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LAGRANGE ASTEROID CITY (LAC) – ASTEROPOLIS: THE O'NEILL'S SPACE URBAN MODEL
REVISITED

Abstract

This paper proposes an orbiting infrastructure to be located at an Earth-Moon Lagrange point (L5 or L4). The envisaged infrastructure, designed to include both habitation and industrial settlements, will be carved inside a Near Earth Asteroid to be captured and moved to such destination in the cislunar space region. The solution will solve both the main threats to civilian life in outer space: rotation will provide artificial gravity 1G and protection against cosmic radiation and solar flares. Being the living volumes obtained inside the body of the asteroid, many meters of rock will be opposed to incoming radiation and micrometeorites. The paper will also describe the mining process to dig a cave of at least half of the asteroids volume. This cave will contain the rotating living and agricultural facilities for some thousand inhabitants. The various materials produced by mining can be used for construction. Oxygen, hydrogen and carbon can be extracted if the chosen asteroid is carbonaceous. Natural sunlight can be collected outside the asteroid by parabolic mirrors and beamed into the cave through a central tunnel. The goal is to provide in the long run a closed self-sustainable biosphere. The industrial plants and the harbor with docking facilities will be built as non-rotating modular structures outside the asteroid hull. The paper includes a conceptual study and some basic requirements, to facilitate further stages of the project, i.e. feasibility and cost estimations. We will mention also some possible precursor projects to study and test artificial gravity to investigate the influence of centrifugal forces and the Coriolis acceleration on the human body.