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INTERSTELLAR SPACECRAFT CONFIGURATION FOR A GENERAL TERRAFORMING MISSION SCENARIO

Abstract

Our aim is to develop a construction of a spacecraft for permanent interstellar life expansion that would consist of a set of standardized blocks and would be relatively easy to extend and adapt to different terraforming missions.

A terraforming mission includes an interstellar flight and the process of artificial adaptation of a planetary system for the purpose of inhabitation. The variety of conditions of such missions can be very large and the proposed model is worked out without taking into consideration any particular planetary systems. For each real mission the calculations have to be done separately. The purpose of this study is to work out the most general model of a spacecraft capable of conducting such missions.

The proposed configuration of a spacecraft meets the following requirements: capability to carry a closed ecosystem with 10.000+ crew to provide sufficient genetic pool for further sustainable inhabitation of a planetary system and to transport the equipment necessary to configure the planetary system, as well as the required diversity of bacterial stamms, plant seeds, mushrooms, fish and other species to create full-scale self-sufficient biospheres on newly terraformed planets. The configuration process of a planetary system can be based on the currently existing technologies. The aim is to distribute all the material of significant size orbiting the star in order to form several planets inside the habitable zone during the star life cycle and reach the masses, densities, orbits, rotations, magnetic fields, surface chemical compounds, atmospheres and hydrospheres, etc. as close to optimal as possible.

The described spacecraft configuration includes measures to protect the onboard ecosystem from interstellar environment during the flight. March engine propellant candidates are estimated. The described spacecraft configuration is technologically feasible with the current scientific level. The infrastructure and productive capacities required to build such spacecraft are estimated. The standardized multi-functional modules can be produced on flow to assemble the spacecraft.

The amount of available uranium in already configured and inhabited planetary system is considered as the major constraint for further missions. More that 90% of uranium is necessary for reaching and configuring new planetary systems. The spacecraft can be repaired and recharged, thus decreasing the cost and time for preparing missions to inhabit new planetary systems.

Social changes are required for mobilization and organization of the flow production of such spaceships. International collaboration is the crucial factor for such mobilization.