



## 3D Printing Helps Ford Develop All-New Ford GT – and Means You Can Build a Supercar in Your Own Home

- Advanced 3D printing technology is used in the development of new Ford vehicles including the all-new Ford GT supercar
- 3D printing can deliver prototypes in a matter of hours, enables designers and engineers to quickly test and refine new designs and innovations – sometimes hundreds of times
- Printed prototype parts for the Ford GT included the steering wheel, paddle shifts and door controls. All-new Ford Mondeo Vignale grille also developed using 3D printing
- Ford offers first automaker-licensed, one-stop 3D shop online. All-new Ford GT, Ford Mustang and Focus RS are among 1,000 models that customers can build at home

**COLOGNE, Germany, Oct. 14, 2015** – Here’s a reason to add a 3D printer to your Christmas list. The technology can now be used at home to print models of some of Ford’s most desired cars, including the all-new Ford GT, Ford Mustang, and Focus RS. Appropriately, these are three cars for which 3D printing played a key role in the development of the full-sized vehicle.

Ford uses 3D printing to significantly reduce development time through the use of prototype parts that enable designers and engineers to quickly test and refine a range of different approaches. Traditional prototyping methods require special tools and can be time-consuming. Ford can print a 3D-part in just a few hours, for as little as €1,000, opening the door to experimentation, and more radical, innovative design.

For the Ford GT, designers used laser 3D printing techniques to create the F1-style steering wheel with integrated driver controls, and the transmission paddle-shift controls. Engineers also printed key lightweight structural components for the upward-swinging doors.

For customers with their own 3D printer [The Ford 3D Store](#) offers the first automaker-authorized one-stop online store for 3D-printable vehicle files. As well as enabling customers to print their own Ford GT, templates for a further 1,000 models also include the Focus ST, Fiesta ST and the U.S. spec F-150 Raptor.

“3D computer printing technology has totally changed the way we design and develop new vehicles. We can be more creative in trying to find potential solutions, and for the customer this means that our cars are better able to incorporate the latest thinking in design and technology,” said Sandro Piroddi, supervisor, Rapid Technology, Ford of Europe.

Ford actually bought the third 3D printing machine ever produced in 1988, and globally has since produced its 500,000th 3D printed part, an engine cover for the [all-new Ford Mustang](#). Today’s printers are quicker, more cost efficient, and incredibly accurate. Prototypes are used for everything from engine parts, to wheels, to intricate detailing.

The first step in bringing a design to life is a sketch produced by the Ford Design team. Clay modellers then make a scale- and later full-size model of the vehicle to assess proportions and develop the design. In parallel, digital sculptors will create a model using computer-aided design (CAD). The two models are developed together, leveraging the strengths of both disciplines. While some parts are worked in clay, more complex or detailed items are mostly developed digitally and

often 3D printed – this is where the Rapid Prototype team, based at Ford’s European headquarters in Cologne, Germany, comes into play.

Depending on the requirement – Ford Design or engineering – the Rapid Prototype team evaluates the design, and will use one of a number of techniques to create the piece they are working on, including 3D printing. The latter requires CAD software that “slices” parts into paper-thin layers to create a 3D printed prototype.

This will act as a template for the 3D printing machine. How robust the prototype part will need to be will determine whether it is constructed from materials that may include plastic, sand, or metal. Layer by layer, the materials are fused together into the desired shape using a laser.

After printing, any excess material is dissolved away and the part is finished as required, such as by sanding or painting. The completed part can then be delivered to the appropriate design studio or test facility for immediate use.

### **All-new Ford GT and Mondeo Vignale**

The precision smoothness of the finishing process was a key to 3D-printed parts being used in the development of the all-new Ford GT supercar. The [Ford GT race car](#), competing next year at Le Mans as part of the FIA World Endurance Championship, also benefitted from the technology, employed in the development of the intake manifold on the EcoBoost race engine.

3D printing has enabled Ford to try hundreds of different designs for the [all-new Mondeo Vignale](#), the first in a new range of Ford Vignale vehicles that offers customers an upscale product and personalised ownership experience. Among prototype parts manufactured using 3D printing processes were the unique hexagonal Vignale design used in the upper front grille, with aluminium surround, dark matt metallic finish, and polished aluminium surround; and the high-gloss lower grille, with chrome bars and door detail designs.

Designers also employed 3D printing to evaluate Vignale badges and exterior ornamentation, cut from nylon. The dedicated 19-inch Vignale lustre nickel alloy wheels, and dual chrome exhausts with polished aluminium surround, also were printed.

### **From prototypes to manufacturing**

Ford is collaborating with Carbon3D in the U.S. to research future rapid prototyping and small manufacturing programme capabilities. The partnership is leading the development of future 3D print resins capable of supporting loads, high temperatures and severe vibrations associated with vehicle testing.

Continuous Liquid Interface Production technology (CLIP), a 3D printing technology used in the movie industry to create special effects, grows parts from UV curable resins at speeds as much as 25 to 100 times faster than conventional 3D printing processes. The resulting parts boast mechanical properties that are applicable for a range of needs for Ford vehicles. Ford vehicle designers in the U.S. have used the technology to create small interior parts for the Ford Focus Electric and Transit Connect.

“Incredible as it is to realise that 3D printing has now been around for more than 25 years, it is a technology that is moving more quickly than ever before, opening up new ways of manufacturing the cars of the future,” Piroddi said.

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