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AUTOMOBILES

A 3-D Printed Car, Ready for the Road

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Wheels

By AARON M. KESSLER

DETROIT — TUCKED away among the gleaming steel machines on display at the North American International Auto Show this week, an Arizona start-up was trying something new: manufacturing a car from scratch right on the convention floor.

Thanks to 3-D printing, a vehicle whose body, frame and interior were constructed from a carbon-polymer composite materialized as puzzled onlookers watched. After workers installed an electric motor, suspension and tires, the small car — which resembled a coupe crossed with a dune buggy — was ready to go.

The idea was the brainchild of John B. Rogers Jr., the founder and chief executive of Local Motors, based in Phoenix. Mr. Rogers, who prefers to be called Jay, was an infantry commander in the Marines, has an M.B.A. from Harvard and is determined to simplify the way automobiles are produced.

Mr. Rogers is no stranger to mobile machines: His grandfather ran the Indian Motorcycle Company and was also the first distributor of Cummins engines in the United States. He himself started a small custom rally-car

business in Arizona in 2007, Local Motors.

But two years ago, as he read about the auto industry's attempts to make lighter auto panels and parts, he had an epiphany.

"It occurred to me that our enemy was the supply chain. There are just too many parts," he said in an interview. "That was the genesis of all this."

The question though, was what could be done about it. Cars need parts, thousands of them. Mr. Rogers said he started obsessing about the idea of making a vehicle from a few solid pieces, and began looking for a material. He talked to experts about hardened clay, but that went nowhere. Other options, deemed impractical, also fizzled out.

Then a colleague attending a conference in Boston happened to cross paths with an engineer from Oak Ridge National Laboratory in Tennessee, who invited Mr. Rogers to visit the lab. Inside was an enormous device with a robot arm that emitted moldable plastic and made shapes — a 3-D printer.

"As soon as I saw that, I said, 'That's my machine,' " Mr. Rogers said. "I asked, 'Can we make a car?' "

This week in Detroit, he showed off the answer — part of a road show in recent months as he has traveled the country with his creation, the Strati concept vehicle. Aside from a few dozen additional components, like the electric motor, wheels and suspension parts, the small concept car is made from 3-D printed carbon-polymer material.

On Monday, Mr. Rogers announced bigger plans: Local Motors would build a production factory outside Washington, capable of making up to 3,000 3-D printed vehicles a year.

The so-called microfactory, Local Motors' fourth, is set to be completed within a year and will sell cars to the public. The company has its original microfactory in Phoenix and another in Las Vegas. It is also building one in

Oak Ridge, Tenn., near the national laboratory, its partner.

Part retail store, part factory, the Washington plant will let consumers browse the designs, customize their cars, then have them created on one of the half-dozen industrial-grade 3-D printers on site and assembled in a matter of days.

“We like to think of it as Build-A-Bear, mashed up with Ikea, mashed up with Formula One,” Mr. Rogers said.

But the cars may not be entirely street legal. Local Motors’ first 3-D-printed car is categorized as a “neighborhood electric vehicle,” much like a golf cart. Under federal regulations, it is legal on public roads at speeds up to 25 miles per hour, and some states allow certain road access up to 45 miles per hour.

The company plans to offer a vehicle that can be driven on all roads in the United States by 2017, Mr. Rogers said. That would require passing safety requirements set by the National Highway Traffic Safety Administration, including crash tests.

Jessica Caldwell, a senior analyst at Edmunds.com, said that while the market for customization of cars was blossoming, a 3-D-printed car remained “a bit gimmicky at this point in time.” Noting that the price begins at $18,000 and tops out at $30,000, she said most buyers would opt for a vehicle with more traditional amenities.

“I struggle to understand the value to the consumer besides having something cool and cutting-edge,” she said.

Terry Wohlers, president of the research firm Wohlers Associates, which tracks the 3-D printing industry, said while he did not anticipate the Fords or Toyotas of the world adopting 3-D-printed car bodies any time soon, the idea might work on a smaller scale.

“If you’re looking at low quantity, individualized kind of production, that could make sense,” Mr. Wohlers said. “But right now, the cost is too prohibitive to use for large-scale production.”

And although Toyota may not use 3-D printing for its Camrys, the major automakers have already adopted the technology when it comes to designing their cars: building models quickly, and testing the form, fit and function of certain elements.

“They’re all using it in a big way,” Mr. Wohlers said.

Some high-end automakers are going even further, integrating select 3-D-printed parts into production models. Examples include Lamborghini, which uses the technology for part of a console component, and Bentley, where part of a dashboard panel was printed that way, he said.

“Over time, we will see more of them adopt this kind of technology, if not for whole cars, for certain hard-to-produce or complicated parts that 3-D printing can make easier,” he said.

The cost of 3-D printing machines is also likely to drop. Currently, plastics-based machines average around $75,000, and machines that can 3-D print metal, a relatively new invention, cost upward of $500,000 each.

Mr. Rogers said Local Motors believed that a market existed for locally produced, individualized vehicles made with 3-D printing.

“This is not just a science experiment, but is something that can be developed, brought forward safely and enjoyed by consumers around the world,” he said. “It’s about allowing local communities, and people within those communities, to tailor vehicles to suit their individual needs.”

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