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HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
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ISS AS A FIRST STEP TOWARDS SUSTAINED SPACE EXPLORATION

Abstract

The first building block of the International Space Station (ISS), the biggest cooperative space project in human history, was launched more than 15 years ago. Whereas at first sight operating a space station in LEO may have seemed a step backwards after the bold endeavours of the Apollo missions to the Moon, maintaining a large manned orbital infrastructure with a broad international cooperation for more than 15 years has laid an essential base for a sustainable human space exploration programme beyond LEO. Primarily, the ISS was designed to be a microgravity laboratory for leading edge science in fields like material science, physiology, biology, and fundamental physics for terrestrial applications, but it has also proven to be of utmost importance for preparing human and robotic missions beyond Earth orbit and its value in this respect will even increase in the near-term future.

Three different categories of contribution of the ISS programme to exploration preparation have been identified. Firstly, the ISS programme has set up an organizational and political framework that can be useful for new exploration missions as these will most likely also be multinational cooperative projects. Lessons learned from 15 years of cooperation between participating states will help to find an efficient organizational set-up for what will come beyond LEO. Aspects of this are today reflected by global space agencies in the coordination process of ISECG. A second category is the scientific contributions made by the ISS programme. A lot of science, especially in the fields of physiology and psychology, has been conducted to investigate the effects of the space environment on human beings and how to effectively mitigate negative effects. Future exploration missions will definitely feature long mission times even further away from Earth than today and the results of these experiments will help to keep the crew healthy and productive. Thirdly, a very visible contribution is within the technology sector. Besides operating and maintaining the orbital structure itself, the ISS programme has spawned a whole fleet of spacecrafts which can play a significant role in future missions. The new partnership of NASA and ESA on MPCV is just one good example.

This paper will give an overview about contributions of the ISS programme to the preparation of future exploration missions from the beginning of the ISS programme until its near-term future. A special focus is laid on projects that received significant support from ESA and DLR.