EDITORS' PICK

Aptiv's Self-Driving Vehicles Top 100,000 Rides In Las Vegas

Sam Abuelsamid Senior Contributor
A lifetime in the car business, first engineering, now communicating

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An Aptiv automated driving BMW pulling up to the Mandalay Bay convention center in Las Vegas SAM ABUELSAMID

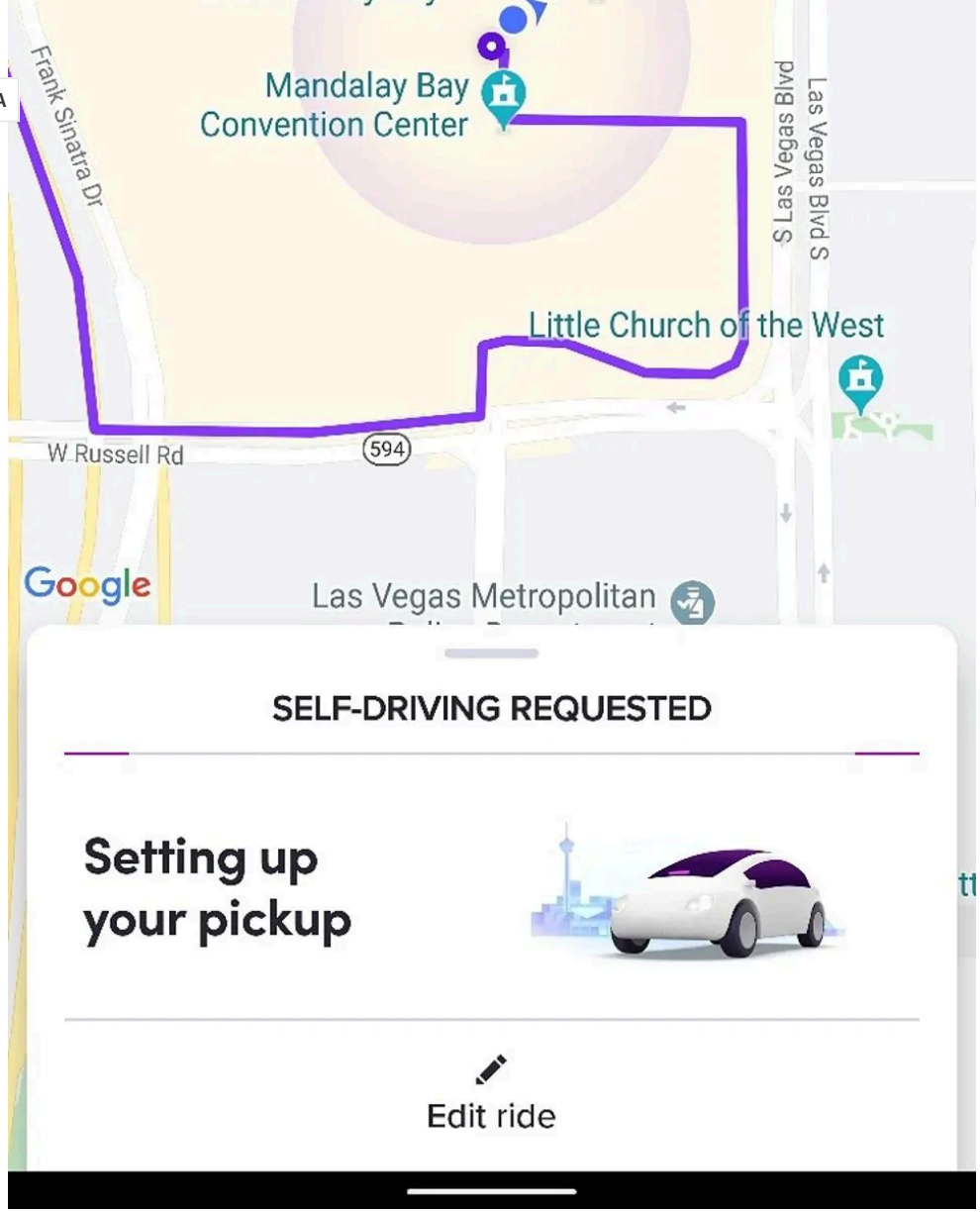
Waymo got a lot of media coverage for the December 2018 commercial launch of its automated ride-hailing service. But Waymo wasn't the first company to open such a service to the general public and start charging for rides. It's hard to say for sure who was actually first, but automotive supplier Aptiv deployed a fleet of 30 BMWs on Lyft in Las Vegas in May 2018. That fleet has now given over 100,000 rides.

Aptiv has a total of 75 BMW 5 series sedans which can easily be spotted on the streets of Las Vegas thanks to their bright orange wheels. Since the service launched in mid-2018,

anyone that opens the Lyft app for the first time after arriving in Las Vegas will see an information screen letting them know that “self-driving” cars are available. If they want the opportunity to ride in one, they can tap to opt-in.

Despite my personal distaste for the city, as an auto industry analyst, I am compelled to travel there each January for CES. I first saw this opt-in screen during the 2019 show, but never got a chance to hail one of Aptiv’s cars although I did go for a demo ride with Karl Iagnemma, president of autonomous mobility at Aptiv.

When I returned for the 2020 show, I lucked out and got four Lyft rides in Aptiv cars during my stay.I also got the chance to meet up again with Karl for a tour of Aptiv’s Las Vegas Technical Center (LVTC). The LVTC is the hub of Aptiv operations in the city.



Requesting a ride in one of Aptiv's "self-driving" cars in Las Vegas through Lyft SAM ABUELSAMID

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y **Jordan Thomas**

The 130,000 square foot building which began operations for Aptiv in 2018 was formerly a warehouse for slot machines. It turned out to be just the right home for Aptiv. The largest part of the building serves as a garage for the fleet and can accommodate over 130 vehicles. Most of the parking spaces are equipped with ethernet cables that safety operators plug in when they return from a shift to download the data that has been collected.

In one corner of the garage are several service bays with hoists used for working on the vehicles. At the opposite end is an area dedicated to sensor calibration. When a new vehicle is built, modified or even after some period of time driving on the road, the sensors need to be calibrated before use.

Elsewhere in the building are break rooms and class rooms for training staff including the safety operators. The technicians that ride around in these vehicles go through several weeks of classroom and track training before venturing onto the roads and then come back for regular refreshers. They also go through debrief sessions at the end of each shift. The cars operating on Lyft, currently run two ten-hour shifts a day, seven days a week.

Currently, Aptiv has two operators in each vehicle, one watches the road and keeps their hands by the wheel ready to take over when needed while the other watches data and answers questions for riders. In addition to testing the system, Aptiv is trying to build consumer trust in the technology. So far it seems to be working. Like any other Lyft ride, passengers in the Aptiv vehicles are prompted to rate the "driver" after each trip and Aptiv has a 4.95 rating with 98% of passengers giving the ride five stars.

Another aspect of the LVTC is the control center. A large display on one wall shows a range of statistics including the current ride count (at the time of my visit in January it was closing in on 96,000) and the locations of each vehicle in the Aptiv fleet around the world. In addition to Las Vegas, this included the vehicles being tested in Pittsburgh, Boston and Singapore. Data collected here feeds into the development of routing algorithms and vehicle positioning to make sure that the fleet is available near where the demand is.

In September 2019, Aptiv and Hyundai announced a new joint-venture to develop automated driving and robotaxi services. When that deal closes, probably some time in the second quarter of 2020, the entire Aptiv automated driving program will become part of the JV and Iagnemma will be CEO of the new company. As part of that deal Hyundai engineers will be developing a dedicated electric robotaxi platform.

Earlier in this article I put quotation marks around the words self-driving in reference to Aptiv's current fleet. That's because these vehicles currently don't operate in fully automated mode all the time. In Nevada, testing permits allow companies to drive autonomously on public roads, but on private property the operator must get approval from the property owner.

Aptiv hasn't managed to get these approvals from all of the property owners including the big casinos. As a result, as soon as the cars turn off the street into the driveways or parking lots, the safety operator takes over manual control. This is a problem that will need to be addressed before Aptiv or any other company can launch true driverless services.

Even on the road, there are limitations. The current Aptiv vehicles can't go on the highway in automated mode. Thus if you want to get from Mandalay Bay out at the south end of the strip to the Sahara at the north end, the fastest route would be I-15 but if you want to go autonomous, you have to take Las Vegas blvd.

The Aptiv driver, like most similar systems, has been optimized for safety and smoothness. Smoothness is important to provide a good customer experience that includes minimizing the chance of motion sickness and safety is the price of entry in this field. While all of the maneuvers in the BMW felt very seamless, none of the four trips I took were devoid of driver interventions.

The garage of Aptiv's Las Vegas Technical Center can hold up to 130 vehicles APTIV

For example, on one trip a police car was halfway into our lane during a traffic stop. Rather than switching lanes, the car came to a stop and the driver had to maneuver around the cruiser. On the other hand, automatic lane changes while approaching a turn weren't a problem at all. During one such maneuver as the car was shifting to the right lane, a vehicle coming in that lane accelerated, closing the gap, so the BMW smoothly returned to its original lane until that vehicle passed and then completed the maneuver.

While the BMWs are certainly nice to ride in, they are not terribly well suited to robotaxi applications. In addition to being conventional sedans without automatic doors, they lack the redundant systems required to provide fail-operational capability.

At the north end of the Las Vegas strip where construction is ongoing for the convention center expansion, there were several large steel plates on the road over pavement that had been dug up. When the car drove over these plates, the impact of hitting the edge of the plate, evidently knocked something loose. Watching the sensor display screen in the front of the car, I could see the whole interface suddenly get confused and the car reverted to manual mode. The operator tried to reboot the system to no avail. If this had been a driverless operation, the vehicle and passengers would have been stranded. Fortunately, the driver was able to take control and get me to my hotel.

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Aptiv is currently in the process of getting its third-generation (the first were Audi Q5s with the BMWs being the second-generation) fleet ready for operation later this year. This will bring a transition from the BMW sedans to Chrysler Pacificas as used by Waymo, Voyage, Lyft and others. The Pacificas are roomier with automatic sliding doors that make entry and exit easier.

More importantly, the Pacificas will come from the factory equipped with redundant steering and braking actuators and wiring harnesses configured to provide dual, independent power supply to critical components. According to Iagnemma, once this new fleet is up and running, Aptiv hopes to launch true driverless operations in Las Vegas by the end of 2020.

In the meantime, travellers in Las Vegas can still get a glimpse of the future of mobility using the Lyft app and Aptiv's fleet.

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Sam Abuelsamid

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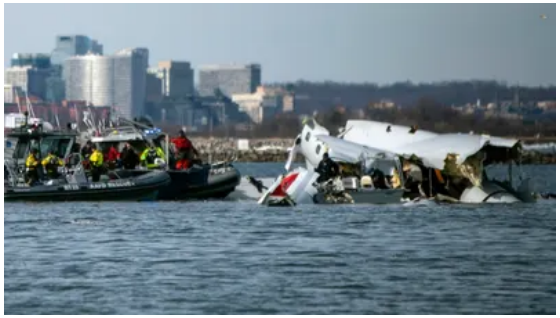

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