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SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Upper Stages, Space Transfer, Entry and Landing Systems (3)

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DISTINCTIVE FEATURES OF A TECHNICAL LAYOUT OF THE SPACE VEHICLES WITH
NUCLEAR POWER PLANTS ONBOARD IN THE PERFORMANCE OF GLOBAL PROBLEMS OF
MODERN AGE

Abstract

In the paper, options of the space vehicles with nuclear power plants onboard are considered. Nuclear power plants produce electrical energy which is supplied to the onboard thrusters, predominantly magnetoplasma ones. The nuclear power plant is pressurised, there are no radioactive products leaking the plant's casing. The magnetoplasma thruster's jet consists of ions which could not be radioactive. To the transfer orbit where ignition of the magnetoplasma thruster takes place, the space vehicles are delivered by launchers equipped with chemical engines with non-radioactive propellants. The paper presents distinctive features of a technical layout of the space vehicles with nuclear power plant onboard, due to which: - in case of a manned flight to Mars, the mission duration is cut to the extent that astronauts could reliably survive the external radioactive radiation; - in case of a space module to clean the near-Earth space from space debris, one achieves an increase of the useful onboard power not only for making flight trajectories, but also for power supply of onboard devices impacting space debris (e.g. onboard lasers). Besides, the nuclear power plant is necessary for deep space flights to the borders of the Solar system, as well as in the perspective – for the anti-asteroid protection of the Earth.