

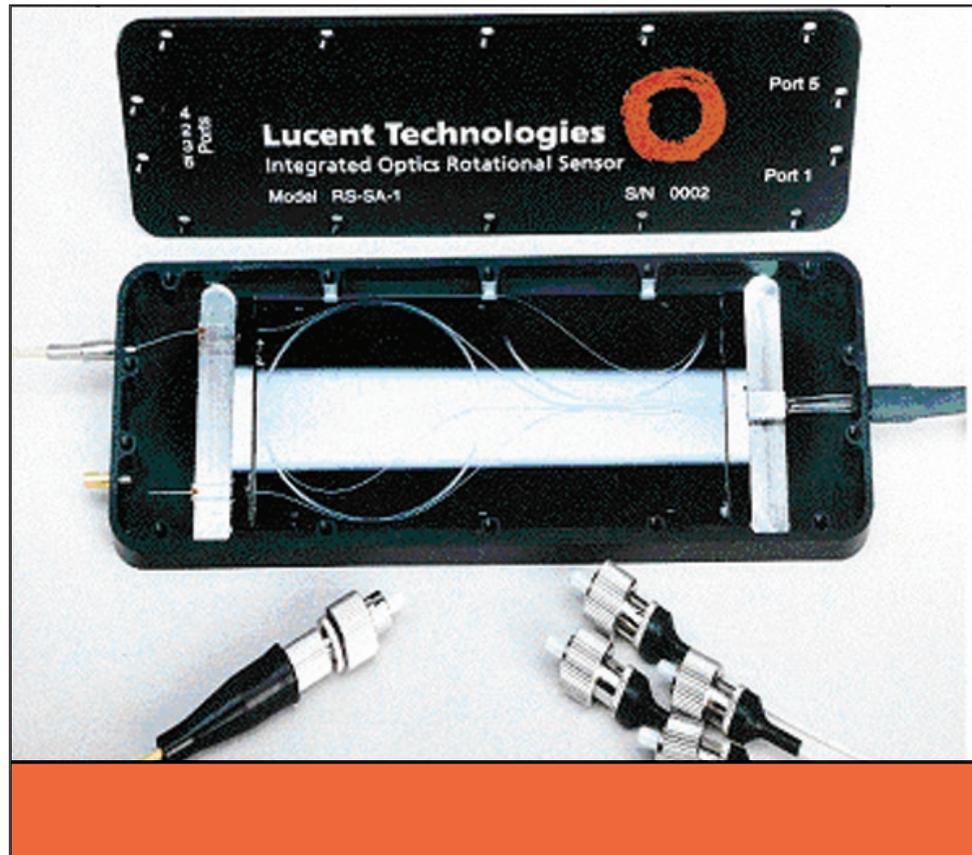


Air Force Research Laboratory | AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

INTEGRATED OPTICS ROTATION SENSOR



The Sensors Directorate managed a Small Business Innovation Research Phase II project with Rice Systems, Inc. of Irvine California, to develop and demonstrate a lightweight, compact, glass-on-silicon optical gyroscope with an optics package slightly larger than a credit card. Directorate engineers needed the Integrated Optics Rotation Sensor (IORS) for the development of a low cost, environmentally rugged optical gyroscope for a variety of military rotation sensing requirements. The Defense Advanced Research Projects Agency funded this project under the Technology Reinvestment project.



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Accomplishment

Rice Systems continued development of the IORS (“gyro on a chip” concept) that led to innovations for both military and commercial applications. These applications include inertial navigation, satellite guidance and control, flow diagnostic sensors, biomechanics, materials inspection, and the characterization of protein crystal growth.

Air Force (AF) system applications include low-grade navigation, and guidance and control applications such as munitions and platform stabilization requiring small size and low weight instrumentation. Directorate engineers estimate a potential savings of up to 75% of the cost for an inertial measurement unit for AF weapons systems.

Background

Rice Systems engineers identified many important commercial applications for the IORS such as automotive, robotic, munitions, and medical applications. For example, medical devices, such as wheel chairs that must stay upright, could use the technology to implement some type of coarse navigation system. Angular rate sensing in automobiles is another possibility. Rice engineers are also investigating IORS as a way to stabilize the human body to help prevent falls of the elderly.

Rice Systems is currently developing several follow-on devices, which are more commercially applicable. These devices include a lossless splitter for telecommunications and a sensor for the micropropulsion systems of microsattellites.

Sensors
Technology Transfer

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (02-SN-10)