Pitfalls and Precautions when using Predicted Failure Data for Quantitative Analysis of Safety Risk for Human Rated Launch Vehicles

Abstract

Launch vehicle reliability analysis is largely dependent upon using predicted failure rates from data sources such as MIL-HDBK-217F. Reliability prediction methodologies based on component data do not take into account system integration risks such as those attributable to manufacturing and assembly. These sources often dominate component level risk.

While consequence of failure is often understood, using predicted values in a risk model to estimate the probability of occurrence may underestimate the actual risk. Managers and decision makers use the probability of occurrence to influence the determination whether to accept the risk or require a design modification. The actual risk threshold for acceptance may not be fully understood due to the absence of system level test data or operational data. This paper will establish a method and approach to identify the pitfalls and precautions of accepting risk based solely upon predicted failure data. This approach will provide a set of guidelines that may be useful to arrive at a more realistic quantification of risk prior to acceptance by a program.

Topic: Probabilistic Risk Assessment

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