

Low-Cost Space-Based Geoengineering: An Assessment Based on Self-Replicating Manufacturing of in-Situ Resources on the Moon

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Abstract : Geoengineering approaches to climate change mitigation are unpopular and regarded with suspicion. Of these, space-based approaches are regarded as unworkable and enormously costly. Here, a space-based approach is presented that is modest in cost, fully controllable and reversible, and acts as a natural spur to the development of solar power satellites over the longer term as a clean source of energy. The low-cost approach exploits self-replication technology which it is proposed may be enabled by 3D printing technology. Self-replication of 3D printing platforms will enable mass production of simple spacecraft units. Key elements being developed are 3D-printable electric motors and 3D-printable vacuum tube-based electronics. The power of such technologies will open up enormous possibilities at low cost including space-based geoengineering.

Keywords : 3D printing, in-situ resource utilization, self-replication technology, space-based geoengineering

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