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A Quantitative Approach to System-Level Risk Assessment using Monte Carlo Simulation

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Abstract: The transition of new technology from idea to reality is a significant programmatic challenge for both commercial enterprises and government agencies. There is an ever present need to assess the technical performance and program costs during the development phase of new technologies and define the risk of program failure. The development of quantitative, system-level risk assessments are one means of applying Systems Engineering methodologies to the problem. This paper presents a System-level Performance Risk Index Distribution that uses historical program cost variance and performance data to assess transition risk for major U.S Department of Defense (DoD) Weapon System Acquisition programs. Previous studies of performance risk indices are advanced by incorporating Monte Carlo simulation to account for uncertainty in the cost variance and performance data used to calculate the risk index. This provides program managers a better informed means for assessing the system-level risk of transitioning an acquisition program to an operational status.

Keywords: Quantitative Risk Analysis, Program Management, Monte Carlo Simulation