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DEVELOPMENT AND CONTROL OF A SOLAR TRACKER SYSTEM FOR SPACE EXPLORATION VEHICLES

Abstract

Space exploration critically depends on efficient and reliable energy systems, with solar energy being a primary source for space exploration vehicles. This paper addresses the development of an advanced solar tracking system to provide constant energy to future missions through solar panels.

The core of this project is to offer an efficient and reliable solution for the energy supply to space exploration vehicles, avoiding the need for more complex and costly systems. The system will be controlled by a PID (Proportional-Integral-Derivative) control integrated into a microcontroller, supported by photoresistors responsible for the feedback of the PID control, transmitting signals to the microcontroller and positioning the solar panels at the point where the reception of solar energy is strongest. Initially presented in a general context at the International Astronautical Congress held in Baku last year, this year's project focuses on the control algorithm of the system and its mechanical design.

The development of an optimized control algorithm and the implementation of an advanced mechanical design represent a qualitative leap in the exploration vehicles' capability to maximize solar energy capture. This innovation promises to substantially extend the lifespan of space exploration vehicles and offers a significant impact on reducing costs for space agencies and the private aerospace industry, marking a crucial advancement for future space missions.