



Development and Automation of An Orbital Replacement Unit (ORU) Selection Methodology

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Objective

The goal is to provide designers with an automated methodology for ORU selections that will integrate easily with the existing computer-aided design (CAD) systems, operate in a graphics-oriented environment, and provide results in a common platform format.

Why Needed

The advent of the International Space Station (ISS) and its capability to perform long-duration science investigations has emphasized the need to efficiently support and maintain on-orbit hardware. Selecting ORU candidates is a crucial process that determines the effectiveness of the resulting logistics support – e.g., selecting the wrong candidates or the incorrect replacement level could result in a system that cannot be practically maintained on-orbit. Although an ORU selection methodology has been developed for the ISS element-level hardware (ref. ISS Spec. D684-10041-1-1, Sec. 2.4) that addresses the reliability, accessibility, physical properties and safety criteria, science payloads also typically consider additional performance factors such as technical obsolescence (e.g., improved quality and accuracy of data). To date, the ORU selection process has been a manual exercise that follows a flowchart of evaluation criteria. Since this tends to be a tedious approach, ORU selection is normally performed by the logistics analysts instead of the hardware designers, and is often not reiterated to reflect changes in the system design. Recognizing that supportability

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