

An Assessment of the Accuracy of Precise Point Positioning in Remote Areas in Oman

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SUMMARY

Traditionally, high accuracy Global Navigation Satellite Systems (GNSS) positioning has involved differential techniques. Such techniques significantly reduce or eliminate inherent biases in the GNSS measurement by referencing simultaneous measurements to one or more known reference stations. On a national scale, these differential techniques rely heavily on a costly spatial infrastructure of accurately known points usually occupied by Continually Operating Reference Stations (CORS). In recent years, the development of Precise Point Positioning (PPP) techniques have been shown to reduce many of the inherent observation errors and biases in GNSS solutions which eliminate the need for a ground based reference station. Such techniques may provide sufficient accuracy when surveying in remote locations where CORS infrastructure are not suitable. To assess the suitability of PPP as a viable positioning technique, fifteen known control points in remote areas of Oman were observed by the National Survey Authority field survey team in 2014. Each station was observed for two sessions (1- and 2-hours in duration) and the observed data sent to three PPP online services - Trimble RTX, CSRS and AUSPOS. The results were compiled and analyzed to evaluate the accuracy of PPP in Oman. Results indicated a bias in Easting across all sites and although some variability in the results was found, there was no significant difference in results between the three online service providers. Differences in the 3D position of both the 1- and 2-hour sessions of 33% of the samples were found to be approximately 50mm. Thus it has been shown that PPP can provide a positioning solution and be adopted for medium-accuracy positioning purposes in remote areas.