SPACE POWER SYMPOSIUM (C3)
Joint Session with IAA Commission 3 (Space Technology & System Development) on "Solar Energy From Space" (1)

Author: Dr. Alex Ignatiev
University of Houston, United States, ignatiev@uh.edu

Dr. Alexandre Freundlich
University of Houston, United States, alexf@uh.edu

THE MOON AND FUTURE ENERGY FROM SPACE

Abstract

Future electrical energy needs for the Earth have been proposed to be addressed by the deployment of massive solar arrays in space with power beaming back to Earth. The use of the indigenous resources of the Moon can mitigate the complexity of the development of such space power systems through three proposed scenarios for the space-based fabrication of solar cells. The first scenario is one in which thin film solar cells are fabricated directly on the surface of the Moon by the deployment of a moderately-sized robotic lunar Cell Paver, and power beaming back from the Moon to the Earth with appropriate power beaming instrumentation. The second scenario incorporates the fabrication of solar cells on the Moon using lunar resources, followed by transport of the lunar fabricated solar cells to GEO for installation in a GEO solar power satellite. The third scenario advances the extraction of the raw materials needed for solar cells from the Moon and transport of these materials to GEO where a solar cell fabrication tool will utilize the materials for making solar cells to populate the GEO solar arrays. The benefits of each scenario will be discussed as pertaining to technology-effective solar power beaming from space.