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The Hidden Side of Everything

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## To Solve Our Problems on the Road: Lose the Drivers

By *ERIC A. MORRIS*

Suppose you were polishing the hood of your car and accidentally summoned up a transportation genie from the depths of your transmission. What would your three wishes be? (Guys: assume this is a genie who looks more like **Shaq** than **Barbara Eden**.)

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How about:

- Cure congestion. Allow cars to race at 65 mph down the Jersey Turnpike or the 405 at the height of rush hour, with no new blacktop or tolling necessary.
- Increase safety. Even with those higher speeds, cut fatal accidents way down. And achieve this even with lots more dangerous behavior, like in-vehicle texting, drunk driving, Big Mac eating, YouTube watching, and the always-addictive computer solitaire.
- Improve mobility for the transportation-deprived members of our society: the young, the elderly, and the disabled.

Are these developments in the realm of fantasy? Happily, no. In fact, a technological suite is progressing which will allow us to enjoy all three simultaneously, meaning you can save your wishes for Middle East peace, tomorrow's lottery numbers, or cursing the Miami Heat.

The miracle innovation is self-driving, robotic cars. Urban planner (or, as he fancies himself, "antiplanner") **Randal O'Toole** has a nice chapter on this looming development in his recent, informative and provocative book *Gridlock*. (More on the interesting and controversial O'Toole coming up.)

Driverless cars may seem the stuff of science fiction. Futurist **Norman Bel Geddes** predicted we'd have them in a couple of decades – in 1940. They're not here yet, but, hey, in 1940 nobody believed wristwatches that let us talk to each other on TV would make it out of the Dick Tracy comic strip, and today they are basically reality. So are computer systems which know where we are and can direct us to where we are going anywhere in the country, which certainly would have seemed fantastic just a few decades ago.

At the moment, robot cars are not the subject of much public scrutiny or debate. However, that should change given that important technological innovations are not just feasible but are currently being deployed on the roads.

As you may know, some new Lexuses and Toyotas parallel park themselves, a great boon

to all except residents of New York and San Francisco, where there are never any curb spaces to begin with. The problem of cars navigating in more complex urban situations is orders of magnitude more difficult, but a solution is on the horizon – in 2007, in the DARPA Challenge several robot cars successfully negotiated a demanding 60 mile urban course.

Many of you might be disturbed by the safety implications. It is probably safe to assume that robot cars will not rise up against their masters and enslave us all, but any PC user undoubtedly has concerns about computer crashes leading to real ones.

This certainly must be taken seriously, but, after all, new cars are loaded with microprocessors that control things like your fuel injection and transmission, and which function so flawlessly that you don't even know they're there. And the next time you're on a plane, consider how you're placing your life in the hands of a computer (the autopilot, which even basically lands the plane in bad weather) without giving it a second thought.

Moreover, we have to consider the shortcomings of the auto control devices computers would replace – us. Human beings are admirably adapted for replicating our genes: it's doubtful any computer could look as good as we do on the dance floor. But we are poorly adapted for driving cars, which move at speeds far above what humans ever achieved prior to 1800.

Thus more than half of the fatal accidents in America – which claim 40,000 lives a year – are due to driver error. When perfected, computers would be so far superior to us – in terms of reaction time, consistency, perception, focus, etc. – that the safety benefits of self-driving cars would greatly outweigh any new safety concerns.

At this point, computers are enhancing safety, not undermining it. A growing number of high-end new cars feature “adaptive cruise control,” which utilizes radar (more technologically advanced, but costing between \$1000 and \$3000) or lasers (less effective, but much cheaper at \$400-\$600) to judge the distance to the car in front of you, automatically cutting speed when you are getting too close for comfort. Volkswagen, Raytheon and other companies are also developing anti-collision radar systems.

Another innovation that has become reality (thanks to automakers like Nissan, Toyota and Honda) is the “lane keep assist system.” Here cars sense the position of the lane markers and resist efforts by the car to drift unless a lane change is signaled.

Because drivers will pay for it, these innovations are focused on safety. But equally importantly, driverless car technology holds the seeds of congestion relief.

Humans can judge that the car in front of them is slowing down (its brake lights flash and the car is growing), but we are poor judges of *how quickly* it is slowing down. Thus, to err on the side of safety, we have to overapply the brake. This creates a chain reaction when

the same behavior gets replicated by driver after driver down the line. Traffic thus slows far more than necessary.

Slow reaction times and poor perception also mean that we have to leave an unnecessarily large amount of distance between us and the car in front of us.

With a system in which cars cooperate and inform each other (and perhaps the road) about their intentions instantaneously, they can start and stop relatively simultaneously. Moreover, cars can be packed much more tightly together. The outcome: a freeway lane can hold between three and four times more cars than are currently accommodated. And those cars can move at high speeds. **Xi Jou** of the University of Minnesota has estimated that congestion relief will start to bite when as few as 20 percent of the cars on the road have adaptive cruise control.

Finally, driverless cars hold the potential for revolutionizing the lives of those who are currently deprived by our auto-centric transportation system. A 14-year-old would be freed to go to school or the mall without an onerous and time-wasting journey by an adult, and a 90-year-old would no longer have to face an agonizing decision about giving up her license.

Despite the fact that we are making real progress – in 2008, General Motors announced it was planning a driverless car that could be on the road by 2018 – the difficulty of an automated traffic system is, of course, in the implementation. Many of the regulatory, logistical, financial and technical problems involved are quite vexing. They will require political will. More coming up on what we can be doing to put this issue on society's radar screen.