

22nd SYMPOSIUM ON SPACE ACTIVITY AND SOCIETY (E5)
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TERRAFORMING, A REALITY OR SCIENCE FICTION?

Abstract

Ever since Yuri Gagarin became the first man to travel to space, humans have been dreaming of the day they will be able to colonize distant worlds. This dream edged closer to reality in 2010 which was a record year in the discovery of exoplanets (about 100 new ones, more than ever before). Meanwhile, 2010 has also been the year of the European Space Agency's 500 day mock trip to mars, and Russia's Khrunichev research center is currently planning to develop a new super-heavy carrier rocket that will be used to launch piloted spacecraft to Mars. To create sustainable colonies elsewhere in the universe, however, human beings must first make those far away planets habitable. This will be accomplished by terraforming, the process of transforming a hostile environment into an ecosystem compatible with life. The objective of this paper is to study both the fictional and practical applications of terraforming, and determine whether terraforming is likely to become a reality in the foreseeable future or remain indefinitely a subject only of science fiction. As an introduction the paper will survey the effect of space exploration on popular culture, the public's imagination as expressed through science fiction and the extent to which plausible methods of terraforming have already been envisioned in literature and film. This paper will then move to the real science behind the issue of terraforming and will cover a wide array of subjects, ranging from microbiology to astrophysics. It will specifically examine the importance of seeding microbial life or creating genetically modified plants, in order to accelerate the process of creating oxygen, as well as the critical need for liquid water. The paper will talk about temperature, the importance of gravity in stabilizing an atmosphere, and the process of maintaining a range of atmospheric pressure that is favorable to life. It will also address the issue of radiation shielding in future space explorations. The paper will conclude by looking at measures that are being taken to address issues concerning our own planet, such as global warming, and pollution, in short efforts at domestic terraforming to avoid environmental catastrophe. Solutions found here may enable us to find solutions to other planets as well. Humans inevitably have an effect on their planet's environment and ecosystems. What analysis of terraforming techniques may show is how this can be done advantageously to create a positive impact rather than a detrimental one.