

TOP 5 STARTUPS TO WATCH

SELF-DRIVING CAR SOFTWARE

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**BUSINESS
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INTRODUCTION

Digital leaps in areas like AI and autonomous technology are fundamentally changing the way goods and people move around the world. Startups are the lynchpin of this transformation, pinpointing areas of need that can be tackled by cutting-edge digital solutions, including digital freight services, warehouse robotics, AI for supply chain management, delivery robotics, and autonomous driving software. That's ultimately forcing incumbents to evolve or see their core businesses erode. Monitoring these startups thus offers unique insight into the development of the transportation and logistics industries at large, and how incumbents are defending their turf.

In a series of five notes, Business Insider Intelligence looks at the top startups disrupting transportation and logistics. In the first note, we [discussed](#) the leading startups in digital freight and offered an assessment of their value and impact on the sector. In the second note, we [examined](#) the startups spearheading the rise of warehouse robotics. In the third note, we [explored](#) the leading startups offering AI software to enhance the routing of shipments and speed up delivery times, and the fourth note [looked at](#) the robotics startups automating last-mile delivery. Finally, in this fifth note, we analyze the startups developing autonomous driving software and how they're helping big automotive and tech companies in the race to put a self-driving car on the road.

SELF-DRIVING CAR SOFTWARE: ENABLING THE SHIFT TO AUTONOMY IN THE AUTOMATIVE SPACE

Self-driving technologies are undoubtedly the future of the automotive industry. A 2017 [survey](#) of 80 auto industry executives conducted by advisory firm Foley & Lardner LLP found that 23% expect semi- and fully-autonomous cars to account for at least 20% of their company's sales by 2025. And Business Insider Intelligence [expects](#) that nearly one in seven vehicles shipped in 2023 will have at least some self-driving features. We also project that self-driving cars used for Uber-like mobility services will account for 16% of the total miles driven in the US in 2023.

However, developing autonomous driving technologies is incredibly expensive and time-consuming, and often requires a massive transformation of companies' existing business structures. General Motors (GM) [raised](#) \$2.25 billion from Japanese telco SoftBank earlier this year to advance its self-driving efforts, while Ford [plans](#) to invest \$4 billion in self-driving car development through 2023. In total, legacy auto companies have spent between \$40 billion and \$50 billion developing autonomous and semi-autonomous car technologies, according to a Reuters [analysis](#) conducted last fall. Meanwhile, Daimler divided itself into three segments to better prepare for autonomy, and last fall, auto supplier Aptiv (formerly known as Delphi) [underwent](#) a similar re-shuffling to transform its business around autonomous cars and other emerging, disruptive technologies.

Because of the immense cost associated with developing autonomous car technologies, many legacy automakers are turning to startups that are primarily dedicated to developing the software that gives cars autonomous capabilities. GM became one of the earliest to take this route when it bought Cruise Automation for north of \$1 billion back in early 2016. More recently, legacy auto supplier Delphi [purchased](#) nuTonomy for \$450 million, and Volkswagen partnered with Aurora, a two-year-old startup, earlier this year. These acquisitions and partnerships have moved the spotlight to startups in the industry, as the race to operate an autonomous mobility service at scale intensifies.

TOP 5 SELF-DRIVING CAR SOFTWARE STARTUPS				
Name	Total Investment	Notable Investors	Geographies/Markets	Highlights
Drive.ai	\$77 million	<ul style="list-style-type: none"> Northern Light Venture Capital New Enterprise Associates 	<ul style="list-style-type: none"> Silicon Valley-based firm developing a software kit to give vehicles Level 4 autonomy for the North American market 	<ul style="list-style-type: none"> Currently operating ride-hailing service in Texas, logged 3rd most miles of any company in California in 2017
Zoox	\$790 million	<ul style="list-style-type: none"> Lux Capital Blackbird Ventures AID Capital Partners 	<ul style="list-style-type: none"> California-based company working on its own car design and self-driving technology stack for the US market 	<ul style="list-style-type: none"> Logged 2,244 test miles in California last year and plans to launch autonomous ride-hailing service by 2020
Aurora	\$90 million	<ul style="list-style-type: none"> Greylock Partners Index Ventures 	<ul style="list-style-type: none"> Silicon Valley startup developing software-centric technologies to give cars fully autonomous capabilities 	<ul style="list-style-type: none"> Founded by former heads of Tesla, Waymo autonomous tech groups, has partnerships with Volkswagen and Hyundai
Roadstar.ai	\$138 million	<ul style="list-style-type: none"> Shenzhen Capital Wu Capital Yunqi Partners 	<ul style="list-style-type: none"> China-based company working on a hardware and software kit that gives cars Level 4 autonomy 	<ul style="list-style-type: none"> Currently testing cars in China and California, will have 1,500+ cars on the road in China by 2020
Voyage	\$15 million	<ul style="list-style-type: none"> InMotion Ventures Khosla Ventures SV Angel 	<ul style="list-style-type: none"> California-based firm working on a software stack that gives cars Level 4 autonomy 	<ul style="list-style-type: none"> Trialing a ride-hailing service in a retirement community in Florida
Source: News reports, Crunchbase, California Department of Motor Vehicles, company websites				BUSINESS INSIDER INTELLIGENCE

TOP 5 STARTUPS IN SELF-DRIVING CAR SOFTWARE

We selected each startup based on the amount of funding it's received, the value of its products, the potential value of the market it serves, the quality and number of its customers and partners, and the number of noteworthy investors — either from within the industry or the technology space more broadly — it has secured.

For the purposes of this note, we are limiting the scope software-focused startups, although many on our list make specific types of hardware, as well. We did this to exclude LiDAR suppliers, most of which have very different business models and occupy a different place in the autonomous driving ecosystem.

Startup: Drive.ai

Founded: 2015

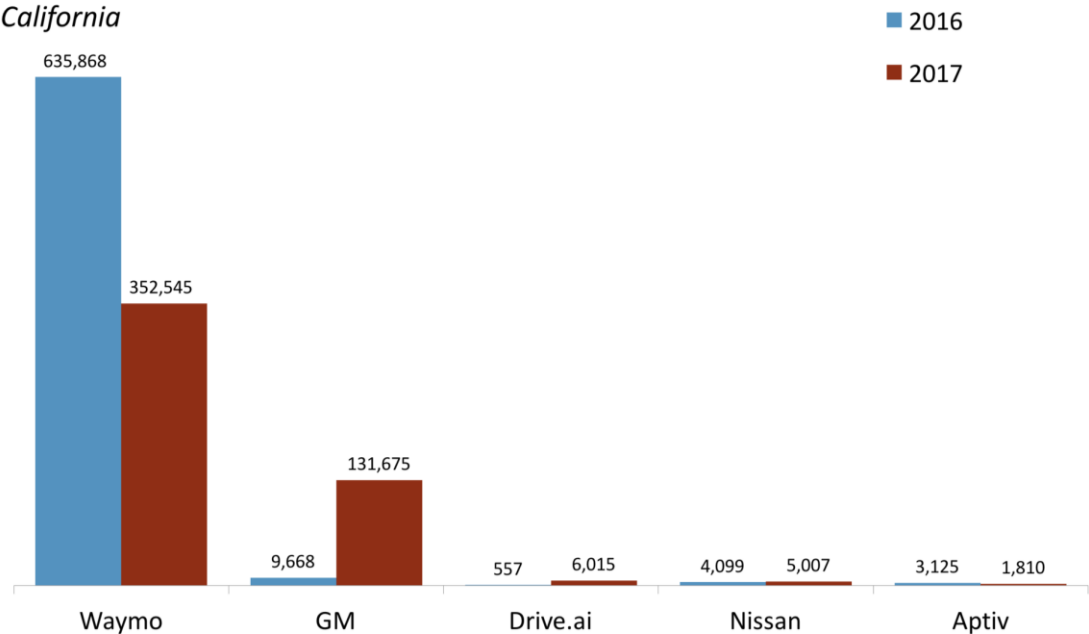
Notable investors: Northern Light Venture Capital, New Enterprise Associates

Why it's worth watching: Drive.ai is building a [kit](#), which includes AI-based software and a computing platform, that's designed to give any vehicle fully autonomous capabilities. The company [secured approval](#) from the California Department of Motor Vehicles (DMV) to test cars equipped with these technologies in early 2016, and its 11 cars have now logged 6,572 miles on the state's roads. That's the most extensive testing of any company on our list, and its 2017 mileage totals are the third most of any company, after only Alphabet's Waymo and GM. These tests have allowed Drive.ai to fine-tune its technologies and gain clout in the industry. That helped it [secure](#) a partnership with Lyft last fall to deploy its autonomous cars to the public on the ride-hailing company's open [platform](#) in the San Francisco area, as well as partnerships with several [undisclosed legacy automakers](#). Most importantly, Drive.ai [started](#) a free, publicly available six-month-long trial of a ride-hailing service using a handful of specially modified Nissan vans in a geofenced area in Frisco, Texas earlier this month.

What's next: After Drive.ai gets its proprietary ride-hailing service in Texas up and running, it'll likely expand it to new geographies, potentially including California. At that point, it'll likely need to hire in its business strategy and operations departments. In addition, cofounder and CEO Sameep Tandon [told](#) VentureBeat that Drive.ai eventually wants to release additional versions of its self-driving kit that are designed for different settings and vehicle types.

Top Companies' Autonomous Test Miles Driven

California



Source: California Department of Motor Vehicles

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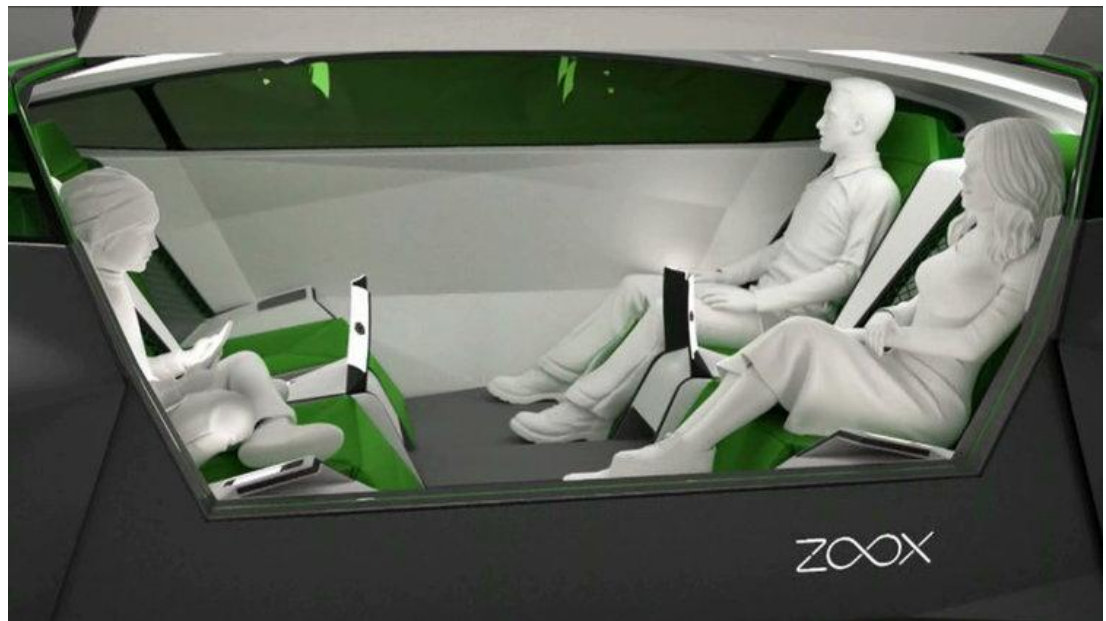
Startup: Zoox

Founded: 2014

Notable investors: Lux Capital, Blackbird Ventures, AID Capital Partners

Why it's worth watching: Zoox is developing a vertically integrated network of fully autonomous, electric cars that it plans to use as part of a ride-hailing service. It's built everything from the LiDAR sensor hardware and the AI software to the car itself, and most importantly, boasts a proprietary connected in-car design. Although the firm has not specified the full details of this design, it could give the company a unique opportunity to gobble up a share of the additional 900 million minutes a day US consumers [will spend](#) in cars every day by 2025. Zoox's early start on this massive undertaking — it's the oldest startup on our list — helped it quickly advance its technologies and start preparing to use the cars to generate revenue. At the end of 2017, Zoox's test cars had [driven](#) 2,244 miles on California roads (95% of which were in San Francisco). These factors have helped Zoox achieve an extraordinary valuation — its most recent funding round [valued](#) the company at \$3.2 billion.

What's next: Zoox said last month that it plans to launch a commercial ride-hailing service using its vehicles in the US in 2020, though it declined to specify a geography. In addition, in a call with Business Insider Intelligence, Zoox's head of corporate and regulatory affairs, Bert Kaufman, emphasized the expensive nature of its business model. As such, even though the firm just [completed](#) a \$500 million funding round last month, it could still raise additional capital, especially as it inches closer to launching its ride-hailing service.



Startup: Aurora

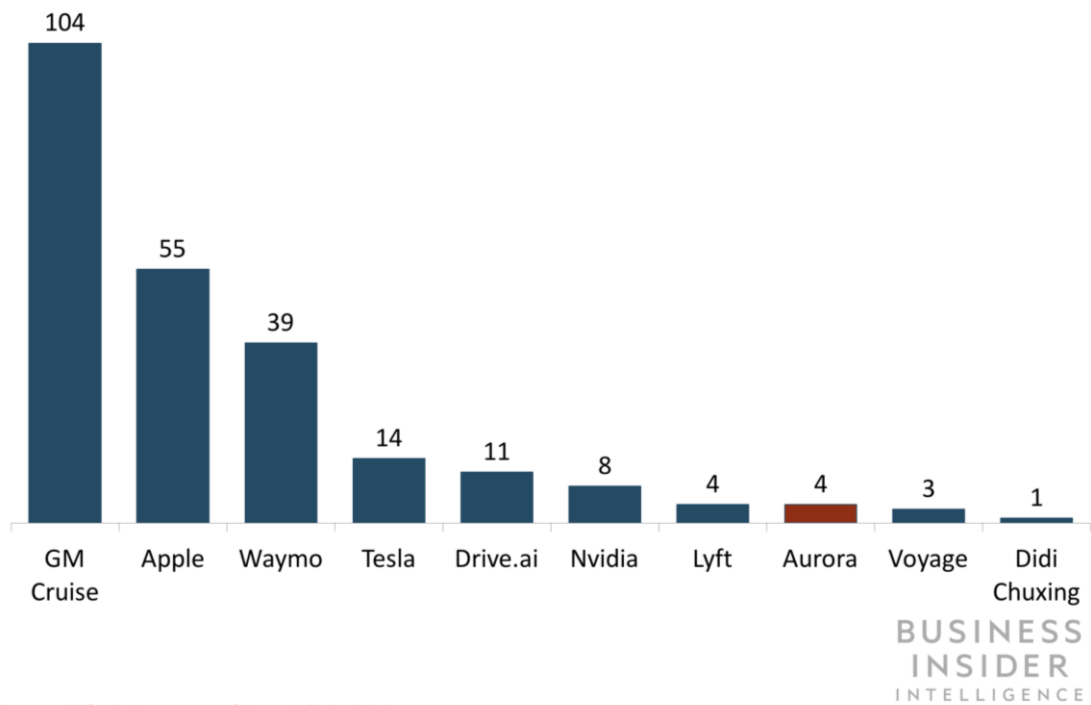
Founded: 2016

Notable investors: Greylock Partners, Index Ventures

Why it's worth watching: Aurora, which is developing machine learning software that enables cars to drive themselves, immediately grabbed headlines due to its experienced leadership team when it emerged from stealth mode last year. The two-year-old company was founded by Chris Umson, an early engineer on Google's self-driving car project, Sterling Anderson, a former Tesla Autopilot exec, and Andrew Bagnell, a former assistant professor of engineering at Carnegie Mellon University. Moreover, the company added LinkedIn cofounder Reid Hoffman to its board of directors earlier this year. This impressive leadership team, coupled with the fact that it's been testing four cars with its software on California roads since early 2018, has helped the company secure an impressive set of customers, including Hyundai, Volkswagen, and Chinese electric car startup [Byton](#).

What's next: When Aurora closed its Series A funding round back in February, the company said hiring — it had over 50 open positions at the time — was its top priority for the rest of this year.

Registered Autonomous Test Cars In California



Startup: Roadstar.ai

Founded: 2015

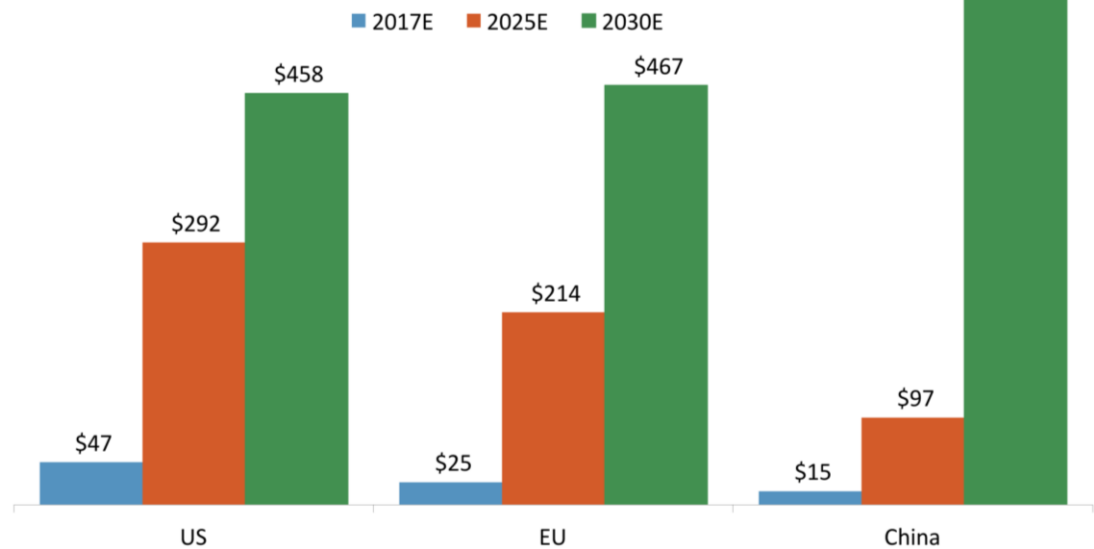
Notable investors: Shenzen Capital, Wu Capital, Yunqi Partners

Why it's worth watching: Roadstar.ai is based in Shenzhen, China and is developing a technology stack — including LiDAR sensors, cameras, and machine learning algorithms — that gives vehicles [Level 4 autonomy](#). The company, which was founded by a trio of engineers who previously worked at well-known companies [including](#) Apple, Nvidia, Waymo, and Baidu, wants to operate a ride-hailing service with fully electric cars powered by its stack. Roadstar has been testing cars with its technology stack in both California and Shenzhen [since](#) September 2017, and [plans](#) to deploy another 50 in China by the end of the year. Roadstar's cars have the unique opportunity to collect data from two disparate locations, which could help advance its core tech faster than any other startup on our list. As such, Roadstar has a strong chance to grab a share of the Chinese autonomous car market, which McKinsey [projects](#) will be the largest in the world by 2030.

What's next: Roadstar [said](#) earlier this year that it planned to expand its ride-hailing fleet in Shenzhen to 200 by next year. Additionally, the company will expand that fleet to 1,500 cars by 2020, and [says](#) the cars will be deployed in the core districts of four of China's "first-tier cities."

Estimated US, EU, And China Shared Mobility Market Size

Billions (\$)



Source: PwC and Strategy&, 2017

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Startup: Voyage

Founded: 2017

Notable investors: InMotion Ventures, Khosla Ventures, SV Angel

Why it's worth watching: Voyage is developing machine learning software designed to give vehicles Level 4 autonomy. It's specifically looking to deploy a ride-hailing service using cars with its technology stack in closed settings before expanding to public roads. Specifically, the company started trialing a ride-hailing service using about 12 cars in a Florida retirement community [home to](#) about 150,000 people last year. This approach could allow Voyage to scale its services very rapidly, since it could circumvent often stringent state and local regulations that are only applicable to public roads. These early tests and its ability to attract talented experienced leaders — it [poached](#) the former head of Uber's flying car division earlier this year and [brought in](#) a former Tesla and Uber engineer as its CTO last month — have helped it nab a partnership with Enterprise Rent-A-Car.

What's next: Voyage CEO Oliver Cameron told Business Insider Intelligence that it plans to bring its ride-hailing service to new geographies in the not-too-distant future, though he declined to specify a time frame or name any specific locations.



[Download the charts and data in Excel »](#)

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