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# MILITARY OPERATIONS RESEARCH SOCIETY



**MORS Workshop**  
**Capabilities Based Planning:**  
**The Road Ahead**  
19-21 October 2004  
Institute for Defense Analyses  
Arlington, Virginia

**Chairs: James Bexfield, FS and Lisa Disbrow**

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This Military Operations Research Society report summarizes the proceedings of a workshop conducted over three days by experts, users and participants interested in quantifying the relationship between testing and simulation. It is not intended to be a comprehensive treatise on the subject. It reflects the major concerns, insights, thoughts and directions of the participants at the time of the workshop.

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# EXECUTIVE SUMMARY

## ***Background***

The Military Operations Research Society (MORS) conducted a Capability Based Planning (CBP) workshop in Washington, DC, October 2004. Interest in the understanding and implementation of CBP was keen as more than 230 attendees gathered at the Institute for Defense Analyses for the three-day conference. The workshop included several plenary sessions with keynote addresses by high-level defense officials, a special educational session to make attendees aware of the state of the art in CBP and several working group sessions addressing specific CBP-related issues.

The goals of the MORS CBP workshop were to inform the community of DoD's progress to date in implementing this new paradigm for planning, to review the lexicon and suggest changes, and to exchange concepts and new ideas that will further the development of the Secretary's CBP initiative. As a result of these discussions, the attendees gained a better appreciation of what CBP is, where it fits, and how it is different from business as usual.

Several topics were suggested for a follow-on workshop, including: analytic techniques appropriate to the three levels of CBP; tools for adaptive planning analytic support for roadmaps; characterizations and measurement of risk; the role of costs in CBP; the role of architectures in CBP; and, interagency collaboration.

## ***Keynote Addresses***

Four senior defense officials presented the keynote addresses and enthusiastically endorsed the need for a department-wide transformation of the defense planning process. The first speaker, Mr. Christopher "Ryan" Henry, Principal Deputy Under Secretary of Defense for Policy discussed the scope of CBP encompassing operational planning, resource allocation, and organizational transformation throughout the DoD. The 2005 Quadrennial Defense Review (QDR) will have a similar enterprise-wide scope, and CBP principles will help frame those issues. Mr. Henry defines CBP as a top-down, competitive approach for weighing options across a spectrum of challenges, with a careful regard for resource constraints. He felt that defining the top level capabilities that span the spectrum of challenges will enable DoD leaders to better understand joint capability gaps, redundancies, and opportunities, providing a foundation for cross-capability tradeoffs.

MG Ken Hunzeker, Vice Director of the Joint Staff for Force Structure, Resources, and Assessment, described the shifting focus of the Analytic Agenda. The Operational Availability studies that constitute Department effort to examine the defense strategy in a scenario context are shifting focus from traditional challenges to areas with a broader non-traditional "challenge space." MG Hunzeker also addressed the Joint Capabilities Integration and Development System (JCIDS) as the process for addressing end-to-end issues of requirements, acquisition, and testing. He sees only JCIDS as taking issues from policy, to concepts, to analysis and assessment, and then acquisition.

In the third keynote, Dr. Glenn Lamartin, Director for Defense Systems in the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, described the impact of CBP on the acquisition community. Two key initiatives to augment the current systems acquisition process are Capability Area Reviews (CARs) and Capability Roadmaps. CARs are

intended to provide “top down” overviews of capability areas linking policy, requirements generation, and acquisition and budget processes with program and Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities relationships. Similarly, Roadmaps provide a framework to prompt discussion, inform decisions, and capture strategic planning choices.

The final keynote speaker was Mr. Ken Krieg, Director of Program Analysis and Evaluation in the office of Secretary of Defense. Mr. Krieg emphasized CBP’s importance as a strategic planning framework that links planning, programming and budgeting functions with the requirements development and system acquisition processes. He introduced the concept of applying CBP to three levels of decisions:

1. Top-level decisions to help manage risk and allow senior officials to balance investments across capability areas.
2. Mid-level decisions to help determine the best way to accomplish missions or implement joint concepts.
3. “Level 3” or system level to help authorities determine what to buy, what to stop buying and what the key parameters are for systems we are considering to buy. He sees a need for consistent lexicon and clear linkages among and within the three levels.

The success of CBP at these three levels requires improved decision analysis techniques that incorporate military judgment and measure risk. The challenge is to effectively address the many possible scenarios and variations, a paucity of risk metrics, and need for organization structures that better support this type of analysis.

The remaining sessions on Tuesday focused on the status of CBP initiatives Department-wide, the ways in which allies are using CBP in their acquisition decisions, and how the four US services are employing the concept to help equip their forces.

### **Working Group Summaries**

The Wednesday and Thursday agendas were devoted to working groups, each with a specific focus. Highlights from these discussions are presented below.

#### **Working Group 1 - Methodologies for CBP**

This working group’s task was to explore analytical methods used in CBP. Three observations stood out as particularly important. First, more model development is needed in representing perception, cognitive, decision, behavioral, organizational, and social concepts in a military context. This is particularly significant for scenarios addressing non-traditional futures. CBP tools should be able to represent not only adversary actions, but also responses from other nations, including allies and friends. Deriving the requisite data, particularly for threat forces, will be a challenge. Second, CBP requires the production of a greater variety of scenarios. Endeavors so far are laudable, but improvements are necessary to enhance the timeliness, responsiveness, and completeness of DoD’s scenario databases. Finally, a common capability framework-encompassing projections of risk, uncertainty, and preferences-will allow consistency across services, OSD, the Joint Staff, other agencies, and US allies.

#### **Working Group 2 - Taxonomy, Lexicon, and Implementation of CBP**

This working group included Australian, Canadian, British, and Israeli representatives as well as US participants from OSD, the Joint Staff, and the military services. The group broke into two

teams, one to review and comment on the common lexicon and the other to compare organizational approaches to CBP. The group identified a wide-range of definitions used in CBP, but found that there is consensus on the approach to take in conducting analyses. Participants, while noting that common processes are more important than common labels, still stressed the need for a common CBP language to improve the community's ability to collaborate on and compare analyses.

### **Working Group 3 - Applying CBP to Adaptive Planning**

Adaptive planning (AP) involves the creation, refinement, and management of deliberate and crisis-action operational plans within the Defense Department. The ultimate goal of AP is to produce robust plans with multiple feasible options in months, not years. AP will allow planners to refine, adjust, or completely change plans rapidly. The objectives of the working group were to: (1) educate the community on the AP concept; (2) identify the capabilities needed to perform AP tasks; and (3) suggest initiatives in the areas of people, products, personnel, and tools that would advance the development of AP capabilities. The working group identified seven tasks necessary to implement CBP in an AP environment: force capabilities identification and sourcing, wargaming, plan/project management (both within and across plans and projects), assessment of non-kinetic effects, interagency coordination, global force management, and plan annex development. Several suggestions were made to help alleviate current deficiencies. First, the Department should develop a glossary and a common set of tools and databases to enable adaptive planning and capabilities development to be performed collaboratively and concurrently. Second, planners and analysts should work in parallel rather than sequentially. Consideration should also be given to training analysts as planners and to placing analysts on J-5 staffs. Third, greater emphasis should be placed on developing techniques and tools for planning and analysis of non-traditional forms of warfare.

### **Working Group 4 - Applying CBP to Future Force Planning**

Transformation in force planning includes important new concepts, especially the incorporation of fiscal constraints and risks at all stages of the decision process. This working group explored eleven recent CBP efforts and examined how well they met the principles of CBP analysis. The group identified several roadblocks to implementing the CBP strategy. First, the lack of an accepted lexicon and taxonomy has caused widespread inefficiencies. Second, while the need to incorporate fiscal constraints into CBP activities is clear, there has been only limited guidance to date on when and how such factors should be included in future force planning. Similarly, while defense planners have accepted the need to better characterize risks entailed in decisions, there has been little guidance on how to quantify, or even describe, risks to decision makers. This working group offered four recommendations. First, the taxonomy problem must be solved. Without a DoD-wide taxonomy for capabilities, comparisons and trade-offs are difficult, if not impossible to make. Second, a five to ten page white paper on CBP principles is desperately needed, as no complete guidance exists. Third, strategic guidance and study taskings must contain more precise risk guidelines (or at least require that the implications of adopting certain risk levels be explicitly assessed). And finally, exemplar CBP studies are needed at all levels in order to provide examples for analysts.

### **Working Group 5 - Application of CBP to Acquisition**

This working group examined CBP as it applies to the transformed acquisition process. Many new tools and processes are being developed in support of acquisition at the capabilities level. For the acquisition community, a key "process handoff" takes place when capability needs

transition from JCIDS to the 5000-acquisition process. Specific criteria should exist for entering key acquisition decision points. Shared involvement by the acquisition and requirements communities facilitates the identification and elimination of capability gaps. Systems engineering (SE) is an important enabler for capabilities-based acquisition. Traditional SE principles are sound; however, their application at the capabilities level means raising the focus above a single program, and involving systems engineers earlier in the requirements and concept refinement process. To incorporate Department-wide systems engineering principles across the CBP process, a workforce with a broader skill set and more specialized analytical capabilities will be needed. Management at the capabilities level is essential to ensuring individual programs are able to meet capability area needs. The working group identified key elements needed for effective management, including a broad understanding of definitions, consistent, accessible data sets; and tools that enable visual understanding of dependencies across broad areas of interest. The group felt that capability roadmaps could take different forms, and be developed for varying levels of analysis, to support resource allocation and execution decisions.

### **Synthesis Group**

One of the major challenges identified by two workshop participants was the lack of consistent definitions. The Synthesis Group developed the set of CBP definitions below using Mr. Henry's (OSD Policy) capability definition and the Joint Staff's working definitions as starting points:

- *Mission*: The purpose(s) (objectives and end state) assigned to a commander.
- *Conditions*: The values of operational environment variables, including scenarios that affect task performance.
- *Effect*: A change in a condition, behavior, or degree of freedom
- *Capability*: The ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks. [Mr. Henry's definition]
- *Task*: An action or activity (derived from an analysis of a mission and concept of operations) assigned to an individual or organization to provide a capability.
- *CONOPS*: The overall picture and broad flow of tasks assigned to subordinates/supporting entities within a plan by which a commander maps capabilities to effects in order to accomplish a mission in a specific scenario.
- *Scenarios*: Assumptions about the political-military context of an operation, including adversaries, friendly forces, and neutrals.
- *End State*: A set of conditions, behaviors, and degrees of freedom that defines achievement of a commander's mission.
- *Standards*: Quantitative or qualitative measures that gauge the levels of performance of a task. This is a new definition. The previous definition of "minimum proficiency" was believed to be useless for future force structure and acquisition decision making. A definition is needed that provides trade space for planners and acquisition authorities.

The Synthesis Group also found that multiple objective decision analysis (MODA) was an appropriate technique that had been used in many of the CBP studies that were presented at the conference. This operations research technique can inform decisions with multiple conflicting objectives, large uncertainties, and complex alternatives. It incorporates military judgment, can be accomplished in a short time frame, and provides transparency to stakeholders and decision makers.



## **Key Findings**

The working groups presented a number of findings for the conference summary. The key findings were:

- The proposed lexicon (included in this document) is acceptable.
- Allied countries provide a unique perspective as they adapt Capabilities Based Planning in similar ways but with different lexicons and a focus on joint acquisition.
- “Decision analysis” should be used in top-level CBP as it incorporates military judgment and risk. Examples include Value-focused Thinking and Portfolio Management.
- The analysis community needs to better share applications and methods of CBP.
- CBP analysis is complex due to the number of scenarios and the variation within each scenario, the absence of risk metrics and criteria and an analytical structure that is ill suited for this type of analysis.
- A “white paper,” explaining CBP principles with associated examples, would significantly contribute to the needs of the analysis community.

In addition to the working groups findings, the synthesis group highlighted several crosscutting findings:

- Services have implemented differing CBP frameworks
  - Linking to evolving Joint framework has been difficult
- Most CBP presented focused on the traditional challenge
  - Lack accepted models for other three challenge areas (Disruptive, Catastrophic, Irregular)
  - Accepted models and data are lacking for many of the capability areas (stability operations, interagency integration, etc.).
- Those activities with the most positive impact are broad, inclusive, collaborative, and facilitate data sharing
  - Databases and tools
- A useful operations research technique for multiple conflicting objectives, large uncertainties, and complex alternatives is decision analysis (e.g. Value-focused Thinking, Multi-attribute Utility)
  - Driven by time and transparency
  - Need to incorporate military judgment
  - Supports risk assessments



## **Workshop Summary**

### **Background**

A MORS Workshop titled, "*Capabilities Based Planning: The Road Ahead*" was held at the Institute for Defense Analyses in Arlington, Virginia, 19-21 October 2004. Over 230 analysts and defense decision makers participated. Among the attendees were foreign representatives from Australia, the United Kingdom, Canada, and Israel.

### **Workshop Overview**

The workshop was comprised of three sessions: The pre-workshop seminar, a mini-symposium, and the workshop.

#### **Pre-Workshop Seminar (CBP educational briefings on 18 October 2004)**

A pre-workshop special education seminar was held for those unfamiliar with some of the recent work in CBP. The intent of this educational session was to develop a common understanding of the current state of CBP among all the conference attendees.

#### **Mini-Symposium (Day 1 - 19 October 2004)**

On Tuesday the plenary session began with keynote addresses from four senior defense officials providing their perspectives on the importance of the new capabilities based planning paradigm.

#### **Workshops (Days 2 and 3 - 20-21 October 2004)**

The mini-symposium was followed by a two-day workshop on Wednesday and Thursday. The participants met in six working groups: 1) Methodologies for CBP; 2) Taxonomy, Lexicon, and Implementation of CBP; 3) Applying CBP to Adaptive Planning; 4) Applying CBP to Future Force Planning; and 5) Application of CBP to Acquisition. A synthesis group examined insights across all five working groups and developed a crosscutting set of workshop findings. The groups presented out briefs of their deliberations, observations, findings, and recommendations at a final plenary session.

#### **Pre-Workshop Seminar**

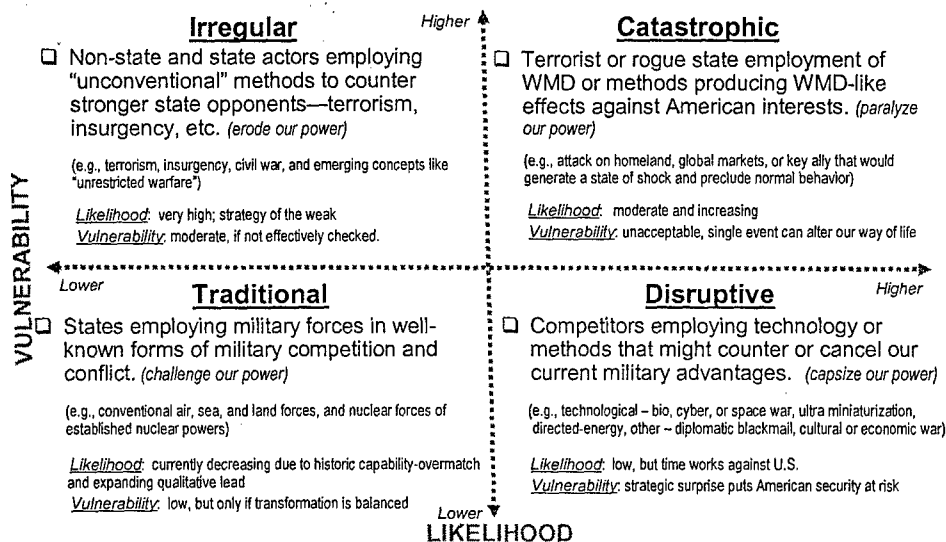
As CBP is relatively new, Sue Iwanski developed a special education seminar held on Monday afternoon that included seven CBP background briefs:

1. "CBP Ontology," presented by CDR Todd Kiefer of the Joint Staff (J7), proposed a task based approach for a common language and data architecture for DoD Capabilities Based Planning.
2. "Where We are Today," presented by Mr. Vance Gordon of OSD (PA&E), described the DoD transformation process
3. In the "JCIDS Overview" Mr. Joe Bonnet of the Joint Staff (J7) described the Joint Capability Integration and Development System using the capability based methodology to link concepts to capabilities. He also described the Joint Integrating Concepts Process as well as JCIDS oversight.
4. The "Analytic Agenda Update," presented by Dr. Jim Stevens of OSD (PA&E) and Lt Col Bruce Hollywood of the Joint Staff (J8), described the Department-wide agreement to make major, joint analysis efforts more effective, efficient and relevant.

5. Mr. Gordon's second brief titled "DoD's Planning Programming and Budgeting System (PPBS)." gave an overview of PPBS, its purpose, how it evolved, the process and current initiatives.
6. The "Adaptive Planning" brief by Mr. Tim Hoffman, OSD (Policy), proposed a vision for adaptive planning to solve the problem of the "deliberate" planning process being insufficiently responsive and relevant in today's dynamic security environment.
7. Dr. Drew Miller of the DoD Business Management Modernization Program made a presentation on "Capability Delivery Groups" where he described a Capabilities Based PPBE framework using capability delivery groups.

### Mini-Symposium (Summaries of Briefings)

**"Building Top-Level Capabilities"** Mr. Christopher "Ryan" Henry, Principal Under Secretary of Defense for Policy, led off the conference by discussing the scope of CBP, which encompasses operational planning, resource allocation, and organizational transformation throughout the Department. He defines CBP as a top-down, competitive approach for weighing options across a spectrum of challenges, with a careful regard for resource constraints. It will link DoD-wide decisions with the defense strategy and apportion risk across the range of challenge areas: traditional, irregular, catastrophic, and disruptive (Figure 1). Defining top-level capabilities that span the spectrum of challenges will enable DoD leaders to better understand joint capability gaps, redundancies, and opportunities, providing a foundation for cross-capability tradeoffs. CBP will help frame the issues for the Quadrennial Defense Review.



**Capabilities-based planning should apportion risk across challenges**

Figure 1. CBP Challenges—Risk Horizon

**"The View from My Foxhole"** The second address was from MG Ken Hunzeker, Vice Director of the Joint Staff for Force Structure, Resources, and Assessment, and addressed the Joint Capabilities Integration and Development System as the process for addressing end-to-end issues

of requirements, acquisition, and testing. He sees the value of JCIDS as taking issues from policy to concepts to analysis and assessment, and then acquisition.

He also described the shifting focus of the Department's Analytic Agenda. As the Defense establishment was heavily focused on traditional challenges in the past, circumstances dictated that we better address risk outside the "traditional" challenge area and across the entire risk horizon.

As a result, the Operational Availability (OA) studies that constitute Department efforts to examine the defense strategy in a scenario context are increasing their emphasis on the non-traditional "challenge space" associated with irregular, catastrophic, and disruptive warfare areas (Figure 2).

Draft Working Papers

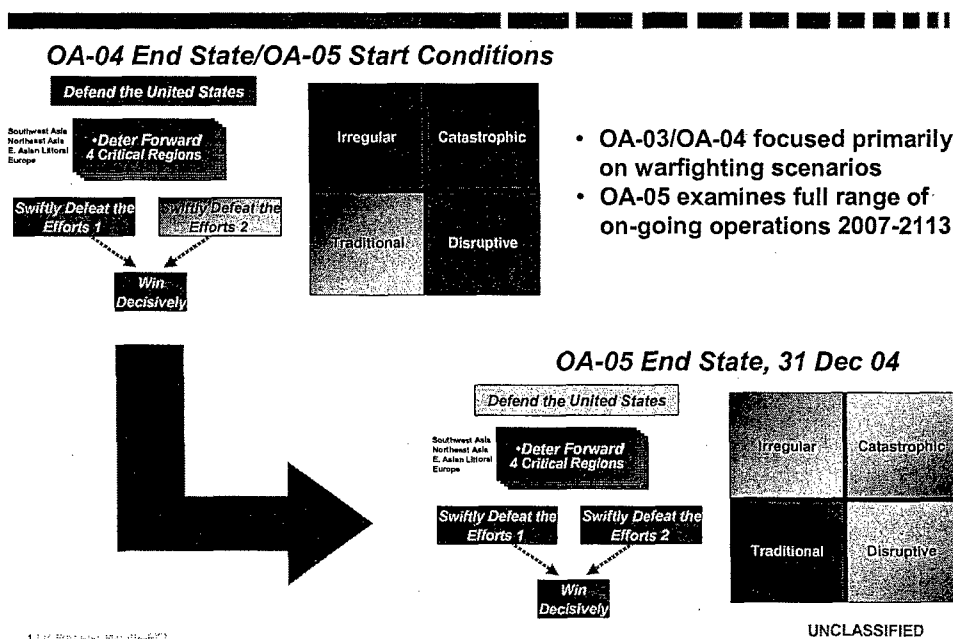


Figure 2. Analytical Progress

*“Capability Based Planning: An Acquisition Perspective”* Dr. Glenn Lamartin, Director for Defense Systems in the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, described the impact of CBP on the acquisition community. Figures 3 and 4 describe Capability Area Reviews (CARs) and Capability Roadmaps as two key initiatives to augment the current systems acquisition process. CARs are intended to provide “top down” overviews of capability areas linking policy, requirements generation, and acquisition and budget processes with program and Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities (DOTMLPF) relationships. Similarly, Roadmaps provide a framework to prompt discussion, inform decisions, and capture strategic planning choices for a collection of programs that support a mission area.



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***USD(AT&L), as Defense Acquisition Executive, will lead reviews of select capability areas to:***

- Provide mission area context – from a top-down perspective
- Implement capability based methodology on provider side
- Link policy, capability generation, acquisition, and budget processes
- Identify joint solutions and added work to be done (across DOTMLPF)
- Reveal need for management, engineering, and testing across an area
- Help align individual program expectations
- Provide basis to set metrics and gauge progress over time
- Assess the cumulative effect of individual program decisions
- Wide participation is essential

**Figure 3. Capability Area Reviews**



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***Roadmaps provide a framework for decision making – prompt discussion, inform decisions, and capture decisions made***

- Lay out Department's strategic plan considering:
  - Materiel and non-materiel solutions
  - Capability that only exists at Family/System-of-Systems level
  - What to expect from each system
  - Cross-cutting management, engineering, and testing
  - Network enablers
  - Affordability
- Nature of Roadmaps will vary by topic
- Start with the "as is" and show where we want to go
- Must balance decisions across capability areas

2

**Figure 4. Roadmaps and Roadmapping**

***“Capabilities Based Planning: The View from PA&E”*** Mr. Ken Krieg, Director of Program Analysis and Evaluation in the office of Secretary of Defense, emphasized CBP's importance as a strategic planning framework that links planning, programming and budgeting functions with the requirements development and system acquisition processes. He sees CBP as an emerging art that needs a common language to describe “capabilities,” a common means of assessing risk to support tradeoff decisions, and a common means of developing/proposing capability options — particularly cross-capability/cross-component trades.

Mr. Krieg described his view of a framework for managing change (Figure 5) by comparing key aspects of the historical view of addressing change with future objectives that we are already

working towards. He then went a step further by also describing the tools needed (some yet to be fully developed themselves) to accomplish these future objectives.

Historical World View	Future Objectives	Developing Tools
Central Planning	Adaptive and Dynamic Planning	Changes to War Planning and Support Tools
Fixed, Predictable Threat	Capabilities Against Shifting Threats	Capabilities Based Planning Joint Operational Concepts New Modeling Approaches
Mature Business and Organization	Mix of New and Mature Organizations	SJTF, UCP realignment, OSD changes
Inputs Based Management – Focus on Programs	Output Based Management Focus on Results	Global Force Management Balanced Risk Scorecard Metrics
Appropriated Funds – “Cost is Free”	More Market-like and price based	Offsets Required Portfolio Thinking
Segmented Information Closed Architecture	Networked Information – Open Architectures	Horizontal Integration GIG Standards BMMP
Stovepiped and Competitive Organizations – “Zero sum Enterprise”	Aligned Organizations with common and shared objectives	Capabilities Equivalencies Training Transformation Integrating Processes/JCIDS

2

**Figure 5. Managing the Change.**

Mr. Krieg then introduced the concept of applying CBP at multiple decision levels, each with its own perspective. The three levels of decisions suggested (Figure 6) are: top-level decisions to help manage risk and allow senior officials to balance investments across capability areas, mid-level (“level 2”) decisions to help determine the best way to accomplish missions or implement joint concepts and “level 3” or system level decisions to help authorities determine what to buy, what to stop buying and what the key parameters are for systems we are considering to buy.

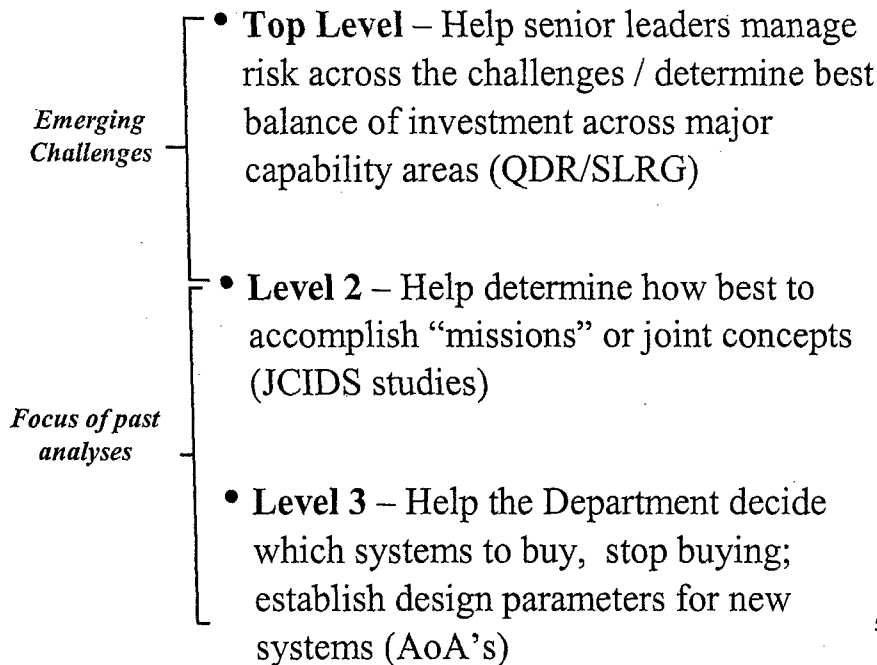


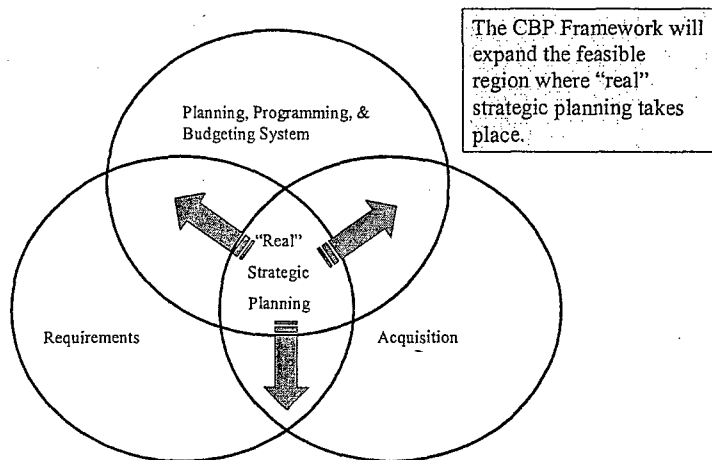
Figure 6. Levels in CBP

In addition to describing a framework for change and the levels in CBP, Mr. Krieg offered six Planning, Programming, Budgeting System principles — still valid — that date back to the 1960s:

- Decisions should be based on explicit criteria of national interest, not on compromises among institutional forces.
- Needs and costs must be considered simultaneously.
- Major decisions should be made by choices among explicit, balanced, feasible alternatives.
- The Secretary should have an active analytic staff to provide him with relevant data and unbiased perspectives.
- Open and explicit analysis, available to all parties, must form the basis for major decisions.
- A multi-year force and financial plan is required to project the consequences of present decisions into the future.

Lastly, in Figure 7 he described the need to expand the region where strategic planning takes place by better integrating and synchronizing the requirements process, PPBE, and acquisition system. This will facilitate the development of affordable capability portfolios that hedge against uncertainty and increase costs to adversaries while suppressing our costs.





6

Figure 7. Integrating processes.

**Allies and Components Briefings.** During the afternoon session of the mini-symposium, allies and components made some thought-provoking presentations. The Technical Cooperation Programme (TTCP) presentation was given by Dr. Ben Taylor of the UK, this programme includes allies from Australia, Canada, New Zealand, the United Kingdom, and the United States). In his brief: “Guide to Capability-Based Planning” Dr. Taylor described the background, structure and definition of CBP and what makes it different, as well as the advantages of CBP and its role in defense planning. Dr. Taylor described CBP as a complex process that starts with overarching guidance, identifies capability gaps, explores options and ends with an affordable investment plan. Two generic steps make up the process: Stage One: “Where are we?” and Stage Two: “What to do?” (Figures 8 and 9). In reference to Stage One (Figure 8), Dr. Taylor made observations about the criticality of time frames:

- CBP may be conducted against a single future time frame or a set of time frames.
- The time frames must be consistent across all capability partitions.
- The set of time frames selected should:
  - Cover a sufficient span of time so that there is freedom to act and bring about change.
  - Allow the assessment of risk in intermediate time frames.

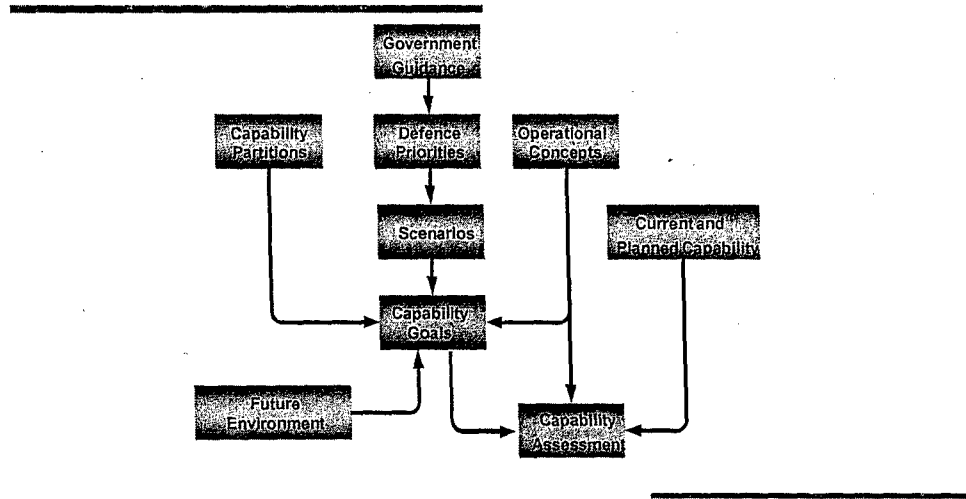


Figure 8. Stage One: Where are we?

Addressing Stage Two (Figure 9), Dr. Taylor provided further insights on balancing investment:

- Determining the set of force development options to follow is not easy
  - Options will include deletions as well as additions
- Decisions will require a subjective view on risk and priority
  - A purely analytical approach may not be feasible
- Some form of structured judgment process directly engaging senior leadership is preferred

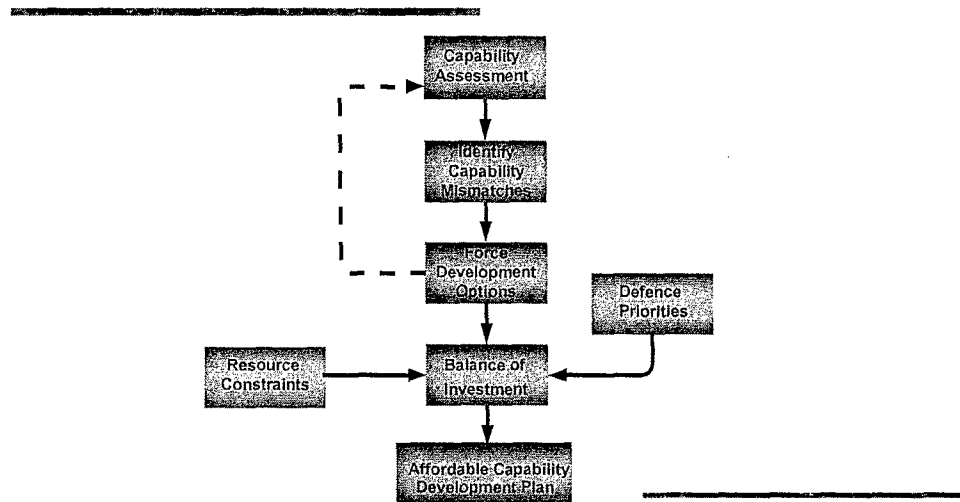


Figure 9. Stage Two: What to do?

Additionally, he spoke of the importance of scenarios to the process and the criticality in developing an agreed upon partition scheme that avoids being aligned with inappropriate organizational boundaries and avoids looking like characteristics of existing systems. In summary, he made the following observations about CBP:

- Caters to a more diverse and dynamic strategic environment.
- Links procurement decisions to strategic goals and provides an audit trail.
- Encourages innovation through moving away from determining equipment solutions prematurely.
- Enhances the quality of information available to defense decision makers and capability developers.

The afternoon session ended with Service and COCOM briefs that highlighted the whole of the Defense establishment's interest in developing and using capability based planning. These briefs and discussions detailed the superior work and varied approaches that the components are pursuing to move the CBP development process forward. The briefs also emphasized the need for continued efforts at integrating the various approaches.

- USAF: "Capabilities Based Planning" by Col Darhaus Mitchell (AF/XOX-CONOPS)
- USA: "Analysis Support of FD" by COL George Prohoda (DAPR-FDA)
- USN: "Capability Basis for Navy Program Development" by A.H. Barber (N81B)
- USMC: "Expeditionary Force Development System" by Mr. Erik Doyle
- USPACOM: "Linking Plans to Resources" by Dr. Michael Fischerkeller

## **Working and Synthesis Group Reports**

### **WG 1 - Methodologies for CBP**

Chaired by Mr. Bart Bennett and Mr. Greg McIntyre, Working Group 1 had three major observations. First, more model development is needed in representing perception, cognition, decisions, behavior, organizations and social concepts in a military context. This is especially important when analyzing non-traditional futures. Second, that CBP requires production of more scenarios with greater variety. Lastly, a common capability framework should encompass risk, uncertainty and preferences, which will allow consistency across services, OSD the Joint Staff, other agencies, and US allies. The WG 1 briefing begins on page 19.

### **WG 2 - Lexicon, Taxonomy, and Implementation of Capabilities Based Planning**

This working group, chaired by Clay Bowen and Chuck Werchado, included allied participants (Australian, Canadian, British and Israeli representatives) and stressed the need for common CBP language to improve the community's ability to collaborate and compare analyses. The WG 2 briefing begins on page 37.

### **WG 3 - Applying CBP to Adaptive Planning (AP)**

Co-chairs Bob Clemence and Tim Hoffman described AP as the creation, refinement, and management of deliberate and crisis action operational plans. The goal of AP is to produce robust plans with multiple feasible options in months, not years. The working group identified seven tasks necessary to implement CBP in an AP environment:

1. Force capabilities identification and sourcing.
2. Wargaming.
3. Plan/project management.
4. Assessment of non-kinetic effects.
5. Interagency coordination.
6. Global force management.
7. Plan annex development.

The WG 3 briefing begins on page 53.

### **WG 4 - Applying CBP to Future Force Planning**

The working group co-chaired by Jim Thomason and Kirk Yost offered four recommendations. First, solve the taxonomy problem. Without a DoD wide taxonomy, capabilities comparisons and tradeoffs are challenging. Second, publish a white paper on CBP principles. Third, provide more precise risk and strategic guidance in study taskings. Finally, produce exemplar studies at all levels in order to provide examples for analysts. The WG 4 briefing begins on page 71.

### **WG 5 - Application of CBP to Acquisition**

Working Group 5 co-chaired by Kristen Baldwin and LTC Bob Larsen found that traditional systems engineering principles are sound but the application at the capabilities level requires raising the focus above the single program level. This requires a workforce with a broader set of skills and more specialized analytical capabilities. Effective management at the capabilities level requires broad understanding of definitions, consistent and accessible data sets, and tools that enable visual understanding of dependencies across broad areas of interest. The WG 5 briefing begins on page 87.

## **Synthesis Group**

Based on working groups' identification of inconsistent definitions as a major challenge, the synthesis group, chaired by Dr. Greg Parnell, FS, developed a set of CBP definitions using Mr. Henry's capability definition and the Joint Staff's working definitions as starting points. The synthesis group also found that multiple objective decision analysis (MODA) was an appropriate technique used in many of the CBP studies presented at the conference. This operations research technique can inform decisions with multiple conflicting objectives, large uncertainties, and complex alternatives. It can be accomplished in a short time frame, and provides transparency to stakeholders and decision makers. The Synthesis briefing begins on page 119.



**MORS Workshop Outbrief:  
Capabilities Based Planning -  
The Road Ahead**

19-21 October, Alexandria, VA



**Working Group 1 - Methodology**

Chairs and Advisors:  
Dr. Bart Bennett  
Lt Col Darren Durkee  
Dr. Mark Gallagher  
Dr. Greg McIntyre

This annotated briefing overviews the presentations and discussion of the Methodology Working Group (WG 1) that was part of the MORS Capabilities Based Planning Workshop held 19-21 October 2004 at the Institute for Defense Analyses (IDA) in Alexandria Virginia. Preparations for the working group sessions were performed by Dr. Greg McIntyre, Applied Research Associates, Inc., and Dr. Bart Bennett, The RAND Corporation. Working group sessions were conducted by Dr. Bart Bennett and Lt Col Darren Durkee, J8, with the assistance of Dr. Mark Gallagher, USSTRATCOM/PR12.

## Members

- ◆ Mr. Nickolas P. Angelo
- ◆ Lt Col James R. Ayers
- ◆ Mr. Millard I. Barger
- ◆ Dr. Bart Emil Bennett
- ◆ Dr. Joseph J. Bolmarcich
- ◆ Mrs. Mary T. Bonnet
- ◆ Mr. John R. Brinkerhoff
- ◆ MAJ John H. Bruggeman
- ◆ MAJ Stephen P. Chambal
- ◆ Mr. Charles S. Chellis
- ◆ Mr. Adam F. Clark
- ◆ Mr. Paul Czarzasty
- ◆ Maj Scott DeThomas
- ◆ Lt Col Darren P. Durkee
- ◆ Mr. Norman Edwards
- ◆ Eugene Frament
- ◆ Mr. John S. Furman
- ◆ Dr. Mark A. Gallagher
- ◆ MAJ Karl H. Gingrich
- ◆ Mr. Russell Hayes
- ◆ Mr. Hubert H. Jr. Hill
- ◆ Mr. Michael J. Hilton
- ◆ Ms. Susan M. Iwanski
- ◆ Maj Todd E. Key
- ◆ Mr. Michael Scott King
- ◆ Mr. Ron Kroecker
- ◆ Mr. Wallace R.G. Langbehn, II
- ◆ Mr. Frank T. Lawrence
- ◆ Mr. Chris E. Leak
- ◆ Mr. Harry Lewis
- ◆ Paul Massel
- ◆ Dr. Gregory A. McIntyre
- ◆ Col Darphaus L. Mitchell
- ◆ Mr. William F. Montgomery
- ◆ Mr. Michael J. Morin
- ◆ Mr. Gary L. Mullen
- ◆ Darrell Newcomb
- ◆ Capt Phyllis D. Noble
- ◆ Dr. Lisa Oakley-Bogdewic
- ◆ Mr. James R. O'Brien
- ◆ Maj Zannas M. Pappas
- ◆ Mr. Dade J. Phillips
- ◆ Mr. Chad S. Quill
- ◆ Ms. Carol A. Quintero
- ◆ Mr. Michael R. Raker
- ◆ Maj Robert S. Renfro, II
- ◆ Dr. Francis Russell Richards
- ◆ Maj Jenns Robertson
- ◆ Lt Col Glenn G. Rousseau
- ◆ Mr. William A. Rumbaugh
- ◆ LTC Jeffrey Brian Schamburg
- ◆ Mr. Steven M. Shaker
- ◆ Mr. Ronald H. Smits
- ◆ COL Jose P. Sosa
- ◆ Mr. Baxter L. Sosebee
- ◆ Dr. Richard C. Staats, Jr
- ◆ Mr. Steven G. Starner
- ◆ Robert Sweeney
- ◆ Mr. Thomas A. Thompson
- ◆ CDR Timothy T. Tucker
- ◆ LTCol Floyd James Usry, Jr.
- ◆ Mr. Gary L. Waag
- ◆ Mr. Earl B. Wardell
- ◆ COL James Wasson
- ◆ Mr. Jordan L. Wescott
- ◆ Mr. David Leslie Wood
- ◆ Mr. Geary W. Younkin



Approximately 70 people registered for or attended the working group session representing a wide selection from the government, military, FFRDCs and industry. Working group sessions, held all day Wednesday 20 October and the morning of Thursday 21 October, were attended by 40-50 people.



## Methodology WG Charter

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- ◆ Focus on models, simulations, and other quantitative decision tools used to perform analysis in a CBP environment.
- ◆ Conduct a broad-range discussion in two prime areas
  - Current M&S activities and how they may be used by CBP
    - » Define and measure the transparency of models.
  - Unconventional methodologies may be of considerable use in CBP
    - » Examine some of these new approaches and suggest potential applications to analysis that supports CBP.

### Methodology > Models



The original charter of Working Group 1 was to focus on the range of models and simulations (M&S) that have been and are used to perform analyses in the style of capabilities based planning (CBP). Other quantitative decision tools were also to be considered. The charter further specified holding discussions in two primary areas: 1) current M&S activities with an emphasis on defining and measuring transparency; and, 2) new, unconventional methodologies that should be considered for CBP activities.

Responding to the working group charter was encumbered by the limited and varied perception of what CBP actually entails. Without definitions, a taxonomy, or well-understood concepts, there is no clear top-down vision on how M&S should respond to the CBP environment. Said another way, there is no capabilities based plan, yet, that can be used to determine the M&S needs for CBP.

More importantly, models, simulations, and other quantitative techniques are only a part of methodology. As important as the tools are, how the tools are used and in what contexts are also part of methodology and can have a greater impact than what the tools are composed of. Therefore, the Methodology Working Group broadened the charter statement to allow for discussion in these areas as well.

## Background and Key Definitions (1 of 2)

**Objective:** Desired outcomes. Tasks, effects, or changes (improvement) in either?

**Measures:** Assessable means for valuing options. Directly or indirectly related to the objective. Quantitative or Qualitative. Proficiency.

**Options:** Means or methods for accomplishing objectives.

**Assess:** Evaluate options in terms of the measures.

**Mix and quantity:** Combination and sufficiency of options providing most favorable values across multiple measures.

**Contexts:** Scenarios and scenario variations.

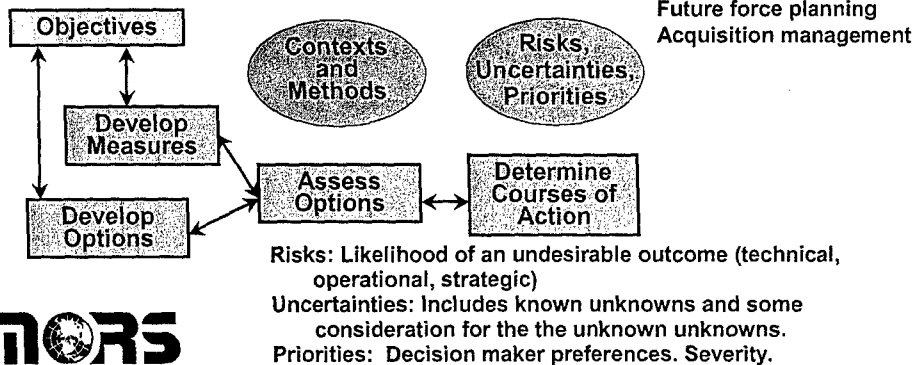
**Methods:** A wide range of evaluation tools.

**Purposes:**

Adaptive planning

Future force planning

Acquisition management



To derive a simple, general framework to support decision making, we appeal to a structure that should be quite familiar to analysts and decision makers alike. Various authors denote the pieces in different ways, but by-and-large, these elements are embedded, or should be embedded, within a rigorous treatment of a critical decision problem. We begin with the purpose or description of the decision problem. This workshop has proposed three general areas which mandate the need for analysis: 1) adaptive planning; 2) future force planning; and, 3) acquisition management. These three substantive areas were the topics of Working Groups 3, 4, and 5. Naturally, a good deal of overlap will exist between these working groups and this, the Methodology Working Group. Furthermore, the top-down discussion within the Methodology Working Group was limited by not having already had these other working groups establish the capability needs for the Methodology Working Group.

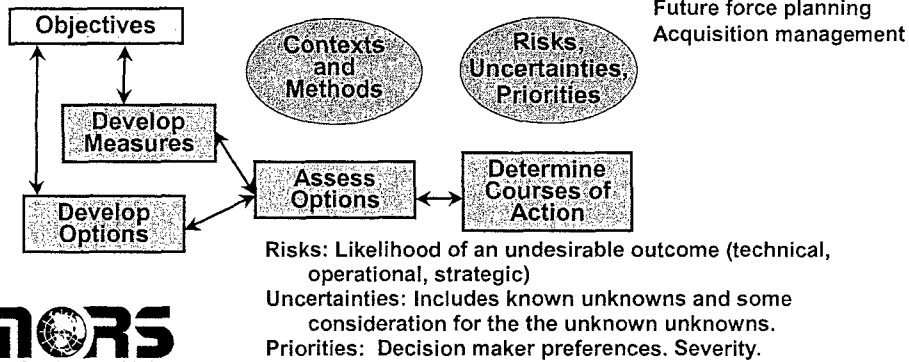
The next step in the decision making framework is to determine the overall objectives of the decision or policy problem. We recognize this is the part of the structure that will likely be the point of greatest overlap with the other working groups. In the parlance of CPB, we identify these objectives with the word capabilities. Some of the processes portrayed on the chart had significant components dedicated to determining what capabilities ought to be included. Although not recognized as a methodological step by some, the procedures for determining the objectives gives this whole process direction and can provide the fundamental motivation or justification for proceeding. Subsequent steps are often thought of as the more traditional methodological elements.

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## Background and Key Definitions (1 of 2 Cont.)

**Objective:** Desired outcomes. Tasks, effects, or changes (improvement) in either?  
**Measures:** Assessable means for valuing options. Directly or indirectly related to the objective. Quantitative or Qualitative. Proficiency.  
**Options:** Means or methods for accomplishing objectives.  
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**Mix and quantity:** Combination and sufficiency of options providing most favorable values across multiple measures.  
**Contexts:** Scenarios and scenario variations.  
**Methods:** A wide range of evaluation tools.

**Purposes:**  
 Adaptive planning  
 Future force planning  
 Acquisition management



We move next to developing capability measures. Objectives tend to be high-level descriptions of value. Most are difficult to measure directly or are composed of a set of measures such as effectiveness, task accomplishment, cost, and risk. Developing capability measures provides the solid and consistent criteria on which options will be assessed. This step often requires methodological creativity in order to identify measurable surrogates, in some rigorous quantitative or qualitative way, for the objectives.

Next we look at developing options. These are the building blocks that will be used to address the objectives and satisfy the decision problem. In order to suggest that a wide variety of options should be included, we have used the acronym DOTMLPF (doctrine, organization, training, materiel, leadership, personnel and facilities). The net here should be cast very widely. The process by which these options are solicited or determined is an important part of the overall methodology.

With measures and options determined, we then proceed to making assessments. This is the traditional area in which M&S is applied. As we have said, we view "methodology" as more than the assessment tools (M&S), although the selection of tools to appropriately perform the assessments is often the methodological piece that receives the greatest attention. As important is the context in which the assessments will be performed. By this, we mean the conditions and assumptions assumed in the assessment process. The development and usage of these contexts or scenarios is a crucial methodological process.

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## Background and Key Definitions (1 of 2 Cont.)

**Objective:** Desired outcomes. Tasks, effects, or changes (improvement) in either?

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**Options:** Means or methods for accomplishing objectives.

**Assess:** Evaluate options in terms of the measures.

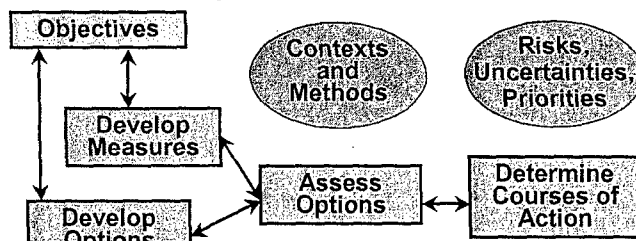
**Mix and quantity:** Combination and sufficiency of options providing most favorable values across multiple measures.

**Contexts:** Scenarios and scenario variations.

**Methods:** A wide range of evaluation tools.

**Purposes:**

Adaptive planning  
Future force planning  
Acquisition management



**Risks:** Likelihood of an undesirable outcome (technical, operational, strategic)

**Uncertainties:** Includes known unknowns and some consideration for the the unknown unknowns.

**Priorities:** Decision maker preferences. Severity.



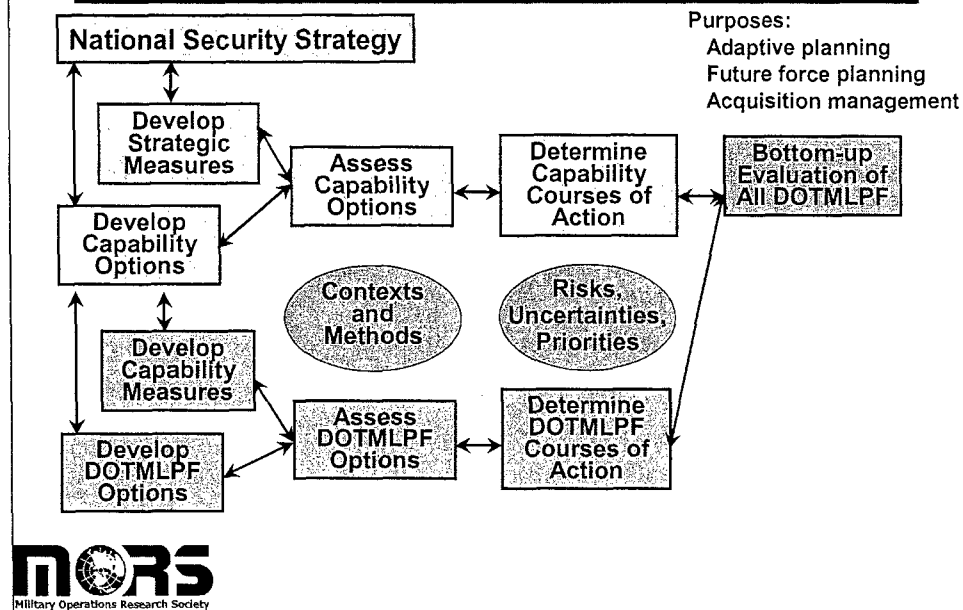
Determining how many and how varied both the contexts and methods should be is a major methodological challenge.

Once individual assessments have been performed, an overall course of action must be determined. Principally, this involves balancing the various criteria within the various possible contexts and accounting for operational or situational uncertainties. Uncertainties often provide a spectrum of possible outcomes from which the decision maker's risk tolerance and priorities need to be accounted for. A variety of methodologies might be applied to develop courses of action and to resolve these into a final selection.

This framework organizes the methodology of CBP into five steps. The arrows pointing both ways between the boxes suggest that the interaction between the steps is not linear. For example, the effort to determine courses of action might bring a stated object into question, require alternative measures, or suggest additional options. While not a methodological step, contexts, methods, uncertainty, risk tolerance, and priorities play a crucial role in the execution of the methodology. It is around this framework that the working group organized its discussions.

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## Background and Key Definitions (2 of 2)

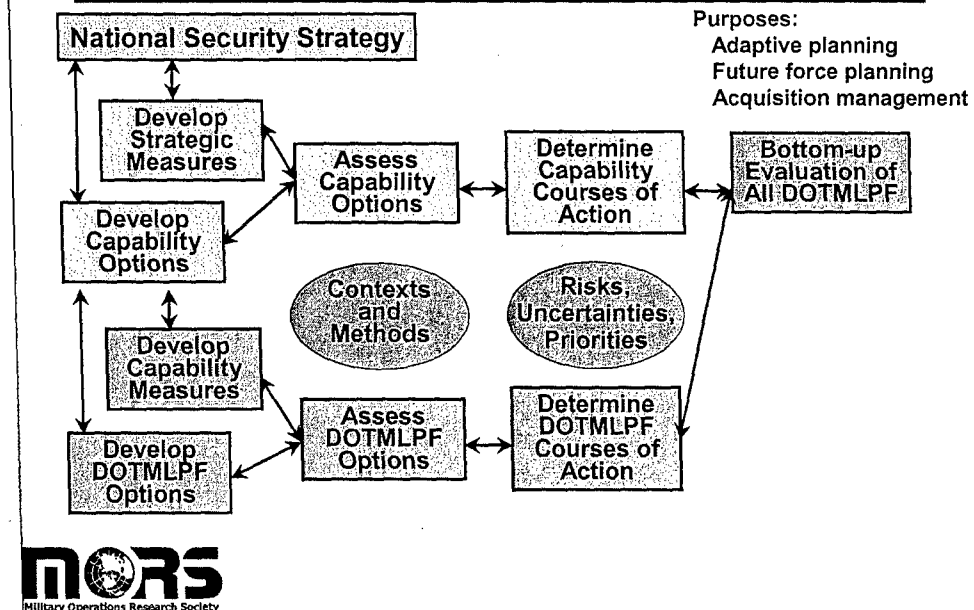


As the working group discussed this framework, it was clear that methodological efforts were being expended at multiple levels. This diagram shows two such parallel levels: the capabilities level and the DOTMLPF level. Some members of the working group also thought there could be a concept level between the national security strategy and the capabilities. Similarly, some thought that a task level should be embedded between the capabilities and the DOTMLPF. For now, we consider just two levels a simple means of suggestion that multiple levels could exist.

At the capabilities level, the national security strategy provides the objectives. Methodological steps occur at this level to define the measures that will be used to determine how well a capability option or mix of options satisfies national security objectives, to develop the set of capability options, to assess the options in terms of the measures, and to determine what combination, extent, and course of action among the capabilities is desirable. These steps are performed in the presence of the same wide-range of contexts both within and among scenarios. Methods to perform the assessment will not include the detail of the DOTMLPF level, and are likely to have a broader scope. Uncertainties, risks, and priorities are also significant to capture. Decision analysis tools seem particularly well suited at this level.

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## Background and Key Definitions (2 of 2 Cont.)



The capabilities level and the DOTMLPF level, explained on the previous chart, interact in at least two places: at the beginning and end of the process. At the beginning, the capability options create a set of objectives for the DOTMLPF level. As capabilities are assessed, the quantity and emphasis on a particular capability may change. This might extend or restrict DOTMLPF options previously under consideration. Some care should be taken to define DOTMLPF options that can be scaled to the related capability. At the end of the process, DOTMLPF option, developed from the top down, should be evaluated from the bottom up against the desired capability courses of action. Coordination between the levels of analysis, for example among the contexts considered, will simplify the bottom-up evaluation at the end.

## Approach: Briefings

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- ◆ Develop measures and options
  - Gap Analysis (Chris Morey)
  - Air Force CRAA Process (Maj Rob Renfro)
  - NRO Requirements Process (Maj Stephen Chambal)
- ◆ Perform assessments
  - Analysis to Support CBP (Tom Allen)
  - Perspective from COCOM (Mark Gallagher)
- ◆ Determine mix and quantity
  - Mission-System, Exploratory and Portfolio Analysis (Paul Davis)
  - Examples in Exploratory Analysis (Bart Bennett)
  - Joint Resource Allocation Model (Bob Might)



For the deliberations of the working group, our approach was to focus our three sessions on the parts of the framework: develop measures and options, perform assessments, and determine courses of action (mix and quantity). Each session began with a set of corresponding briefings to stimulate the discussion. Briefings and the briefers are shown on this slide. These were followed by group discussions in order to determine what has been done in the past, what innovative ideas may be available in the future, and what areas of research need to be developed. It was hoped that the first session would be able to cover both measures and options. In the end, the inertia needed to get a constructive interchange started and the many dimensions related to measures limited the discussion to just measures. Because of the large number of people in the working group, we divided into two sub-groups for the first two sessions. In the third session, the working group met together.

## Approach: Discussions

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- ◆ Map methodological areas into
  - Tasks, standards, conditions.
  - Challenges: traditional, irregular, disruptive, catastrophic.
  - Classes of models.
  - 20 joint capabilities (seven cross-functional, 13 operational).



As additional points of discussion, we mapped the methodological framework four other taxonomies. In the first session, one of the subgroups specifically addressed tasks, standards, and conditions. The four challenging scenarios (traditional, irregular, disruptive, and catastrophic) and the ability to represent the seven enabling cross-functional and 13 operational capabilities were discussed in the second session. In the third session, we also discussed methodological transparency.



## Observations – Results (1 of 3)

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- ◆ Mapping to frameworks hampered by lack of common lexicon
- ◆ Methodologies for determining measures dependent on level of analysis
  - At strategic level, relies on professional military judgment
  - At capability level, measures can be determined by considering effects, tasks, methods, DOTMLPF
  - Measures should be uniform and quantifiable across options and contexts at a certain level although weighted by context
- ◆ Human factors models need development (increasingly important!)
  - Perception models
  - Cognitive models
  - Decision models
  - Behavioral models
  - Social/organizational models



This slide depicts the first of three major observations. These observations are presented in roughly the order that they occurred within the working group discussions. Some were more thematic and reappeared throughout the working group sessions.

First, trying to develop and map the methodological framework to any other structure, particularly to tasks, standards, and conditions, is drastically hampered by a lack of common lexicon. We found, as would be expected, that different organizations use the same terms to mean very different things. For example, a task is used by some to describe a mission component for which there is a directly measurable outcome. Others use task and mission synonymously. What this meant for our working group was an overly complicated discussion with members often talking by each other because of a lack of commonality in their language. Unfortunately, simply writing up a set of definitions for terms would only be a first step in resolving this problem. The diverse membership in this community would need to actually adopt it and be educated in it.

As the working group considered measures, we realized that the level of analysis played a critical role in how participants thought about methodology. At the strategic level, decision making now relies heavily on professional military judgment. Measures are often not explicitly considered but are embedded in both the thought processes of individuals and the political processes of organizations.

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## Observations – Results (1 of 3 cont.)

---

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- ◆ Methodologies for determining measures dependent on level of analysis
  - At strategic level, relies on professional military judgment
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- ◆ Human factors models need development (increasingly important!)
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  - Cognitive models
  - Decision models
  - Behavioral models
  - Social/organizational models



Thus, when measures can be determined at this level, they are often transient with the specific decision makers at the time. At the capability level, measures are derived from effects that we desire to create, tasks we desire to perform, methods and means (DOTMLPF) we desire to employ. These measures are more commonly recognized and used among practitioners. The working group did recognize, however, that across organizations, measures are not uniformly captured. For example, service organizations sometimes exclusively focus on measures that help to demonstrate the utility of their people and systems. At a certain level — such as assessments completely within the scope of one service — this may be appropriate. However, measures should be more uniformly applied across organizational boundaries and the set of options and scenarios. Furthermore, quantifiable measures need to be rigorously defined in order to produce successful assessment. The working group did recognize the need to weight measures in order to match decision makers' priorities.

The discussion of assessment tools recognized the many and varied models that exist in the community. However, the working group focused on human factors models as the single development need. Although required in the past to represent such things as commanders' decisions, these tools have an even greater role in performing assessments in the irregular, disruptive, and catastrophic contexts. Within this class of models, five categories were particularly noted, although variations on how to classify or the words used to designate these models were energetically discussed.

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## Observations – Results (1 of 3 cont.)

---

- ◆ Mapping to frameworks hampered by lack of common lexicon
- ◆ Methodologies for determining measures dependent on level of analysis
  - At strategic level, relies on professional military judgment
  - At capability level, measures can be determined by considering effects, tasks, methods, DOTMLPF
  - Measures should be uniform and quantifiable across options and contexts at a certain level although weighted by context
- ◆ Human factors models need development (increasingly important!)
  - Perception models
  - Cognitive models
  - Decision models
  - Behavioral models
  - Social/organizational models



Without a guiding lexicon, these are the simple description the working group developed:

**Perception models:** These models determine how information about external conditions are sensed and gathered over time.

**Behavioral models:** These models supply the key internal information including moral and ethical factors along with attitudes, agendas, and morale.

**Cognitive models:** Based on the perceived information, these models create an internal world view. Since information is often missing or of poor quality, these models include assumption and “intuition” in establishing the world view. These model also allow for the world view to develop over time.

**Decision models:** These models determine plans of action based on the world views and desired goals.

**Social/organizational models:** All the models above could be used for individual or groups. These models add the necessary structure and “norms” for group actions.

Other names could be used to describe these human factor components. The working group was in agreement that this is the key area of deficiency in modeling.

## Observations – Results (2 of 3)

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- ◆ Tools and data need to be extended beyond the traditional areas
  - Data, data, data
- ◆ Other modeling limitations
  - Additional effort needed to resolve aggregation/disaggregation problems
  - Investments efforts to test out and learn from new methods
  - Greater sharing of applications and methods across the community
  - Greater use of resource allocation methods for integrating programs
  - Rapid campaign models with perceptions
  - Data needed by capability vs platforms
  - Development of non-traditional warfare theory



Beside the human factors models, the tools and data we now use will need some extensions in order to represent irregular, disruptive, and catastrophic scenarios. Not surprisingly, the plea from modeling focused heavily on getting good data. It was noted that in the past, some organizations clung to their data and supplied a litany of reasons why only a select group could obtain it. Certainly, security and contractual legalities limit the ability of some data to be disseminated. However, mere impediments need to be resolved. Another dimension to the data accessibility issue is development of data that is consistent and reliable. We recognized that some data, perhaps a great deal of data, must still be developed, particularly for the human factor models mentioned on the previous slide. The progress of the Analytic Agenda to produce this kind of data was widely acknowledged and appreciated.

Our discussion led us to note a variety of modeling issues that deserve further research. As we talked about examining issues at various levels, the persistence of aggregation/disaggregation was raised. For example, for years we have extracted from physics models representing such system interactions as a radar, a missile, and an aircraft to supply a summary measure — such as probability of kill, to more aggregated, broader scoped models. The question arises to the validity of passing results generally between level of aggregation and scope. Do the results capture enough of the significant details? Are the results used correctly as they are moved between levels of aggregation? It has been shown that subtle errors occur when aggregation is not well executed.

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## Observations – Results (2 of 3 cont.)

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- ◆ Tools and data need to be extended beyond the traditional areas
  - Data, data, data
- ◆ Other modeling limitations
  - Additional effort needed to resolve aggregation/disaggregation problems
  - Investments efforts to test out and learn from new methods
  - Greater sharing of applications and methods across the community
  - Greater use of resource allocation methods for integrating programs
  - Rapid campaign models with perceptions
  - Data needed by capability vs platforms
  - Development of non-traditional warfare theory



A variety of other limitations currently restrict the ability to perform successful assessments. We spent years examining and understanding a war in central Europe. Now we are faced with a wider spectrum of potential conflicts. Embedded in this spectrum are non-traditional approaches to warfare. Research is needed to develop theories for these kinds of conflicts. These theories will then need to be embedded into new tools and methods. Investments need to be made in testing out new methods and taking advantage of lessons learned from using them. As the scope of these modeling tools increase, the need to integrate a variety of non-homogeneous programs increases. Assessing the benefits of these systems is significant, but resolving the resource allocation issues among various alternatives is equally important. Methods for examining this dimension of the problem need more thorough development. In order to promote the science of military-oriented modeling, tools and methods need to be broadly accessible. This a particularly important role for MORS. Finally, two specific issues were raised: modeling of perceptions in a rapid campaign model and collecting capability based data rather than platform specific data.

## Observations – Results (3 of 3)

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- ◆ Various methods exist to determine courses of action: VFT, Portfolio Management, Gap Analysis, Excursion Analysis, Goal Programming
- ◆ No textbook solution currently exists
  - Need to get the “big picture” across the multiple part-solutions that do exist
- ◆ Information you wish you had
  - How exactly do you define CBP? (lexicon and taxonomy)
  - What are the methodological limitations perceived by Working Groups 3-5?



The working group did spend a significant amount of time considering a variety of approaches that will be helpful for performing capabilities-based assessments. These include such methods as value focused thinking (VFT), portfolio management, gap analysis, excursion analysis, and goal programming. It is easy for an individual or organization to become entirely focused on one approach. We advocate a broad consideration of the tools available when an analysis is performed. There are no text book solutions (yet). Each analysis has some uniqueness that appeals to a particular approach and a particular set of tools. Our search is for a methodological generality on top of our current analyses that can capture the “big picture” and help integrate the multiple pieces of research into a greater whole.

## Potential Topics for Next Workshop

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- ◆ Methodology in light of the results of this workshop
  - Specific success stories in specific methodological areas
- ◆ Human factors working group
- ◆ The continuing JCIDS experience
  - Achieving "top down" versus "bottom up" analysis
  - Determining gaps, offsets, trades, and risk
- ◆ Broader scope and detailed definition of four Challenges
- ◆ Who does what in CBP?
  - OSD, COCOMs, Services, ...
  - Uniformed, GS, FFRDCs, contractors



Now that the other working groups have reported their needs and objective, a close examination of methodological needs can be made. In particular, it would be helpful to inspect successful cases to determine the utility of specific methods. Additionally, these cases will undoubtedly include some gaps or omissions that need greater methodological development. In particular, we identified the whole area of human factors as a much needed developmental area. We strongly recommend including a human factors working group at the next workshop. We believe much can be gained from the continuing JCIDS analysis. CBP attempts to perform a top down analysis. Some JCIDS analysis looks for gaps, offsets, trades, and risk at a lower level, and then develops plan of action from the bottom up. Although strictly bottom up analysis focuses in the wrong direction, some mix of both top down and bottom up analysis within the multi-level framework presented in the working group may provide a more robust methodology.

Additionally, we acknowledged that the four challenge scenarios promote the increased breadth of the contexts in which our analysis needs to be performed. However, they will require richer, more detailed definitions. As we move to further CBP, we must also be aware of the need to determine the organizational roles of OSD, the COCOMs, the services, and other government agencies like the Department of Homeland Defense. The roles of uniformed officers, government employees, FFRDC employees, and other contractors will also need to be determined. These topics would be useful to discuss at the next workshop.

## Conclusion - "Way Ahead"

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- ◆ Human factors methodological development is critical for assessment of future capabilities.
- ◆ Common capabilities framework and preferences need to be used throughout joint, service, interagencies, and allies.
- ◆ Improvements needed in the scenario process
  - Modeling development precluded by lack of data
    - » More than non-kinetic aspects
  - Timeliness and releasability



In conclusion, the Methodology Working Group strongly supports the development of human factors models to perform some of the most critical assessments relative to future capabilities. Second, although the variety of frameworks that exist now help individual organizations to function, they can be an impediment in communicating and working with other organizations. We recommend that a greater level of generalization be sought out that will reduce this difficulty. One fertile piece of analysis would be to examine in some detail the leading taxonomies that currently exist and develop a higher level abstraction, such as the one used by this working group. As part of that analysis, each of the frameworks could be mapped into this more generalized taxonomy. Furthermore, some consistency in establishing preferences for measures and scenario contexts will help to make the analyses performed within organizations of greater use across organizations. Finally, we support the effort of the analytic agenda and appeal for even greater efforts to produce data in a more timely, accessible way. Significant model developments, particularly in the human factors area, are precluded because of lack of data. Often time it is because of quality concerns for the data we do have. MORS stands in a unique position to be able to support experimental uses of such data and the development of corresponding models.



**MORS Workshop Outbrief:  
Capabilities Based Planning -  
The Road Ahead**

19-21 October, Alexandria, VA



**Working Group 2 - Taxonomy, Lexicon and  
Implementation**

Chairs:

Mr. Chuck Werchado

Dr. Clayton Bowen

This is the outbrief for WG 2 - Taxonomy, Lexicon and Implementation. It was Co-Chaired by Chuck Werchado, who works at OSD PA&E, and Clayton Bowen, who works at AFSAA.

## Members

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- ◆ Mr. William Aldridge
- ◆ Dr. Clay Bowen
- ◆ Mr. Duncan Byrne
- ◆ Dr. Paul Chouinard
- ◆ LTC Doug Crissman
- ◆ LTC Robert Fancher
- ◆ CDR Thomas Griffin
- ◆ Lt Col Eitan Israeli
- ◆ Ms. TaMeisha Jenkins
- ◆ LTC Thomas Kastner
- ◆ CDR Todd Kiefer
- ◆ Mr. Cliff Krieger
- ◆ CDR Jeff Maclay
- ◆ Maj John Malevich
- ◆ CDR Ian Wood
- ◆ Maj Krista Simonds
- ◆ Dr. Ben Taylor
- ◆ CDR Michael Vineyard
- ◆ Mr. John Wallace
- ◆ Maj. Paul Weaver
- ◆ Mr. Charles Werchado
- ◆ Mr. Norman Yarbrough
- ◆ Mr. Hugh Hill
- ◆ CDR Bernie Carter



Because it was an unclassified venue, WG 2 attracted the largest number of foreign participants of any working group. Members represented analytic organizations in the US, UK, Canada, Australia, and Israel.

## WG Charter

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- ◆ Define terms used in Capabilities Based Planning, discuss and create a common taxonomy, and compare CBP methodologies used by participating organizations.
- ◆ Products
  - Agreed on list of terms and definitions
  - Made a collective list of approaches and a generic "common" one
- ◆ Group Motto
  - Strategy without analysis = words
  - Analysis without strategy = numbers (KK)



WG 2 was tasked to both compare the definitions of terms used in CBP by participating organizations and also the methodologies by which those organizations conduct CBP. In the course of doing this, the working group also decided to try crafting a "common" approach from the various groups' methodologies. WG 2 took its motto from the opening remarks given by Ken Krieg, OSD PA&E Director.

## Approach

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- ◆ Briefings from organizations conducting CBP on their individual approaches
- ◆ Broke out into two teams
  - Lexicon Team: Discussed CBP terms and sought consensus on definitions
  - Comparative Approaches Team: Assessed organizational CBP methodologies and built generic "common" approach
- ◆ Each team briefed the other and the combined working group (WG) discussed findings
- ◆ The WG met to discuss a common Taxonomy



The group began with briefings from the individual organizations represented, which allowed them to go into greater detail than in the plenary briefings. In order to more expeditiously meet their goals in the limited time available, the group decided to break into two teams working in parallel, then meet and discuss findings among the full WG.

## Observations – Results

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### ◆ Lexicon

- Capabilities Based Planning: A top-down competitive approach to weigh options within resource constraints in order to address risks and exploit opportunities across a spectrum of challenges.
- Capability: The ability to achieve an effect to a standard under specified conditions through multiple combinations of means and ways to perform a set of tasks.

*- Joint Concept Development and Revision Plan TOR*

*Group comment: Can we define capability in terms of effects without a concept of operations?*

- Effect: A change to a condition, behavior, or degree of freedom



The first challenge was to agree on a common definition of the Workshop's theme, capability based planning, along with definitions of the difference between the concepts of capability and effects.

## Observations – Results

---

- ◆ Lexicon
  - Standard: The minimum proficiency required in performance of a task
  - Conditions: A variable of the environment that affects task performance
  - Means and Ways
    - » People, Ideas, Things (Boyd)
    - » DOTMLPF (US) (does not include Information Management, R&D, Policy and Concepts)
    - » PRICIE (CA):
      - ◆ Personnel - (including PD and Leadership)
      - ◆ Research and Development/Operations Research
      - ◆ Infrastructure and Organization
      - ◆ Concepts/Doctrine and Collective Training
      - ◆ Information Technology Infrastructure
      - ◆ Equipment, Supplies and Services
    - » Lines of Development (UK)
      - ◆ Structure and Processes
      - ◆ Concepts and Doctrine
      - ◆ Equipment
      - ◆ Personnel
      - ◆ Training
      - ◆ Sustainment



The Lexicon team defined the terms used in CBP, using US, UK and Canadian (CA) examples. It found that, although the names for their processes were different, many of the same terms appeared under each one.

## Observations – Results

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### ◆ Lexicon

- Task: An action or activity derived from mission analysis, doctrine, standard procedures, or concepts that may be assigned to an individual or organization
- Risk: Probability and severity linked to hazard
  - » Includes attempts to seize opportunity



The team also defined Task and Risk.

## The Elephant in the Room

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- ◆ The issue of Effects versus Tasks
- ◆ Question:
  - Can you do capabilities based planning without doing the mission analysis that brings us to the resolution level of “tasks?”
  - Group discussion identified that some organizations consider them integral and some do not, and there are clear advantages to conducting mission analysis



One issue the Lexicon Team highlighted was the question of into how much detail CBP should go. It discovered that some organizations stayed at the higher, “effects” level, while some considered it mandatory to cover the supporting “tasks.”



## Working Joint Capability Areas

As of 18 Oct 04

1. Battlespace Awareness
2. Command and Control (C2)
3. Interagency Integration
4. Logistics
5. Force Protection
6. Force Management
7. Force Development
8. Information Affairs
9. Strategic Deterrence
10. Homeland Defense
11. Civil Support
12. Access and Interdiction
13. Air/Space Control Operations
14. Maritime/Littoral Control Operations
15. Land Control Operations
16. Special Operations
17. Information Operations (IO)
18. Noncombatant Protection
19. Assistance and Stabilization
20. Reconstruction and Transition
21. Shaping and Security Cooperation



Here is an example of Capability Areas, provided by the Joint Staff representative, as a potential template for a common list for use by CBP analysts.

## Taxonomy

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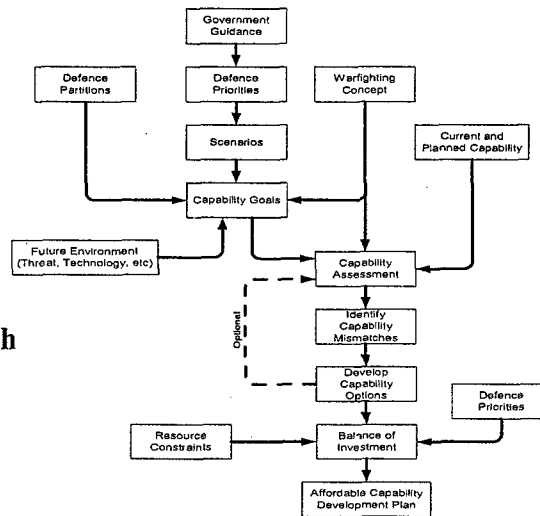
- ◆ The group identified the utility of the JFCA Force Capability Assessment Study list, including the separation into functional and operational categories, while recognizing that separation causes complications — is it a linear list or a two-way matrix?



As the text indicates, the list was not without its detractors, who pointed out the inherent difficulty in working with a list whose terms overlap in actual application.

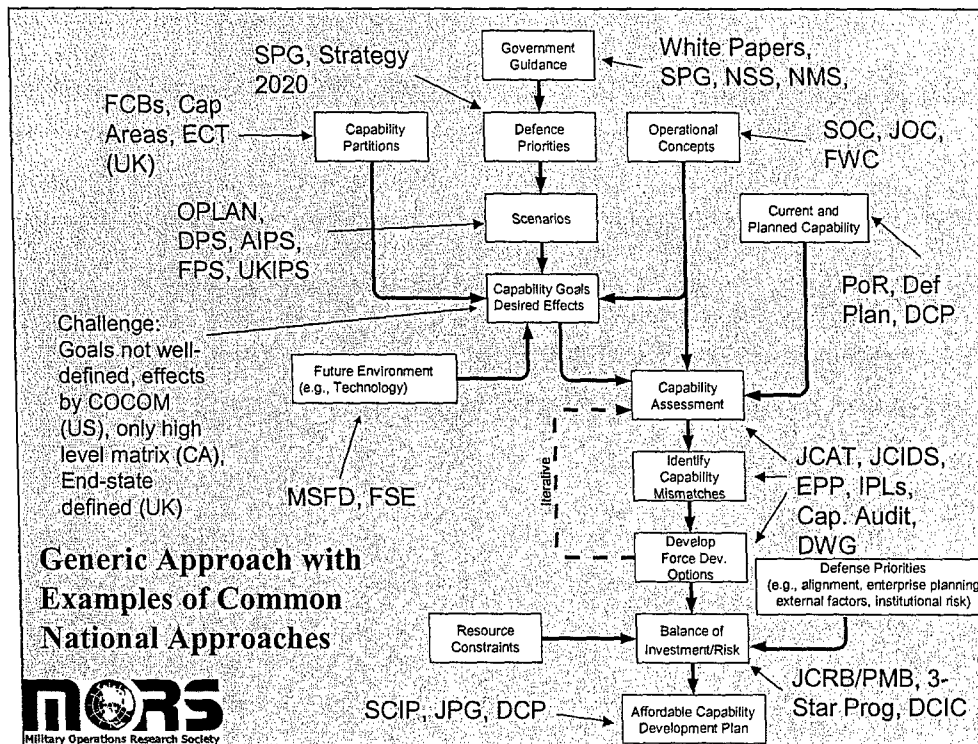
## Comparative Approaches

### Generic Approach (TTCP)



**MORS**  
Military Operations Research Society

The second team, Comparative Approaches, focused on the different CBP methodologies in use by participating organizations. They began with a generic approach provided by the The Technical Cooperation Program, or TTCP, an information exchange program between the US, UK, Canada, Australia and New Zealand.



Using the TTCP template, team members added their own organizations names for each of the CBP steps. They found that most organizations used all of the same steps, but had their own terms for that process. For example, everyone used scenarios in their analysis, but had a different name for them. The only point of departure was for goals and effects. Most organizations agreed it was difficult to get senior leaders to define “success,” in measurable terms (such as tolerable losses or days to complete a task) so they settled on different ways to assess the attainment of scenario goals.

## Glossary of Acronyms

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### Canada

- ◆ JCRB – Joint Capability Requirements Board
- ◆ JCAT – Joint Capability Assessment Team
- ◆ FSE – Future Security Environment
- ◆ FPS – Force Planning Scenarios
- ◆ SCIP – Strategic Capability Investment Plan
- ◆ SOC – Strategic Operating Concept
- ◆ PMB – Program Management Board

### Australia

- ◆ DCP – Defence Capability Plan
- ◆ DWG – Domain Working Group
- ◆ FWC – Future Warfighting Concept
- ◆ AIPS – Australian Illustrative Planning Scenarios
- ◆ DCIC – Defence Capability Investment Committee

### United Kingdom

- ◆ ECT – Equipment Capability Taxonomy
- ◆ UKIPS – UK Illustrative Planning Scenarios
- ◆ Cap Audit – Capability Audit

### United States

- ◆ SPG – Strategic Planning Guidance
- ◆ NSS – National Security Strategy
- ◆ NMS – National Military Strategy
- ◆ FCB – Functional Capability Board
- ◆ OPLAN – Operational Plan
- ◆ DPS – Defense Planning Scenarios
- ◆ MSFD – Multi-Service Force Deployment
- ◆ EPP – Enhanced Planning Process
- ◆ JCIDS – Joint Capabilities Integrated Development System
- ◆ JPG – Joint Programming Guidance
- ◆ 3-Star Prog – Service Programmers
- ◆ IPL – Integrated Priority List
- ◆ PoR – Program of Record



Since each organization defined the steps in their CBP methodology differently, the Comparative Approaches team thought it would be useful to provide a glossary of the acronyms in use.

## Summary of “Analytical” Suggestions

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- ◆ Analysts conducting CBP are responsible to clearly inform senior-level decision makers (who may not be experienced in military science)
  - What risks various alternatives presented in terms of military losses, economic cost, etc.
  - Be able to present CBP analysis in layman’s terms
- ◆ Scenario Goals are not well-defined, other than success or failure in a given campaign.
  - Need top-level warfighting requirements, such as campaign duration, loss tolerance, and degree of effects required
  - Issue: should this be determined by operational commanders, Services, or MoD/DoD level?



Two major suggestions were developed from the working groups deliberations — learning to define risk to leaders who may not be conversant in OR, or even military science, and developing metrics below the “did we win or lose” level that can serve to measure campaign outcome.

## Way Ahead — Key Activities

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- ◆ Potential topics for March 2005 workshop:
  - Focus on Blue and Red concepts of operations versus primarily Blue — how to take Red into greater account?
  - Examine Capability Goals and Desired Effects — who should determine them and how? (suggest approaches)
  - Examine relationship between operational and force-structure applications of CBP



WG2 also came up with some suggested topics for the follow-on CBP meeting — giving threat analysis a greater role, defining goals and desired effects, and the relationship between operational (used less) and force structure (used more) applications of CBP.

## Conclusion

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- ◆ There is a wide range of definitions of the terms used in Capabilities Based Planning, but there is a good consensus on the approach to take in conducting that analysis.
- ◆ This is good in the sense that the common processes are more important than common labels, but a common CBP language is the logical next step in its development, to improve our ability to collaborate on and compare analyses.



In conclusion, the working group found a lot of different definitions in use for the terms of CBP, but that a common analytic approach was already in general use. They felt the latter was the more significant, but that a common taxonomy should be developed to facilitate collaboration and information exchanges.



**MORS Workshop Outbrief:  
Capabilities Based Planning -  
The Road Ahead**

**19-21 October, Alexandria, VA**



**Working Group 3 – Adaptive Planning**

**Chairs:  
Tim Hoffman  
Bob Clemence**

## Workshop Members

---

Mr. Robert Anderson, Concurrent Technologies

LTC Randall Bentz, US STRATCOM

Ms. Wanda Bethel, MITRE

MAJ Robert Block, HQ AFSPC/XPY

Dr. Robert Clemence, Evidence Based Research

Ms. Kathleen Conley, OSD PA&E

Mr. Lawrence Cooper, Kepler Research

MAJ Roy Glassco, AFEUR/A5

Mr. Brock Harris, SAIC

Mr. Stephen Hess, L-3 Comm GSI

Mr. Hugh Hoffman, OUSD (Policy)

Mr. Timothy Hope, Alion Science and Technology

LTC Thomas Kastner, US CENTCOM

Mr. Harry Lesser, Lockheed Martin

CDR John Meissel, JOINT STAFF, J7

COL Leonard Moskal, US STRATCOM

Mr. James Pasquarette, Joint Staff, J8

LTC Gregory Perrotta, US EUCOM

COL Michael Scott, US EUCOM

Ms. Gail Steele, HQ AFMC/XRC

Dr. James Stevens, OSD PA&E/JDS

Mr. Timothy Suttief, US NORTHCOM

Mr. Gary Thompson, SVERDRUP

Mr. Andrew Vonada, 1<sup>ST</sup> IO Command (Land)

COL James Wasson, OUSD (Policy)



## **Purpose of AP Working Group**

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### ***Purpose***

**Identify planning capability  
shortfalls within proposed  
Adaptive Planning Process and  
propose remedies**

## Definition

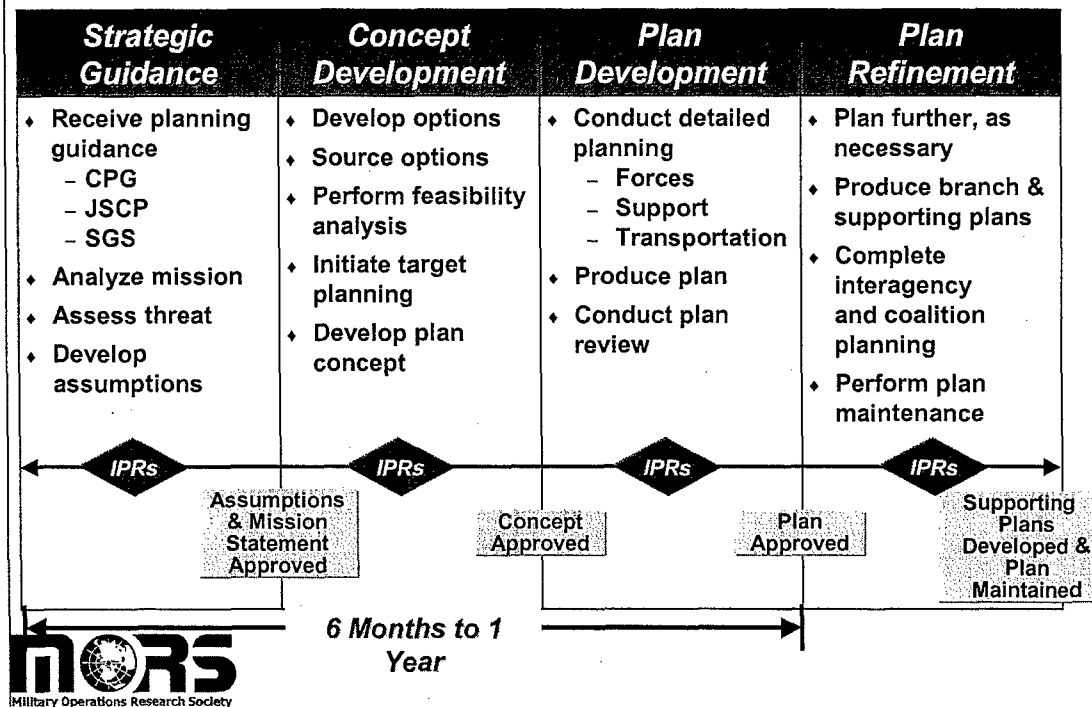
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**“Adaptive Planning is the systematic, on-demand creation and revision of executable plans, with up-to-date options, as circumstances require.”**

*AP Concept approved by SecDef  
and JCS for development*



# The Prototype Process



## Facts

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- ◆ Continually changing strategic environment requires
  - Frequent plan updates or revisions
  - Built in flexibility/adaptability
- ◆ Shortened timelines to produce plans (6 months vs 2 years)
- ◆ POTUS/SecDef require more options than current plans provide
- ◆ Planning staffs are small and preparatory training/experience largely gained on-the-job
- ◆ Planning tools largely unique to COCOMs
- ◆ Plans produced in sequential process — very little collaborative capability
- ◆ Increasing need for interagency and coalition collaborative planning
- ◆ DoD senior leadership will provide direction throughout the planning process
- ◆ Planning does not transition seamlessly between deliberate and crisis action planning



# Assumptions

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- ◆ Planning will be enhanced with networked, collaborative automation
  - Faster
  - Better
- ◆ Accessible, common and current data is the linchpin to AP's success
- ◆ AP will close the seam between Deliberate Planning and Crisis Action Planning
- ◆ Standardized business rules and practices are essential to AP success
- ◆ DoD will be increasingly required to plan for non-kinetic activities/operations with other parts of the USG
- ◆ Planning will be improved by focused joint training programs (for planners)
- ◆ Realignment of resources will be required to achieve AP goals



## Key Characteristics

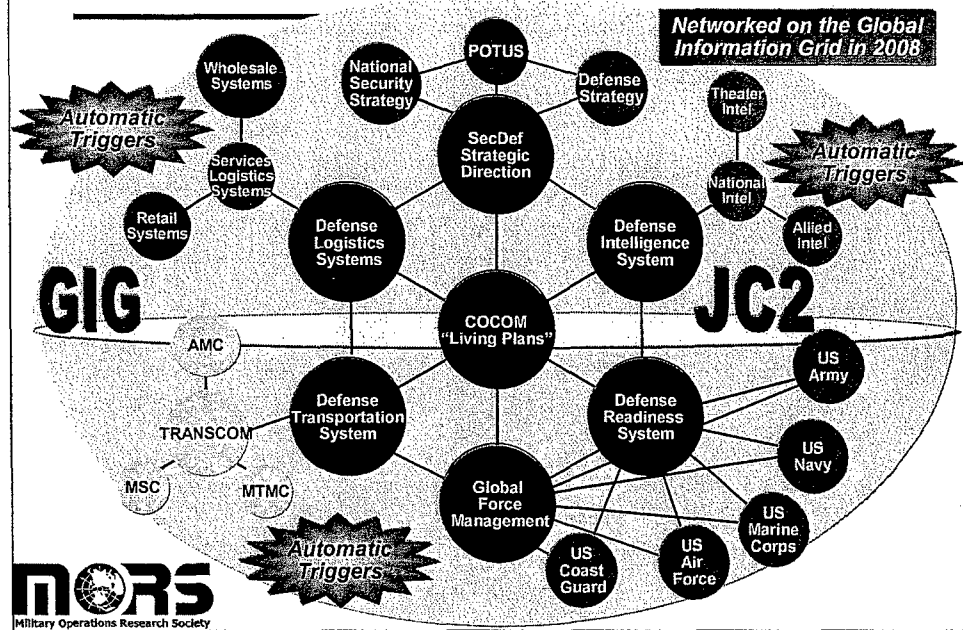
<b><u>Rapid</u></b> Produces military plans on demand in one year or less with revisions as needed	<b><u>Flexible</u></b> Produces and tailors full range and menu of military options according to changing circumstances
<b><u>Iterative</u></b> Shapes the plan during development through dialogue among key leaders and planners	<b><u>Comprehensive</u></b> Anticipates multiple related and/or simultaneous contingencies
<b><u>Collaborative</u></b> Provides parallel and concurrent planning at strategic and operational levels	<b><u>Focused</u></b> Prioritizes plans and planning effort to best support the strategy and allows seamless transition to execution
<b><u>Networked</u></b> Links planning, readiness and force management processes and data in a virtual environment	<b><u>Feasible</u></b> Determines force, logistics, transportation and operational feasibility throughout planning



- ◆ These are the **attributes** that characterize an adaptive planning system.
- ◆ Some of these derive directly from **Secretary of Defense** guidance, such as “**rapid**” and “**iterative**.”
- ◆ Some derived from the Department’s increasing **network-centricity**, like “**Collaborative**” and “**Networked**.”
- ◆ Some respond to the **current strategic environment**, such as “**Flexible**” and “**Comprehensive**.”
- ◆ Others, like “**Focused**” and “**Feasible**” reflect the **concerns of the planning community**.
- ◆ Our current system of deliberate and crisis action planning does not meet this definition nor exhibit these attributes.



## An Interconnected "System of Systems"



- ◆ The adaptive planning environment when the Department achieves net-centricity sometime in 2008.
- ◆ "Living plans" are adapted in networked, near-real-time to changing circumstances.
- ◆ **Automatic triggers** keyed to specified thresholds in relevant data that informs planners immediately when modifications or a revision may be necessary. Examples would be:
  - Friendly force changes like the deployment of certain forces or the deadlining of an aircraft (C130)
  - Enemy force changes like the confirmation of enemy WMD capability
  - A change to strategic assumptions like access for US Forces (Turkey)
- ◆ Number- and data-crunching is done by computer, often in response to triggers, and the results are shared throughout the community in real-time.
- ◆ Planning is **collaborative and iterative**. Decisions appear immediately.
- ◆ Essential sequences require no more time than is necessary for decision makers. **Planners and commanders focus their energy on the art of war** that requires their subjective judgment.

# AP Capability Gaps

<i>Planning Guidance</i>	<i>Concept Development</i>	<i>Plan Development</i>
Strategic Guidance	Planning Guidance	Support and Sustainment
Situation Awareness	COA Development	Build Force Flow, TPEDD
Assess Strategic Environment	Determine Effects	Allocate Lift
Mission Analysis	Force Capabilities ID	Transportation Feasibility
Commander's Estimate	Global Force Management	Detailed Plan/Targeting
	Readiness Assessment	Interagency Coordination
	Validation of Requirements	Coalition Coordination
	Wargaming	Modeling and Simulation
	Modeling and Simulation	Plan Annex Development
	Feasibility Analysis	Plan Production
	Commander's CONOPS	
Collaboration		
Formal Training		
Plan (Project) Management		



## Four Dimensions of Solution → P3T

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<b>People</b> <ul style="list-style-type: none"><li>- Organization</li><li>- Training</li><li>- Personnel Management</li></ul>	<b>Processes</b> <ul style="list-style-type: none"><li>- Planning procedures</li><li>- Doctrine</li></ul>
<b>Products</b> <ul style="list-style-type: none"><li>- Guidance Documents</li><li>- Estimates, Plans and Orders</li><li>- Capability needs</li></ul>	<b>Tools</b> <ul style="list-style-type: none"><li>- Hardware</li><li>- Software</li><li>- Data</li><li>- Network</li></ul>

# People

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Suggestions	Planners	Analysts
Provide Joint formal planning education/training early	X	
Progressive Planning Assignments – Grow Sr. Planners	X	
Develop analysts with Planning Training		X
Increase training emphasis on non-traditional challenges	X	X
Add Dedicated Analysts to COCOM Staffs for Planning		X
Assign Skill Identifiers and Code Billets	X	X
Develop a “Surge Capacity” for Planning and Analysis	X	X
Billet COCOM/Component staffs adequately to support AP	X	X



## Process

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### ◆ Suggestions

- JOPES and Joint Doctrine need to change focus from plan completeness to achieving effects
- Adaptive planning needs to be part of Joint Doctrine and JOPES
- Adaptive planning process itself must be adaptable
- Capability to manage/monitor across and within plans is necessary
- Need a joint capabilities substitution rule set
- Build ties to Global Force Management
- Need an overarching AP operational architecture
- Need rules for interagency/coalition planning and collaboration



## Products

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### ◆ Suggestions

- Evolve plans from text form to an interactive form that includes visualization, course of action modeling, war gaming, and commentary, etc.
- Virtual planning products need to be integrated and interconnected (to inform each other)
- COCOMs need the flexibility to adapt planning products as required
- Products should be directly linked to DoD planning guidance documents
- Products should be visible, accessible and traceable — governed by a set of “business rules”



# Tools

---

## ◆ Suggestions

- Should be collaborative and virtual: plan development, wargaming, analysis and recording for all 4 threat quadrants
- High payoff tools that we don't have:
  - » Wargaming – must be interoperable with existing tools (e.g. CFAST) and M&S
  - » Common, usable, accessible, distributed data (probably the linchpin)
  - » Suite of supporting functional tools (intelligence, IA, logistics, etc)
- Capability for plan project management within and across plans
- Non-kinetic effects in traditional quadrant
- Effects (kinetic and non-kinetic) in irregular, catastrophic, and disruptive quadrants
- Rapid logistics/transportation feasibility
- Need capability to develop and assess deterrence activities/actions/effects
- Need a manager for AP/CBP tools



## Way Ahead – Key Activities

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- ◆ Produce and implement “AP Roadmap”
- ◆ Develop and verify AP process model to provide basis for capability needs
  - This process model itself has to be adaptive
- ◆ Identify, develop, test and field initial tool suite
- ◆ Establish the AAR process for evaluating AP prototype  
Process and supporting P2T
- ◆ As they become available, adopt CBP constructs





## Conclusions

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- ◆ Capabilities Based Planning informs and is informed by Adaptive Planning
  - Adaptive Planning informs the Department of what capabilities are required in the near term (2 years) and where near-term investments might be made
  - COCOM Planners are the customers for Joint Capability “packages”
  - Thus, DoD needs a common set of tools and data bases to jointly serve the planning and programming community
- ◆ The analytic and planning communities need to be more tightly linked
  - Training, Organization, Personnel Management
- ◆ More emphasis is needed on the Irregular, Catastrophic, and Disruptive Quadrants — Thinking, Process, and Tools
- ◆ Adaptive Planning crosscuts and enables all capability areas
  - As such, it currently has no forcing function to cause these other capability areas to integrate their efforts with AP





**MORS Workshop Outbrief:  
Capabilities Based Planning -  
The Road Ahead**

**19-21 October, Alexandria, VA**



**Working Group 4 – Future Force Planning**

**Chairs:**

**Dr. Jim Thomason, IDA**

**Dr. Kirk Yost, MITRE**

## Members

---

- ◆ Norm Edwards (DFI)
- ◆ Skip Langbehn (DFI)
- ◆ Cliff Tompkins (AFSAA)
- ◆ Mike Applin
- ◆ Gregg Burgess
- ◆ Herb Champion
- ◆ Nancy Evans
- ◆ Robin Hartsel
- ◆ Bert Head
- ◆ Joel Heaton
- ◆ Patrick Hyland
- ◆ Paul Kellner
- ◆ Mike Kelly
- ◆ Dave Lengyel
- ◆ Pat McKenna
- ◆ Drew Miller
- ◆ Darrell Morgeson
- ◆ Mark Murray
- ◆ Steven Muston
- ◆ John Paron
- ◆ Deborah Peeler
- ◆ Dick Polin
- ◆ George Rissky
- ◆ Michael Runnals
- ◆ Jose Sosa
- ◆ Wayne Stamper
- ◆ Gary Thompson
- ◆ Ken Wagner
- ◆ Thomas Walker
- ◆ Stephen Zavadil



The WG members represented a wide range of organizations, including OSD, the Joint Staff, the Services, various Defense Agencies, and COCOMS

## WG Charter

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- ◆ Denote similarities and differences between CBP and classical analyses
- ◆ Identify emergent CBP efforts
  - Characterize their degrees of success
  - Capture the lessons from these efforts
  - Discuss how these efforts integrate risk
  - Discuss how they have addressed the range of security environments
  - Discuss how their results reflect a capabilities focus
  - Identify studies that integrate resource tradeoffs



With respect to force structure analysis, the basic tasking was to determine if a CBP approach was substantially different from classical approaches to force structure questions.

In addition, WG 4 had the task to identify and examine current CBP efforts.

## Background

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- ◆ QDR 2001 directed the DoD to broaden its strategic perspective
- ◆ The report said to do this via a “capabilities based approach,” which was not well-defined
- ◆ Subsequent changes, such as the installment of the Joint Capabilities Integration and Development System (JCIDS), further reinforced the desire for capabilities based analyses
- ◆ So the force structure analysis world has asked two questions
  - *What is a capabilities based analysis?*
  - *Who knows how to do such a thing?*



In discussions of CBP, most people forget that the original intent of the 2001 QDR was to broaden the strategic perspective of the DoD. In particular, QDR rejected the notion of building the force around two classical theater wars, and called for the examination of a much broader range of futures.

The QDR report then said this aim would be met by the “capabilities based approach” which was not well-explained in either the QDR report or any subsequent strategic document. The establishment of the Joint Integrated Capabilities Integration and Development System (JCIDS), however, reenergized the notion of a capabilities based approach, and also institutionalized the demand for capabilities based analyses.

These imperatives were unfortunately not accompanied by extensive explanations or examples. Consequently, force structure analysts have been left to determine what constitutes a capabilities based approach.

## Approach

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- ◆ Identify and present a set of completed capabilities based analyses
  - Solicited studies from Services, OSD, JS, and other agencies
  - Wanted to get a broad spectrum of studies
- ◆ Compare how well these analyses matched the draft CBP principles developed by the "Small Group" (i.e., the Theologians)
- ◆ Collect lessons learned from people who had actually tried to do one of these things (i.e., the Masses)
- ◆ Transmit hard-won lessons about what worked and what didn't



As a result, WG 4's approach was to find capabilities based force structure studies and classify them with respect to the draft CBP principles developed by a high-level group charged with examining CBP processes and progress. These principles (which exist only as a draft briefing slide) are currently the only available DoD-wide benchmark for capabilities based analyses.

The group also wanted to collect and summarize the experiences of the study leads in these efforts. Many of the studies we saw were the first attempts at capabilities based assessments, and experienced the pains of being pathfinders. The group wanted to ensure that these experiences were exposed and documented.

## Presenters

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- ◆ Operational Availability 05 (COL Al Sweetser, JCS/J8)
- ◆ Naval Forcible Entry Concept Gap Analysis (Dr. David Lee, Whitney-Bradley-Brown)
- ◆ Investing in the Future (Maj Steve Chambal, NRO)
- ◆ USAF CRRRA Process (Mr. John Lawrence, SAIC)
- ◆ Precision Munitions Review (Mr. Chris Morey, TRAC)
- ◆ USMC POM Risk Assessment (Maj Bill Hallahan, HQ USMC)
- ◆ Joint Forcible Entry/Joint Undersea Superiority (Maj Britt McNeill, LtCol Joe Engle, JCS/J8)
- ◆ EPP Joint Forcible Entry (Dr. Web Ewell, OSD PA&E)
- ◆ Small Unit JCIDS Analysis (LTC Larry Larimer, TRAC)
- ◆ Operational Ready Spacelift AoA (Capt Chris Solo, AFSPACECOM)
- ◆ Group II Capabilities Study (Dr. Royce Kneece, OSD PA&E)



We collected 11 studies, ranging from very focused small-element force equipment efforts (the Small-Unit JCIDS Analysis) to examinations of major moves among DoD mission areas (the Group II Capabilities Study). The studies collected spanned all four Services, the Joint Staff, OSD, and one Defense Agency (the NRO).



## Studies Versus CBP Principles

CBP Guiding Principle	Number (out of 11)
Balance risk	6
Shift focus towards joint capability demands	7
Wider range of scenarios	7
Provide flexibility to evaluate and implement technology	6
Link policy, planning, programming, budgeting, requirements and acquisition	1
Ensure CBP process addresses leadership concerns	11
Strengthen joint approach	5
Define capabilities in relation to effects	9
From programs to portfolios of capabilities	4
Identification of potential trades across capabilities	5
Decrease operational costs, better ROI	3
Produce sound options highlighting opportunities	5
Modifiable over time	10
Resource-informed	8



This table compares the 11 studies to the draft principles (some of which, like “resource-informed,” are ambiguous). The group gave a study credit if it honestly attempted to address a particular principle. For example, many of the studies measured risk in some fashion, but did not recommend ways to balance or manage risk; nonetheless, the group gave those studies credit for this principle.

It is worth noting here that some principles appear unnecessary. For example, the principle of “ensuring CBP process addresses leadership concerns” seems to imply that at least some studies ignore leadership concerns. This is a management issue, not a CBP issue. Also, the principle that calls for linking policy, planning, programming, budgeting, requirements, and acquisition encompasses the entire PPBE process, and it seems as if CBP should be a contributor to the aim of providing this linkage.

The point of this chart is that most of the principles of CBP that are attainable in a single study are being treated in some fashion; force structure analysts are attempting to meet these (unpublished) imperatives.

## Recommended Example Studies (1)

CBP Guiding Principle	Studies
Balance risk	CRRA, USA PMR, OSD JFEO
Shift focus towards joint capability demands	OA-05, NRO
Wider range of scenarios	OA-05, OSD Group II
Provide flexibility to evaluate and implement technology	CRRA, NRO
Link policy, planning, programming, budgeting, requirements and acquisition	NRO
Ensure CBP process addresses leadership concerns	CRRA, NRO, USMC POM
Strengthen joint approach	OA-05



The next two slides identify studies that were commendable applications of the principles; in other words, the group would recommend them to someone looking for advice on how to conduct a capabilities based force structure study.

## Recommended Example Studies (2)

CBP Guiding Principle	Studies
Define capabilities in relation to effects	CRRA, JFEO/JUSS
From programs to portfolios of capabilities	USMC POM
Identification of potential trades across capabilities	OSD JFEO, NRO
Decrease operational costs, better ROI	ORS
Produce sound options highlighting opportunities	ORS
Modifiable over time	OA-05, ORS
Resource-informed	



## Study Observations (1)

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- ◆ Substantial (up to 20%!) study time spent agreeing on taxonomies and terminologies
  - Whose capability list should we use? Are we being ordered to use a particular one?
  - What the #\$\$%^\*^@!! is a capability, in the context of my study?
- ◆ Substantial study time spent on scenario scoping
  - Have to sample from large range of scenarios and scenario conditions
  - Scenario agnosticism does NOT work
- ◆ Substantial time spent interpreting and reconciling strategic imperatives
  - Example: SPG says eliminate overmatch, CPG says win decisively
  - Decision analysis has helped tremendously in exposing issues
  - No apparent link between CBP and capabilities based analysis



The next four slides contain observations, as opposed to “lessons learned;” the reason for describing them as observations is that the group noted that some areas are not immediately curable.

The first observation about the CBP studies is that they require additional steps that consume significant additional time. In particular, each study required construction of a capabilities lexicon and structure, which in some cases was quite arduous. Also, the imperative to examine a wide range of scenarios (the QDR edict to broaden the strategic perspective) made scenario scoping a significant task.

Also, the broadening of the perspective meant that many more ambiguities in strategic guidance must be uncovered and reconciled. The widespread use of decision analysis in these studies allowed the study leads to find these ambiguities as they constructed objective or value hierarchies, but this step added time to the efforts.

## Study Observations (2)

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- ◆ Substantial time spent in studies on defining risk
  - No DoD-wide guidance beyond "Level 1"
  - The studies that addressed risk only measured it; they did not recommend ways to balance or manage it
- ◆ Capability-based studies are more difficult to organize and manage, and generally require more people
  - Capabilities invariably cut across functions, require access to a larger body of knowledge
  - Does "strengthen the joint approach" mean more meetings?
- ◆ Demand for wide range and depth of scenario analyses exceeds current scenario supply
- ◆ Difficult to reconcile results over a wide range of scenarios with current priority and risk guidance



Each study that examined risk defined it differently, with only one study using the formal risk categories (force management, operational, future challenges, and institutional) in force in the DoD. This so-called "Level 1" risk definition was not useful for lower-level efforts, so the study leads had to define risk frameworks and standards themselves.

A capabilities based study is usually a cross-cutting study, and involves working with a much larger group of people and organizations than the familiar, functionally-focused effort. Several study briefers commented on the demands of coordinating among these groups, and also mentioned that many organizations were not particularly motivated to participate to supply the desired Jointness. In particular, Service efforts had a difficult time getting participation from other Services.

The imperative to broaden the strategic perspective has meant more scenarios, but the approved catalog of Defense Planning Scenarios has not yet met the demands of the new strategy. In particular, the availability of disruptive and long-range scenarios is very thin.

Perversely, even if all these scenarios are available, analysts are finding themselves challenged to consider them all and reconcile results among them. Many briefers commented on the difficulty of characterizing the value of a capability that is essential in one scenario and unnecessary in many others.

## Study Observations (3)

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- ◆ Extensive use of decision analysis, due to
  - Shrinking time for studies
  - Need to connect large, disparate collections of systems, functions, tasks, effects, and objectives
- ◆ Demands for broad analyses have significant model and modeling implications
  - Large, entity-based models viewed as unresponsive, intractable, or inappropriate
  - May signal a return to aggregated (read knob-based) models
  - Increases demand for joint data
- ◆ Architectures are controversial
  - Opinions range from “essential” to “an evil plague”
  - Use of architectures seems to be an exception, not the rule



CBP has popularized the use of decision analysis due to its speed, agility, and ability to link to more detailed forms of modeling and simulation. Many briefers noted that time constraints and the other CBP demands of their studies forced them to rely on decision analysis techniques driven by expert judgment.

More importantly, decision analysis techniques allow connection of tasks, capabilities, effects, objectives, and strategy — the things that CBP appears to demand.

An interesting implication of broadening the perspective is that the drive over the last decade for increasing detail in warfighting models appears counterproductive. The 1997 QDR, for example, demanded system-level detail and entity representation in standard models, but the resulting tools are not proving to be useful for CBP (particularly in high-level efforts). This may signal a return to parametric models, which are more agile in capturing many of the issues being labeled as “capabilities.”

Early in CBP, there were several attempts to mandate the use of DoDAF architectures in studies. Only one study employed these architectures, and the rest felt as if architectures were grossly oversold as a solution aid.

## Study Observations (4)

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- ◆ No consensus on when and how to consider costs and cost-effectiveness
- ◆ How do we balance the imperatives to collaborate and compete simultaneously?
- ◆ Threat-based vs. capabilities based is a FALSE CHOICE!
  - Every study we saw used scenarios (read threats)
  - Even the use of a training standard implies a threat
  - The real question is whether a study considers enough threats to provide evaluations across the strategy



In its current state, costs and cost-effectiveness are notably absent from CBP discussions. Only two of the studies the group saw addressed cost explicitly, and the overwhelming view was that the CBP study only provided advice on operational contributions; cost was considered later in some other process.

There has long been an opposing view in DoD, which is that cost and effectiveness must be considered simultaneously to find truly robust solutions. We did not see a study that did that across capabilities, at least in this sample.

One recently published imperative on CBP is that it simultaneously encourage collaboration and competition. The group noted that, given humans are involved, it is unreasonable to expect both collaboration and competition for resources to occur simultaneously in an equitable manner. Furthermore, the advertised “top down” thrust of JCIDS seems to *deny* competition, at least at high levels; the notion is that JCIDS will at least frame any particular solution. Consequently, it is unclear where competition is appropriate.

The group felt very strongly that frequent statements positing “threat-based” and “capabilities based” studies as polar opposites are simply nonsense. Every study we saw used some sort of threat for operational context, and the one study that tried to be threat-agnostic was unsuccessful. The real question is whether the study examines enough scenarios to be compelling.

## Actions We Should Take Now

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- ◆ Cure the taxonomy problem!
  - We cannot examine trades without an organizing set of capabilities
  - Current plethora makes comparisons nearly impossible
- ◆ Publish a white paper fully explaining CBP principles
  - Explicitly include cost, risk, and resource considerations
- ◆ Strategic guidance (or study tasking for Level 3 efforts) must have more precise scenario prioritization and quantitative goals
  - Required for trades and risk assessment
  - Defense Strategy "quad chart" is an important first step
- ◆ Make exemplar capabilities based study plans, reports, and templates available for all "Levels" (e.g. via JDS)
  - Perform pilot efforts before institutionalizing study products (e.g., FAA, FNA, FSA, PIA)



In order to overcome the issues exposed by the group's examination of existing CBP studies, we are making 4 recommendations.

First, the taxonomy problem must be cured. Without a DoD-wide taxonomy for capabilities, comparisons and trades are difficult, if not impossible. The current situation of having to translate among multiple Service, Joint, and OSD capability taxonomies merely adds time and frustration to force structure analysis.

Second, a 5-10 page white paper on CBP principles (NOT a PowerPoint briefing) is desperately needed. The theologians of CBP have a responsibility to explain the principles of CBP in clear, concise English.

Third, strategic guidance and study taskings must contain more precise risk guidance (or at least ask for the implications of adopting certain risk levels, which may be more palatable from a policy point of view). Every study we saw had its own unique risk framework.

Finally, CBP needs exemplar examples. This WG is a modest start, but we can do much better.



## Some Topics for the Follow-On Workshop

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1. Solutions to the taxonomy problem
2. Methods for characterizing and balancing risk across many possible futures
3. Investigation of handling cost considerations, execution, and performance feedback in CBP
4. Methods for handling large scenario spaces
5. Analytic support to "stretch goal" formulation
6. Investigation of "capabilities based" models
7. Methods for analysis of non-"M" DOTMLPF alternatives in CBP



These are the WG's prioritized suggestions for topics for the follow-on workshop. They generally follow the structure of the recommendations, and are aimed at pervasive issues identified in the studies.

The reference to "stretch goals" is from the plenary presentations, where these goals represent the highest level of strategic guidance for the future security environments.

The last topic is based on the observation that all of the studies we saw concentrated on material solutions; other cures were not well-studied. It is well-known that DoD has a material bias in its analyses, but we are charged to consider other solutions as well.

## Conclusion

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- ◆ Actual studies are trying to comply with CBP principles
  - Efforts are heroic in some cases
  - Considerable filling of "guidance gaps"
- ◆ Our message is captured in our recommendations for action



Our conclusion is that force structure analysts are trying (heroically in some cases) to obey the edicts of CBP. The focus on capabilities has had a positive effect in broadening the perspective of these studies, so the aims of QDR 2001 are being addressed.

Nonetheless, certain actions, particularly an attack on the taxonomy and publication of coherent principles, are essential if we expect any more progress.

# **MORS Workshop Outbrief: Capabilities Based Planning - The Road Ahead**

**19-21 October, Alexandria, VA**



## **Working Group 5 – Acquisition**

**Chairs:**

**Kristen Baldwin, OUSD(AT&L)  
LTC Bob Larsen, Chief, Plans J8**

### **Working Group Participants**

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Mr. Carl M. Tankersley  
Mr. G. Gordon Tillery  
Mr. John W. Tindall  
Mr. Kurt Willstatter

## Working Group 5 Overview

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Title: The Application of CBP to Acquisition Management

Scope: The DoD end to end requirements development acquisition and test process

Discussion Areas

- a. Needs to Solutions - Transition from Requirements to Acquisition
- b. Systems Engineering of Capabilities
- c. Management of Capabilities (Capability Area Reviews, Roadmaps, DABs, area oversight and management)
- d. Tools and methods (role of Databases, M&S, other)



This working group examined CBP as it applies to support of the acquisition process. Many new tools and processes are being developed in support of acquisition at the capabilities level. The group covered four specific discussion areas, described on the next four slides.

## Discussion Area 1 - Needs to Solutions

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**Timeframe:** 20 October, 0830-1000

### **Briefings**

- ◆ Covered in context briefing during introduction

### **Key Questions**

1. What are the functions of the FSA and CR and how can these functions be shared to limit duplication? What is being delivered and what should be delivered to the acquisition community? What are Acquisition Milestone Gate needs?
2. How can solutions be shaped by technology risk, technology maturity, strategic challenges, operational implications, and programmatic, economic and fiscal realities?
3. What are the purpose and relationships between the analysis of materiel solutions, the AoA, the ICD, the Technology Development Strategy, and the Systems Engineering Plan? What are the AoA needs?
4. How do we define the capability such that the acquisition community can propose solutions?



## Discussion Area 2 - Systems Engineering

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**Timeframe:** 20 October, 1015-1145

### **Briefings**

- ◆ 1015-1030: OSD SE Policy, Guidance (Skalamera)
- ◆ 1030-1045: Systems Engineering for Capabilities (Loomis)
- ◆ 1045-1100: Example Capability Area: IAMD (Novak)

### **Key Questions**

1. What is the role of systems engineering to support Capabilities Based Planning? (requirements and acquisition)
2. How does SE differ for capabilities?
3. In what systems analysis and management context should systems of systems-systems engineering (SoS SE) exist and operate?
4. How should SoS capability managers monitor technical (SE) progress toward attainment of capabilities, and keep up with requirements changes, technology opportunities?



## Discussion Area 3 - Management

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**Timeframe:** 20 October, 1245-1415

### **Briefings**

- ◆ 1230-1245: CAR / Roadmap Briefing, (Durham)
- ◆ 1245-1300: sample program
- ◆ 1300-1315: ISR Roadmap for the SLRG (Boxall or Lee)

### **Key Questions**

1. What management tools are effective for capabilities – at a DoD level? At a Service/PEO level? By a Program Manager?
2. How do we manage SoS?
3. What is the COCOM perspective?
4. How do we remain mindful of evolutionary, and rapid acquisition opportunities (e.g. ACTD to a MS C)?



## Discussion Area 4 - Tools

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**Timeframe:** 20 October, 1430-1600

### **Briefings**

- ◆ 1415-1430: M&S for Acquisition (Tillery)
- ◆ 1430-1445: Costing for SoS (Anderson)
- ◆ 1445-1500: CEaVa (Larsen)
- ◆ 1500-1515: MMT (Dahmann)
- ◆ 1515-1530: JRAM (Might)

### **Key Questions**

1. How can modeling and simulation effectively be used to support capabilities based acquisition?
2. How do we estimate costs of capabilities and SoS?
3. How are AoA's conducted and what tools are necessary for capabilities?
4. What other tools, experimentation capabilities should we be thinking about?
5. What DoD processes and standards should be examined?
6. Centrally managed M&S versus M&S verification by Capability?





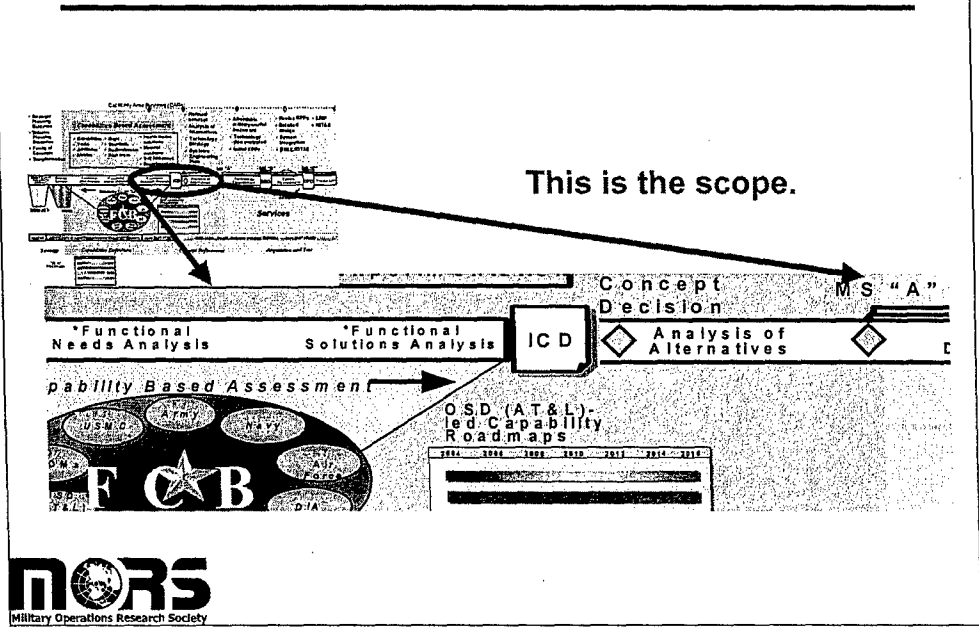
## What We Did For 36 Hours

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- ◆ Introduced four discussion areas
  - Key questions
  - Context briefing
- ◆ Group discussion of the areas
  - Scoping and issue briefings
  - Q&A, general discussion
- ◆ Broke into four teams, assigned to
  - Answer key questions
  - List additional issues
  - Pose recommendations
- ◆ Teams briefed their output to the group
- ◆ Consolidated findings into WG 5 outbrief



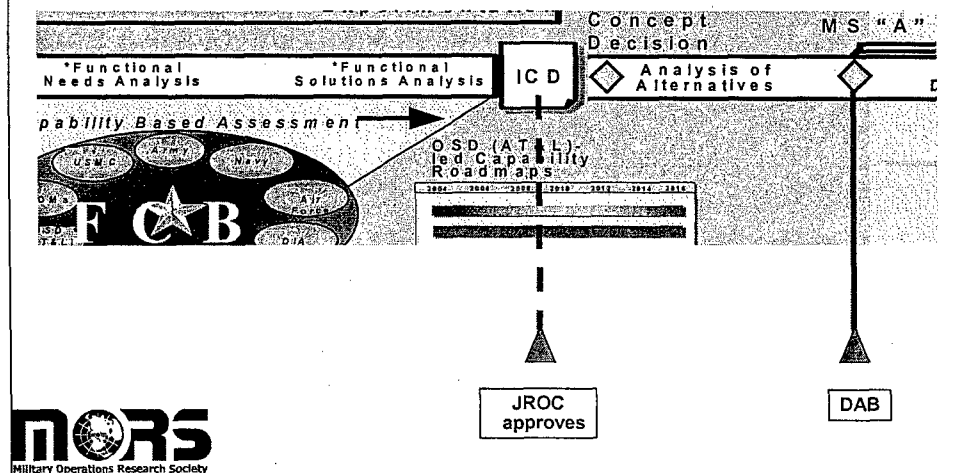
## Team 1: Needs to Solutions - "Passing the Baton"



For the acquisition community, a key "process handoff" takes place when capability needs transition from CJCSI 3170.01 JCIDS to the DoD 5000-acquisition process. This chart highlights the transition area (shown in gray) in JCIDS and 5000 processes that the group covered. This transition area includes the JCIDS Functional Solutions Analysis (FSA) through Milestone A in DoD 5000.

## Passing the Baton

This is the current JCIDS / DoD 5000 process.



Currently, the decision points in the gray transition area are at the completion of the FSA, when the JROC approves the Initial Capabilities Document, and at Milestone A, the Defense Acquisition Board (DAB). Because these are two separate decisions at two separate times by two separate boards, the group discussed that there is not much opportunity to give shared guidance.

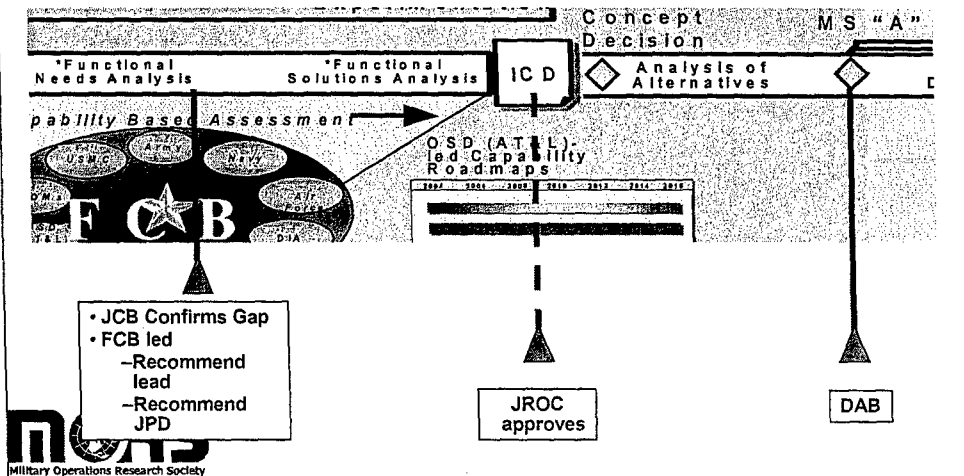
Some issues that the group discussed are:

1. Lack of consistency between the FSA and the Analysis of Alternatives. Nothing ties these two important analyses together. They are governed by separate processes and separate decision bodies. Shared involvement by the acquisition and requirements communities facilitates the identification and elimination of capability gaps.
2. There is no opportunity to provide guidance for entering the acquisition process. Typically programs enter acquisition at MS B, skipping the Concept Decision point, and MS A. This does not provide for up-front guidance and oversight to see that solutions are built from a joint perspective. The group finds that acquisition solutions are developed by a single service, and milestone decisions come after the solutions have been formed.
3. FSAs are typically conducted by a single Service with no "joint" guidance. The JROC does not see the identification of need, or the results of the FSA until the ICD has been written, and through a 4-Star approval process conducted inside the lead service. This is a significant amount of effort, with no "top down" guidance.

# Passing the Baton

## Recommendation 1:

- Add decision point at completion of FNA.

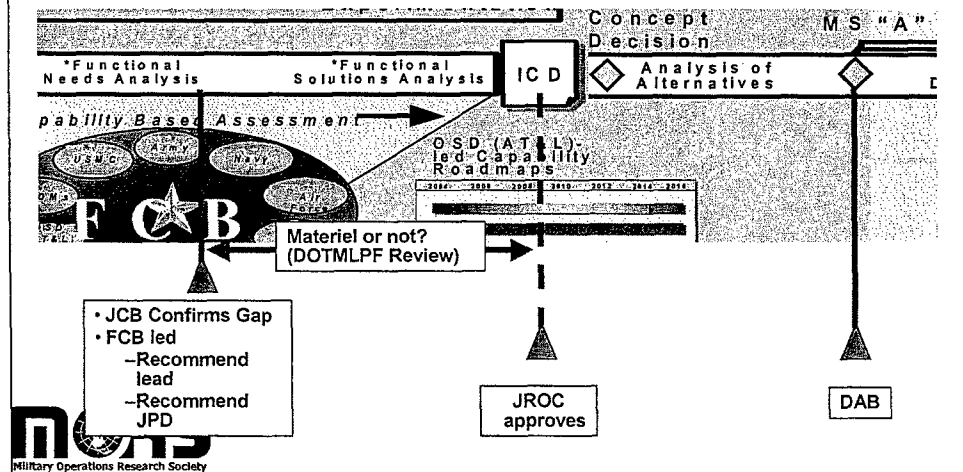


The group's first recommendation was to add a decision point at the end of the Functional Needs Analysis (FNA), before the FSA. This would give an opportunity for the JROC to validate the capability gap. Validation would include reviewing results of the sponsor's FAA and FNA analyses, considering the roles of the other services. This decision point upon validating the gap, would recommend a lead service to conduct the FSA, and would provide guidance for completing the FSA. Further, the decision body, the Joint Capabilities Board, would recommend a Joint Program Designator.

# Passing the Baton

## Recommendation 2:

- Focus FSA on only DOTMLPF review.



The group's second recommendation was to scale the FSA to be solely a review of whether the solution to the need identified in the FNA was materiel or non-materiel. This scopes the purpose of the FSA, and prevents the solution process from beginning prior to initiation of the acquisition process.

The group felt that this FSA scope would prevent duplication between the FSA and the AoA. The group also felt this scoped FSA was appropriate for a requirements process, and would prevent the solutions process from beginning without materiel acquisition oversight. It was discussed by the group that many ICDs are too system specific. Scaling back the FSA would maintain the capability focus of the analysis.



## Passing the Baton

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- ◆ Principles
  - JCIDS and DoD 5000 processes implemented at the OSD/Joint Staff level must be executable at the service level when following a similar process.
  - OSD/Joint Staff requirements for reaching decisions at designated JCIDS and DoD 5000 decision points will be made available (to services) as early as practicable.
  - OSD/Joint Staff decisions will facilitate and scope follow-on efforts.
- ◆ Issues
  - Funding
    - » If ICD doesn't have a natural sponsor, who pays?
    - » If a service is designated, how do we effect openness and coordination?
    - » Can responsibilities and funding requirements be partitioned across Services?
  - Ensuring jointness in CR phase.
    - » How do we ensure the FCB stays involved?
    - » What guidance and entry/exit criteria are needed at each decision point?
  - Ensuring smooth handoff.
    - » Should AT&L oversight begin at CR with a transition officer?
  - Relating CR to larger management process.
    - » How is this integrated into the capability areas?...ongoing acquisitions....?
    - » Is the CR process applied to all ACAT levels? All JPDs?



The group described some principles to keep in mind when overseeing and reviewing processes governing this important transition phase between JCIDS and DoD 5000.

Further, the group agreed there were some issues that should be addressed by the process owners. Four issues are listed here: 1) Funding, 2) Jointness, 3) Handoff, 4) Larger Management.

The group recommended that funding is required to perform early acquisition analysis and determine a preferred solution. If funding comes from one service, or sponsor, it is likely that the solution will be influenced only by that sponsor, rather than the joint services.

The group recommended joint oversight of the CR phase. Because Concept Decision and MS A are often skipped, there is no joint oversight of early acquisition, no FCB involvement, and little top down guidance to ensure that all the work performed during this phase is done from a joint perspective.

The group recommended that a transition officer be considered to forge a smooth handoff between the FSA and the AoA. It is felt that analysis conducted during the Capabilities Based Assessment is largely ignored by the AoA. A transition officer, that would participate on each, would promote a continuum of effort, and prevent a disconnect.

Finally, the group recommended that CR for a single solution must be performed in context of larger capability needs. The group expressed concern that CR apply to all ACAT levels.

## Team 2: Systems Engineering of Capabilities

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- ◆ Systems engineering has a potentially pervasive role in CBP
  - Consider as a 3x3 dimensional engagement (scope, fidelity, response axes)
- ◆ SE principles sound – culture adjustment required
  - SoS SE is an extension of a SE (more analytical focus) – broader skill set
  - Capabilities/SoS originating concepts and artifacts lack traditional SE fidelity, specificity, syntactical agreement. Artifacts differ for each functional area
- ◆ Ability to monitor capabilities level progress and keep up with requirements changes, technology opportunities is a challenge
  - Synchronization Challenge
  - Non-linear progression unlike traditional realms (Complexity/Emergent Behavior/Chaos)
  - Consider Cross Functional teams, open systems and modularity to ensure future proofing
  - SE will need to explore/understand non-traditional realms, such as intellectual interfaces and cultural divides for human role



High, mid, low level of fidelity

Speed of engagement (rapid assessment, deliberative and detailed)

Capability issues at aggregation systems (Systems of Systems (SoS)) (engineering is nested)

Systems engineering (SE) is an important enabler for capabilities based acquisition. Traditional SE principles are sound; however, their application at the capabilities level is different from an organizational and cultural perspective when raising the focus above a single program, and involving systems engineers earlier in the requirements and concept refinement processes



## Team 2: Systems Engineering of Capabilities

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### ◆ Recommendations

- Develop resource pool for SoS SE
  - » Combination of SE and OR skills
  - » 1-3 Mentorship
  - » Anthology capture/Knowledge Elicitation
- Continued support/evolution of framing tools, e.g., Matrix Mapping Tool.



To incorporate department-wide systems engineering principles across the CBP process, a workforce with a broader skill set and more specialized analytical capabilities will be needed.

Tools, such as the Matrix Mapping Tool help facilitate the systems engineering process.

## Team 3: Management of Capabilities

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### Findings

- ◆ Tools (Process and Methods)
  - Standardized Definitions (capability areas, joint capabilities, joint tasks)
  - Roadmaps and portfolio views (various levels)
  - Consistent, accessible data sets
  - Enhanced collaboration in processes (OSD, Joint Staff, Services, Congress?)
- ◆ Managing SoS
  - Ensure lines of responsibility and authority parallel
  - Clear understanding of goals, impacts of decisions, and tradespace
  - Ability to identify and visualize interdependencies
  - Not over-constrain (allow "biological" development)
  - Maintain management tenure (continuity of vision)
  - Manage as centrally funded "overlays" (i.e., Link 16, missile defense, etc.)



Management at the capabilities level is essential to ensuring individual programs are able to meet capability area needs. The working group identified key elements needed for tools, and for effective management, including a broad understanding of dependencies across broad areas of interest.

The group felt that Capability Roadmaps could take different forms, and be developed for varying levels of analysis, to support resource allocation and execution decisions.

## Team 3: Management of Capabilities

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### Findings, continued

- ◆ COCOM Perspective
  - Near-term versus future time horizon
  - DOT\_LPF lessons learned
  - Needs insights on technology innovations
  - Future COCOMS are customers: who is their advocate?
- ◆ Evolutionary and Rapid Acquisition
  - Not over-constrain (allow "biological" development)
  - Frequent product off-ramps with review of strategic course
  - Constant, integral operational assessment (part of systems engineering process?)

### Issues

- ◆ What levels of oversight/review/roadmaps are required to effectively manage in a Capability-Based environment (i.e., strategy, capability allocation, investment, execution)?
- ◆ How do we measure and evaluate "capability" in a CAR?



COCOMs have a near term focus. Team 3 recommended COCOMs have a lead role in non-materiel analyses.

Processes must be based in strategy, but allow flexibility, and not constrain rapid acquisition needs.

Some issues with management include levels of oversight necessary for a capabilities level review, and the identification of measures.

## Team 4: Tools - Findings

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### 1. Use of Tools – Operators/Engineers /Acquisition Specialists (Integrated Approach)

- Operationally Sound – define capabilities/metrics
- Technically Feasible – model based systems engineering
- Cost Effective – decision support and trade space
- Acceptable Risk – decision support and proof of success

**Challenges: technical, cultural, process**

### 2. Tools for CBP AoAs – Systems Engineering Approach (Early/Often)

- Operator Activities mapped to Systems Function... mapped to Systems in the threads
- Multi-attribute utility analysis tools to determine what systems should be in the thread
- End to end assessments between the threads – under multiple, variable and unpredictable conditions

**Challenges: time, data, resources**



Many new tools and processes are being developed in support of acquisition at the capabilities level.

Tools helpful in CBP are those that can help operational assessment, compare technologies, determine costs, and perform risk analysis.

These tools must cross communities, relating operational data to systems data, and connecting “thread” of capabilities.

## Team 4: Tools - Key Recommendations

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- ◆ Write a plan for M&S to support the FCB process and transition to the acquisition process
- ◆ Define Standardized Capability Descriptions, Lists and Metrics
- ◆ Move towards modeling based systems engineering process
- ◆ Establish cost of capability approaches and align budgeting accounting to capabilities
- ◆ Begin to replace the current tools that are focused on limited number of issues
- ◆ Invest in tools to support integrated functional capability assessments/unpredicted events
- ◆ Begin the instrumentation of the end to end CBP process in phases
- ◆ Review other tools needed to improve support to the analysis (Exp, IWGS, KM, Port Management)
- ◆ Continue to Centralize M&S management in areas of V&V ("Consumer Reports")
- ◆ Continue to establish Joint capabilities verification and test
- ◆ Develop capability effectiveness vs cost trade space tools with identified risk (MOE (operations), MOP (systems))
- ◆ Provide end-to-end consistent process with tools that leverage existing data
- ◆ Visualize Results to provide decision support with traceable data



Team 4 provided a list of recommendations for tools to support CBP. In summary – CBP requires a top down view across multiple communities, and contexts that is not currently supported by any tools. There is a lot of investment required for tools ranging from management visibility, to detailed models to ascertain operational value against key tasks, conditions and standards.

## Recommendations (60 days)

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- ◆ Refine roles and missions for transition from Needs to Solutions
  - Criteria and scope for JCIDS FSA and DoD 5000 Concept Refinement activities (change to Capability Refinement)
  - Pre-ICD: "FSA part 1": 3 months, Led by JS, AT&L support
  - Post-ICD: "FSA part 2": 6 months, led by AT&L, JS support
  - Consider establishing a transition officer to facilitate "passing the baton"
- ◆ Increase SE involvement throughout end to end process
  - Lay out plan to address cultural barriers
  - Identify resource pool

End to End process must be collaborative,  
with multi-disciplined stakeholders



Working Group 5 provided a list of near term (next 60 days) recommendations to the MORS community.

The first was to refine the transition phase from JCIDS to DoD 5000, allowing for a continuum of effort, with a lead change from JS to AT&L.

The second was to facilitate systems engineering support across the entire CBP process.

## Recommendations (60 days)

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- ◆ Tools and standards
  - Establish characteristics and attributes that support end to end decisions
  - Designate repository for lessons learned
  - Develop investment plan
- ◆ Focus on output for decisions
  - Visualization of broad areas and dependencies
  - Appealing and understandable
- ◆ Establish tiger team to develop transition plan and assist with implementation



WG 5 recommended addressing the tools support issues that CBP faces with a plan, and investment. A key factor in making CBP a success is to understand what the leadership needs to make top-down decisions, and focusing on these needs, enable visualization of the capability areas.

WG 5 recommended that these recommendations not be lost, and that a tiger team be established to plan and implement their recommendations.

## Ideas for Next Conference

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- ◆ Capability Area Management
  - Define management/roadmap levels and stakeholders
  - Determine taxonomy of areas
  - Evaluate funding issues and alternatives
  - How to oversee multiple levels of programs (ACAT levels)
- ◆ Culture Change
  - Understand human element of SoS SE
  - Multidisciplined involvement across the end to end process
- ◆ Conduct of Capability Refinement (FSA "Part 2")
  - Investigate USMC SAG/Capability AoA process
  - Efficiency (schedule, cost and expectations)
- ◆ Roadmaps – Types and uses
  - Levels of analysis and implementation (strategic, operational, investment, synchronization)



WG 5 offered some potential issues for examination at the next CBP conference.



## Backup

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# General Agenda

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## 20 October

- 0800-0830 Intro briefing, Kristen Baldwin and Bob Larsen
- 0830-1000 Discussion Area 1: Needs to Solutions
- 1000-1015 Break
- 1015-1145 Discussion Area 2: Systems Engineering
- 1145-1245 Lunch
- 1245-1415 Discussion Area 3: Management
- 1415-1430 Break
- 1430-1600 Discussion Area 4: Tools
- 1600-1630 Review findings from each discussion area

## 21 October

- 0800-0830 Opportunity to raise additional thoughts
- 0830-1000 Area teams meet to consolidate answers to questions, prioritize issues and develop recommendations
- 1000-1100 Area Leads brief out (10 min each)
- 1100-1130 Wrap up
  - Prioritize issues and recommendations for outbrief
  - Ideas for March Workshop (and near term actions to achieve them)
- 1130-1400 Finalize outbrief (small group)



## Expectations

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- ◆ Product of this group – Report
  - Annotated Briefing
  - Published Article
  - Issues and Recommendations
- ◆ How:
  - Answer Discussion Area Questions
  - Develop outbrief
- ◆ Your help:
  - Volunteer for discussion Area teams
    - » Assign a leader
    - » Provide a 10min outbrief 1000-1100hrs, Thursday
  - Identify 2 recorders
  - Homework may be required
- ◆ **NOW:** Volunteer for discussion areas

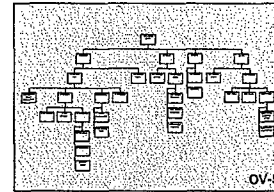


Context Briefing

# JCIDS Analysis per 3170.01D

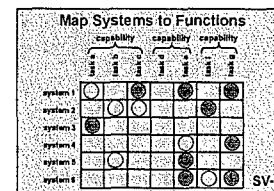
## ◆ Functional Area Analysis (FAA)

- Identify operational task, conditions, and standards needed to accomplish military objectives
- *Result: tasks to be accomplished*



## ◆ Functional Needs Analysis (FNA)

- Assess ability of current and programmed capabilities to accomplish the tasks
- *Result: list of capability gaps and excesses*



# JCIDS Analysis per 3170.01D

## ◆ Functional Solutions Analysis (FSA)

- Assessment of potential materiel and non-materiel approaches to addressing capability gaps

Recommend a prioritized capability approach to meet the need, including initial TRL, sustainability, supportability, schedule of delivery, and affordability assessments

Assess operational risk of each approach

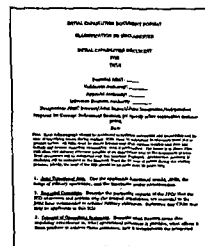
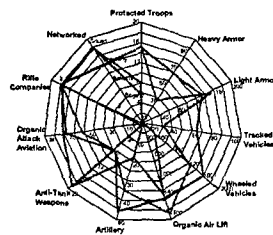
Consider S&T Initiatives

ID Experimentation needs

- *Result: viable solutions for capability gaps*

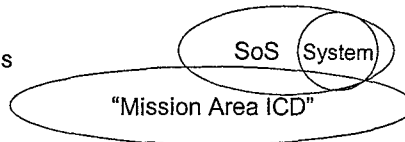
## ◆ Post Independent Analysis

- Independent analysis to determine best solution
- *Result: Initial Capabilities Document*



## Findings/Issues — Requirements Phase\*

- ◆ FCBs have become influential in IPL, EPP, JPG, S&T, and DAB decisions
  - Analysis is inconsistent across FCBs
  - FCB process continues to evolve and is still highly reactive
- ◆ FCB process is open to input; however, participation is inconsistent
  - Process is taxing; not all offices are organized/staffed to support
  - Process could easily get bogged down with too much input too early
  - Latter portions of process overlap Concept Refinement activities
- ◆ JROC/DAB/PAE processes and COCOMs should provide grounding and help guide FCB activities
- ◆ There is no institutionalized participation in JCB/JROC by OSD
- ◆ Initial Capabilities Documents (ICDs) have different “flavors”
  - Systems-, System of Systems-focused
  - “Mission Area ICDs” generated by FCBs



\*From AT&L SPG 04 CBP Study

## Findings/Issues - Concept Refinement (CR) Phase\*

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- ◆ Traditionally, CR activities were delegated to the requirement sponsor
- ◆ Mission Area Requirements pose new challenges
  - Lack a Component sponsor, or an Executive Agent
  - No identified prioritization and funding resource
  - Out of synch with PPBE cycle
  - ICD breadth and overlap confound traditional systems-specific systems engineering
- ◆ A structured CR implementation and tools to address challenges is needed
  - With specific entrance criteria for Concept Decision Gate
  - To conduct Capability Area Systems Engineering:
  - To conduct joint AOAs and affordability analyses
  - To ensure joint solutions and establish priorities through management and oversight
- ◆ These issues could be ameliorated by a combined, end-to-end effort involving Joint Staff, AT&L, PAE



\*From AT&L SPG 04 CBP Study



## Findings/Issues - Acquisition and Test Phase\*

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- ◆ The acquisition process is still focused on individual systems
  - DAB system context views relate systems to their associated systems, not to the capability areas
- ◆ Capability area reviews, roadmaps, large SOS acquisition (e.g. FCS) are being initiated
- ◆ To support mission areas, solutions must be engineered and tested against capability benchmarks – how does Systems Engineering support Capabilities over time
  - Multiple systems may be needed to satisfy a capability need
  - One system may contribute to multiple capability needs
  - Analysis and engineering involves full range of systems, in addition to MDAPs
- ◆ There is currently no overarching method to:
  - Assess impact of individual system decisions on a capability area
  - Tie system performance and DAB decisions to capability and/or strategic needs
  - Assess “roadmap to roadmap” implications



\*From AT&L SPG 04 CBP Study

## Tools to Support

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### ◆ M&S for Acquisition

- Linked with operational wargames
- Applied across lifecycle
  - » Define capabilities
  - » Identify solution space
  - » Develop solutions

### ◆ Investment Decision

- Costing
- Analyze tradespace and impacts

### ◆ Data

- Ability to share common data
- Common framework for discussion and analysis

*Tools help facilitate communication and buy-in to potential solutions*



**MORS Workshop Outbrief:  
Capabilities Based Planning -  
The Road Ahead**

**19-21 October, Alexandria, VA**



**Synthesis Group**

## Capability Based Planning

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### SYNTHESIS GROUP

Dr. Greg Parnell, FS, Chair  
Dr. Tom Allen  
Mr. Todd Calhoun  
Dr. Paul Davis  
Col Jerry Diaz  
Dr. Don Duncan  
Dr. Mark Gallagher  
Mr. Bert Head  
Mr. Harry Lesser  
Dr. Andy Loerch  
Dr. Roy Rice, FS  
Dr. Russ Richards  
Mr. Gene Visco, FS



The following individuals participated in the Synthesis Group. This presentation documents their findings, conclusions, and recommendations.

## CBP is easy

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- ◆ The key to CBP is JCIDS, JOCs, JFCs, JICs, and FCBs using SPG, DPS, JPG, 1-4-2-1, EBP, DOTMLPF, ROMO, OA-3, OA-4, OA-5, UJTL, CRRA, KPPs, MCL, and VFT integrated with TCP and UCP for SLRG, JCS, COCOMs, and OSD to respond to irregular, traditional, catastrophic, and disruptive challenges while supporting OEF, OIF, GWOT, PPBE, QDR, JROC, and AP.



This chart's attempt to use humor to describe the magnitude of the challenge that CBP is trying to address. CBP is a fundamental change in defense analysis. CBP has been mandated by the SecDef and is being used for PPBE, force management, acquisition management, and adaptive planning applications.

## Synthesis Working Group Charter

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- ◆ Responsible for developing an integrated perspective of the conference
  - Consistent definitions
  - Lessons learned (positive and negative)
- ◆ Capture cross-cutting insights that may not be apparent in individual groups
- ◆ Identify what is different about CBP and where the problems are
- ◆ Suggest topics for a follow-on workshop



This chart provides the charter of the Synthesis Group. Per our charter, we spent a lot of time working on a set of CBP definitions that would be applicable across the full range of CBP applications. We also focused on cross-cutting insights. We identified one major confusion area — the need for and the role of detailed tasks in CBP. Finally, we suggest topics for the follow-on workshop.

## Capabilities Based Planning is the DoD Process.

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- ◆ SecDef directed a joint capabilities development process.
- ◆ “Change how we develop and execute programs to ensure our programs meet joint needs and effectively balance current and future risk”
- ◆ “Goal is a streamlined and collaborative, yet competitive, process that produces fully integrated joint warfighting capabilities”



SecDef Letter, *Initiation of Joint Capabilities Development Process*, 31 October 2003

We found it useful to remind the attendees that CBP is the DoD joint capability development process.

## Cross Cutting Findings

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- ◆ Agreed, operable definitions are essential for analysts to effectively support CBP to meet leadership expectations and to acquire systems
  - Significant time and energy spent reinventing definitions
  - Fundamental disagreements about how to use "task" in CBP
  - Complexity vs. streamlined
- ◆ Each Ally and Service has implemented a different CBP framework
  - Linking to evolving Joint framework has been difficult
- ◆ Most CBP presented focused on traditional challenges
  - Modeling issues in the traditional challenge area
  - Lack accepted models for other three challenge areas
  - Accepted models and data are lacking for many of the capability areas
    - » Stability operations, interagency integration, etc.
- ◆ Those activities with the most positive impact are broad, inclusive, collaborative, and facilitate data sharing
  - Databases and tools

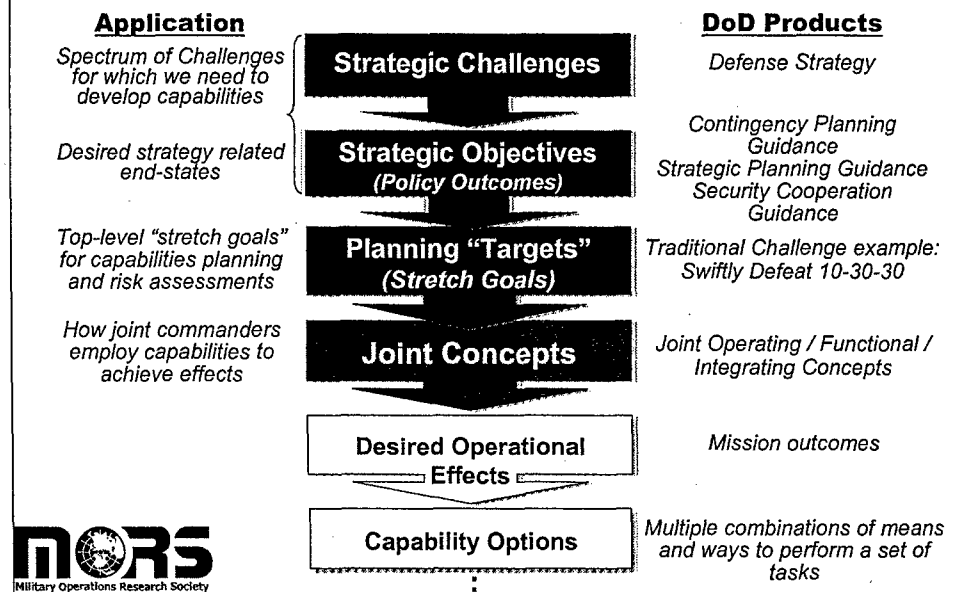


We identified four cross-cutting findings:

1. First, we found that agreed upon, operable definitions are essential for analysts to effectively support CBP to meet leadership expectations and to acquire systems. We found that significant time and energy was spent reinventing definitions. In addition, we found that there were fundamental disagreements about how to use "task" in CBP. Finally, the definitions were too complex and not streamlined.
2. Second, we found that each Ally and Service has implemented a different CBP framework. We believe that this will make linking to the evolving Joint framework difficult.
3. Third, we found that most CBP studies presented focused on traditional challenges. Furthermore, there are modeling issues in the traditional challenge area. There appears to be a lack of accepted models for the other three challenge areas. In addition, accepted models and data are lacking for many of the capability areas, i.e., stability operations, interagency integration, etc.
4. Finally, we believe that those activities with the most positive impact are broad, inclusive, collaborative, and facilitate data sharing, databases and tools. This MORS workshop is an example of collaborative effort.



# CPB: Top-Level Capabilities



This chart was used by Mr. Henry to show how CBP focuses on top-level capabilities. In the next couple charts, we are going to focus on the bottom two boxes.

**Source:** *Building Top-Level Capabilities*, 19 October 2004, Ryan Henry, Principal Deputy Under Secretary of Defense for Policy

## Working Joint Capability Areas

As of 18 October 2004

### Enabling Categories

1. Battlespace Awareness
2. Command and Control (C2)
3. Interagency Integration
4. Logistics
5. Force Protection
6. Force Management
7. Force Development
8. Information Affairs

### Operational Categories

9. Strategic Deterrence
10. Homeland Defense
11. Civil Support
12. Access & Interdiction
13. Air/Space Control Operations
14. Maritime/Littoral Control Operations
15. Land Control Operations
16. Special Operations
17. Information Operations
18. Noncombatant Protection
19. Assistance and Stabilization
20. Reconstruction and Transition
21. Shaping and Security Cooperation



This chart shows the current list of the enabling categories and operational categories that are being proposed by the Joint Staff.

## CBP: Common Framework

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***“The ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks”***

*OSD/Joint Staff working definition*

### **Standards:**

- ◆ *Magnitude* -- What is the intensity and scope
  - ◆ *Temporal* -- What is the timing and duration
  - ◆ *Geospatial* -- What is the distance to and coverage
- } *of the effect?*

### **Conditions:**

***What is the operational environment?***



Source: *Building Top-Level Capabilities*, 19 October 2004,  
Ryan Henry, *Principal Deputy Under Secretary of Defense for Policy*

This chart describes the current definition of capability being used by OSD.  
We developed our definitions based on this definition.

## Proposed CBP Terminology

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- ◆ **Mission:** purpose (objectives and endstate) assigned to the commander.
- ◆ **Endstate:** set of conditions, behaviors, and degrees of freedom that defines achievement of the commander's mission.
- ◆ **Effect:** a change in a condition, behavior, or degree of freedom.
- ◆ **Capability:** *"The ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks"*
- ◆ **Task:** an action or activity (derived from an analysis of the mission and concept of operations) assigned to an individual or organization to provide a capability
- ◆ **CONOPS:** overall picture and broad flow of tasks assigned to subordinates/supporting entities within a plan by which a commander maps capabilities to effects to accomplish the mission for a specific scenario.
- ◆ **Scenarios:** assumptions about the political-military context, including the adversaries, friendlies, and neutrals.
- ◆ **Conditions:** variables of the operational environment including scenarios that affect task performance.
- ◆ **Standards:** quantitative or qualitative measures for achieving the levels of performance for a task



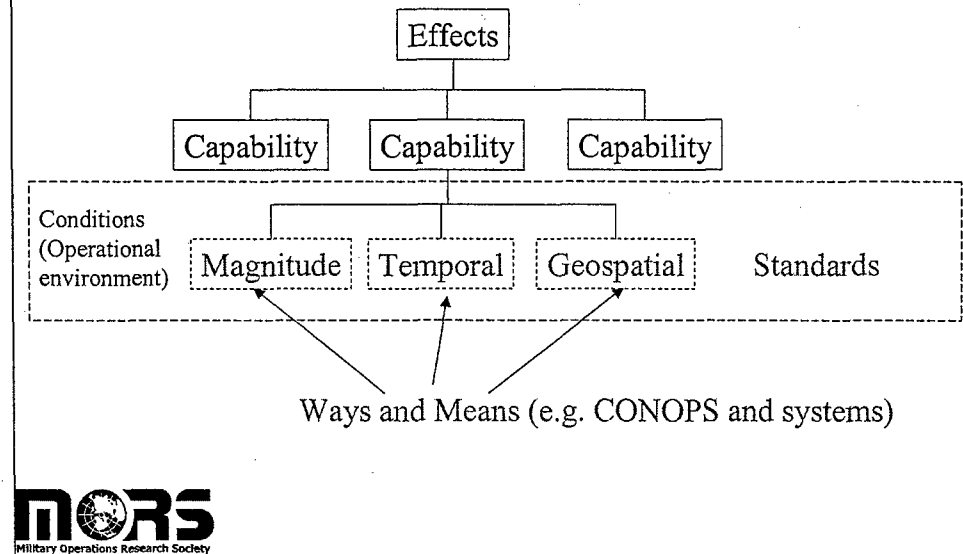
### New CBP Definitions Were Developed

One of the major challenges identified by workshop participants was the lack of consistent definitions. The Synthesis Group was asked to develop a consistent set of Capability Based Planning definitions that could be used in the major decision areas of force structure planning, PPBE, acquisition, and adaptive planning. This is not an easy task. Using Mr. Henry's capability definition as a foundation and the Joint Staff working definitions as a starting point, we developed the above definitions.

The Synthesis Group made some minor changes and some significant changes to the definitions. The changes and rationale are following:

- Re-ordered definitions to be in logical order.
- Revised CONOPs to include supporting entities which may be non-military organizations, e.g., Non-Governmental Organizations.
- Added scenarios to the definition list since scenarios are critical to CBP.
- Included scenarios in the conditions since Mr. Henry defined conditions as operational environment not just weather.
- Provided new definition of standards. The previous definition of "minimum proficiency" was believed to be useless for future force structure and acquisition decision making. We need a definition that enables a trade space for planners and acquirers.

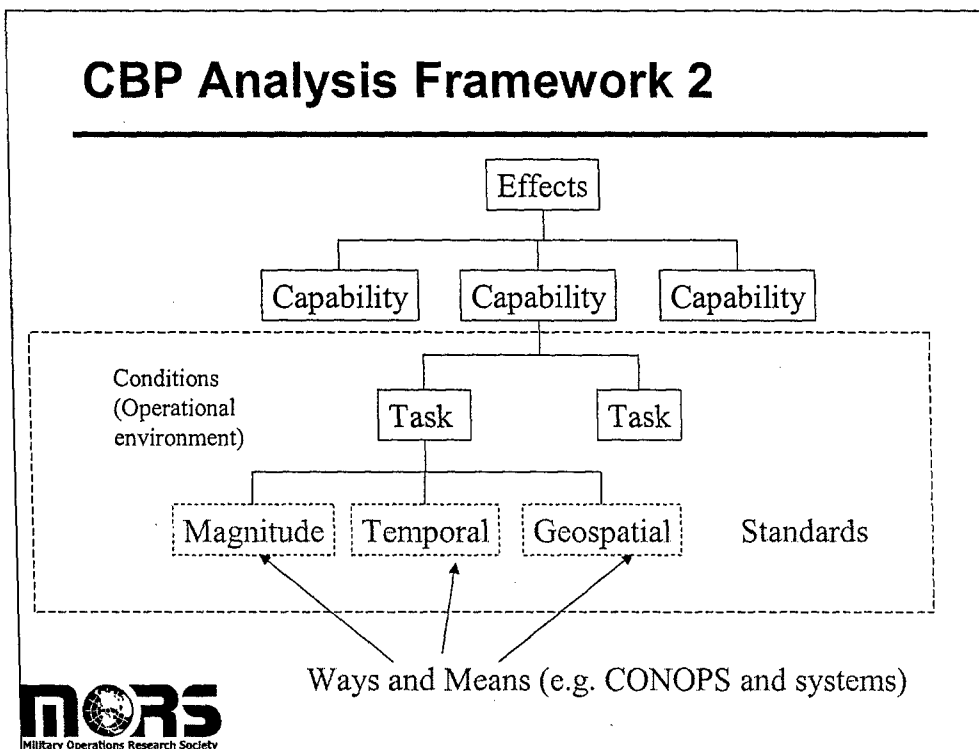
# CBP Analysis Framework 1



In the next two charts we examine two CBP analysis frameworks.

The first one does not explicitly use tasks. This approach is used by the Joint Staff for high-level analysis.

## CBP Analysis Framework 2



The second CBP framework uses one, two, three or more levels of tasks or sub-capabilities to define the capabilities in more detail. This approach is more commonly used by the Services.

We have observed both frameworks in use.

## Methodology Observations

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- ◆ The operations research technique for multiple conflicting objectives, large uncertainties, and complex alternatives is decision analysis
  - Value-Focus Thinking, Multiple objective decision analysis, Multi-attribute Utility
  - Allows to combine with other techniques
    - » M&S and optimization
- ◆ The most used operations research technique for CBP is decision analysis
  - Driven by time and transparency
  - Need to incorporate military judgment
  - Supports risk assessments



### **Multiple Objective Decision Analysis is the Most Appropriate Technique for CPB analysis.**

A significant finding of the workshop was that multiple objective decision analysis (MODA) was the most appropriate and the most used technique in the CBP studies that were presented at the conference. MODA has several different names including Value-Focus Thinking and Multi-Attribute Utility (Keeney and Raiffa, 1976; Keeney, 1992; Kirkwood 1997). MODA has been used successfully to support military decision making in many applications (Parnell, 2004).

MODA is the most appropriate technique because it is the operations research technique for decision problems involving, multiple conflicting objectives, large uncertainties, and complex alternatives. This clearly describes CBP! One of the benefits of MODA is that it can be easily combined with other operations research techniques including simulation, optimization, and risk analysis. MODA is the most used operations research technique for CBP because it incorporates military judgment, can be accomplished in a short time frame, and provides transparency to stakeholders and decision makers.

### **References**

- Keeney, R. L. and Raiffa, H., 1976, *Decision Making with Multiple Objectives: Preferences and Value Tradeoffs*, New York: Wiley.
- Keeney, R. L., 1992, *Value-Focused Thinking: A Path to Creative Decisionmaking*. Cambridge, Massachusetts: Harvard University Press.
- Kirkwood, C. W., 1997, *Strategic Decision Making: Multiobjective Decision Analysis with Spreadsheets*, Belmont, California: Duxbury Press.
- Parnell, G. S., "Value-Focused Thinking Using Multiple Objective Decision Analysis", *Methods for Conducting Military Operational Analysis: Best Practices in Use Throughout the Department of Defense*, Military Operations Research Society, Final Draft, 29 June 2004

## Adaptive Planning

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- ◆ Adaptive planning is a cross-cutting process which is informed by and informs other CBP aspects
- ◆ Most of the work in kinetic traditional quadrant
- ◆ COCOMs need to collaborate to do adaptive planning
  - Email and VTCs are not adequate
  - Lack of tools, collaborative environment, data
  - Lack of common terminology
  - Classification
- ◆ Pool of adequately trained analysts and planners is small
- ◆ Need early assessment of course of actions
  - Valuable to determine infeasibility early in COA assessment



We believe that adaptive planning is a cross-cutting process which is informed by and informs other CBP aspects.

We found that most of the work in kinetic traditional quadrant.

The COCOMs need to collaborate to do adaptive planning. Email and VTCs are not adequate. There is a lack of tools, collaborative environment, data. In addition there is a lack of common terminology. Finally, classification is also a barrier to adaptive planning development.

The pool of adequately trained analysts and planners who can do adaptive planning is small.

Finally, we need early assessment of course of actions. It would be valuable to determine infeasibility early in COA assessment process.



## Acquisition Findings

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- ◆ How to do handover from requirements to acquisition?
  - How to conduct Concept Refinement?
  - Who is responsible for Capabilities Based Analysis and AoA?
  - Systems engineering has key role in translating CBP to system specifications to bridge between concepts, systems, and systems of systems
- ◆ How do we measure and evaluate "capability?"
  - Need for tools that support cost of capability estimation
  - Is there a fundamental change in operational testing to support CBP?
- ◆ How do we provide Acquisition Management tools and training?
  - Require tools for capabilities based technology road mapping
  - Must account for the transaction and transition costs to include labor and staffing, etc.



The acquisition management group had several findings that we would like to reinforce. We present the findings in terms of questions.

- In the CBP process, how do we handover from requirements to acquisition? Once the concepts are identified, how do we conduct Concept Refinement? Who is responsible for Capabilities Based Analysis and AoA? Regardless of the answers, we believe systems engineering has a key role in translating CBP to system specifications to bridge between concepts, systems, and systems of systems.
- How do we measure and evaluate "capability?" There is a need for tools that support estimation of the cost of capability. Also, will there be a fundamental change in operational testing to support CBP? Will testing have to be done at the system-of-system level instead of the system level?
- How do we provide Acquisition Management tools and training for CBP? For example, we require tools for capabilities based technology road mapping. Also we must account for the transaction and transition costs to include labor and staffing, etc., to bridge the gap for analysis to concepts to systems.

## Focus for the Follow-on Meeting: Capability Based Planning II

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- ◆ Assumptions
  - CBP terms are defined
  - Separate meeting on Adaptive Planning
- ◆ Purpose
  - Implementing analysis to support CBP
    - » Joint, COCOM, Service
    - » Force planning and acquisition
    - » How to assess and mitigate risk
    - » Large number of scenarios
    - » How to incorporate cost analysis
  - Capabilities that lack accepted models and data
    - » Methodology and techniques
    - » Development of scenarios
  - Interagency and coalition participation



We make two assumptions. First, CBP terms are defined. Second, a separate meeting is planned for Adaptive Planning.

Based on these assumptions. We identified three possible purposes.

1. The first purpose would be to focus on implementing analysis to support CBP. The types of analysis would be Joint, COCOM, and Service force planning and acquisition. The major topics would be risk assessment and mitigation; analysis of large number of scenarios; and, incorporating cost analysis in CBP.
2. A second purpose would be to focus on capabilities that lack accepted models and data. We could examine methodology and techniques that might be appropriate and work on development of scenarios for these capabilities.
3. The final purpose would be to improve interagency and coalition participation in CBP. Moving out of the traditional challenges will require interaction with interagency and coalition participants.

## Acronyms

**MORS Workshop:**  
Capabilities-Based Planning: The Road Ahead  
Institute for Defense Analyses, Alexandria, VA  
18-21 October 2004

3-Star Prog	Service Programmers
AAR	After Action Report
ACAT	Acquisition Category
ACTD	Advanced Concept Technology Demonstration
AFSAA	Air Force Studies and Analyses Agency
AFSPACECOM	Air Force Space Command
AIPS	Australian Illustrative Planning Scenarios (Australia)
AMA	Analysis of Materiel Alternatives
AMC	Air Mobility Command
AoA	Analysis of Alternatives
AP	Adaptive Planning
AT&L	Acquisition, Technology, and Logistics
BMMP	Business Management Modernization Program
C2	Command and Control
CA	Canada or Canadian
Cap Audit	Capability Audit (United Kingdom)
CAR(s)	Capability Area Review(s)
CBP	Capability Based Planning
CDD	Capability Description Document
CFAST	Collaborative Force Building Sustainment and Transportation
COA	Course of Action
COCOM	Combatant Command
CONOPS	Concept of Operations
CPG	Contingency Planning Guidance
CR	Capability Refinement
CRRA	Capabilities Review and Risk Assessment
DAB	Defense Acquisition Board
DCIC	Defence Capability Investment Committee (Australia)
DCP	Defence Capability Plan (Australia)
DoD	Department of Defense
DoDAF	DoD Architecture Framework
DOTMLPF	Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities
DOT_LPF	Doctrine, Organization, Training, Leadership, Personnel and Facilities
DPS	Defense Planning Scenarios
DWG	Domain Working Group (Australia)
EBP	Effects Based Planning
ECT	Equipment Capability Taxonomy (United Kingdom)
EPP	Enhanced Planning Process
FAA	Functional Area Analysis
FCB	Functional Capability Board
FFRDC	Federally Funded Research and Development Center

FNA	Functional Needs Analysis
FPS	Force Planning Scenarios (Canada)
FSA	Functional Solutions Analysis
FSE	Future Security Environment (Canada)
FWC	Future Warfighting Concept (Australia)
GIG	Global Information Grid
GS	General Service (US Government)
GWOT	Global war on Terror
HQ	Headquarters
IA	Information Assurance
IAMD	Integrated Air and Missile Defense
ICD	Initial Capabilities Document
IDA	Institute for Defense Analyses
IMA	Identification of Materiel Alternatives
IO	Information Operations
IPL	Integrated Priority List
IPR	Intelligence Production Requirement
ISR	Intelligence, Surveillance and Reconnaissance
J7	Joint Staff, Operational Plans and Joint Force Development Directorate
J8	Joint Staff, Director for Force Structure, Resource, and Assessment
JC2	Joint Command and Control
JCAT	Joint Capability Assessment Team (Canada)
JCIDS	Joint Capabilities Integration and Development System
JCRB	Joint Capability Requirements Board (Canada)
JCS	Joint Chiefs of Staff
JDS	Joint Data Support
JFC	Joint Force Commander
JFCA	Joint Force Capabilities Assessment
JFEO	Joint Forcible Entry Operations
JIC	Joint Information Center
JOC	Joint Oversight Committee
JOPES	Joint Operation Planning and Execution System
JPD	Joint Planning Document
JPG	Joint Programming Guidance
JRAM	Joint Resource Allocation Model
JROC	Joint Requirement Oversight Council
JS	Joint Staff
JSCP	Joint Strategic Capabilities Plan
KPP	Key Performance Parameters
M&S	Models and Simulations
MCL	Master Capability List
MMT	Materiel Management Team
MoD	Ministry of Defence
MODA	Multiple Objective Decision Analysis
MOE	Measure of Effectiveness
MOP	Measure of Performance
MORS	Military Operations Research Society
MS A/B/C	Milestone A/B/C
MSC	Military Sealift Command

MSFD	Multi-Service Force Deployment
MTMC	Military Traffic Management Command
NMS	National Military Strategy
NRO	National Reconnaissance Office
NSS	National Security Strategy
OA	Operational Availability
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OPLAN	Operational Plan
ORS	Occurrence Reporting System
OSD	Office of the Secretary of Defense
OSD PA&E	Office of the Secretary of Defense Program Analysis and Evaluation
OUSD	Office of the Under Secretary of Defense
P3T	People, Processes, Products, Tools
PEO	Personnel Executive Officer
PIA	Post Independent Analysis
PMB	Program Management Board (Canada)
POM	Program Objective Memorandum
PoR	Program of Record
POTUS	President of the United States
PPBE	Policy, Planning, Programming, Budgeting and Execution
PPBS	Planning Programming and Budgeting System
Q&A	Question and Answer
QDR	Quadrennial Defense Review
R&D	Research and Development
ROI	Return on Investment
ROMO	Range of Military Operations
SAB	Stakeholders Advisory Board
SAIC	Science Applications International Corporation
SCIP	Strategic Capability Investment Plan (Canada)
SE	Systems Engineering
SecDef	Secretary of Defense
SGS	Strategic Guidance Statement
SJTF	Standing Joint Task Force
SLRG	Senior Level Review Group
SOC	Strategic Operating Concept (Canada)
SoS	System of Systems
SPG	Strategic Planning Guidance
TCP	Transformation Change Package
TOR	Terms of Reference
TPFDD	Time-Phased Force and Deployment Data
TRAC	US Army Training and Doctrine Command Analysis Center
TRANSCOM	United States Transportation Command
TTCP	The Technical Cooperation Programme
UCP	Unified Command Plan
UJTL	Universal Joint Task List
UK	United Kingdom
UKIPS	UK Illustrative Planning Scenarios (United Kingdom)
US	United States

USA	United States Army
USAF	United States Air Force
USAF CRRA	USAF Capabilities Review and Risk Assessment
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
USG	United States Government
USMC	United States Marine Corps
USN	United States Navy
USPACOM	US Pacific Command
V&V	Verification and Validation
VFT	Value Focused Thinking
VTC	Video Tele Conferencing
WG	Working Group
WMD	Weapons of Mass Destruction

# Terms of Reference

**MORS Workshop:**  
***Capabilities-Based Planning: The Road Ahead***  
Institute for Defense Analyses, Alexandria, VA  
18-21 October 2004

## 1. Background:

The refinement of the evolving Capabilities-Based Planning (CBP) process continues within the Department of Defense (DoD). In October, there will be a community-wide workshop on CBP principles and approaches that will provide an opportunity for planners and analysts throughout the Department to exchange concepts, acquire new ideas, and further the development of the Secretary's CBP directive.

The FY 2006-11 Strategic Planning Guidance (SPG) calls on the Under Secretary of Defense for Policy to develop, by the fall of 2004, a strategy for institutionalizing CBP within the Defense Department. This initiative will build upon existing efforts in the Department to transition to CBP. The strategy will include policies, procedures, and a lexicon, and will apply to both future force and adaptive planning. In addition, recommendations to better align joint analytical resources and to better manage models and simulations in support of CBP will be developed. As the constituent parts of the strategy begin to mature, MORS members will have increased opportunities to assist in refining the process.

A successfully implemented CBP process will help DoD develop, within overall resource limits, a flexible force capable of responding to a wide spectrum of possible conflicts. The new construct stresses joint solutions to problems, requires identifying risk tradeoffs within and across mission areas, and treats uncertainty explicitly.

Several allied countries have incorporated CBP into their force planning processes, and we will hear from some of them during the workshop. A number of DoD-wide CBP initiatives support future force planning, the most significant being:

- The Joint Capabilities Integration and Development System (JCIDS), which replaces the previous requirements definition process.
- The Enhanced Planning Process (EPP), which reforms key elements of defense planning to make it more responsive and adaptive to the needs of senior decision-makers.
- New acquisition regulations (5000 series) that focus decisions on a broader mission context.
- The *Analytic Agenda*, which fosters better analysis through improved data and models.

Identifying and assessing risk plays a major role in defense decision-making under CBP. New processes and tools will be needed to describe and quantify the risks associated with DoD-wide decisions. For many future decisions, this will require a comprehensive analysis of the entire defense program, for only with such a synoptic view can the Secretary determine an appropriate risk balance.

CBP will continue to refine the checks within the system to ensure that future capabilities and supporting force elements are *integrated* answers to defense needs. This will require a much greater degree of collaboration among the services during the annual program formulation period. CBP also will be supported by enhanced participation of the combatant commanders (COCOMs) in the planning process. The COCOM staffs already participate in the establishment of near-term plans, and CBP has begun to engage these staffs in the process of long-term planning.

CBP also has an important role in adaptive planning—a broad category that ranges from crisis action planning to deliberate planning for potential future operations, and encompasses the entire spectrum of military operations. This area is undergoing significant reform, with several major new initiatives under way, including one on Global Force Management and another incorporating CBP in the development of the *Contingency Planning Guidance (CPG)*.

## **2. Goals and Objectives.**

The focus of the workshop is to help the analytical community prepare for Capabilities Based Planning. It will identify and showcase promising processes and developments, and describe areas for methodological improvement.

A rethinking of analytical processes will likely be needed to support CBP. This means that a different set of techniques may be needed, particularly to address the increased emphasis on characterizing risks due to uncertainties. Success in adapting department-wide analyses to focus on these broader issues will be a key driver for success of CBP as a whole. The conference plans to include examples of successful “CBP-flavored” analysis, or prototypes, that might be scaled to a DoD-wide process.

Several goals should be accomplished by the MORS workshop on Capabilities-Based Planning:

- a. Inform the military operations research community of “where we are.”
- b. Identify ways to collaborate and cooperate to improve consistency—including with allies.
- c. Review the lexicon and suggest changes.
- d. Identify emerging needs in theory, data, and methods-and suggest solutions.

## **3. Approach and Sequence of Events**

### **a. Monday.**

The workshop will be preceded by an optional preparatory session on Monday afternoon, 18 October 2004 also at IDA. Overviews of the lexicon, JCIDS, CPG, EPP, and the Analytic Agenda will be offered. The session is open to anyone who registers for either the full workshop or Plenary-only at no additional fee. A rough agenda is in paragraph 10, below. Workshop registration may be accomplished at 1200 that day for early arrivers. Additional details will be sent to registrants in the future.

### **b. Tuesday: Plenary Session.**

- *Keynote:* Senior leaders in OSD and the Joint Staff will deliver the keynote. They are expected to stress the role that CBP plays in the Defense Department, describe its guiding principles, and establish expectations from the OR community.
- *Allies:* Several of our allies have already implemented CBP processes. This briefing, sponsored by The Technical Cooperation Program (TTCP), will describe an approach that



captures the key aspects of how CBP concepts are applied in the United Kingdom, Australia, and Canada.

- *Overview of OSD and JCS Initiatives:* This briefing will provide key definitions and describe relationships among existing processes.
- *Services:* The services will describe how they are implementing CBP.
- *COCOMs:* JFCOM and PACOM will discuss their CBP activities. (tentative)
- *Education & Training Community:* (tentative) It is envisioned that a new cadre of planning experts will need to evolve—new skills will be needed throughout the defense enterprise. Someone from this community will describe their implementation plans.
- *Lunch:* Working group chairs will introduce their sessions to their members

c. **Wednesday and Thursday: Working Groups and Tutorials.** Wednesday and Thursday will consist of working group meetings and tutorials, concluding with the working group brief-outs Thursday afternoon.

**WG 1: Methodologies for CBP (Unclassified)**

*Scope:* This working group will focus on the models, simulations, and other quantitative decision tools used to perform analysis in a CBP environment.

*Background:* Challenges to DoD analytical tools have resulted due to not only recent changes in the Department's planning process such as JCIDS, the Enhanced Planning Process (EPP), and the Analytic Agenda but also due to emphasis on key warfighting concepts such as effects based operations (EBO), special operations forces (SOF), information operations (IO), command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR). WG 1 will start by reviewing the key concepts associated with CBP. Next, it will review the analytical methods currently used to support CBP. This will be followed by a session on identifying what is different—what new demands does CBP place on the analytical community. Finally, the working group will explore what the analysis community needs to do to build a foundation to address these new challenges.

*Tasks:* WG 1 will conduct a broad-range discussion in two prime areas:

- i. Current M&S activities and how they may be used by CBP. Openness is a key feature of CBP. This translates into analytical transparency in analysis. The working group will address how to define and measure the transparency of models.
- ii. Unconventional methodologies may be of considerable use in CBP. New techniques have emerged for assessing asymmetric warfare, unconventional operations, and other non-traditional military situations. This WG will examine some of these new approaches and suggest potential applications to analysis that supports CBP.

**WG 2: Taxonomy, Lexicon and Implementation (Unclassified)**

*Scope:* The underlying definitions, relationships and processes that define the use of Capabilities-Based Planning for defense decision making in the United States and allied countries.

*Background:* As the new taxonomy is established, the framework for conducting Capabilities-Based Planning will begin to take shape. A hierarchical characterization of CBP subject areas will also help establish the relationships among the various CBP processes and goals.

*Tasks:* Compare allied approaches and concepts on Capabilities-Based Planning with our

own. Suggest metrics that measure how well CBP is being implemented in the DoD. Compare relationships with existing planning processes. Based on the above, suggest changes to the current definitions and taxonomy being used in the U.S.

**WG 3: The Application of CBP to Adaptive Planning. (Classified)**

Scope: Processes that employ the new paradigm applied to crisis action or deliberate planning.

Background: In the past, the planning process has been unable to respond to fast-paced real-world changes in the strategic picture. As a result, many studies have been obsolete before they were delivered. New requirements have been levied on the planning community to make this process more adaptive and responsive, better able to adjust to changing needs and emergent issues. Included in the discussion will be the current tools (CFAST, JICM, Seaway, etc.), case studies of adaptive planning process (successful or not), and descriptions of adaptive planning and its unique requirements.

Tasks: Define CBP as it relates to adaptive planning. Recommend best response to COCOM planners' *critical* need for fast turn-around planning tools. Examine the impact of CBP on logistics. Determine: can we use the same tools for adaptive and future force planning?

**WG 4: The Application of CBP to Future Force Planning. (Classified)**

Scope: All OSD- and JS-level processes that employ the new paradigm for future force planning.

Background: Transformation in force planning includes important new concepts. These include the incorporation of fiscal constraints and risk at all stages of the decision process.

Tasks: Begin by denoting similarities and difference between CBP and classical analyses. Identify emergent CBP efforts, characterize their degrees of success, and capture the lessons from these efforts. Discuss how these efforts have integrated risk into department-level decisions, how they have addressed broader ranges of security environments, and how their results reflect a capabilities focus. Identify studies that attempt to integrate resource tradeoffs throughout the force planning process, not just at the end.

**WG 5: The Application of CBP to Acquisition Management (Unclassified)**

Scope: The transformed acquisition process, and the supporting elements of military modeling (cost and effectiveness models).

Background: Transformation in the acquisition community is an important part of the development of the CBP process. New tools and processes will be developed in support of acquisition in a capabilities context. These include the use of roadmaps, and the role of systems engineering to answer important acquisition issues. This working group will focus on understanding needs and developing recommendations for an acquisition process that will oversee the development and fielding of capabilities.

Tasks: Discuss a capabilities approach to acquisition. Identify and discuss new and modified processes and tools to support its implementation. Identify data needs. Suggest recommendations for augmenting current acquisition practice.

**Synthesis Group. (Unclassified)** This working group will take a broad view, identifying high-level issues across the domains of CBP. The group is responsible for developing an integrated perspective of the Workshop and capturing crosscutting insights and lessons learned that might not be apparent in individual working groups. It also will help establish consistent definitions.

## 5. Agenda

Day/Time	Activity	POC
<b>Monday, 18 October 2004</b>		
1200	Registration	MORS
1300	Preliminary Session	Ms. Sue Iwanski
1730	Organizing Committee Meeting	Mr. Jim Bexfield, Ms. Lisa Disbrow
<b>Tuesday, 19 October 2004</b>		
0700	Registration	MORS
0800	MORS President's Welcome	Dr. Andy Loerch
0805	Welcome by Host	
0810	Keynote Address 1	Policy
0830	Keynote Address 2	J-8
0850	Keynote Address 3	PA&E
0910	Keynote Address 4	J-7
0930	Keynote Address 5	AT&L
0950	Panel Discussion	All
1015	Break	
1030	Generalized Allied Approach	UK
1130	Lunch (in working group rooms)	
1300	CBP Status	
1400	Organizational Viewpoints	
1400	Army	
1420	Air Force	
1440	Marines	
1500	Navy	
1520	Break	
1535	Panel	All
1600	JFCOM: Experimental	
1630	PACOM	
1700	Educating the Community (tentative)	Dr. Andy Loerch
1715	Mixer	
<b>Wednesday, 20 October 2004</b>		
0800-1200	Working Group Meetings	
1200-1330	"Staggered" Lunch Breaks	
1330-1730	Working Group Meetings	
1730	WG Chairs Hot Wash	
<b>Thursday, 21 October 2004</b>		
0800	Working Group Meetings	
1200-1330	"Staggered" Lunch Breaks	
1330-1400	Tutorial on Special Brief	
1400-1430	Outbriefs: WG 2 Taxonomy & Lexicon	
1430-1500	WG 3 Adaptive Planning	
1500-1530	WG 4 Future Force Planning	
1530-2600	WG 5 Acquisition	
1600-1630	WG 1 Methodologies	
1630-1700	Synthesis Report	
1700	Adjourn	

## 6. Attendance.

Attendance will be controlled via invitation. Attendees will include invited experts from OSD, all services, the Joint Staff, Federally Funded Research and Development Centers, operational commanders, DoD contractors, analysts from other government departments, allied nations' officials involved in CBP, commercial firms, and academia. Workshop chairs will control membership of their sessions in conjunction with the Organizing Committee. Attendance will be limited to 120 people.

## 7. Products.

There will be up to five specific products generated from this workshop:

- An executive summary addressing the findings, conclusions, and recommendations
- A proceedings document containing the summaries of all sessions and copies of appropriate briefing slides and presentations
- A *PHALANX* article
- If appropriate, suggested updates to the lexicon

## 8. Proponents of the Workshop:

- OSD, Mr. Kenneth Krieg
- Joint Staff, MG Hunzeker

## 9. Planning and Organizing Committee

General Chairs (PA&E, JS):	Jim Bexfield, Lisa Disbrow
MORS Advisors	Sue Iwanski, Tom Allen
OSD/Policy Rep.	Mark Gunzinger
OSD/AT&L	Kris Baldwin
Air Force	Cliff Tompkins
Army	Forrest Crain
Navy	LCDR Ken Masson
Marine	Maj John Bruggeman
Technical Advisors	Ken Comer, Jim Stevens, Joe Bonnet, Al Sweetser
Allies	Ben Taylor (UK)

Working Group	Co Chairs	Assistants
1. Methodologies	Bart Bennett Greg McIntyre	Lt Col Darren Durkee, USAF Gary Mullin Mark Gallagher
2. Taxonomy, Lexicon, and Data	Charles Werchado Clay Bowen	Ben Taylor CDR Todd Kiefer
3. Application to Adaptive Planning	Tim Hoffman OSD/P Bob Clemence	Kathleen Conley Jim Stevens Jim Pasquarette
4. Application to Future Force Planning	Jim Thomason Kirk Yost	Pat McKenna Chris Morey (TRAC)
5. Application to Acquisition Management	Kristen Baldwin LTC Bob Larsen	Dan Maxwell Phil Walsh
6. Synthesis	Greg Parnell	Stu Starr (tentative) Tom Allen Gene Visco Wayne Hughes Todd Calhoun Bert Head Col Jerry Diaz Paul Davis Roy Rice

10. Monday Preliminary Session

Time	Topic	Speaker	Organization
1300-1330	CBP Lexicon	CDR Todd Kiefer	Joint Staff, J-7
1330-1400	Overview of EPP	Vance Gordon	OSD PA&E
1400-1430	Overview of JCIDS	Joe Bonnet	Joint Staff, J-7
1430-1500	Analytic Agenda	Jim Stevens COL Mike Altomare	OSD PA&E Joint Staff, J-8
1500-1520	Panel Q&A	Kiefer, Gordon, Bonnet, Stevens, Altomare	Joint Staff, OSD PA&E
1520-1530	<b>Break</b>	-	-
1530-1600	PPBS History	Vance Gordon	OSD PA&E
1600-1630	Adaptive Planning	Tim Hoffman	OSD (P)
1630-1700	Comptroller	Drew Miller	OSD (Comp)
1700-1720	Panel Q&A	Gordon, Hoffman, Miller	OSD

## 11. Administration

Name: Ms. Natalie Kelly, MORS, 1703 N. Beauregard St, Suite 450, Alexandria, VA 22311  
Dates: 19- 21 October 2004 (Preliminary Session on 18 October.)

Location: Institute for Defense Analyses (IDA)

Fee: \$210 government, \$420 all others

Attendance: 100-120

Classification: UNCLASSIFIED except for two working groups that will be held at SECRET/  
NOFORN level.

IDA-Pentagon Shuttle: There is a shuttle that runs between IDA and the Pentagon. It leaves IDA every 15 minutes starting at 0715 each day. The last departure from IDA to the Pentagon is 1800. *Those who plan to use this shuttle will be asked to indicate so on their application.*