Analysis of Smaller Scale Contingencies

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CDR Aasgeir Gangsaas, United States Navy, is currently assigned as an Operations Research Analyst to the Office of the Secretary of Defense for Program Analysis and Evaluation. He has been involved in a number Department of Defense reviews including the 1997 Quadrennial Defense Review, Mobility Requirements Study 2005, Kosovo data collection effort, and various budgetary assessments. He most recently was involved in developing a comprehensive database of Smaller-Scale Contingencies to support future force structure analysis. He also serves as the Office of the Secretary of Defense representative on NATO Studies, Analysis, and Simulation (SAS) Panel – 025 (Long Term Defence Planning) and SAS-027 (Analysis of Smaller Scale Contingencies). He earned a Bachelor of Science in Aeronautical and Astronautical Engineering from University of Washington in 1986 and a Masters of Science in Operations Research from the Naval Postgraduate School in 1993.

ABSTRACT

During the past decade, DOD found itself embroiled in a never-ending series of Smaller Scale Contingencies (SSCs). Conventional wisdom has it that these operations have pushed defense planners dangerously close to shortchanging key defense needs in the scramble to meet SSC requirements. However, closer inspection reveals troubling anomalies with such conventional wisdom and opens up a difficult and challenging area for analysis. SSC analysis presents significant challenges because of problems with methodology, data and models. OSD PA&E in cooperation with the Joint Staff J-8 is conducting a multiple SSCs study designed to analytically determine if there are problems with recent and anticipated levels of SSC commitment, where those problems are, and what solutions there might be to these problems. The study is intended to develop analytic capabilities, data, and results for use during Department of Defense reviews. This paper describes study development, methodology and selected interim results.

BACKGROUND

OFFICE OF THE SECRETARY OF DEFENSE FOR PROGRAM ANALYSIS & EVALUATION

The Office of the Secretary of Defense (OSD) for Program Analysis & Evaluation (PA&E) provides independent analytic advice to the Secretary of Defense regarding alternative

weapon systems and force structures, the development and evaluation of defense program alternatives, and the cost-effectiveness of defense systems. The office also conducts analysis and offers advice in a number of related areas, such as military medical care, school systems for military dependents, information technology, and defense economics. Consistent with its advisory role, the office has no decision authority or line responsibility and has no vested interest in any sector of the defense budget.

PA&E is also responsible for the management of the programming system, including development of planning and programming guidance (in conjunction with other organizations within the Office of the Secretary of Defense) and direction of the annual program review.

STATUS REPORT

The current OSD (PA&E) Regional Assessments and Modeling Division work on Analysis of Smaller Contingencies began in earnest at Cornwallis IV in March 1999. Our initial concept for SSC analysis was presented at the conference. The presentation suggested a way towards possibly fruitful cooperation through Long Term Planning for SSCs with other nations. The project was intended to develop an understanding of the effects of multiple SSCs on Department of Defense (DoD) over time. Additionally, there was quite a bit of interaction with other participants of the conference. The conference provided excellent opportunities to examine problems and possible ways forward. Perhaps most significantly the conference provided the forum which produced a highly successful cooperation with UK DERA and acquisition of the UK developed Substitution and Basic Resource Inventory Allocator (SABRINA) model for analysis of multiple SSCs over time.

Since Cornwallis IV, there have been a number of notable positive developments. In cooperation with the four services we have begun to build a joint, comprehensive, and agreed upon US DOD historical contingency database. NATO and PfP nations continue to share analytical techniques, models, and data on SSCs analysis under Research & Technology Board Studies Analysis and Simulation (SAS) panel for SSCs Analysis (SAS-027). Continued interactions with the UK on SABRINA and significant investments in both time and money enhancing SABRINA have made it a tool capable of analyzing large force structures over significant periods of time. SABRINA's capabilities were demonstrated with the databases and insights from the highly successful Joint Staff-led wargame series on SSC — Dynamic Commitment.

DYNAMIC COMMITMENT WARGAME

In late September of 2000 the Joint Staff sponsored a series of games designed to look at the stress of US military forces engaged in SSCs over a period of time. Objectives of the game were: to identify the suitability of US forces to meet future challenges, identify key risks associated with the future deployment of US forces, to build databases for use during the 2001 Quadrennial Defense Review (QDR), and to create a group of informed experts to help support the 2001 QDR. During the 1997 version of Dynamic Commitment, no other nations

participated in the game. The most recent game included players from Canada, United Kingdom, and Australia.

Before actual play of the game, a pool of possible vignettes had been developed by the Regional Commanders in Chief (CinCs) (European Command, Pacific Command, Central Command, South Command, and Joint Forces Command), the four armed services (Navy, Marine Corps, Air Force, and Army) and the Coast Guard. The game began with the current real-world major operations as of late 2000. The Joint Staff determined before the game began what vignettes from the pool would be played and for how long. A game turn was three months (quarter of a year) and began with the Joint Staff informing the players what events were going to occur that quarter.

The game process consisted of the players finding out what events would occur for that quarter. The applicable CinCs would review the US forces required and the applicable services would provide the requested forces. If there were not enough of a particular force, the CinCs in collaboration with the services would determine an appropriate substitute. This would result in a played force for a particular vignette and would be recorded into a database. This process repeated itself until the timeline for the game was complete.

SMALLER SCALE CONTINGENCY ANALYSIS

ISSUES TO BE ADDRESSED

How can concerns about the "over stretch" of US forces be reconciled with the fact that the US has a defense capability of approximately 1.4 million active and 850 thousand reserve military personnel that appears sizable relative to SSC force requirements? How can we analytically determine if there is problem with the recent and anticipated future levels of commitment? If there is a problem, where the problems are in the US force structure and the solutions for fixing them. If the problem is overstated, how can we demonstrate and document this analytically? The following issues need to be addressed quantitatively to better understand the scope of the problem at hand.

1. What specific units in total DoD inventory are most stressed by SSC operations?

    - Depict degree of stress quantitatively from greatest to least for any given postulated set of multiple concurrent SSCs over multi-year time period.

    - Depict how stress varies with changes in numbers, size, and types of postulated SSCs.

2. How many multiple, concurrent SSCs (of a given size and type) can DoD accommodate with modest stress, given:

    - Current DoD force posture projected into future.

- Alternative postulated force postures.

3. For above questions can depict stress effects in following ways:

   - By Unit Type Code, percent of DoD's total inventory required for a given set of postulated SSCs.

   - OPTEMPO for individual Unit Type Code.

4. How does postulated DoD involvement in SSCs affect our capabilities required to execute our current or projected military strategy?

5. What can be done to reduce OPTEMPO Stress effects caused by SSC operations?

   - Substitution:

     > Within DoD.
     > Within United States Government.
     > Use of commercial capabilities (e.g., Brown and Root).
     > Use of allied military capabilities.
     > Use of International organization and NGO capabilities.

   - Creation of specialized DoD capabilities for SSCs.

   - Creation of more flexible capabilities (a balanced force with equal capabilities in both SSCs and overall defense strategy).

   - Review and adjust rotation base factors.

APPROACH

US forces are generally categorized by types of units (e.g., Army Infantry Battalions, Attack Submarines, F-15E squadrons) which are referred to as a Unit Type Code (UTC). UTC usage rates can be determined based on a set of SSC scenarios over time. Using SABRINA, the UK developed model, UTC usage rates can be determined across a multiple year time period. Where there are either shortages or very close to shortages, an in depth review using SABRINA at a given time step will reveal the degree of stress on specific assets and permit further analysis of other factors. Display in rank order (from most used to least used) the average UTC usage rate. By reviewing the vignettes, key components of unit stress can be identified and it is easy to determine why the particular UTC was demanded at such a high rate relative to the inventory level of the asset. Figure 1 shows a possible set of vignettes that make up the postulated future.

Based on evaluating the usage rate of all the UTC required for the set of vignettes, the rank order by average usage rate can be plotted with the peak usage rate highlighted. Figure 2 provides illustrative example for a given set of vignettes over a multiple year time period. The vignette laydown as shown in Figure 1 can be reshuffled. These new futures are then

checked to make sure they fit within the concurrency and frequency rules as established based on historical data. These new laydowns are then rerun in SABRINA and compared to previous laydowns to see what changes.

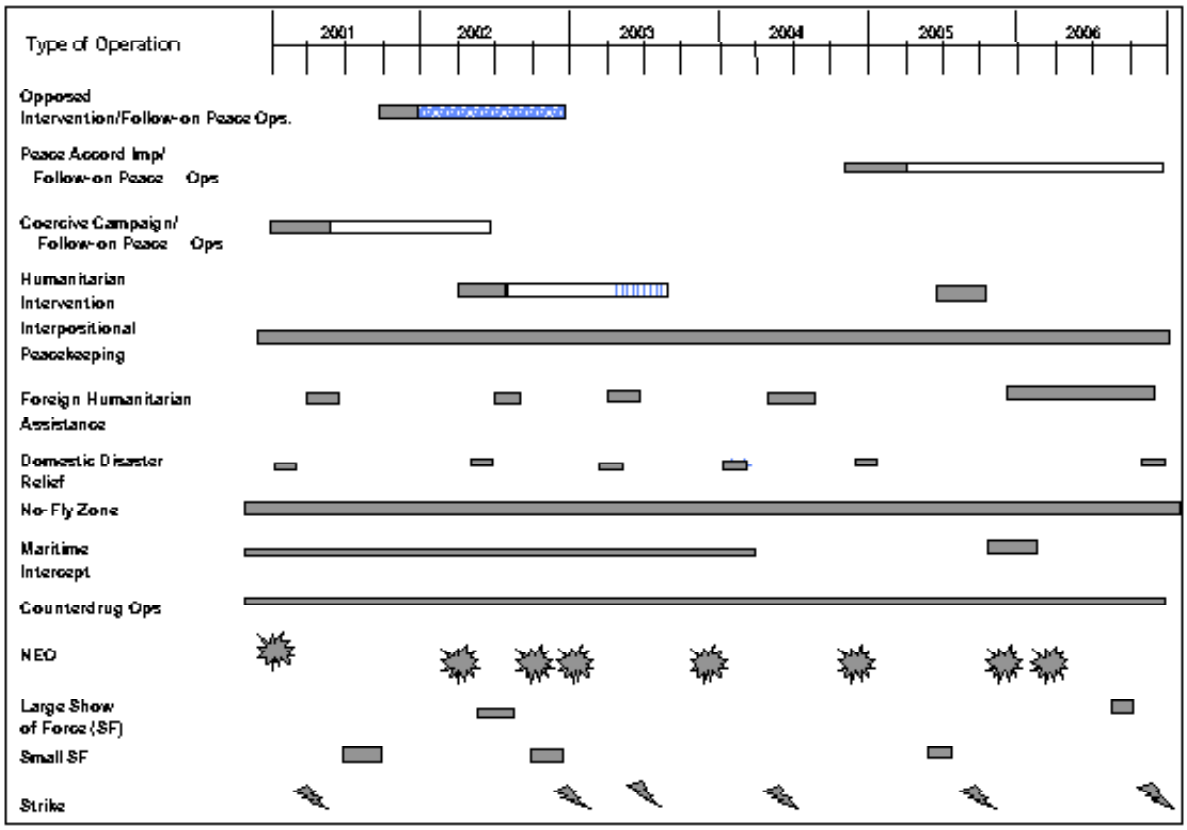

Figure 1: Possible Future.

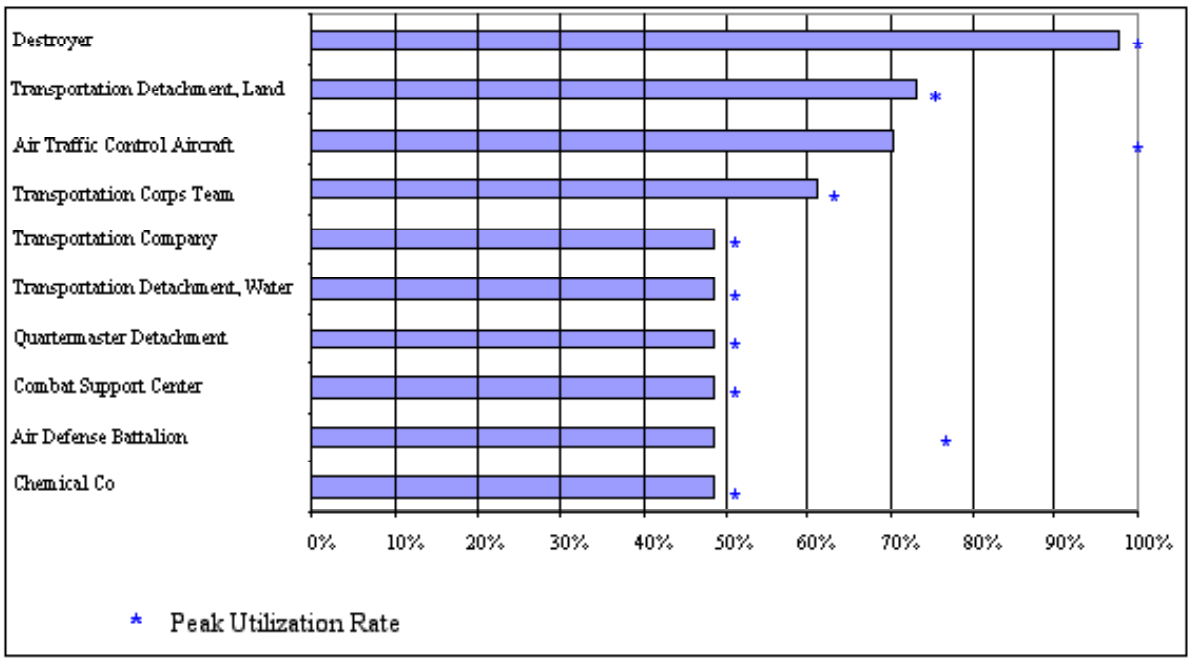

Figure 2: Average Utilization Rate over Time.

ALTERNATIVE FORCE STRUCTURE IMPACTS

Additionally, for a given set of futures, the US force structure can be altered to measure the impact of a set of vignettes. Figure 3 provides an illustrative example of possible outcomes.

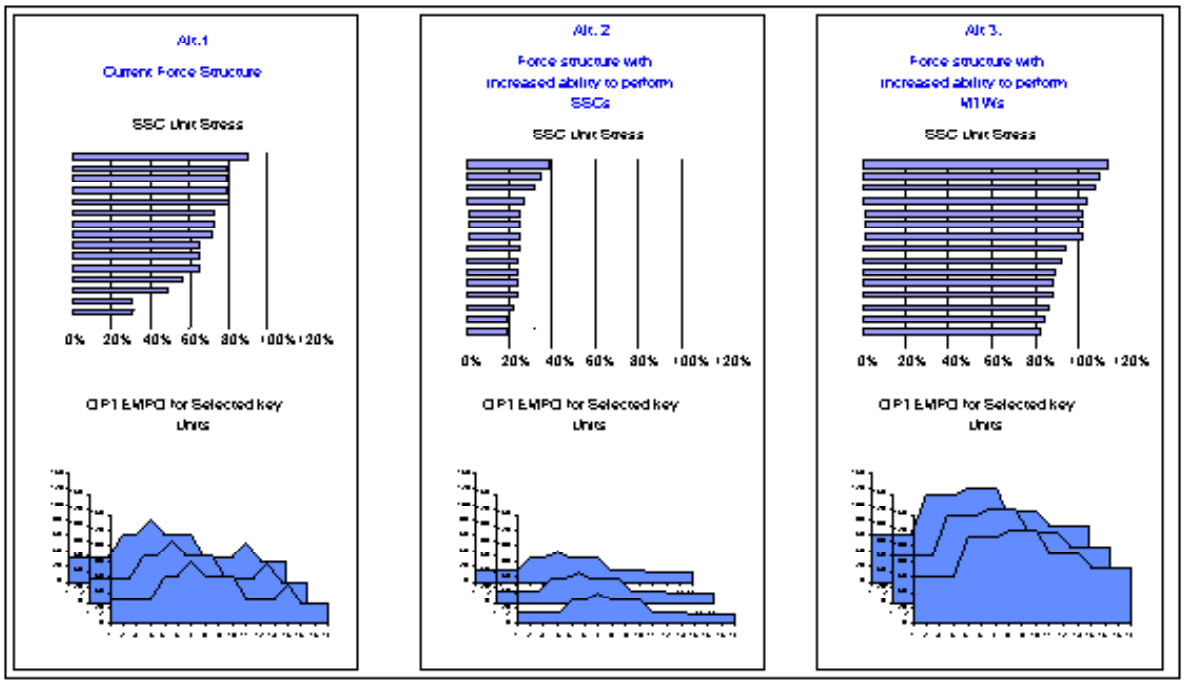

Figure 3: Depicting Effects of SSC Stress for Illustrative Alternative Force Structures.

FACTORS INFLUENCING SSC STRESS

Substitution as defined in the context of SSC operations is the use of one or more units to satisfy a requirement for a unit that is currently unavailable (a shortage of assets in the DOD force structure, not operationally ready due to personnel or equipment shortages). Earlier in the paper it was mentioned that substitutions may be a way to help alleviate stress on certain US forces. If there is a requirement for an Infantry Battalion that is either unavailable or in short supply, it may be possible to use another type of battalion to fulfill the SSC requirement based on the type of SSC and other factors such as mission, enemy (if there is one), time, terrain, and numerous other factors all influencing the feasibility of using a particular substitute. The substitution criterion is a key factor in determining the level of stress and whether the SSC operation can be carried out. If the substitution criteria is flexible (e.g., there are numerous unit types capable of fulfilling the SSC requirement) then stress can most likely be reduced. However, if there is a stringent criterion (e.g., trying to find a reasonable substitute for JSTARS or AWACS) it will most likely be increased. It is important to understand for a given type of operation, which kinds of substitutions are reasonable and which are not. It would be very helpful if reasonable sets of simple substitution rules by SSC type can be established for SSC modeling assessments.

Other factors, which affect the stress on units, include the rotation base of the forces involved. As a general rule, SSC of short duration will produce only modest stress, but long duration SSC (typically those beyond six months) may require a rotation base, which can substantially increase stress. In addition to the actual SSC operation, the units also have training and exercise requirements to help maintain their readiness, and other operational activities.

ALLEVIATING UNIT OVER USE

There are some things that can be done to help alleviate the stress on certain units. Add more of the affected units to the resource pool. Review both number of required units and the rotation factor for those units. Alternatively you can reduce the rotation factor, usually by decreasing readiness levels of a unit (e.g., reduced training and operational activities). An increase in the number a specific unit type must be measured against the potential cost of a unit.

Expand substitution opportunities by forming more flexible units within DoD. For example, train infantry units in Military Police duties. There will need to be an assessment done of the associated financial costs, impact on readiness, and on the ability to conduct major theater war. Examine the participation of non-DoD forces (e.g., allies, NGOs, contract personnel, IOs, PVOs, etc.) in a higher proportion for certain operations.

Decrease the demand for certain assets by not participating in SSC operations that use up those forces. Perhaps the most cost-effective in the short term but must be balanced against strategic risk for the long term.

CONCLUSION

Based on the work to date and the databases that have been developed, we are ready to conduct analysis on the effects of multiple SSCs on the current or alternate DOD force structures. This is an analysis we will be embarking on in earnest over the next year. We believe the approach described above holds great potential for clearly identifying the true dimensions of a problem that until now seems all too real but frustratingly anecdotal. However, we feel our analysis will be ultimately limited if it does not include participation from allies. This potential limitation arises from the simple fact that SSCs have been almost without exception coalition operations so that analysis which does not include participation by such allies will necessarily be of limited utility.

We hope that it will be possible in the near future for several if not many possible SSC participants to join us in this analytic effort. We believe this analysis would be even more enhanced by the addition of non-governmental and other non-state actors who participate in SSC. It is our hope that such a comprehensive approach to the demands of SSCs on participating nations and organizations will clearly illuminate the challenges confronting those seeking to enhance peace and stability with justice in the post cold war world. We look forward to embarking on this exciting task and hope someday to be able to discuss preliminary results at some future Cornwallis Conference.