Self-driving cars need FOG, inertial

May 18, 2016 - By GPS World staff

New products come to market poised for take-off

Fiber-optic gyros (FOGs) and FOG-based inertial measurement units (IMUs) form key parts of the integrated sensor systems essential for highly accurate autonomous car performance. For example, FOGs provide precise azimuth measurements that an autonomous car's logic processing unit and control systems need to determine motion through a curve.

KVH high-precision fiber-optic gyro
The red illumination in the photo represents light moving through the FOG's optical circuit of coiled fiber. This circuit is the FOG's sensing unit, mounted with power and processing electronics within a driverless car to provide precise data for the car's navigation systems.

An IMU — which can include FOGs and accelerometers in one compact package — also provides highly accurate six-degrees-of-freedom angular rate and acceleration data to precisely track the position and orientation of the car even when GPS is unavailable, helping the car stay on course.

KVH Industries is developing a FOG-based, low-cost inertial sensor for self-driving cars. The company has also released a Developer's Kit to assist design engineers with integrating FOG technology into driverless car control systems.

"Extremely precise heading based on fiber-optic gyro technology is absolutely essential for autonomous vehicle performance," said Martin Kits van Heyningen, KVH's chief executive officer. "This is something we learned from having been involved with more than a dozen driverless car development programs over the years."

"What we are seeing now is that each driverless vehicle concept in development around the world is being designed in a unique way," van Heyningen continued. "With so many different possibilities, developers can accelerate their progress by working with a proven technology such as KVH's FOGs and FOG-based IMUs and leveraging our experience to ensure their success."

Developer's Kit

The new Developer's Kit includes the user interface software and all components needed to connect a KVH FOG or FOG-based IMU to a computer to configure, analyze and test a unit. "The kit is designed to help engineers get up and running in minutes, making it easier to run diagnostics and accelerate their system development," said Roger Ward, KVH's director of FOG product development.

"We have successfully produced more than 90,000 fiber-optic gyros for an extensive range of unmanned applications, in part because of our ability to tailor size, performance and cost to meet different design needs," said Jeff Brunner, KVH's vice president for FOG operations. "Controlling the entire FOG design and manufacturing process gives us that advantage, and makes it possible to produce a low-cost sensor when driverless cars enter full-scale production."

KVH's FOGs and FOG-based IMUs are in use in prototype programs not only for autonomous cars, but also for production programs for underwater unmanned vehicle navigation and rail/track geometry measurement systems, to name just a few. In addition, KVH's inertial products have been widely adopted for commercial applications such as land-based street-mapping platforms, unmanned aerial systems, camera-stabilization systems and remotely operated subsea systems.

KVH's 1750 IMU was an integral part of 11 of the 23 humanoid robot finalists in last year's DARPA Robotics finals, a competition designed to showcase robots capable of intervening for and even replacing humans in high-risk situations such as fires, earthquakes and other natural disasters.

Related Articles

- Expert Opinions: UAV PNT commercial requirements

- KVH highlights line of IMUs for unmanned systems at AUVSI's Xponential 2016

- KVH looks to self-driving cars with inertial sensor plans

- iXBlue Launches Marins M Series Inertial Nav System

- ION GNSS+ 2014: KVH Industries, Inc.

This article is tagged with DARPA Robotics, Fiber-optic gyro, fiber-optic gyro technology, FOG, FOG-based IMU, inertial measurement units, KVH FOG, KVH Industries and posted in From the Magazine, UAV/UGV

GPS WORLD

About the Author: GPS World staff

GPS World covers all aspects of the GPS and GNSS industry for our readers. To submit news, please send your release to gpsworld@gpsworld.com.