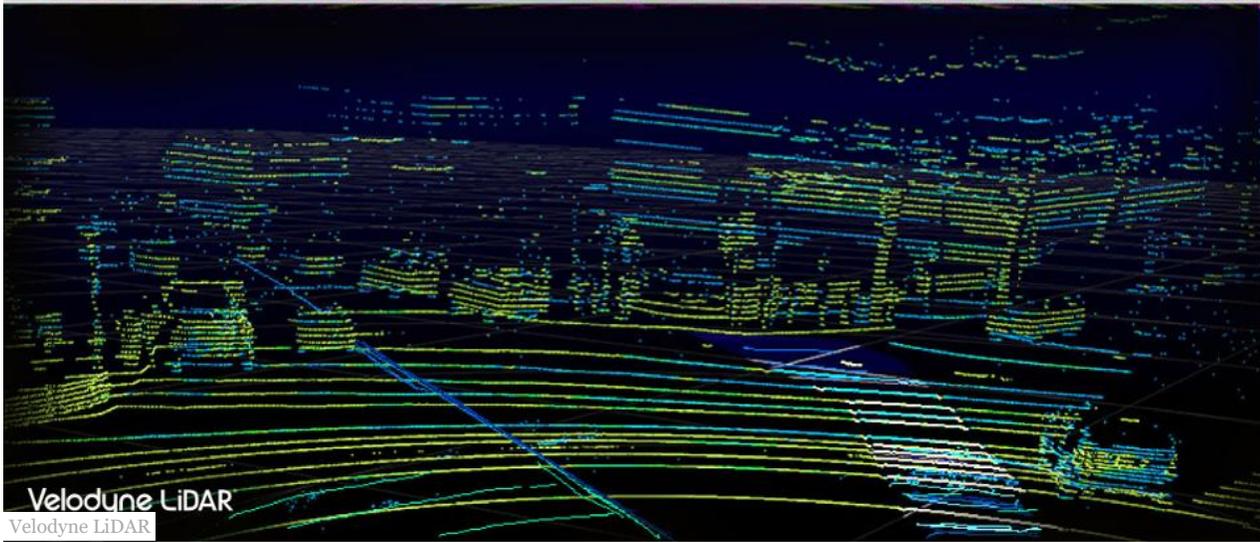
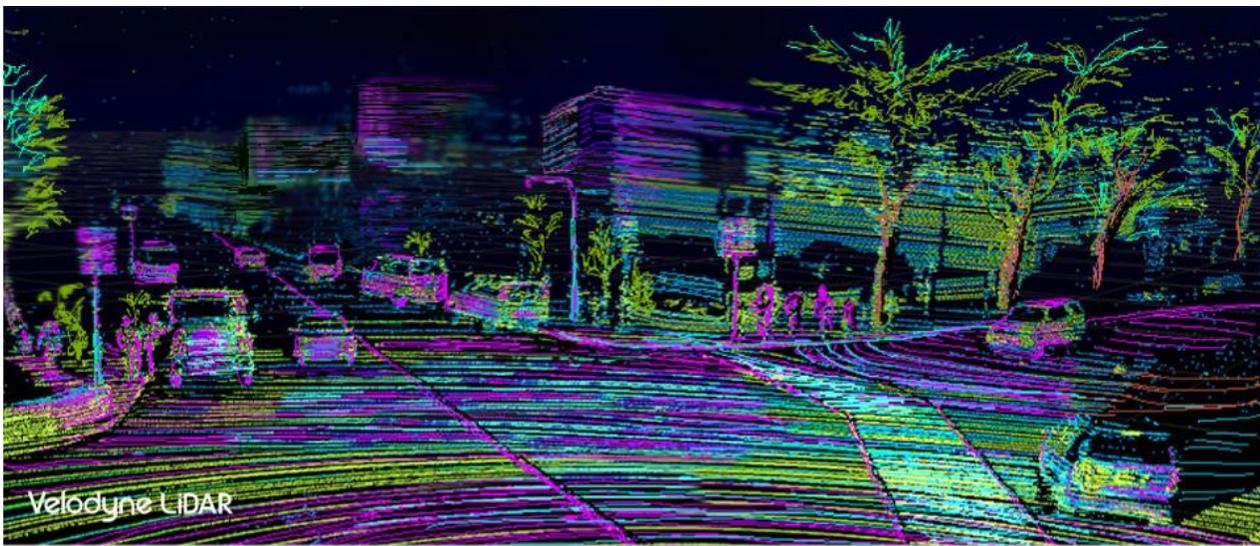


Velodyne Rolling Out 128-Laser Beam LiDAR To Maintain Driverless Car Vision Lead



Alan Ohnsman, FORBES STAFF ✓

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A street image created by Velodyne's new VLS-128 LiDAR sensor, top, has 10 times the resolution of an image from its [+]

Velodyne, the top supplier of sensors that give self-driving cars 360-degree, 3D vision, is releasing a significantly enhanced laser LiDAR that can see further and

with higher image resolution than anything currently available amid rising competition from startups touting cheaper or higher-quality sensors.

The tech company created by David Hall, who patented the first spinning LiDAR for driverless vehicles more than a decade ago, begins shipping initial units of its 128-laser beam VLS-128 in December, with production to expand in 2018. The sensor has at least 10 times the resolution of Velodyne's previous top-end model and can see dark objects in a vehicle's path as far away as the length of three football fields.

"We want to be able to see tire debris out on a road and then steer around it," Hall told *Forbes*. "The current thinking is that's about 300 meters, and it has to see something pretty black. We think we can do that with this device."

Self-driving cars need artificial intelligence and cutting-edge computing power to understand and react to road conditions and surroundings. Just like human drivers, they also need to see. Cameras and radar are already standard equipment on many new vehicles, alerting drivers of pedestrians and nearby hazards they may not notice. But LiDAR's ability to create detailed, somewhat ghostly "point cloud" images of surroundings – in virtually all lighting and weather conditions and at long range – makes it a vital tool for robotic cars.

Velodyne got a big head start in the optical sensor market when it supplied 64-beam LiDAR units to contestants in the 2007 DARPA Urban Challenge, a legendary engineering competition that helped ignite the self-driving car revolution. Now its racing to complete a fully automated factory in San Jose to supply up to a million of the vision devices a year to auto and tech customers making driverless cars, which Halls expects to help drive down the cost of the exotic optical devices in the process.

(For more on Velodyne, see "[How A 34-Year-Old Audio Equipment Company Is Leading The Self-Driving Car Revolution](#)" from the September 5, 2017 issue of *Forbes*.)

Hall declined to discuss pricing for the new product, beyond confirming that initial units will cost several thousand dollars. Product refinements and mass production will lower the cost significantly, he said, without elaborating.

[Waymo](#), Alphabet Inc.'s self-driving tech company, outfits its vehicles with long- and short-range LiDARs the company says it designed in-house. [GM recently bought Strobe](#), a little-known LiDAR company in Southern California that is developing a highly low cost "chip scale" sensor, while Germany's Ibeo is expanding its automotive LiDAR business. And since 2016, startups including [AEye](#), [Innoviz](#),

Quanergy, LeddarTech, Luminar and Oryx Vision have announced funding deals and industry partnerships to get their sensors to market as quickly as possible.

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So far, few of those companies are producing in high volume, while Velodyne will supply tens of thousands of LiDAR sensors to customers this year. To maintain its advantage, there's also pressure to keep improving its products.

The new model “represents all of Velodyne’s learning from having built and deployed LiDAR sensors around the world for more than a decade,” said Chief Technology Officer Anand Gopalan. “Range and resolution are both critical, and we've tried to maximize both, maintaining a 360-degree field of view and a high frame rate. And as far at the long-range resolution goes, there's nothing out there that matches the 128.”



Velodyne LiDAR

The new VLS-128, right, has twice as many lasers and 10 times the resolution of the company's previous high-end [+]

Alan Ohnsman covers technology-driven changes reshaping transportation. Follow him on [Twitter](#). Have tips to share with Forbes anonymously? Click [here](#).

