

The Effect of Antenna Covers On GPS Baseline Solutions (1997)

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The Effect of Antenna Covers On GPS Baseline Solutions

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Abstract

With the increasing number of permanent GPS monuments being deployed, many investigators are adding covers over antennas to prevent snow accumulation, reduce the amount of wear on antennas, and discourage animals from disturbing the antenna. UNAVCO has tested some of these covers and has designed a model that minimizes their effect on baseline estimation.

From the tests presented here, it is shown that antenna covers cause an additional delay on the GPS signal that effects the height component of a GPS baseline solution. The errors introduced can change baseline height solutions between 2 mm and 40 mm depending on the cover type, the antenna type, and the elevation cutoff angle used for data processing. Of the two shapes of antenna covers tested, the ones with a conical shape have the largest effect. Covers shaped like a hemispherical dome have a smaller effect, especially when they are mounted so that the antennas's mean phase center is positioned in the center of the cover. The thickness of the cover is also important. The thinner the cover, the smaller the effect. Finally, there does appear to be an effect caused by the material used to make the cover, but this has the smallest effect of all the variables described above.

The results from these tests also show that the mounting apparatus of the cover can also have an effect on the phase center of an antenna. In particular, mounting the cover on a metal base plate will drastically increase the near field reflections around the antenna, [Elosegui et al., 1995] causing errors of up to 10 mm in the baseline height solution.

While not seen in these tests, results from continuous networks in Scandinavia show that antenna covers can cause up to a 10 mm level effect in the horizontal baseline components (Jim Davis, personal communication, 1996).

[See [attached .pdf file](#) for more.]

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