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MEMS-BASED SOLAR PANEL DEPLOYMENT FOR A SPACECRAFT

Abstract

This paper investigates the potential of Micro-Electro-Mechanical Systems (MEMS) technology to improve the performance of solar panels for spacecraft. The paper examines how the integration of mechanical elements, sensors, actuators, and electronics on a small scale can lead to the creation of tiny solar cells that are integrated into a larger panel, providing increased efficiency and weight reduction. Additionally, the paper demonstrates how MEMS technology enables the creation of solar cells that can track the sun, increasing the overall energy captured by the panel. The paper includes an examination of the manufacturing process and a basic MATLAB code that demonstrates how to control the movement of the panel using options to deploy, expand, turn and compress with a control feedback mechanism. The paper also includes an explanation of how to plot the results of a MEMS-based solar panel and how to handle the warning message of function shadowing. The paper concludes with a summary of the potential benefits of using MEMS technology for solar panels for spacecraft, providing cost savings and increased energy output with comparison to current solar panels.