

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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THE INFINITE STAGING ROCKET – PULSE MODE TESTING

Abstract

The infinite staging project, the investigation of the engineering feasibility of an autophage quasi single stage launch vehicle, which has been continuing at Dnipropetrovsk National University, Ukraine, has been presented at 63rd and 66th IAF Congresses in 2013 and 2015. The rocket concept is interesting because it can be realized for extremely small launch vehicles with initial masses of several tens kilograms and payloads of several hundred grams while traditional technology theoretically is not applicable for the launchers lighter than several tons according to our estimating.

The presented previously results described a gradual approximation to the solving of the problem. At the first stage a direct-feed and reverse-feed gasification chambers for the rocket engine were successfully tested. Then the development turned to pulse engine mode which has been considered theoretically at the recent IAF Congress in Jerusalem.

This year paper reveals our experimental results of the new test to get a pulse mode for a rocket engine of a new design. The engine is fed with a rod of polypropylene and ammonium perchlorate propellant and has a dual-throat nozzle. The reverse-feed gasification chamber of the engine is equipped with 16 heat-resistant tantalum clapper valves coated with zirconium oxide.

The paper contains an analysis of the experimental data, a discussion of the investigation development and a conceptual design of a femto satellite autophage launcher with an initial mass of 30-50 kg as well.