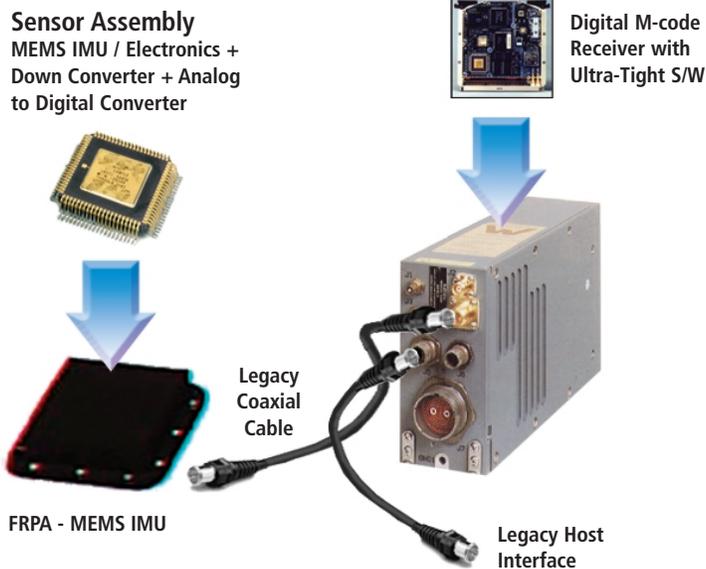


GPS/IMU ULTRA-TIGHT COUPLING

DESCRIPTION

GPS/Inertial Measurement Unit (IMU) Ultra-Tight Coupling, which is implemented as software within a receiver, provides more anti-jam performance for GPS satellite tracking compared to conventional code and carrier loops. It is effective against all jammer types by more optimally processing IMU data with raw GPS measurement data.

Ultra-Tight Coupling processing is compatible with a variety of Fixed Reception Pattern Antenna (FRPA) and Control Reception Pattern Antenna (CRPA) based receiver systems.



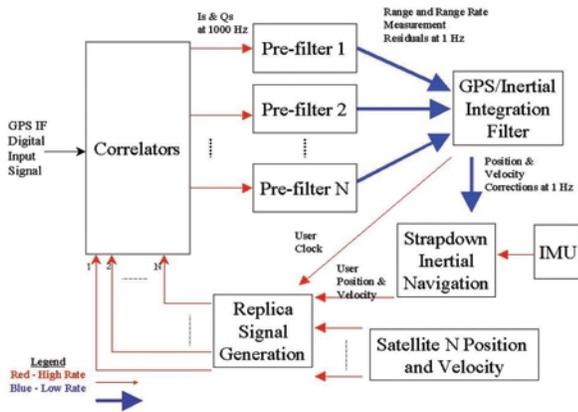
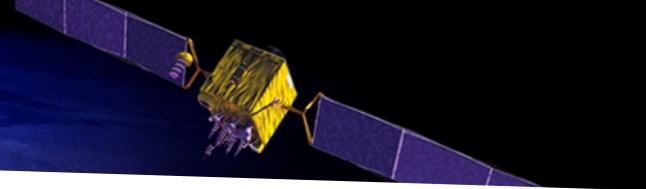
FEATURES

- ▶ 15 to 20 dB of added jamming resistance
- ▶ No host vehicle integration impact
- ▶ Optimal processing yields higher accuracy
- ▶ Improved integrity
- ▶ Synergism with other adaptive AJ devices

APPLICATIONS

Any FRPA/CRPA – M-code receiver installation





MECHANIZATION

The Ultra-Tight Coupling approach utilizes information from the Integration Navigation Filter that blends the GPS receiver measurements with the high-rate IMU measurements to drive the replica signal generation. This mechanism offers the best estimate of position, velocity, receiver clock and ephemeris data to generate the prompt, early and late replicas that drive the GPS signal correlators. This mechanization replaces the traditional code and carrier tracking loops with "Federated Filtering." This technique decomposes a large optimal filter into two or more smaller filters that synergistically work together.

Advantages of Ultra-Tight Coupling

- ▶ No host vehicle integration impact
 - Interface between the antenna and the Digital M-code Receiver uses the existing coaxial cable
 - DAE/MIMU – Digital M-code Receiver ICD available
- ▶ Robust operation in a challenged environment
 - Code and carrier measurement residuals directly generated
 - Replica signal generated from IMU and best estimate of navigation state
 - Exploits synergy of all satellites in view
 - Allows coherent integration > 20 milliseconds for increased anti-jam
 - 15 to 20 dB of added jamming resistance
- ▶ Optimal processing yields higher accuracy
 - Relaxes real time processing requirement to near time

- Allows batch processing one whole second of all receiver data every second
- Improved accuracy from pre-filtering all receiver data from all-in-view satellites
- Allows use of advanced data bit decoding algorithms
- Completely integrated dual frequency code, carrier and TEC estimation
- Complete coupling of antenna motion and Ionosphere TEC modeled
- Improved detection of multipath and ionosphere scintillation
- ▶ Improved integrity
 - Measurement residuals should detect anomalies immediately

FOR FURTHER INFORMATION CONTACT:

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