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Mechanical design of the University of Florida Torsion Pendulum for testing the LISA Gravitational Reference Sensor RYAN SHELLEY, ANDREW CHILTON, TAWIO OLATUNDE, GIACOMO CIANI, GUIDO MUELLER, JOHN CONKLIN, University of Florida — The Laser Interferometer Space Antenna (LISA) requires free falling test masses, whose acceleration must be below 3 fm/s^2/rtHz in the lower part of LISA's frequency band ranging from 0.1 to 100 mHz. Gravitational reference sensors (GRS) house the test masses, shield them from external disturbances, control their orientation, and sense their position at the nm/rtHz level. The GRS torsion pendulum is a laboratory test bed for GRS technology. By decoupling the system of test masses from the gravity of the Earth, it is possible to identify and quantify many sources of noise in the sensor. The mechanical design of the pendulum is critical to the study of the noise sources and the development of new technologies that can improve performance and reduce cost. The suspended test mass is a hollow, gold-coated, aluminum cube which rests inside a gold-coated, aluminum housing with electrodes for sensing and actuating all six degrees of freedom. This poster describes the design, analysis, and assembly of the mechanical subsystems of the UF Torsion Pendulum.

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