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ASSESSING THE EFFECTIVENESS OF DIFFERENT DEPLOYABLE SOLAR PANEL SETUPS ON SHARJAH-SAT-2, AN EARTH OBSERVATIONAL 6U CUBESAT, USING THE CUBESAT TOOLBOX

Abstract

Sharjah-Sat-2 is a 6U CubeSat currently being developed by the Sharjah Academy for Astronomy, Space Sciences, and Technology (SAASST) and the University of Sharjah (UoS). The CubeSat is in the design phase and is equipped with a High-Resolution Hyperspectral Imager capable of capturing high-resolution spectral information about the United Arab Emirates. The primary objective of this mission is to provide a constant stream of reliable data that can be used to improve the country's remote sensing applications, including environmental monitoring, resource mapping, and agriculture. One key consideration for CubeSat development is the selection of solar panels to provide the necessary power to operate the onboard payload and subsystems. Deployable solar panels offer a larger sunlight exposure surface area, which increases power generation compared to standard solar panels mounted on the exterior of the CubeSat. The CubeSat Toolbox in MATLAB was utilized to analyze the performance of different deployable solar panel configurations on a 6U CubeSat. The CubeSat Toolbox is a suite of tools and functions that enables the simulation and analysis of small satellite systems, including solar panels, propulsion

systems, and communication systems. Using the CubeSat Toolbox, the study simulated the performance of a range of deployable solar panel configurations to determine the effect of surface area, angle of deployment, and orientation of the solar panels on power generation. The results showed that these factors significantly impacted power generation, demonstrating the importance of selecting the appropriate solar panel configuration to optimize satellite performance. This study highlights the utility of the CubeSat Toolbox in analyzing the performance of deployable solar panel configurations on 6U CubeSats. The findings can inform the design of future CubeSats and improve the reliability of remote sensing applications. The Sharjah-Sat-2 mission is expected to contribute significantly to the remote sensing capabilities of the United Arab Emirates and could potentially pave the way for future CubeSat missions.