

IAF SPACE POWER SYMPOSIUM (C3)
Solar Power Satellite (1)

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HARVEST OF SPACE SOLAR POWER

Abstract

Solar energy being the most renewable and consistent energy source is the main idea for the energy conservation. There is substantial amount of solar energy present in the outer space in the form light and heat from various celestial bodies and Sun being the major source. Space solar power technology is a response to the global energy crisis. The Solar power satellite is an entity which collects the Sun's energy and converts into electric energy, transmitting it to earth. There are huge benefits of assembling Sun's emissions in the outer space. This satellite orbits around the earth in a geosynchronous orbit, where it receives solar power ten times more incident to the panels than when on the ground. Since there is no influence of atmospheric conditions in space, more amount of heat can be directly absorbed. The third crucial factor of this location is the ability to dissipate waste heat. There are multiple possibilities for the conversion of the solar power. Photovoltaic conversion is the most used for the study of space based solar power. Gallium arsenide typical solar cells and cells made of other newly developed materials with varying thickness and sizes are used in this conversion. The laser beam and microwave power transmission systems are currently the leading techniques for wireless transmission of power from satellite in orbit to the earth covering a long distance. The Microwave power transmission system consists of radio frequency energy up to 2.45 GHz bandwidth. These electromagnetic microwave beams are transmitted using a transmitting antenna array to the giant antennas (rectennas) on the ground and distributed to National electricity houses. In order to prevent the limitations of the above-mentioned methods, there arises a third type which is the hybrid of the two which would also radiate more solar power. In the near future, as the fossil fuels are meeting their end, solar power would be a great replacement to it. Space solar power has more environmental advantages and is self-sustenance than ground based solar power. Space solar power will provide long term solutions and would successfully eradicate the energy problems.