

SPACE POWER SYMPOSIUM (C3)

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THE FUTURE OF SPACE POWER: COMPARE OF POWER SYSTEM BETWEEN EARTH AND SPACE

Abstract

Electrical power, as an area of study, is relatively young as compared to language, chemistry, physics, mathematics, philosophy, metallurgy, textiles, transportation, or farming. Practically all of the technology that has enabled the huge, continent-spanning power grids that have become ubiquitous in developed countries was developed in the last 150 years. In fact, Tesla's advocacy of alternating current (ac) for transmission just won out in the beginning of 20th century. Despite the novelty of the field as a whole, space power applications are, of course, much newer. This paper will look at the abstract of space power and compare it to its older sibling on Earth, forming a basis for determining appropriate transitions of technology from the terrestrial realm to Space application. A century's time and practice have developed a whole suite of techniques for dealing with generating and distributing power here on Earth. Some of these "old" ways of doing business work as well in space as on Earth, some do not work at all, and some may work, but not as well as alternatives. This paper highlights some of the differences in structure, management, environment and practice. The brief history of space power presented in this paper shows the increasing complexity of space power systems and gives some insight into approaches for operating such systems. The comparison of space power systems with terrestrial utilities shows some of the differences between the systems. As space systems continue to grow in size and complexity, the methods of operation used will become more like those used on Earth. Some terrestrial techniques will be applicable and appropriate, others will not. The attempt of this report was to present some of the issues involved to serve as a basis for determining appropriate transitions of technology from the terrestrial realm to Space application.