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Abstract

Economy of scale is inherent in the microwave power transmission aperture/spot-size trade-off, resulting in a requirement for large space systems in the existing design concepts. Unfortunately, this large size means that the initial investment required before the first return, and the price of amortization of this initial investment, is a daunting (and perhaps insurmountable) barrier to economic viability. As the growth of ground-based solar power applications will fund the development of the PV technology required for space solar power and will also create the demand for space solar power by manufacturing a ready-made market, space power systems must be designed with an understanding that ground-based solar technologies will be implemented as a precursor to space-based solar. for low initial cost, (3) operation in synergy with ground solar systems, and (4) power production profile tailored to peak rates. A key to simplicity of design is to maximize the integration of the system components. Microwave, millimeter-wave, and laser systems are analyzed. A new solar power satellite design concept with no sun-tracking and no moving parts is proposed to reduce the required cost to initial operational capability.

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