

Northrop Grumman Navigation Systems Division

A Legacy of Fiber-Optic Navigation System Innovation

Northrop Grumman's Fiber-Optic Gyro (FOG)-based family of Inertial Navigation Systems (INS) have demonstrated superb performance in applications ranging from high dynamic fighter aircraft, unmanned air vehicles, land vehicles and commercial aircraft.

Compared to the previous generation of ring laser or mechanical gyro systems, the FOG navigation systems offer significantly smaller size, much lower weight, lower power consumption, vast improvement in life and reliability, all at the same or better level of accuracy. Using FOG technology, low noise accelerometers, high performance global positioning system, and sophisti-

require high voltage for the laser plasma, and, with the exception of a laser diode for the light source, are composed of passive optical components and thus yield extremely high reliability compared to any other available technology.

Inertial products utilizing fiber-optic gyros are in high volume production and are used everywhere, from under the sea to outer space and in most places in between. These products include rate gyros, inertial measurement units (IMU), and inertial navigation systems (INS).

Development of inertial grade fiber-optic gyros started in the mid-1980s and production of fiber-optic gyro-based inertial navigation systems started in 2001. While Northrop Grumman has

produced nearly 20,000 of the FOG-based tactical class LN-200 IMU since the early 1990s, the first fiber-optic gyro-based INS product was the LN-251, the basis of Northrop Grumman's family of fiber-optic gyro based, navigation grade inertial systems. It resulted from a DARPA-funded project to produce the next generation of navigation grade inertial system that would provide the smallest volume, lowest weight, lowest power consumption and highest

reliability system compared to any other approach using alternate technologies.

Northrop Grumman also applies the advantages of fiber-optic gyro technology to the commercial aircraft navigation market with the LTN-101E Inertial Reference System. Of extreme importance in this market is the very high reliability and long life that fiber-optic technology brings compared to current ring laser gyro technology. The LTN-101E provides highly reliable velocity and attitude information for the aircraft.

The LN-270 INS/GPS system is the production land configuration of the LN-251 INS/GPS. The LN-270 includes

provisions to interface to a land vehicle Velocity Measurement System (VMS), such as the standard MIL-PRF-71196 odometer. The same airborne GPS receiver found in the LN-251 is embedded in the LN-270, forming a tightly coupled INS/GPS suitable for all land navigation applications.

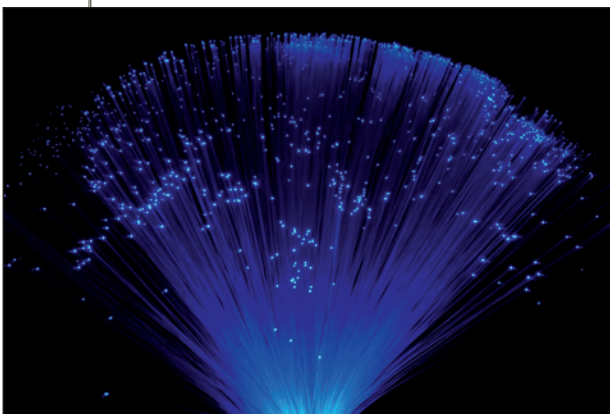
The LN-260, another variant of the LN-251, was developed for use on the F-16. Northrop Grumman has developed the LN-260, which combines the features of the LN-100s, including missionization software and input/output (I/O) protocol, with the benefits of the FOG sensor assembly. It implements the full interface requirements of SNU-84 and has the required analog and mechanical interfaces for the F-16.

Northrop Grumman's Navigation System Division supplies situational awareness products for international and domestic defense and commercial markets and offers fiber-optic gyro systems designed to customer requirements, navigation and positioning systems for space and high-value platform products, navigation-grade and tactical-grade inertial systems, integrated avionics, underwater fiber-optic sensors, identification friend-or-foe transponders and interrogators, cockpit displays and computers, and logistic support products and services.

Northrop Grumman Corporation is a global defense and technology company whose 120,000 employees provide innovative systems, products and solutions in information and services, electronics, aerospace and shipbuilding to government and commercial customers worldwide.

Contact Information

**Northrop Grumman
Corp. Navigation
Systems Division**
Phone 818-715-2470 or visit
www.northropgrumman.com
Search: NSD



Navigation based on fiber optics

cated integration algorithms, Northrop Grumman has demonstrated the FOG navigator's ability to provide extremely low-velocity noise information, enabling improved surveillance sensor compensation and reduced target location errors. Transfer alignment techniques also permit leveraging the full accuracy of the FOG navigator to smaller remote inertial measurement units used for motion compensation or stabilization of other sensors, such as radar or electro-optic pods.

Fiber-optic gyros require no mechanical dither for their operation, do not