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OPTIMIZING ISS ELECTRICAL POWER GENERATION AND UTILIZATION

Abstract

With the International Space Station (ISS) life extension to 2024 and maybe beyond many of the components and systems aboard will far exceed their design life. Key components, such as the ISS Solar Arrays are degrading at an expected rate, but will be relied upon to power the ISS well beyond their original expected life span. In order to assure that all utilization and science goals are complete and users have adequate resources, steps must be taken to address some of the assumptions that have been in place and to optimize the way in which power is generated by the system and budgeted across the users. Power generation optimization can be accomplished by various methods, including adjustments to the operational modes of the Solar Arrays and also variations in vehicle attitude. Power allocation is defined based on both power availability and expected power usage requirements. If expected power use requirements exceed actual usage, it is possible that, with diminishing resources, an artificial deficit might be created, unnecessarily limiting utilization. The purpose of this paper is to describe the process by which power allocation will be optimized to ensure maximum utilization over the remaining life of the ISS. Steps that can or may be taken to maximize available power being generated will be detailed. Additionally, steps to minimize the power demand by the ISS infrastructure, in order to maximize the power available to payloads will be discussed. Finally, an overview will be given regarding the necessity and efforts to better understand and refine the expected power requirements during various phases of operation of for all payload and utilization customers.