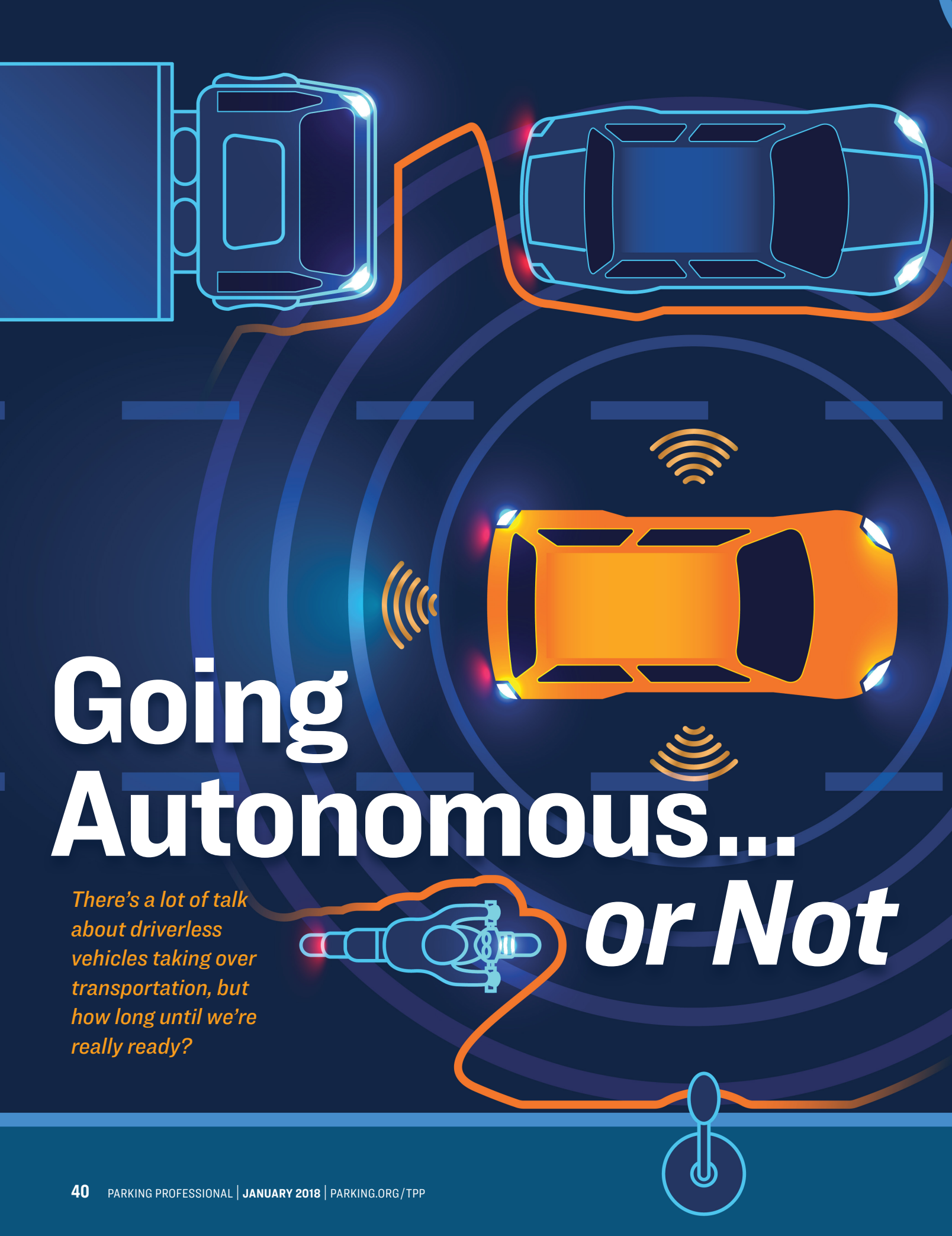

Going Autonomous... or Not

There's a lot of talk about driverless vehicles taking over transportation, but how long until we're really ready?

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By Thomas Curtis, CAPP

It has been more than two years since I last wrote about autonomous vehicle acceptance—where I thought it was heading and how long it would take to get there. Technologically, two years is an extremely long time so I wanted to revisit the subject.

To truly understand where the technology is I felt it would be necessary to drive one of the most highly automated vehicles available to the public. Arguably, that is the Tesla. The local Tesla gallery provided me with what they call an owner adviser to detail the unique qualities of the vehicle and co-pilot the experience. The experience was truly amazing. Even so, when I got back from the future, I started to think about the realities of our progress toward an autonomous world.

How far have we come in two years? In its September 2016 Federal Automated Vehicle Policy, the National Highway Traffic Safety Administration (NHTSA) adopted the Society of Automotive Engineers (SAE) autonomous vehicle classification standard. One year later, it released an updated automated driving system guidance. Issuing policies and assuming a single standard is a considerable leap forward and should be considered significant in the progress of autonomous vehicles. It should be noted that NHTSA's policy is a guidance document and does not contain official regulations. Federal acknowledgement and direction is a good start, but an autonomous future requires more.

Many automakers continue to predict autonomous vehicles by 2021. These will be for geo-fenced ride-hailing or private vehicle highway-only applications with minimal effect on the parking industry. When will our industry feel the effects of truly autonomous vehicles?

Technology

We are still many years away from the necessary technology to go fully autonomous. The International Organization for Standardization (ISO) standard for functional safety of electrical and electronic systems in automobiles states that systems can be regarded as safe when there is no unreasonable risk. Compliance with the standard applies to almost everyone involved in the automotive supply chain. High definition 3-D mapping, sensor arrays, software algorithms, cybersecurity, vehicle-to-vehicle (V2V), and vehicle-to-infrastructure wireless connections (V2I) would all possibly fall under the standard.

More than 40 different corporations are developing highly automated vehicles (HAVs) or HAV technology. Autonomous vehicles will have to interact in a predictable manner with pedestrians, human-driven vehicles, and other HAVs. Without standards, there will be a tremendous variance in how different HAVs behave in the same situation. Standards will be a challenge.

In December 2016, the U.S. Department of Transportation proposed a rule to mandate vehicle-to-vehicle communications on light vehicles, allowing cars to talk to each other. By April 2017, the proposed rule was already in trouble with automakers, trade groups, and the current administration for a host of reasons.

Consider vehicles that don't talk to each other, that react differently to the same situations, and that travel the same roads with human drivers. Our highways are going to be dangerous for quite some time and give consumers considerable reason to slow overall HAV acceptance. In January 2017, Gill Pratt, Toyota Research Institute CEO, put it this way: Even though the automotive industry "has made great strides over the last five years, we are a long way from the finish line of fully automated cars. [The current] systems can only handle certain speed ranges, certain weather conditions, certain street complexity, or certain traffic."

Cost

Would we even be able to afford an autonomous vehicle? The average price of a new car or light truck today is about $33,000. Adding driverless technology to a car can easily add more than $10,000 to the cost. The Victoria Transport Policy Institute estimates that "when the technology is mature, self-driving capability will probably add several thousand dollars to vehicle purchase prices, plus a few hundred dollars in annual service costs, adding $1,000 to $3,000 to annual vehicle costs." How many consumers are going to pay an extra $10,000 when offered the choice between a base human-driven model or upgrading to a car that can drive itself? Even if we can assume that costs will come down, a car affordability study by Bankrate.com shows that a median-income household in the U.S. today cannot afford the average new vehicle.

Infrastructure

Even if consumers eventually can afford HAVs, progress is largely dependent on the quality of the roads they use. According to the DOT there are 4.12 million miles of road in the U.S. More than one-third are unpaved gravel or dirt, and almost 50 percent are in poor condition. Funding, based mainly on fuel taxes, for maintenance of paved roads is diminishing due to vehicle fuel efficiency and hybrid and electric vehicles.

Smart roadways that provide information to HAVs can help. One of the toughest challenges in developing smart roadways, as noted previously, is getting telecom operators, infrastructure suppliers, and hardware and software suppliers on the same page. Many companies are developing vehicles that won't rely on roadway upkeep. However, infrastructure, including vehicle communication and roadway maintenance, will be a key element in moving from perfect weather, geo-fenced, or highway-only vehicles to truly autonomous.

Regulation

The Federal Automated Vehicle Policy states: "Today, a motorist can drive across state lines without a worry more complicated than, 'did the speed limit change?' The integration of HAVs should not change that ability." NHTSA's policies urge states to coordinate legislation so as not to hinder the advancement of driverless cars. The National Conference of State Legislatures indicates that since 2012, 41 states and the District of Columbia (D.C.) have considered legislation related to autonomous vehicles. Only 21 states and D.C. have passed legislation related to autonomous vehicles. Governors in Arizona, Delaware, Massachusetts, Washington, and Wisconsin issued executive orders related to autonomous vehicles.

Many legislative bills are extremely restrictive and require a human driver prepared to take control in these vehicles. Many of them permit HAVs only for testing purposes. Michigan and Nevada currently have the most extensive enacted legislation defining autonomous vehicles, testing, and liability. Current law regarding autonomous vehicles varies drastically between states. Legislation may not be the challenge originally thought as states appear to be moving forward quickly in the legislative process; guidance from the federal government has helped.

Liability

I won't go into any detail about liability here as there was a very good article detailing the issues by Leonard

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T. Bier, CAPP, JD, in the March 2017 issue of *The Parking Professional*. To quote the closing statement from the article, "I pose an issue that doesn't have a clear solution but requires further thought, debate, and deliberation to reach a conclusion that needs to be codified into uniform federal law." Well said.

Cybersecurity

There are currently somewhere around 100 million lines of code in a typical new car. Experts constantly warn that the more connected vehicles get, the more vulnerable they are to attack. Computer systems that have been hacked seem to be in the news almost daily. Vulnerable vehicle access points for hackers continue to grow with embedded modems, Wi-Fi internet routers, Bluetooth modules, USB ports, and more. To date there have been no major cybersecurity incidents involving autonomous vehicles. It should also be noted that there are redundant systems guiding the vehicle—cameras, sensors, and communications. Hacking and disabling them all would be a major undertaking. Even with redundant systems, the current state of cybersecurity should provide pause for consumers and may slow autonomous vehicle acceptance.

Other Vehicles

If we get past all the hurdles and have a truly autonomous vehicle that's capable of navigating from point A to point B without human input, what then? The public must accept and purchase them. Elon Musk, or "Uncle Elon" as my Tesla owner adviser called him, has stated that "the point at which we see autonomy appear will not be the point at which there is a massive societal impact on people because it will take a lot of time to make enough autonomous vehicles to disrupt."

According to consulting firm IHS Automotive, the combined average age of all light vehicles on the road in the U.S. is 11.6 years. There are more than 263 million light vehicles on the road in U.S., and 17 million new ones sold each year. At a rate of only about 11 million cars scrapped per year, turning over the U.S. car fleet could take more than two decades. Fleetcarma has projected that it would take 18 years for 50 percent of all new vehicles to comply with a newly mandated requirement if a law was passed today.

What It All Means

Where does all this leave the parking industry? That depends. It's not clear how people will choose to travel as HAVs become more prevalent in our society. There are many directions in which the technology can move; private vehicles, ride-hailing, public transit, and most likely a combination of the three. Truly autonomous vehicles will work on a dedicated transit lane before they will work in general traffic. We will most likely see earliest acceptance by public transportation. This adoption should have little effect on parking. Mobility as a service is the model that most automakers are currently focusing on. Early on many of these will be limited, geo-fenced applications. Most likely, early adoption will be within urban areas and for short trips. This should again have minimal effect on parking.

The most immediate concern of autonomous vehicle acceptance will be with parking structures. Garages generally have lifespans exceeding 40 years. Deciding now on appropriate design and construction features for future changes in use would be prudent.

Parking management will see a more unhurried change and have time to adapt. Even so, we cannot ignore that the future of parking is going to change. IPI is already taking steps to ensure that operators can keep up during these changing times. Their Data Exchange Standard will be vital to aiding in the adoption of services such as ride-sharing, dynamic pricing, and remote management. As the fiduciary of landowners, parking professionals must maintain close watch on developments and the direction of mobility. I have no doubt that we will continue to need parking spaces in the future, just not in the same way or places that we do currently.

Technologically, two years is a long time, but my position has not changed. I still believe any disrupting effect of highly autonomous vehicles on parking management will be measured over the next couple of decades. As I see it, the actual progress toward autonomous vehicles is not nearly as exhilarating as the feeling one gets during a Tesla test drive on autopilot.

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