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How will cities change with autonomous cars?

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Many automakers and analysts are predicting that autonomous cars could arrive as soon as 2020. In order to support these driverless cars, our cities will have to change drastically.

According to a report from global architecture, planning, engineering and technology firm IBI Group, driverless cars can solve a number of traffic problems, but only if they're implemented properly and with the right support from cities.

Alex Mereu, the author of the report and a transportation planner based in Toronto, was able to shed some light on what cities need to do to appropriately support the future of driverless cars.

How will successful integration happen?

Mereu is quick to point out that cities will play a pivotal role in successfully integrating autonomous cars. "It starts with effective governance led by a city council that is committed to city-building objectives and has a trusting relationship with city staff that shares the same vision," he said.

Simply put, a lot of the onus is on politicians.

Cities have to have a vision where their "objectives can be achieved by leveraging technology and establishing private-public partnerships," Mereu said. He added that success comes from providing a "framework for how a transit agency can leverage the benefits that technology can bring to their operational efficiency and passenger experience — this includes capitalizing on autonomous vehicle technology as it becomes more widely available."

The city paves the way for autonomous vehicles

How will they get to this point? Self-driving cars are still being tested and there are a lot of obstacles to overcome before they achieve true success. In the IBI Group report that Mereu authored, he explained that autonomous vehicles (AVs) "could eliminate or reduce the severity of 90 per cent of traffic-related fatalities," but that the "transition period when both autonomous vehicles and non-autonomous vehicles are on the road could make matters worse before it makes them better."

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The Navya Arma autonomous vehicle ferries passengers in Las Vegas as part of a test program.

According to the report, a solution that maximizes the advantages of autonomous tech while minimizing issues for regular cars would be to separate AVs and non-AVs on the road in the early stages.

This can be done through good infrastructure and road design. "Certain practices in road design can be applied to optimize the operational efficiency and effectiveness of AVs," Mereu said.

He points to an AV research paper conducted and published by the Canadian government (called "Automated and Connected Vehicles: Status of the Technology and Key Policy Issues for Canadian Governments") that points out other ways cities can improve infrastructure to support AVs: "The creation of AV-only lanes, the construction of roundabouts (which are more efficient for AVs than traffic signals) and the changing of traffic signs to transmitters that send data directly to connected vehicles."

Urban versus highway issues

When discussing the early stages of AVs on our roads, Mereu says they will be used equally in the city and on the highway. Sure, the highway seems like the logical place to have AVs at first, since there are very defined rules and a consistent traffic pattern, but driverless cars will also be a huge asset in the city, where they can reduce the number of pedestrian injuries and fatalities while providing a taxi-like service without the labour charges.

"The application won't necessarily be urban versus suburban, but certain industries are more likely to adopt the technology first," Mereu said. "Any agency or company that operates vehicle fleets, for example, will be encouraged by the ability to reduce operating expenses by reducing driver labour costs and improving driving efficiency."

"That being said, the freight applications will first be seen on highways," Mereu said. "Public transit applications will first be seen on highways and separated rights-of-way (buses with their own lanes, for example), or in controlled environments, such as university campuses or airports."

And, as mentioned before, AVs could work as connections between suburban neighbourhoods and larger mass transit systems, such as train or subway systems, so they can work together.

Additionally, Mereu pointed out that in the future, fewer parking lots will be needed, so the land could be repurposed for housing or recreation, as an example. The IBI report suggests that driverless cars don't need to be parked all day because many will be owned by ride-sharing companies, so they can be on the road constantly picking people up and dropping them off.

While this could contribute to less demand for parking and less car ownership, there is a risk of increasing congestion with an increase in single and zero occupant vehicles. A high use of shared rides (multi-passenger vehicles) is an extremely important component of the successful mitigation of congestion in such a system.

The transportation conversation is shifting

With driverless cars and autonomous vehicles potentially in the near future, the conversation surrounding transportation is shifting away from personal vehicles and toward shared services and autonomous cars. It is in a city's best interest to get on board with this new technology.

Not only will our roads change as autonomous cars become more mainstream, but our cities will have to be proactive to help autonomous cars reach that level of use. The way cities and infrastructure are constructed from the get-go will have to change, and city planning will take on a whole new objective to enable mobility and efficient movement better than ever before.