

wbur



Bostonomix

Donate

Menu

Support the news

LOOKING TO INSPIRE PRODUCTIVITY,
ATTRACT AND RETAIN TALENT,
AS WELL AS ENHANCE YOUR BRAND?

LEARN

Autonomous Vehicles Could 'Change Everything,' But 'Growing Pains' Are Likely

10:40

April 29, 2016

By [Bruce Gellerman](#)

Share



Live: BBC Newsday

If you think you've been stuck in Boston traffic a long time, consider ancient Rome. In the first century B.C. congestion was so bad, Julius Caesar banned wheeled vehicles in the city during daylight hours.

Centuries later, Italian artist, engineer and inventor Leonardo da Vinci envisioned a new way of curbing urban traffic: building separate roads on different levels for pedestrians and vehicles.

Fast forward to today and another Italian urban planner, Carlo Ratti, has an equally audacious idea to help car-clogged cities like Boston: Eliminate stop signs and traffic lights at intersections.

"Think about intersections where cars will not stop at a traffic light [and] will keep on going," Ratti says in an interview. "You simply avoid them bumping into each other."

In a place like Boston this would be a neat, if not death-defying, trick. Ratti, an MIT professor, heads the school's [Senseable City Lab](#), where researchers apply digital technologies to transform urban landscapes.

"The intersection is one of the most difficult things because you've got two competing flows fighting for the same real estate," Ratti explains. "So if you solve it, then the whole network would benefit."

Ratti believes streets bristling with embedded sensors and computer-controlled cars that communicate to one another could virtually eliminate traffic congestion, as vehicles weave in and out in a digitally choreographed ballet. "You might slow down a little bit before and then by the time you get there, the intersection is yours," he says.

Light Traffic | MIT Senseable City Lab



There are 850 intersections in Boston with traffic lights. Imagine the city without those signals -- traffic going with the flow.

The formula for this congestion-free future is intelligent intersections and smart, driverless vehicles.

"The solution more and more is going to be not about building new roads; it's actually less asphalt and more silicon," Ratti says.

Part Of That Future Is Already Here

A future with digital, driverless vehicles sounds idyllic, but is it realistic? Well, part of that future is on the road right now.

Jeff Manning owns a Tesla Model S. The electric car has zero emissions and already incorporates many of the advanced technologies futurists say will help untangle traffic and perhaps even

eliminate road fatalities — nearly 90 percent of which are driver related.

This model is expensive but tax incentives helped Manning afford his Tesla. (And solar panels on the roof of his home in Shrewsbury supply free energy. He even makes money selling excess electricity back to the grid.)

"It's a stylish car, it can fit my family and a great deal of luggage," he says. "It can fit me, I'm 6-foot-7, and I can't fit in a Volt, I can't fit in a Leaf, I can't fit in the Toyota Prius, and that's one of the reasons I got this car."

The luxury sedan has a longer range than other electric vehicles and it does what few other cars today can do: It's a semi-autonomous vehicle. When the autopilot software is switched on, computers and sensors take over and the car drives itself. You set it, but don't forget it.

"The driver doesn't need to be laser-focused on the road," Manning explains. "They can be focused on the road, but not laser-focused. You're not steering; you're using the brake only if it's a red light."

Heading east on Route 20, Manning sets the speed and distance he wants to be from the car in front and flicks on the autopilot software. Sensors lock onto the lines on the roadway, keeping the car in the middle of its lane while also looking for nearby vehicles.

Manning takes his hands off the wheel and places them on his knees. "I'm not pressing the brake, I'm not pressing the

accelerator. The cars in front of us are slowing down, [and so] we're slowing down."

Traffic speeds up, we speed up. Manning signals, and when the car senses it's safe, it switches lanes all by itself, merging with traffic seamlessly.

Every once in a while autopilot reminds Manning to touch the steering wheel. The car is checking to make sure he's still attentive and ready, just in case.

"I think the steering wheel at some point will go away and you'll type on a screen or say out loud: 'Take me to so and so,' and it will take you there," Manning muses.

Mounted inside his car are six small sensors and cameras that are not standard equipment. They're supplied by an MIT research lab.

Courtesy of MIT researchers, here's video of them driving around campus in a semi-autonomous Tesla and detecting both the state of the self-driving capability (autopilot) and the state of the human driver:

Manning is participating in an experiment to measure not the vehicle's behavior, but his. "So it takes a video of my eyes to see where I'm looking, and it will take a video of my hands and the speedometer and it'll take a video of where we're going," he says. "So it has all this information that it can extrapolate however they want to use it."

Riding in a semi-autonomous car is ghostly and takes some getting used to, but after the system wins your trust, stress eases, and you could see how getting stuck in traffic might become less frustrating.

At least that's how Manning sees it. "When I go to work I'm going to hit some traffic for sure, but that's OK in this car," he says. "Self-driving it's not as bad of a drive as it would [be] in other cars."

'It Changes Everything'

Bryan Reimer, the associate director of the [New England Transportation Center at MIT](#), says autonomous vehicles will change everything.

"It changes how we move. It changes how packages are moved. It changes how we behave. It changes the future of old age. It changes

everything," Reimer says. "But there are going to be some difficult growing pains along the way. They're policy, they're societal."



MIT's Bryan Reimer stands with a Range Rover Evoque that is outfitted with many driverless features. (Jesse Costa/WBUR)

It was Reimer's lab that installed sensors and cameras inside Manning's Tesla to research human behavior and autonomous vehicles. Data showed how the driver was interacting with the semi-autonomous car.

Developing the hardware is a lot easier than programming the software to make ethical decisions that could be a matter of life and death.

"We look at distraction today as a problem on the road. What does automation do? It allows us to do more -- most of the time, safely," Reimer explains. "However, when the automation determines that it reaches a situation outside of the programmers' view of the world, the automation will make very different decisions than we do. So the ethics, are the robots making good decisions?"

If a kid suddenly jumped into the middle of a road, would an autonomous vehicle sacrifice the child to save its passengers?

Reimer is also concerned with the economic consequences of driverless cars. No drivers means no fees from driver's licenses.

And since autonomous vehicles will be programmed to obey traffic laws, there would be no speeding tickets. State revenues will take a hit. And would we even need police to monitor traffic?

"There is a big question: Will traffic congestion decrease or increase as we automate more?" Reimer looks ahead. "So let's fast forward to some point in the distance where I'm no longer responsible for driving, I have a fully autonomous vehicle that shuttles me to work. That instead of sitting in the parking lot waiting for me, it goes and picks up my wife at home and takes her to work. The model of that is an increase [in] traffic flow."

More traffic, but less road congestion. It's one vision of a transportation future rapidly coming down the pike as clean energy autonomous vehicles replace our current fleet of not-so-smart gas guzzlers.

Current Cars Becoming Distant Memories

Every major car company is getting into the act. But upstarts like Tesla, Apple and Google are paving the way. Digital technology is driving the change to new business models as automakers become mobility enablers.

"Now the real core question becomes: Do we move and continue down a society built upon vehicle ownership, or do we move to one that is based upon ride sharing?" Reimer says. "They probably more tilt to ride sharing now. But that's against the basic culture that has existed in this country for decades."

Barry Steinberg, who owns Direct Tire, a local chain of auto repair stores, worries driving autonomous vehicles will be boring.

"I think self driving is just taking all the fun out of driving cars," Steinberg says. "You know, how can you have fun by sitting there and not doing anything? It's the engagement of the automobile."

In the coming years and decades our current cars will seem as quaint as horseless carriages, and traffic congestion a distant memory. But even before the first fully autonomous vehicles hit the road, change is in the air.

Hold on to your seat and buckle up. The Woburn company Terrafugia is designing flying vehicles that will rise above roadways — vertically taking off and landing, whisking us into the future.

Related:

- [The Almost Self-Driving Car Is Here](#)

- What's Next For Self-Driving Cars?
- Why The Future Of Driverless Cars Is Not So Driverless
- More from our series: 'Driving Us Crazy'
- Bostonomix: WBUR's home for the innovation economy



More...

Bruce Gellerman  Reporter

Bruce Gellerman is an award-winning journalist and senior correspondent, frequently covering science, business, technology and the environment.

5

Join the discussion

Share 

View comment(s)

Support the news

Next Up

Mass. Income Growth Lagged The Nation's In 2015

Households in Massachusetts saw their incomes rise in 2015, but at only about half the level of gains nationally.

Mass. Unemployment Rate Drops Beneath 4 Percent

The state jobless rate is the lowest it's been since August 2001.

Where to now?

More [Bostonomix](#) or [Explore Audio](#).

© Copyright WBUR 2016

