Propulsion System Engineering

Electrospray emitter arrays can be assembled with different tanks according to varying mission needs. The image below shows the NASA MEP thruster tank, compared to the latest, fully scalable tank design on the left. These thrusters have been successfully tested for launch vibration, thermal cycling and static acceleration >12Gs, fully filled with propellant.

Fully scalable iEPS tank design compared to NASA S-iEPS tank design

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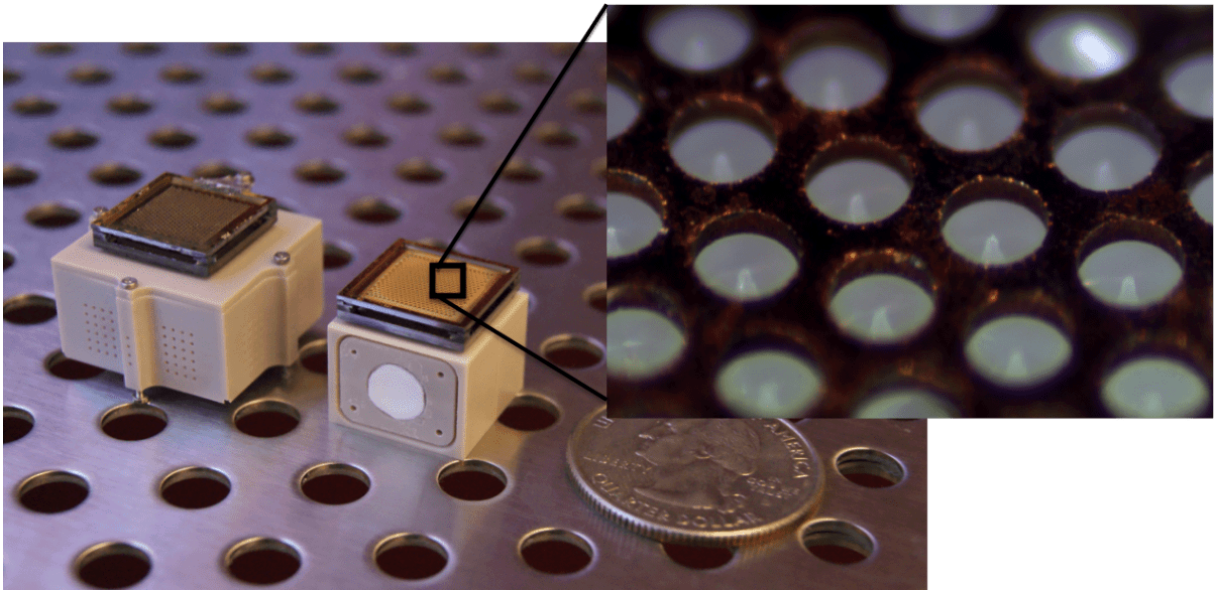
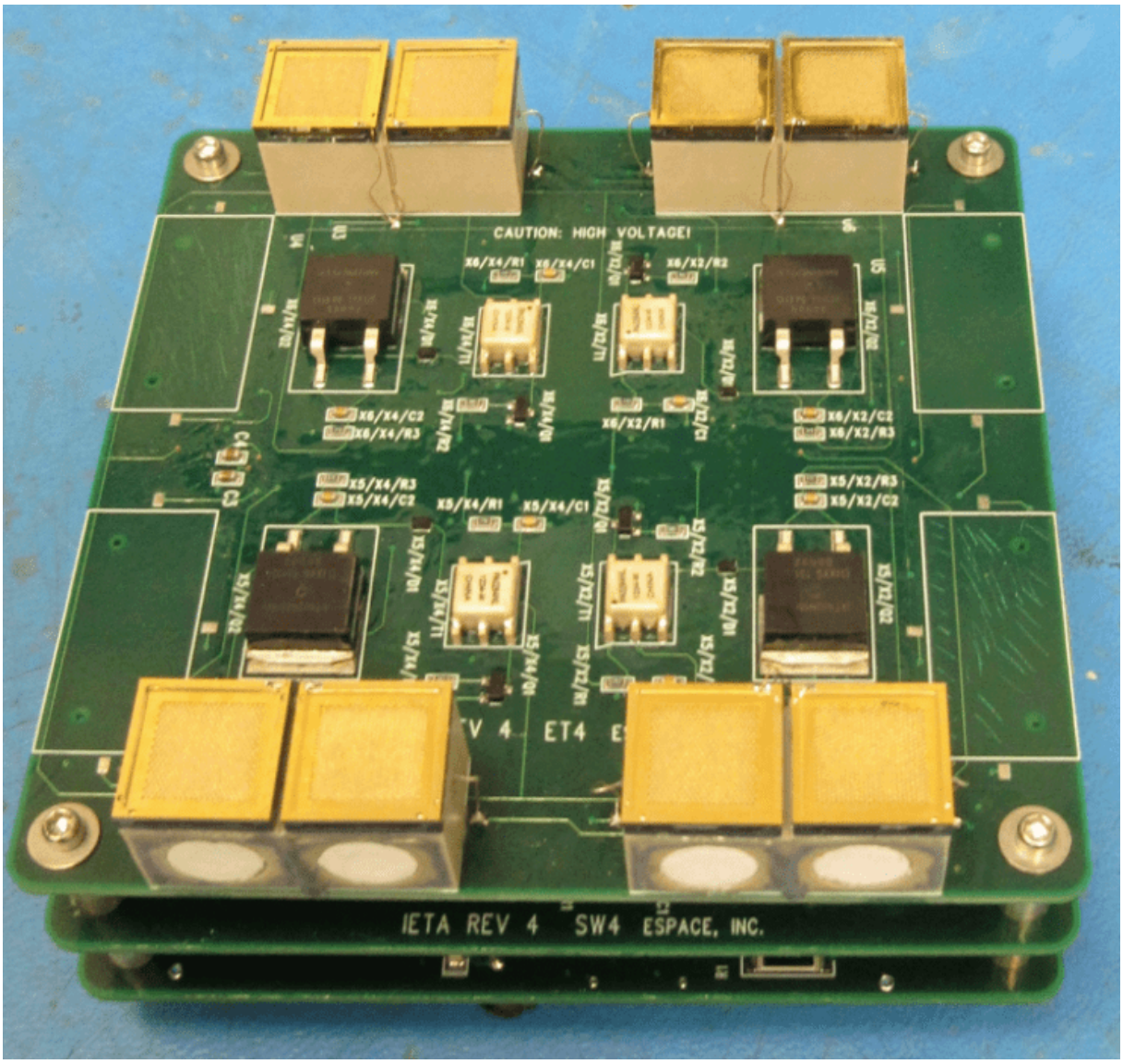
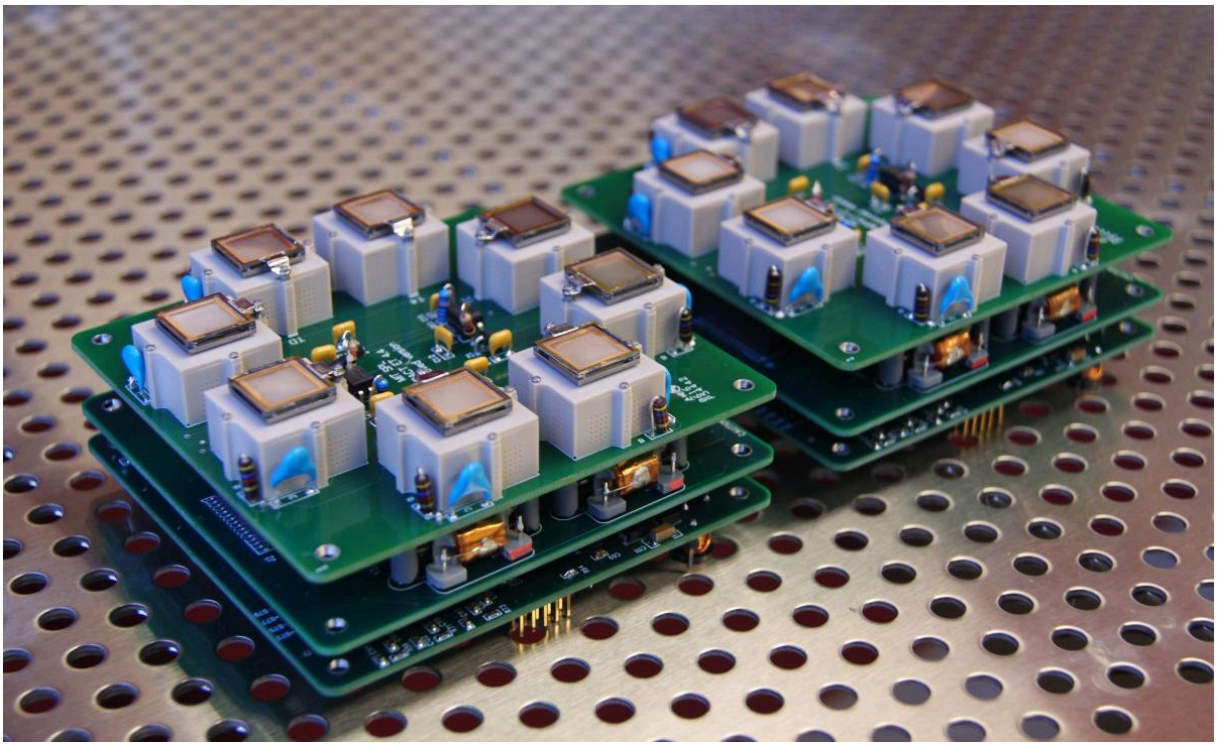


MIT SPL integrates the MEMS based electrospray thruster technology for space based testing in different propulsion module configurations. The modular thruster design allows different propulsion module configurations to prioritize different aspects. These included attitude control featuring multiple individually commendable thrusters per module such as the modules shown below, and primary propulsion modules such as the NASA MEP iEPS module for high efficiency primary propulsion of a Cubesat.

Flight propulsion modules of the iEPS thruster technology (Engineering modules shown).



early version

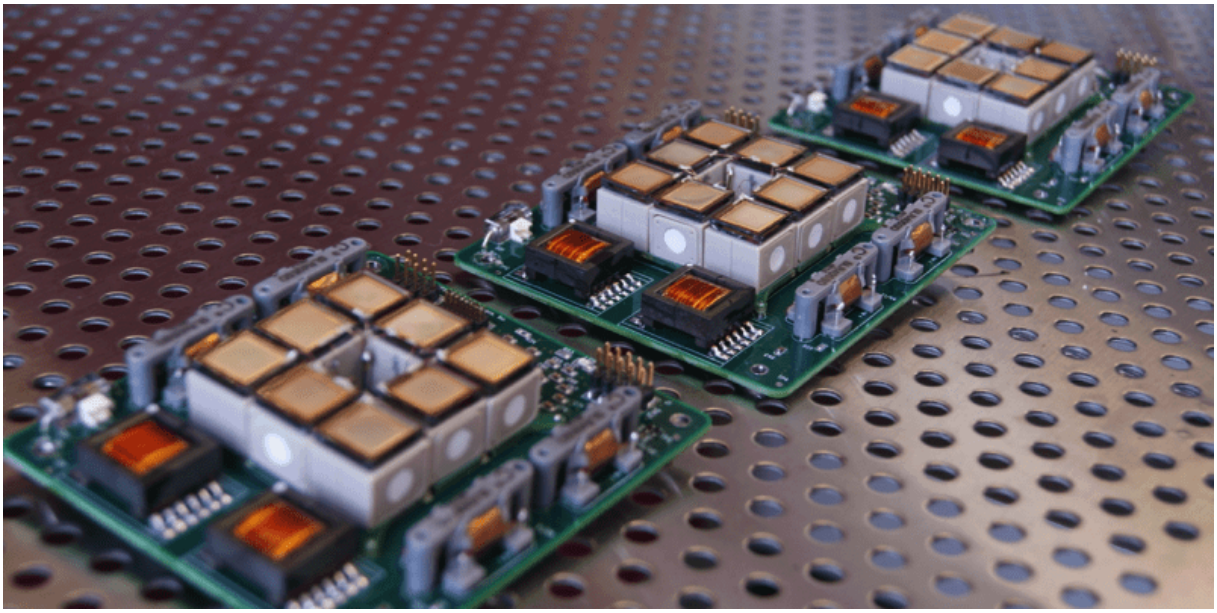


current version

The above images show the engineering unit of an early flight heritage module flown on two Cubesats, and a recent flight design scheduled for launch in fall 2016. These modules feature 8 thrusters each and are capable of attitude control, primary propulsion and self-neutralization.

The image below shows three single PCB propulsion modules developed for primary propulsion of Nanosatellites, targeting highest system compactness and overall efficiency. All images show the entire propulsion module including thrusters, propellant reservoirs and all necessary high voltage electronics.

S-iEPS propulsion module: A single axis, highly efficient and compact propulsion module developed during the NASA MEP program.



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