

SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)Novel Concepts and Technologies to Enable Future Building Blocks in Space Exploration and
Development (3)

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AUTONOMOUS SPACE COLONY CONSTRUCTION

Abstract

The classic O' Neill space colony manufacturing concept relied heavily on human labour and the use of lunar materials. However, current and future advances in additive manufacturing and the potential transport of Near-Earth Asteroids to the vicinity of the Earth-Moon system, creates potential approaches to the construction of large space habitats.

This paper assesses the composition of the heaviest components of such a space colony and analyses the possible construction of these based on asteroid mining and additive manufacturing. Different methods of construction are analysed and compared. The amount of mass required to bring from the Earth is assessed and compared with the classic O'Neill approach and the amount of asteroid material is determined. In addition, a comparison between lunar regolith and asteroid composition is undertaken to assess the replaceability of lunar regolith for the parts manufacturing.