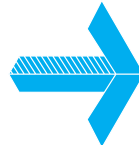




Go Further



Go Further with Ford

Inside the Oval





Go Further with Ford
Inside the Oval

Get a more intimate understanding of how Ford vehicles are created at our Inside the Oval experience. At stations located throughout the Ford campus, Inside the Oval takes you behind the scenes to learn about the intricate processes of designing, engineering and manufacturing world-class cars and trucks. Virtual Reality Lab is a hands-on experience that explores how engineers worldwide are creating vehicles collaboratively, courtesy of ultra-high-definition, virtual reality technology. Innovations in Safety is an immersive experience that showcases the different tools Ford uses to help design safer products. Studio 2000x brings to life the digital design process, showcasing how Ford designers work with early-stage sketches and renderings to create three-dimensional prototypes. And Tough Testing focuses on how Ford uses robotics technologies to build durable vehicles that can withstand extreme road and climate conditions.

EXPERIENCES

VIRTUAL REALITY LAB

INNOVATIONS IN SAFETY

STUDIO 2000x

TOUGH TESTING



Go Further with Ford

Virtual Reality Lab

Years before a Ford Motor Company vehicle shines on the stage at a car show or arrives in dealer showrooms, Ford researchers are hard at work behind the scenes.

Early evaluations in the virtual world contribute to the high-quality materials, superior craftsmanship and refined finish that characterize Ford vehicles at production. These evaluations also speed up production timing, while reducing costs.



In Ford's immersive Vehicle Environment lab – a state-of-the-art facility that uses virtual reality to fully experience a vehicle long before a physical prototype can be built – designers and engineers analyze how concepts come together. The lab allows engineers and designers to communicate in a common environment and apply their unique knowledge of different disciplines to produce higher-quality vehicles.

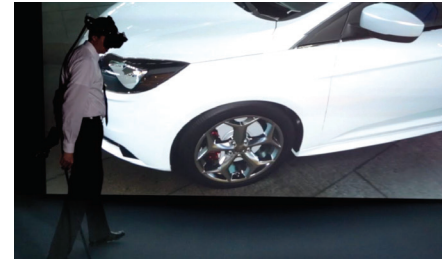
The lab immerses a person in a full-size, photo-realistic environment, enabling real-time product evaluations to take place before physical builds. Ford's immersive Vehicle Environment can evaluate crafted quality for margins, gaps, fit and finish. It is also used in aesthetics and design, vehicle packaging, ergonomics and visibility.

The facility provides a multitude of significant capabilities that have eliminated costly physical aids. Ford's immersive Vehicle Environment goes beyond digital renderings – this immersive technology provides:

- A true sense of the physical world, increasing the ability to evaluate complex engineering issues concurrently with aesthetic design characteristics.
- Manufacturing process capability – the lab can represent a complete vehicle – including every powertrain configuration – all in one virtual environment.

Enhancing craftsmanship

The virtual space within Ford's immersive Vehicle Environment lab is a large motion-capture area where you can fully interact with the entire interior and exterior of a vehicle. Ford engineers and designers are able to walk around a full-scale virtual vehicle, then get inside and quickly evaluate each seating position. This environment is used to develop and ensure quality, and to evaluate designs for potential manufacturing-related issues.



Realism is key

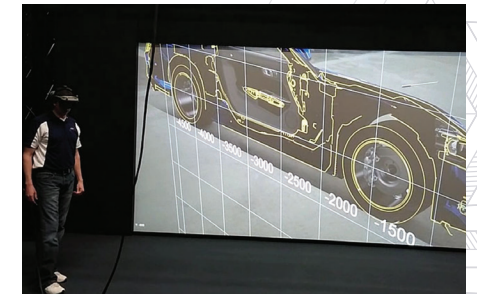
A beautiful display that draws – indeed, compels – attention is an underlying principle for immersive evaluations. This environment needs to show the gradation of color, contrast, shadow, texture, light, reflection and many other attributes to simulate the real world. Further, tactility through physical touch points must be engaged as well.

What gets evaluated

Within the virtual world, just about anything you do, see or touch in a car can be replicated. In terms of visibility – forward, upward, rearward (over both shoulders), sideward – everything can be evaluated. This includes vision through the rearview and sideview mirrors and sunroof, along with readability and potential obstructions in the instrument cluster. Location, reach, roominess, comfort and other ergonomic factors also can be evaluated.

Immersive engineering

Immersive engineering brings together multiple disciplines in product development unlike any other engineering or design approach. Ford's immersive Vehicle Environment lab allows engineering and design teams to make educated decisions, which helps the company to satisfy customer expectations.



Go Further with Ford

Innovations in Safety

With safety in mind, Ford Motor Company employs innovative and interesting methods for providing high-quality products and educating young drivers on the importance of being responsible motorists.

Two of the more inventive methods used by Ford to meet these goals are the drunk driving suit and the enhanced third age suit.



Drunk driving suit

Ford's drunk driving suit is intended to raise awareness about the dangers involved with impaired driving by limiting an individual's sensations and physical abilities.

The suit was developed in a collaboration between Ford Motor Company and Meyer-Hentschel Institute in Germany. It is used for Ford's Driving Skills for Life programs, which are held in Europe, the United States and Asia.

The suit mimics how being impaired can make a person move more slowly, experience reduced coordination, have blurred vision and have difficulty completing certain tasks.

Enhanced third age suit



The enhanced third age suit was developed so Ford Motor Company engineers and designers could better understand how vehicles must be accessible for older members of the population.

With mechanical links that can be adjusted for an individual to experience different ages, the wearer can understand the challenges a vehicle could pose for someone at later stages in life.

The suit limits physical movement of the limbs, making it difficult to get inside and outside of a car and operate vehicle controls. It also allows the wearer to understand the impact of tremors and reduced muscle strength, with features that simulate hand tremors via gloves and weights that restrict movement. The wearer is forced to get into a vehicle bottom first, and to experience limited vision due to the suit's yellowed glasses.

The third age suit was developed in a joint effort between Ford Motor Company, Meyer-Hentschel Institute and Universitätsaugenklinik.

Advancements in airbag technology

Ford has developed the industry's first five-row side-curtain airbag for the high-roof, long wheelbase wagon version of the Ford Transit, coming in at 15 feet long and three feet tall.

Ford developed the five-row side-curtain airbag in cooperation with TRW Automotive, a global automotive supplier of technologies that include systems for occupant safety, steering and braking.

Another Ford innovation is the active glove box knee airbag, which is integrated into the glove box door.

The new system consists of a pliable, injection-molded plastic bladder that is sandwiched between the inner and outer glove box door panels. Upon vehicle impact, an inflator fills the bladder, extending the entire glove box outer door panel toward the front passenger's legs.



SYNC 911 Assist

SYNC® 911 Assist® enhancements provide emergency dispatchers more information for first responders.

SYNC 911 Assist is a subscription-free emergency feature included in more than 7 million Ford vehicles equipped with SYNC technology. It helps connect vehicle occupants directly to a local 911 emergency operator following an airbag deployment.

Go Further with Ford Studio 2000x

Automotive design is a long process that starts with a two-dimensional sketch; it can take up to two years for that sketch to become a vehicle ready to be produced.

A little-known step within this complex process involves animations. Animations offer the opportunity to see the new vehicle in its natural habitat, so to speak. An animation also can dynamically bring to life the differences between the current version and the next-generation product.

In a small, secret room in Ford's Product Development Center, a team of about 10 animators work on computers with three screens each. This is Studio 2000x, Ford's internal animation facility that creates ultra-high-definition productions for a wide range of uses.

Think of it as a trailer into the future – a glimpse of an exciting and dramatic coming attraction.

Studio 2000x

Videos created by Studio 2000x convey the essence of upcoming Ford products before a prototype is ever built. The artistic vignettes display shapes and forms, and layer them against real-life backgrounds. This adds emotion to early designer sketches and incredible definition to more advanced renderings.



Selling a vision

Studio 2000x renders images in ultra-high-definition, known as 4K, which is four times clearer than commercial high-definition imaging. 4K helps Studio 2000x sell a vision, allowing others in the company to see what the design team envisions. Think of these renderings as internal previews of what is to come.



Like the movie industry

Creating the animations requires a long list of ingredients, including renderings and scans. These ingredients then must be “seasoned” correctly. Images are created in high definition. Shot angles – some of which are not possible in real life but can be replicated – are selected, and backgrounds created to see how the vehicle looks in different contexts. This helps to assess proportions and to evaluate visual changes that would not be as evident without the reference points.

On with the show

The audience – key executives – uses these animations to make better-informed decisions for the customer. Changes are implemented before a prototype is even built, improving efficiency. Even more important, customer satisfaction with the end result can be improved by making changes early in the process.



Did you know?

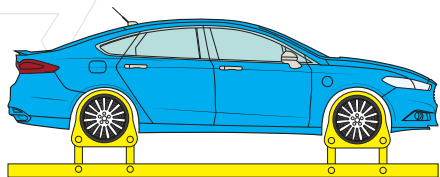
Just as with full-length motion pictures, music is a key part of these animations to accurately convey the character of the vehicle.

Go Further with Ford

Tough Testing

Before it can be sold, any vehicle produced by Ford Motor Company undergoes rigorous testing to ensure it will deliver a quality ownership experience over the long haul. Every vehicle is tested to make sure it can stand up to everything from potholed streets to repeated door slams – all without failure.

These demanding tests take place in Ford's tough testing laboratories. Using a variety of processes designed to test individual components and entire vehicle systems to the limits, Ford researchers can check the durability of vehicle frames, seats and doors under a wide array of conditions.



Four degrees of freedom testing

Four-channel input testing is a full-vehicle simulation that uses remote parameter control to reproduce proving-ground road-load data on spindle-coupled or tire-coupled vehicle simulators. Within a few weeks, a vehicle can be evaluated for structural durability performance of its body and chassis subsystems and components for upward of 150,000 miles.

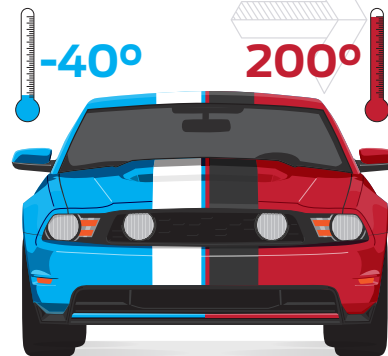
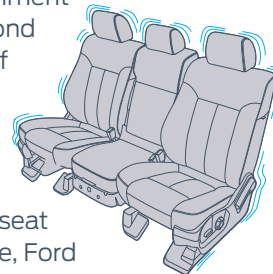
Robotic seat testing

You get in and out of the driver's seat of your vehicle several times every day. How can you be sure the seat fabric doesn't wear out, that the seat foam doesn't give way over time? Ford validates seat prototypes through robotic testing processes. A weight-bearing robotic arm simulates myriad sits on vehicle prototype seats – lowering, rotating and raising a dummy backside thousands of times until durability is ensured.



Seat-shaking test

Anyone who has kids knows how much stress the rear seat of a vehicle endures. Ford's seat-shaking test delivers punishment that goes beyond the rowdiest of kids, shaking seats for up to a week. By the time the prototype seat shaking is done, Ford workers discover and eliminate any rattles and squeaks before the vehicle reaches production.



Heating and cooling tests

Simulating the hottest desert and coldest tundra in a lab environment helps allow Ford to ensure vehicles can survive years outside in the elements. Ford's heating and cooling lab lets engineers simulate conditions from as low as minus 40 degrees Fahrenheit all the way up to 200 degrees. Long-term exposure in these situations helps Ford ensure extreme conditions will not lead to cracks or fractures in vehicle components.

Door opening and closing tests

Ensuring doors hold up over time is a critical part of vehicle quality. Through door-slam testing, Ford Motor Company engineers monitor the speed and force used to open and close vehicle doors and, following hours of repetition, regularly check for signs of damage or wear. These tests can be conducted so that every door, hatch, trunk and hood on the vehicle can be simultaneously opened and closed repeatedly.

