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MARS/EUROPA INPPS HIGH POWER SPACE TRANSPORTATION

Abstract

This talk explicitly explains INPPS (International Nuclear Power and Propulsion System) flagship subsystems like nuclear reactor, shielding, power conversion, boom, radiators, building blocks for tanks / payload basket / PPU / cluster of electric thrusters as well as additional solar power ring electricity and real time radiation detectors. Differences between the two flagships - as high power space transportation tug - for non-human (second half of 2020th) Mars / Europa and human (2030th) Mars exploration missions are sketched.

The international studied conditions for human Mars and exploration Europa space flights are realizable by rationales for pursuing high power space transportation by INPPS due to: 1) the successful finalization of the European-Russian DEMOCRITOS and MEGAHIT projects with their three concepts of space, ground and nuclear demonstrators for INPPS realization (reached in 2017), 2) the successful ground based test of the Russian nuclear reactor with 1MWel plus important heat transfer solution via droplet radiators (confirmed in 2018), 3) the space qualification of the Russian reactor until 2025 and 4) the perfect celestial constellation for a Earth-Mars/Phobos-Earth-Jupiter/Europa trajectory in 2026-2031 for maximal INPPS flagship tests. Critical performance will be studied by parallel realizations of the ground and nuclear demonstrators of DEMOCRITOS (until 2025). The space qualification of INPPS with all subsystems including the nuclear reactor in the middle of the 2020th plus the INPPS tests for about one to two years – first in high Earth orbit robotic assembly phase of INPPS and later extended in nearby Earth space environment flight - means a complete concepts driven approval for all applied INPPS space technologies for both Mars/Europa exploration missions by INPPS flagship.

In dependence – from the cluster of electric thrusters - the MARS/EUROPA INPPS payload mass is up to 18/12 tons. This very high payload mass allows to transport scientific, pure commercial and new media communication payload sections. For example, the scientific payload also includes a small INPPS orbiting inspection satellite. The INPPS flagship missions are visionary, comparable with Apollo project and ISS with dedicated outcomes for science / technologies, international peaceful cooperation in space and additionally for commercialization plus communication from space to Earth, means in space down to Earth.