



## Navigation Single Board Receiver NavSBR

The **Moog Broad Reach** NavSBR GPS is a POD receiver optimized for fast signal acquisition and weak signal tracking. The NavSBR is the result of our successful collaboration with NASA/Goddard.

**Moog Broad Reach** implemented the receiver as an embedded single frequency 12-Channel GPS receiver ported to a single 3 U cPCI card. The NavSBR is available as a standalone assembly or a single 3 U cPCI card for direct chassis integration.

Generated observables are filtered using GPS-Enhanced Onboard Navigation System (GEONS) technology (under license from GSFC) providing high-quality solutions by employing an extended Kalman filter (EKF) augmented with physically representative models for gravity, atmospheric drag, solar radiation pressure, clock bias, and drift to provide accurate state estimation and a realistic state error covariance.



© NASA



© Airbus Defence and Space

# Navigation Single Board Receiver NavSBR

Performance Characteristics					
	TriG RO 	TriG POD 	NavSBR 	Pyxis POD 	Pyxis RO 
Family	JPL BlackJack+ TOGA	JPL BlackJack+ TOGA	Goddard Navigator	BRE	BRE
Freq	L1,L2,L5,Lx	L1,L2,L5,Lx	L1 CA	L1,L1G,E2,L2,L2G,L5	L1,L1G,E2,L2,L2G,L5
Antennas	4-16	4	2	4	4+
Orbit	LEO	LEO	LEO-GEO	LEO	LEO
CPU	2	1	1	1	1
Digital Signal Proc.	Reconf. FPGA	Reconf. FPGA	FPGA	Reconf. FPGA +DSP	Reconf. FPGA +DSP
Heritage	Space Flight Qualified	Space Flight Qualified	1 Flight	Currently In Design	Currently In Design
Accuracy Position Velocity	Post-Proc cm mm/sec	Post-Proc cm mm/sec	real-time accuracy <10 m GEO, <1 m LEO 2 cm/sec	Post-Proc cm mm/sec	Post-Proc cm mm/sec
Power	60W	20W	12W	20W	50W
Size Mass	19x22x12 5.2kg	19x14x12 2.8kg	19x24x8 or 3U card 2.3Kg, 0.342Kg	19x14x12 2.8kg	19x20x12 4.8kg
PPS	One PPS out synchronized to GPS	One PPS out synchronized to GPS	One PPS out synchronized to GPS	One PPS out synchronized to GPS	One PPS out synchronized to GPS
Interfaces Supported	RS422 Serial Port, LVDS, MIL-STD 1553 Option	RS422 Serial Port, LVDS, MIL-STD 1553 Option	RS422 Serial Port, LVDS, MIL-STD 1553 Option	RS422 Serial Port, LVDS, MIL-STD 1553 Option	RS422 Serial Port, LVDS, MIL-STD 1553 Option
Number of Channels	16	16	12	N/A	N/A
Time Accuracy	<100nSec	<100nSec	<50mSec	N/A	N/A
Acquisition Time	<10.0 min GEO	<10.0 min GEO	<10.0 min GEO, Cold Start <1.0 min LEO	N/A	N/A

**Time to First Fix** – <1 min. LEO, <10 min. GEO, Assuming Cold Start No Seeding

**Cold Start Capability** – Yes, No Seeding Necessary

**PPS Accuracy** – <0.2 microseconds

**Sensitivity** – Better than -146 dBm

## The NavSBR is available in the following options:

- 1) Two 3U cPCI card orbit determination at GEO (stand alone or within the Integrated Avionics Unit)
- 2) Two 3U cPCI card orbit determination at LEO (stand alone or within the Integrated Avionics Unit)
- 3) A single 3U cPCI card orbit determination GEO or LEO (currently under development)



Pat Stroh, Business Development Manager  
Tel +1 480 377 0400 x362  
pstroh@moog.com