

16th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)Systems and Infrastructures to Implement Future Building Blocks in Space Exploration and Development
(2)

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POWERING SPACE: THE POTENTIAL ROLE OF SOLAR POWER IN EXPLORATION,
DEVELOPMENT AND SETTLEMENT**Abstract**

Space solar power (SSP) is often discussed only in the context of its prospective use for markets on Earth; however, there is no single more important source of energy for use elsewhere in our Solar System than the Sun itself. The environments that exist on the surface of Earth's Moon, at the orbit of Mars and on its surface, in the main belt asteroids, and the among the moons of Gas Giants differ dramatically from one another. As a result, nuclear power systems of one sort or another have typically been discussed for mission applications on the Moon or Mars, or in space beyond the asteroids. However, one characteristic that all have in common: freely available sunlight – admittedly at decreasing intensity with increasing distance. At an entirely greater order of difficulty, the challenge of transportation beyond our solar system is now being discussed seriously by several strategic programs.

This paper will review ambitious energy requirements for a variety of candidate missions and markets across the solar system – including power for Earth, but focusing on the Moon, the Mars system, the asteroids and targets beyond. It will examine the potential for SSP systems to meet those energy requirements and compare this potential with other options, including a variety of nuclear approaches. The paper will conclude with a roadmap forward, setting into an integrated framework the potential for SSP to truly “Power Space” during the coming century.