leveraging adaptive business models and collaborating with others, we have a partnership with Mahindra to jointly develop a small EV in India, and we are exploring potential collaboration on electric vehicles with Volkswagen.

SELF-DRIVING VEHICLES

The opportunity with self-driving vehicles is much more than just developing the technology. The challenge is to build consumer trust in the safety, reliability and experience that it will enable, and to apply it to improve our lives.

A TASTE OF TOMORROW'S MOBILITY TODAY

Self-driving vehicles can help solve real-world problems in today’s increasingly urbanized environments. They promise individuals new levels of accessibility, affordability and convenience, while also enabling businesses large and small the opportunity to reach more customers.

We believe that self-driving vehicles can become a fundamental part of a new connected transportation network, populated by smart vehicles and infrastructure communicating through the TMC. That’s why we’re working closely with business, government and industry partners to test and deploy self-driving technology.

BRINGING SELF-DRIVING TO THE CAPITAL

With our partners Argo AI beginning to map the city in 2018, we became the first company to test self-driving vehicles in Washington D.C. in early 2019. Working with the municipal government, we plan to deploy our test fleet of self-driving vehicles in all eight of the city’s neighborhoods. Washington D.C. is our latest U.S. testbed, enabling us to build on what we’ve already learned from the different environments and specific challenges presented by Pittsburgh, Detroit and Miami.

	HEVs	PHEVs	All-Electric Vehicles
Power Sources	ICE, electric motor with a battery system	ICE, electric motor with a high-voltage electric battery	High-voltage electric motor powered by a lithium-ion battery pack
Benefits	<p>When using the electric motor and battery system only (e.g., low speeds, short distances), no gasoline is used</p> <p>Can run on battery power, on ICE power, or both</p> <p>Regenerative braking system captures energy to recharge the battery</p>	<p>Battery can be charged from a household or public electric outlet</p> <p>When the battery is depleted, the vehicle functions as a standard HEV</p> <p>Accrues charge through regenerative braking</p> <p>Tailpipe emissions can reach zero when running on battery power</p>	Lack of tailpipe CO ₂ and other emissions during use
Models	Hybrid versions of high-volume vehicle platforms, including: Ford Fusion, Ford Mondeo, Lincoln MKZ, Ford Police Responder Hybrid Sedan	Fusion Energi, Mondeo Energi, Police Special Service Plug-in Hybrid Sedan	

SELF-DRIVING VEHICLES CONTINUED

OUR NO.1 PRIORITY: SAFETY

We currently offer customers a wide variety of driver assist technologies in our vehicles, alerting them to potential collisions and making stressful aspects of driving, such as parallel parking, easier. As well as improving safety today, many of these automated features are also the building blocks for a safe autonomous future.

Recognizing the level of public hesitation that exists about self-driving cars, we implement strict precautions to ensure safety. As well as going through simulation and proving-ground testing before testing on public roads, all of Ford's self-driving test vehicles have a safety driver and co-pilot on board during development.

We are on track to deliver on our commitment to launch a purpose-built self-driving vehicle in 2021.

A Matter of Trust

We have recently published *A Matter of Trust*, a voluntary safety self-assessment that outlines our approach to self-driving vehicle development. It details how self-driving vehicles work, what challenges they will solve and how we're working to earn public trust by prioritizing safety, designing for reliability and delivering an enjoyable and valuable customer experience.

> [Read A Matter of Trust](#)



Goods That Deliver Themselves

As we work toward our goal to launch self-driving vehicles in commercial operation in 2021, we have teamed up with several partners in Miami to test how customers interact with them.

A project with Postmates allowed us to test prototype vehicles with novel modifications. The vans have a locker system to keep packages secure and to make multiple deliveries along a route. A touch screen allows customers to retrieve

their order with a personalized code, while external audio and lights systems direct them to the correct locker.

Keeping the customer at the center of our vehicle and service developments, we're also working with Walmart, trialing the delivery of groceries using self-driving vehicles.

MOBILITY SOLUTIONS

We could be on the cusp of the biggest transportation revolution in a century. Our vision for the future of urban transportation is to return streets to the people, by addressing the challenges facing cities today, such as climate change, air pollution and congestion.

CREATING TOMORROW, TOGETHER

We believe smart vehicles for a smart world will help people continue enjoying the freedom of movement that has underpinned human progress. We also believe coordinating all forms of transportation will benefit the growing number of people moving into big cities and facing more congestion. Everything from parking and traffic flow to public transport and goods deliveries could be radically improved to reduce congestion and to transform roads into more public spaces.

Two core elements underpin everything we're doing to ensure our mobility solutions will benefit both the city and the citizen:

- We're focusing on the real-world experiences of our customers, taking a human-centric approach to looking at how technology can enhance those experiences
- Building on our existing reputation for data privacy and security, we want owners and users of our vehicles to trust us with the data they share with us



We aspire to drive human progress by providing mobility and accessibility for all

Transforming Michigan Central Station

We are investing \$740 million to restore Michigan Central Station and several surrounding properties to create a hub of innovation in Corktown, Detroit's oldest neighborhood. This will bring together more than 2,500 Ford employees and 2,500 other entrepreneurs and partners to shape the future of mobility. The area will serve as a catalyst for new ideas and a proving ground for self-driving vehicles, connectivity and new mobility solutions that will address the way people live and move.

We plan to transform the long-abandoned train station to its original grandeur and preserve the cultural heritage of existing neighborhoods, while creating modern and sustainable mixed-use spaces to foster innovation and community engagement.

POWERING SMART CITIES IN THE CLOUD

Collectively, it is estimated that people spend 160 million hours commuting and sitting in traffic each year, and putting more cars on the road, without taking any other action, will only worsen the congestion and pollution we already endure. It's no wonder that a new vision for city transport is emerging – one that revolves around the people who live and work in our cities – and we are at the forefront of efforts to make that vision a reality.

MOBILITY SOLUTIONS CONTINUED

From A to B with Ease

The [Micro-Mobility Revolution](#), a 2018 report by Populus, states that nearly half of all trips made in the United States are three miles or less in length, highlighting a need for convenient, cost-effective micro-mobility options.

With this in mind, Ford acquired San Francisco-based electric-scooter company Spin, to help more people travel those first and last miles more efficiently and sustainably.

Extending Spin's existing operations in three U.S. cities and university campuses, we plan to deploy fleets of zero-emission two-wheelers in more than 100 locations by 2020.

To provide new mobility services that improve people's lives, it will be essential for vehicles to communicate with the city around them, including the road itself. The TMC is the first open cloud-based platform that connects the diverse components of urban mobility systems, including connected vehicles, mass transit, pedestrians, city infrastructure and service providers – with the goal of orchestrating a safer, more efficient and sustainable transportation network.

Like other tech platforms, the TMC leverages innovation inside and outside Ford. In fact, during 2018, Ford signed six partners, including:

- RideOS: cutting-edge transportation marketplace and mapping technologies for highly accurate travel time estimates
- Swarm Technologies: the world's lowest-cost satellite network for access to critical

remote cloud services anywhere

- TribalScale: Dashero predictive ordering service for businesses to better plan on-demand deliveries

Also, since August 2018, Ford has been collaborating with Alibaba Cloud to bring the TMC to China. The TMC will provide standardized data and infrastructure to help developers deliver better experiences, from helping residents plan transit journeys and ride-hailing businesses manage large-scale fleets to routing self-driving cars on busy streets.

C-V2X: It's Good to Talk

Every new car we make in the United States will soon be able to tap into a wireless network and “talk” directly to other vehicles, pedestrians and infrastructure, helping to make our streets safer and less congested. Ford is committing to deploy cellular vehicle-to-everything technology (C-V2X) in all new U.S. vehicle models beginning in 2022, pending a technology neutral regulatory environment. Also, the company will begin deploying C-V2X technology in Ford vehicles in China in 2021. C-V2X is a wireless communication technology that can “talk” and “listen” to similarly equipped vehicles, people and traffic management infrastructure such as traffic lights to relay important information.

Enabled through the rapidly developing, powerful 5G cellular network, C-V2X enables direct communication between the connected devices, meaning a signal doesn't need to first travel to a cellular tower, allowing vehicles to quickly send and receive information. Ultimately, it lets drivers know what's ahead of them before they have to encounter it.

For example, if a person suddenly steps into the street from out of view, your vehicle would stop because it was alerted by that person's smartphone. This unique ability for vehicles and cell phones to communicate is just one example of what C-V2X will enable, but it is important, as fatalities involving pedestrians continue to undo years of auto safety improvements.

The City:One Challenge

Our City Solutions team was created to help cities and communities address their challenges and help residents move more freely. To do so, we're learning how each city works and how our technology could be adapted to improve traffic flow through an ever-wider range of mobility options.

As part of their work, our City Solutions team has launched the 2019 series of its [City:One Challenge](#) with the first of this year's locations: Indianapolis. Through the competition, city officials and residents collaborate to solve their own community's unique mobility challenges, with \$100,000 available to help fund pilot projects. More 2019 cities will be announced in the coming months.

The 2018 challenge winners, from challenge cities Pittsburgh, Miami-Dade County and Grand Rapids, have now received funding to pilot their ideas. These range from providing safe transport for people working night shifts at unpredictable hours, to a mobile app that improves school drop-offs and pick-ups for parents, teachers and children.

[> Watch a recap of our 2018 Challenge](#)

Creating Commercial Connections

For long-lasting improvements in our urban transport, commercial vehicles must be able to handle all the challenges posed by the modern city. Ford Commercial Solutions has developed two new, connected vehicle systems that are designed to improve the efficiency of business vehicle fleets:

- The first, aimed at large company fleets, relays information from built-in modems in Ford vehicles to a business's internal IT system. Fuel usage, mileage, GPS location, vehicle health and driver behavior can all be analyzed to improve efficiency
- The other, for law enforcement operators, uses information on fuel usage, emissions, vehicle health and driver seatbelt to monitor fleet efficiency and driver behavior

RECLAIMING THE STREETS

Our streets are economic engines, destinations for social activity and channels for everything that moves. We want streets that provide places of personal fulfillment and give access to opportunity for all people in cities. So, we're looking at how they can be redesigned to serve many functions and meet a multitude of needs for pedestrians, cyclists, business owners, users of private and public vehicles and those who use them for relaxation and exercise.

To foster conversations about the potential of America's streets, our City Solutions team offers the [National Street Service](#), a participatory social movement, as part of the City:One Challenge program. This effort has a simple message: the street is yours to use in meaningful ways and yours to change for the better.

DRIVER ASSIST TECHNOLOGIES

Sixty years after we set the standard with factory-installed safety belts, we are still pushing the boundaries. We continue to develop new, innovative technologies that enhance vehicle safety and help customers stay safe on the road.

A WORLD OF DRIVER ASSIST OPTIONS

We offer a wide variety of available driver assist technologies, which can alert drivers to potential collisions and make routine tasks easier amid rising congestion and distractions. These features use radar, ultrasonic sensors and cameras to detect and interpret the environment.

Ford Co-Pilot360™ will roll out in key global markets in 2019. Ford was the first non-luxury OEM to bundle and offer five Ford Co-Pilot360™ technologies as standard on most vehicles in North America. Our 2020 Ford Explorer will have a suite of Ford Co-Pilot360™ technologies available:



¹¹ Driver assist features are supplemental and do not replace the driver's attention, judgement and need to control the vehicle.

¹² If the vehicle stops for more than three seconds, the driver must intervene and press the RES button or accelerator pedal to resume system operation.

– **Pre-Collision Assist with Automatic Emergency Braking** scans the road ahead and alerts the driver to potential collisions with vehicles or pedestrians. If an impact becomes imminent and corrective action is not taken, the brakes can apply automatically¹¹

– **BLIS® (Blind Spot Information System) with Cross-Traffic Alert** alerts drivers to vehicles in a blind spot with an indicator light in the side view mirror, while Cross-Traffic Alert can detect traffic behind the vehicle when backing out of a parking spot or driveway. Available BLIS with Trailer Coverage can detect vehicles alongside a trailer¹¹

– **Lane-Keeping System**, when engaged, notifies drivers through steering wheel vibration when they need to correct course, provides steering torque to steer back toward the center of the lane and includes an alert system that continuously monitors driving patterns using a forward-looking camera. If the system detects limited vigilance in driver behavior, it provides visual and audible warnings to remind the driver to take a break¹¹



– **Intelligent Adaptive Cruise Control** maintains a vehicle's speed but can also stop or slow the vehicle to match the traffic ahead.¹² It can even "read" speed limit signs and adjust speed accordingly. An additional **Lane Centering** feature scans lane markings to help keep the vehicle centered between the lines¹¹

– Available **Active Park Assist 2.0** can help locate a potential parking spot and assist with parallel or reverse parking. The driver brakes to a complete stop, shifts into neutral and holds down the Active Park Assist button while the vehicle takes care of the rest. This feature also offers **Park Out Assist** with side-sensing capability for navigating out of a tight spot¹¹

– Available **Reverse Brake Assist** can detect both stationary and moving objects (up to 37 mph) behind a vehicle, alerting the driver to potential hazards like garage pillars and distracted pedestrians, and apply the brakes to help mitigate a potential collision¹¹

Occupant Protection

Precompetitive Partnerships

We collaborate with other automakers to enhance the safety of vehicle occupants and

RoadCode

RoadCode is a simulation tool that reveals the driver behavior contained in connected vehicle, crash and infrastructure data and combines them with social media and population information to inform transportation engineers' decisions about safety.

Through an intuitive web-based platform, RoadCode shows traffic flow, travel patterns, and crash and connected vehicle events associated with specific road segments and intersections. This allows users to simulate the potential impacts of different safety interventions. The system incorporates analytical methods found in the Highway Safety Manual, as well as algorithms developed by our Global Data Insights and Analytics team.

We developed RoadCode for the U.S. Department of Transport-sponsored Solving for Safety Challenge, which ended in May 2019. Beta testing will be conducted across the United States.

often publish the results in peer-reviewed journals and scientific publications.

We work alongside General Motors and Fiat Chrysler through the working groups and committees of the U.S. Council.

> See how we're addressing the challenges associated with autonomous driving, including safety, reliability and trust, in our safety assessment report, [A Matter of Trust](#).

DRIVER ASSIST TECHNOLOGIES CONTINUED

Our Safety Research Partnerships

Technical Challenges Surrounding Autonomous Driving	<ul style="list-style-type: none"> – As a founding member, Ford uses the American Center for Mobility's facility for developing and validating self-driving test methods – Ford is a Leadership Circle member of MCity, partnering with the University of Michigan on self-driving-related projects – We joined the Partners for Automated Vehicle Education to inform the public and policymakers about self-driving vehicles – We work with Virginia Tech to assess positional issues for potential restraints and seating configurations in self-driving vehicles – We participate in the Society of Automotive Engineers (SAE) Automated Driving Systems (ADS) Crashworthiness Task Force Committee
Vehicle-to-Vehicle (V2V) Safety Communication Systems	<ul style="list-style-type: none"> – Through the Crash Avoidance Metrics Partnership, Ford and other automakers in the Vehicle Safety Communications Consortium are working on V2V development and testing
Vehicle-to-Infrastructure (V2I) Applications	<ul style="list-style-type: none"> – Various automotive OEMs are working with the Federal Highway Administration on V2I safety, mobility and sustainability applications, alongside the SAE on message standards, and with owners and operators of road infrastructure to facilitate developments
Cybersecurity	<ul style="list-style-type: none"> – We have been developing automotive cybersecurity best practice alongside members of the Alliance of Automobile Manufacturers (Auto Alliance) and Global Automakers, and in conjunction with the Auto-ISAC – Ford is working with the Department of Homeland Security on precompetitive research through the Automotive Cybersecurity Industry Consortium
Driver Distraction	<ul style="list-style-type: none"> – Partnering with universities and organizations such as the Auto Alliance, we are researching driver distraction and analyzing data from large-scale naturalistic driving studies

for Automotive Research (USCAR) and collaborate with other manufacturers through the SAE, Auto Alliance, the European Automobile Manufacturers' Association and the International Organization for Standardization.

Research into Occupant Protection and Crashworthiness

We have conducted internal studies and teamed up with universities to conduct vehicle safety and occupant protection research.

- We are working with industry partners to evaluate the repeatability, reproducibility and durability of new anthropomorphic test devices – “crash test dummies” – so that they more closely simulate the responses of human occupants
- With USCAR, we are analyzing the occupant injuries sustained in far-side crashes
- We continue to work with Sandia National Laboratories and the National Renewable Energy Laboratory to evaluate the safety performance of lithium-ion batteries
- With Wayne State University, we are researching a non-destructive way to quantify the internal damage a battery cell can sustain without shorting
- We are researching the potential of nano-liquid foam technology in both restraints and structural applications with Michigan State University
- With the Royal Melbourne Institute of Technology, we're evaluating the material properties of 3D metal lattices using additive manufacturing and developing the computer-aided engineering methodology for modeling crash-loading

Post-Crash Response

In-vehicle technology that helps occupants to call for accident assistance can give first responders potentially life-saving information, quickly and efficiently. Our SYNC® in-car connectivity, which enables drivers to use cell phones and MP3 players through voice commands, also comes with a call-for-help system. SYNC 911 Assist (or Emergency Assistance outside the United States) can make an emergency call using a paired cell phone after a severe crash where an airbag is deployed or the fuel pump shut off.

The system provides the operator with a GPS location and data on impact velocity, crash type, safety belt usage and whether airbags were deployed. This information helps emergency services understand the severity of the incident and dispatch the most appropriate response.

Most of our vehicles also carry the SOS Post-Crash Alert System™, which alerts passers-by and first responders to a vehicle's location. In the event of airbag or safety belt pre-tensioner activation, it automatically starts the hazard lights, unlocks the doors and sounds the horn (non-European vehicles only).

A EU regulation on “Automated Emergency Calling Systems” became mandatory for new vehicles in 2018. In parallel, a UN regulation covering all in-vehicle systems and requirements to drive harmonization of this technology on a global scale has also been adopted.