

AN OVERVIEW OF THE GRAVITY PROBE B PROGRAM



C.W. Francis Everitt and the Gravity Probe B Team

GP-B Posters at the APS:

- L1.00012: Radio Imaging of the Gravity Probe B Guide Star IM Pegasi.
- L1.00013: The "Core" of the Quasar 3C454.3 as the Extragalactic Reference for the Proper Motion of the Gravity Probe B Guide Star.
- L1.00014: Performance of the Gravity Probe B Inertial Reference Telescope.
- L1.00015: Gravity Probe B Timing System and Roll Phase Determination.
- L1.00016: The Gravity Probe B SQUID Readout Detector.
- L1.00017: SQUID Control, Temperature Regulation, and Signal Processing Electronics for Gravity Probe B.
- L1.00018: Gravity Probe B Science Instrument Assembly (SIA).
- L1.00019: Polhode Motion of the Gravity Probe-B Gyroscopes.
- L1.00020: Evidence for Patch Effect Forces on the Gravity Probe B Gyroscopes.
- L1.00021: Gravity Probe B Orbit Determination.
- L1.00022: Simulator Technology of the Gravity Probe-B Mission.
- L1.00023: Achievement of the Magnetic Environment Requirements for Gravity Probe B.
- L1.00024: The Gravity Probe B Gyroscopes.
- L1.00025: Gravity Probe B Gyroscope Electrostatic Suspension System (GSS).
- L1.00026: The Gravity Probe B Relativity Mission (GP-B).
- L1.00027: Gravity Probe B Experiment Error.
- L1.00028: Gravity Probe B Science Data Analysis: Filtering Strategy.
- L1.00029: Performance of the Gravity Probe B Cryogenic Sub-System.
- L1.00030: The Gravity Probe B Drag-free and Attitude Control System.
- L1.00031: Features of the Gravity Probe B Space Vehicle.
- L1.00032: Classical Torques on Gravity Probe B Gyroscopes.
- L1.00033: Trapped Flux Mapping for the Gravity Probe B Gyroscopes.

Missions Operations Center



World's roughest spheres



Probe during assembly

Vehicle on Booster



Guide Star IM Pegasi HR8703

Frame Dragging Precession: 39 marc-sec/year in Equatorial plane

Geodetic Precession: 6606 marc-sec/year in orbital plane

$$\Omega = \frac{3GM}{2c^2 R^3} (R \times v) + \frac{GI}{c^2 R^3} \left[\frac{3R}{R^2} (\omega \cdot R) - \omega \right]$$

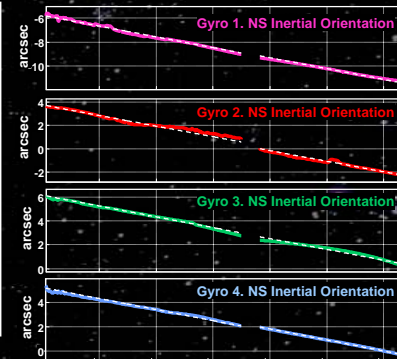
Guide Star tracking telescope



Detector Package



Launch 20 April 2004
Initial Orbit Checkout (IOC) 128 days
Science Phase 353 days
Post-experiment tests 46 days

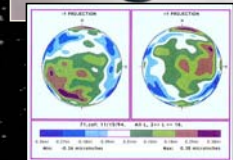


First results - Geodetic Precession



SQUID sensor and package

Gyroscope and housing



Rotor topology

642 kilometers (~400 miles)

