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Characterization of the LISA Pathfinder Drag Reduction System
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The LISA Pathfinder mission will be launched this year by ESA, and so it is urgent to simulate and characterize key experiments to optimize and validate the Gravitational Reference Sensor (GRS) performance. Success of this technology directly applies to any future LISA-like mission. Pathfinder is comprised of both European and NASA payloads, the LISA Technology Package (LTP) and Space Technology 7 (ST-7), respectively. ST-7 includes a Colloid Micro-Newton Thruster (CMNT) system, to maneuver the spacecraft with low noise, and a control system for spacecraft and test mass actuation. European partners have developed the LTP Data Analysis (LTPDA) Matlab suite, including state-space simulations of the full mission to create mock data, analysis pipelines constructed to reduce this and eventual actual data. We have adapted this infrastructure to reflect CMNT physics and control design where they differ from LTP. We analyze the residual GRS acceleration noise, paying particular attention to ST-7 specific CMNT noise characterization experiments and the performance differentials between using the inertial and interferometric sensing systems of Pathfinder in and out of loop. I will discuss our current results analyzing simulated ST-7 experimental runs and our future plans.

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