

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Future Space Transportation Systems Technologies (5)

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## USE OF VASIMR TECHNOLOGY FOR CARGO TRANSPORTATION TO ISS

**Abstract**

With the focus of major space actors shifting to efficient and low cost space missions with multi-tasking capabilities, many innovative technologies have been developed like Electric Propulsion, Nuclear Propulsion, Variable Specific Impulse Magnetoplasma Rocket (VASIMR), etc. Out of all the above, VASIMR provides reliable multitasking capabilities at a comparatively lower cost than the others when operational. It combines the usability of Electric as well as Nuclear Propulsion Systems into one entity, thus bringing about variations in its capability. It utilizes argon or hydrogen as fuel, which are available abundantly in the universe, thus providing the possibility of long range missions in the future. It can provide low specific impulse, high thrust or high specific impulse, low thrust; thus it caters greater variation for short distance or long haul missions. Theoretically, it can help in reaching Mars in less than 40 days. In this paper, we propose the feasibility study of using VASIMR technology for a reusable cargo transportation mission to International Space Station. We also propose the possibility of space debris removal in Low Earth Orbit. The huge amount of nonfunctional satellites, disintegrated fragments from spacecrafts, rocket stages, etc. that have been classified as 'space waste' or 'orbital debris' pose a serious threat to space crew and future space missions. Thus it is the need of the hour to address this worldwide concern and think of some viable option to get rid of this problem, at least to a certain extent. The VASIMR technology if properly studied, tested and implemented can provide an achievable solution to this problem. Hence, sufficient attention has been paid in this paper to bring forward the usefulness of this technology in order to get a cleaner and safer space environment.