

Does Beidou Enhance Positioning Performance Within CORSnet-NSW?

Jerom Vanderstappen, Craig Roberts and Thomas Grinter (Australia)

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SUMMARY

BeiDou is China's independent Satellite Navigation System capable of providing positioning, navigation and timing (PNT) services regionally over China and ultimately globally. It comprises 14 operational satellites (plus 4 extra satellites in commission) as of September 2015.

CORSnet-NSW is a network of over 170 permanent satellite navigation tracking stations of which 63 receivers are now tracking Galileo, BeiDou and the Japanese QZSS satellites. This project investigates if combining these new Beidou signals into GNSS solutions improves positioning performance in real-time.

This was tested by comparing GPS/BeiDou vs GPS/Glonass vs GPS/Glonass/BeiDou RTK combinations on six points in open and difficult environments using single base RTK. Each point was measured independently 15 times for each combination and parameters such as time to first fix (TTFF) as well as repeatability and accuracy in Easting, Northing and Height were compared.

This testing revealed that the addition of Beidou into the solution had little impact on TTFF and improved the robustness of the easting and northing solutions. However there was a distinct ~30mm bias in height when Beidou was combined in the solution.

This assertion was confirmed using a two-peg test and suggests that inappropriate Antenna Phase Centre Variation (APCV) modelling may be the cause of this bias. Some comments about APCV modelling with regard to Beidou signals conclude this paper.