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OMICRON SPACE HABITAT

Abstract

The design presented in this paper is in response to the revolution in private space activities, the increasing public interest in commercial flights to space, and the utilization of structures such as space hotels or private orbital habitats.

The baseline for the Omicron design concept is the Russian Salyut derived space station module. Salyut was the first space station to orbit the Earth. Its unique design and technical features were what made the development of space stations Salyut 1-7, MIR and the International Space Station (ISS) Zvezda service module possible. Due to its versatility and the reliably operating launch vehicle Proton, this space module series has the potential to be adapted for space hotel development. This paper proposes a conceptual design of the space habitat called Omicron, with particular focus on interior design for the microgravity environment. It is intended to address the needs of space tourism with a strong emphasis on the safety and comfort of the spaceflight participants.

Omicron habitat supports 3 inhabitants in nominal conditions (e.g., 2 passengers and 1 astronaut). The habitat provides a flexible interior, facilities and spaces dynamically transforming in order to accommodate 4 types of activities: - Private/intimate activities such as acclimatization, relaxing, sleeping, video communications, countermeasure activities and hygiene - Common activities such as spaces for observations, entertainment, science and dining - Virtual environment activities - EVA experience

The interior activities will be accommodated in an organically formed interior supporting spatial orientation and movement in microgravity. The architecture utilizes the benefits of continuous digital fabric displays on most surfaces.

The future development potential of Omicron is also considered. The simplest version is composed solely of a one rigid module with an inverted cupola for observations. An alternative version offers more space using an inflatable structure. Finally, a combination of multiple Omicron modules enables the creation of a larger orbital habitat. The operation of the Omicron habitat will support a few days visit by specially trained passengers. The transport to the habitat would be provided by the Soyuz TM-like spacecraft and Soyuz launch vehicle.