What is the AMCS?

250 Beth Bartel October 31, 2008 Antenna and Multipath Calibration System (AMCS) 1251

Radio multipath effects on signals received from GPS satellites are highly dependent on the local topography and other site-specific factors. Significant improvements in the accuracy of estimates of positions, atmosphere, and satellite orbits are expected if this source of error is reduced or eliminated. We are constructing a transportable Antenna and Multipath Calibration System (AMCS) for this purpose. The AMCS (Antenna and Multipath Calibration System) involves investigators from the Harvard-Smithsonian Center for Astrophysics, the MIT Haystack Observatory, and UNAVCO. We are developing the AMCS as part of a "Global Positioning System (GPS) calibration system" effort to characterize site-specific GPS phase-measurement errors, such as antenna scattering and multipath, at a level of 1 mm. This level represents an improvement in accuracy of one order of magnitude.

The AMCS system consists of a high-gain, fully-steerable, "multipath-free" paraboloid antenna, two GPS receivers, and a short baseline to a GPS geodetic antenna to be calibrated for multipath, scattering, and phase-center variations.

Specifically, the AMCS consists of 2 parts:

1. A parabolic reflector radio antenna with high directivity coupled to a standard, geodetic GPS receiver; this component will provide the signal from the satellite free of multipath and scattering effects.

2. A second identical receiver to connect to the GPS antenna to be calibrated. In order to keep the cost low and to facilitate duplication, currently available commercial GPS receivers will be adapted for the AMCS. The first step in AMCS construction therefore consisted of examining different commercial GPS receivers to find suitable candidates for the AMCS.

The AMCS began in 1998.

Kwan-Dong Park, J.L. Davis, T.A. Herring, B.E. Corey, A.E. Niell, P. Elosegui, P.O.J. Jarlemark, J. Normandeau, C. Meertens, and V. Andreatta

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