

Title: The DRS-ST7 Interferometer

Abstract: Laser interferometers will monitor the positions of the test masses in NASA's DRS-ST7 Gravitational Reference Sensor aboard Smart-2. Each of two interferometers will be sensitive to motion of a test mass relative to the spacecraft; the sum displacement signal is insensitive to spacecraft motion, and measures the separation of the masses along the line of the laser beams. For simplicity, the readout is based on homodyne detection, and is free of modulators. Sensitivity to imperfections in the laser light and to position and alignment of the test masses is analyzed. Testbed results demonstrating displacement noise of less than 30 pm/rthz at 10 mHz are presented.