NGSTM
Pseudolite System

Product Briefing

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What is Pseudolite?

- A Ground-based GPS Satellite
- Transmit a kind of ranging signal which is very similar to GPS satellite’s signal
  - Same data format as GPS
    - Carrier frequency = C/A code chip rate x 1540
    - C/A code chip rate = data rate x 20460
  - Different C/A codes from GPS
  - Don’t use high-accuracy atomic clocks
Applications of Pseudolite

- Indoor / Outdoor Local Positioning System
  - Personnel or child tracking system in theme park
  - Mobile object tracking & control system in large plant

- Aircraft precision landing system: LAAS (Local Area Augmentation System)

- Precision harbor entry

- Agricultural automation

- Heavy industry control in dangerous area

- Military and special applications

- DGPS Data Link
Conceptual Diagram of Simple Pseudolite
Developed Pseudolite & Receiver

NGSTM1T: Pseudolite
GPS L1 (1.57542GHz), (selectable) C/A Code,
Asynchronous/Synchronous Random Pulsing

NGSTM2R: Pseudolite Receiver
H/W is same as GPS receiver, but F/W is different.
Carrier phase output : 10Hz
Features of Navicom Pseudolite (NGS™2T)

- Frequency: 1575.42MHz ± 10.23MHz
- External reference inputs capability
  - External 10MHz input capable
  - External 1PPS input synchronizing capable
- PLL
  - Settling time: 15ms
  - Spurious suppression: 60dBc
  - Phase noise
    - -95dBc/Hz @10KHz offset
    - -120dBc/Hz @ 100KHz offset
- C/A code & Navigation data generation
- RF Output Power level: 20dBm(max)
- Output RF power dynamic range: ≤ 60dB
- Output Pulsing Control
- Operating voltage: +6 ~ +24Vdc
Why not GPS receiver?

- GPS receivers are normally searching and tracking the C/A codes of GPS satellites only.
  - 1023 Gold codes can be generated by C/A code generators.
  - 32 codes of them are selected and assigned to each GPS satellites as the C/A codes.
- Another Gold codes from the same C/A code generators are assigned to Pseudolites.
- Therefore GPS receiver can not search and track the C/A code from Pseudolites.
- Require the modification of F/W of GPS receivers.
Technical Problem of Pseudolite

Near-Far Problem

- In DS/CDMA system such as GPS and CDMA cellular system, the receiving powers at a receiver from every transmitter should be almost same.
- The power from GPS satellite and the power from Pseudolite are to be same.
- How to solve the interference
  - Pulsing
  - Frequency offset
  - Power control

So it is very difficult to get the Compatibility of GPS and Pseudolite system.