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**GPS HEIGHTING:
THE EFFECT OF THE GPS ANTENNA
PHASE CENTER VARIATION ON
HEIGHT DETERMINATION**

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ABSTRACT

This thesis examines the effect on height determination of the antenna phase centre variation of GPS user segment antennae. A discussion of the various antenna types in common use is followed by an explanation of the problem at hand. In particular the effect of the antenna's environment on the phase centre variation is covered more fully, since the phase variation phenomenon itself is largely unexplained in the engineering community to date.

A number of examples of the heighting errors caused by this phenomenon are presented, followed by specifically designed experiments, which quantify the effect. Finally the phase centre variation itself is modelled for a particular GPS antenna in common use by surveyors in Australia.

The overall conclusion, arrived at by demonstration, is that the antenna phase centre offsets and the variation model are very important for high accuracy determinations of height.

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