

Goodrich Supplies Europe's First MEMS Gyros for Space Navigation

Experimental miniature solid state gyros pass CryoSat-2 in-orbit test

Goodrich Corporation gyroscopes have successfully passed in orbit testing on the European Space Agency's (ESA) Earth Explorer CryoSat-2 satellite during a mission to detect shifts in global ice cover. The Goodrich Micro Electro-Mechanical System (MEMS) gyros were the smallest ever flown by ESA and were used to monitor the satellite's rate of spin. They were integrated into the SiREUS rate sensor to form Europe's first MEMS-based device to be used for space vehicle navigation.

"This sensor is based on a new concept and the flight experiment was very important for proving its feasibility," explained Daniele Temperanza of ESA's Control Systems Division. "The CryoSat-2 project offered the opportunity to gain flight heritage. The satellite's precision ice measurements rely on knowing its orbital position and attitude very precisely requiring highly accurate navigation sensor performance."

At the heart of the SiREUS rate sensor are three 1-square-centimeter (0.155-square-inch) MEMS gyros from Plymouth, UK-based Atlantic Inertial Systems (AIS), which was acquired by Goodrich in December 2009. Running on just six watts and weighing only 750 grams (1.65 pounds), the gyros are development extensions of units already used worldwide for automotive electronic stability control. Their evolution for space was backed through ESA's Technology Programmes with three UK-based industrial partners: Selex Galileo, AIS and Systems Engineering and Assessment (SEA). SiREUS is now being made available commercially through Selex Galileo.

Ian Longden, Director of MEMS Inertial Sensing Technology for Goodrich Sensors and Integrated Systems commented, "The culmination of this project with such positive results is an excellent outcome. We've delivered over 18 million MEMS-based gyros around the world and the ESA program offered us the first opportunity to explore the potential of these gyros for the unique needs of the space sector."

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