

# Comparative Analysis of Short, Medium and Long Baseline Processing in the Precision of GNSS Positioning

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## SUMMARY

The science of positioning has revolutionized with the advent of high precision instruments targeted to improving the achievable accuracy in positioning. GPS has presently evolved into GNSS, with the GNSS receivers having the capability of tracking different satellite constellations. Active CORS have emerged replacing the former passive stations. These innovations in the science of satellite positioning however, have not undermined the importance of baseline processing in satellite based positioning system. This paper thus, presents a comparative analysis and the significance of short, medium and long baseline processing in the precision of GNSS positioning. Satellite observations were acquired on 12 control points using both the passive and active (CORS) station principles in Post Processing GNSS positioning data at differential mode. The short baselines have maximum length not exceeding 1.5km from the control points to a base station, the medium baselines have range not exceeding 12km from the control points to a CORS while the long baselines have range not exceeding 107km from the control points to another CORS. The results obtained from the baselines processing were statistically analysed using ANOVA One Way at 0.05 significant level i.e. 95% confidence interval and subsequently Scheffe test. The statistical results shows no significant difference between the level of precision obtained by the baseline processing involving the CORS at 12km and the Base receivers at 1.5km but there exist a significant difference between the 107km CORS baseline processing and the 12km as well as the 1.5km baselines. The short baselines were found to have the highest achievable processing precision while the long baselines have the least. The study shows that the longer the baselines the lower the processing precision even with CORS. This however, does not negate the reliability of the long baseline result but defines the level of precision and accuracy achievable when compared with other baseline length.