

SPACE POWER SYMPOSIUM (C3)
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THERMAL MANAGEMENT OF SPS MICROWAVE SANDWICH USING DIRECTIONAL
EMISSIVE/REFLECTIVE COATINGS

Abstract

Some recent and promising concepts of Solar Power Satellites rely on the use of large concentrators tracking the sun and focusing sunlight onto a nadir pointing sandwich antenna. The sandwich is composed of the solar cells converting the sunlight to electricity then to microwave by the converter located just below the cells. The sandwich concept offers the advantage of not requiring extensive PMAD. However, due to the relatively low efficiency of the solar cells and microwave converter components, almost 75% of the power is lost. The idea proposed in this paper is to use a secondary set of reflector that could also be used as radiator, pending a directional emissivity coating is applied on the surface. Without this directionality behaviour, the view factor between the concentrator/radiator sides cancel the effect. Using a directional emissivity or reflectivity coating could help reduce this effect and therefore reduce the equilibrium temperature of the sandwich.