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SMALL ROBOTIC MARS WEATHER MAPPING USING SLNMS FOR PRECISE NAVIGATION AND AWIPS FOR WEATHER DATA ANALYSIS

Abstract

SLNMS (Surface-Level Navigation and Monitoring System) technology is utilized for the operational navigation of small robots equipped with thermal, humidity, and dust sensors, offering a cost-effective alternative to high-quality thermoelectric motors. These compact robots, roughly the size of a hand, are specifically designed to endure Mars' extreme conditions. Deployed from mobile stations on a landing platform, they are strategically distributed across targeted areas of the Martian surface to collect weather data while following precise navigation paths. Their primary mission is to explore potential landing sites for future Mars missions, providing direct, high-accuracy surface data that satellites cannot effectively capture. Powered by solar cells and built to withstand Mars' harsh temperatures, these robots relay data to the Advanced Weather Information Processing System (AWIPS), which analyzes it to generate thermal maps and deliver continuous, real-time weather updates throughout the year, significantly enhancing mission planning by predicting weather conditions in key exploration zones