GENERAL DYNAMICS
Mission Systems

PNT Receiver

Integrated Navigation Subsystem

Single channel GNSS Receiver subsystem supporting Civil GPS and Galileo signals (L1 C/A, L1C, L2C, L5, E1 and E5)

Optional second independent RF channel for Situational Awareness monitoring

Includes GDMS aPNT software fully integrated into the receiver

Includes Chip Scale Atomic Clock (CSAC) with integrated clock ensemble

RS422 and Ethernet I/O interface and control

Overview

Designed for DoD/Civil Smallsat LEO constellations with low-cost, low-SWAP and 3-5 years mission life.

- Next Generation of our Legacy Space-Qualified Monarch and Sentinel® GPS Receivers
- 1000+ Equivalent Years of Accumulated DoD Space Heritage: greater than 6M Orbits

Key Features and Benefits

- Compatible with LEO orbit regimes up to 1200 km
- Radiation tolerant to 20 krad(Si)
- Tri-Frequency GNSS covers L1, L2 and L5
- Fast Acquisition Processor enables rapid cold start capability
- Fully integrated aPNT software for enhanced performance using TWTT data from optical and communications crosslinks to ground terminals
- Low-Cost high-stability clock ensemble for extended hold-over time keeping
- Reduced integration burden into existing SV platforms

Performance Characteristics

- Supporting GPS and Galileo Civil Codes on L1, L2 and L5
- GNSS Codes: GPS L1 C/A, L1C, L2C, L5 and Galileo E1, E5
- Narrow Bandwidth Acceleration-Aided Carrier/Code Tracking
- Tracking and Navigation Algorithms based on Monarch-M and Sentinel GPS Receivers
- Sensor fusion of GNSS and aPNT measurements provides superior resiliency and performance
- GDMS proprietary GNSS aPNT TWTT and orbit propagation algorithms

PNT Receiver

LEO Solution Accuracy

- Autonomous Position: < 1 meter (1σ)
- Autonomous Velocity: < 0.5 cm/sec (1σ)
- Clock and Precise 1PPS Absolute: < 4 ns (1σ)
- Position Error after 40 min outage*: < 5 meter (1σ)
  - *Outage is no GNSS or TWTT measurements
- Holdover time estimate: < 3 ns after 100 sec
  < 100 ns after 1 hour

Cold Start Time to First Fix

- LEO: < 4 minutes

aPNT Solution Accuracy (GNSS Denied)

- Position: < 9 meter (1σ)
- Velocity: < 2 cm/sec (1σ)
- Timing: < 5 ns (1σ)
  - 1 ns possible based on modem TWTT timestamp accuracy performance

Clock Ensemble

- Integrated clock ensemble of EMXO and CSAC
- Clock steering performed by integrated aPNT software
- Supports alternate Ground Control clock steering commands with configurable priority

Physical/Environmental

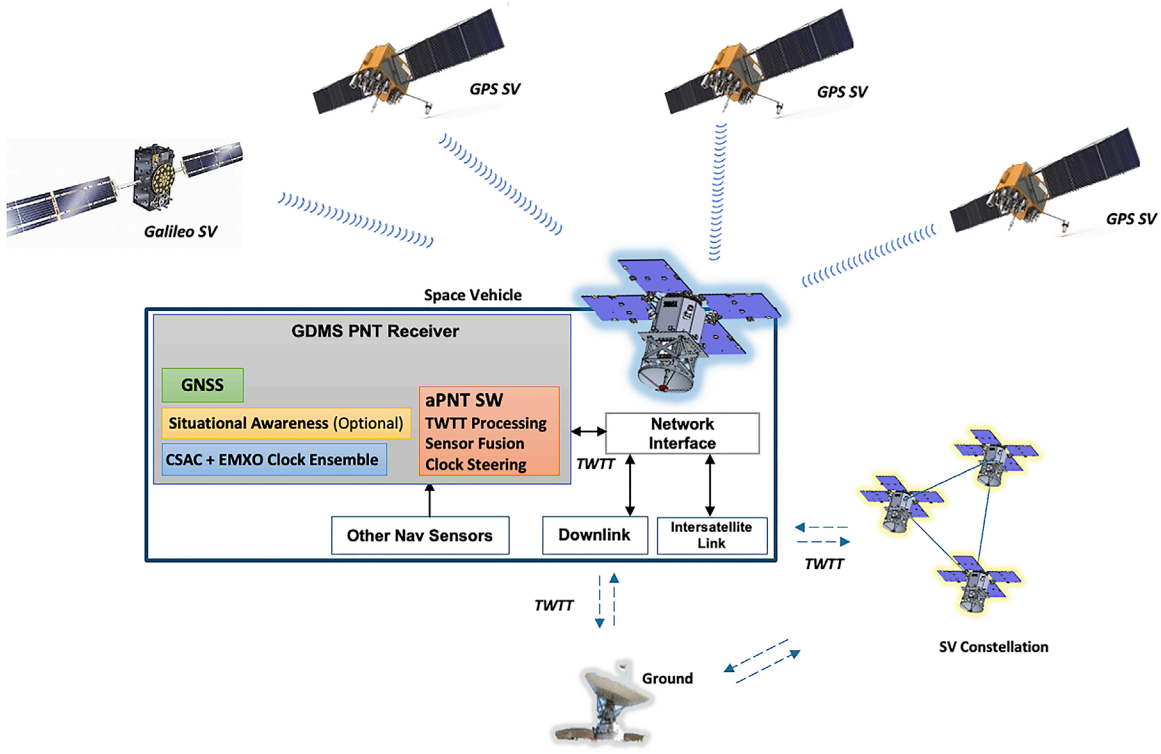
- 1.42x Radiation Design Margin TID
- Tolerant to 20 krad(Si)
- Mission Life: 3-5 years
- Vibration: 16.08 Grms
- Pyro Shock: 1500 G
- Temperature: -15 to +45 C
- Size: 6.2 in x 7.1 in x 2.9 in
- Weight: < 3 kg
- DC Power (typical at 25 C with 28 V Prime Power)
  - Single Channel GNSS: < 33 W
  - GNSS plus optional second independent RF channel: < 38 W

Orbital Dynamics

- Altitude: LEO (200 km – 1,200 km)
- Velocity: up to 11,000 meters/second

Input/Output

- RS422 and Ethernet Command/Data interfaces
- One Pulse per Second (GPS, UTC, or Measurement Epoch Time)



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