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Author: Mr. Arthur R. Woods  
Ars Astronautica, Switzerland, arthur.woods@arsastronautica.com

Dr. Marco C Bernasconi  
MCB Consultants, Switzerland, mcb@ieee.org

THE SPACE OPTION STAR: AN IN-SITU DEMONSTRATION OF SPACE-TO-SPACE WIRELESS  
TRANSMISSION OF POWER

**Abstract**

The Space Option Star (SOS) is a proposed in-situ demonstration of space-to-space wireless transmission of power. As it is currently defined, the SOS will be an expandable structure in the shape of an icosahedron with a diameter of 100 meters. The mission of the SOS is to collect solar energy in space and use a microwave transmitter to convert the sunlight into electricity and then transmit electrical power to an auxiliary spacecraft which will then use the received power to interactively communicate with stations located on Earth. As such, it will be an early in-situ demonstration of the basic technological concepts of Space Solar Power.

The SOS will utilize an expandable laminated membrane technology incorporating a thin-film photovoltaic outer surface. The underlying technology is based on CRES (Chemically Rigidized Expandable Structures) developed for large space structures that has been under development in Europe and in the United States for over thirty years, although not yet used for a space structure of this dimension. The authors have a long experience with proposing such space structures for technological and cultural purposes which have been based on CRES technology and have carried out a study sponsored by the European Space Agency in 2003 that provided a basis for the current technological (icosahedron) definition.

In addition to the technological aspects, once in orbit, the reflective, faceted shape of the Space Option Star will reflect sunlight as it rotates causing it to appear as a blinking star in the night sky for a period of approximately one month or longer which will make the SOS visible to much of the world's population. Integrated components on the auxiliary spacecraft will transmit video and other interactive communications from orbit to public locations around the world such as art and science museums and schools.

The name – Space Option Star – is derived from the Space Option concept introduced and subsequently developed by the authors which has promoted the utilization of extraterrestrial resources for meeting the needs of humanity on Earth, most specifically that of energy. S.O.S. is commonly used as the international Morse code distress signal. Thus, in addition to SOS being an acronym for the Space Option Star project, we are using this project to send a message about humanity's future energy choices.

The paper will introduce the history, development and current status of the Space Option Star concept.