

FLIGHT PERFORMANCE OF A PROPULSION UNIT EQUIPPED WITH PULSE DETONATION ENGINE AND BYPASS DUCT

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The operation process of air-breathing propane-fueled pulsed detonation engine (PDE) based on repeated deflagration-to-detonation transition (DDT) and PDE thrust performance in flight conditions have been simulated numerically. A PDE-based axisymmetric vehicle with supersonic air intake, bypass channel, mechanical valve, and nozzle, flying at Mach 3.0 at the altitude 9.3 km was considered. The DDT run-up distance and time in such conditions were shown to be so short that the engine could be quite compact with the total length of about 1.8 m and could operate with positive thrust at a frequency of 100 Hz and very low detonation ignition energy. The fuel-based specific impulse was estimated as 2150 ± 100 s, which is 15%–25% higher than the specific impulse characteristic for hydrocarbon-fueled ramjets.

**РАСЧЕТ ПОЛЕТНЫХ ХАРАКТЕРИСТИК СИЛОВОЙ
УСТАНОВКИ С ДВУХКОНТУРНЫМ ИМПУЛЬСНЫМ
ДЕТОНАЦИОННЫМ ДВИГАТЕЛЕМ**