Paper ID: 90748
oral
student

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Interactive Presentations - IAF HUMAN SPACEFLIGHT SYMPOSIUM (IP)

Author: Ms. Lisa HEDIN
ISAE-Supaero University of Toulouse, France

Mr. Aurélien HEREL
ISAE-Supaero University of Toulouse, France
Mr. Samuel GAUTHIER
ISAE-Supaero University of Toulouse, France
Ms. Lina ARAB
ISAE-Supaero University of Toulouse, France
Ms. Fiona HUBERT
ISAE - Institut Supérieur de l'Aéronautique et de l'Espace, France
Mr. Paul LANDAIS
ISAE-Supaero University of Toulouse, France

INCREMENTAL EXPANSION OF ORBITAL SPACE HOTEL

Abstract

This abstract presents the development of an innovative space hotel, by detailing the architectural, engineering, and operational considerations involved in this phased expansion. The purpose of this challenging project is to design a space hotel in orbit using system engineering methods and space project management. This project is led by ISAE-SUPAERO students.

Our design starts with a space hotel housing 6 occupants, which is planned to expand to 12, finally scaling up to 24 occupants. The objective is to detail the comprehensive architecture and logistical planning involved in deploying such a space station, illustrating an adaptable and scalable model for orbital infrastructure. The initial phase involves launching the necessary modules to support the journey of 6 people. This will include modules such as those for sleeping quarters, the main hospitality area, exercise equipment, as well as the attitude control system and the service module, all of which will be deployed first. A fully shielded module, ensuring the safety of occupants during solar flares or collisions with space debris, will also be among the first to be established. Following that, the capacity will be expanded to accommodate 12 people, with new modules deployed such as one designed for microgravity experiment, the modules which will also serve dual purpose, enhancing guest experience in microgravity and providing life-support redundancies in case of emergencies. In the final phase, the station's capacity will be extended to house 24 occupants, marking the culmination of its scalable design. This stage introduces additional living and recreational modules.

Each expansion phase incorporates lessons learned from the preceding operations, leveraging technological advancements and guest feedback to refine the design and functionality. The challenges are in the bearing of a high standard of guest experience in the harsh environment of space, and the strategies to ensure safety and reliability. The proposed space hotel exemplifies a visionary model for future commercial human spaceflight endeavors, setting the stage for a new era of space tourism and microgravity activities.