

SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations (IP)

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OVERVIEW OF ELECTRIC PROPULSION DEVELOPMENTS AT TU DRESDEN FOR MICRO AND
SMALL-SATELLITES**Abstract**

The institute of aerospace engineering at TU Dresden is developing several electric propulsion thrusters in the low power range for micro and small satellites as well as for precision pointing science applications. The first concept is a FEEP thruster called NanoFEEP using gallium as propellant that is small enough to be integrated into a CubeSat enabling formation flying and orbit control on a widely available small satellite platform. First mission applications include the UWE-4 and the SNUSAT-2 CubeSats that use NanoFEEP for attitude-control and de-orbiting demonstrations. The power requirement is so small that up to 8 thrusters can be fired simultaneously enabling full 3-axis attitude and orbit control with maximum thrusts in the range up to 10 μN . The second concept uses gas as propellant using a porous MEMS silicon chip with carbon nanotubes for field ionization. The thruster requires only a single power supply with a few hundred volts DC and no magnetic field. It can even work as an add-on to cold-gas thrusters which can significantly improve their specific impulse. A third concept under development is a low power hall thruster that uses a C12A7 low-work function heaterless hollow cathode. All thrusters can be tested on a new torsion thrust balance that promises thrust resolutions down to the Nano-Newton range together with plasma diagnostics. Our paper will review and summarize the latest electric propulsion activities at TU Dresden.