

57th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE
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MANAGEMENT IN SPACE ACTIVITIES (IP)

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REVOLUTIONIZING SATELLITE HARDWARE RELIABILITY THROUGH INNOVATIVE DESIGN
PARADIGMS

Abstract

This abstract explores a transformative shift in the reliability paradigm of satellite hardware, driven by innovative design strategies. Traditionally, satellite systems have relied on redundancy and rigorous testing to ensure operational integrity. However, this approach often entails high costs and complex development processes.

Our proposed solution challenges this status quo by introducing a novel reliability framework that combines adaptive hardware design, machine learning-based fault prediction, and efficient error correction mechanisms. The key innovation lies in creating satellite hardware capable of self-monitoring, self-diagnosing, and autonomously adapting to mitigate potential failures.

This abstract discusses the theoretical foundations, design considerations, and anticipated benefits of this paradigm shift. By leveraging advanced technologies, such as artificial intelligence and adaptive hardware components, the proposed approach aims to enhance the reliability of satellite systems while simultaneously reducing development costs. The potential impact of this innovation extends to various space missions, promising a more resilient and cost-effective era for satellite hardware.