IAF SYMPOSIUM ON ONGOING AND NEAR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Interactive Presentations - IAF SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SPACE PHYSICS (IP)

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LUNASAT - A COMPACT PCB BOARD FOR COMPREHENSIVE LUNAR EXPLORATION BY THE SHARJAH ACADEMY FOR ASTRONOMY, SPACE SCIENCES, AND TECHNOLOGY

Abstract

The Sharjah Academy for Astronomy, Space Sciences, and Technology (SAASST) has developed a state-of-the-art printed circuit board (PCB), "LunaSat," for future lunar exploration launches of the United Arab Emirates. This paper describes its design, development, and implementation. The LunaSat is equipped with a suite of advanced scientific instruments and sensors designed to provide a wealth of information about the lunar surface.

LunaSat was designed with the primary objective of contributing to a greater understanding of the composition and environmental conditions of the Moon. To achieve this, the PCB board integrates a variety of sensors, including a "Dosimeter" for measuring high-energy radiation levels, a "Thermometer" for monitoring lunar surface temperatures, a "Magnetometer" to detect and quantify magnetic fields, a "Luxmeter" for studying solar energy trends, an "Optical Sensor" for capturing high-resolution images of the lunar surface, a "Seismic Sensor" to detect lunar quakes and tremors, a "Dust Sensor" for measuring lunar dust concentrations, and a "Gravity Sensor" to analyze the local gravitational field.

To ensure optimal performance in the challenging lunar environment and terrain, the LunaSat board is meticulously designed to be compact, lightweight, and equipped with space heritage components. The

Dosimeter will provide insight into radiation variations over time, while the Thermometer will provide insight into the temperature of the Moon's outer surface, allowing an in-depth examination of the lunar environment. The Magnetometer and Luxmeter contribute valuable data on the Moon's magnetic field and solar energy trends, respectively, while the Optical Sensor captures detailed images for visual analysis. The Seismic Sensor, Dust Sensor, and Gravity Sensor provide a comprehensive view of lunar geological activity.

This paper aims to describe the LunaSat PCB board as an innovative instrument for lunar exploration, providing a platform for diverse scientific studies. We will gain a greater understanding of the Moon based on the data from LunaSat and contribute to planetary science research, paving the way for future space exploration missions.