36th IAA SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS (E3)
The future of space exploration and innovation (2)

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PERSPECTIVES OF THE INTERNATIONAL INPPS FLAGSHIP AS A DEVELOPMENT JUMP IN SPACE TRANSPORTATION TO MARS AND BEYOND

Abstract

Future human space exploration depends on essential progress in space transportation. The international INPPS program (International Nuclear Power and Propulsion System) has the goal to bring together international partners in a hybrid approach of solar energy, chemical and nuclear electric powered space transportation. It will serve a human to Mars mission with a preparative mission – a non-human, but human robot space flight to Mars, Earth return and deep space exploration to Jupiter moon Europa.

Since 2009 detailed technological, scientific, commercial and legal (Nuclear Power Source (NPS) - requirements) preparations related to INPPS are in progress, inter alia an EU-Commission collaboration consortia and a number of bilateral initiatives with Brazil, Costa Rica, Israel, Japan and USA. After 2022, the INPPS flagship extended international strategy includes more European entities (Finland, Poland and Portugal) as well as India and Pacific nations. In 2023, the Indo-Pacific Space Conclave White Paper stated a coherent plan for international collaboration in space activities with a focus and benefit of humankind applied to human Mars flight - also with respect to the INPPS flagship.

Insofar still realistic the first INPPS: the 2028 – 2032 INPPS subsystems autonomous robotic plus astronautic assembly in Earth orbit with a maximum of space qualifications towards Mars and by Earth return and Europa moon flight. Up to 18 t – in form of scientific, commercial and communication payload – also means the heaviest space tug, usable to gain profits by space manufacturing (the next space commercialization step). Due to laser communication between INPPS and Earth ground, virtual real-time human participation is already an international highlight for long-term, continuous promotion and acceptance.

The maximal experiences with the first INPPS flagship allows the second INPPS flagship human transport to Mars after 2032.