

RELIABILITY ANALYSIS OF AIRCRAFT POWER SUPPLY SYSTEMS

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AST 2009, March 2009

Abstract - This article presents the recent developments of the software tool SYRELAN (System Reliability Analysis), which provides an environment for system engineers to model and analyze complex systems of various technical backgrounds with respect to safety and reliability. The core of each SYRELAN system model is the hybrid model, imaging the failure-free system architecture with the use of Reliability Block Diagrams and the system behavior and interactions of the components with the use of Concurrent Finite State Machines. In light of the fact that for modern and complex fault-tolerant systems not just the nominal behavior but also the degraded system states with available performance levels are essential for system design, the existing environment has been extended by a Performance Degradation Analysis which considers active and standby system components. Additionally, a basic functional behavior of the modeled components, using sources, converters, loads and other behavioral models, can be considered. This analysis capability allows the user not just to analyze one top event in a single step. Rather it enables a simultaneous analysis of several points of operation including the system's degradation. The new method is demonstrated using the electrical power supply system of the AIRBUS A320.