

The affordable, flight-proven LN-100LG navigates critical launch and reentry vehicles reliably and accurately

LN-100LG Launch and Reentry Vehicle GPS-Inertial Navigation System



Ready to Launch

The LN-100LG system provides an affordable, reliable, accurate and flight proven guidance unit for critical launch and reentry vehicles that is available today.

Adapted from the high-production LN-100G GPS-updated inertial navigation system, the LN-100LG employs common hardware and software modules to offer shorter delivery lead times, faster service, and ensured supportability.

To address the more severe and dynamic environments of launch and reentry, the LN-100LG has been mechanically ruggedized and its operating range has been enhanced. The embedded GPS receiver has been modified to operate in most launch and ballistic coast trajectories.

Performs in Severe Environments

The mechanical robustness of the LN-100LG has been proven in qualification tests and in many flight applications, including:

- Low earth orbit
- Geosynchronous orbit
- Target vehicles
- Midcourse and reentry navigation

Proven Accuracy

The LN-100LG can be initialized on the ground by gyrocompassing or by using GPS updates optimized by a multi-error-state Kalman filter while in flight. Its orbital insertion accuracy has been demonstrated on its many launches.

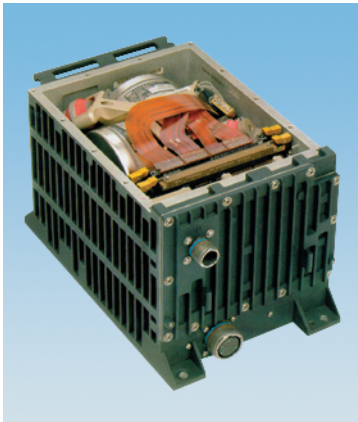
Launch and Reentry Vehicle Experience

The LN-100LG variants have successfully performed in over 35 flights for programs including:

- Pegasus
- Hyper-X
- Taurus
- Minotaur
- Payload Launch Vehicle
- Athena
- Multi-Service Launch System

Advantages

- Flight proven on critical launch and reentry programs
- Derived from the production LN-100 family of systems
- Optional embedded GPS receiver
- Optional separate processor for user-programmed vehicle flight control and mission functions



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Functional Capability

The LN-100LG performs inertial navigation and guidance and offers GPS update capability. The system outputs position, velocity, attitude, attitude rates, body-axis linear acceleration and angular rate and acceleration data.

Data messages are transmitted via dual MIL-STD-1553B buses and via three RS-485/422 data buses with UART protocol. The MIL-STD-1553B buses function as either a remote terminal or bus controller.

Performance Capability

- Ground gyrocompassing alignment
- Optional in-flight alignment
- Provides free inertial, blended GPS-inertial, or GPS-only navigation solutions

Gyro Performance (1 σ)

Angular Rate Range	400°/sec
(Optional)	720°/sec
Angular Acceleration	1500°/sec ²
Bias Stability	0.003°/hr
Scale Factor Stability	1 ppm
Input Axis Alignment	2 arc sec
Angle Random Walk	0.0015°/hr ^{1/2}
G-Sensitive Drift	Negligible

Accelerometer Performance (1 σ)

Operating Range	32g
(Optional)	150g
Bias Stability	25 μ g
Scale Factor Stability	50 ppm
Input Axis Alignment	2 arc sec
Noise	5 μ g/Hz ^{1/2}

Physical Characteristics

Size	7 x 7 x 11 in (17.78 x 17.78 x 27.94 cm)
Weight	22 lb (9.98 kg)
Power	28 Vdc, 48 W
Interface	MIL-STD-1553B, RS-422/485
Cooling	Free convection and base-plate conduction

Environmental Capability

The LN-100LG is qualified for use in the harsh environments of launch, hypersonic, and reentry vehicles and missiles.

Temperature Range	-54°C to +71°C
Random Vibration	30g rms
Sine Vibration	12.8g pk (450-550 Hz)
Shock (SRS)	110g @ 100 Hz 3000g @ 1300 Hz 7500g @ 4000 Hz
Altitude	Sea level to space

Design Features

- Three non-dithered, multi-mode ZLG™ gyros
- Three A-4 accelerometers in a compact triad mounting
- Power PC 603e processor supports inertial and GPS navigation
- Ruggedized, space qualified electronics and power supplies
- Flexible I/O interface
- Optional fast acquisition, 12 channel Trimble Force-5 GPS receiver
- Optional PowerPC 603e processor card supports vehicle mission and flight control
- Optional expansion card

For more information, please contact:

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