

## IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)

Space Structures II - Development and Verification (Deployable and Dimensionally Stable Structures) (2)

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## SHADOW THERMAL CYCLING AND ITS EFFECT ON SOLAR ARRAY PREDICTED EOL TIME

**Abstract**

At present, due to the complexity of the design of spacecraft and the growing use of high-power large-sized antennas, it has become necessary to consider the effect of shading on the SA and research the effects accompanying this phenomenon. We are talking about the reliability of the calculations of the SA parameters at the EOL. In this paper, an attempt has been made to summarize the emerging effects that are new to the normal operation of SA, which allows us to specify the requirements for SA design and SA parameters at the EOL. The effect of partial long-term shadowing with mixed-typed shadows was studied by using computer modeling tools. The effect of the occurrence of multiple heatwaves with fronts of varying intensity was discovered. Also, during long-term shading, a critically high-temperature gradient between the shaded and lighted SA parts takes place. Hence, it seems necessary to study this phenomenon in more detail from the point-of-view of the behavior of materials used in the SA manufacture. We present the results of the computer-aided modeling of this phenomenon based on the model spacecraft 3D model.