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A CONCEPT FOR SPACE COLONIZATION PROCESS BASED ON ASTEROID MINERY

Abstract

Being conservative, the habitability zone of a sun-like star varies from 120 to 24 percent of sunlight received by earth. This habitability zone can be extended for the colonization of the solar system if the human capacity of providing an adequate environment for life is considered, even when solar radiation rates are smaller than those of the natural habitability zone. Here we develop a concept of propagation of the human species within this habitable zone. We are assuming that in not distant future asteroid mining technology will be available. This approach is inspired by natural life spread on earth, that starts with a colony, rather minimal, that contains itself all the capacities to grow exponentially without the need for other resources than those provided by the environment. The concept presented here is divided into three phases: the first one is the implementation of a mining system that allows the production of basic materials for the construction of a space habitat. The conceptual design of a unmanned mission formed by a swarm of mining nano and microsatellites and a workshop ship destined to transform raw materials into construction pieces is presented. The second phase consists of the assembly of a habitable work station, of which we also present a conceptual design. This station will receive manned missions, that will have the task of completing the habitat construction. This habitat will have the capacity of sustaining human life temporarily, and with some dependence of earthly resources. The third phase consists of the construction of a self-sustaining space base, in which both robots and humans would work. It will have the necessary resources to maintain human life for indefinite periods of time, transport and communication with other similar bases, and capacity to manufacture ships and other devices. Artistic representations of the conceptual designs are also presented, along with some preliminary scientific studies that support the model.