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Analysis and Performance of European Geostationary Navigation Overlay Service System in North of Algeria for GPS Single Point Positioning

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Abstract : The European Geostationary Navigation Overlay Service (EGNOS) provides an augmentation signal to GPS (Global Positioning System) single point positioning. Presently EGNOS provides data correction and integrity information using the GPS L1 (1575.42 MHz) frequency band. The main objective of this system is to provide a better real-time positioning precision than using GPS only. They are expected to be used with single-frequency code observations. EGNOS offers navigation performance for an open service (OS), in terms of precision and availability this performance gradually degrades as moving away from the service area. For accurate system performance, the service will become less and less available as the user moves away from the EGNOS service. The improvement in position solution is investigated using the two collocated dual frequency GPS, where no EGNOS Ranging and Integrity Monitoring Station (RIMS) exists. One of the pseudo-range was kept as GPS stand-alone and the other was corrected by EGNOS to estimate the planimetric and altimetric precision for different dates. It is found that precision in position improved significantly in the second due to EGNOS correction. The performance of EGNOS system in the north of Algeria is also investigated in terms of integrity. The results show that the horizontal protection level (HPL) value is below 18.25 meters (95%) and the vertical protection level (VPL) is below 42.22 meters (95 %). These results represent good integrity information transmitted by EGNOS for APV I service. This service is thus compliant with the aviation requirements for Approaches with Vertical Guidance (APV-I), which is characterised by 40 m HAL (horizontal alarm limit) and 50 m VAL (vertical alarm limit).

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