

Space Transportation (6)
Space Transportation (1) (1)

Author: Mr. Andrey Shashkov
Keldysh Research Center, Russian Federation, shashkov@phystech.edu

CONCEPT OF A SHORTCUT CREATION OF MULTIPURPOSE ORBITAL TRANSPORT MODULE BASED ON KM-10 HALL-EFFECT THRUSTER

Abstract

The concept of a shortcut creation of a transport module with a 50 kW electric propulsion system (EPS) based on KM-10 Hall thruster with wide throttle ratio is presented. The transport module combined with Launch Vehicles (LV) of heavy (Angara-A5) and medium (Soyuz-5) classes will provide significantly cheaper delivery to the lunar orbit of payloads weighing 5...23t for the assembly of the Lunar Orbital Station (LOS) in comparison with the traditional liquid propellant systems (LPS). The concept includes 3 stages. At the first stage, it is proposed to carry out a space test with a small and relatively inexpensive demonstrator, created on the basis of the Express-2000 (15 kW energy capacity) and EPS based on three KM-10 operating with a power of 4,5 kW, discharge voltage of 300 V and specific impulse of 1800 s. The test is aimed at the in-space KM-10 operating, flight to the Lunar orbit using EPS, docking with a LOS simulator, and deployment of a promising low-power flexible solar array (2kW). The flight will take about 0.5 years. In practical use, the demonstrator combined with the Angara-A5 LV and the DM-03 upper stage can deliver up to 5,6t of payload to the LOS per 1.6 years with a cost profit about 19