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ELECTRICAL POWER SYSTEM DATA MANAGEMENT ALGORITHM FOR TSC-1 SATELLITE

Abstract

Electrical Power Systems (EPS) are necessary for ensuring optimal performance of onboard equipment by providing necessary power for the satellite. However, the complex coordination of energy generation, storage, distribution, and data communication presents significant challenges. This paper proposes a systematic approach to address these challenges through algorithmic management implemented in TSC-1 Satellite. An Energy Management Algorithm optimizes power distribution among satellite systems based on priority and energy requirements, ensuring continuous operation even under energy constraints. Fault Detections quickly identify and resolve anomalies within the EPS, minimizing downtime and enabling rapid error resolution by the On-Board Computer (OBC). Additionally, a Data Management Algorithm efficiently handles high data traffic within the EPS, reducing the risk of data corruption or loss while enabling seamless communication with the OBC. Furthermore, a Scheduling Algorithm optimizes EPS operation sequencing, considering factors like power availability and mission objectives to enhance overall efficiency. Furthermore, an Adaptive Control Algorithm dynamically adjusts EPS parameters in response to changing conditions, ensuring adaptability and resilience. Integrating these algorithmic management techniques increase stability and efficiency of satellite EPS, facilitating uninterrupted mission performance while enabling swift error recognition and mitigation.

Keyword: Thai Space Consortium,Electrical Power System,Data Management Algorithm