In 2017 Aptiv (Delphi without the split-off powertrain division) capped off its plan to transition the company from a traditional components supplier to a higher tech version of itself with the acquisition of nuTonomy, a Boston-based autonomous vehicle technology developer. Aptiv paid 400 million US dollars plus 50 million US dollars in earn outs for nuTonomy.

Bringing self-driving technology to market has proven to be a lot harder and more expensive than people realized. Significant revenues are at least five more years out. Aptiv’s pockets were not deep enough, so it sold half of its L4 self-driving venture to Hyundai for 2 billion US dollars: 1.6 billion US dollars in cash, plus 400 million US dollars worth of engineering services that Hyundai will provide to the 50-50 Joint Venture (JV). The 1.6 billion US dollars in cash on the JV’s balance sheet will fund the new company for the next several years.

The headcount, which stood at 800 in May, will climb to 1000 by year end 2020, according to Aptiv. The JV supports development centers in Boston, Las Vegas, Singapore, Santa Monica and Seoul.

**Target: the Robotaxi Market**

The JV plans to have its driverless system ready for the robotaxi market by 2022, and while the driverless platform will be its main product, to establish its validity the JV will initially operate robotaxi fleets. The partners expect those fleets will deliver hundreds of millions of dollars in revenue in 2025. As system costs come down, by 2030 or so the JV expects to begin marketing its AV platform to makers of personally owned vehicles. Hyundai will be an obvious customer to target. The JV’s driverless platform includes integrated sensors, the computer and software along with connectivity to a cloud service so robotaxi fleets can be monitored and coordinated by remote operators. According to Karl Iagnemma, President and CEO of the yet unnamed JV, R&D for the AV system is nearly complete. “We are way past the stage of focusing on demos and pilots; we are building products for the real world,” he said. What remains is the industrialization. The platform needs to meet automotive reliability and quality standards and to be deeply integrated into the vehicle. Along with cash, it is these capabilities that Hyundai brings to the partnership.

**Joint Efforts Needed for Success of AD**

“A few years ago, a lot of experts believed that success in autonomy was going to come from software development hubs in Silicon Valley,” said Iagnemma. “That’s no longer the case. You need a deep strategic relationship with a global automaker. … We found the perfect partner in Hyundai. What Hyundai does better than anyone in the world is mass produce a highly cost-optimized vehicle at very large scale.”

The JV’s plan to land significant revenue from robotaxi fleets by 2025 was made prior to the Covid-19 pandemic. That plan has not been altered but it has caused the company to consider modifying its product. These days most people would be unwilling to jump into a robotaxi for fear of contact with unclean surfaces. The JV is considering a number of initiatives to keep robotaxis disinfected, either manually or automatically. And further, it will have to make the entire mobility experience as non-contact as possible, maybe with access doors that open and close automatically. It would be far better for the JV (and everyone) if we soon have a vaccine and they do not need to consider how to operate with the risks of contagion.

The JV is pointing toward three ways in which it will distinguish itself from Waymo, Cruise, Argo AI, Aurora and the many other autonomous vehicle developers. In partnership with Lyft, its 75-vehicle robotaxi fleet in Las Vegas has already delivered more 100,000 rides (with safety drivers). The JV is learning how to deliver a great rider experience. Second, the JV is focused on delivering a platform that is highly cost-optimized. And third, its footprint in the USA and Asia means that it can set up robotaxi fleets in many different locations. Candidate sites for robotaxi fleets already include Las Vegas and Singapore. Others will be selected based on regulatory landscape, weather, driving conditions and the market opportunity.

**Simulation is Fine But Real World Testing Also a Must**

Still, there are huge obstacles standing in the JV’s path to the robotaxi market. Each of the sensors must meet automotive requirements, and mechanisms for keeping the sensors clean are needed. Affordable solid-state lidar sensors are not nearly ready. The powerful computer at the center of the platform needs to cost less and consume less power. Not much road testing can be done these days with much of the world in lockdown due to the coronavirus, so developers must rely to an even greater extent on simulation. “Simulation does certain things very well, such as allowing us to test the performance and reliability of our policy engine, but there are gaps,” said Iagnemma. “Simulation today has trouble with the physical properties of the driving environment, which would allow us to test our perception systems.” Simulating radar signal returns from different obstacles is especially challenging.

**IPO Not Ruled Out**

The JV will soon select a new name for itself. “This is fundamentally a new business, so we are going to take the opportunity with a new brand to tell our story and reintroduce ourselves to the world,” said Iagnemma, who is not ruling out an eventual IPO.
According to Microsoft, cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale. Customers typically pay only for the cloud services they use, which helps to lower operating costs, letting them deploy infrastructure more efficiently and scale as their business needs change.

By now, most carmakers are embedding cellular modems in their new vehicles, and that has led to a strong demand for automotive cloud computing, a market that is expected to reach 10 billion US dollars by 2025. The market is led by two of the world’s biggest tech companies, Microsoft and Amazon.

Thus far, Microsoft’s Connected Vehicle Platform appears to have landed the most business. In February 2020, Microsoft and Volkswagen launched a strategic partnership that will make the Volkswagen Automotive Cloud one of the largest dedicated clouds in the automotive industry. More than five million new Volkswagen vehicles will be connected to Microsoft’s Azure cloud and edge platform each year.

Last year, Renault-Nissan-Mitsubishi launched Alliance Intelligent Cloud, a platform that will deliver connected services in vehicles sold in nearly all 200 markets served by Alliance member companies. The connected vehicle program will be deployed utilizing cloud, artificial intelligence and IoT technologies provided by Microsoft Azure.

Microsoft’s Connected Vehicle Platform business has also won significant engagements with Cerence, Ericsson, LG Electronics, ZF Friedrichshafen, Faurecia and Luxoft, among others.

Amazon Best in Cloud,
Microsoft Best in Automotive

While Amazon Web Services (AWS) holds the largest share of the overall 100 billion US dollars cloud market, with a 33%-share, it is second to Microsoft when it comes to significant automotive engagements. AWS’s biggest collaboration is with Ford and Autonomous, a Ford subsidiary charged with creating Ford’s Transportation Mobility Cloud (TMC). TMC will be powered by AWS to become the standard connected car solution for Ford vehicles. Ford says they chose AWS for its global availability and breadth of services, including IoT, machine learning and analytics.

For the last two years, the Toyota Research Institute has been using AWS’s deep learning framework to train ADAS and autonomous systems it is developing. Denso and AWS have been collaborating to offer connected vehicle solutions from the edge to the cloud. Joint solutions include real-time mapping and telemetry, detection of suspicious activity near the vehicle, and real-time driving event detection. Denso is partially owned by Toyota. Numerous automotive players have developed connected vehicle solutions with AWS including Aptiv, Lyft, Kia, Hyundai, Here, BMW and Audi, among others.

“Most OEMs have developed a connectivity strategy and are either completely connected or in the process of connecting their fleets,” said Dean Philips, Technology Leader for Automotive at AWS. “With this foundation in place we are now seeing more aggressive investments in machine learning, analytics, artificial intelligence and data lakes. Car makers are finding ways to turn their data into new products and services and making better vehicles.”
**Mentor | Siemens | Roll-out of Full E/E System Development Portfolio under Capital Brand**

Over the years Mentor has successfully integrated a collection of piecemeal tools for the design and manufacture of wiring harnesses into a unified suite of tools under the Capital brand. That business has seen fast growth. Mentor is well on the way to doing the same thing with software and network development. According to Martin O’Brien, Senior Vice President and General Manager of Mentor, “We now have a common perspective on the overall development of the Electrical/Electronics (E/E) system. We identify common language, common tools, and common data integration opportunities. We can offer a more seamless end-to-end development process.”

**Nvidia | Ampere Architecture Introduced**

With the introduction of the Ampere architecture, the Nvidia Drive platform is expanding its range of performance. At the high end, a new level-5 robotaxi system will deliver 2000 TOPS. Plus, a new entry-level ADAS solution, consuming just 5 W, will deliver NCAP 5-star capabilities when mounted behind the windshield. Now with a single architecture and single software development effort, manufacturers can deploy a high-performance AI system to make every vehicle in their lineups software-defined.

**QNX | Black Channel Communications Technology Added to Portfolio**

Communications paths using unknown components, where the route the data might take to get to its destination is uncertain, are called black channel communications. Black channels are not appropriate for safety-related data unless technology is deployed to protect the data regardless of the underlying software and hardware, which is exactly what QNX’s Black Channel Communications Technology is designed to do. The solution is available now. QNX’s Black Channel Communications Technology is certified to ISO 26262 ASIL D, the automotive industry’s functional safety standard. It is based on the safe data communications requirements identified in IEC 61508 and mitigation measures defined in Autosar End-to-End communications protection profiles. Software from BlackBerry QNX has thus far been embedded in more than 150 million vehicles on the road today.
The world of mobility is changing. The challenge facing automotive developers is to acquire the knowledge they will need tomorrow without losing sight of future technologies. The complexity of the mobility transformation process calls for groundbreaking solutions. ATZelectronics provides the latest information from across the entire spectrum of automotive electronics. Take advantage of the interactive e-magazine and benefit from the extensive information in our unique online archive, which gives you the option of downloading PDF files.