## IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3) Advanced Systems, Technologies, and Innovations for Human Spaceflight (7)

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## USING DESIGN THINKING AS A TOOL FOR INNOVATION IN HUMAN SPACEFLIGHT

## Abstract

The current Human Spaceflight presents many human factors and habitability issues. Technology, products and materials have remarkably evolved over the last few decades. However, astronauts' present lifestyle and living standards are focused solely on surviving the harshness of outer space. Therefore, this project premise revolves around making life in space more humane using the lens of design thinking. The project's context is centred on Space Galley as it has an exciting premise for a designer: frequent interaction of astronauts with the area, food being a crucial comfort element, and the galley is an essential aspect in long-duration space travel.

Furthermore, while consuming food, it was observed that station-keeping is an essential aspect for astronauts. Hence, the project narrowed down to Restraint Aids, which help in station-keeping, allowing astronauts to orient themselves to the workspace and carry out experiments and daily activities. The project's outcome is space footwear and new mobility aid, which significantly reduce the physical discomfort to the user, improve ergonomics for a longer duration and enhance well-being. The project's overall theme focuses on shifting from a machine-centric approach to a more human-centric approach.

A new framework, Gravitational Cartography, was developed during the research and synthesis to bridge the gap between design, engineering, and science. Gravitational Cartography is mapping interactions between design, gravity and life. It blends essential aspects of different fields like engineering, human factors, space science, psychology, and design to achieve harmony between technical and humanistic needs.