# Improving Precision and Reliability in the Department of Defense Supply Chain

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## ABSTRACT

The Department of Defense (DOD) enterprise is large and complex, with an estimated 3 million employees, 5,000 locations, and a $600 billion budget. In support of that enterprise, the DOD supply chain deals with 5 million items, approximately $98 billion in inventory, and a worldwide distribution system. With such a large scale of operations, it is possible that a supply chain activity can introduce unwanted variability and uncertainty, leading to inventory losses, delays, or inaccuracies. This study uses modeling and simulation (M&S) to demonstrate how reductions in variability improve supply chain reliability and precision. In addition, opportunities are identified for improving the reliability of overall supply support.

### Background

Concerns exist that, while the DOD has largely transitioned into a leaner fighting force, its supply chain is still characterized by a brute-force approach. The goal of this, and other research efforts, is to advance the ability of the DOD's supply chain to meet the strategic and fiscal challenges of the coming decade. To meet this goal, the study team investigated opportunities to improve supply chain reliability and precision across the five supply chain processes of Plan, Source, Make/Maintain, Deliver, and Return, as well as Enable activities that support each process. The opportunities focus on helping the DOD overcome the significant cost of human capital, inventory, and redundant infrastructure in a less-than-lean system; and improve confidence in supply chain planning and lessen reliance on expensive performance buffers, such as safety stocks and the expediting of materiel.

### Modeling and Simulation

To evaluate the effect of variability, the study team employed three hierarchically integrated models: a system dynamics model for strategic decisions; 2) an analytical readiness-based sparing model for tactical decisions; and 3) a discrete event simulation model for logistical and operational performance decisions. This integrated modeling architecture enables the estimation of supply chain performance across multiple echelons, in a variety of time scales, and from several important modeling perspectives (strategic, tactical, and operational). It also provides a structured environment for quantifying the effects of variance reduction in a repeatable, rigorous manner. This enables more robust solutions: each model can be used to cross-check and calibrate the other models' performance.

### Results

Based on the results of the M&S, as well as additional analysis, the study provides a plan of action for reducing DOD supply chain variability. The objective of the plan is to reduce both the variability customers experience and the variability materiel manager's experience. The result is more effective materiel support and management and greater customer confidence. Completion of each action will ensure the maintainer and the warfighter have what they need when they need it, while reducing inefficiencies and eliminating excesses.