

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Vehicles – Mechanical/Thermal/Fluidic Systems (7)

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POTENTIAL ADVANTAGES OF THE SPACE VEHICLES WITH NUCLEAR POWER - PLANT ON
BOARD WHEN DEALING WITH GLOBAL PROBLEMS OF MODERN AGE

Abstract

A paper discusses the options of Space Vehicles, which contain nuclear power-plants on its board. The nuclear power-plants generate electric power, which is supplied to onboard engines, predominantly, magnetoplasma rocket powered engines. The nuclear power-plant is airtight and no radioactive products escape outside its casing. The jet stream of magnetoplasma rocket powered engines consists of ions, which cannot be radioactive apart from molecules, which are inherent to jet streams of the chemical engines. The Space Vehicles are injected using the stages of Launch Vehicle, equipped with chemical engines with nonradioactive propellants into transfer orbit, where ignition of the magnetoplasma engine occurs. The paper illustrates the advantages of Space Vehicles, equipped with onboard nuclear power-plant, thanks to which: - for option of the manned Mars mission a reduction in time of the entire mission is possible to the extent that human space flight can be carried out with a guarantee to withstand external radioactive radiation; - for option of the Space Module to clean the near-Earth space from space debris an increase in onboard useful power is possible not only for implementation of the flight trajectory, but for power supply of onboard units with impact on space debris (e.g. onboard lasers); - for option of the radioactive waste removal of nuclear power stations outside the Earth biosphere, first and foremost, on account of high specific impulse of the magnetoplasma rocket powered engines. Moreover, the nuclear power-plant is necessary for extended space flights to boundaries of the solar system and is also preferable for protection of Earth against asteroids.