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Budget Modeling Under Uncertainty for the Modular Force Structure

75th Annual MORS Symposium

MAJ Paul Evangelista, Ph.D.
MAJ Melanie Carlson

Operations Research Center of Excellence
Researching the Army’s Future
Developing Tomorrow’s Leaders
Agenda

- Background
- Problem Statement
- Funding Analysis
- Model Approach
- Inputs and Uncertainties
- Progress on Model Development
- Future Work
Project Impetus

Since the start of the GWOT, DoD has relied on substantial and regular supplemental funds.

Program Executive Office (PEO) Soldier provides material solutions for Soldier equipment requirements.

80% of the current PEO Soldier budget consists of supplemental funds.

What message does that send?
PEO Soldier Budget

Supplemental
Base

billions $

2003 2004 2005 2006 2007
Objectives

- Identify and analyze the impact of supplemental funding on the PEO Soldier budget and mission

- Develop a Capabilities Based Budget Forecasting Model for PEO Soldier
  - Life after the supplemental funding surge
  - Focus on the *delivery of capabilities*
Background

- **Purpose of PEO Soldier:**
  - “to develop the best equipment and field it as quickly as possible so that our Soldiers remain second to none in missions that span the full spectrum of military operations”

- **Sample of Programs**
  - Rapid Fielding Initiative
  - Body Armor
  - Sensors and Lasers
  - Weapons Modularity / Modernization
  - Army Combat Uniform
Problem Statement

- PEO Soldier accurately predicts programming (FY10-15) requirements that support the needs of the Soldier for the future Army force structure

- PEO Soldier seeks analysis of supplemental vs. programmed funding

- Budget management directorate seeks a predictive model to support the building of the program objective memorandum (POM)
Impact of Supplemental Funds

FY2006 PEO Soldier Budget Execution($3.2B)

FY2007 PEO Soldier Budget Execution($4.4B)
Analysis of Supplemental Funds

- Supplemental funds have enabled extraordinary and rapid progress on several PEO Soldier initiatives
  - RFI, ACU, GC Helmet, weapons advances

- Why aren’t equipment advances programmed and anticipated?
  - Direct impact on Soldier readiness
  - Readiness is arguably a national and DoD priority that deserves sustained and predictable funding
  - Inadequate or misallocated efforts prior to the onset of GWOT made cost-intensive rapid development and fielding efforts necessary
### Risk Relationship

#### Funding Strategy

<table>
<thead>
<tr>
<th>Problem Class</th>
<th>Programmed Funds</th>
<th>Supplemental Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured Problems</td>
<td>Low Risk</td>
<td>Medium Risk</td>
</tr>
<tr>
<td>Unstructured Problems</td>
<td>Medium Risk</td>
<td>High Risk</td>
</tr>
</tbody>
</table>

Risk = Exposing the force to degraded readiness of the associated system, resource, or capability
Supplemental Detox

- Supplemental funding, which has fueled recent PEO Soldier successes, is expected to substantially decrease.

- Given the current funding scheme, PEO Soldier may be less effective in its mission to provide capability to the force without supplemental funds.

- Road forward for budgets sans supplementals
  - Capabilities Based Budget Forecasting
Capabilities Based Budget Forecasting

- Data driven strategy to influence budget decisions
  - What is the impact in terms of **capabilities** of funding decisions
  - Support for POM development for the long term assuming a significant decline supplemental funding
- What capabilities will the force need?
- How much will that cost?
- What are the uncertainties in that information?
Driving Factors

- Unit Costs and Brigade Sets for Systems
  - Quantification of Unfunded Requests in terms of BCTs
- ARFORGEN and Deployment Rates
  - Requirements in Reset Phase
- Growth of the Army
- Asset Visibility Model
  - Condition of the equipment fleet
  - Consumption rates
Capabilities Based Budget Forecasting Model

OUTPUTS

What **capabilities** will the Army need

What are the budget requirements

What are the implications of budget decisions in terms of **capability**
Incorporating Future Dynamics of the Army

Deployed Forces (OIF + OEF)

AC End Strength

Status Quo
- Iraq pull out NLT AUG08 - Afghanistan same
- Iraq 30K NLT AUG08 - Afghanistan same
- Iraq 60K NLT AUG08 - Afghanistan same
- Iraq 90K NLT AUG08 - Afghanistan same
- Iraq same - Afghanistan same

Actual
- Planned Growth
- Sustained Growth
- Linear (Actual)
For each FY, the number associated with each BCT type is a quantification of the UFR.
For each FY, the number associated with each BCT type is a quantification of the UFR. For example, for the M240 in FY07, filling that FY UFR would field M240s to 36.93 IBCTs or 45.64 HBCTs or 29.86 SBCTs. But these are based on Acquisition Objectives, not Capability Requirements!
Budget Line Forecast and Impact Illustration

An Example

Thermal Weapon Sights

Assess Uncertainty:

ID Capability Impact:

<table>
<thead>
<tr>
<th>FY06</th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
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<tbody>
<tr>
<td>$M</td>
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<tr>
<td>0</td>
<td>50</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
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</tbody>
</table>

- 10 IBCTs or 9 HBC Ts or 6 SBCTs
- 4 IBCTs or 4 HBC Ts or 3 SBCTs
- 22 IBCTs or 20 HBC Ts or 14 SBCTs
- 24 IBCTs or 22 HBC Ts or 16 SBCTs
- 23 IBCTs or 21 HBC Ts or 16 SBCTs
- 33 IBCTs or 30 HBC Ts or 21 SBCTs

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Future Work

- Build the Capabilities Based Budget Forecasting Model
  - **Challenges:**
    - Significant uncertainties and assumptions
    - Data collection

- **Goal**
  - Provide data for the FY10 POM development
Back Up Slides
Inputs to the CBFM

CBFM

- Army Force Structure
- ARFORGEN Cycles
- System Unit Costs
- System Fielding Plan
- BDE Sets
- Asset Visibility (Condition and Consumption Rates)
# Use of Transformed BCT Force Structure Data to Drive Budget Line Impacts

<table>
<thead>
<tr>
<th>Tgt'd Line</th>
<th>LIN</th>
<th>Name</th>
<th>IBCT</th>
<th>HBCT</th>
<th>SBCT</th>
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<tbody>
<tr>
<td>M240</td>
<td>M92841</td>
<td>MACHINE GUN: 7.62MM M240B</td>
<td>173</td>
<td>140</td>
<td>214</td>
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<tr>
<td>TWS</td>
<td>S60356</td>
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<td>110</td>
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<td>S90603</td>
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<td>375</td>
<td>457</td>
<td>601</td>
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<tr>
<td>M4</td>
<td>R97234</td>
<td>RIFLE 5 56 MILLIMETER: M4</td>
<td>3072</td>
<td>3145</td>
<td>3701</td>
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<tr>
<td>E-NVDs</td>
<td>M79678</td>
<td>NIGHT VISION DEVICE: AN/ PVS-14</td>
<td>487</td>
<td>487</td>
<td>1092</td>
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<tr>
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<td>N05482</td>
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<td>2881</td>
<td>2542</td>
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<tr>
<td>LLDR</td>
<td>R60282</td>
<td>LLDR: LASER AN/ PED-1</td>
<td>32</td>
<td>38</td>
<td>17</td>
</tr>
</tbody>
</table>
The Environment

Facts
- Soldiers will continue to require modern solutions to meet survivability, lethality, and information needs.
- The Department of the Army will annually consider a budget that seeks to meet Soldier needs.

Assumptions
- The Army will transform IAW the Army Campaign Plan
- The Army will grow to an authorization of 547,000 soldiers
- The Army will continue to deploy modular brigades in combat environments (at least through FY09-15)
- The Army will implement the AFORGEN synchronization plan and provide AC BCTs with dwell time of 10 mos to three years (1:3, 1 unit deployed for every 3 at home station) and ARNG dwell time of 3 to 6 years (1:6)
ARFORGEN

“CSA Corollary:” Every unit is focused against future mission(s) as early as possible in ARFORGEN process, then task organized into Expeditionary Force Packages