

# TAC-450-320 IMU

emcore®

Photonic Inertial Measurement Unit



## Key Features

- Non-ITAR and compliant with EU import regulations
- Exclusive EMCORE PIC technology
- Available with 10g or 16g inertial-grade MEMS accelerometers
- Compact design with improved SWaP
- Robust performance and survivability
- Three tactical-grade photonic gyros
- Outstanding tolerance of shock and vibration
- Low Angle Random Walk and bias instability
- High scale factor accuracy and bandwidth
- Backward compatible with existing EMCORE IMU/FOG equipment

## Applications

- Autonomous and unmanned commercial and defense platforms (ground/aerial/marine surface/submersible)
- Antenna and camera system stabilization
- EO/FLIR system stabilization
- GNSS-aiding inertial navigation
- Mobile mapping systems
- Targeting and pointing systems
- Autonomous navigation, guidance, and positioning

## Affordable, Robust Photonic FOG-based IMU with High-performance in Challenging Stabilization and Navigation Applications

The new EMCORE TAC-320 IMU is a dependable, tactical-grade, non-ITAR inertial system that's also affordable. The TAC-450-320 features EMCORE's exclusive photonic integrated chip (PIC) technology to deliver robust performance and survivability in the harshest environments. EMCORE's PIC technology provides more efficient fiber optic gyroscopes (FOGs) over traditional open-loop FOG technology by replacing previously high-touch optical components with a single precision-manufactured silicon chip.

The TAC-450 320-IMU meets the demanding needs of a broad range of navigation and stabilization applications and is offered with your choice of 10g or 16g inertial-grade high-performance accelerometers. With excellent FOG performance as affordable as MEMS alternatives, the TAC-450-320 IMU delivers outstanding performance and low cost. With three state-of-the-art photonic FOGs integrated with three high-grade low noise inertial accelerometers, the TAC-450-320 IMU is ideal for manned and unmanned platforms and navigation and stabilization systems in which affordability, high performance, and high bandwidth are critical for success.

## PIC Technology for Dependable Performance

EMCORE's exclusive PIC technology reinvents traditional FOG technology using an integrated planar optical chip, resulting in a sensor that delivers exceptional performance and survivability in challenging environments. The TAC-450-320 IMU offers a user-configurable baud rate to adjust communication latency and user-selectable message outputs from both the TAC-450 photonic FOGs and integrated high-grade accelerometers.

## Improved SWaP, High Bandwidth, Low Cost

The EMCORE TAC-450-320 offers great SWaP in a durable, compact package. Designed for ease of integration, the compact TAC-450-320 IMU is perfect for drop-in replacement for many available IMUs. The TAC-450-320 IMU's programmable message outputs simplify the integration of the TAC-450 system.

With its high bandwidth and low noise, the new TAC-450-320 IMU provides the data output required for demanding applications such as autonomous navigation systems, precision pointing and stabilization systems, and mobile mapping systems and still helps keep program costs down. EMCORE's TAC-450-320 IMU enables you to have exceptional photonic FOG-based quality performance at an affordable price.

The TAC-450-320 IMU is ideal for autonomous and unmanned commercial and defense platforms, in addition to GNSS-aiding inertial navigation, mobile mapping and surveying systems, targeting and pointing systems, and guidance and positioning.

## EMCORE TAC-450-320 IMU

### Performance Specifications – Gyros

<b>Input Rate</b>	$\pm 490^\circ/\text{sec}$ (max)
<b>Bias Instability (25°C)</b>	$\leq 0.05^\circ/\text{hr}$ , 1 $\sigma$ (typical) $\leq 0.1^\circ/\text{hr}$ , 1 $\sigma$ (max)
<b>Scale Factor Non-linearity (full rate, 25°C)</b>	$\leq 75$ ppm, 1 $\sigma$ (typical)
<b>Angle Random Walk (ARW) (25°C)</b>	$\leq 0.017^\circ/\sqrt{\text{hr}}$ ( $\leq 1.0^\circ/\text{hr}/\sqrt{\text{Hz}}$ )

### Performance Specifications – Accelerometers

	10g	16g
<b>Input Range</b>	$\pm 10\text{g}$ (max)	$\pm 16\text{g}$ (max)
<b>Bias Instability (25°C)</b>	15 $\mu\text{g}$ , 1 $\sigma$	24 $\mu\text{g}$ , 1 $\sigma$
<b>Velocity Random Walk (25°C)</b>	34 $\mu\text{g}/\sqrt{\text{Hz}}$	54 $\mu\text{g}/\sqrt{\text{Hz}}$
<b>Bandwidth (-3 dB)</b>	$\geq 200$ Hz	$\geq 200$ Hz

### Environment

	10g	16g
<b>Temperature (operating)</b>	-40°C to +75°C (-40°F to +167°F)	-40°C to +75°C (-40°F to +167°F)
<b>Shock (operating)</b>	9g (11 ms, sawtooth)	15g (11 ms, sawtooth)
<b>Vibration (operating)</b>	8g rms (20-2000 Hz, random)	10g rms (20-2000 Hz, random)

### Electrical/Mechanical

<b>Data Interface</b>	RS-422 Full Differential, Asynchronous or Synchronous
<b>Dimensions</b>	88.9 mm Dia x 63.5 mm H (3.5" x 2.5")
<b>Weight</b>	0.7 kg (1.54 lbs)
<b>Power Consumption</b>	5 W (typical), 8 W (max)

For technical manuals, expanded specifications, and additional information,  
please visit: [emcore.com/nav/support](http://emcore.com/nav/support)



### For More Information

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