Abstract Submitted
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Gravity Probe B Orbit Determination[1] PAUL SHESTOPLE, Stanford University, HUNTINGTON SMALL — The GP-B satellite is equipped with two redundant Trimble TANS Vector III GPS receivers and matching antennae, used to reconcile vehicle time with Coordinated Universal Time (UTC) and to provide a satellite position measurement. Real time GPS position accuracy easily meets mission requirements of 100 m RMS per axis. The GP-B precision orbit was determined in ground processing of 18-hour and 30-hour GPS data segments. Analysis of overlapping consecutive 18-hour ephemeris segments suggest a maximum position uncertainty of 2.5 m RMS and maximum velocity uncertainty of 2.2 mm/sec RMS. Satellite Laser Ranging (SLR) measurements provide independent verification of the GPS-derived GP-B orbit. We describe the GPS equipment and orbit determination operations, including pre-launch verification testing. On-orbit performance and lessons learned are discussed. GP-B ephemeris uncertainties estimated using ephemeris overlap comparisons and SLR residual computations are detailed.

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