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TERRAFORMING MARS INTO A FUTURE HUMAN HABITAT- A FOUR - PHASE PROCESS

Abstract

The paper presents a detailed, feasible and potent plan to planetary engineer Mars in order to make it habitable for future human civilization. Mars has inspired human imagination for centuries and stands as the most probable candidate for human settlement taking into account, factors such as the state of our current propulsion systems, distance from earth and detected frozen water on its surface. With the advent of time we face threats, each potent enough to extinct the human race, this includes running out of natural resources, global warming or a devastating impact from an asteroid on earth's surface. The following events can wipe out humanity and hence they serve as strong and valid reasons for us to evolve ourselves into a multi-planetary species with Mars as our next settlement. The proposed method to planetary engineer Mars out of an inhospitable planet with a thin atmosphere to a habitable planet with a dense atmosphere and liquid water on surface is a comprehensive and detailed four phase process which would terraform the surface of Mars to a potential "Second Earth". The first phase involves constructing and deploying a large solar reflector in space to direct the solar radiation down to heat the surface of Mars, this process will be specifically targeted at poles of Mars where colossal amounts of frozen polar caps are present. This will release large amount of frozen water and carbon dioxide. Now once the atmosphere of Mars becomes warmer, we undertake the second phase where we seed the surface of Mars to convert carbon dioxide to oxygen. The upper Martian regolith is rich in perchlorate, hence perchlorate-eating bacteria, which produce oxygen as a metabolic by-product will be used to protect the human settlers from serious health hazards while also bolstering their oxygen supply. Third phase involves forming a protective ozone-layer. As once oxygen evolves in the atmosphere, solar ultra-violet radiation will form an ozone layer, shielding the surface from the biologically lethal ultraviolet radiation. The fourth and final phase is to stabilize the liquid water. With a thicker and warmer atmosphere, the liquid water which is formed from melting the frozen ice caps will remain stable on the surface of Mars. This ultimately realizes our aim to terraform mars and develop it into a potential human habitat. The four-phase program proposed has a potential to extend survival of human civilization exponentially as we develop into multi-planetary species.