

25th IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM (A5)
Interactive Presentations - 25th IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR
SYSTEM (IP)

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USAGE OF NUCLEAR PROPULSION SHUTTLECRAFT FOR ROUTINE TRANSPORT TO AND
FROM THE MOON WITH ISS AS LAUNCHING POINT

Abstract

Going to the moon has been one of the most important feats of mankind as the moon represents a stepping stone to rest of the solar system and beyond. Establishing a firm presence on the moon is essential for opening up the rest of the solar system to mankind. In order to realize this, fast and effective transport mechanisms need to be available to space agencies and to private space companies. While the Artemis Project offers moon transportation with classical methods, a speedier and more efficient human and cargo transport system is required to the moon. This paper discusses the possibility of using a shuttlecraft and/or cargo spacecraft that is nuclear propelled to provide daily to and from transport from the Moon to the ISS. While plans of establishing a Gateway is underway, its possible to use ISS as a launching point for a nuclear propulsion shuttlecraft that can do daily runs to the moon. In order to achieve this, a lightweight modular nuclear propulsion reactor that uses Helium as a coolant will be used to power the spacecraft. The paper provides the case study of such a nuclear shuttlecraft and provides specifics such as specific impulse, thrust, potential orbital paths and approximate costs per each flight. All of the suggested components and technology for this particular transport method will be existing technologies so new RD is not needed. While the initial cost of such an endeavor may be high, the ability to have daily flights between ISS and the Moon may provide an unprecedented acceleration for establishing a regular presence on the Moon. Potential challenges are also discussed in this paper and a case study of a daily flight pattern is also provided. It is thought that this novel idea may provide unlimited access to the moon for all the nations on Earth with its ease. An international cooperation roadmap is also provided.