

SPACE SYSTEMS SYMPOSIUM (D1)
Innovative and Visionary Space Systems (1)

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THE FUTURE OF ISS: LIFESPAN EXTENSION OF THE INTERNATIONAL SPACE STATION
AFTER 2024**Abstract**

The International Space Station (ISS) is the most expensive object ever created by humanity. In 2024 the present mission of the ISS will end. Nominal end-of-life disposal for space stations is to deorbit and burn up as much as possible in the atmosphere. Since the orbital energy of the ISS is a costly asset, the mass of ISS in low Earth orbit is extremely valuable even if it is only used as raw material. This paper investigates the prospect of repurposing the ISS after the completion of its primary mission in 2024. As part of the International Space University Space Studies Program 2017 in Cork an interdisciplinary team investigates the possible future of the ISS. A literature research is conducted that summarizes previous ideas of the future of the ISS. Several future use cases are presented and a more detailed case study is conducted elaborating the conversion of the ISS into an Earth-Moon-Earth cyclus. This work gives an overview of possible possible continuations of the life of the ISS, such as ascent into a monument orbit, reassembly of parts (plus new modules) into a cislunar cyclus, or extraction of modules to be joined into a new station with added international partners. If its orbital life can be extended there will be an opportunity for innovative applications of it or of its parts, such as raising it into a high, long-duration orbit for future use or disassembling and reassembling some modules into a new station for other uses. Problems of ownership, international cooperation, space environment, deconstruction techniques, orbital debris generation, and costs of repositioning and repurposing are some of the aspects discussed. The outcomes of this work could start a useful international discussion of ISS longer term futures. Planning should begin now to establish a policy baseline and some feasibility knowledge about what to do with ISS at the end of its primary mission.