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EXPLORING MARS WITH CUBESAT CONSTELLATIONS: FEASIBILITY AND SCIENTIFIC
POTENTIAL OF HYPERSPECTRAL IMAGING.

Abstract

This research paper explores the feasibility of using a constellation of CubeSats to conduct hyperspectral imaging of Mars. The proposed mission aims to provide a high-resolution imaging capability for studying the geological and environmental features of the Martian surface. The study focuses on the design and development of a CubeSat constellation for Martian imaging, which includes the selection of appropriate instruments, orbit design, and communication infrastructure. The CubeSats will be equipped with hyperspectral imagers, capable of capturing data across a wide range of wavelengths, providing detailed information on the mineral composition of the Martian surface. A key aspect of the mission is the use of a constellation of CubeSats to provide a high temporal resolution imaging capability. By using multiple spacecraft, the mission can capture images of the Martian surface from different angles and at different times of the day, allowing for more comprehensive and accurate mapping of the planet. The research paper outlines the technical challenges of the mission, including power management, data storage and transmission, and thermal control. Additionally, the paper discusses the potential scientific discoveries that could be made through the use of a CubeSat constellation for Martian imaging, including improved understanding of the planet's geological history, identification of potential areas for human exploration, and insights into the planet's climate and atmosphere. Overall, the research paper concludes that a CubeSat constellation for Martian hyperspectral imaging is a viable and promising approach for conducting scientific investigations of the red planet. The mission has the potential to significantly enhance our understanding of Mars and pave the way for future missions to the planet.