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Gravitational Reference Sensor Technology Development at the University of Florida JOHN CONKLIN, ANDREW CHILTON, GIACOMO CHIANI, GUIDO MUELLER, RYAN SHELLEY, University of Florida — The Laser Interferometer Space Antenna (LISA), the most mature concept for detecting gravitational waves from space, consists of three Sun-orbiting spacecraft that form a million kilometer-scale equilateral triangle. Each spacecraft houses two free-floating test masses (TM), which are protected from disturbing forces so that they follow pure geodesics. A single TM together with its protective housing and associated components is referred to as a gravitational reference sensor (GRS). Laser interferometry is used to measure the minute variations in the distance, or light travel time, between these purely free-falling TMs, caused by gravitational waves. The demanding acceleration noise requirement of 3×10^{-15} m/sec^{2}Hz$^{1/2}$ for the LISA GRS has motivated a rigorous testing campaign in Europe and a dedicated technology mission, LISA Pathfinder, scheduled for launch in 2014. In order to increase U.S. competency in GRS technologies, various research activities at the University of Florida (UF) have been initiated. The first is the development of a nearly thermally noise limited torsion pendulum for testing the GRS and for understanding the dozens of acceleration noise sources that affect the performance of the LISA GRS. The team at UF also collaborates with Stanford and NASA Ames on a small satellite mission that will test the performance of UV LEDs for ac charge control in space. This presentation will describe the design of the GRS testing facility at UF, the status of the UV LED small satellite mission, and plans for UF participation in the LISA Pathfinder mission.

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