Enterprise-Level Modeling and Optimization of DOD Logistics Operations

A growing collaboration between Discrete Algorithms and Math (1415) and Systems Sustainment and Readiness (6642) is developing software technology to solve enterprise-level DOD logistics problems, including spare parts inventory and resource allocation for the Lockheed Martin Joint Strike Fighter (JSF). This strategic partnership leverages expertise in combinatorial optimization - led by Jean-Paul Watson (1415), discrete-event modeling and simulation - led by Bruce Thompson (6642), and technology management and systems sustainment - led by Craig Lawton (6642). The software simulates the multi-year operational lifetime of a weapons platform, such as the JSF, and can minimize the cost of logistics operations involving as many as 50 million decision variables (completed in hours on a PC platform). The potential customer cost savings due to this capability are very large. Manager Robert Cranwell (6642) is expanding this successful capability from the initial focus on the JSF to additional DOD systems such as the Army's Future Combat System. The cross-organizational collaboration has strong positive impacts on both 1415 and 6642. For 1415, the effort has exposed a number of novel, open challenges in optimization algorithm technology, allowing their R&D efforts to be more closely aligned with the needs of real-world customers. For 6642, an optimization capability significantly enhances the utility of simulation as a decision-making tool for the deployment and sustainment of key DOD weapons systems.

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