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IN-ORBIT DEMONSTRATION OF A STEAM-POWERED PROPULSION SYSTEM

**Abstract**

The Steam Thruster One is a 2U electrothermal thruster able to provide a Total Impulse of 1200 Ns, with a thrust over 5 mN and requiring less than 20W of power input. The system uses just low pressure water as the main propellant, making it completely safe for integration and operations both on the ground and in space. The propulsion system converts low pressure liquid water into superheated steam, which is then ejected through a nozzle creating thrust. One Steam Thruster One propulsion system was launched in 2023 for a demonstrative/commercial mission, aboard a 100 kg satellite deployed in a Sun Synchronous Orbit. The propulsion system was successfully commissioned after the orbit insertion and telemetry provided a clear indication that all subsystems were operating nominally. Firing was confirmed by measuring the fine orbital changes before and after the maneuvers, with the propulsion system delivering over 100 Ns so far. This paper gives an insight into both the ground and in-orbit testing performed, highlighting the lessons learned during the process.