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AUTOPHAGE SMALL SATELLITE ENGINE LAB VERSION TEST RESULTS

Abstract

This year a joint team of Dnipro National University, Ukraine, and Cranfield University, the United Kingdom, is developing and testing a laboratory scale model of small autophage engine with a thrust of about 1N. The paper presents a progress report about the testing and an analytical study about the preferred range of application for such a propulsion.

The concept of the small satellite autophage engine was proposed by us at IAC 2018 in Bremen for the first time. In comparison with modern micropropulsions the autophage versions have prospects to be lighter and powerful. According to our estimation, their thrust-to-weight ratio equals about 10 including micro wheel feeding system. For example, a propulsion with a thrust of 1 N and the mass of about 0.1 kg is capable of transferring 1 kg satellite from 200 km to 400 km circular orbit by means of one 100 mm propellant rod. The expected feeding electric supply is about 1 W and restart system needs about 10 W which are possible to be provided by means of solar panels. With respect to thrust-to-weight ratio autophage propulsions are superior to modern liquid bipropellant, monopropellant or cold gas propulsions.