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FIRST ANNUAL ACQUISITION RESEARCH SYMPOSIUM

USING THE SYSTEMS ENGINEERING PROCESS TO BALANCE THE INTERDEPENDENCE OF MISSION CAPABILITY, OPERATIONS AND SUPPORT COSTS AND SYSTEM UTILITY RATES— WHAT'S T&E'S ROLE?

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by

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Proceedings of the Annual Acquisition Research Program

The following article is taken as an excerpt from the proceedings of the annual Acquisition Research Program. This annual event showcases the research projects funded through the Acquisition Research Program at the Graduate School of Business and Public Policy at the Naval Postgraduate School. Featuring keynote speakers, plenary panels, multiple panel sessions, a student research poster show and social events, the Annual Acquisition Research Symposium offers a candid environment where high-ranking Department of Defense (DoD) officials, industry officials, accomplished faculty and military students are encouraged to collaborate on finding applicable solutions to the challenges facing acquisition policies and processes within the DoD today. By jointly and publicly questioning the norms of industry and academia, the resulting research benefits from myriad perspectives and collaborations which can identify better solutions and practices in acquisition, contract, financial, logistics and program management.

For further information regarding the Acquisition Research Program, electronic copies of additional research, or to learn more about becoming a sponsor, please visit our program website at:

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For further information on or to register for the next Acquisition Research Symposium during the third week of May, please visit our conference website at:

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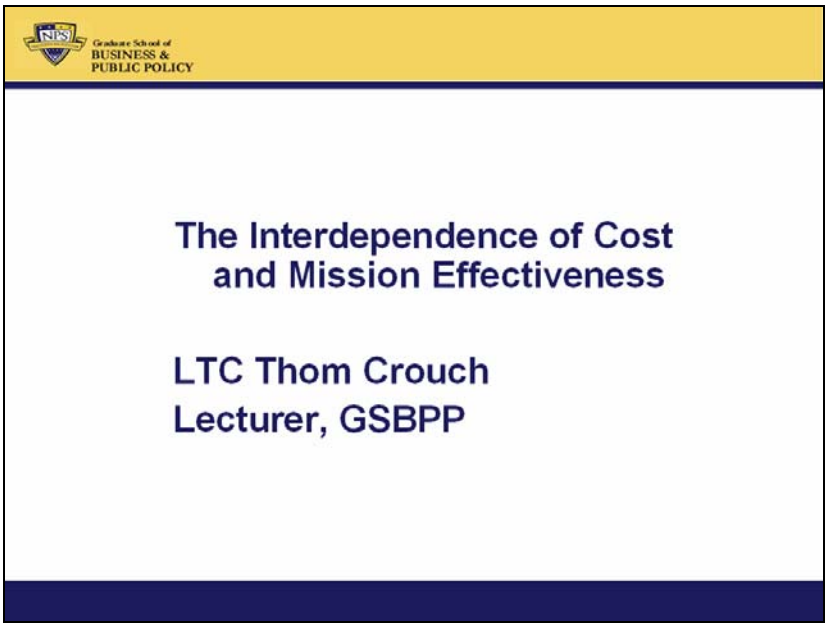
Using the Systems Engineering Process to Balance the Interdependence of Mission Capability, Operations and Support Costs, and System Utility Rates—What's T&E's Role?

Presenter: LTC Thom Crouch, Lecturer, Graduate School of Business & Public Policy, Naval Postgraduate School

Abstract

This research project defines the interdependent relationship between a weapon system's mission capabilities, O&S costs, operational utility rate, and their impacts on overall mission effectiveness of an operational combat unit. By analyzing the sub-elements of both operational effectiveness and operational suitability it can be shown how operational effectiveness is a dependent element of operation suitability. Additionally, it will be demonstrated how support costs influence operational suitability parameters of a weapon system, which then impacts a combat unit's overall mission effectiveness. Since support costs have such a critical relationship with operational suitability factors, the project also defines the current relationships between Service Cost and T&E communities to question whether or not there is the requisite level of integration of effort between the two organizations to accurately assess weapon system costs and capability prior to production.

Introduction



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MISSION EFFECTIVENESS DRIVERS

Full Mission Effectiveness (ME) is a function of *BOTH:*

1. Collective crew proficiency to perform requisite mission tasks
2. Collective weapon system readiness and capability at the unit of action level

In current terms – At the unit of action level, weapon systems must be both operationally effective and suitable (in both peace & wartime OPTEMPO) with particular attention to whether or not system readiness levels support crew proficiency.

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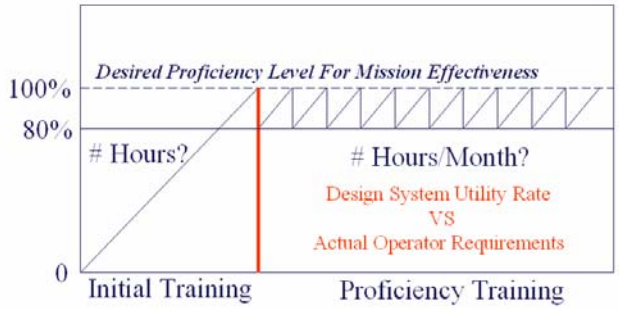
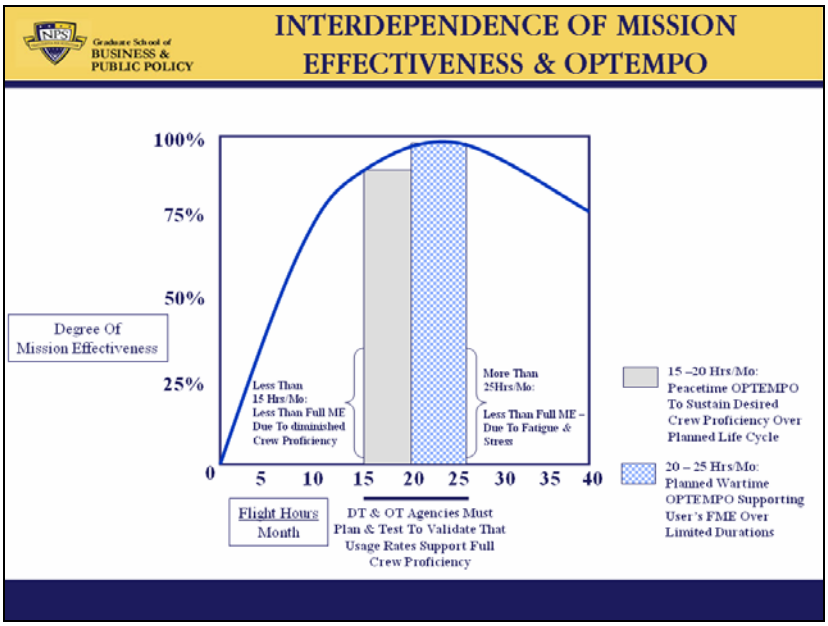
TRAINING REQUIREMENTS

How do training requirements compare to the design utility rate of the weapon system?

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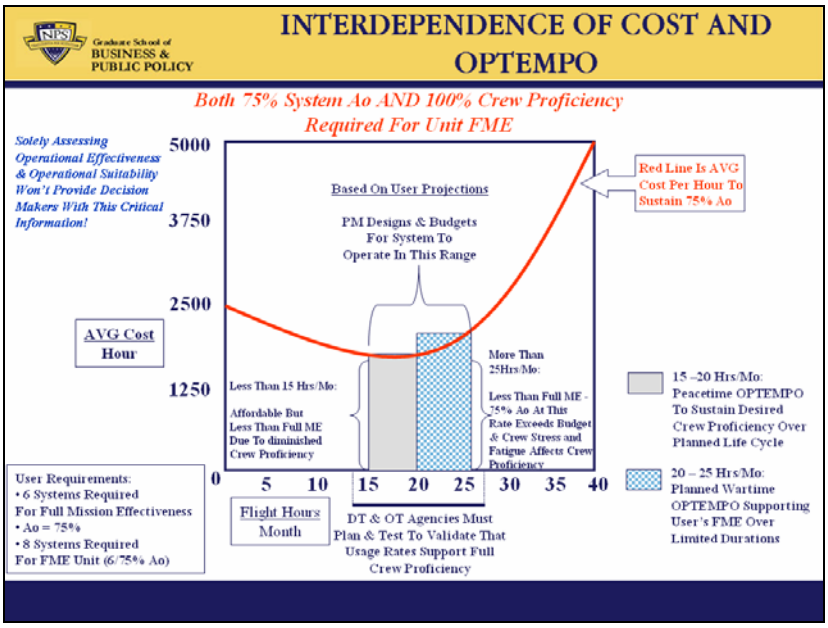
INTERDEPENDENCE OF MISSION EFFECTIVENESS & OPTEMPO
100%
75%
50%
25%
0
Degree Of Mission Effectiveness
5 10 15 20 25 30 35 40
Flight Hours Month
Less Than 15 Hrs/Mo: Less Than Full ME Due To diminished Crew Proficiency
More Than 25Hrs/Mo:
Less Than Full ME – Due To Fatigue & Stress
DT & OT Agencies Must Plan & Test To Validate That Usage Rates Support Full Crew Proficiency
15 –20 Hrs/Mo: Peacetime OPTEMPO To Sustain Desired Crew Proficiency Over Planned Life Cycle
20 – 25 Hrs/Mo: Planned Wartime OPTEMPO Supporting User's FME Over Limited Durations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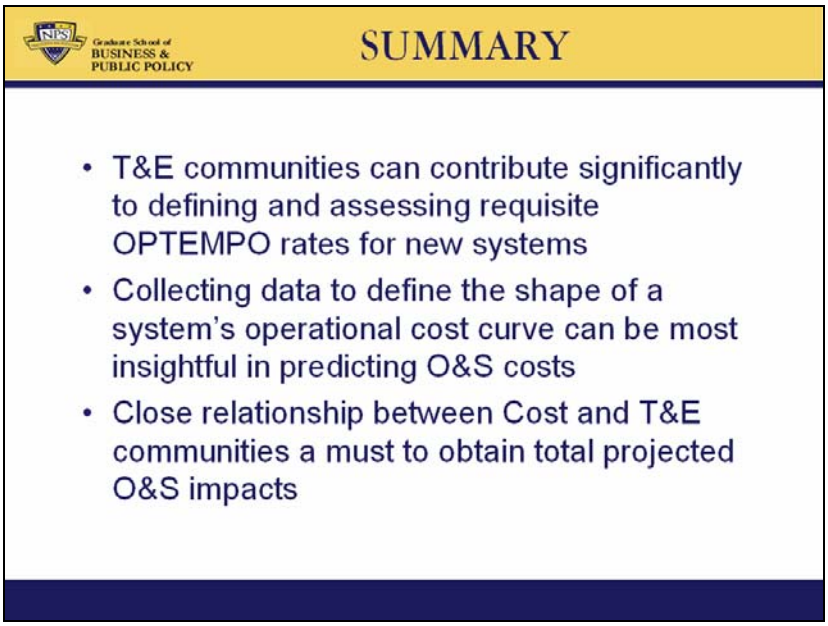
INTERDEPENDENCE OF COST AND OPTEMPO
Both 75% System Ao AND 100% Crew Proficiency Required For Unit FME
Solely Assessing Operational Effectiveness & Operational Suitability Won't Provide Decision Makers With This Critical Information!
5000
3750
2500
1250
0
AVG Cost Hour
Based On User Projections
PM Designs & Budgets For System To Operate In This Range
Red Line Is AVG Cost Per Hour To Sustain 75% Ao
5 10 15 20 25 30 35 40
Flight Hours Month
Less Than 15 Hrs/Mo: Affordable But Less Than Full ME Due To diminished Crew Proficiency
More Than 25Hrs/Mo: Less Than Full ME - 75% Ao At This Rate Exceeds Budget & Crew Stress and Fatigue Affects Crew Proficiency
DT & OT Agencies Must Plan & Test To Validate That Usage Rates Support Full Crew Proficiency
User Requirements:
• 6 Systems Required For Full Mission Effectiveness
• Ao = 75%
• 8 Systems Required For FME Unit (6/75% Ao)
15 –20 Hrs/Mo: Peacetime OPTEMPO To Sustain Desired Crew Proficiency Over Planned Life Cycle
20 – 25 Hrs/Mo: Planned Wartime OPTEMPO Supporting User's FME Over Limited Durations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SUMMARY
• T&E communities can contribute significantly to defining and assessing requisite OPTEMPO rates for new systems
• Collecting data to define the shape of a system's operational cost curve can be most insightful in predicting O&S costs
• Close relationship between Cost and T&E communities a must to obtain total projected O&S impacts

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2003 - 2006 Sponsored Acquisition Research Topics

Acquisition Management

- Software Requirements for OA
- Managing Services Supply Chain
- Acquiring Combat Capability via Public-Private Partnerships (PPPs)
- Knowledge Value Added (KVA) + Real Options (RO) Applied to Shipyard Planning Processes
- Portfolio Optimization via KVA + RO
- MOSA Contracting Implications
- Strategy for Defense Acquisition Research
- Spiral Development
- BCA: Contractor vs. Organic Growth

Contract Management

- USAF IT Commodity Council
- Contractors in 21st Century Combat Zone
- Joint Contingency Contracting
- Navy Contract Writing Guide
- Commodity Sourcing Strategies
- Past Performance in Source Selection
- USMC Contingency Contracting
- Transforming DoD Contract Closeout
- Model for Optimizing Contingency Contracting Planning and Execution

Financial Management

- PPPs and Government Financing
- Energy Saving Contracts/DoD Mobile Assets
- Capital Budgeting for DoD
- Financing DoD Budget via PPPs
- ROI of Information Warfare Systems
- Acquisitions via leasing: MPS case
- Special Termination Liability in MDAPs

Logistics Management

- R-TOC Aegis Microwave Power Tubes

- Privatization-NOSL/NAWCI
- Army LOG MOD
- PBL (4)
- Contractors Supporting Military Operations
- RFID (4)
- Strategic Sourcing
- ASDS Product Support Analysis
- Analysis of LAV Depot Maintenance
- Diffusion/Variability on Vendor Performance Evaluation
- Optimizing CIWS Life Cycle Support (LCS)

Program Management

- Building Collaborative Capacity
- Knowledge, Responsibilities and Decision Rights in MDAPs
- KVA Applied to Aegis and SSDS
- Business Process Reengineering (BPR) for LCS Mission Module Acquisition
- Terminating Your Own Program
- Collaborative IT Tools Leveraging Competence

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