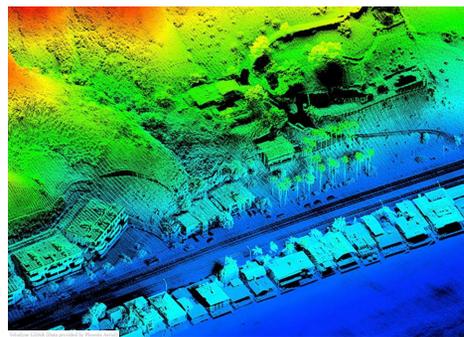


# Velodyne Adds Hyundai, Tesla Veterans To Aid Robot Car LiDAR Production Leap

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A point-cloud 3D image generated by a driver using a Velodyne LiDAR sensor.

Velodyne, the top supplier of sensors that give self-driving cars 360-degree, 3D vision, hired veteran auto and tech executives to help it transition into a high-volume maker of the high-tech devices as competition from new LiDAR players grows.

The San Jose company promoted Frank Blohm, previously Velodyne's general manager, to chief operating officer in addition to making two hires that will be key as its "Megafactory" prepares to make a million LiDAR sensors annually from 2018. Mircea Gradu, previously responsible for engineering quality at Hyundai Motor's U.S. unit, is Velodyne's new senior vice president of validation, while Pablo Gonzalez, who helped automate production at Tesla and SolarCity, is overseeing robotics and automation engineering.

"We're investing in highly skilled industry veterans and building an executive bench prepared to shape a company positioned for massive growth and long-standing market domination," David Hall, Velodyne's CEO and founder, said in a statement.

Hall, an inventor who started Velodyne as an audio components company in 1983, patented the first spinning LiDAR, short for light, distance and ranging, more than a decade ago. Last year he sold stakes in his company to Ford and Baidu for a combined \$150 million, the first outside investment in the private company since its founding.

(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.)

The new executives will be under pressure as the Silicon Valley company fully automates LiDAR production at the San Jose facility added in January. Velodyne has made the optical devices at its original headquarters in Morgan Hill, California, since 2005, but wanted the much-larger San Jose facility in anticipation of heavy demand for LiDAR for both fully and semi-autonomous cars and trucks starting next year.

A high-volume, automated plant that can run "with the lights out" will ensure that the devices get far less costly in the years ahead, Hall told Forbes recently.

Just last week two would-be LiDAR rivals, Innoviz and LeddarTech, announced funding from investors worth \$66 million and \$101 million, respectively, to begin production of solid-state LiDAR sensors. Both say their products will be cheaper than Velodyne's, which currently costs thousands of dollars each, while matching its imaging quality.

Self-driving cars need artificial intelligence and cutting-edge computing power to understand and react to road conditions and surroundings. And just like human drivers, they need to see. Cameras and radar are already standard equipment on many new vehicles, alerting drivers of pedestrians and nearby hazards they may not see. 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.

Along with Innoviz and LeddarTech, other LiDAR companies jumping into the market include Silicon Valley-based Quanergy and Luminar, Israeli startup Oryx Vision and established sensor makers including Germany's Ibeo. Google was Velodyne's biggest customer for years, but it's stand-alone Waymo self-driving car company now makes its own LiDAR sensors.



Velodyne's San Jose "Megafactory" opened in January, but the process of installing a fully automated production system will continue into 2018.

Velodyne's long experience developing and selling LiDAR gives it a significant head start relative to companies with little or no production capability currently. Hall has said that Velodyne's sensors will keep improving in image quality and durability, and that prices will fall. It's also preparing to start making its own solid-state LiDAR, in addition to a range of spinning, multi-laser sensors.

"Other companies are coming from the low end, we are coming in from the top of the market," Gradu told Forbes in an interview. As a result, it's easier for Velodyne to "dumb down" its products in terms of cost and design than for rivals to match its imaging quality and range, he said without identifying specific companies.

Gradu's job is to work closely with Velodyne's auto and tech customers to tailor sensors to their specific needs. Along with Hyundai, his lengthy automotive background includes stints at Daimler-Benz in Germany and at the former Chrysler Group.

Gonzalez recently helped design an automated production system to make solar power modules at Tesla's SolarCity plant in Buffalo, New York, and now has to do the same for Velodyne.

"We'll wow the world. We're going to have a lot of output at this factory," Gonzalez told Forbes. He's designing Velodyne's automated production along the lines he followed in Buffalo factory and isn't concerned about meeting the million-unit production rate.

"I don't think we stop there," he said. "That's a goal for 2018, but we're building this factory to be scalable to an even higher volume," he said, without elaborating.



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