Aerospace Engineering Master's Defense

Detailed Design of a Pulsed Plasma Thrust Stand

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abstract

This thesis gives a detailed design process for a pulsed type thruster. The thrust stand designed in this paper is for a Pulsed Plasma Thruster built by Sun Devil Satellite Laboratory, a student organization at Arizona State University. The thrust stand uses a torsional beam rotating to record displacement along with impulse-momentum theorem to find the impulse bit of the thruster, which varies largely from other design which focus on using the natural dynamics their fixtures. The target impulse to record on this fixture was estimated to be 275 μN-s of impulse. Through calibration and experimentation, the fixture is capable of recording an impulse of 332 μN-s ± 14.81 μN-s, close to the target impulse. The error due to noise was characterized and evaluated to be under 5% which is deemed to be acceptable.

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