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The UF torsion pendulum and its role in space-based gravitational wave detectors JOHN CONKLIN, RYAN SHELLEY, ANDREW CHILTON, TAIWO OLATUNDE, GIACOMO CIANI, GUIDO MUELLER, Univ of Florida - Gainesville — Space-based gravitational wave observatories like LISA measure picometer changes in the distances between free falling test masses separated by millions of kilometers caused by gravitational waves from sources ranging from super-massive black hole mergers to compact galactic binaries. A test mass and its associated sensing, actuation, charge control and caging subsystems are referred to as a gravitational reference sensor (GRS). LISA has consistently been ranked in the top two of future space missions in the last two Decadal Reviews. With the 2015 launch of LISA Pathfinder (LPF), the expected detection of gravitational waves by aLIGO, and the selection of The Gravitational Universe for the European Space Agency's L3 science theme, LISA is one of the strongest candidates for the next Decadal. Following a successful demonstration of the baseline LISA GRS by LPF, the measurement principle will be carried forward, but improvements in the electronic and optical sensing and control system, the charge control system, and many other components are possible over the next ten years. These improvements will lead to cost savings and potential noise reductions. The UF LISA group has constructed the UF Torsion Pendulum to increase U.S. competency in this critical area and to have a facility where these new technologies can be developed and evaluated. This presentation will introduce this facility and its future role in LISA.

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