

Inertial measurement unit with quartz gyro-sensors developed by Epson Toyocom

September 30 2010

Epson Toyocom Corp. today announced that it has begun commercial development of a highly compact, accurate, and stable inertial measurement unit (IMU). The IMU employs technology the company has accumulated in the development of QMEMS quartz gyro-sensors. Epson Toyocom plans to make engineering samples available in April 2011.

Epson Toyocom already provides a variety of sensing products, including six-axis [sensors](#) for motion sensing and gyro-sensors for use in camera-shake correction and high-accuracy navigation systems. The company has also been providing customers with support and system solution support for its sensing devices. Epson Toyocom launched the IMU development project with the aim of using the know-how accumulated in the course of providing customer service to provide efficient and high-performance inertia measurement.

The IMU currently under development is a compact device that employs ± 300 degrees per second triple gyroscopes on three axes and three ± 3 -G tri-axis accelerometers. It exhibits excellent angular rate characteristics, with gyro bias instability less than 6 degrees per hour and angle random walk performance less than 0.24 degrees per $\sqrt{\text{hr}}$. The new IMU's instability and accuracy parameters, respectively, are approximately 25% and 12.5% better than comparable IMUs available in the market. Technology for adding highly accurate compensations enables the IMU to show excellent bias-temperature stability (instability less than 0.005 degree per second / $^{\circ}\text{C}$) across the operating temperature range. This

represents an approximately 50% improvement in bias-temperature stability compared to comparable IMUs.

Sensor stability and miniaturization are generally mutually opposing. However, Epson Toyocom has fine-tuned its QMEMS technology to enable it to downsize the device package for easy assembly in lightweight applications and mobile systems without sacrificing stability characteristics. The ease with which the IMU can be handled will help lower the technical barriers for customers wanting to offer inertial measurement and allow them to provide on-board inertial motion analysis or control to applications with minimal time and engineering expense.

The IMU is being developed for a wide variety of applications in areas such as industrial system motion analysis and control, moving object control, and vibration control and stabilization. Excellent stability, accuracy, and other characteristics, combined with a compact form factor, will make it easy for customers to use the IMU in new industrial applications or differentiate existing applications, accelerating the spread of inertial measurement in these markets.

Provided by Epson

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