Trimble Choke Ring Antenna Mean Phase Center Calibration (1996)

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TRIMBLE CHOKE RING ANTENNA MEAN PHASE CENTER CALIBRATION

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Abstract

The consistency of the phase center offsets of GPS antennas is important when trying to achieve geodetic measurements which are accurate at the millimeter level. UNAVCO has previously tested the NASA-UNAVCO pool of Allen Osborne Associates SNR-8000 Turborogue Dorne- Margolin (DM) choke ring antennas manufactured in 1992. These results showed an Ionosphere Free (L3) horizontal baseline scatter of 1.5 mm between antennas of the same model number. The nominal phase center offset for these antennas is zero. Full rotation tests conducted by Trimble in early 1996 on their prototype choke ring antenna using newly built Dorne-Margolin antenna elements showed an L3 systematic horizontal offset of up to 3 mm, significantly larger than previously found and attributable to the particular pair of DM elements used. Random tests of DM antennas subsequently delivered to Trimble showed sub-mm offsets. In order to confirm these results with the first Trimble choke ring antennas delivered to UNAVCO, we conducted full rotation tests using a subset of 11 antennas from the new equipment pool. This testing occurred at the NOAA Table Mountain Gravity Observatory (TMGO) test facility. Using three or more antennas allows for absolute calibration of the horizontal phase center offsets. The results show sub-mm L1 and L2 offsets and L3 offsets of less than 1.8 mm in both horizontal components. The effect of changing the processing elevation cutoff from 20 degrees above the horizon to 10 degrees is less than 10 percent. The relative vertical offset derived from swapping of antennas shows a scatter of less than 1 mm.

[See attached .pdf file for more.]

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