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FAST. FORWARD.

PROTECTED GLOBAL POSITIONING SYSTEM-MINI (PGPS-M)

Miniature embedded M-Code GPS receiver

The L3Harris Protected Global Positioning System-Mini (PGPS-M) offers ruggedized Military Code (M-Code) GPS capability in a miniature form factor, ideal for missile, hypersonic and small-lift launch applications, as well as air-breathing platforms where performance is critical and minimum size, weight and power are essential.

The PGPS-M uses an embedded GPS receiver specialized for high-dynamic applications satisfying the Department of Defense's mandate to transition to M-Code GPS in support of the National Security Space Launch program's "Assured Access to Space" initiative. The PGPS-M supports multiple use cases including 10 Hz RCC-324 range tracking, navigation aiding or as an external GPS sensor compatible with autonomous flight safety systems.

PGPS-M	
Inputs	
1 DS-101 GPS key interface (not a covered interface)	
1 L-Band RF input	
Outputs	
1 Pulse Per Second (PPS) output (10 Hz)	
Bi-Directional Inputs/Outputs	
2 RS-422 GPS sensor telemetry, command for ground/vehicle	
Power Supply	
Supply Voltage	+28 VDC
Power Consumption	< 12 W (including GPS)

PHYSICAL AND ENVIRONMENT CHARACTERISTICS	
Physical	
Volume	8.71 in^3
Dimensions	3.3 L x 2.2 W x 1.2 H in (with embedded GPS)
Weight	0.8 lb
Reliability	
Operating Life	10,000 hours
Storage	15 years
Reliability	>0.9999 at 95% confidence
Environments	
Thermal Environment	-37°C to +71°C
Pyrotechnic Shock	>5,600 G @ 10,000 Hz
Acceleration	81 G 30 sec ea + axis (180 sec total)
Random Vibration	36 Grms, 300 sec/axis, 58 Grms, 60 sec/axis

KEY FEATURES

- Embedded M-Code L1/L2 GPS receiver, RCC-324 compliant
- M-Code GPS receiver based on the L3Harris TRUTRAK-M™ optimized for high-dynamic applications
- Dual-use PNT sensor for navigation and range tracking
- True 10 Hz update rate
- Continuous atmospheric correction for improved solution accuracy
- Radiation tolerant by design
- High tolerance for extreme shock and vibe environments
- Autonomous flight termination unit (AFTU) compatible external sensor
- Designed for minimum size, weight and power
- Customizable for specific user mission needs

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BUILT-IN M-CODE GPS RECEIVER

The PGPS-M includes an embedded M-Code GPS receiver based on the L3Harris TRUTRAK-M™, tailored to provide 10 Hz output rates and customizable telemetry. The TRUTRAK-M has been granted security approval by the MilComm and PNT Directorate. In addition to cost, weight and space savings, the embedded GPS provides built-in compliance to the congressional M-Code mandate, while maintaining compatibility with the current GPS constellation. The PGPS-M is fully backward compatible with legacy Selective Availability Anti-Spoofing Module receivers, providing the capability to obtain precise positioning service using M-Code, Y-Code or Mixed Y- and M-Code operation. Specialized for high-dynamic applications, the PGPS-M built-in GPS receiver features a unique atmospheric correction capability which improves solution accuracy at high altitudes.

GPS RECEIVER PERFORMANCE*	
Solution Accuracy	
Position Accuracy	< 50 m 3σ
Velocity Accuracy	< 1 m/s 3σ
Startup Conditions	
Cold Start	< 180 sec
Hot Start	< 60 sec
Reacquisition	
Rapid Reacquisition	< 2 sec
On-Orbit	< 10 sec

*Notional target performance

OPTIMIZED GPS TELEMETRY

The PGPS-M provides optimized telemetry formats for multiple simultaneous use cases. Position, velocity, time, GPS tracking information and data quality indicators can all be reported at a true 10 Hz rate without extrapolation. Temperature, self-test results and secondary voltage monitors are available along with GPS telemetry for unit-level health and status reporting. Telemetry formats can be customized for application-specific telemetry needs. Ground support equipment and flight computer interfaces are GPS telemetry configurable for hardware-in-the-loop testing. Telemetry output can be formatted for direct compatibility with L3Harris' Autonomous Flight Termination Unit.

DESIGNED FOR HIGH DYNAMICS AND HIGH ALTITUDE

Leveraging decades of space avionics experience, the PGPS-M is designed for the strenuous environments of a launch vehicle and the rigors of space. Radiation tolerant by design, the PGPS-M includes mitigation techniques to maintain a high-system availability while balancing size, weight, power and cost.

EXPERT SUPPORT

The PGPS-M is designed, built, assembled and tested in one facility and is serviced and supported by engineering professionals with decades of spaceflight design experience. Every PGPS-M delivered is accompanied by domain expertise in parts, materials, radiation analysis, mechanical engineering, power supply design, digital signal processing, radio frequency design and manufacturing engineering. L3Harris has provided time-tested range tracking and launch vehicle telemetry hardware for more than 60 years.

Protected Global Positioning System-Mini (PGPS-M)

L3Harris Technologies is the Trusted Disruptor in the defense industry. With customers' mission-critical needs always in mind, our employees deliver end-to-end technology solutions connecting the space, air, land, sea and cyber domains in the interest of national security. Visit L3Harris.com for more information.

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