

SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

Author: Prof. Martin Tajmar
TU Dresden, Germany, martin.tajmar@tu-dresden.de

DEVELOPMENT AND TESTING OF A CUBESAT WITH HIGHLY MINIATURISED FEEP
THRUSTERS ON A THRUST BALANCE WITH SUB-NANONEWTON RESOLUTION

Abstract

A highly miniaturised FEEP thruster was developed that allows full attitude and orbit control of a Double-CubeSat presently developed at TU Dresden. In order to verify the thruster capabilities, a dedicated torsion balance was developed using flexural pivot bearings and fiberoptical displacement sensors. The novel configuration allows large test masses up to 20 kg while maintaining thrust resolutions down to sub-Nanonewton values. This enables to test the whole CubeSat satellite including thrusters and electronics remotely controlled by infrared communication on the balance. The whole test-setup is mounted inside a large vacuum chamber on top of a vibration damping table in order to minimise environmental noise. We will present an overview of the complete NanoFEEP thruster subsystem, the configuration and capabilities of the thrust balance as well as the results of an end-to-end test of the CubeSat on the teststand.