Exceptional service in the national interest

Sandia National Laboratories

Military Systems & Analysis

Advanced analytics to support informed military decision making

Overview

For almost 15 years, Sandia's Military Systems and Analysis program has provided DoD with support in areas that involve system, system of systems (SoS), and enterprise acquisition, readiness, sustainment, and operations. By performing cutting-edge R&D and developing unique modeling and simulation (M&S) tools that combine and customize the latest technologies in M&S with advanced statistics and optimization techniques, we support customers addressing their most challenging decisions.

In today's fiscally constrained environment, every service is facing difficult trades and conducting business case analyses as they decide where to invest so that the United States maintains military superiority. Our team has extensive experience, tools, and capabilities that complement and extend existing DoD capabilities. We have supported numerous major programs including: the Joint Strike Fighter (F-35), Army Future Combat System, and Navy Littoral Combat Ship.

As a multidisciplinary national security laboratory and Federally Funded Research and Development Center (FFRDC), Sandia accomplishes tasks that are integral to the mission and operation of our sponsoring agencies.

Core Capabilities

- Optimization for modernization, Technology Management, Portfolio/Fleet Composition, and Systems Engineering
- Systems of Systems Assessments & Trade Studies
- Systems Performance/Operational Effectiveness
- Modeling & Analysis
- Systems of Systems Assessments & Trade Studies
- Reliability, Logistics and Sustainability
- Energy and Cyber Security Analysis

Tools

Sandia's unique suite of tools includes:

Whole System Trade Analysis Tool (WSTAT)

Identify tradeoffs between requirements, design decisions, and consequences relevant to stakeholders in areas such as investment cost, O&S cost, growth potential, risk, and performance.

- *Inform Requirements Development*
- *Compare Existing Designs*
- *Identify Technology Trends*
- *Explore Performance & Cost Tradeoffs*
- *Conduct Sensitivity Analyses*

Capability Portfolio Analysis Tool (CPAT)

Optimal fleet-level management and investment, identifying the "best" investments across fleet to maximize performance. Ensure strategic investments balance performance, cost, and schedule

- *Measure Performance*
- *Assess Costs*
- *Inform Schedule*

Systems of Systems Analysis Toolset (SoSAT)

Large-scale System of Systems (SoS) stochastic simulation for analyzing integrated SoS mission scenarios.

- *Allows linkages, dependencies, and shared functionality across systems*

Key Customers

United States Army

- PEO Ground Combat Systems
- PEO Combat Support and Combat Service Support (CSCSS)
- PEO Aviation
- PEO Enterprise Information Systems

United States Navy

- PEO Littoral Mine Warfare
- PMS Amphibious Warfare

United States Marine Corps

- Expeditionary Energy Office

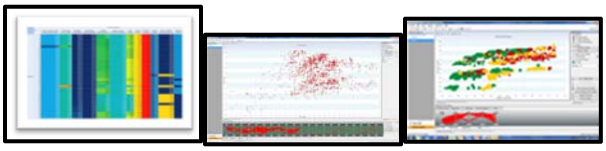
Examples of Our Support

Army Program Manager (PM) Ground Combat Vehicles (GCV)

Challenge: *PM GCV was challenged to aggressively explore the trade space between design decisions for the new GCV and stakeholder value (including performance, cost, Operating & Support (O&S), schedule risk and growth) to obtain greater efficiency in defense spending.*

Approach: *Develop the analytical processes and tools (WSTAT) to explore the design trade space of the GCV and understand the major cost and performance drivers, as well as the interplay of multiple requirements on the system.*

Results: *PM GCV has extensively used WSTAT analysis to refine their requirements and inform several knowledge points leading up to acquisition Milestone C.*



Navy Program Executive Office (PEO) Littoral Combat Ship (LCS)

Challenge: *The LCS program has to address complicated mission scenarios with multiple systems working together to perform mine countermeasures and surface warfare missions. In addition, one of the mission systems onboard the LCS, the Remote Multi-Mission Vehicle (RMMV) is undergoing an intensive reliability growth program due to a Nunn-McCurdy breach.*

Approach: *System of systems modeling and simulation is being used to evaluate Key System Attributes (KSA)s and Key Performance Parameters (KPPs) for program offices within PEO LCS. Analysis identifies areas for improvement on mission system hardware and logistics and onboard the LCS.*

Results: *Sandia analysis has provided decision makers with tools to assess various logistics changes including onboard sparing for the RMMV as well as mission system staging.*

Army PEO CS&CSS Joint Operational Energy (OE) Initiative

Challenge: *The program needs a holistic approach to the evaluation of OE-related impacts and improvements. The focus is on reducing military energy dependency and increasing systems energy efficiency, seeking alternative energy sources, while sustaining or enhancing operational capabilities.*

Approach: *Develop a detailed simulation model of an area of operations to analyze energy usage within an integrated system-of-systems engineering environment.*

Results: *Quantitative evidence to support evaluation of operational energy impacts of materiel, non-material solutions, and future capabilities across the entire force.*

What Our Customers Say

"I believe it [CPAT] is a great tool to show leadership multiple COAs and the impacts/costs of various approaches. This could be a game changer across multiple portfolios." - GEN Chiarelli

*"...**this is the type of analysis that will help us make good decisions**"* - Ms. Heidi Shyu (AAE)

"CPAT is a game changer, we need to leverage this capability moving forward" - Anne Swanek (OSD-ATL)

"This is great, can we have it? - Keith Kasperson (OSD-CAPE)

"We need to work together to incorporate it into the Analysis of Portfolio Alternatives" - Terry Edwards (ASA(ALT))

Contact Us

Mr. Alan Nanco
Deputy Director, Military Systems & Analysis
(505) 845-9147 / asnanco@sandia.gov

Mr. Bruce M. Thompson
Program Manager, Military Systems & Analysis
(505) 284-4949 / bmthomp@sandia.gov

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