Advances in DGPS Systems

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Abstract

During recent years there have been two important advances in wide area Wide Area Differential GPS (WADGPS) systems:

- *Wide area network carrier phase services.* These services utilize the dual frequency carrier phase of the GPS signal and have sub-decimeter level position accuracy. The carrier phase measurement accuracy is sub-centimeter, and the phase is far less susceptible to multi-path than the code.
- *Orbit/Clock services.* This concept utilizes reference stations with a worldwide spread to calculate the orbit and the clock value of each GPS satellite more accurately than the broadcast GPS ephemeris. Orbit and clock corrections to the broadcast ephemeris are then transmitted to user. These corrections are valid worldwide and the distance from the nearest reference stations to the user does not affect performance. Typically orbit/clock user equipment make dual frequency carrier phase measurements as well, achieving decimeter level accuracy.

The paper describes characteristics of phase-based systems versus code-based systems and characteristics of orbit/clock solutions versus traditional network based systems. Position results for different systems under different conditions are presented.

Fugro's long-term strategy is to maintain two independent services for customers that require a high degree of redundancy and reliability of their Differential GPS (DGPS) position system. One such application is Dynamic Positioning (DP) offshore, where two independent DGPS services are used extensively. The paper describes how Fugro will maintain the independence of the two main services: the orbit/clock carrier phase service and the network carrier phase service.

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