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# IMPLEMENTATION OF A CLOUD-BASED ERP SYSTEM FOR OPTIMIZED INVENTORY AND SUPPLY MANAGEMENT IN SPACE STATIONS AND LONG-DURATION MISSIONS

**Abstract**

Efficient inventory and supply management is a critical challenge in long-duration space missions, where the availability of essential resources such as food, oxygen, spare parts, and medical equipment must be precisely controlled to minimize waste and ensure operational continuity. This study proposes the implementation of a cloud-based Enterprise Resource Planning (ERP) system, adapted for managing inventories in space stations and extraplanetary habitats, integrating data from multiple technological sources to optimize decision-making in planning and resupply operations. In space environments, resource availability depends not only on stored quantities but also on the ability to predict consumption and optimize distribution. The integration of an ERP provides a structured approach to managing these supplies, facilitating tracking, monitoring, and replenishment of critical materials. Automated reporting and resupply order generation aim to reduce operational risks and enhance logistics efficiency in supply shipments from Earth or between station modules. This study also examines the technical challenges of deploying an ERP in high-latency and intermittent connectivity environments, proposing a hybrid model that combines local storage with periodic synchronization with terrestrial servers. Case studies from the International Space Station (ISS) and simulations of future lunar and Martian missions demonstrate the positive impact of optimized inventory management on the sustainability of space exploration.