

Vehicles that Drive Themselves

Tokyo is pushing ahead with mobility-as-a-service initiatives.
by **Tim Hornyak**

Cars that can drive themselves were once the stuff of science fiction, but they are now on the roads and taking on an increasing share of the burden of driving. With automakers around the world rolling out autonomous driving platforms, observers are looking to Japan, home to leading car companies as well as a rapidly aging population that could benefit from the technology, for a glimpse of the future of driving.

There are several arguments to be made for self-driving vehicles. Proponents say they will be safer than traditional vehicles because they will eliminate human error, which in the United States is associated with 94 percent of serious accidents. They may reduce traffic congestion and vehicle emissions, which are associated with global warming. They can help address shortages of drivers for public transit, and open up mobility options for those with few options, such as elderly people living in rural areas.

The changes to the automotive industry, as well as society as a whole, could be staggering. It is no wonder, then, that companies, governments, and organizations in Japan are feverishly moving ahead with autonomous driv-

ing policies and research and development.

One research lab affiliated with a leading Japanese carmaker notes that the number of companies working on autonomous driving jumped to more than 250 in 2017 from only a few in the year before. One reason for this is that cloud networks can now deploy solutions using deep learning, a form of artificial intelligence technology. For its part, the lab is using deep learning and other means with an eye to creating the world's safest self-driving vehicles suitable for mass production. For instance, it runs numerous computer simulations to test its autonomous driving platform's response to conditions such as nighttime driving, inclement weather including fog, and pedestrians appearing in front of the vehicle. However, the lab has not forgotten that many people enjoy driving, and thus instead of replacing drivers, it envisions self-driving cars as teammates that can take over when drivers feel tired.

The public sector is working with industry to realize the dream of autonomous vehicles. The Japanese Cabinet has paved the way for Level 3 autonomous driving on public roads, which allows drivers to safely turn their attention

away from driving, for instance to watch a movie. Level 4 autonomous driving requires even less intervention by drivers, and Level 5 means the vehicle handles all aspects of driving.

The Tokyo Metropolitan Government, meanwhile, is advancing the spread of self-driving vehicles in several ways. It established the Tokyo Self-Driving One Stop Center to experiment with and answer questions on the new technology. Over a two-year period since it opened in September 2017, the center received more than 500 inquiries from 64 businesses. It also supported 25 trials, including Japan's first trial of a remote-type autonomous driving system. Since then, the number of consultations and demonstrations has continued to increase. Other mobility as a service (MaaS) experimental projects at the center include self-driving hybrid-drive taxis linked with airport limousine buses, in which the city worked with a taxi company and an autonomous driving company. Also autonomous all-electric buses connect the airport and tourist information center on Hachijojima Island, located about 300 kilometers south of mainland Tokyo.

Toyota also announced e-Palette, a multipurpose electric self-driving car for MaaS. Couriering goods, mobile restaurants with kitchens, and mobile offices are some of the various expected purposes it is to be used for.

The Japan Automobile Manufacturers Association (JAMA) is planning a variety of autonomous driving demonstrations ahead of the Olympic and Paralympic Games Tokyo 2020. Approximately 80 autonomous vehicles (Level 2–4 autonomous driving) of 10 JAMA member companies will take part in the demonstrations around Haneda International Airport, on expressways between the airport and central Tokyo, and in the waterfront area.

JAMA sees the effects of such initiatives going far beyond 2020. It expects the Tokyo 2020 Games to be a stepping stone to future mobility and to leave a legacy of autonomous driving infrastructure, improved regulations, and increased social acceptance. It also expects exponential development to create a society with zero traffic accidents in which everybody has freedom of movement. It is one way in which the Tokyo 2020 Games are changing society.



Some of the exciting concept vehicles that are being realized for our future autonomous driving lives.

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