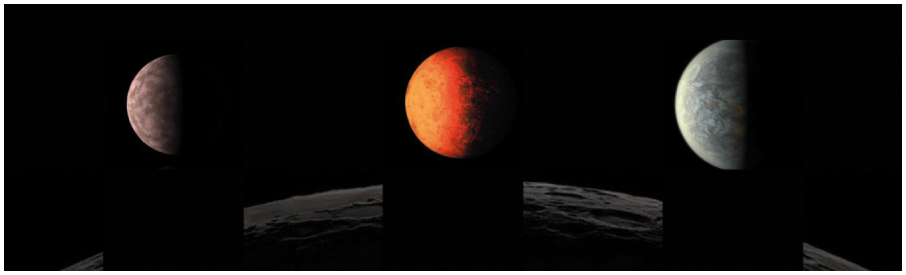

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Terraforming Mars –a feasibility study

Friday 24 October 2025 18:00 (1 hour)

In this paper, we develop the terraforming ideas proposed in "Energy Problems of Terraforming Mars" (www.hou.usra.edu/meetings/lpsc20
We consider terraforming enabling humans to live on the surface of Mars without space suits.
There could be a number of reasons why Earth may become uninhabitable and terraforming Mars would be necessary, for example: (1) the eruptions of a series of supervolcanoes and increased volcanic activity; (2) accelerated global warming leading to extreme temperatures; (3) unrestricted nuclear war; etc. The source of matter for new Martian atmosphere will be minor bodies from the outer parts of the Solar System. The Kuiper Belt is the best source. Calculations indicate that app. 1,000 bodies with a diameter of 20 km will be sufficient to create a sufficiently dense atmosphere. The technologies necessary to implement the proposed terraforming are currently being developed and should be available for use in about 40 years. We also demonstrate that the total energy required to carry out terraforming is comparable to the energy currently produced by humanity. The shortest time required could be 70 years, although a more realistic is over 200 years. It seems be very long but in fact various projects lasted similar time, e.g. the Achtermeer polder was started in the 16th century, and the construction of the Sagrada Familia in Barcelona in 1882. An important factor facilitating terraforming is gravitational assist, which allows for a significant change in velocity with little energy expenditure. This maneuver is widely used today in spaceflight. It is quite difficult and requires precise maneuvering. Our research group is conducting calculations of this process. Some of these results will be presented at this conference. They confirm the feasibility of the proposed version of terraforming. The proposed methods can also be applied to other projects.

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