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## Abstract

As we look at the Moon and dream of spaceflight, again, we forget how extremely difficult it was to accomplish. In the 70's, Peter Glaser saw the future with power projected to the surface of the planet ensuring a cleaner environment. As we turned into the third decade of this century, Dr. Mankins' SPS-ALPHA MK-III and Ian Cash's CASSIOPEiA systems are remarkable solutions to continuous growing global warming. The major problem is that their mass to orbit is enormous. To supply the needed power to slow or stop global warming would require in excess of 3,000,000 tonnes to GEO altitude. This paper will show a complementary approach combining advanced rockets and space elevators to enable Space Solar Power missions in the next three decades. Space Elevators, as the green road to space, will relieve the initial rocket delivery systems once the programs have been demonstrated by taking on the "heavy lifting" to GEO. The rocket equation still dominates and must be avoided to accomplish such monumental missions that will improve the human condition. Dr. Swan will discuss the strengths and weaknesses of the components of this combined architecture, including future reusable rockets and Space Elevators. Expanding space access architectures will enable a robust movement off-planet.

## A short bio

Dr. Peter A. Swan is President of the International Space Elevator Consortium. As such, he leads a team who furthered the concept with incremental studies and yearly conferences. Over the last 18 years he has published many books on the topic as author, co-author, and/or co-editor. He is a full Academician of the International Academy of Astronautics and contributes often to their Cosmic Studies. He is also the Senior Vice President of Galactic Harbour Associates He teaches for Osher Lifelong Living Institute (ASU) in the area of Moving Off-Planet and Living in Space. He graduated from the US Military Academy in 1968 with a Bachelor of Science degree and served 20 years in the Air Force with a variety of research and development positions in the space arena. Upon retirement in 1988, he joined Motorola on the Iridium satellite program. He lead the team responsible for the development of the Iridium spacecraft bus. In 1998, he helped develop Teaching Science and Technology, Inc. a company that teaches space systems engineering. He is a Fellow of both the American Institute of Aeronautics and Astronautics and the British Interplanetary Society. Pete received his Ph.D. from the University of California at Los Angeles in Mechanical Engineering with a specialty in space systems. A few of his books (ISEC reports are on [www.isec.org](http://www.isec.org) free pdf) are: Space Elevators are the Green Road to Space (Apr 2021), Space Elevators are the Transportation Story of the 21st Century [2020], Today's Space Elevator Assured Survivability Approach for Space Debris [2020], Road to the Space Elevator Era [2019], Today's Space Elevator, ISEC Study Report [status as of Fall 2019]