



Impact of absolute phase center models on GPS reference frames

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The recent adoption of absolute phase centers for both ground and satellite antennas has led to a re-assessment of the GPS reference frame. In particular, the development of these models showed the sensitivity of the scale of the GPS reference frame to the treatment of the antenna patterns and the positions of the antenna reference points (ARP). Analyses of GPS results associated with the evaluation of the absolute phase center models also showed the sensitivity of the GPS origin, nominally center of mass of the Earth system, to the treatment of perturbations of the GPS orbits. The origin results seem particularly sensitive to once-per-revolution terms. In this talk, we evaluate the effects of the absolute phase center models on GPS reference frame definition through comparisons with relative phase center results, and through estimation of the satellite phase center locations relative to spacecraft center of mass. The latter, satellite specific values, are estimated by a number of IGS analysis centers (ACs) on a weekly basis and we compare recent results between the ACs and older results from GAMIT/GLOBK processing. Current results show good agreement (<1 part-per-billion) between the GPS and ITRF2005 scales when the satellite phase center positions are fixed to the IGS adopted values. There is evidence for some remaining systematic scale change when the satellite antenna locations are freely estimated. However, these types of estimates are very sensitive to modeling and estimated parameters (particularly those related to orbit modeling). The sensitivities of the estimates the satellite antenna locations and their effects on scale and origin of the GPS reference will also be explored.