

STEP Baseline Design and Validation

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STEP (Satellite Test of the Equivalence Principle) proposes to test the Equivalence Principle to a part in 10^{18} by comparing the free-fall acceleration of test masses in orbit about the Earth. The baseline design goal is to resolve a difference in acceleration of $4 \times 10^{-19}g$ in approximately 10^5 s. Demonstrating this level of sensitivity by a test on the ground is not possible, limited by seismic and other disturbances. An analysis of the acceleration measurement subsystem shows more than adequate sensitivity, and an extensive system analysis, in which external disturbances and the effect of other subsystems are included in a self-consistent model, has also shown that the baseline design goal can be achieved. Our approach to validate the baseline design is to focus on verifying the assumptions used in analysis. We will discuss how this approach has been implemented in our recent manufacture and test of prototype accelerometers, and in our future plans for prototype instrument testing.