

WE'RE ENGINEERING A BETTER TOMORROW

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GSTAR

ANTI-JAM GPS - ELECTRONIC PROTECTION



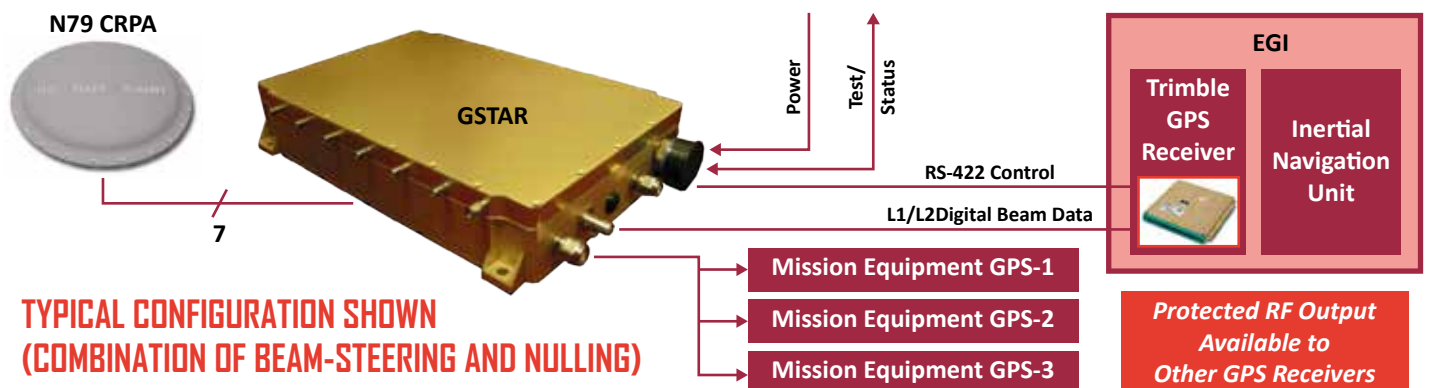


ASSURED GPS IN THE MOST CONTESTED ENVIRONMENTS (BEAM-STEERING AND NULLING)

Throughout the 20 years of leading the development of Anti-Jam GPS (AJ-GPS) technology, Lockheed Martin has fielded over 2,500 GPS Spatial Temporal Anti-Jam Receiver (GSTAR) systems. Lockheed Martin continues this legacy by providing a modular, scalable family of solutions that can provide highly effective digital Electronic Protection (EP) for any platform that relies on GPS for navigation. Lockheed Martin has designed, implemented and tested a suite of reliable “building blocks” that can be quickly adapted to meet the specific needs of each platform as required. In addition, Lockheed Martin has all the tools, resources and relationships to quickly and effectively field GSTAR Antenna Electronic Units (AEU) to any platform and for any contested condition, ensuring critical GPS operation.

GSTAR is a fully digital system providing the strongest protection against adversarial jammers and spoofers. The high-end beam-steering capability allows the host platform to survive the harshest of contested environments. GSTAR can be configured as a nulling only solution for compatibility with existing GPS Receivers with the inherent growth to beam-steering without replacement of the GSTAR or the antenna.

When you choose GSTAR, you choose proven performance. Lockheed Martin will continue to be a driving force behind Assured Position Navigation and Timing (A-PNT) improvements in the performance, quality and reliability of GPS navigation solutions.



**TYPICAL CONFIGURATION SHOWN
(COMBINATION OF BEAM-STEERING AND NULLING)**

MODULAR DESIGN APPROACH

Building Blocks

GSTAR products are based on these key modules:

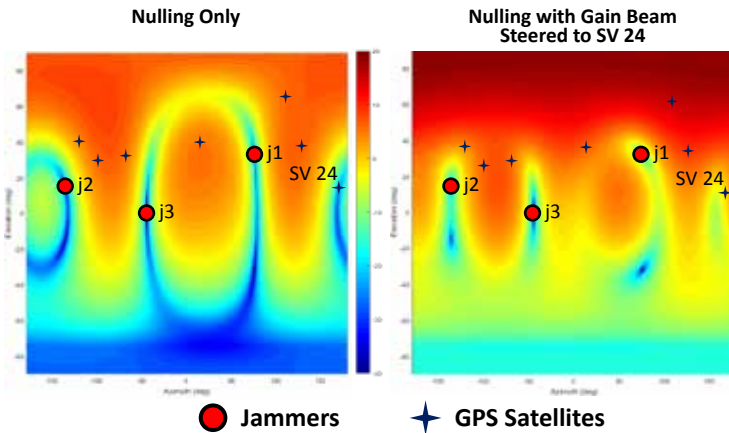
- High dynamic range RF front-end
- Digital beamformer
- Receiver interface circuitry allowing seamless connection with both legacy RF receivers and multi-beam digital receivers

High Dynamic Range RF Front-End

Today's digital AJ requirements demand an RF design with a broad sensitivity range. To meet that challenge, Lockheed Martin has developed circuitry with the high dynamic range and proven environmental robustness to handle the challenge.

Digital Beamformer

Our digital beamformer, based on spatial temporal adaptive processing technology and a tight coupling developed with our GPS partner, Trimble, combines multiple digital signal processing techniques to deliver advanced GPS signal protection. GSTAR is capable of rapidly adapting to a dynamically changing GPS interference environment by simultaneously forming multiple beams on the satellites of interest, while nulling the interference.



GPS Receiver Integration and Backward Compatibility

The GPS receiver plays a critical role in the effectiveness of any AJ solution. GSTAR provides multiple integration options:

- RF interface compatible with any standard GPS receiver
- Digital multi-beam interface to external digital receivers; this option is used for EGI-based platforms

Designed for Growth

- M-Code and SAASM-based EGI compatible AEU
- Open digital interface for beamforming
- FPGA-based architecture adaptable for future threats
- Advancing AJ-GPS with key Government and industry partners

Proven Design

Variants of the GSTAR family of products have been successfully tested against a variety of threat scenarios. We have proven our design against threats in numerous simulation arenas including Wright Patterson Air Force Base, the Antenna Wave Front Simulator and in-flight test at Holloman Air Force Base.

Simulation and Design

As we refined our designs, we developed, validated and enhanced our extensive simulation capabilities as well. Through simulation, we can evaluate the environment of the target platform and determine the optimal configuration to meet operational requirements. Armed with this information and based on our scalable modules, we design and develop a GSTAR solution that is scaled to meet the performance, interface, packaging and cost requirements of the specific customer.



MANNED AND UNMANNED APPLICATIONS

KEY FEATURES AND BENEFITS

Key Features

- High-dynamic range RF front-end
- Scalable, modular design approach
- Digital IF or analog RF output
- Maintains Deep Nulls while Providing Antenna Gain (Beamforming)
- Minimize Pseudo Range and Carrier Phase Distortions
- Multipath Mitigation
- Qualified to 16g RMS, -45C to +75C, MIL-STD-461F

Key Benefits

- High levels of Anti-Jam protection
- Best value cost/performance solution
- Flexible packaging alternatives
- Seamless integration
- High accuracy
- Forward compatibility
- M-code compatible

DESCRIPTION	GSTAR-716P (SAASM)	GSTAR-M (SAASM OR M-CODE)
SYSTEM MTBF (HRS)	13996 (FIXED WING) 4664 (ROTARY WING)	15000 (PREDICTED) 6000 (PREDICTED)
SYSTEM WRA QUANTITY		
SIZE	13" X 8.6" X 2.5"	8" X 5" X 2.5"
WEIGHT	10LBS	5LBS
POWER	115VAC (65W)	115VAC OR 28VDC (65W PREDICTED)
COOLING	CONDUCTION/ CONVECTION	CONDUCTION/ CONVECTION