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SPACE PROPULSION SYMPOSIUM (C4)
Propulsion Systems II (2)

Author: Prof. Paolo Gessini
Universidade de Brasília, Brazil, paologessini@unb.br

Dr. Domenico Simone
Sapienza University of Rome, Italy, domenico.simone@uniroma1.it
Prof. Carlos Alberto Gurgel Veras
Universidade de Brasília, Brazil, gurgel@unb.br
Mr. Pedro Luiz Kaled Da Cás
Universidade de Brasília, Brazil, pedrokdc@gmail.com

AIR-LAUNCHED, AIR-AUGMENTED HYBRID ROCKET

Abstract

This paper presents the results of a conceptual study of an air-augmented rocket system based on liquefying fuel, more specifically paraffin. Work on paraffin/nitrous oxide hybrid rockets has been ongoing at the University of Brasilia for about a decade. The proposed cycle uses a single hybrid propulsion system to initially accelerate the rocket, followed by an air-augmented rocket mode operation, based on the same motor. Subsequent stages would allow payload insertion into orbit. The possibility of launching the vehicle from an airplane, for example a supersonic heavy fighter, is being considered in order to reduce the required Δv. The paper also addresses a technological assessment of the proposed system partially based on static test firings. The propellants used in the tests are self-pressurized nitrous oxide and vitiated air along with paraffin-based solid fuel.