EXOTERRA

Halo Hall-Effect Thruster - Xenon

Product Overview

ExoTerra's Halo is a compact Hall-effect thruster designed for the tight limitations of small spacecraft. Rideshare-compatible Halo thrusters extend the lifespan and utility of CubeSats, making possible new applications and mission architectures that were previously limited to larger spacecraft.

Rideshare Orbit Optimization and Deorbit

ExoTerra's revolutionary Halo Hall-Effect Thruster allows CubeSats to escape their rideshare drop-off orbits to reach optimal orbits, maintain them for long durations, and deorbit on command. Halo meets the tight mass, volume, and thermal constraints of CubeSats and other rideshare spacecraft, and its high Isp and total impulse expand the mission potential of CubeSats by enabling them to attain and maintain targeted orbits. With Halo, CubeSats can perform better science, extend their useful lifetime, operate together in structured constellations, and even conduct low cost lunar and interplanetary missions.

Mass: 0.83 kg
Volume: 0.375 U
Input Power: 100 – 450 W
Total I_{SP}: 700 – 1500 s
Thrust Range: 4 – 30 mN
Impulse: ≥ 375 kN-s
Propellant: Xenon

Halo has demonstrated operation at input power levels between 100 and 450 W, making it the perfect choice for satellites from 6U CubeSats up to ESPA class.

Big Propulsion for Small Satellites

Hall-effect thrusters provide superior total impulse performance compared to combustion, electrospray, or pulsed plasma propulsion options for CubeSat and small satellite applications. This enables a broader spectrum of missions and greater satellite lifetime.

Halo's demonstrated thrust range of 4 to 30 mN with xenon propellant decreases total transfer time over ion engine alternatives. Total specific impulse correspondingly ranges from 700-1500 s, allowing Halo to produce greater ΔV from a given propellant volume than other options. This high thrust and high efficiency fits into a compact space: Halo weighs only 0.83 kg and fits within a 80 mm diameter by 75 mm long envelope.

Halo performs best when paired with an ExoTerra Power Processing Unit (PPU) and Xenon Flow Controller (XFC). The PPU weighs just 1.88 kg and measures 218 x 145 x 121 mm and the XFC weighs an additional 0.8 kg and requires 120 x 113 x 90 mm volume.

For more information contact:
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About ExoTerra

ExoTerra was founded in 2011 with a vision of reducing the cost of space exploration. We pursue this goal by developing affordable technologies that minimize spacecraft mass and volume while enhancing their performance and offering unique capabilities.

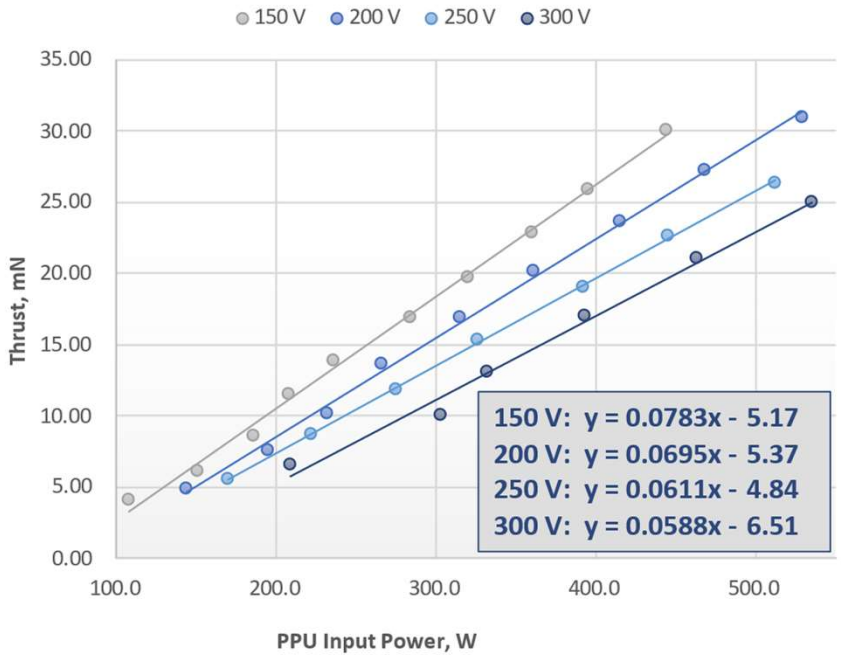
Halo Development

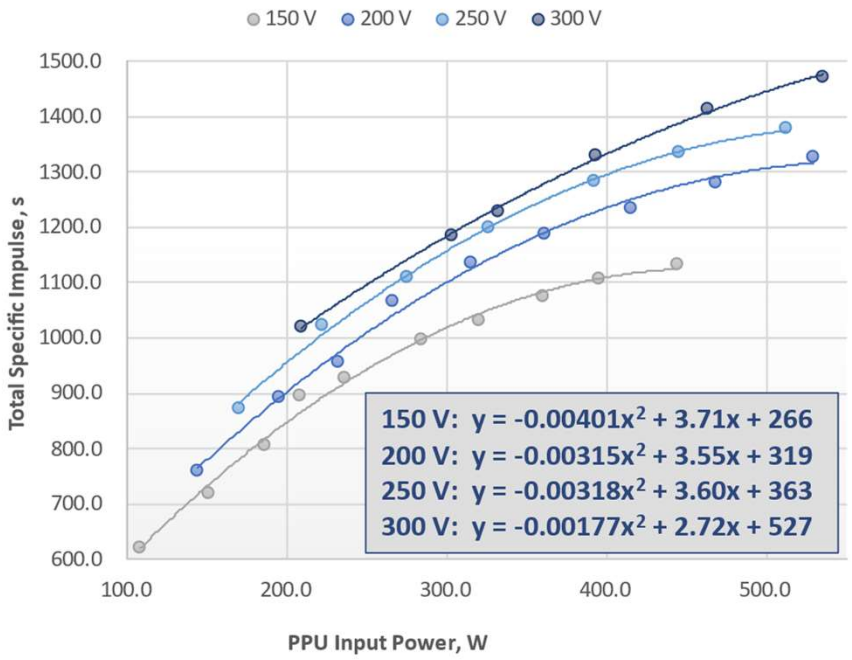
The Halo Thruster, PPU & XFC have completed qualification testing that meet or exceed NASA GEVS load profiles. Long-Duration Wear Testing resulted in a projected lifetime of ≥5,000 h. First flight hardware is delivered with launch in October 2022.

Part of an Integrated Propulsion System

ExoTerra has the expertise, tools and processes to offer satellite makers a full electric propulsion system solution for micro and small satellites. The Halo EP module includes the thruster, a propellant storage (tank) and distribution system, and a power processing unit. ExoTerra offers the module as a kit to be assembled by the customer, or can provide custom solutions to integrate the system into the customer's satellite. This service includes components, precision welding, tube and harness design and mounting, complete thermal & mechanical analysis, tooling, assembly onto the customer's satellite, and testing prior to delivery.

Thrust and Total Specific Impulse with Xenon Propellant





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