

17th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)

Space Technology and System Management Practices and Tools (4)

Author: Ms. Paivi Jukola
Aalto University, Finland, paivi.jukola@aalto.fiON DESIGN-ENGINEERING AND MANAGING OF COMPLEX STRUCTURES - FROM THE ISS TO
THE MOON VILLAGE**Abstract**

The aim of this research is to gather lessons learned from most ambitious building construction projects. From developing ideas to sketches; from design and buildings; to managing operations. The goal is to pave the way to even more complex and disruptive challenges, such as those of Cislunar Habitats and the Moon Village.

The study is structured in two parts. Firstly, a literature review on complex structures and international collaborations, including CERN in Switzerland and the ISS International Space Station. Scheduling, managing and controlling design-engineering is a complex task, resulting frequently costs over budget. We examine the methodology of Technology Readiness Levels (TRL) both for traditional, and for 3D printing, terrestrial building construction; for Moon and Mars Habitats.

Secondly, a qualitative research; interviews with international partners of the ISS on technology management methodologies and best practices, particularly for human spaceflight research. We seek to develop and to propose a novel human factors and design research program for the ISS. The well being of astronauts reduces risk of human error and increases the success rate of future missions; benefits the daily lives of us all. Innovations in materials' research; in architecture and interior design; in ergonomics; benefit living and working conditions of all.