

A hollow corner cube design for the GPS III laser retro-reflector arrays

J. McGarry, D. Arnold, T. Zagwodzki, J. Degnan, M. Pearlman

The Goddard Space Flight Center is currently analyzing a hollow corner cube design to be flown on the GPS Series III satellites. Hollow flight qualified cubes are commercially available and have flown before, but not in the GPS environment with its accuracy and response requirements. Our preliminary analysis indicates that these commercially available cubes will work for GPS. We are purchasing several cubes to test, while also modelling the cubes to determine their performance under the expected thermal conditions. We will compare our simulations with actual test data. We are currently planning for the GPS arrays to consist of approximately forty (40) 1.5 inch cubes to give a lidar cross section of 100 Million square meters (or about 5 times the current performance of GPS-35 and 36).

If the theory and testing show these cubes perform as required for GPS, we feel they could be successfully used on any GNSS satellite. The first of 32 GPS III satellites is expected to be launched in 2013.