

Automotive News

AUTOMOTIVE DESIGN

Your assignment: Design the interior of the self-driving car

A place to work -- or work out -- inside your lounge on wheels

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For as long as there have been automobiles, vehicle interiors have been designed around the driver. But what happens to the look, feel and function of the inside of cars that drive themselves?

That's a question designers and engineers are pondering as they prepare for the first generation of autonomous and semiautonomous vehicles.

"If the driver is no longer driving, then the interior becomes a more democratic space with the other occupants," says Moray Callum, Ford Motor's executive director of Americas design.

Some cars on the road -- such as the redesigned Mercedes-Benz S class -- can pilot themselves in controlled situations. But we have yet to see an interior layout adapted to a self-driving car.

As long as vehicles are unable to completely drive themselves, their interiors must allow for human drivers to leap into action when autopilot is impossible, preventing interiors from being transformed into conference rooms on wheels.



Ford's Moray Callum: If the driver doesn't drive, car interiors can change design.

Cooking while driving?

Interior module suppliers are brainstorming how to design autonomous and semiautonomous vehicles, but for now it has been mostly renderings and mock-ups -- nothing ready for showrooms.

Han Hendriks, head of advanced product development for Johnson Controls' automotive electronics and interiors group, has a laundry list of items to be addressed for semiautonomous vehicles. Meanwhile, he is examining nearly every element of interior

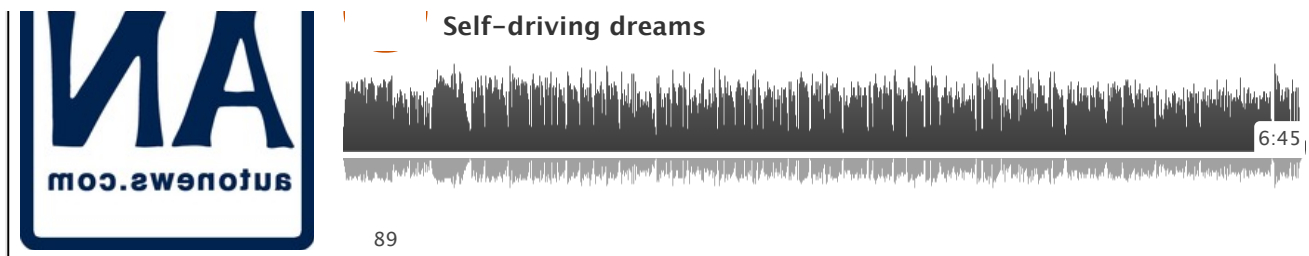
The list includes: stowaway driving controls, new placements for airbags, expanded leg movement, fully reclining and swiveling seats, adjustable armrests, videoconferencing capability, changeable interior lighting from ambient to illumination, and a stowaway work table with computer charging, Bluetooth pairing and Internet connectivity.



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Automotive News spoke to designers on the challenges and inspiration behind autonomous design. View this in a new tab.

Other ideas include letting occupants perform fitness activities or prepare meals. All this, of course, without ignoring the crash-safety element -- because autonomous cars will be sharing the road with human-piloted cars for decades to come.

"We're looking at this as an interesting opportunity, but we have to be patient," Hendriks says. "Human error is acceptable, but a machine has to be 100 percent."

In conceiving the interior of the future, a key question has to do with the handoff from computer to human driver. What happens if a car's occupant is deep into a PowerPoint presentation -- with workspace set up and video camera running -- and the car's brain tells him he has 10 seconds to put everything away and take command of the car?

Those situations are fraught with potential calamity. That is why Stanford University's Revs Program, an engineering curriculum that considers the automobile and its role in society, has created a simulator to test reaction times during that window.



Nass: From "outer space" to behind the wheel
idea whether people can mentally prepare themselves for this."

"Imagine you get into an autonomous car and it's sunny outside, your suburban road is empty and you're playing Angry Birds," says Clifford Nass, director of the Revs program.

"An hour later, the car asks you to take over within 10 seconds. Except now, it's pouring rain, there's tons of traffic downtown and the car to your left rear is behaving erratically.

"These are things you would have noticed if you were driving. But now you are dropping in from outer space, basically. We have no

Stanford is researching the design of an in-car briefing feature, in which the vehicle can quickly bring a person up to speed, much like a change of command aboard an airliner.

For more than a decade the Michelin Challenge Design competition has allowed young designers -- from high school students to design professionals -- to anticipate the vehicles of the future. With autonomous cars all the buzz the subject was an obvious choice for this year's challenge.

For contest juror Ben Ebel, a Michelin industrial designer, the encouraging sign was that many of the design entries were for cars that had passion.

"There is a perception of autonomous cars becoming appliances, as merely a device you use to transport yourself," Ebel says. "But we saw devices that had the ability to reflect a driver's personality, the way in which the car morphs between autonomous and nonautonomous."

A key question, he says: Will people still want to do a certain amount of driving, or is the autonomous vehicle of the future just transportation?

"If it's a personalized transportation device, I would think configurability is going to be the biggest part of it," Ebel says. "Certainly, for someone that has a commute, they're going to want to have an area to work. For someone taking a family or transporting items, it needs to be multiconfigurably. So I think you're going to see a lot of that -- a multiconfigurably area."

And comfort is likely to be a premium.

"We can start looking at what a superluxury liner looks like," he says, "like a 787 Dreamliner, or something, and start looking at how we keep people very comfortable over traveling distances -- but still have a place for them to work."

Design firms such as IDEO in San Francisco are taking a holistic approach to the autopilot question.

For example, autonomous cars also could change the way people travel to a vacation.

The fly-or-drive debate for the Los Angeles-to-San Francisco dash would change dramatically "if you could just hang out with your family" while your minivan piloted you door-to-door without the frazzle of Interstate 5, says IDEO partner Diego Rodriguez.

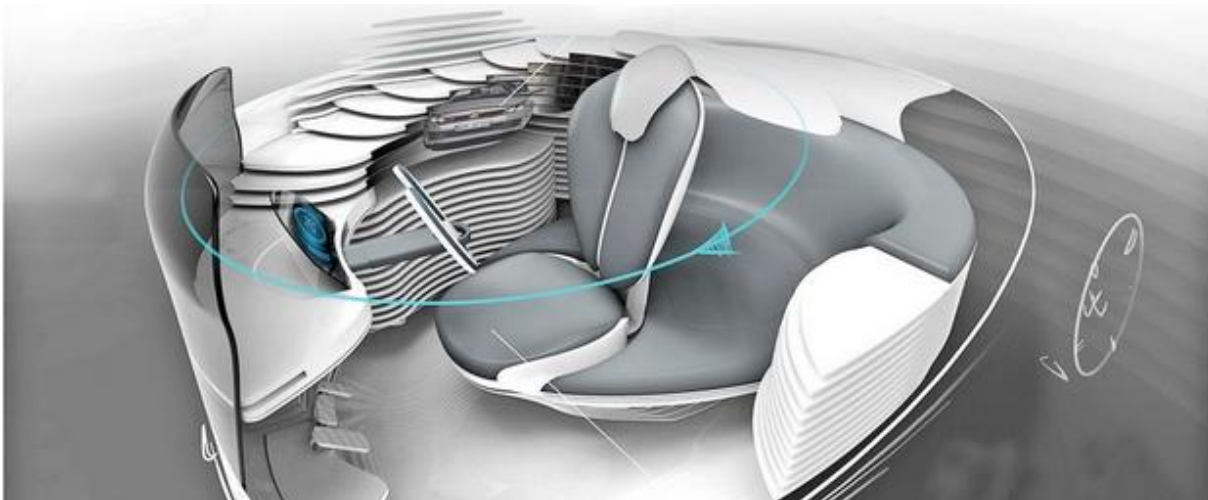
But that's only the beginning. Could an autonomous car pilot an 8-year-old to school or Little League practice by itself? If so, Rodriguez asks, how would the car's controls be designed to prevent the child from taking control of the car?

Ford's Callum sees the possibility of interior design returning to the era of stylized Renaissance horse-drawn coaches. But a big factor in the aspirational vs. appliance question is whether autonomous cars will allow for a sense of "arrival" at a destination.

"If it's a bespoke infrastructure just for autonomous vehicles, then you just have an appliance, because you won't be 'arriving' anywhere. It will just be regimented," Callum says.

"But how cool would it be to arrive at the door of a restaurant, step out and be able to tell the car to go away? There is an element of theater there."

Shiraz Ahmed contributed to this report.



**Driving mode**

Designing autonomous vehicles was the focus of this year's Michelin Challenge Design competition. One finalist entry, led by Kim Do-hyung of South Korea, envisioned a compact Volkswagen city car with a steering wheel that folds away when the car is on autopilot. Passengers can rearrange the interior layout with the aid of electric superconductors.

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