CPAT
Capability Portfolio Analysis Tool

Highlights

What does CPAT Enable?
- Decision support for portfolio resourcing and capability of a large fleet of systems
- Comprehensive investment plans that ensure an optimal balance between capability, cost, and schedule

Why is CPAT important?
- Provides analytical rigor to strategic portfolio management process
- Provides a repeatable way of assessing different investment strategies and provides insights into the impacts of these strategies
- Develops detailed fielding plans from high-level modernization goals and strategies, which show layout of funds and can be evaluated for implementability, schedule/performance risk, etc.

Key to Success
- Collaboration with analytical community
- Validated data sources (cost & performance)
- Senior leadership engagement and involvement

Example Applications
Trade Studies
- Evaluate modernization strategies and courses of action for input to high-level portfolio reviews
- Assess modernization alternatives under different funding levels
- Evaluate current modernization plans for impacts on performance and cost, and provide insight into operational and industrial base impacts
- Investigate how decisions in a single modernization program impact the entire fleet

Sensitivity Analyses
- Assess which programs are cornerstones of an optimal modernization strategy
- Evaluate robustness of modernization strategy to changes in program cost, performance, and/or schedule

CPAT Overview

CPAT is a powerful fleet management analysis tool which optimizes investment and fielding decisions to provide maximum fleet performance under cost, schedule and programmatic constraints. It is capable of solving highly complex fleet modernization optimization problems – problems spanning many mission areas and modernization programs over several decades – in sufficiently short timeframes to enable interactive analytics and a high degree of responsiveness to evolving plans and assumptions. CPAT has been developed and applied in partnership with the US Army Program Executive Office for Ground Combat Systems to provide unprecedented analytical capability in support of modernization and investment decisions.
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Key Features

Optimization Features
• Identifies the highest-performing investments for fleet modernization over a complex trade space
• Analyzes problems spanning multiple mission areas and modernization programs over several decades
• Captures salient characteristics and constraints of the fleet management and modernization problem, for example:
  ➢ Fielding gaps can be disallowed
  ➢ Purchases can be required to occur in full brigade quantities
  ➢ Different types of budget (procurement, O&S, R&D) can be allocated

Input Features
• Data architecture makes it easy to define the inputs despite high complexity of the problem
• Enforces consistency between inputs and provides the analyst multiple means of cross-checking input
• Allows definition of systems, mission roles, fleet structure, budgets, system performance and costs, and programmatic and production constraints and requirements

Output Features
• Detailed fielding and retirement plans showing number of purchases/divestitures of a system type in each mission area per year
• Fleet composition over time
• Fleet performance and costs over time
• Multiple levels of output detail, from individual programs and mission areas up to the entire fleet

Key Benefits

High Performance and Capability
• Makes sophisticated investment and scheduling tradeoffs between different mission areas and modernization programs to provide maximum overall fleet performance
• Careful problem formulation and use of gold-standard CPLEX optimization engine enable quick solution of highly complex modernization problems
  ➢ Takes advantage of high-performance multicore computing capabilities
  ➢ Can be quickly re-run with updated assumptions and constraints

Clean, Intuitive User Interface
• Streamlines data entry/model building process
• Effective data visualization
  ➢ Enhances communication between stakeholders, analysts, and SMEs
  ➢ Provides tools to assist analyst with data verification and validation
• Simplifies specification of different analysis cases
• Provides insightful results tables and charts

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