

# Czinger Aims to Change the Way Cars Are Built

The Czinger 21C is more than a supercar. It represents a whole new way of designing and building cars that's faster, more adaptable and more sustainable.

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 CZINGER



If we had a dime for every time the phrase "we're going to reinvent the auto industry" has been muttered, we'd all be able to skip buying Powerball tickets. But the father-son duo leading Los Angeles-based Czinger may be on to something, and they're proving it with the products they've delivered to their clients and their own Czinger 21C supercar.

Czinger co-founder Kevin Czinger and his son, Lukas Czinger, describe the process of designing, engineering and building the 21C as the first 3D-printed all-digital vehicle on the road. Not only are the car's major structures developed using artificial intelligence, but they're manufactured using state-of-the-art 3D printing. In addition to creating parts for their own cars, Czinger provides rapidly designed and fabricated components for other automakers.

Before you think that the Czinger 21C is simply a conceptual supercar devised to fit mathematical formulas with no human soul behind it, and no real intention to build it for customers, you need to look at the team involved in its creation. It includes alumni from several Formula One team engineers, alongside recruits from major automobile manufacturers. The Czinger 21C has already smashed production car track records at the Circuit of the Americas in Austin, Texas and Monterey, California's iconic Laguna Seca Raceway.

## **The Process**

Crafting the Czinger 21C essentially demonstrates the design, engineering and production processes on the company is building its future on. It promises to dramatically speed up the time it takes to move a vehicle – or even a single part – from an idea to a completed product. We're not talking about shaving weeks off a schedule; we're talking months or years.

The Divergent Adaptive Production System starts with engineers showing the artificial intelligence-based design system what they want, with the durability, attachment points, weight and other constraints to which the component will have to adhere. They can even tell the system a cost target for the part, and have that figured into the simulations. The system will then run simulations to find the perfect design solution.

Divergent, a firm also founded by Kevin Czinger, is the majority owner of carmaker Czinger.





Czinger 21C at the 2022 Los Angeles Auto Show 📷 JOHN M. VINCENT | USN&WR



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From there, the design goes into the company's 3D-printing process, using Czingier's own aluminum alloys and other materials to create the parts from scratch. Unlike traditional machining, where the material is stripped away to form a part, 3D printing is an additive process, where the material is added to create the shape of a component, with zero waste. The parts themselves take on a more organic look than you'll see in most car parts, with flowing printed shapes that are beyond the ability of traditional manufacturing processes.

The beauty of the system is the speed at which the company can change the design to improve performance, solve a problem, reduce weight or react to a change in a related part. The entire change process can be measured in hours, rather than weeks.

Because 3D printed parts are still relatively small, even when you use massive 3D printers, Czingier created processes and adhesives to join various parts into larger and larger structures until the entire backbone of the car is formed.

The machines that design, print and assemble the parts are not dedicated to making just one component. They're flexible from moment to moment, capable of making many different parts. A manufacturer using the system doesn't need a traditional assembly line, instead using teams of robots that are coordinated to perform the currently assigned task.

In addition to the sustainability benefits of the process itself, Czingier claims that at the end of a part's life, it can be completely broken down and used to create another 3D-printed component.

## **The Car**

Czingier used the Divergent Adaptive Production System to craft the Czingier 21C hypercar. It's not simply a one-off concept or race car, however. It meets current U.S. crash-test standards and passes even California's emissions standards. The company plans to build 80 21C models, split between the car's high-downforce and low-drag V Max models. It will be priced at around \$2 million.



# LA Auto Show Czinger 21C Photos



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Looking like a next-gen Batmobile, the Czinger 21C's look was inspired by the U.S. Air Force's SR-71 Blackbird reconnaissance aircraft. It features tandem seating, with the passenger seated behind the driver, like Maverick and Goose in the original Top Gun. Accessed by a pair of butterfly doors, the 21C's cabin is capped by a fighter jet-like glass canopy. The cabin is flanked by massive fenders front and rear. There's an impressive array of functional aerodynamic accents for a road-legal car, including a giant rear wing.

Much of the car's body is made of carbon fiber. Originally conceived with a narrower width, Czinger's AI-powered design and manufacturing systems allowed it to quickly scale the vehicle up to its current 2,050 mm width, with no factory re-tooling needed.

Helping achieve its hypercar credentials are a 2.9-liter twin-turbo V8 strong hybrid powerplant, a seven-speed sequential automated manual transmission and all-wheel drive. Together, the mid-mounted engine and 120-kW electric motors on each front wheel create an impressive total output of up to 1,350 horsepower.

That's enough power to catapult you from zero to 62 mph (zero to 100 kph) in just 1.9 seconds. According to the company, it can reach 186 mph (300 kph) in 13.8 seconds on its way to a top track speed of 281 mph (in its low-drag V Max setup).

You can run the Czinger 21C on a variety of fuels, including gasoline and carbon-recycled methanol.

The company expects to begin delivering 21C models to customers in late 2023.





## The Czinger Future



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While Czinger may find niche success once the Czinger 21C and the recently debuted Czinger Hyper GT coupe arrive in customers' hands, the company's real triumph will likely come from revolutionizing parts of the new vehicle development, engineering and production system.

The ability to rapidly design, prototype, test and modify vehicles promises to speed the development of new vehicles. In a marketplace where improving speed to market means making more money, the technology pioneered by Kevin and Lukas Czinger promises to be an essential tool in automakers' toolboxes.



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