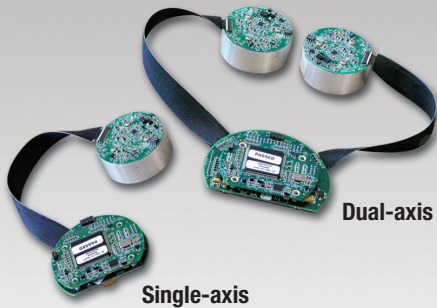


# DSP-1750 FOG Digital Output

World's Smallest High-performance Fiber Optic Gyro



## Key Features

- EMCORE E•Core® ThinFiber technology
- Extremely low noise, high bandwidth
- Angle random walk  $\leq 0.013^\circ/\sqrt{\text{hr}}$
- Option of standard input rate of  $\pm 490^\circ/\text{sec}$  or high input rate of  $\pm 1000^\circ/\text{sec}^*$
- Superior bias instability of  $\leq 0.05^\circ/\text{hr}$ ,  $1\sigma$
- Digital output; single- and dual-axis
- Magnetic shielding optional
- Commercial off-the-shelf (COTS) product
- Proven reliability – MTBF >36,000 hrs (Ground Mobile)

## Applications

- Gimbals
- Optical/antenna stabilization
- Long-range optical and sensor systems
- Equipment platform stabilization
- Payloads for UAVs
- Weapons platform stabilization
- GPS/INS, IMU integration

## Super-compact Single- or Dual-axis Package

EMCORE takes fiber optic gyro (FOG) technology to a new level of performance with the DSP-1750, the world's smallest high-accuracy FOG. Available in both single- and dual-axis configurations, the DSP-1750 is designed for a wide range of precision navigation, stabilization, and pointing applications where low noise and high performance across the entire range of operating temperatures are critical. Ideal applications include long-range optical and sensor systems, gimbals, tactical missiles, autonomous vehicle navigation, and the stabilization of virtually all types of commercial equipment platforms.

## Delivering Groundbreaking Performance

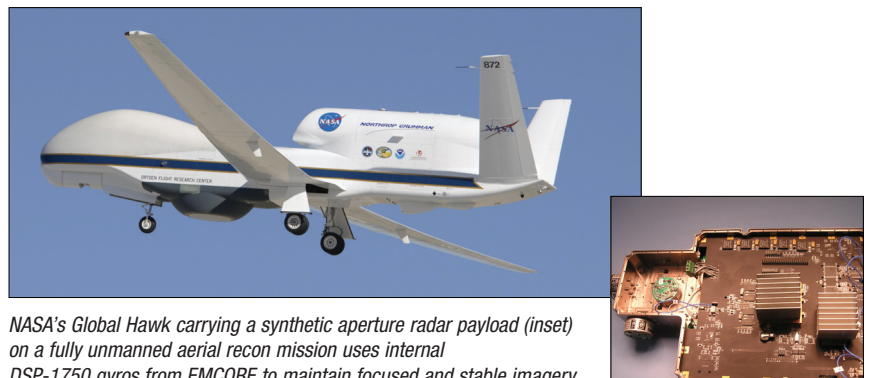
The DSP-1750 delivers performance never before achieved in FOGs of similar size. Utilizing EMCORE's 170-micron E•Core ThinFiber, the world's smallest D-shaped optical fiber, it delivers extremely low noise coupled with high bandwidth. This super-compact FOG offers input rate options of  $\pm 490^\circ/\text{sec}$  or  $\pm 1000^\circ/\text{sec}^*$ , exceptional ARW, and bias stability previously only available in closed-loop FOGs and ring laser gyros.

## Innovative, Versatile Design

Featuring a flexible design in which the optical sensor is separate from the control electronics, the DSP-1750 has a 45.7 mm (1.8") diameter optical sensor housing connected to its power and processing electronics via a robust interlocking tether. This two-piece design allows the sensor to be installed directly on the sensitive axis, while the control circuit cards can be integrated elsewhere, such as in an existing board stack assembly. This innovative design makes the DSP-1750 easy to integrate into customer platforms where space and payload weight are at a premium.

## Unmatched Quality and Reliability

EMCORE is the only U.S. FOG manufacturer that draws its own optical fiber, ensuring consistent quality, performance, and instant turn-on to turn-on repeatability in every FOG. And like all of EMCORE's precision FOGs, the solid state DSP-1750 is built using EMCORE's patented Digital Signal Processing (DSP) electronics design which offers significant improvements in such critical areas as scale factor and bias stability, scale factor non-linearity, and maximum input rate.



NASA's Global Hawk carrying a synthetic aperture radar payload (inset) on a fully unmanned aerial recon mission uses internal DSP-1750 gyros from EMCORE to maintain focused and stable imagery.

\* The DSP-1750 High Rate variants are controlled by the Export Administration Act of 1979, as amended (Title 50, USC App 2401 et seq.) and its implementing regulations, the Export Administration Regulations, 15 CFR 730 et seq.

Specifications	EMCORE DSP-1750 Fiber Optic Gyro - Digital Output			
Number of Axes	Single-Axis (Digital)		Dual-Axis (Digital)	
Variant	Standard Rate	High Rate	Standard Rate	High Rate
Input Rate ( <i>max</i> )	±490°/sec standard rate	±1000°/sec high rate	±490°/sec standard rate	±1000°/sec high rate
Bias Instability (25°C)	≤0.05°/hr, 1σ		≤0.05°/hr, 1σ	
Bias vs. Temperature (≤1°C/min)	≤3°/hr, 1σ		≤3°/hr, 1σ	
Bias Offset (25°C)	±2°/hr		±2°/hr	
Scale Factor Non-linearity ( <i>max rate</i> , 25°C)	≤200 ppm, 1σ		≤200 ppm, 1σ	
Scale Factor vs. Temperature (≤1°C/min)	≤300 ppm, 1σ		≤300 ppm, 1σ	
Angle Random Walk (25°C)	≤0.013°/√hr (≤0.8°/hr/√Hz)		≤0.013°/√hr (≤0.8°/hr/√Hz)	
Electrical/Mechanical Interface				
Bandwidth (-3 dB)	≥440 Hz ±4%		≥790 Hz ±4%	
Initialization Time ( <i>valid data</i> )	≤3 secs		≤3 secs	
Data Interface	Asynchronous (RS-422); optional 1000 Hz or 1800 Hz		Asynchronous (RS-422); optional 1000 Hz or 1800 Hz	
Baud Rate	115.2 Kbps		115.2 Kbps	
Data Rate	1000 Hz		1800 Hz	
Physical Specifications				
Dimensions ( <i>max</i> )	45.7 mm Dia x 22.9 mm H (1.8" x 0.9")		45.7 mm Dia x 22.9 mm H (1.8" x 0.9")	
Weight ( <i>max</i> )	Non-magnetically shielded: 0.11 kg (0.24 lbs) Magnetically shielded: 0.13 kg (0.28 lbs)		Non-magnetically shielded: 0.14 kg (0.30 lbs) Magnetically shielded: 0.17 kg (0.34 lbs)	
Power Consumption	4 W (max), <3 (typical)		5.5 W (max), <3.75 (typical)	
Input Voltage	+5 & ±8 to ±15, ±5% VDC		+5 & ±8 to ±15, ±5% VDC	
Environmental Specifications				
Temperature ( <i>operating</i> )	-40°C to +75°C (-40°F to +167°F)		-40°C to +75°C (-40°F to +167°F)	
Shock ( <i>operating</i> )	25 g, 11 ms, sawtooth		25 g, 11 ms, sawtooth	
Vibration ( <i>operating</i> )	8 g rms, 20-2000 Hz		8 g rms, 20-2000 Hz	
MTBF	≥36,000 hours		≥22,000 hours	

For detailed interface control drawings (ICD) and technical information on this product, please visit [emcore.com/nav/support](http://emcore.com/nav/support)

## For More Information

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