

Report on **Business**

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The driverless road to transportation heaven

It will arrive first in enterprises that must maintain their own roads



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Seventy years ago, a U.S. artist named Norman Bel Geddes assembled a 35,000-square-foot exhibit for New York's 1939 World's Fair - showing, in precise scale, an expanse of American countryside.

Sponsored by [General Motors](#), this "World of Tomorrow" model featured 500,000 little buildings, 1,000,000 tiny trees and thousands of mini-miles of paved highways. On these roads zoomed 16,000 miniature cars and trucks, not a single one of them with a driver.

An early proponent of driverless cars, Mr. Bel Geddes designed multiple-lane highways for his masterpiece model, allotting different speeds for different lanes - 100 mph, 75 mph, 50 mph. On entering a freeway, as he imagined it, drivers would simply push buttons to select the speed at which they wished to travel. An electrical conductor embedded in the pavement would then automatically direct each car to its chosen lane.

For the rest of the trip, drivers would then "relinquish control of their vehicles to the road."

Oregon urban planner Randy O'Toole tells Mr. Bel Geddes's story in *Gridlock*, a fascinating compendium that explores the economic and social consequences of high-speed travel - or, in many cases, the search for it. Mr. Bel Geddes anticipated driverless cars by 1960. As Mr. O'Toole notes, something went wrong. "Many of our highways are congested," he says in his book, which will be published in January by the Washington-based [Cato Institute](#). "Top speeds remain well below 100 mph. Highway technology has not significantly advanced since the 1950s."

Mr. O'Toole looks to Mr. Bel Geddes's insight as well as his art for explanation. "Because we move more freely than our ancestors," Mr. Bel Geddes said, "we overlook the fact that we should be able to move 10 times more freely." What we now overlook, Mr. O'Toole says, is the fact that the technology for driverless cars already exists. Our superhighways could be adapted for them in a single decade.

Driverless cars have proven themselves in real-world experiments. Perhaps the most sophisticated of these cars (developed by GM, Continental Tire, Caterpillar and Carnegie Mellon) showed on a highly complex "urban test course" in 2007 that highways don't need adaptation at all - the car was controlled

by sensors and 500,000 lines of software code.

Cars already come equipped, as Mr. O'Toole notes, with computer-controlled fuel injection, automatic transmissions, cruise control, anti-lock brakes, air bags, climate control, instrument panels - and much more. These functions are themselves controlled by microprocessors with 100 million lines of software code - "close to 15 times as many lines as are used to operate Boeing's 787 aircraft."

From this starting point, it would take relatively small changes to produce driverless cars. GM executives said last year that they could mass-produce them by 2018. The problem in doing so, the company said, was primarily government regulation.

Driverless cars and driverless highways, Mr. O'Toole says, would deliver tremendous benefits. First, adapting existing highways would quadruple the capacity of existing roads. "At 60 miles an hour, modern freeway lanes can move no more than 2,200 vehicles an hour," he says. "By safely reducing the distance between cars, driverless lanes could move more than 8,000 vehicles an hour at the same speed. In most urban areas, this would eliminate the need for new highway construction for decades."

Second, driverless highways would eliminate congestion, the principal cause of which is a driver who - for some obscure reason - insists on slowing down. This is because highways that can handle 2,200 vehicles an hour when cars move at 60 miles an hour can handle only 1,600 vehicles when any one car slows to 30 miles an hour (which explains why people often find themselves moving slowly in congestion that has no visible cause).

Third, by eliminating driver error on the highway, driverless cars would save thousands of lives every year - a compelling reason in itself to go driverless - and save many thousands of hours for people delayed by accidents (to say nothing of attendant suffering).

Fourth, driverless cars would significantly increase travel speeds by the elimination of stop-and-go traffic - and use much less gasoline in the process.

How do we get - belatedly - from conventional highway to Mr. Bel Geddes's vision of fast-and-safe driverless highways? Given government ownership and control of highways, Mr. O'Toole suggests that people look elsewhere.

Driverless highways are coming soon, he says, "even if no government promotes them." Watch for them in enterprises (such as forestry) that must maintain their own roads. Coincidentally, London's Heathrow Airport introduced a fleet of futuristic, battery-operated driverless cars in August: People need only to punch on a keypad the airport location they wish to reach - such as one of the airport's parking lots. The very first expressway, after all, was built by private initiative.

"The first highway built exclusively for automobiles," Mr. O'Toole says, "was William K. Vanderbilt II's 48-mile Long Island Parkway, which opened as a toll road in 1908." Paved in concrete, with banked curves, the parkway was the world's first limited-access highway. The road thrived for years - until New York State put it out of business with a public highway of its own in 1938. It is now a bike path.