

Data Visualization Software for the MinXSS CubeSat

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Abstract:

This project focused on data visualization for the MinXSS Cube-Sat. Being able to monitor housekeeping data, such as temperature of instruments and power levels, is key part of satellite operations during flight and also during pre-flight tests. To fully understand the changes in housekeeping data it is relevant to compare these data to orbital location, specifically if the satellite is in the sunlight or shadow. Therefore, the purpose of this project was to create ground software to analyze and compare housekeeping data with orbital location relative to the Earth and Sun. The program was created in IDL to create a user-interactive widget. It is capable of loading data files to plot the user's desired housekeeping data and calculating the orbit from TLE data for each orbit contained within the data file. Features, like a scroll bar, allow the user to directly compare the orbital position to subsystem temperatures, power supply voltage, battery state of charge, and solar X-ray spectrum at specific user selected times. With the MinXSS Data Visualization program it is now possible to perform and analyze mission simulation tests before flight. In the future, the program will potentially be improved to perform real time analysis of flight data.