OSD CAPE Support to UK Strategic Defense and Security Review (SDSR)

July thru Oct 2010

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Purpose/Agenda

• **Purpose:**
  – Provide an overview of analysis in support of the UK SDSR
  – Describe US support to the SDSR
  – Discuss insights from this effort that could shape US analysis

• **Agenda:**
  – Background
  – SDSR Analysis
  – Insights
Background

• May, 2010 UK election brought a new government to power; the Conservative Party in coalition with Liberal Democrats announced plans for a 20% across-the-board cuts to government spending and launched the SDSR
  – UK government debt is 64% of GDP (£: 927B)
  – Budget deficit 13% of GDP

• New government directed the development of options to reduce the Defense Budget by up to 20% accounting for:
  – Modernization costs
  – Personnel costs increasing above the rate of inflation
  – Replacing the UK nuclear deterrent

• Future Character of Conflict (FCOC) strategy paper provided future operational context

• US supported SDSR in multiple UK organizations
  – Jim Johnson (OSD/CAPE) – Equipment Programming
  – Rachel Ellehaus (OSD (P)) – Strategy Development
  – Al Sweetser (OSD/CAPE/SAC) – Strategy Management/Operational Analysis
  – Erik Adams (OSD/CAPE/SAC) – Strategy Management/Operational Analysis
  – LtCol Nestor Perone (USAF) – exchange officer to RAF
UK Defense Overview

SDSR analysis 181 Force Elements that addressed ~67% of Defense Budget & ~50% of Manpower
SDSR Organization

National Security Council
Chair: Prime Minister

NSC (Threats, Hazards Resilience and Contingencies)
Chair: Home Secretary

NSC (Emerging Powers)
Chair: Foreign Secretary

NSC (Nuclear)
Chair: Prime Minister

NSC (Officials)
Chair: National Security Advisor

Strategic Defense and Security Review Implementation Board
Cabinet Office chaired

Program Boards
Chaired by responsible senior officials across government reporting requirement to Implementation Board

Senior Judgment Panel
Chair: Vice Chief Defense Staff

Military Judgment Panel
O-6/O-5 Action Officers

Informed by:
- Concurrency Analysis
- Force Structure Cost Assessment
- Equipping analyses
- “Workstream” papers
- Other capability Studies
Scenarios and Force Sizing Construct

**Strategic Postures Evaluated**

- **Committed Britain**
  - Committed, Large Stabilization, and a simple operation
- **Adaptable Britain**
  - Committed, Medium Stabilization, and two small complex, and a simple operation
- **Vigilant Britain**
  - Committed, Small Stabilization, medium complex, and a simple operation

*Presented is initial Force Sizing Construct. SDSR ended up focusing on Adaptable and eliminating one complex scenario*

- Scenarios binned into 4 classifications
  - **Committed** - Homeland Defense, nuclear deterrence, special operations, strategic intelligence
  - **Stabilization** – enduring operations
  - **Complex** – multi-service focus and multiple objectives
  - **Simple** – single-service focus and singular objective

- The force sizing construct evaluated seven scenarios
  - Restore freedom of navigation in contested waters (ability to sustain global trade)
  - Stabilization (scale and sufficiency in ability to deploy and sustain a brigade size force including enablers)
  - UK lead Coalition that intervenes in civil war with follow-on counter-insurgency (logistics and C2 capabilities)
  - Reaction to loose nuke in hands of non-state group (highly responsive force with focus on strategic intelligence)
  - Complex NEO (rapid deployment and reach-back)
  - Liberation of allied from occupying state (multi-role brigade with maritime and air support)
  - Deter Use of Force against UK (presence and nuclear deterrent)
Competing Contributions to SDSR Analysis

- Equipment Programming Division
  - Equipping issue analyses
  - Approach: Strategic Balance of Investment (StratBoI) model
- Strategy Management Division
  - Operational Analysis
  - Approach: Concurrency Analysis Tool (CAT), supported by DSTL
- Strategy Development and MoD Programmers
  - Cost Analysis
  - Approach: “Workstreams” papers

All strands of analysis considered Force Sizing Construct, Concurrency, and Costs
SDSR General Methodology & Process

• National Security Council established force sizing construct
• Senior Judgment Panel (SJP: Vice Chief led) and Military Judgment Panel (MJP: O-5/O-6 action officers) reviewed and approved scenario demands
• MoD programmers computed cost for various options generated by 30 teams covering a range of capabilities
• MoD organizations (FD/OA/EP/DSTL - Military and Analysts) conducted concurrency analysis using StratBoI, Concurrency Analysis Tool, and Force Costing Tools
  – Developed Force structure options based on Senior leadership guidance, scenario requirements, and cost constraints
  – Conducted *Sufficiency Analysis* for each of the force structure options to determine a potential force structure’s ability to support a force sizing construct and test its robustness against more demanding and complex scenarios
• Analytical products were considered in the SJP and NSC to inform decisions
Concurrent Analysis

Adaptable Britain
Committed, Medium Stabilization, and two small complex, and a simple operation

1. Standing Commitments
2. Medium Stabilization
3. 1st Complex
4. 2nd Complex
5. Simple

33 Total Scenario Combinations

Complex Scenarios
- Scenario X
  - COA 1
  - COA 2
- Scenario Y
  - COA 1
- Scenario Z
  - COA 1
  - COA 2
  - COA 3

Simple Scenario
- Scenario A
  - COA 1
  - COA 2
  - COA 3

- Based on Strategic Posture and scenario selection all possible permutations are generated
- Sufficiency Analysis is conducted for each Concurrency Set
- Select “most efficient” COA within each Concurrency Set
- Maximum demand based on “most efficient” COA in each of the Concurrency Sets is used to determine over/under utilized forces
  - Each Concurrency Set has multiple scenarios each with multiple Courses of Action
  - The combination of COAs that best aligns with the capability and capacity of a force structure option is selected
  - Other COAs provide a means to test a force structure option to better understand risk and robustness

Concurrent Set with Complex X&Y

Scenario Combination 1
1. Commitments
2. Medium Stabilization
3. Scenario X COA 1
4. Scenario Y COA 1
5. Scenario A COA 1

Scenario Combination 6
1. Commitments
2. Medium Stabilization
3. Scenario X COA 2
4. Scenario Y COA 1
5. Scenario A COA 1

Determine “most efficient” COA

Max demand of “most efficient” COAs across all Concurrency Sets

Concurrent Set with Complex X&Z

Scenario Combination 1
1. Commitments
2. Medium Stabilization
3. Scenario X COA 1
4. Scenario Z COA 1
5. Scenario A COA 1

Scenario Combination 18
1. Commitments
2. Medium Stabilization
3. Scenario X COA 2
4. Scenario Z COA 3
5. Scenario A COA 3

Determine “most efficient” COA

Concurrent Set with Complex Y&Z

Scenario Combination 1
1. Commitments
2. Medium Stabilization
3. Scenario Y COA 1
4. Scenario Z COA 3
5. Scenario A COA 1

Scenario Combination 9
1. Commitments
2. Medium Stabilization
3. Scenario Y COA 1
4. Scenario Z COA 3
5. Scenario A COA 3

Determine “most efficient” COA
Force Structure Tools - Concurrency Analysis Tool (CAT)

• Determines the “most efficient” course of action for each scenario combination based on weighted score or cost
• Determines the minimal force requirement to achieve all scenario combinations being considered
• Highlights affluences and shortfalls across all COAs given minimal force requirement
• Identifies alternative courses of action that can be met given the minimal force requirement
• Provides recommendations on potential force adjustments given budgetary constraints
• Requires interaction with analyst to determine appropriate substitutions and places to take risk
**Force Structure Tools – CAT**

*Illustrative Outputs*

Represents force utilization for a scenario combination measured against a force structure option.

<table>
<thead>
<tr>
<th>Simple (COA 3)</th>
<th>Simple (COA 3)</th>
<th>Simple (COA 3)</th>
<th>Simple (COA 3)</th>
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<tbody>
<tr>
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<tr>
<td>Stabilization</td>
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<tr>
<td>Standing Commitments</td>
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<table>
<thead>
<tr>
<th>Medical</th>
<th>Engineers</th>
<th>ISR</th>
<th>Logistics</th>
<th>Helios</th>
<th>BCT</th>
<th>Fast Jets</th>
<th>Carrier/Amphib</th>
<th>MCMV</th>
<th>SOF</th>
</tr>
</thead>
</table>

Illustrative Example of output presented to SJP
Force Structure Tools - StratBoI

- Optimization tool that determines the most cost effective force structure for each service that best achieves a set of policy goals
- Highlights priorities for savings and areas for investment
  - Determines under-utilized forces and costs associated with not using them
  - Determines over-utilized forces and costs needed to obtain more capability
- Task-based model utilizing *alternative means of achievement* and costs
- SDSR use:
  - Build up of scenarios to better understand operational risks and costs
  - Vary Coalition contributions
  - Modify standing commitments
  - Alter assumptions on level of effort in Afghanistan
  - Vary force structure mix assumptions (decreasing/increasing capabilities)
  - Modify force rotation rates
UK Optimization Tool Structure (StratBoI)

Scenario → Region → Area

By Time Phase

Effector Tasks → Enabler Tasks

Capability ← Sub Component ← Entity

Component ($, Inventory Limits, Force Generation)

# required defined by Area for:
- Task
- Capability
- Subcomponent
- Component

Scenario 1
Region Y
Area X

Battlefield
Hard/Complex/
No SAM Threat

Air-to-Ground

Dependent Enablers
Air Defense Escort
Lo UCAV StealthCap

Estimate of UK Variable Sizes

<table>
<thead>
<tr>
<th></th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
<th>Stabilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effector Tasks</td>
<td>200</td>
<td>100</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Regions</td>
<td>4 - 5</td>
<td>2 - 4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Areas (per region)</td>
<td>4 - 5</td>
<td>1 - 3</td>
<td>1 - 2</td>
<td>1</td>
</tr>
<tr>
<td>Capabilities</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub Components</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entities</td>
<td>250</td>
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<tr>
<td>Components</td>
<td>150</td>
<td></td>
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</tr>
</tbody>
</table>

F-16_Scen1 or
A-10_Scen1 or
F-15E_Scen1

F-16_Entity

F-16 Block 40 and
ISR Aircraft Support and
AAR Aircraft and
C2 Support

Independent Enablers include:
- Lift
- Protection
- Fuel
- Maintenance
- Logistics
- Movement
SDSR Key Outcomes

- 8% reduction in defense spending
- 17K personnel reduction across Army, Navy, AF
- 30% cut in MOD civilian workforce
- Cuts Nimrod, Ark Royal Aircraft Carrier, Sentinel, 600 tanks and armored vehicles, 4 destroyers/fast frigates, 5 Army HQ
- Early retirement of Tornado and Harrier
- Cancels buy of 138 F-35B and replaces with smaller buy of F35C
- Cuts 1 Army Brigade
- Buys more Transport/Utility Helios (Chinooks, extends Puma, upgrades Merlin, continues Wildcat buy)
- Delayed Trident nuclear deterrent replacement by up to 5 years
- No cuts to SF and Marines
- Invests in Cyber
- Places new aircraft carrier, amphibious ship, some tanks and aircraft in extended readiness for regeneration
Strengths & Weaknesses of SDSR Analysis

Strengths

• Credibility of scenarios was improved by FCOC and SJP/MJP
• SJP/MJP provided responsive guidance
• Analysis turn around was rapid and relevant
• A wide range of alternatives was considered

Weaknesses

• Did not consider future shocks or scenarios beyond those initially prescribed
• Did not consider linkages to future concepts
• Simplified Force Management Assumptions
• Although depth of scenarios was a strength, the breadth of scenarios considered could have been expanded
## US/UK Analysis Comparison

<table>
<thead>
<tr>
<th>Players</th>
<th>US</th>
<th>UK</th>
</tr>
</thead>
</table>
| • OSD (P), OSD CAPE, Joint Staff, Military  
• Stove-Piped with Structured Collaboration | | • Policy, Programmers,  
Operational Analysis, Military  
• Integrated no independent analysis |

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>US</th>
<th>UK</th>
</tr>
</thead>
</table>
| • Day-to-Day, CM, and Stabilization, Warfights  
• Singular means of execution | | • Standing Commitments,  
Stabilization, Interventions  
• Multiple Courses of Action |

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>US</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Steady State (Rot), Surge (Non-Rot), Post Surge (Rot)</td>
<td></td>
<td>• Single Timeframe (Rot)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>US</th>
<th>UK</th>
</tr>
</thead>
</table>
| • Rotation Rates by Timeframe, RIP/TOA, Presence Usage, Ramp Down of Forces, Disengagement, Mobilization, Force Availability | | • Rotation Rates by Event  
• Costs |

<table>
<thead>
<tr>
<th>Outputs</th>
<th>US</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Over/Under Stressed Capabilities across multiple force sizing constructs</td>
<td></td>
<td>• Over/Under Stressed Capabilities across multiple force structure options and force sizing constructs</td>
</tr>
</tbody>
</table>
Things for DoD to Consider in Future Studies

- Improve ability to rapidly develop and assess new scenarios
- Improve links in analysis to costs and end strength
- Focus Analytic Agenda work to prepare for future strategic reviews (e.g. QDR, OA etc)
- Consider force testing across a wider range of scenarios and courses of action for each scenario
- Consider impacts of future shocks on defense planning
- Improve participation of allies and consideration of their capabilities
Back up
Challenges in the Use of Optimization Tools for Force Structure Analysis

• Task translation
  – Defining number of units to complete task
  – Defining effectiveness functions (linear or non-linear)
• Issues
  – Defining meaningful tasks at an aggregated level
  – Defining alternative capabilities
• Simplification
  – Analytical assumptions
    • Presence Usage, Guard/Reserve Mobilization, Rotational/Non-Rotational forces for same events, etc
  – Data Specification
• Development of cost data
• Policy
StratBoI provided useful information throughout SDSR process, though it is unclear of how much influence the model results had on Senior decision making.
CAPE/SAC Way Ahead

- Plan to integrate Cost and End-Strength into current force structure analysis
- Investigating applicability of optimization
  - Bill Cotsworth on contract thru April 2011
- Work with CAPE/SAC campaign analysts to define Warfight tasks and alternative means of execution
  - Start with ISC B warfights
- Expand on IDA work to determine better estimate cost
- Use IDA COST model to calculate cost of Foundational Activities