High Performance Space IMU

LR-450 Inertial Measurement Unit (IMU)

Proven Legacy

The LR-450 incorporates Northrop Grumman's milli-HRG™ (mHRG™) Precision Space Gyroscope, which uses the same critical quartz components — high-Q resonator and inner electrode assembly — employed in Northrop Grumman's proven hemispherical resonator gyroscope (HRG) technology. The HRG has achieved more than 70 million failure free hours in space missions.

A single LR-450 can take the place of two RLG IMUs, optimizing SWaP-C for a typical 15-year mission.

Description

The mHRG™, known for its unmatched reliability in commercial, government and civil space missions, is inherently stable, with no wear-out mechanism, and has high tolerance to radiation effects.

LR-450 configurations include:

- Three mHRGs™. The inertial instruments are arranged as an orthonormal set
- Single integrated interface to power supply, communications bus, digital processor and control electronics
- Optional – one triax accelerometer (3 accelerometers mounted orthogonally)

Applications

The LR-450 is ideally suited for pointing, stabilization and platform attitude control applications, including:

- Orbital missions, including GEO, MEO and LEO at all inclinations.

mHRG™ Precision Space Gyroscope

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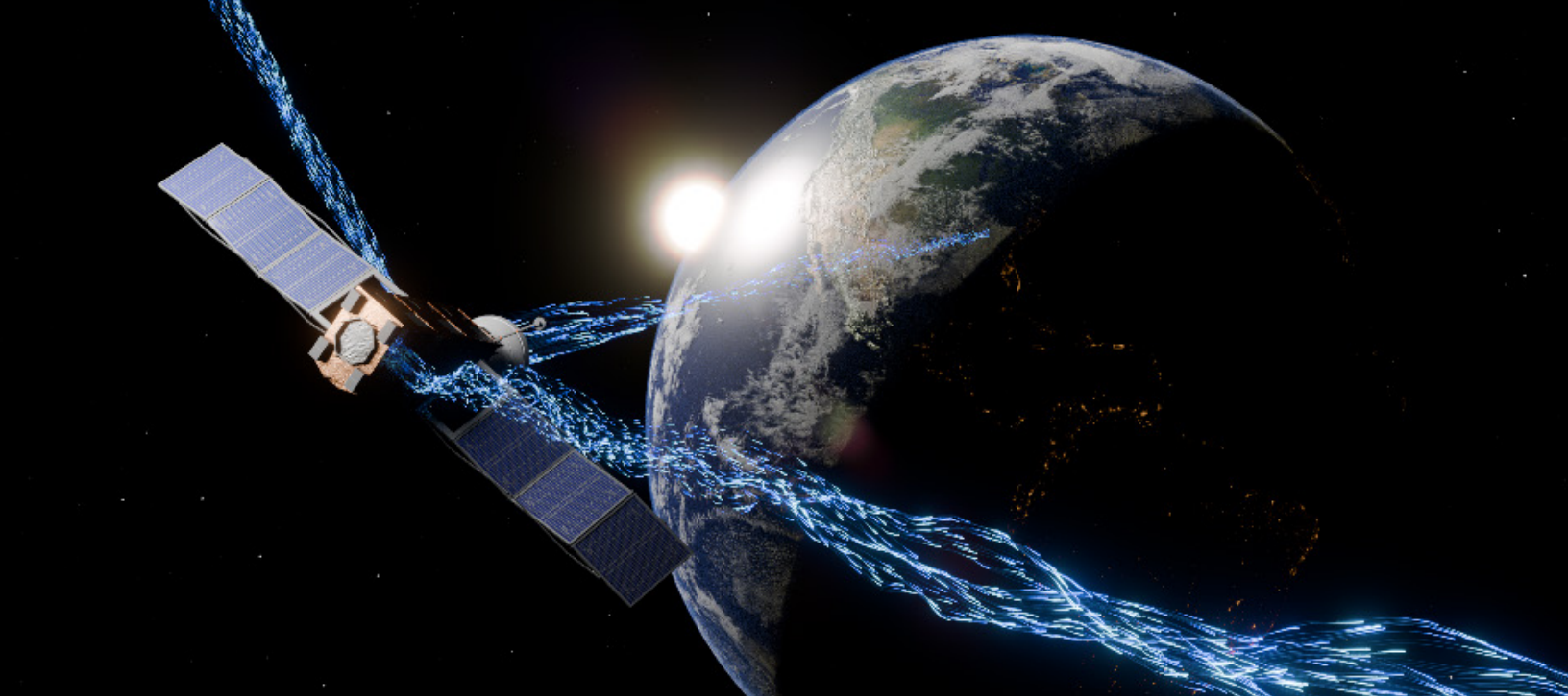
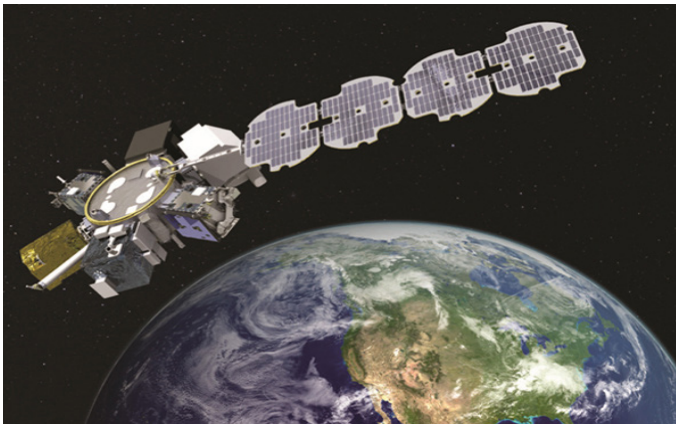


Advantages

The LR-450 provides customers with a robust and high-reliability system.

- Supports RS-422 protocol for easy integration into new and existing platforms
- Stable, low-noise gyros with no wear-out mechanism
- Inherent radiation hardness of mHRG™ along with space hardened and high-reliability components
- Designed for 15-year mission life
- Components proven in the HRG, with more than 70 million failure-free hours of operation in space



SWaP	
Size	8.6″ x 6.3″ x 6.3″; 341 in3
Weight	<10 lbs
Power	<15W, 28V Input Voltage
Performance	
ARW	< 0.003 (<0.002, typical) deg/rt-hr
Bias	< 0.005 (<0.002, typical) 1σ, deg/hr
Scale Factor	< 250 ppm RMS (typical)
Range	±15 deg/sec / ±400 deg/sec
Environments	
Temperature	-35°C to 65°C
Radiation	100 kRad Total Dose
Vibration	18.67 Grms (20 – 2000 Hz)
Mission Life	15 years (Ps ≥ 0.96)

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