KVH Has Delivered First Precision Gyros Using New Photonic Chip to Automotive Customers

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Integrated into KVH's high-precision inertial measurement units (IMUs), the new Photonic Gyros provide cost and performance advantages designed for the emerging driverless car market

MIDDLETOWN, R.I., Jan. 03, 2019 (GLOBE NEWSWIRE) -- KVH Industries, Inc., (Nasdaq: KVHI), announced today that it has integrated its photonic chip technology into its high-precision fiber optic gyro (FOG) products and began delivering working prototypes of a new Photonic Gyro IMU to select leading automotive customers in late December. Developed by KVH engineers working in Tinley Park, Illinois, and Middletown, Rhode Island, the photonic chip technology is designed to enable the centimeter-level localization accuracy that autonomous vehicle developers have indicated is a requirement.

"This is groundbreaking technology that we expect will transform our fiber optic gyros and inertial systems, and I couldn't be prouder of the tremendous effort by our incredible team of engineers," says Martin Kits van Heyningen, KVH's chief executive officer. "Our FOGs and FOG-based IMUs provide a higher level of precision than less expensive MEMS-based gyros and are already in use on more than 20 autonomous vehicle platforms today. With the development of this Photonic Gyro IMU, KVH can provide an inertial sensor with high precision but at a price expected to be competitive with MEMS systems when produced at high volumes."

During development, the Photonic Gyro IMU prototype exhibited navigation performance superior to KVH's existing FOG-based IMUs in angle random walk (ARW) and bias instability, two of the most important performance parameters that contribute to the safety of any autonomous vehicle.

The ARW, or noise, of the Photonic Gyro IMU prototype has been calculated at <0.0097°/√hr, a very low value that supports extremely accurate navigation. In addition, the bias instability, or drift, of KVH's Photonic Gyro IMU prototype is extremely low, measuring 0.02°/hour. Low drift is a key parameter for maintaining position and delivering precise turning measurement, which contributes to safety.

With the development of the photonic chip technology, KVH expects to be able to mass-produce high-performance inertial systems at lower cost; manufacturing processes are expected to be less labor-intensive than were previously possible in the fiber optic gyro industry. KVH manufactures its FOGs and FOG-based inertial products in its Tinley Park, Illinois, facility, and controls the design and manufacturing process.

To date, FOGs and FOG-based inertial navigation systems have formed key parts of integrated sensor systems shown to be essential for highly accurate autonomous car performance. For precise navigation and position, an autonomous vehicle uses a combination of sensors, primarily the Global Positioning System (GPS) and inertial navigation systems. Inertial navigation systems provide crucial dead reckoning capability when the vehicle is required to operate within a GPS-denied scenario, such as that created by buildings, parking garages, and other obstacles common in a city environment. Given that traffic lanes typically measure three meters, autonomous vehicle engineers are focusing on centimeter-level precision to ensure the car is operating safely within its lane.

"Sensor fusion is essential for autonomous vehicle operation, and the accuracy provided by our FOGs and FOG-based IMUs has been acknowledged in the industry as setting a high bar for inertial navigation in driverless cars," says Kits van Heyningen. "Now, with the high precision we are seeing with our photonic chip technology, we think photonic gyros may become a core part of the success of autonomous vehicles. We are thrilled at the possibilities."

Based on a photonic integrated circuit, KVH's patent-pending photonic chip technology has relevance for KVH's entire line of FOGs and FOG-based inertial systems, which are already considered high-performance inertial sensors.

KVH is a leading innovator for assured navigation and autonomous accuracy using high-performance sensors and integrated inertial systems. KVH's widely-fielded TACNAV ® systems are currently in use by the U.S. Army and Marine Corps as well as many allied militaries around the world. KVH's FOGs and FOG-based IMUs are in use today in a wide variety of applications ranging from optical, antenna, and sensor stabilization systems to mobile mapping solutions and autonomous platforms and cars.

Note to Editors: For more information about KVH's photonic chip technology, please visit the KVH website, kvh.com/photonicgyro. High-resolution images of KVH products are available at the KVH Press Room Image Library, kvh.com/Press-Room/Image-Library.

About KVH Industries, Inc.
KVH Industries, Inc. is a global leader in mobile connectivity and inertial navigation systems, innovating to enable a mobile world. A market leader in maritime VSAT, KVH designs, manufactures, and provides connectivity and content products and services

globally. KVH is also a premier manufacturer of high-performance sensors and integrated inertial systems for defense and commercial applications. Founded in 1982, the company is based in Middletown, RI, with research, development, and manufacturing operations in Middletown, RI, and Tinley Park, IL, and more than a dozen offices around the globe.

This press release contains forward-looking statements that involve risks and uncertainties. For example, forward-looking statements include statements regarding the performance, functionality, characteristics, quality and manufacturing costs of KVH products and technology, our product development goals, market trends, and competitive positioning. The actual results could differ materially from the statements made in this press release. Factors that might cause these differences include, but are not limited to: inability to complete the commercialization stage of development of the new photonic-chip-based gyro; potential failure to achieve expected manufacturing goals, including production volumes and reductions in labor costs; unexpected increases in costs of materials; reductions in the prices customers are willing to pay; manufacturing challenges that increase costs; potential unanticipated technical impediments and poor or delayed research and development results; unforeseen changes in competing technologies and products, including undisclosed breakthroughs by competitors; lack of reliable vendors; potential changes in market trends, and other developments affecting the buying patterns of end-users of inertial products, including management's assessment of the probability and effect of future events. These and other factors are discussed in more detail in KVH's most recent Form 10-Q filed with the Securities and Exchange Commission on October 31, 2018. Copies are available through its Investor Relations department and website, ir.kvh.com. KVH does not assume any obligation to update its forward-looking statements to reflect new information and developments.

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