Planner's Handbook
for
Operational Design

Version 1.0

Joint Staff, J-7
Joint and Coalition Warfighting
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MESSAGE TO JOINT WARFIGHTERS

Military operations, particularly those involving combat, have always been tough. However, today's operational environment challenges us even more with increasingly complex and interconnected geopolitical circumstances, the blurring of the lines between combatants and civilians, rapid technology change, and adaptive adversaries who possess a wider range of capabilities and an ideological "home-field" advantage. Strategic and operational-level problems that cannot be solved with military ways and means alone are the norm rather than the exception.

In his October 2009 *Vision for a Joint Approach to Operational Design*, General James Mattis observed that standard planning processes have served us well to this point. However, he wrote that commanders and staffs generally tend to use these processes somewhat mechanically, with a focus on procedure and details that often obscure the importance of the underlying creative process. The complex nature of current and projected challenges requires that critical thinking, creativity, foresight, and adaptability—rather than strict reliance on methodical steps—must become routine.

To support and improve detailed planning, Army and Marine Corps design-related initiatives have been exploring methods that use critical and creative thinking to understand and describe ill-defined problems and visualize broad approaches to solve them. The joint community has been considering the potential beneficial effect of this effort on joint doctrine, training, and professional military education, and is codifying key design-related ideas in JP 3-0, *Joint Operations*, and JP 5-0, *Joint Operation Planning*.

Although not authoritative, this handbook describes *design* ideas in the context of joint doctrine's current *operational design* and *joint operation planning process*. These ideas should stimulate the joint community's thinking to help refine operational design and improve joint doctrine, education, and training. Your perspectives are important to us, and I encourage you to engage in this examination. We welcome your specific critique of the ideas presented in this handbook, and ask that you share your own value-added ideas for incorporation in emerging joint doctrine.

FREDERICK S. RUDESHEIM
Major General, U.S. Army
Deputy Director, J-7, Joint Staff,
Joint and Coalition Warfighting

PREFACE

1. Scope

This handbook describes operational design and its interaction with joint operation planning. It is based partly on joint doctrine contained in JP 5-0, *Joint Operation Planning*, and JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment*, but it provides more details on operational design than currently exist in these publications. The handbook also highlights "best practices" derived from Service, joint, and multinational operations and joint exercises. In particular, this handbook increases the depth of discussion on operational design by incorporating new design-related ideas developed and refined in Service and joint academic institutions during the past three years.

2. Purpose

This handbook has two primary purposes:

a. The first is to provide useful details to commanders and planners on joint operational design and its interaction with the joint operation planning process.

b. The second is to stimulate thinking about the best ways to incorporate new, design-related ideas into emerging joint doctrine, training, and education. This handbook provides a platform the joint community can use to examine and debate design issues and establish a common frame of reference for collaboration on assimilating value-added ideas.

3. Development

This handbook fulfills a commitment to develop this product as stated in the USJFCOM Commander's 6 Oct 09 memorandum, *Vision for a Joint Approach to Operational Design* and the Joint Warfighting Center's 20 Sep 10 Pamphlet 10, *Design in Military Operations*. The USJFCOM Joint Doctrine Division developed this handbook based on a variety of sources, including the following:

a. Design-related work primarily by the Army and Marine Corps and reflected in a variety of non-doctrinal papers and doctrine products;

b. The exploration of design in the classroom by the Joint Advanced Warfighting School (JAWS) at the Joint Forces Staff College and the Army's School of Advanced Military Studies (SAMS) at Fort Leavenworth;

c. An extensive array of articles in professional journals reflecting the ideas of practitioners across the joint community;

    d.   Discussions during the CAPSTONE and PINNACLE senior executive education programs as well as observations during joint operations and training exercises.

4. Application

This handbook is aimed at joint force planners, Service/functional component planners, and others involved in planning. <u>The handbook is not approved doctrine</u>, but it is consistent with current joint doctrine. It is a non-authoritative product that can assist commanders and staffs to design, plan, and execute joint operations. Users should consider the potential benefits and risks of using this information in actual operations.

5. Contact Information

We encourage comments and suggestions on this important topic. The Deputy Director, J-7, Joint Staff, Joint and Coalition Warfighting points of contact are LTC Jim DiCrocco, 757-203-6243, <u>james.dicrocco@hr.js.mil</u>; and Mr. Rick Rowlett, 757-203-6167 (DSN 668), <u>ricky.rowlett.ctr@hr.js.mil.</u>

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> *Design does not replace planning, but planning is incomplete without design.* *The balance between the two varies from operation to operation as well as within each operation. Design helps the commander provide enough structure to an ill-structured problem so that planning can lead to effective action toward strategic objectives. Likewise, design is not new to joint doctrine, but I believe we can substantially improve doctrine's current treatment and change JPME and joint training accordingly to the benefit of current and future leaders at all levels.*
>
> **General James Mattis**
> ***Vision for a Joint Approach to Operational Design,***
> **6 October 2009**

1.   Introduction

a.   This handbook focuses on *operational design* and related aspects of *joint operation planning* within strategic and operational-level context. The handbook is relevant to joint force commanders (JFC), joint force Service and functional component commanders, and their respective staffs. However, **the staff is the intended target audience, especially those involved in planning joint operations**.

b.   Dealing with ill-structured problems has been at the core of a multi-year "design" initiative spearheaded by the Army and Marine Corps. These Services examined this challenge over a three-year period during a series of strategic and operational-level seminars and wargames. These included UNIFIED QUEST, the Army's annual U.S. Code, Title 10, Future Warfare Study Plan and capstone wargame, and numerous Marine Corps seminars. The work has focused on improving commanders' and staff's abilities to use critical and creative thinking to help them understand the fundamental nature of a complex military problem; to design a broad approach to achieve objectives and accomplish the mission; and to determine if, when, and how to change that approach when circumstances change. The Army and Marine Corps have embedded key ideas in their planning doctrine and the joint community is doing the same in Joint Publication (JP) 5-0, *Joint Operation Planning*, and other key JPs.

c.   *Operational design* **is the conception and construction of the framework that underpins a campaign or major operation plan and its subsequent execution**.[1] The *joint operation planning process* (JOPP) is an orderly, analytical process that consists of a logical set of steps to analyze a mission, select the best course of action, and produce a joint operation plan or order.[2] Early operational design focuses on conceptual planning. It occurs within JOPP to produce the eventual plan or order that drives the joint

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[1] Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*.
[2] JP 5-0, *Joint Operation Planning*, August 2011, p. GL-12. JOPP is essentially the same set of steps used in Service-specific planning processes. See JP 5-0 Chapter IV.

operation, but also continues throughout execution. **Operational design's initial focus** is on helping the JFC visualize the operational environment, understand the problem that must be solved, and develop a broad operational approach that can create the desired end state. **JOPP converts the broad approach to a detailed solution** in an operation plan (OPLAN) or operation order (OPORD). The box below highlights the potential value of incorporating new design-related ideas in joint doctrine, training, and education.

What's the Potential Value-added?

- **Increased emphasis on the role of the commander.**
- **Enhanced dialogue between commanders and staffs across levels.**
- **Deeper (and earlier) understanding of the operational environment.**
- **Better understanding of the problem and its root causes.**
- **Better guidance to drive detailed planning.**
- **Shared visualization of the flow of the operation.**
- **Enhanced adaptability to changes in the environment or problem.**
- **Expanded role of the assessment process.**

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d. **What is the relationship of generic *design* to joint doctrine's *operational design*?**

(1) **In general, the terms have been related but not identical**. The focus of discussion and writing on *design* during the past three years has been on the critical and creative thinking and learning required to understand complex operational environments and ill-defined problems facing the commander. Such understanding should facilitate early development of a broad operational approach that can guide the more detailed planning process. *Operational design* is a construct that joint doctrine has used since 2002 to encompass various *elements of operational design* (previously called *facets of operational art*) that planners have applied to develop a framework for a campaign or major operation.[3] However, joint doctrine's explanation of operational design has focused more on the details of each element (such as center of gravity analysis) than on the critical and creative thinking that must precede the elements. The term *operational art*, described later, embodied the creative and visionary application of the elements.

(2) Army and Marine Corps doctrine publications provide Service-specific views of design, **which can apply at all levels as a generic critical and creative methodology**.[4] To distinguish between joint and Service planning, however, **joint doctrine uses the term *operational design* to encompass practices at the operational**

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[3] JP 5-00.1, *Joint Doctrine for Campaign Planning*, 25 January 2002. This JP first defined *operational design* as "The key considerations used as a framework in the course of planning for a campaign or major operation."

[4] See Army Field Manual 5-0, *The Operations Process*, and Marine Corps Warfighting Publication 5-1, *Marine Corps Planning Process*.

level by joint force commanders[5] **and their staffs.** The joint force's Service and functional components participate in joint operation planning, so it is important that those commanders and staffs be able to adjust to nuances of *operational design* and JOPP.

(3) JP 5-0, *Joint Operation Planning*, is joint doctrine's authoritative source for joint operation planning and operational design. **The community's recent work to describe the importance of** *design's* **early critical and creative thinking has helped refocus joint doctrine's operational design.** The new (August 2011) JP 5-0 now incorporates the generic *design* methodology as a way to improve the JFC's and staff's early understanding through what some call "conceptual planning" before planners move too quickly to detailed planning.[6] **The intent for this handbook is to provide sufficient additional detail so that JFCs and staffs can better understand design methodology in the context of operational design and JOPP**.

> **Note to the Reader**
> In essence, the above explanation conveys that joint doctrine's operational design has embraced and subsumed design's philosophy and general methodology. Therefore, the remainder of the handbook uses the two terms interchangeably (to mean operational design) except when referring specifically to the historical development of the Services' design ideas or underlying design theory.

e. Following is an executive summary that provides a brief introduction to the handbook's contents.

2. Executive Summary

Theoretical Underpinnings of Operational Design **See Chapter II**

a. Extensive theory—developed by both classical and contemporary writers and practitioners—underpins the planning and execution of military operations. Some theoretical constructs such as *center of gravity* relate specifically to military operations, while constructs such as *systems theory* can apply across a wide range of disciplines.

b. Operational design combines aspects of military theory, systems theory, writings on the nature of problems and problem solving, and the challenge of critical and creative thinking in order to help the JFC and staff understand and develop effective solutions for complex military problems.

Relationship between Operational Art and Operational Design **See Chapter III**

a. Joint operation planning requires a balance of art and science. *Operational art* is a doctrinal term defined as "The cognitive approach by commanders and staffs— supported by their skill, knowledge, experience, creativity, and judgment—to develop

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[5] These are commanders of combatant commands, sub-unified commands, and joint task forces.
[6] JP 5-0, Chapter III, pp. III-1 through III-18.

strategies, campaigns, and operations and organize and employ military forces by integrating ends, ways, and means."[7] This application occurs through the thought process JFCs use to visualize how to best efficiently and effectively use military capabilities to accomplish their mission.

b.   *Operational art* encompasses *intuition*, an unquantifiable talent for applying a level of insight that underpins the commander's decisions on all aspects of joint operations. ***Operational design*** provides a methodology that extends operational art's creative thinking and intuition. This methodology is an iterative approach that allows for the JFC's vision and mastery of operational art to help planners answer ends–ways–means–risk questions and appropriately structure campaigns and major operations. Operational design ***elements***, such as *objective*, *end state*, and *line of operations*, are tools that help JFCs and staffs visualize, describe, and modify a joint operation's framework. Such elements support joint operation planning and the JFC and staff use them throughout JOPP. **Operational design and JOPP are complementary elements of the overall planning process.**

c.   The JFC's role in planning, as a fundamental responsibility of command, should include personal involvement and guidance to the staff, particularly during early design. The commander uses planning to increase understanding of the environment and the problem in order to support sound decision making. The JFC typically has information not available to the staff as well as a broader base of experience, judgment, and intuition to guide decision making. Regardless of time constraints, the JFC should create conditions that facilitate the staff's critical and creative thinking and sharing of ideas and recommendations. Such participation is essential early in the process.

Depicting the Operational Environment   See Chapter IV

a.   The *operational environment* is defined as a "composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander."[8] To visualize an approach that can achieve objectives and accomplish the mission, the JFC must be able to describe both the beginning state of the operational environment and the state of the environment desired when operations have achieved a desired end state. One way to do so is to visualize the environment in terms of constantly interacting systems, which are complex, adaptive, and in flux.

b.   This chapter describes a systems-oriented technique to *depict* the operational environment graphically. This is a doctrinally-based approach that is becoming widely used in ongoing joint operations. This technique supports Chapter V's discussion of considerations associated with *understanding* the operational environment and the problem facing the commander.

Understanding the Operational Environment and the Problem   See Chapter V

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[7] JP 3-0, *Joint Operations*, August 2011.
[8] JP 1-02

a.   The operational environment provides context—the set of circumstances within which the JFC will operate. **The JFC and staff need the best possible understanding of this context and the problem to be solved to design an effective approach to solve the problem.** Higher headquarters (HQ) typically provides the initial context for an operation in the form of a warning order, alert order, or planning requirement, but this initial context will not be complete. Additional analysis will be necessary, particularly for a complex operational environment and ill-defined problem.

b.   Understanding the operational environment requires understanding how its systems behave and interact, which varies from country to country, from region to region, and from one set of operational circumstances to another. It also requires the ability to think through cause and effect—how the joint force's actions on one component of a system will likely affect that system and others. It involves understanding and isolating the root causes of the issue at hand—defining the essence of a complex, ill-structured problem—so the JFC and staff can visualize and describe a solution that will drive detailed planning.   As the introduction to this chapter mentions, joint doctrine's operational design now incorporates the up-front emphasis on the critical and creative thinking necessary to understand the operational environment and problem at hand.

> *When ends are confused and conflicting, [and] there is not yet a clearly defined problem to solve, it is through the process of framing the complex situation that we may organize and clarify both the ends and possible means to achieve them.[9]*
>
> **Donald Schon,**
> ***The Reflexive Practitioner*, 1983**

The Operational Approach   See Chapter VI

a.   As the commander and staff gain an understanding of the problem within the context of the operational environment, potential solutions should become evident. The JFC and staff use their understanding of the current operational environment, the nature of the problem, and how they believe the environment should look when operations conclude to develop a broad solution called the ***operational approach***. JP 5-0 describes operational approach as "…a commander's description of the broad actions the force must take in order to achieve the desired end state."[10]

b.   The operational approach is a visualization of broad, general actions—typically described using constructs such as *center of gravity*, *lines of effort* and *lines of operations*—to produce conditions that define the way the JFC wants the operational environment to look when operations end. This approach provides the framework that underpins the operation, is one of the primary products of early operational design, and can become part of the JFC's more detailed planning guidance and intent.

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[9] Schon, Donald A., *The Reflective Practitioner: How Professionals Think In Action*, Basic Books, Inc. 1983.
[10] JP 5-0, p. III-5.

Interaction of Operational Design and Planning   **See Chapter VII**

a.   While some contend that design occurs before planning, this handbook addresses operational design as a methodology or activity that begins with the *planning initiation* step and heavily influences *mission analysis*, which is front-loaded with design-related actions.   Operational design continues throughout the JOPP steps as the operational approach drives course-of-action (COA) development. The commander and staff can adjust the approach based on results of COA development and changes to (or discoveries about) the operational environment.

b.   Preparing to evaluate progress during execution occurs during planning when planners determine how to monitor the joint force's progress toward creating conditions and achieving objectives that will accomplish the mission and satisfy the desired strategic end state.   *Measures of performance* and *measures of effectiveness* help determine whether the joint force is both "doing things right" and "doing the right things."   The handbook introduces *reframing indicators*, which focus on changes in the operational environment or problem that could cause the JFC to begin a redesign effort that could change the operational approach.

Organizing for Operational Design and Planning   **See Chapter VIII**

a.   Chapter III highlights the importance of the JFC's role in operational design and planning. In support, the J-5 typically leads the staff's effort to prepare joint plans, orders, and associated estimates of the situation for future efforts. The J-3 leads current and near-term operations planning during execution.   The J-5 often forms *a joint planning group* to integrate planning efforts. This group should include representation from all joint force principal and special staff sections, joint force components and supporting commands, and interorganizational partners[11] as required.

b.   In some circumstances and when resources permit, the JFC or J-5 might decide to form a ***design team*** that would focus on working with the JFC to frame the environment, frame the problem, and develop the operational approach. The J-5 and other key members from across the staff will typically be members of the design team. Regardless of how the staff organizes for design and planning, participation by subject matter experts from interorganizational partners is essential to understanding the operational environment and true nature of the problem.

Operational Design during Execution   **See Chapter IX**

a.   Operational design and planning continue during execution. As the operation progresses, planning generally occurs in three distinct but overlapping timeframes: *future plans*, *future operations*, and *current operations*. If operations are progressing according

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[11]   JP 3-08, *Interorganizational Coordination During Joint Operations*, introduces the term "interorganizational partners" to refer collectively to USG departments and agencies; state, territorial, local, and tribal agencies; foreign military forces and government agencies; nongovernmental agencies; and the private sector. This handbook will use this term where appropriate.

to plan, design activities typically consist of adjusting operational design elements such as decisive point and line of effort (LOE).

b.   Changes in the operational environment or the nature of the problem during execution can require the JFC and staff to review and adapt the approved operational approach as necessary. These changes can trigger the requirement for a redesign effort that revisits earlier assumptions, "reframes" the operational environment and the problem facing the JFC, revises the operational approach, and adjusts current operations.

Operational Implications and Conclusion

See Chapter X

a.   Integrating the individual Services' diverse capabilities in joint operations, especially in unified action with our interorganizational partners, begins with operational design. The best conceivable operational approach will be ineffective without the capabilities to execute it, even with comprehensive understanding of the problem and the operational environment.

b.   Sound joint training and education rests on a foundation of sound joint doctrine. A good doctrinal base should provide the foundation and impetus for an appropriate level of education and training. However, this must begin with Service education and training programs at relatively low levels.

Supplementary Material

Appendices support the chapters summarized above with additional information on—

a.   Visualizing the operational environment (Appendix A)

b.   Selected elements of operational design (Appendix B)

c.   Critical and creative thinking (Appendix C)

d.   Historical examples of operational design (Appendix D)

e.   Design and theory references (Appendix E)

3.   Conclusion

a.   This handbook provides information that is not in approved joint doctrine. It also incorporates some "best practices" observed in actual operations and training, ideas from Service doctrine, related material developed by selected academic institutions, and emerging constructs intended to refine and improve operational design and the planning process. The authors encourage users to refer to footnote references and Appendix D for more information.

   b.   For a perspective of the use of design in actual operations, readers should refer to the USJFCOM Joint Coalition Warfighting Center publication *Design and Planning (A Joint Force Operational Perspective)*, July 2011, which documents insights and best practices observed during training, exercises, and ongoing joint operations. This and other "focus papers" can be found at found at: https://jko.harmonieweb.org/coi/JointTrainingDivision/Pages/default.aspx

CHAPTER II
THEORETICAL UNDERPINNINGS OF OPERATIONAL DESIGN

"All too often, the critical importance of military theory either is not well understood or is completely ignored by many officers. A reason for this is their apparent lack of knowledge and understanding of the relationship between theory and practice and the real purpose of military theory. Many officers are also contemptuous of theory because they overemphasize the importance of technology."

Henry E. Eccles
Military Concepts and Philosophy[1]

First, you know, a new theory is attacked as absurd; then it is admitted to be true, but obvious and insignificant; finally it is seen to be so important that its adversaries claim that they themselves discovered it.

William James

1. Introduction

a. Extensive theory, developed by both classical and contemporary writers and practitioners, underpins the planning and execution of military operations. Some theoretical constructs such as *center of gravity* have been associated specifically with joint doctrine's traditional treatment of operational design, while constructs such as *systems theory* and *critical thinking* have been emphasized recently in conjunction with design initiatives. Chapter I briefly explains the relationship of *design* to joint doctrine's *operational design* and states that operational design has embraced and subsumed design's philosophy and general methodology. Therefore, these theories can be considered to be relevant to operational design as it is currently described in JP 5-0, *Joint Operation Planning*

b. **Operational design is a journey of discovery, not a destination.** While the solution to straightforward military problems can be obvious early in mission analysis, the critical and creative thinking that should characterize operational design can help commanders and planners 1) make sense of complicated operational environments; 2) unveil the true nature of ill-structured problems; and 3) devise an operational approach to solve the problem in the context of the operational environment. Later chapters discuss these three components and how operational design and detailed planning interact. This chapter summarizes selected related theories.

Note to the Reader

The chapter is simply intended to acknowledge that operational design has a theoretical foundation and to encourage readers to research further if they are

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[1] Henry E. Eccles, *Military Concepts and Philosophy*, New Brunswick, NJ: Rutgers University Press, 1965, p. 24. Courtesy of Milan Vego's Joint Forces Quarterly issue 62 article, *On Military Theory*, 3d quarter 2011, p. 59.

so inclined. However, this chapter is not meant as a comprehensive review or analysis of these theories. See footnotes and Appendix E, References for related sources.

2. Critical and Creative Thinking

a.   Various writings mention that *critical and creative thinking* are essential to design. For example, US Army Field Manual (FM) 5-0 states, "Critical thinking captures the reflective and continuous learning essential to design. Creative thinking involves thinking in new, innovative ways while capitalizing on imagination, insight, and novel ideas."[2]

> *"Everyone thinks; it is our nature to do so. But much of our thinking, left to itself, is biased, distorted, partial, uninformed or down-right prejudiced. Yet the quality of our life and that of what we produce, make, or build depends precisely on the quality of our thought. Shoddy thinking is costly, both in money and in quality of life. Excellence in thought, however, must be systematically cultivated."*
>
> **Dr. Richard Paul and Dr. Linda Elder**
> **The Miniature Guide to Critical Thinking Concepts and Tools[3]**

b.   There are numerous definitions of the term *critical thinking*. Here are four:

(1) "Critical thinking is a deliberate process of thought whose purpose is to discern truth in situations where direct observation is insufficient, impossible, or impractical."[4]

(2) "Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness."[5]

(3) "Critical thinking is the use of those cognitive skills or strategies that increase the probability of a desired outcome. It is used to describe thinking that is purposeful, reasoned, and goal directed."[6]

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[2] Field Manual (FM) 5-0, *The Operations Process*, March 2010, p. 3-1.
[3] Dr. Richard Paul and Dr. Linda Elder, *The Miniature Guide to Critical Thinking Concepts and Tools*, 2008, p. 2. This is a special edition of the guide produced for the 28th Annual International conference on Critical Thinking, July 19-24, 2008.
[4] Ibid, p. 1-6.
[5] The National Council for Excellence in Critical Thinking, 1987
[6] Diane F. Halpern, Thought & Knowledge: An Introduction to Critical Thinking, 4th ed. (Mahway, NJ: Lawrence Erlbaum Associates, 2003), p. 6.

(4) "Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue, assumptions, concepts, empirical grounding; reasoning leading to conclusions, implications and consequences, objections from alternative viewpoints, and frame of reference. Critical thinking—in being responsive to variable subject matter, issues, and purposes—is incorporated in a family of interwoven modes of thinking, among them: scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking."[7]

c. Bloom's Taxonomy of Learning (**Figure II-1**), developed in 1956 for education purposes, is a model that can help us relate critical thinking and creative thinking by associating them with the model's components.[8] Although not part of the original model, we can generally associate critical thinking and creative thinking with the six categories as the left side of the figure shows. **We should strive for creative thinking in operational design**. It is reasonable to expect that senior commanders should be more adept than most subordinates at creative thinking based on their training, education, and experience, which hopefully are enhanced by intuition and superior judgment. **This is why the commander's direction and participation in design is important early in planning and throughout operations**.
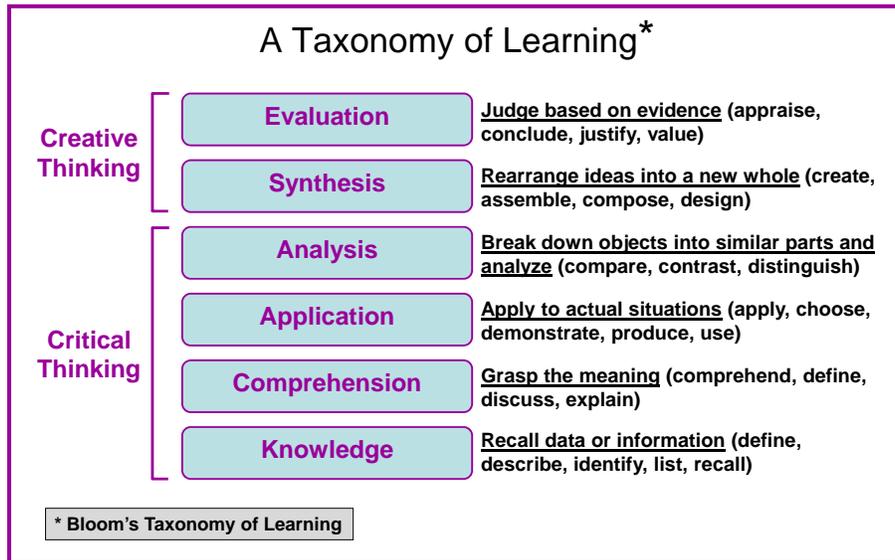
Figure II-1. A Taxonomy of Learning

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[7] A Working Definition of critical thinking by Michael Scriven and Richard Paul, Wikipedia, undated, http://lonestar.texas.net/~mseifert/crit2.html
[8] Bloom's Taxonomy of Learning: a classification of learning objectives within education proposed in 1956 by a committee of educators chaired by Benjamin Bloom.

d.   Among philosophers most closely associated with critical thinking is Socrates, who tried to find meaning and truth through serious questioning. He developed the art of "Socratic questioning" to reach a more profound logic, understanding, and reflective thought. In essence, Socrates' method was the quest for reason and wisdom.[9] It is, "...the ability to logically assess the quality of one's thinking and the thinking of others to consistently arrive at greater understanding and achieve wise judgments."[10]

Refer to Appendix C, *Thinking Critically about Critical Thinking***, for more information and practical application of critical thinking. This appendix consists of a 2008 paper by Colonel (Retired) Stephen J. Gerras, Professor of Behavioral Sciences at the US Army War College to support curriculum discussion of the topic.**

Refer also to the US Army School of Advanced Military Studies *Art of Design* **Student Text, Version 2.0, a comprehensive design product with a heavy emphasis on how to think critically and creatively.**

3. Systems Theory

a.   **Systems theory supports a major component of operational design—the JFC's and staff's efforts to understand (or frame) the operational environment.** *Systems theory* is the transdisciplinary study of systems in general, with the goal of elucidating principles that can be applied to all types of systems in all fields of research. The term does not yet have a well-established precise meaning, but systems theory can reasonably be considered a specialization of *systems thinking* and a generalization of *systems science*. The term originates from Ludwig von Bertalanffy's General System Theory.[11]

b.   DOD defines a "system" as a "functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements; that group of elements forming a unified whole."[12]

c.   There is no formal DOD definition for "systems theory." As a result of various efforts within academia, however, the defense establishment has come to recognize that understanding of the operating environment and nature of a problem may be enhanced through the study of systems and how they relate to each other. Various constructs have been developed to characterize systems. These include, for example; *open* and *closed* systems; *structurally complex* and *interactively complex* systems; and *determined* and *adaptive* systems. Each of these approaches is summarized in paragraphs that follow.

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[9] Colonel W. Michael Guillot, "Critical Thinking for the Military Professional," *Air and Space Power Journal*, 17 June, 2004
[10] Guillot.
[11] Ludwig von Bertalanffy, General System Theory: Foundations, Development, Applications (George Braziller, Inc, 1969)
[12] JP 1-02.

   d.   A simple way to categorize systems is determining whether they are *open* or *closed*. Closed systems, such as electrical grids or lines of communication, can be easily understood and actions taken regarding those systems may be predicable with reasonable certainty. On the other hand, open systems involve economic, political and social interaction. They are dominated by humans, who are both adaptable and unpredictable. Thus, actions taken regarding those systems cannot be predicted with any degree of certainty.

   For a comprehensive overview of general systems theory, the reader should refer to Ludwig von Bertalanffy's <u>General Systems Theory</u>, George Braziller, Inc.: New York, 1969, pp. 30-41, 46-49, and 222-248.

   e.   In "An Introduction to System Theory and Decision-Making,"[13] Lieutenant General Paul Van Riper provides the following summary of one author's perspective of systems:

   "Heinz Pagels, the noted American physicist and science writer, identified two kinds of systems, those that are **structurally complex** *and those that are* **interactively complex***. He chose the term* structurally complex*, recognizing that the more parts in a system and the more orderly the arrangement of those parts the greater is the system's structural complexity. Structurally complex systems produce rigid, lockstep, and generally predictable behavior. Many modern machines possess this characteristic; they have numerous parts arranged in a specific manner, but they operate in only one way or they do not operate at all. Often we can understand structurally complex systems better by studying their parts separately. They are systems where the sum equals the parts. Structurally complex systems are also known as* linear *systems.*

   For the second kind of system, Pagels selected the term interactively complex *because he understood that in these systems the lack of a fixed structure and the significant freedom of action among the parts is what makes the systems dynamic and unpredictable. The more freedom of action the parts enjoy the greater are the dynamics of the system. Interactively complex systems create multifaceted, rich, challenging, and potentially volatile behavior. Actions within the system often produce disproportionate outcomes. Even interactive systems with only a few parts can exhibit surprisingly rich and novel behavior. The interaction among the parts and the unanticipated emergent behavior is what makes these systems unique. We benefit little when we separate the parts of an interactively complex system and study them in isolation. In the act of separation the system looses [sic] its coherence and the parts lose their meaning. Interactively [complex] systems are not additive systems; indeed, they are greater than the sum of their parts. Interactively complex systems are also known as* non-linear *systems."[14]*

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[13]   Paul K. Van Riper, "An Introduction to System Theory and Decision-Making," 2010, p. 1.   Van Riper developed this paper to support the US Marine Corps Command and Staff College elective, *Introduction to System Theory.*
[14]   Ibid.

f.   Another related way to understand *structurally* and *interactively* complex systems is in the distinction of ***determined systems*** and ***adaptive systems***.[15]

(1) ***Determined systems*** can be identified by the linear relationship between the inputs and the outputs of the system. Determined systems are comprised of components that must also behave in a linear, predictable manner. Examples of determined systems include automobiles, airplanes, and most modern machines. Examples of collective human activities that behave like determined systems are marching bands, synchronized swimming, and the use of line and column tactics in warfare.

(2) Unlike determined systems, ***adaptive systems*** are identifiable by the non-linear and often unpredictable relationship between inputs and system responses. Adaptive systems are comprised of "agents" (vice components). Identical inputs to an adaptive system may produce different responses each time they are introduced, making the adaptive system difficult to predict with any precision. In adaptive systems, the connections between the agents are critical but the individual agents are not. If one agent fails, the system will continue without it. Further, the agents have latitude to respond individually within a set of simple rules, producing novel, creative and emergent system responses. Given the complexity created by the near infinite possibility of system interactions and responses, these systems are often referred to as ***complex adaptive systems***.[16] Many human organizations behave as a complex adaptive system, especially when there is little centralized control and the behavior of the members (the system's agents) adheres to a common set of rules. Contrasting with the examples above, collective human activities that behave like adaptive systems are jazz ensembles, swim meets, and unconventional warfare.

g.   Essential to military operations is the ability to understand an operational environment comprised of complex, adaptive, and interacting systems. JP 3-0 states, "One way to think of the operational environment is as a set of complex and constantly interacting *political*, *military*, *economic*, *social*, *information*, and *infrastructure* (PMESII), and other systems…. The nature and interaction of these systems will affect how the commander plans, organizes for, and conducts joint operations."[17] JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment*, further amplifies the systems perspective theme with extensive discussion, examples, and vignettes.[18]

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[15] Paragraph c is largely derived from: Jones, Wendell. "Complex Adaptive Systems" *Beyond Intractability*. Eds. Guy Burgess and Heidi Burgess. Conflict Research Consortium, University of Colorado, Boulder. Posted: October 2003
http://beyondintractability.org/essay/complex_adaptive_systems/

[16] Peter Fryer provides an excellent summary of the origins and properties of complex adaptive systems in his essay "A Brief Description of Complex Adaptive Systems and Complexity Theory", posted at
http://www.trojanmice.com/articles/complexadaptivesystems.htm

[17] JP 3-0, *Joint Operations*, Revision Final Coordination Draft, 7 October 2010.

[18] JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment*, 16 June 2009. In particular, see Appendix B, "Somalia 1992-1993 — A Case Study of Support to Stability Operations and Irregular Warfare" and Appendix C, "Analyzing and Depicting a System."

h. **Operational design may benefit from understanding the nature and interaction of systems in the operational environment.** The JFC and staff observe and understand the conditions in the environment before the operation begins to determine the *current observed system*. As Chapters IV and V describe later, this system comprises the JFC's *operational environment*—the interacting systems (friendly, enemy, and neutral political, economic, military, and others) that are relevant to the operation at hand. The JFC and staff then determine the desired future state of the environment—the *desired system*—that should exist once objectives have been achieved and the operation concludes. Understanding these starting and end points, the commander and staff may then focus on what factors must be addressed to change the observed system to the desired system. This leads to developing an operational approach that addresses these factors.

4. The Nature of Problems

a. Numerous theories describe the nature of problems and problem solving. Understanding the nature of different types of problems greatly assists the commander's and staff's efforts to understand (or frame) the problem that must be solved. The discussion of systems theory in paragraph 3 is also relevant because the problem typically can be described in terms of interaction of systems in the operational environment.

b. Problems can be thought of as ranging from simple or well-structured to complex or ill-structured (see **Figure II-2**). In 1973, Horst Rittel and Melvin M. Webber formally described the concept of wicked problems in a treatise that contrasted "wicked" problems with relatively "tame," soluble problems in mathematics, chess, or puzzle solving.[19] Their treatise describes the following ten characteristics of wicked problems:
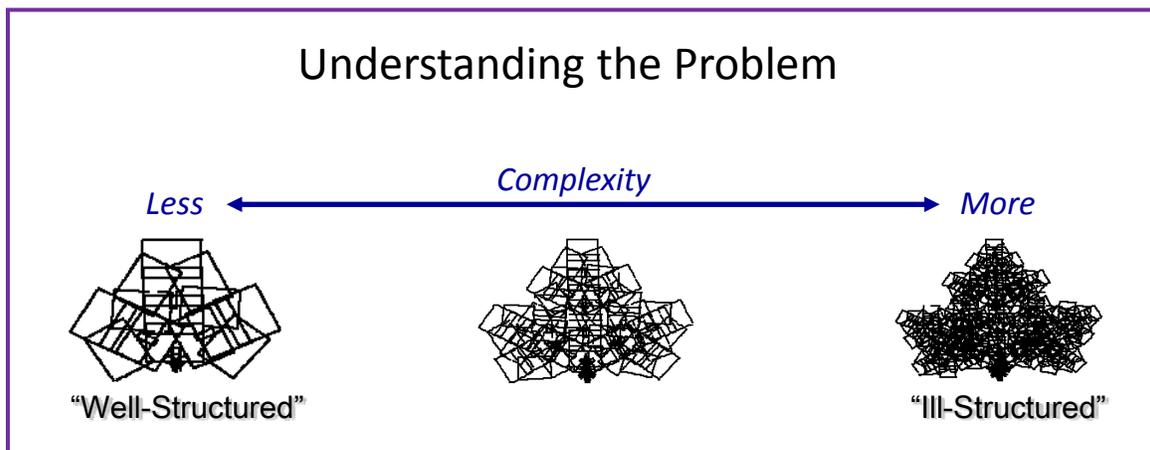
Figure II-2. Understanding the Problem

(1) There is no definitive formulation of a wicked problem.

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[19] Rittel, Horst, and Melvin Webber; "Dilemmas in a General Theory of Planning," pp. 155–169, Policy Sciences, Vol. 4, Elsevier Scientific Publishing Company, Inc., Amsterdam, 1973. [Reprinted in N. Cross (ed.), Developments in Design Methodology, J. Wiley & Sons, Chichester, 1984, pp. 135–144.], http://www.uctc.net/mwebber/Rittel+Webber+Dilemmas+General_Theory_of_Planning.pdf

(2) Wicked problems have no stopping rule.

(3) Solutions to wicked problems are not true-or-false, but better or worse.

(4) There is no immediate and no ultimate test of a solution to a wicked problem.

(5) Every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by trial-and-error, every attempt counts significantly.

(6) Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.

(7) Every wicked problem is essentially unique.

(8) Every wicked problem can be considered to be a symptom of another problem.

(9) The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.

(10) The planner has no right to be wrong (planners are liable for the consequences of the actions they generate).

c.   As with other theories, the challenge is one of describing how to apply the above descriptions to a practical military situation. Whether the problem is described as simple or complex, the commander must sufficiently understand the problem in order to successfully design, plan, and execute joint operations. It is not an understatement to say that understanding the nature and varying complexities of problems is fundamental to the commander's ability to frame problems, and thus solve them. History is rich with examples of commanders who have led their forces to defeat because they have failed to fully understand the problem to be solved.

d.   The combination of design and planning is intended as a problem-solving approach that supports decision making, and this approach must address ill-defined problems. Van Riper links decision making to systems theory and the nature of problems with the following statement:

> To make an effective decision a person must understand which of the two kinds of systems he or she is dealing with, one that is structurally complex or one that is interactively complex. The two systems require fundamentally different decision-making approaches. Structurally complex systems allow for analytical decision-making (sic) while interactively complex systems require intuitive decision-making (sic). Extremely difficult problems—sometimes called "wicked

problems" are always a result of interactive complexity; they call for systemic decision-making (sic).[20]

With respect to whether Western decision making is up to the challenge of dealing with complex problems, Van Riper cites Dr. Andres Ilachinski:

The traditional Western scientific method is predicated on a reductionist philosophy, in which the properties of a system are deduced by decomposing the system into progressively smaller and smaller pieces. In the act of exploring the properties reductionism loses sight of the dynamics. The analysis of complex adaptive systems [interactively complex systems] instead requires a holistic or constructionist approach.[21]

5. Relevant Constructs from Military Theory

a. Military theory coves a broad spectrum of topics from tactics through grand strategy. Some constructs from various writers apply directly to operational design and planning. A seminal military theoretical work is <u>On War</u>, a book about war and military strategy by Prussian general Carl von Clausewitz published in 1832 and subsequently translated several times.[22] <u>On War</u> includes numerous constructs directly relevant to operational design, particularly with respect to current *elements of operational design* that planners use to help develop the *operational approach* (see Chapter 6, *Developing the Operational Approach*.) Examples follow:

(1) *Center of gravity* is "The source of power that provides moral or physical strength, freedom of action, or will to act."[23] The COG was originally found where the army was most densely concentrated, but this meaning has lost much of its original sense due to the greatly expanded modern areas of operations and widely distributed nature of joint operations. One of the most important tasks confronting the JFC's staff during early operational design is the identification of friendly and enemy COGs. Although not always possible, **identifying COGs early in planning helps focus the operational approach**. However, see cautions later in the handbook on premature identification of the COG.

(2) *Culmination* has both offensive and defensive application. **In the offense**, the culminating point is the point in time and space at which an attacker's combat power no longer exceeds that of the defender. **A defender** reaches culmination when the defending force no longer has the capability to go on the counteroffensive or defend successfully. During stability operations, culmination may result from the erosion of national will, decline of popular support, questions concerning legitimacy or restraint, or lapses in protection leading to excessive casualties.

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[20] Van Riper, p. 6.

[21] IIachinski, Andrew, *Land Warfare and Complexity, Part I: Mathematical Background and Technical Sourcebook*, (Arlington, VA: Center for Naval Analyses, July 1996) p. 184. Cited in Van Riper, p. 8.

[22] A popular version is <u>On War</u>, translated by Michael Howard and Peter Paret, Princeton University Press, 1976. This version is a common resource in many military schools.

[23] JP 1-02.

(3) Clausewitz also believed in the *dialectic approach* to military analysis as a "method of intellectual investigation."[24] Also known as the Socratic technique of exposing false beliefs and eliciting the truth, dialectic is essentially an intellectual exchange of ideas between two or more people who hold different points of view about a subject and who wish to establish the truth through reasoned arguments. For example while senior leaders may have a clear strategic perspective of the problem, subordinate leaders often have a better understanding of specific circumstances that comprise the operational situation. Both perspectives are essential to a sound solution. Subordinate commanders should be aggressive in sharing their perspective with their superiors early in design, and both should resolve differences at the earliest opportunity and throughout the planning and execution. A common understanding of the operational environment and problem to be solved is essential. The dialectic approach enhances *critical thinking*.

b. Baron Antoine-Henri Jomini was a general in the French and later in the Russian service, and one of the most celebrated writers on the art of war in the Napoleonic era. Among many other constructs, Jomini wrote about *interior* and *exterior lines of operations*, defining the former as "…those [lines] adopted by one of two armies to oppose several hostile bodies, and having a direction that the general can [create a center of gravity] and maneuver with his whole force in a shorter period of time than it would require for the enemy to oppose to them a greater force. Exterior lines lead to the opposite result and are those formed by an army which operates at the same time on both flanks of the enemy, or against several of its masses."[25] *Line of operations* is a current element of operational design and an essential component of the commander's operational approach, a primary product of early operational design. While interior and exterior lines are still relevant in defining the geographic orientation of a force in relation to the enemy or an objective, a *line of effort* is a contemporary variant that connects actions, tasks, effects and objectives to the endstate. **Lines of effort and lines of operations can be used in combination to describe an operational approach**.

c. British theorist B. H. Liddell Hart popularized the term *indirect approach*, which generally entails the avoidance of enemy strength (an idea also attributed to Sun Tzu). A key aspect of operational design is determining whether to attack the enemy center of gravity directly or indirectly. Liddell Hart set out following World War I to address the causes of the war's high casualty rate. He arrived at a set of principles that he considered the basis of all good strategy, principles which, Liddell Hart claimed, were ignored by nearly all commanders in World War I. He reduced this set of principles to a single phrase: *the indirect approach*; and to two fundamentals: 1) direct attacks against an enemy firmly in position almost never work and should never be attempted; and 2) to defeat the enemy one must first upset his equilibrium, which is not accomplished by the main attack, but must be done before the main attack can succeed. In Liddell Hart's words:

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[24] *Merriam-Webster's Collegiate Dictionary, Eleventh Edition.*

[25] Baron Antoine-Henri Jomini, Treatise on Grand Military Operations, two volumes, translated by Colonel S. B. Holagird (New York: D. Van Nostrand, 1865), p. 93.

"In strategy the longest way round is often the shortest way there; a direct approach to the object exhausts the attacker and hardens the resistance by compression, whereas an indirect approach loosens the defender's hold by upsetting his balance."[26]

JP 5-0 states, "An indirect approach attacks the enemy's COG by applying combat power against a series of decisive points that lead to the defeat of the COG while avoiding enemy strength."[27] Originally applied to tactical force-on-force operations, the idea of *direct and indirect approaches* (a current element of operational design) can apply at all levels of war and in operations where the COG is not an enemy military force.

Refer to Chapter VI for more information of lines of operations and lines of effort in the operational approach. Refer to Appendix B for more information on center of gravity and other selected theoretical constructs used in operational design.

6.   Combining the Theories

a.   Military operations are inherently complex and the variables associated with each are too numerous to count. In some respects, large-scale, force-on-force combat operations could be considered less complex than counterinsurgency, counterterrorism, and other operations against less-advanced enemies because circumstances usually favor analytical rather than intuitive decision making. In these circumstances, strategic objectives are often clearer, the desired end state is more precisely defined, and we tend to be confident in the superiority of our equipment, training, and education. However, large-scale combat will likely be the exception rather than the norm and typically will be followed by stability operations in situations as complex as we face in Afghanistan today.

b.   Our critical and creative thinking and decision-making capabilities must be up to these challenges. In its purest form, *operational design* relies on critical thinking that builds a current and coherent understanding of the relevant relationships. Operational designers should apply critical and creative thinking to understand, visualize, and describe problems—particularly those that are complex and ill-defined—and develop approaches to solve them. A design-inspired framework represents a broad operational approach conceived as a result of understanding gained largely through critical and creative thinking and dialog—the basic mechanism of design—and articulated through the commander's intent and guidance.

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[26] Information on Liddell Hart and the quote are from http://en.wikipedia.org/wiki/B._H._Liddell_Hart.

[27] JP 5-0, p. III-32.

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CHAPTER III
INTRODUCTION TO OPERATIONAL ART AND OPERATIONAL DESIGN

> *First, in designing joint operations, the joint force commander must come to grips with each operational situation on its own terms, accepting that this understanding rarely will be complete or entirely correct, but at best will approximate reality. The… underlying causes and dynamics will be anything but obvious, while the repercussions of action often will be broad and unpredictable. The interests of various stakeholders may be unclear, and even identifying those stakeholders may be difficult. In this environment, the joint force cannot afford to apply preconceived methods reflexively, but instead must conform its methods to the specific conditions of each situation.*
>
> **Capstone Concept for Joint Operations**
> **15 January 2009**

1. Introduction

a. Operational art and operational design provide a bridge between strategy and tactics—they help the JFC and joint force component commanders direct actions that will create the conditions to achieve strategic objectives and a desired end state. Operational art is generally considered the domain of senior commanders (those commanding a joint force or Service/functional component of a joint force) because of the experience, education, intuition, judgment, and vision expected of senior military officers and necessary to link the specific actions of the joint force to broad strategic end states.

b. Operational design extends operational art's vision with a creative methodology that helps commanders and staffs understand the nature of the operational environment, the problem facing them, and possible broad solutions to the problem. Operational design uses various design elements (tools) —such as *objective*, *line of operations*, and *decisive point*,—that help the commander and staff develop and refine the broad approach that will guide detailed planning.

The Challenge

How does the commander understand the operational environment; frame a complex, ill-structured problem; design a broad operational approach that gives direction to planning; and know when to adjust the approach when circumstances change in order to achieve objectives and accomplish the assigned mission?

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2. Operational Art

a. *Operational art* is "**The cognitive approach by commanders and staffs— supported by their skill, knowledge, experience, creativity, and judgment—to develop strategies, campaigns, and operations and organize and employ military**

forces by integrating ends, ways, and means."[1] This application occurs through the thought process commanders use to overcome the ambiguity and uncertainty of a complex operational environment, understand the problem facing them, and visualize how best to effectively and efficiently employ military capabilities to accomplish their mission. Operational art also promotes unified action by helping the JFC and staff understand how to facilitate the integration of interorganizational partners toward achieving strategic and operational objectives.

b. As JP 3-0 describes, operational art requires broad vision, the ability to anticipate, and the skill to plan, prepare, execute, and assess. It helps commanders and their staffs order their thoughts and understand the conditions for victory before seeking battle. Without operational art, campaigns and operations would be a set of disconnected events. Operational art governs the deployment of forces, their commitment to or withdrawal from a joint operation, and the arrangement of battles and major operations to achieve operational and strategic military objectives. This includes fundamental methods associated with synchronizing and integrating military forces and capabilities, in conjunction with those of agencies and multinational partners, in operations often far removed in time from the desired end state.

c. Through operational art, commanders integrate ends, ways, and means across the levels of war to achieve the desired end state. This requires commanders to answer the following questions:

(1) What is the military end state that must be achieved, how is it related to the strategic end state, and what objectives must be achieved to enable that end state? **(Ends)**

(2) What sequence of actions is most likely to achieve those objectives and end state? **(Ways)**

(3) What resources are required to accomplish that sequence of actions? **(Means)**

(4) What is the chance of failure or unacceptable consequences in performing that sequence of actions? **(Risk)**

> Early operational design helps the commander and staff understand the problem before they try to solve it.

d. Together, operational art and operational design help the JFC and staff strengthen the relationship between strategy and tactics.[2]

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[1] JP 5-0.

[2] This lead-in discussion of operational art is largely from Chapter II of JP 3-0 and is consistent with JP 5-0.

3.   Operational Design

a.   **Operational design** extends operational art's vision **with a creative methodology that helps commanders and planners answer the ends—ways— means—risk questions.** The following stand out as key requirements of operational design:

(1) Understand the operation's *context*—the strategic guidance (desired national and military end states, objectives, and operational limitations), the nature of the operational environment, and the problem that requires commitment of military capabilities.

(2) Given this context, develop an approach to overcome the problem and set the conditions to achieve objectives that create the desired end state.

(3) During design, resolve differences in perspective with key leaders on the national and military end states, objectives, and the problem;

(4) Redesign as required during execution.

b.   JFC`s and planners can use operational design to a lesser or greater degree when planning any joint operation, from simple to complex. However, the greatest potential benefit of a focused design effort conducted as early as possible in planning is to understand and solve particularly ill-structured (some writers prefer "ill-defined") problems. Notwithstanding a commander's judgment, education, and experience, today's general operating environment presents some challenges so complex that understanding the problem and visualizing a solution will exceed a single individual's ability. In one respect, the design challenge increases when the joint operation involves other interorganizational partners (this is typically the case) due to their unique considerations. However, the involvement of selected interorganizational partners helps planners understand their perspectives and leverage their expertise toward a quicker understanding of the operational environment and the problem. **Operational design is essential in building a common perspective and shared understanding to create unity of effort**.

c.   A well-devised operational design should promote effectiveness and efficiency, greater coherence during transitions between successive operations, better integration and coordination with interorganizational partners, fewer unintended consequences, and the flexibility to adapt when the situation changes. More importantly, when unintended consequences do occur, they are less likely to create surprise or shock because branches and sequels have been accounted for during detailed planning.

d.   **Operational design begins when the commander anticipates or receives a requirement to plan an operation and continues throughout planning and execution.** Design helps describe the conceptual linkage of the operation's ends, ways, and means. Planners use various *elements of operational design*—intellectual tools that help them

visualize the arrangement of joint capabilities in time, space, and purpose to accomplish the mission.

e.   Many factors can affect individual design elements and the overall operational design. For example, the nature of our multinational partners' strategic objectives could influence the approach to achieving the JFC's strategic and operational objectives. The availability of host nation support, diplomatic permission to overfly nations, access to en route air bases, and the allocation of strategic mobility assets will affect *operational reach*, *lines of effort*, and *lines of operations*. The identification, accessibility, and nature of the *center of gravity* will influence the overall operational approach. Most important are those unknowns and other factors that would cause planners to revisit earlier design hypotheses and assumptions, reframe the problem, and modify or discard the current operational approach. These factors are likely candidates for the commander's critical information requirements (CCIR). During planning, the commander and staff must consider ways, means, and measures to monitor and assess these factors. See Chapter VII for a discussion of *reframing indicators*.

Note to the Reader

An early (circa 2008) school of thought was that design and planning should be distinct to the point that design would not encumbered by the mechanics of planning. **This handbook's perspective is that operational design begins concurrently with joint operation planning. This is consistent with the description in joint doctrine.** JP 5-0, Joint Operation Planning (August 2011), states: Operational art, operational design, and JOPP are complementary elements of the overall planning process. The commander, supported by the staff, gains an understanding of the environment, defines the problem, and develops an operational approach for the campaign or operation through the application of operational art and operational design <u>during the initiation step of JOPP</u>. (underline added) **This perspective is also consistent with Army doctrine in Field Manual (FM) 5-0, The Operations Process (March 2010), and Marine Corps Warfighting Publication (MCWP) 5-1, Marine Corps Planning Process (24 Aug 10). FM 5-0 states:** Planning consists of two separate but closely related components: a conceptual component and a detailed component. The conceptual component is represented by the cognitive application of design. The detailed component translates broad concepts into a complete and practical plan. <u>During planning, these components overlap with no clear delineation between them.</u> (underline added)

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f.   Early operational design (during mission analysis) is characterized as more conceptual in nature than later detailed JOPP planning steps (**Figure III-1**) such as COA analysis. From the perspective of the JFC and core planning team, **the balance of activities early in planning is heavily weighted toward design, and the balance shifts toward detailed JOPP activities and additional design elements as the nature of the operational environment and problem become clearer. Figure III-2** shows that mission analysis is heavily focused on design, which some consider to be *conceptual planning*, until the JFC publishes planning guidance, the operational approach, commander's intent, and CCIR. These products of mission analysis usually mark a shift

in emphasis toward subsequent JOPP steps (*detailed planning*) during which planners devise COAs and continue to refine the operational approach. Given sufficient information and understanding during early design, the JFC might choose to shift COA development to the left, with a goal of issuing planning guidance that narrows COA alternatives or focuses on a single COA.

Joint Operation Planning Process

Step 1:
Initiation

Step 2:
Mission Analysis

Step 3:
Course of Action (COA) Development

Step 4:
COA Analysis and Wargaming

Step 5:
COA Comparison

Step 6:
COA Approval

Step 7:
Plan or Order Development
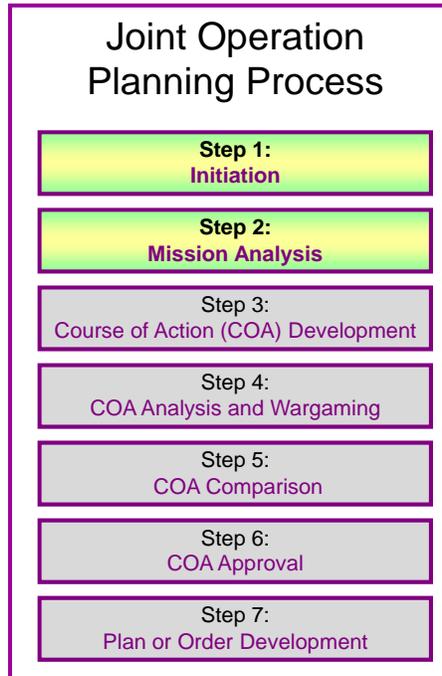
Figure III-1. Joint Operation Planning Process

The Balance of Operational Design and JOPP

Understand The Operational Environment

Frame the Problem

Reframe the Environment and/or Problem

Operational Design

JFC's planning guidance & operational approach

Redesign

Joint Operation Planning Process

Execution

Planning Initiation — Mission Analysis — COA Development — Order Publication — Future Plans, Future Ops, & Current Ops Planning — End State

Conceptual Planning

Detailed Planning

Joint Operation Planning

Circumstances permitting, the early planning effort focuses on **operational design (conceptual planning)** until the JFC publishes planning guidance and the broad operational approach. Emphasis shifts toward **detailed planning** even as planners continue to refine the operational approach. During execution, assessment will track changes in the operational environment and nature of the problem. These changes can cause the JFC to revisit earlier design assumptions, "reframe" the problem, begin redesign if necessary, and develop a new operational approach or otherwise adjust current operations.

Figure III-2. The Balance of Operational Design and JOPP

g. During execution, changes in the operational environment or the nature of the problem can drive an immediate increase in design activity necessary to revisit earlier conclusions, "reframe" (revise the understanding of) the environment and problem facing the JFC, adjust current operations accordingly, and even begin a new design effort that significantly changes the original operational approach.

(1) **Early Operational Design.** During planning initiation and mission analysis, **the commander and staff focus on developing and understanding context for the impending operation**, which includes understanding the operational environment, framing the problem, and developing a broad operational approach. *Joint intelligence preparation of the operational environment* (JIPOE), discussed in Chapter V, is an important source of information that supports these activities, but all staff estimates and other sources contribute.

(a) Early operational design helps the commander visualize the operational environment and true nature of the problem and describe an approach that sets necessary conditions, achieves objectives, and accomplishes the mission. A number of design elements are particularly useful during early operational design. *End state* and *objective* are key elements in forming the context for the operation because they identify specified ends. *Center of gravity* is relevant to early design, although the inability to identify the COG at this point should not delay the initial design and subsequent planning. The commander may have to deploy and employ forces while continuing to learn about the COG as operations progress. *Decisive points* are geographic places, specific key events, critical factors, or functions that, when acted upon, allow a commander to gain a marked advantage over an adversary or contributes materially to achieving success. *Line of effort* and *line of operations* are particularly useful for considering the sequence of actions within various functional groupings and for portraying the results graphically.[3] The operational approach typically connects decisive points along these lines.

(b) The *problem statement* (the product of framing the problem) considers the impact of tension and competition in the operational environment and broadly describes the requirements for transformation, anticipated changes in the operational environment, and critical transitions (see Chapter V, "Understanding the Operational Environment and the Problem" for more information on framing the problem and operational environment).

(c) The result of early operational design is a broad operational approach—developed as a product with text and graphics—that articulates the broad actions the commander believes the force should take in the operational environment to achieve the desired end state. The JFC should include the design elements mentioned earlier in this product, as well as other elements if they help clarify the broad approach to achieving objectives. The operational approach, either as a separate product or incorporated in the

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[3] *Line of effort* is a functionally oriented companion to *line of operations*, which typically is a physically oriented line that defines the geographical orientation of the force to an enemy, usually in the context of friendly actions on a connection of decisive points in time and space.

commander's planning guidance, drives follow-on detailed planning. The approach is also a product the commander and staff can use to explain the operational problem and the broad solution to superiors, subordinates, other interorganizational partners. Detailed planning can cause COA and concept of operations (CONOPS) adjustments that remain consistent with the operational approach, and changes will occur during execution as well. But changes that constitute a fundamental shift in the approach will usually require the staff to begin a *redesign* effort. See "Operational Design during Execution" below.

(d) Available planning time is relatively unconstrained in deliberate planning circumstances, so the commander may keep the effort focused on mission analysis and early design actions as JIPOE continues to refine the understanding of the operational environment. During crisis-action planning, time constraints may cause the commander to issue planning guidance and JFC's initial intent while continuing to gather information and refine the operational approach. **See Chapter VII, "The Interaction of Operational Design and Planning," for more information on early design activities**.

(2) **Operational Design during COA and Plan/Order Development.** Focusing on the operational approach and supporting staff estimates, planners continue mission analysis and begin COA development. The JFC will typically incorporate a revised operational approach in commander's intent and planning guidance, key outputs of mission analysis. Planners continue to refine and focus the operational approach during subsequent JOPP steps until they produce the final plan or order. They use additional elements of operational design, such as *termination* and *operational reach*, as these elements become more relevant to detailed planning.

(3) **Operational Design during Execution.**

(a) As a conceptual component of planning, operational design also applies to planning branches and sequels to the current operation during execution just as it does to pre-execution planning. Commanders and planners continue to consider design elements during execution, and adjust both current operations and future plans to capitalize on tactical and operational successes as the joint operation unfolds. The J5's effort focuses on *future plans* and also may support the J3 in branch planning for *future operations*. The J3 typically focuses on *current operations* and related branch planning (see Figure 29). The timeframe of focus for these efforts varies according to the level of command, type of operation, JFC's desires, and other factors. The J5 usually concentrates on planning subsequent phases (*sequels*) of the operation, and participates in planning *branches* to the current operation. **See Chapter IX, "Planning during Execution," for more information on design during execution.**

(b) Through early and continuous assessment, the staff and JFC monitor the operational environment and progress toward setting conditions and achieving objectives. Assessment helps the commander ensure that the operational approach, CONOPS, and tasks to subordinate and supporting commands remain feasible and acceptable in the context of higher policy, guidance, and orders. If the current approach is failing to meet these criteria, if aspects of the operational environment or problem

change significantly, or if operations meet with unexpected success, the JFC may decide to begin a *redesign* effort, revisit earlier design assumptions, conclusions, and decisions that led to the current operational approach, and redesign the operational approach if necessary. This could cause small adjustments to current operations or a significant reorientation that reframes the operational environment, develops new objectives, or realigns organizational relationships. **See Chapter IX, "Operational Design during Execution," for more information on reframing and redesign.**

4. The Role of the Commander

> *"When all is said and done, it is really the commander's coup d' oeil, his ability to see things simply, to identify the whole business of war completely with himself, that is the essence of good generalship."*
>
> **Carl von Clausewitz**
> **On War**

a. **The commander is the focal point of decision making during military operations, and plays an essential role in planning.** The commander should be the central figure in design, not only due to education and experience, but also because the commander's judgment and decisions are required to guide the staff through the planning process. Too often, commanders defer to the planning staff, even to the point that the staff drafts the commander's planning guidance and intent statement. This approach may work when addressing relatively simple planning problems; but many contemporary operational challenges that seem "simple" can be deceptively complex, particularly when their impact is viewed within the larger strategic framework.

b. To get the most from the design effort, the JFC's critical thinking, foresight, intuition, and visualization are essential during the critical initial stage of design. Identifying the true nature of a complex problem and designing an approach to the solution are key design outputs that drive subsequent planning and execution.[4] The JFC can facilitate planning and diminish the burden on the staff by becoming intimately involved in design and planning and making timely decisions throughout mission analysis and course-of-action discussions. The commander can emphasize the importance of an open and honest dialogue that questions assumptions, vision, guidance, and end state in order to gain a deeper understanding of what the JFC and staff cannot explain or know about the operational environment and the problem.[5] However, other responsibilities may affect the timing and extent of the commander's participation.

> *"From the beginning, however, I felt the effort was doomed. Although the commander had authorized for the effort to commence, he never did participate himself. According to what I understood of the Design process- the commander had to be involved- deeply involved. It was, after all, his process. This was for him. All the commander got from the effort was a backbrief once the final*

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[4] James Mattis, Memorandum for U.S. Joint Forces Command, *Vision for a Joint Approach to Design*, 4 October 2009.
[5] US Army War College, *Campaign Planning Handbook AY 11*, p. 20.

product was completed. While this was perhaps better than no involvement- it was too little too late: at that point he was already divorced from the logic that had driven us to our solutions."[6]

c. **Commanders direct throughout planning.** This direction takes the form of interaction with the staff, guidance on the development of products, and decisions at key points in the process, such as approval of a COA. In crisis action situations, this interaction typically is continuous as the JOPP steps are compressed and blend together. Regardless of time constraints, the commander should create conditions that facilitate the staff's critical and creative thinking and sharing of ideas and recommendations. Such participation is particularly critical early in the process.

d. Throughout planning and execution, the JFC will interact with higher, subordinate, and supporting commanders, agency leaders, multinational partners, US ambassadors in the operational area, and other key sources. Each of these may provide bits and pieces of information that contribute to the staff's understanding of both the environment and the true nature of the problem. **It is essential that the JTF's knowledge-sharing protocols and mechanisms facilitate the exchange of this information**. Consider the following example:

"This happened the other day with our CG. We had been working on a project for two weeks. As we briefed him it became apparent that he didn't agree. So we began to deep dive on different aspects of our problem framing…we found out info that our commander had gathered during a command visit that we didn't have any knowledge of. At the same time, we had intel that our commander had not seen and thus we provided key info to help complete his frame. Out of this we all reached common understanding…and all in less than an hour with the commander. I don't think this process is new. I think it is the staffing process that has always been used…but now we need to formalize it as a key element of developing understanding".[7]

e. JFCs ensure subordinate commands sufficient time to plan. They do so by issuing a warning order to subordinates at the earliest opportunity and by collaborating with other commanders, agency leaders, and multinational partners (as appropriate) to develop and articulate a clear understanding of the commander's mission, intent, guidance, and priorities. JFCs resolve issues that are beyond the staff's authority. Examples include the close-hold, compartmented planning that occurs with some sensitive operations as well as the continuing challenge of incorporating interorganizational partners in JOPP.

> *"The key is not to make quick decisions, but to make timely decisions."*
>
> **General Colin Powell**
> **Former Chairman of the Joint Chiefs of Staff**

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[6] Major Grant Martin, *A Tale of Two Design Efforts (and why they both failed in Afghanistan)*, <u>Small Wars Journal</u>, July 2011.
[7] SAMS *Art of Design* Student Text Version 2.0, p. 176. This example of knowledge sharing was provided by a former SAMS student who had been participating in design during operations.

f. **In particular, commanders collaborate with their superiors to resolve differences of interpretation of higher-level objectives and the ways and means to accomplish these objectives.** A JTF commander might tend to expect that the combatant command headquarters has correctly described the operational environment, +framed the problem, and devised a sound approach to achieve the best solution. But strategic guidance can be vague, and the commander must interpret and filter it for the staff. While CCDRs and national leaders may have a clear strategic perspective of the problem, operational-level commanders and subordinate leaders often have a better understanding of specific circumstances that comprise the operational situation.[8] Both perspectives are essential to a sound solution. **Subordinate commanders should be aggressive in sharing their perspective with their superiors and resolving differences early in design as well as during detailed planning and execution**.

5.   Depicting the Methodology

a.   **Figure III-3** is one way to show the primary components of operational design's methodology: the **operational environment**, the **problem**, and the **operational approach**. The JFC and staff typically progress through these components in a generally accepted order. However, **this is a journey of discovery**, p**articularly early in planning**. While some things must be done before others, the learning that occurs when considering one component will require revisiting the learning that occurs in another component. **Thus design is iterative in nature**. What the JFC and staff learn later will often affect previous conclusions and decisions. These must be re-examined, and could lead to revision of subsequent conclusions.

b.   Operational design begins with understanding *strategic guidance*, which should provide strategic objectives, tasks to the joint force, and operational limitations. With this initial information, the JFC and staff determine the current state of the operational environment (or *current system*), and then determine the future state of the operational environment (*desired system*)—*the conditions that should exist when operations end*. As the iteration of thought and discussion related to the current and desired systems continues, the JFC and staff begin to identify the *problem—the factors that must be addressed to achieve the desired system conditions*. As these factors emerge, the JFC and staff determine broad actions (the *operational approach*) that can address the factors. JP 5-0 states that there are three purposes for developing an operational approach:[9] it provides the foundation for the commander's planning guidance to the staff and other partners; it provides the model for execution of the campaign or operation and development of assessments for that campaign or operation; and it enables a better understanding of the operational environment and of the problem.

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[8] Ibid.
[9] JP 5-0 p. III-13
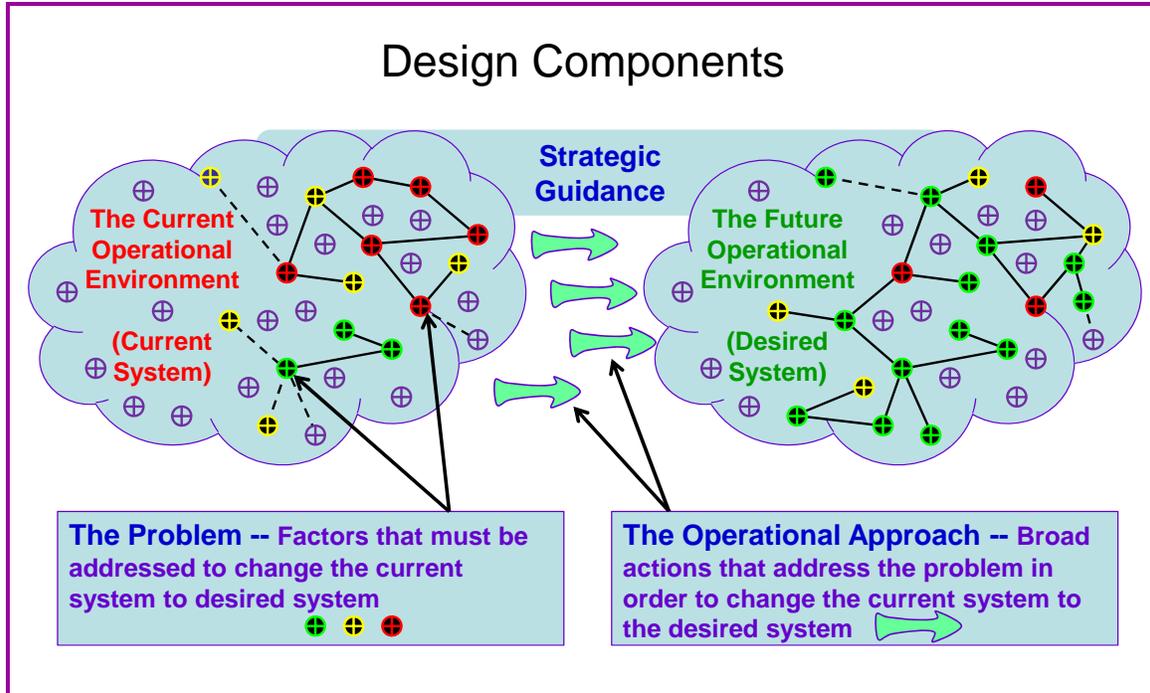
Design Components

Figure III-3. Design Components

c. **Chapter IV**, "Depicting the Operational Environment," provides a doctrinally-based technique that can help the JFC and staff visualize systems in the operational environment. **Chapter V**, "Understanding the Operational Environment and the Problem," discusses how to think about how these systems interact and how to frame the problem facing the JFC. **Chapter VI**, "The Operational Approach," describes how to develop a broad problem solution that will drive detailed planning. **Chapter VII** follows with the "Interaction of Operational Design and Planning," which some characterize as the relationship of *conceptual planning* (operational design) to *detailed planning* (JOPP).

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CHAPTER IV
DEPICTING THE OPERATIONAL ENVIRONMENT

> *"There were no decisions reached about how to exploit a victory in Sicily. It was an egregious error to leave the future unresolved."*
>
> **General Omar Bradley**
> **on Operation Husky**

1. Introduction

a. **Context** is the set of circumstances or events (the interrelated conditions) that forms the environment within which something exists or occurs. Any military commitment occurs within a context larger than just the commander's mission. Getting the context right as early as possible is important to early operational design and helps the commander develop an operational approach to address the right problem.

b. **Joint doctrine uses the *operational environment* construct as a way to understand context in a specific joint operation**. The *operational environment* is a composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander.[1] The JFC's operational environment encompasses physical areas and factors (of the air, land, maritime, and space domains) and the information environment (which includes cyberspace). Included within these areas are all enemy, friendly, and neutral systems that are relevant to a specific joint operation. **One way to visualize, understand, and depict this environment is as a complex and adaptive system of systems.** This is the focus of this chapter.

Related Terms

operational environment — A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (JP 3-0)

system — A functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements; that group of elements forming a unified whole. (JP 3-0)

problem — The factors that must be addressed to move the current system to the desired system. (Handbook, based on multiple sources)

operational approach — A commander's description of the broad actions the force must take in order to achieve the desired military end state. (JP 5-0)

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c. **Figure IV-1** (extracted from **Figure III-3**) shows "before" and "after" perspectives of the JFC's operational environment. *Strategic guidance* provides initial context to help the JFC frame this environment. This guidance typically consists of strategic objectives, the related tasks the JFC must accomplish, and a description of the circumstances that cause the President to commit US military capabilities. Figure IV-1 is

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[1] JP 3-0.

based on the idea that planners can think of the environment is as a set of systems. The systems will interact and adapt during the course of an operation based on what the joint force does and how the *systems of opposition* react. The commander can visualize how this system of systems looks at the start of operations (***current system***), determine what the system should look like when operations conclude (***desired system***), and identify those factors that must be addressed (the ***problem***) to move the current system to the desired system. The ***operational approach*** (see Chapter VI) describes how the JFC addresses the problem (how operations will transform the current system to the desired system).
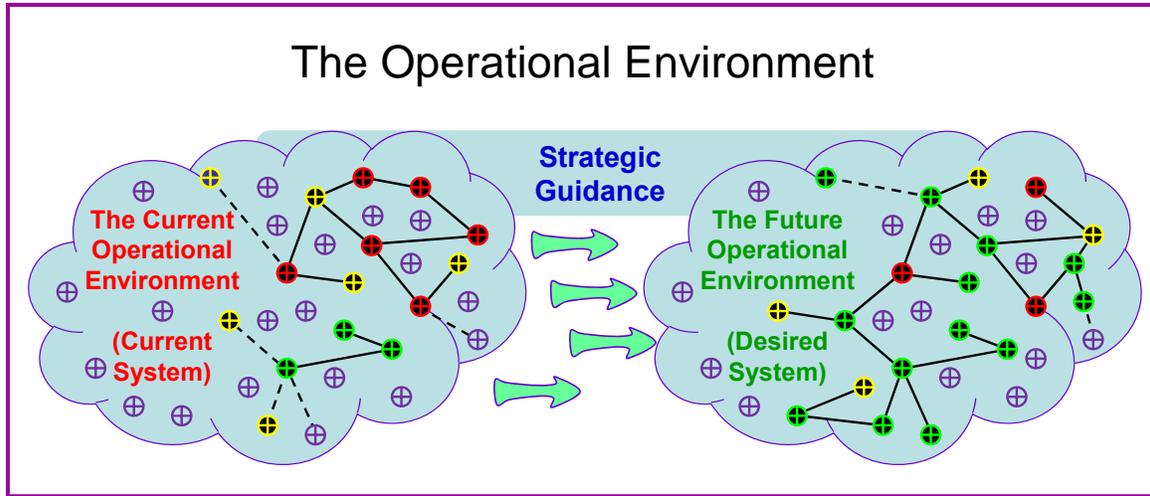
Figure IV-1. The Operational Environment

d. Understanding a complex operational environment requires a combination of art and science and the ability to blend knowledge, experience, intuition, and critical thinking that are essential to operational design with analytical methods and tools that support detailed planning. The remainder of this chapter describes a systems-oriented technique to graphically depict the operational environment. The JFC and his staff use this technique as a vehicle to stimulate dialogue, which in turn can promote critical and creative thinking and deeper understanding. This is a doctrinally-based approach that is becoming more widely used in ongoing joint operations. This technique supports Chapter V's discussion of considerations associated with understanding the operational environment.

2. Depicting the Operational Environment

a. One way to visualize and think about the operational environment is as a set of interacting systems. This is not a new approach, since our military is comfortable thinking of the key components of an enemy's air defense system, the workings of our own logistics system, or the nature of a country's political or social systems. Key joint doctrine publications such as JP 3-0, JP 5-0, and JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment* discuss how to visualize and depict the operational environment as a set of interacting systems. Portraying systems and their relationships in graphic form can facilitate a commonly shared understanding of the operational

environment among interorganizational partners, thereby promoting unified action. Used as this handbook describes, a systems depiction is intended as a set of graphics and text that can aid visualization, **but it is not a systems engineering approach to military operations**. In this context, systems engineering refers to a methodology for studying *structurally complex* systems, usually to assist those who want to build them. **Instead, this handbook advocates a systems-thinking approach**, which refers to a way to study and work within *interactively complex* systems, those that are more characteristic of the operational environment.

   b.   While some systems (such as infrastructure) are relatively static, many systems in the operational environment are inherently complex and dynamic. Most systems can often exhibit unpredictable, surprising, and uncontrollable behaviors. Rather than being an engineered solution, a military operation evolves as the joint force adapts responsively to systems that also are adapting. **This is why the application of operational art emphasizes the importance of the creative imagination, judgment, experience, and skill of commanders and staff.**[2]

   c.   **Figure IV-2** shows a notional relationship of systems that joint doctrine and other sources commonly use in discussions of the operational environment. This group of six systems, commonly referenced by the acronym **PMESII** (political, military, economic, social, information, and infrastructure) can accommodate most aspects of the operational environment. The figure depicts *nodes* and *links* in each system (there could be thousands), and shows that nodes in one system can interact with nodes in other systems.

Note to the Reader

   The depictions of systems in figures that follow in this chapter suffer from the limitations of graphics that are simple, two-dimensional, and static. This could create the impression that the focus is on structure rather than dynamics and flows. In reality most of the operational environment's systems are complex, adaptive, and in flux (infrastructure excepted). The reader should understand that while the PMESII model in Figure IV-2 shows six major systems, these are not inflexible bins for sets of nodes and links. Particularly early in an operation such as counterinsurgency, it will likely be difficult to distinguish whether a human node acts primarily in the social, political, military, or another system, or perhaps has important roles and relationships in multiple systems. Planners should be cautious about prematurely categorizing actors and relationships.

   Likewise, while the figures appear to provide a "third-person" view of relationships from outside a system, planners can use a systems depiction to consider the points of view of various actors (nodes) toward other actors inside and across systems. For example, one can project how the insurgency leader perceives coalition operations in the area from that leader's point of view and how that leader might adjust insurgency objectives to compensate. This

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[2] JP 5-0, p. III-18.

technique is also effective for red-teaming a proposed broad operational approach as well as a detailed course of action.

d. *System relationships* are the linkages that connect the interaction of the actors who make up the system. System **nodes** are the tangible elements within a system that can be "targeted" for action, such as people, materiel, and facilities. **Links** are the behavioral or functional relationships between nodes, such as the command or supervisory arrangement that connects a superior to a subordinate, the relationship of a vehicle to a fuel source, and the ideology that connects a propagandist to a group of terrorists. Links establish the interconnectivity between nodes that allows them to function as a system—to behave in a specific way (accomplish a task or perform a function). Thus, the purpose in acting against specific nodes is often to destroy, interrupt, or otherwise affect the relationship between them and other nodes, which ultimately can influence the system as a whole.
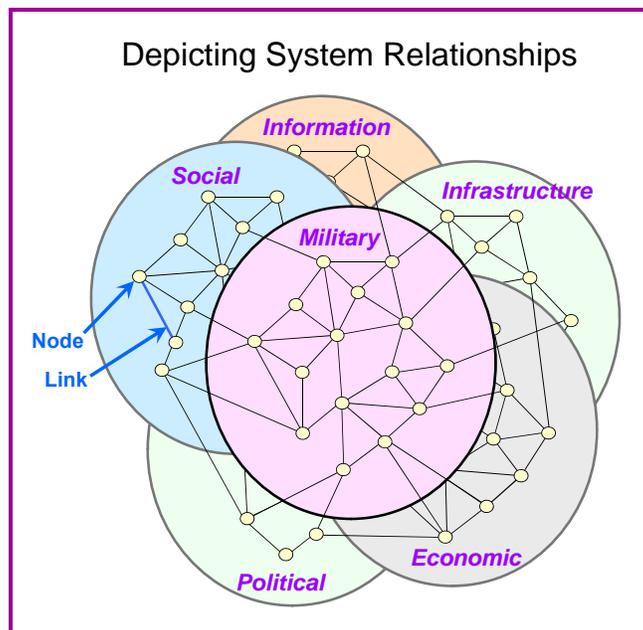
Figure IV-2. Depicting System Relationships

e. The JFC's operational environment is represented by the composite of all nodes and links—friendly, enemy, and neutral across the various PMESII systems—**that are relevant to the joint operation**. Analyzing all possible nodes and links in the operational environment would be an insurmountable task. However, not all nodes and links are relevant to the JFC's design challenge. The JFC and staff should develop their understanding in sufficient detail to identify relevant systems, subsystems, nodes, and potential key nodes. **Figure IV-3** is a simplification of how a system graphic might highlight the nodes and links relevant to an operation. At the beginning of the operation, these relevant nodes and links comprise the operational environment's *current system*. During early operational design, the commander determines how the system should look at the end of operations (the *desired system*) in order to achieve the desired end state. Understanding the current system and visualizing a transition to the desired system requires expertise typically not available in the joint force, particularly for complex

operational environments and ill-defined problems. While the JFC and staff can tap a variety of US agencies for help, they should also include selected interorganizational partners in this process. Refer to Appendix A, *Typical PMESII Systems and Subsystems*, for examples of typical subsystems under the primary political, military, economic, social, information, and infrastructure systems.
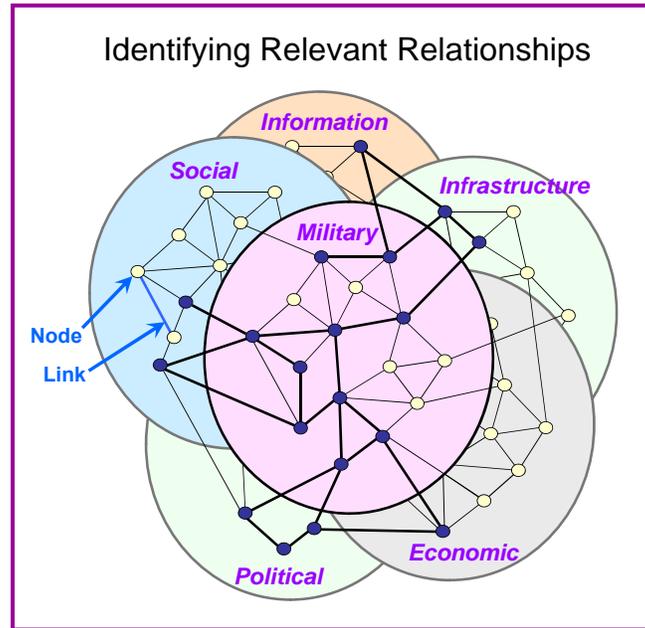
Figure IV-3. Identifying Relevant Relationships

   f.   **The JFC and staff describe relevant systems in sufficient detail to identify potential *key nodes*.** These are nodes that are critical to the functioning of their systems. Some key nodes may become ***decisive points*** for military operations, since successful action on these nodes could allow the JFC to gain a marked advantage over the enemy or otherwise to contribute materially to achieving success.

      (1) **Key nodes often are linked to, or resident in, multiple systems**. For example, the major bridges over a river could be key nodes in the infrastructure and military systems during traditional combat operations because they enable the joint force or enemy to move supplies and military forces across the obstacle and prevent the opponent from doing so. In this example, the bridges are essential to military operations in early phases of the operation, and could be important to later stabilization and reconstruction activities.   Therefore, the JFC and staff could identify the bridges as **decisive points** and consider how to gain control of the bridges early in the operation.

      (2) During counterinsurgency operations, a country's *religion* subsystem (part of the social system) could be central to the functioning of the country's social system, and the core group of religious leaders (or a single leader) could be the religion system's key node. Depending on the country's social and political structure, this same group of religious leaders also could be a key node in the political system and have great influence over the country's relevant population. Weakening or eliminating a key node could cause

its related group of nodes and links to function less effectively or not at all, while strengthening the key node could enhance the performance of the subsystem and larger system. However, **this determination is more straightforward in systems of things (such as infrastructure) than in systems of people (such as social and political systems); the JFC should not prematurely accept the expected effectiveness of actions for or against key people**.

(3) As analysis continues, the commander and staff can use a systems graphic to portray nodes and links that comprise centers of gravity, strengths, and weaknesses (**Figure IV-4**).
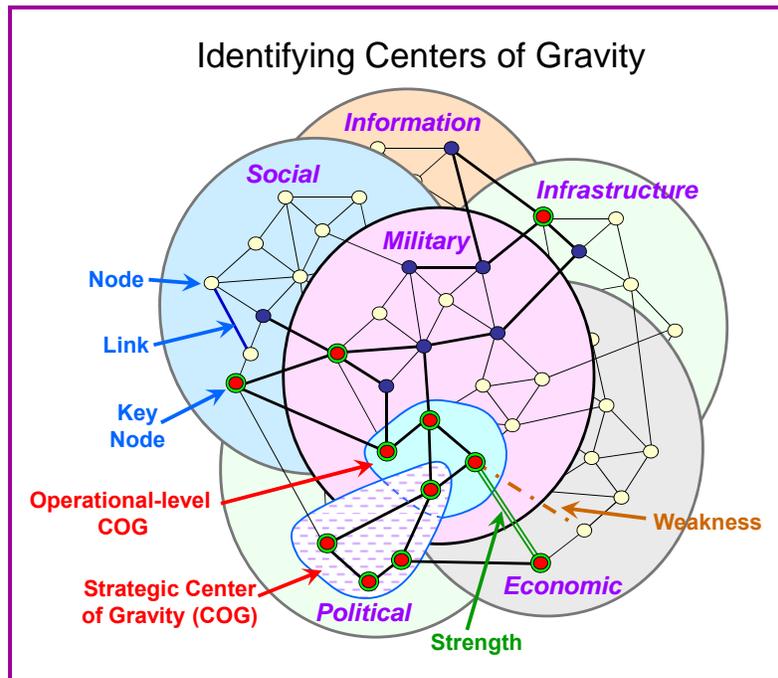
Figure IV-4. Identifying Centers of Gravity

The visual representation (dry erase board) is a thinking pad for the group. The group creates their own map and the grammar of this mapping (the legend or the key). By doing this, the group is creating a virtual world/system. They are conceptualizing. The visual map embodies the logical patterns- which in turn point to new directions of inquiry. The commander and staff look at the mapping and seek to rationalize it. The group is creating their own understanding which allows them to avoid the mental traps of trying to fit the situation into existing constructs.

US Special Operations Command J8-S Briefing
Operational Design Primer, 4 Feb 09

g. **Figure IV-5** shows a simplified example of how the JFC and staff might diagram a narcotics network (system) in a counterdrug operation in order to help them visualize key nodes and their relationships and develop their understanding of how the system works (how the network operates). The figure is one of a series of sketches in a

hypothetical counterdrug operations vignette in Appendix A. The vignette concludes by showing how the JFC could use the sketches to consider various actions along lines of operation and lines of effort as part of the operational approach.
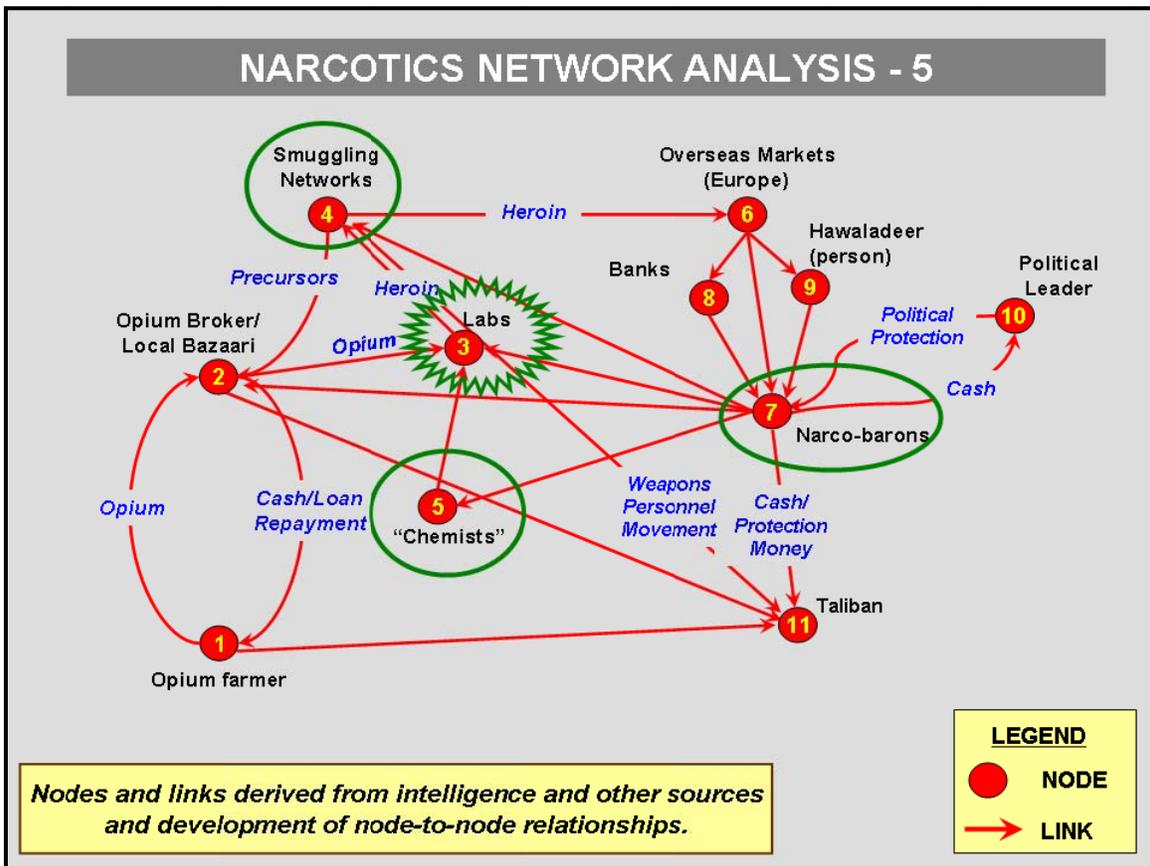
Figure IV-5. Narcotics Network Analysis

Refer to Appendix A for a breakdown of typical PMESII systems and subsystems and for more information on visualizing the OE, including the full vignette related to Figure IV-5.

h. Certain characteristics of the operational environment will be more significant than others based on the joint force's mission and nature of the operation. For example, the presence of civilian relief organizations would be an important factor during a foreign humanitarian assistance operation. During a counterdrug operation, significant characteristics might include the relationships among narcotics trafficking organizations and the governments in the region. During major operations involving combat, significant characteristics of the operational environment would include the locations of critical resources (such as sources of water during desert operations), the enemy's lines of communication and external sources of supply, and the location and viability of friendly and third-party forces. Depending on the assigned mission, economic trade between the enemy and third-party nations could influence the JFC's decision-making process. These examples represent nodes and links that can be represented on a systems depiction of the operational environment.

i.   Previous systems representations in this chapter are notional and intentionally simplistic in order to explain the key ideas. However, **Figure IV-6** is an actual example of a systems diagram used to depict systems relationships with respect to counterinsurgency operations in Afghanistan for a period during 2009. The text that follows the figure is extracted from the Army's School of Advanced Military Studies (SAMS) *Art of Design Student Text Version 2.0* to summarize the background and shortcomings of this detailed depiction.

Note to the Reader

At first glance, Figure IV-6 might seem to be useful only for making the point that operations in Afghanistan are extremely complex.   It would be unreasonable to expect senior leaders to make key decisions based on seeing such a model in a series of briefing charts. In fact, the text that follows the figure states that designers would never build this kind of model themselves.

For the purpose of understanding the operational environment and the problem, the value derives from the collaborative process of developing the systems diagrams. It is during this process, using the critical and creative thinking described in Chapter II and Appendix C, that the commander's and staff's understanding emerges. This development process could begin by sketching a series of simple diagrams with which to debate relationships among key actors, processes, and things. Some sketches would be discarded in the process and others might provide the basis for more detailed development. Section A in Appendix A contains a simplistic counterdrug operations vignette with a sequence of sketches (Figure IV-5 is an example) that help the JFC and staff discuss potential diplomatic, informational, military, and economic actions (see Figure A-6). These actions can comprise part of the operational approach to achieving objectives and creating the desired system state.

A systems diagram is a tool that can help the commander and staff discuss and visualize relationships and interactions, but it should be used with awareness of its limitations.
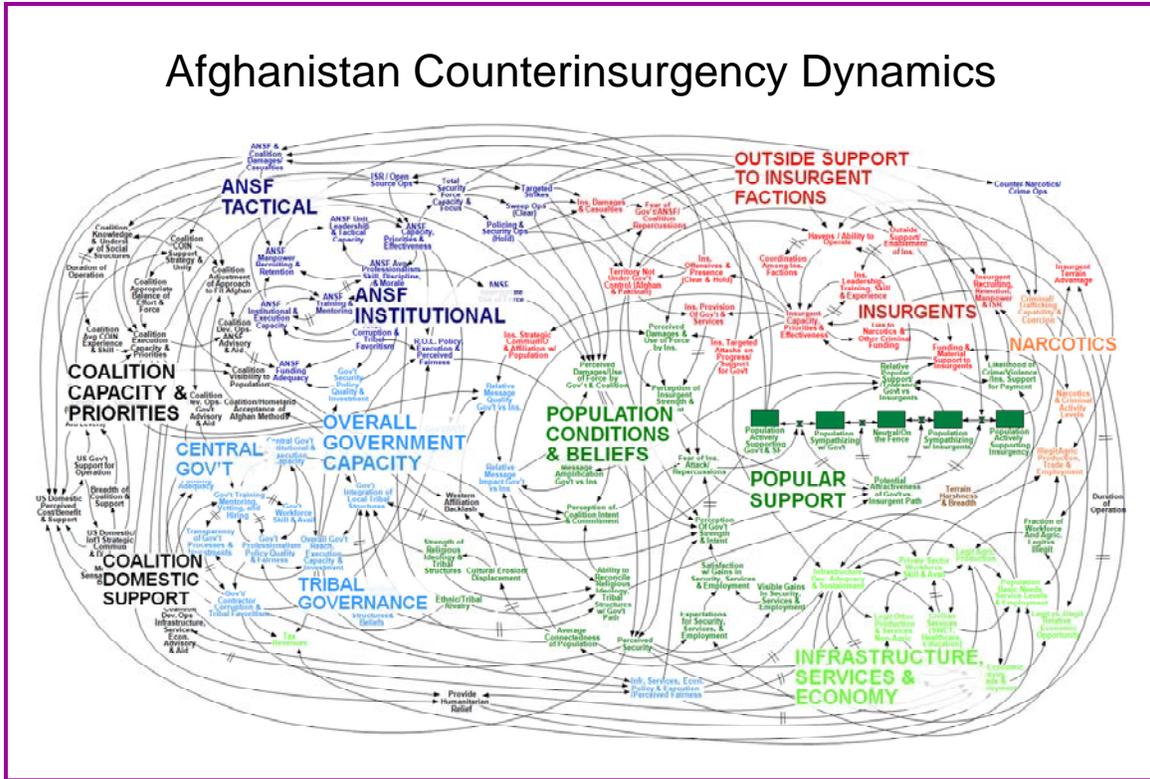
Figure IV-6. Afghanistan Counterinsurgency Dynamics

"In October 2009, U.S. Navy Pilot Captain Brett Pierson from the Warfighting Analysis Division of J8 in the Joint Staff presented a system dynamics model of Afghanistan at SAMS. The full model is shown in Figure [IV-6]. This model has been briefed on hundreds of occasions, including to the Commander, International Security Assistance Force (ISAF) General Stanley McChrystal. It has been widely discussed in the blogosphere and even parodied on Jon Stewart's The Daily Show and The Colbert Report. To the lay person, the only meaning conveyed by this "spaghetti diagram" is that Afghanistan is complex.

The model pushes the application of system dynamics to its limits by attempting to display the full complexity of Afghanistan as an interdependent whole. In spite of its complexity, it still falls well short of the true complexity of Afghanistan. The variables are aggregated to the national level, so no distinction is made between villages, districts, or provinces. Cross-level effects (bottom-up influences from the districts or top-down pressure from the international community) cannot be easily accounted for in this model. The interactions with neighboring countries are not represented, and the international community is aggregated to several variables focused mostly on the U.S. mental, moral, and physical factors are all idealized as either stocks or flows. The flows represent causal links between variables, so they cannot account for other kinds of relationships (such as semiotic links). The choice of variables frames the system from a very Western perspective. The flows between variables represent hypotheses that are difficult to validate individually, and impossible to validate collectively. Because of the high dimensionality of this model, the underlying equations are inherently unstable, meaning that even

if the model was perfectly accurate, it would tell us very little about the time evolution of the system.

While designers would find the model in Figure [IV-6] of interest for potential insights it may shed on the operational environment, they would never construct this kind of systems model themselves. ***That is because the purpose of building systems models in design is not to mirror reality as accurately as possible, but rather to have a reflective conversation with the situation. Systems models also serve as an excellent source of questions to focus discourse. For these purposes, simple models that can be easily discarded are more conducive to creative designing.*** *A design team would build a much simpler model of Afghanistan at the national level, but they would also build multiple models at different levels and from different perspectives, to allow zooming in and out."*[3]

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[3] United States Army School of Advanced Military Studies, *Art of Design* Student Text Version 2.0, pp. 205, 207-208.

CHAPTER V
UNDERSTANDING THE OPERATIONAL
ENVIRONMENT AND THE PROBLEM

"…conflict is inherently complex and unpredictable. It is a non-deterministic human endeavor whose ramifications are never fully guaranteed, because our adversaries have free will, which will inevitably affect the operating environment in unpredictable ways. The enemy's free will, manifested by courage, imagination, resolve, and other human factors, deny (sic) predictability in most aspects of war."[1]

General J.N. Mattis
14 August 2008

1. Introduction

a. Depicting the operational environment as Chapter IV describes simply involves methods that help the commander and staff graphically show and discuss node-link arrangements. A level of understanding obviously occurs during the process of depicting and discussing system relationships. However, developing an extensive understanding of the operational environment involves far more. It requires understanding how the environment's systems behave and interact, which will vary from country to country, from region to region and from one set of operational circumstances to another. Understanding the environment also requires the ability to think through cause and effect—how the joint force's action on one component of a system will likely affect that system and others.

b. *Critical thinking* is instrumental to a sufficient understanding of the operational environment. When commanders, staff, and others participate in critical thinking exchanges, they increase the organization's shared knowledge base. For example, the free exchange of ideas between the commander and staff that should typify early operational design is an activity that shares the individual knowledge of numerous functional experts, modifies and increases their collective knowledge, promotes their shared understanding, and fosters an environment of collaboration and learning. For these reasons, this chapter begins with a brief introduction and recommendation with respect to critical thinking.

"It is so damn complex. If you ever think you have the solution to this, you're wrong, and you're dangerous. You have to keep listening and thinking and being critical and self-critical."

Colonel H. R. McMaster, Commander, 3rd Armored Cavalry Regiment,
quoted in "Letter From Iraq The Lesson Of Tal Afar- Is it too late
for the Administration to correct its course in Iraq?",
The New Yorker (2006), George Packer

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[1] Memorandum for U.S. Joint Forces Command, subj. "Assessment of Effects Based Operations," 14 August 2008.

2. Critical Thinking

a.   References on critical thinking researched for this handbook cover the topic in various levels of detail and with various definitions (see five definitions in Chapter II). There are competing perspectives on what critical thinking is and on how to develop critical thinking skills. See the right side of **Figure II-1** for skills related to critical and creative thinking.

b.   From a design perspective, critical thinking should occur as part of an interactive and iterative methodology involving the commander, staff, and other subject matter experts as necessary. **Critical thinking requires the active participation of members and the free-ranging (but respectful) exchange of different perspectives that some refer to as** *discourse*. The methodology involves making assumptions, defending or refuting arguments, drawing conclusions, and determining the meaning of what is observed in the operational environment. The desired result at any point in time is the best possible understanding of the operational environment and the problem to support development of the operational approach and the commander's subsequent planning guidance to the staff and other commanders. This interaction occurs not only in initial meetings focused on design early in planning, but also throughout planning and execution. **Commanders have an essential role in creating an open atmosphere for discourse.**[2]

> *"…commanders should be transparent with subordinates and convince them that their views, ideas, and perspectives are invaluable to the success of the organization. …The commander must take care to avoid organizational obstacles and be willing to share the work of command, including allowing subordinates and staff officers to exercise healthy initiative and experimentation…. None of this is new, of course. Good commanders have done it for years. The point here is that these conditions are essential for the practice of Design. Where they are absent, Design simply won't work."*
>
> **SAMS Art of Design Student Text Version 2.0**

> *"Designing is creative and is best accomplished through discourse. Discourse is the candid exchange of ideas without fear of retribution that results in a synthesis and a shared visualization of the operational problem."*
> *Joint Advanced Warfighting School*
>
> **Operational Art and Campaigning Primer AY 09-10**

> *"Group discourse allows a rich framing and understanding of a complex and dynamic problem. Discourse allows a synthesis of ideas that is greater than the sum of its parts."*
>
> **US Special Operations command J8-S Briefing**
> **Operational Design Primer, 4 Feb 09**

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[2] SAMS *Art of Design* Student Text Version 2.0, p.

c. Although handbook research on this topic has not been exhaustive, most references reviewed have not approached critical thinking with a "how-to" guide. A notable exception is the paper *Thinking Critically about Critical Thinking: A Fundamental Guide for Strategic Leaders* by Professor Stephen J. Gerras[3] to support instruction at the US Army War College. The paper provides a practical perspective and ideas on critical thinking supplemented by historical and hypothetical examples. The paper is reprinted in Appendix C of this handbook. This information should help the reader understand the command and staff interaction that should occur as key players attempt to design an approach to solve complex problems in complex adaptive systems. The information also is relevant to subsequent chapters on *the interaction of operational design and planning* and *organizing for operational design and planning*. The paper provides a model of critical thinking on page C-6 and copied below (**Figure V-1**) for reference. **Handbook authors recommend that readers review Appendix C in conjunction with this chapter.**
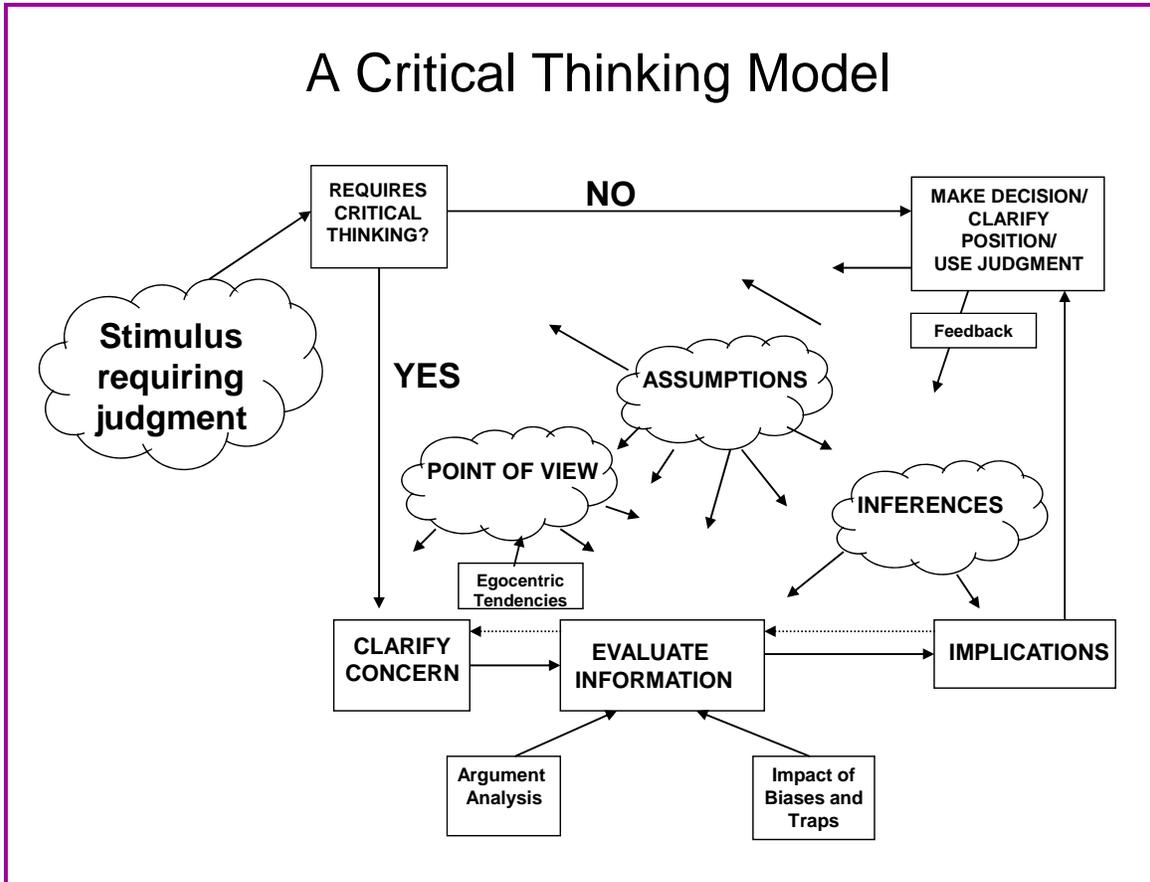
Figure V-1: A Critical Thinking Model

"An Important Caution – Any effort to further <u>prescribe</u> (underline added) an approach to creative thinking is fraught with danger and is sure to insult highly intuitive JFCs who might have their own view of the way forward. Underlying

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[3] Gerras, Stephen J., Colonel (Retired), Professor of Behavioral Sciences, US Army War College, *Thinking Critically about Critical Thinking: A Fundamental Guide for Strategic Leaders*, August 2008.

> *the Systemic Operational Design (SOD) theory is the need for decision-makers to frame and structure their own unique inquiry into the operational problem. As such, every (design) effort … must be flexibly applied."*
>
> **Joint Advanced Warfighting School**
> ***Operational Art and Campaigning Primer AY 09-10***

3. Establishing a Baseline

a. In order to develop an initial picture of the operational environment, the following items provide a good baseline:

(1) <u>National strategic objectives</u>. These objectives provide strategic purpose (the *ends*) that guides how commanders use their *ways* and *means*. A JTF commander should have the added benefit of the CCDR's theater-strategic objectives. These objectives and other strategic guidance represent the desired ***strategic end state***, which is **the broadly expressed set of conditions that should exist at the end of US involvement in the crisis or contingency**. Because the major systems (military, economic, social, and others) in the operational environment are in flux, the desired conditions that comprise the specified end state may change during the course of the operation. Yet objectives based on these desired conditions provide context, and help our national leaders describe what they want environment to be when US operations conclude. While many end-state conditions will not be static, it may be possible to maintain the general conditions (such as Iraqi forces remaining out of Kuwait after the 1990-91 Persian Gulf Conflict) indefinitely or for an extended period.

(2) The desired *military end state*, which is **typically a point in time and/or circumstances beyond which the President does not require the military instrument of national power as the primary means to achieve remaining national objectives**.[4] Achieving the military end state does not mean that the joint force disengages entirely, but instead that joint operations focus on support to other agencies (such as the Department of State) or organizations (such as the United Nations), usually during the operation's phase V (*enable civil authority*).[5] Even if other agencies are in the lead in later phases of the operation, the JFC will often control many or most of the capabilities (personnel and equipment for command and control, protection, etc.) necessary for phase IV (*stabilization*) and phase V activities.

(3) <u>The JFC's mission or set of tasks</u> specified in some type of initiating directive (warning order, planning order, existing OPLAN, etc.) together with other implied tasks necessary to accomplish the specified tasks.

(4) <u>The current intelligence estimate</u>, which should provide the baseline for the commander's and staff's understanding of the operational environment. This estimate is produced through the analytical process JIPOE.[6]

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[4] JP 1-02.
[5] JP 5-0. See p. III-35 thru III-44 for a discussion of phasing.
[6] See JP 2-01.3

b. An initial understanding of the operational environment based on the factors above should help the JFC understand what higher authority believes the current system conditions are and what the desired system conditions should be when operations conclude. At a minimum the commander should have a task or set of tasks and the current intelligence picture with which to provide initial guidance to the staff and begin mission analysis until higher authority clarifies the desired military and national end states.

c. **The rest of this chapter discusses the areas below**. These prepare the commander and staff to develop the operational approach as Chapter VI describes.

(1) The *end state* and related objectives.

(2) The *conditions* necessary to achieve these objectives.

(3) The *desired system*; i.e., the rearrangement of the current system's nodes and links that reflects the JFC's end state conditions and objectives.

(4) The *problem* that the operational approach must address; i.e., the gap between the current and desired systems.

(5) The environmental *forces at work* that will cause the current system to tend to move or resist moving toward the desired system.

4. The End State

a. For specific situations that require the employment of military capabilities (particularly for anticipated major operations), the President and Secretary of Defense (SecDef) typically establish a set of *national strategic objectives*. The supported JFC often has a role in achieving more than one national objective. Some national objectives are the primary responsibility of the JFC, while others require a more balanced use of all instruments of national power, with the JFC in support of other agencies. Achievement of these objectives should result in attainment of the **national strategic end state — the broadly expressed conditions that should exist at the end of a campaign or operation**.

b. The supported JFC must work closely with the civilian leadership to ensure a clearly defined national strategic end state is established when possible. Often this end state is uncertain, difficult to determine with clarity, or an estimate based on assumptions and unpredictable conditions in the operational environment. In some situations, operations must begin before a clear understanding of the end state emerges.

c. Thinking of this "end state" as an integrated set of aims is useful, because national strategic objectives usually are closely related and often interdependent rather than independent. Therefore, consideration of all objectives necessary to reach the

national strategic end state will help the supported JFC formulate proposed *termination criteria* — **the specified standards approved by the President or the SecDef that must be met before a joint operation can be concluded**. Many factors can affect national strategic objectives, possibly causing the national strategic end state to change even as military operations unfold.

> **Note to the Reader**
>
> Some writers prefer the term "desired state" rather than "end state." The state of any complex interactive environment is transitory. Used in the context of joint doctrine, *military end state* typically refers to the point in time and circumstances when objectives have been achieved and the military instrument of national power can "disengage" from the operation. Obviously circumstances could change after that point.

d. **Multinational Strategic Guidance.** In multinational settings, military committee directives provide the strategic guidance and direction for joint operation planning. The JFC and staff, as well as component and supporting commanders and their staffs, must clearly understand the objectives and conditions that the national or multinational political leadership want the multinational military force to attain in terms of the internal and external balance of power, regional security, geopolitics, and so forth. When multinational strategic objectives are unclear, the senior US military commander must seek clarification and convey the positive or negative impact of continued ambiguity to the President and SecDef.

e. **Termination of Military Operations and the Military End State**

(1) *Termination* and *end state* are elements of operational design used early in designing and planning an operation. The President or SecDef, with the advice of the Chairman of the Joint Chiefs of Staff (CJCS) and the supported commander, should clearly describe the national strategic end state before committing the Armed Forces of the United States to an operation. The CJCS or the supported commander may recommend a **military end state**, but the President or SecDef should formally approve it. A clearly defined military end state complements and supports attaining the specified termination criteria and objectives associated with other instruments of national power. An approved military end state helps affected commanders modify their theater strategic estimates and begin mission analysis even without a pre-existing OPLAN.

(2) **The Military End State.** This end state is the set of required conditions that defines achievement of all military objectives. It normally represents **a point in time and/or circumstances beyond which the President does not require the military instrument of national power as the primary means to achieve remaining national objectives**. While it may mirror many of the conditions of the national strategic end state, the military end state typically will be more specific and contain other supporting conditions. Aside from its obvious association with strategic or operational objectives, clearly defining the military end state promotes unity of effort, facilitates synchronization, and helps clarify (and may reduce) the risk associated with the joint

operation. Commanders should include the military end state in their planning guidance and commander's intent statement.

(3) The commander must work closely with the civilian leadership to ensure a clearly defined military end state is established. The commander also should anticipate that military capability likely will be required in some capacity in support of other instruments of national power, potentially before, during, and after any required large-scale combat. A clearly defined end state is just as necessary for situations across the range of military operations that might not require large-scale combat. For example, insurgency and terrorism can present problems for US forces for which the approach to achieving near-term objectives and lasting solutions is more complex that many large-scale combat operations.

(4) Commanders strive to end operations on favorable terms. A hasty or ill-designed end to the operation may bring with it the possibility that related disputes will arise, leading to further conflict. There is a delicate balance between the desire for quick victory and termination on truly favorable terms. A clearly defined set of military end state conditions contributes to developing **termination criteria**, the specified standards approved by the President and/or the SecDef that must be met before a joint operation can be concluded. When addressing conflict termination, commanders and their staffs must consider a wide variety of operational issues, to include disengagement, force protection, transition to post-conflict operations, reconstitution, and redeployment. They must also anticipate the nature of post-conflict operations. When planning a joint operation, the supported JFC and the subordinate commanders consider the nature of the conflict and the type of military operations that will establish the conditions necessary to bring the conflict to a favorable end. Properly conceived termination criteria are essential to ensuring that victories achieved with military forces endure.

5. Conditions and the Desired System

a. In general use, a ***condition*** is "…something essential to the appearance or occurrence of something else.[7] Knowing the existing conditions in the operational environment before operations begin, the commander and staff can develop an operational approach to influence conditions that relate to strategic and operational objectives. For example, one of the conditions of the operational environment at the beginning of Operation IRAQI FREEDOM was that Saddam Hussein was the leader of Iraq. A condition intended at the end of operations was that Saddam Hussein would no longer be in power. This factor was one of many that comprised the problem set the CCDR had to address to move the system from its pre-IRAQI FREEDOM state to a desired post-IRAQI FREEDOM state.

b. **Conditions can help clarify the relationship between objectives and tasks.** By way of a simple example, a climate-related objective for a typical family is to be comfortable in their home regardless of weather. Two conditions necessary to achieve this objective during hot weather are that the home should be cool and dry. As summer

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[7] Webster's

approaches, the family identifies two tasks that can help ensure these conditions will exist—they need to service the cooling system and fix a leaky roof. Accomplishing these two tasks creates the conditions that achieve the "summer comfort" objective. This example is simple because it deals with common circumstances of family life, and it is unlikely that the typical family would think through this problem in terms of objectives, conditions, and tasks. However, other life-related challenges (such as planning for a comfortable retirement) are much more complex, and their solutions can become clearer through an *objectives-conditions-tasks* approach.

c. Identifying and creating the conditions to achieve objectives is essential in military operations. The process typically is implicit in planning for traditional, tactical-level combat engagements because of extensive related training and professional military education in peacetime. For example, air superiority is a desired (and sometimes essential) condition for successful ground combat operations and the commander plans for it accordingly. Operations that are complex, less traditional (such as counterinsurgency), and more extensive (such as a major operation or campaign) will benefit by the deliberate consideration of conditions during design and planning. Consider the following hypothetical example in which a CCDR develops conditions for three objectives the President has established related to deploying US forces to Country Green in response to a threatened invasion of Green by Country Red.

Objective 1: Sovereignty of Green is restored

Condition (C) 1-1: Green leadership facilitates rapid reception and deployment of US forces
C 1-2: Regional countries do not oppose US deployment
C 1-3: If deterrence fails, coalition defeats Red's attack
C 1-4: Coalition restores integrity of Green's borders

Objective 2: Regional terrorism is reduced

C 2-1: Country Red stops supporting terrorist activities
C 2-2: Regional transnational terrorist networks are disrupted
C 2-3: Regional countries expand their antiterrorism and counterterrorism training, capabilities, and operations

Objective 3: Regional security and stability are restored

C 3-1: Red is incapable of cross-border offensive military operations
C 3-2: Red participates in diplomatic engagement with Green
C 3-3: Regional countries support actions to oppose Red aggression

d. Aside from a graphic representation of nodes and links, the *desired system* can be described in terms of those conditions that, if achieved, meet the objectives of policy, orders, guidance, and directives issued to the commander. Thus, a condition is one necessary aspect of the sought-after future state of the operational environment. Identifying conditions during operational design will help the commander and staff determine how to address the problem and devise an operational approach that achieves a

desired system state satisfying each objective. During COA development, conditions will provide a basis for developing tasks for subordinate and supporting organizations. Planners can relate each condition to the state of one or more systems in the operational environment. **The full set of conditions represents one way to think about the desired state of the operational environment when operations conclude**.

e.   The characteristics of conditions vary. Conditions may be tangible or intangible, military or nonmilitary, or physical or psychological. They also may describe or relate to perceptions, levels of comprehension, cohesion among groups, or relationships between organizations or individuals. Because the desired future state of the environment must be clearly defined, success hinges on accurately describing those conditions. They form the basis for decisions on tasks that ensure operations progress consistently toward the objectives that represent the desired state of the operational environment when operations end. When determining conditions that constitute the desired state, the commander and staff consider their relevance to higher policy, orders, guidance, or directives.

> *"It is important to emphasize that the desired end state, just like current conditions, will continue to evolve and change. Current conditions change as time moves on, and therefore future desired conditions should evolve accordingly as commanders reframe and refine the desired end state. The "frame" of the problem is a "moving frame," which allows the commander to focus on future conditions. Thus, the "desired end state" is not a fixed set of conditions that cannot change – in fact, it should change to enable commanders and their subordinates to constantly assess, reframe, and reorient operations to shape and transform the future. This conceptual framework of an end state – stated in broad terms – provides flexibility and enables initiative."*
>
> **Dr. Jack Kem**
> **Design: Tools of the Trade (2d Edition)**

f.   Time is a significant consideration when determining the *desired system*. How time relates to the desired system heavily influences not only the expectations of higher authorities but also how commanders use forces and capabilities to achieve desired conditions. Staffs must exercise diligence throughout design to account for the time expected to achieve the conditions. They also qualify whether the desired conditions are intended to be lasting or transient in nature. This temporal dimension is essential to developing effective operational approaches and managing expectations.

6.   Understanding the Problem

a.   Once armed with an initial understanding of the operational environment's current and desired systems, the design effort shifts to the challenge of *understanding and describing the problem*[8] (those factors that must be addressed to change the current system to the desired system). **Understanding the problem is essential to solving the problem.** It involves understanding and isolating the root causes of the issue at hand—

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[8] JP 5-0 typically refers to this as "defining the problem," while FM 5-0 uses the term "framing the problem."

defining the essence of a complex, ill-structured problem. The essential activities continue to be thinking critically and conducting open, frank discussion with stakeholders,[9] considering their diverse perspectives, and thereby discovering and understanding the underlying nature of the problem. **Bringing adequate order to complex problems to facilitate subsequent detailed planning requires an iterative discourse between commander, staff, and others as Figure V-2 indicates.** The initial depiction of the desired system is based in large part on the objectives, tasks, and other guidance that higher headquarters provides to the JFC. As the JFC and staff continue their analysis and gain a deeper understanding of the systems and forces at work, additional considerations will often emerge that can refine higher headquarters objectives, the conditions to achieve them, and the factors representing the problem. These refinements will change the understanding and depiction of the operational environment.
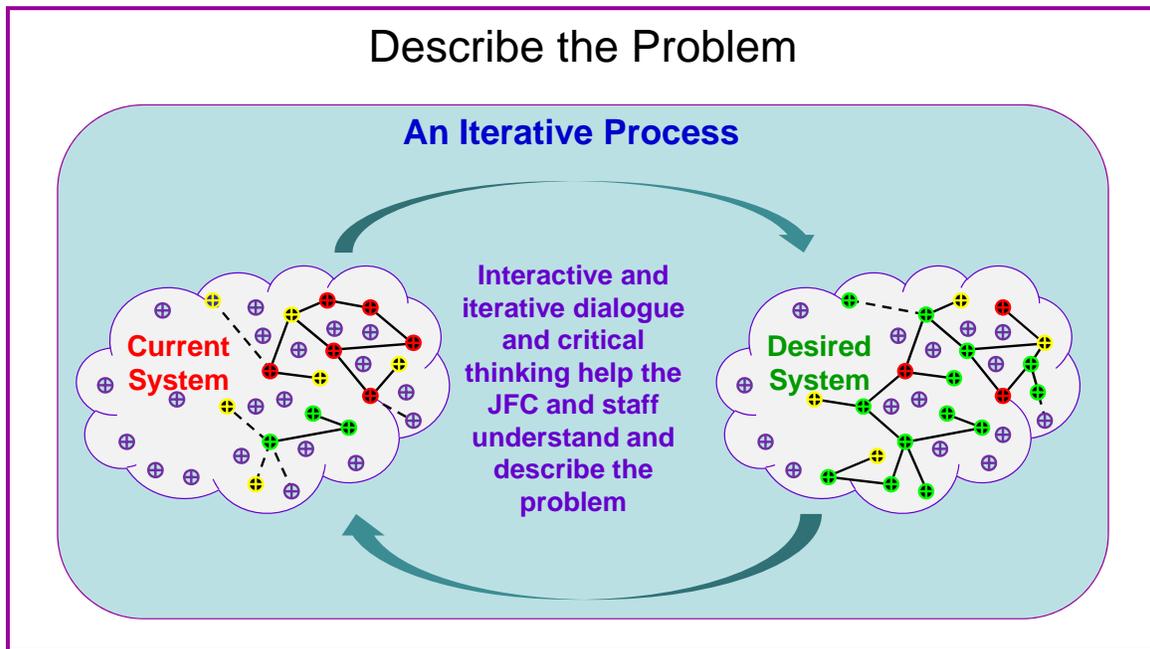
Figure V-2. Describe the Problem

b. Understanding the problem is essential, because the logic of the problem points to possible solutions based on the premise that solutions will become self-evident once we understand the environment and what needs to be done to change it. For example, if the commander and staff conclude that one aspect of the problem is murder and intimidation by the insurgents, then the solution will likely be more lethally focused in nature and involve additional security for the relevant population. However, some aspects of the operational approach will shift if the commander concludes that the problem is the local population's passive or active acceptance of the insurgents' goals and methods. **This also points to a risk in defining the problem too early in the method, because**

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[9] The handbook occasionally uses the term "discourse" to represent the frank discussion among stakeholders. See the discussion of critical thinking in paragraph 2 of this Chapter and Appendix C.

how one defines the problem and shapes the proposed solution (the operational approach) can limit flexibility once operations begin.[10]

c.   **Understanding the problem (which resides within the current system) is essential to understanding the operational environment**. However, understanding how other parts of the operational environment relate to (or interact with) the problem is essential to developing a solution (the operational approach).   Problems that require commitment of military capabilities can range from relatively simple to extremely complex. Circumstances that result in combat are never simple, although some combat situations are less complex than others. Likewise, some irregular warfare circumstances can be more complex and their operational and strategic objectives more difficult to achieve than those of traditional, force-on-force military operations. Initial observable symptoms often do not reflect the true nature and root cause(s) of the problem, so commanders and staffs must devote sufficient time and effort early in planning to correctly frame the problem before considering specific COAs. In the 1990-1991 Persian Gulf Conflict, the beginning state of the operational environment (the current system) included Iraqi forces that occupied Kuwait and were in position to attack into Saudi Arabia. In an address to the Congress on August 5, 1990, three days after Iraq invaded Kuwait, President George H. W. Bush stated that the US national policy objectives in the Persian Gulf were to:[11]

(1) Effect the immediate, complete, and unconditional withdrawal of all Iraqi forces from Kuwait;

(2) Restore Kuwait's legitimate government;

(3) Ensure the security and stability of Saudi Arabia and other Persian Gulf nations; and,

(4) Ensure the safety of American citizens abroad.

At that point early in Operation DESERT SHIELD, and even months before Operation DESERT STORM began, the US Central Command CCDR could anticipate the requirement for an offensive campaign to eject Iraqi forces from Kuwait and set the conditions to enable the other strategic policy objectives. The following is one way that the CCDR might have characterized the problem early in August, 1990:

How do I defend Saudi Arabia from attack by Saddam Hussein's forces, eject those forces from Kuwait, restore Kuwait's legitimate government, and set the conditions for return to regional stability?

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[10] John Schmitt, *A Systemic Concept for Operational Design*, 2006. Much of paragraph 6b is paraphrased from this concept paper.

[11] *From Operation Desert Storm:* Evaluation of the Air Campaign *(Letter Report, 06/12/97, GAO/NSIAD-97-134)*

http://www.fas.org/man/gao/nsiad97134/app_05.htm

d.   The above statement clearly links to the President's stated objectives. But the existing circumstances at that point in time (Iraqi forces occupying Kuwait) represented only a symptom of a more fundamental problem. A sufficient understanding of that operational environment would suggest that the following was part of the problem set:

An oppressive regime ruled by a dictator who has a strong desire for territorial expansion, control of oil, and weapons of mass destruction; complex tribal and religious issues and relationships that complicate the prospect of regional stability and acceptance of follow-on US involvement.

The first part of this statement reflects some of the underlying core conditions, such as a desire for territorial expansion, which led to Saddam Hussein's attack into Kuwait. The second part (tribal and religious issues) reflects the challenge of achieving peace and stability in Iraq and the region should the President decide to continue US offensive operations against Iraq. Certainly such an assessment was part of the intelligence analysis with respect to Iraq and Saddam Hussein and the situation in Iraq in late 1990 and was well understood by senior civilian and military leaders.

e.   **The preceding discussion illustrates the important relationship between symptoms of the problem and the underlying causes.** US forces are often employed to address symptoms of a larger problem, but success in doing so does not always result in the fundamental systemic changes that enable a lasting solution. As was the case in the 1990-1991 Persian Gulf Conflict, the military solution could be transient unless operations address the core problem. Even a clear strategic purpose and objectives can give a false impression of the problem's true nature. A more sustainable solution often must address root economic, social, or political issues that require early consultation and collaboration with interagency and multinational partners. It may not be intended, or even possible, for military operations to address the fundamental issues. Historically however, many joint operations begun in response to the obvious symptoms in a crisis often are extended later to solve or help address related fundamental issues in the operational environment.

f.   There is a natural tendency for commanders and planners to expect that the higher command accurately understands the situation, has framed the problem, and has provided appropriate tasks to subordinates. The higher authority's initial tasks and guidance to the JFC might or might not analyze, describe, and address the underlying causes and considerations early in a crisis. Particularly in a crisis for which no plan exists, the higher command's initial warning order or other planning directive seldom contains a comprehensive or final solution on the exact nature and underlying causes or of an approach to solving the problem. Even if higher headquarters' analysis has occurred, the JFC and staff should ensure by their independent analysis (as time allows) that they agree, and they should work to resolve different perspectives with higher authority and subordinate commanders. Subordinate commanders should frame their circumstances, define the problem for themselves from their respective vantage points, and share their understanding with their superiors and subordinates. **This interaction is necessary to achieve a true, shared, systemic understanding of the operational environment, especially when the problem is complex and planning time is relatively**

compressed. Consensus on the core problem will help ensure a common perspective on the approach to its solution.

g.   As the commander and staff gain an understanding of the problem within the context of the operational environment, potential solutions should become evident. The configuration of tensions, competition, opportunities, and challenges may reveal ways to interact with various aspects of the environment in order to transform it to the *desired system*. Analyzing these options often requires coupling potential actions to a problem by quickly wargaming their possible outcomes. This deepens understanding, informs the commander's ability to visualize friendly actions, and enables the commander to expedite detailed planning by developing intent and planning guidance.

> *"The joint force commander often encounters very complex situations that must be framed individually as early as possible. Understanding must be built over time. The commander must identify and understand the important relationships within such complex situations and use them advantageously. One must also understand the likely second- and third-order consequences or implications of various actions. Operational artists should consider that even the desirable effects of the most appropriate actions can decay as the surrounding system responds to the infusion of energy. A detailed understanding of the system dynamics helps the commander to begin to choose an appropriate approach to transform the situation to one that is more desirable and to observe the response of the system in order to recognize when diminishing return sets in so a new, more effective response can be formulated. The discourse of design provides the understanding that the commander and staff draw upon to frame this new complex problem."[12]*

7.   The Environment's Forces at Work

a.   Understanding how to solve the problem and change the current system to the desired system involves understanding the actors and influences at work in the operational environment. The commander and staff identify motivations and agendas among the relevant actors with regard to the desired transformation. They consider factors that influence these motivations and agendas. They also evaluate *tendencies*, *potentials*, *trends*, *tensions*, and other factors that influence the interactions among social, cultural, and ideological forces. These factors may include political, social, or cultural dispositions in one group that may hinder collaboration with another group.

b.   **Figure V-3** shows a hypothetical current system, the JFC's desired system when operations conclude, and the JFC's assessment of how the enemy wants the system to look at the end of operations. The friendly and enemy goals directly oppose each other, so there will be significant **tension** (resistance) among the major **actors**. The JFC has identified a group of narco-barons as the system's COG. The narco-barons exert significant influence over many actors in the system. The **tendency** of these actors, whether due to fear of the narco-barons or the potential to lose profits, will be to resist

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[12] US Joint Forces Command, Joint Warfighting Center Pamphlet 10, *Design in Military Operations*, 20 September 2010.

change. Thus the tendency of the system as a whole will be one of inertia or movement toward expanded drug operations. In particular, JIPOE shows that the narco-barons intend to expand their drug network to a neighboring country as shown at the bottom-right side of the figure. JIPOE also reveals that *potential* exists to influence (and change the behavior of) the system's political, banking, and farming actors through a combination of diplomatic, economic, and informational initiatives in addition to military action against the narco-barons and their drug-producing and smuggling networks. The JFC seeks an operational approach that will significantly limit the narco-barons' influence through a combination of actions to overcome the tensions and leverage the potentials, thereby creating the friendly desired system at the end of operations. **The following paragraphs discuss actors, tendencies, potentials, and tensions.**
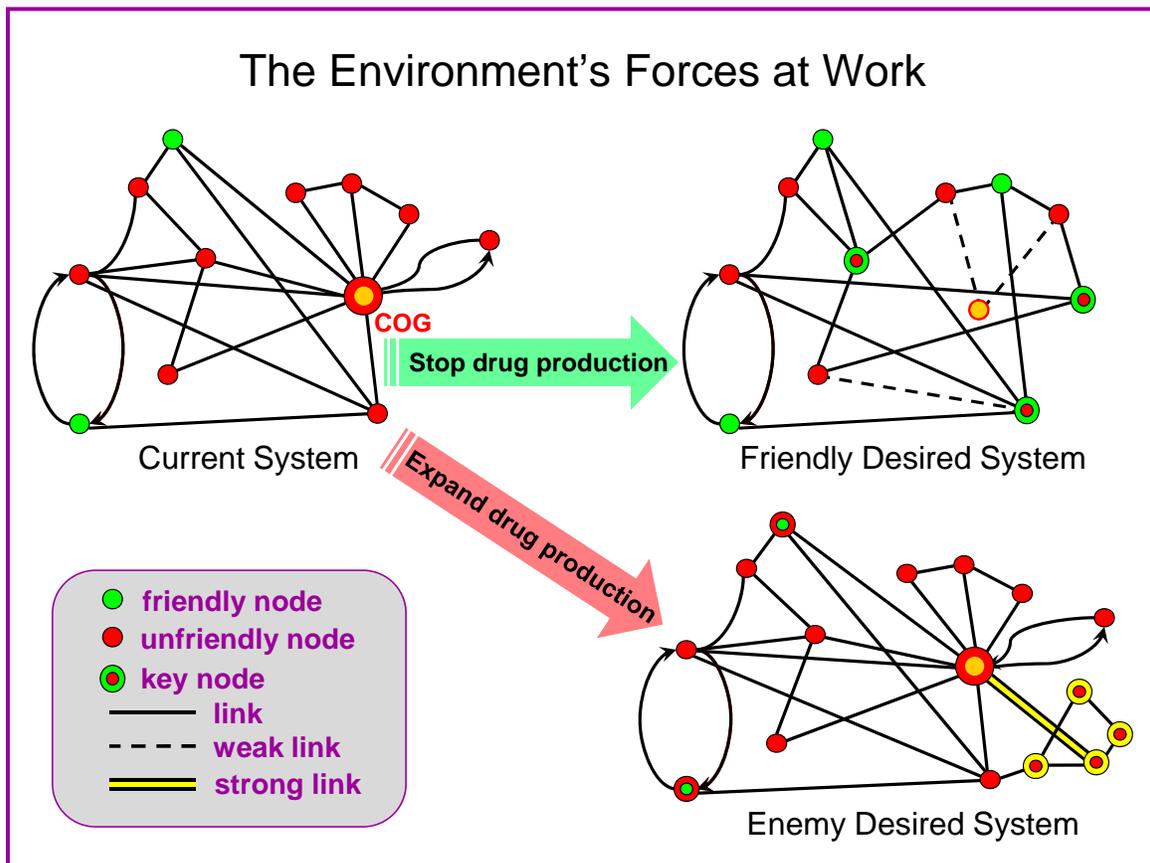
Figure V-3. The Environment's Forces at Work

　　　　(1) Actors**.**　　Commanders use their expanding understanding of the environment to understand and explain behaviors of relevant actors in the operational environment. **An *actor* is an individual or group within a specific system(s) who acts to advance personal or other interests.** *Relevant actors* may include states, governments, multinational actors, coalitions, regional groupings, alliances, terrorist networks, criminal organizations, cartels, multinational and international corporations, nongovernmental organizations, and others able to influence the situation either through, or in spite of, the established civil, religious, or military authorities. A few will be *key actors* who are crucial to the operation's success. The staff can depict key actor

relationships within a larger systems diagram or in a separate graphic. A diagram illustrating relevant actor relationships is a valuable tool for understanding and visualizing the operational environment. However, such diagrams may become so complicated (for more complex situations) that they impart only limited insight and can inhibit critical and creative thought when viewed in isolation. The operational environment narrative captures a more detailed understanding of the relevant actors, their interactions, and relationships. When used in concert, a diagram and narrative become powerful tools. Often relationships among actors are multifaceted and differ depending on the scale of interaction and their temporal aspects (history, duration, type, and frequency). Clarifying the relationships among actors requires intense effort since relationships must be examined from multiple perspectives. Commanders can also depict relationships by identifying and categorizing their unique characteristics.

(2) <u>Tendencies</u>. In developing their understanding of the interactions and relationships of relevant actors in the operational environment, the commander and staff consider natural tendencies in their analyses. ***Tendencies*** *reflect the inclination to think or behave in a certain manner.* Tendencies are not considered deterministic; instead they are models that describe the thoughts or behaviors of relevant actors. Tendencies help identify the range of possibilities that relevant actors may develop with or without external influence. Once identified, commanders and staffs evaluate the potential of these tendencies to manifest within the operational environment.

(3) <u>Potentials.</u> The commander and staff also consider ***potentials***, which *are inherent abilities or capacities for the growth or development of a specific interaction or relationship.* Not all interactions and relationships support achieving the desired end state. The desired end state accounts for tendencies and potentials that exist among the relevant actors or other factors in the operational environment.

(4) <u>Tensions</u>. ***Tension*** *is the resistance or friction among and between actors.* The commander and staff identify the tension by analyzing the context of the relevant actors' tendencies, potentials, and the operational environment. In determining the problem, analysis identifies the positive, neutral, and negative implications of tensions in the operational environment given the differences between existing and desired conditions, understanding that the force's actions within the operational environment may exacerbate latent tensions. Tensions that can be exploited to drive change may be vital to transforming existing conditions. Tensions that may undermine transformation must be addressed appropriately. Because tensions arise from differences in perceptions, goals, and capabilities among relevant actors, they are inherently destabilizing and can both foster and impede transformation. By analyzing these tensions, the commander identifies the problem that the design will ultimately solve.

c. A red team can help the JFC and staff better understand the environment's tensions, potentials, and tendencies. The J-2 typically uses a red team to support COA development and wargaming, but **the JFC should consider forming a red team early in operational design**. This team can center on the J-2, but should also include subject matter experts in social, economic, diplomatic, and other disciplines relevant to the

mission at hand. Chapter VIII, "Organizing for Operational Design and Planning" also mentions use of red teams.

8.   Describing the Problem

a.   In describing the problem, the staff identifies those areas of tension that merit further consideration as areas of possible intervention. Commanders and staff determine how environmental conditions, actors, or relationships may resist or facilitate moving the system from the observed to the desired system and how to leverage environmental inertia to achieve desired conditions. The staff also considers how the individual systems can be expected to resist or facilitate moving the system from the observed to the desired state and how their inertia in the environment can be leveraged to ensure achievement of the desired conditions.

b.   The JFC and staff consider how potential actions will enable the force to maintain the initiative. They must take into account *operational limitations*; those actions required or prohibited by higher authority, such as a constraint, restraint, and other restrictions that limit the commander's freedom of action. The staff evaluates what combination of actions might derail opposing actors from achieving their goals while moving the *observed system* toward the *desired system*. This entails evaluating an action's potential risks and the relevant actors' freedom of action. Likewise, identifying the possible emergence of unintended consequences or threats, commanders and staffs may discover exploitable opportunities to create conditions that support the *desired system*. The staff also explores the risks and opportunities of action by considering exploitable tensions. This includes identifying capabilities and vulnerabilities of the actors who would oppose our achievement of the *desired system*. Commanders and staffs can then formulate methods to neutralize those capabilities and exploit vulnerabilities.

c.   Once the commander and staff have listed the problem's factors, considered the tendencies and potentials of the relevant actors, and identified tensions between the existing conditions and the desired end state, they develop a ***problem statement***. This statement, **which is the basis for developing the operational approach**, is a narrative that lists the problem's factors, describes areas of tension, competition, and opportunity, and identifies the areas for action that will transform existing conditions toward the desired end state before adversaries begin transform current conditions to their desired end state. *Iraqi forces occupy Kuwait* and *US citizens at risk in Persian Gulf* are examples of problem factors that had to be addressed by the CCDR in Operation DESERT STORM and in follow-on actions in order to set the conditions required to achieve the desired system and accomplish strategic objectives in that conflict. Such factors provide the basis for the eventual functional lines of effort and geographic lines of operations that can be the centerpiece of the operational approach.

CHAPTER VI
THE OPERATIONAL APPROACH

The operational approach reflects understanding of the operational environment and the problem while describing the commander's visualization of a broad approach for achieving the desired end state.… The operational approach promotes mutual understanding and unity of effort throughout the echelons of command and partner organizations.

JP 5-0, *Joint Operation Planning*

1. Introduction[1]

a. **The *operational approach* is a JFC's description of the broad actions the force must take in order to achieve the desired end state.**[2] It is the JFC's visualization of how the operation should transform current conditions into the desired conditions at end state—the way the commander wants the operational environment to look when operations conclude (**Figure VI-1**).[3]

The Operational Approach

The Operational Approach: Broad actions the joint force will take that move the current system to the desired system

Current System

Desired System

Typically a combination of lines of operations and lines of effort
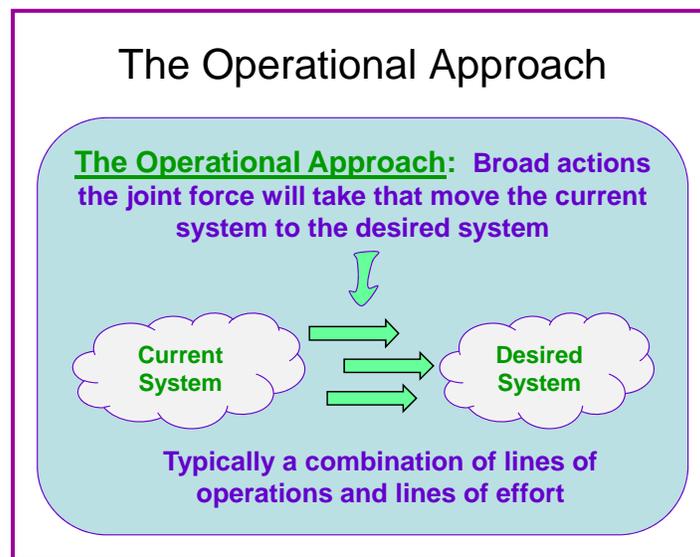
Figure VI-1. The Operational Approach

b. **The operational approach is how the JFC believes US instruments of national power and other interorganizational actions should address the various factors that comprise the gap between the current and desired systems.** Using a design methodology that emphasizes critical and creative thinking in developing this approach enables a better understanding of the operational environment and of the

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[1] The "introduction" paragraphs are taken, with adjustments, from the JP 5-0 RFC, pp. III-3 to III-5.

[2] JP 5-0 RFC, p. III-3

[3] The *operational approach* is not the same as the eventual detailed *concept of operations*, which is contained in paragraph 3b of the operation plan or order. The *concept of operations* is developed during detailed planning, and is a more detailed description of how the joint force will accomplish the commander's approved course of action with available resources.

problem. The resulting product provides the foundation for the JFC's planning guidance to the staff and collaboration with interorganizational partners. The approach also provides the model for executing the operation and determining relevant assessment ways, means, and measures. The JFC's approved operational approach should be a text and graphics product of early operational design that will provide the basis for continuing with mission analysis and subsequent detailed planning. The JFC and staff should continually review, update, and modify the approach throughout planning and execution as the operational environment, end state objectives, or the problem change.

2. The Operational Approach

a. **Figure VI-2** shows the basic elements of a hypothetical operational approach. Once the commander and staff are reasonably comfortable with their understanding of the current and desired operational environments and the nature of the problem, **they can work backward from national strategic and military end-state objectives through the conditions necessary to achieve the objectives and the more specific actions necessary to create these conditions**. The approach considers the equities of actors, their strengths and weaknesses, and the forces (tendencies, potentials, tensions, etc.) at work in the operational environment (described in Chapter V). It should also identify potential unintended desired and undesired effects of actions along the way, which could become the basis for subsequent branches to the operation plan. Desired effects could create opportunities the JFC can leverage, while the JFC may need to prevent or neutralize undesired effects to protect the operational approach.
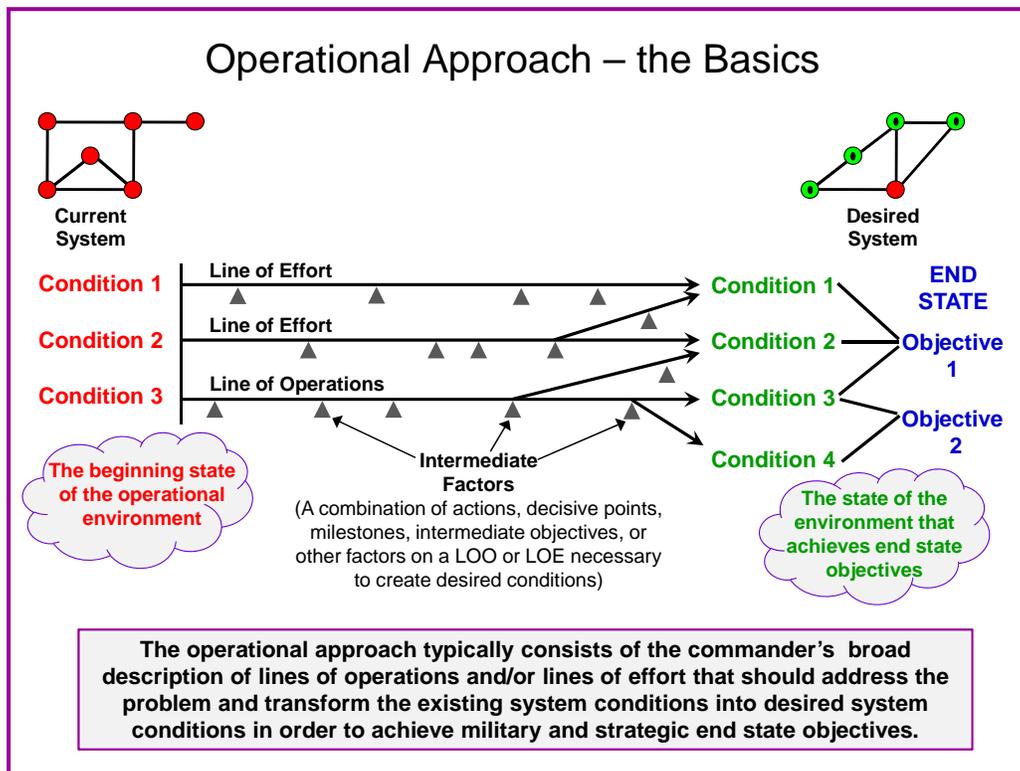

Figure VI-2. Operational Approach – The Basics

b.   Some elements of operational design are important to the early design effort. Examples include *end state*, *objective*, *center of gravity*, *direct versus indirect approach*, *lines of operations,* and *lines of effort*, which figure prominently in developing the operational approach. **Lines of operation and lines of effort are particularly useful in graphically relating the sequence of actions necessary to create conditions and achieve objectives.** A *line of operations* (LOO) is a physical line that usually defines the geographic orientation of the friendly force in relation to the enemy and or an objective in combat operations.   A *line of effort* (LOE) links multiple tasks and missions when positional references to an enemy have little relevance, such as in stability operations. **Figure VI-3** shows an example of a LOO and LOE. There is no "school solution" for how the planners should construct LOOs and LOEs. Although a LOO typically is geographic in nature, the commander may mix functional factors and key milestones with key terrain and geographic objectives. Likewise, geographic relationships may be relevant to a line of effort, such as the time-distance relationship between a country's only operational airport and an earthquake disaster site during foreign humanitarian assistance operations.

c.   Operations along LOOs and/or LOEs typically are not independent of each other. In the hypothetical situation in Figure VI-3, operations along the LOO should have created the desired condition "Capital City secured" before many of the LOE's activities could begin in that city. In some ways, there are general parallels between planning the various military operations along related LOOs and LOEs to achieve objectives and the program evaluation and review technique (PERT) as a model for project management. PERT is a method to analyze the involved tasks in completing a given project, especially the time needed to complete each task, and identify the minimum time needed to complete the total project.[4] It relates tasks in a way that shows how certain tasks on one path cannot begin until a task on a separate path is complete.   This analogy is generally useful, but the application of PERT to military operations is problematic due to the complexity and uncertainty of many operational environments, particularly when combat is required.

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[4] http://en.wikipedia.org/wiki/PERT. PERT was developed primarily to simplify the planning and scheduling of large and complex projects. It was developed for the U.S. Navy Special Projects Office in 1957 to support the U.S. Navy's Polaris nuclear submarine project. It was able to incorporate uncertainty by making it possible to schedule a project while not knowing precisely the details and durations of all the activities. It is more of an event-oriented technique rather than start- and completion-oriented, and is used more in projects where time, rather than cost, is the major factor.
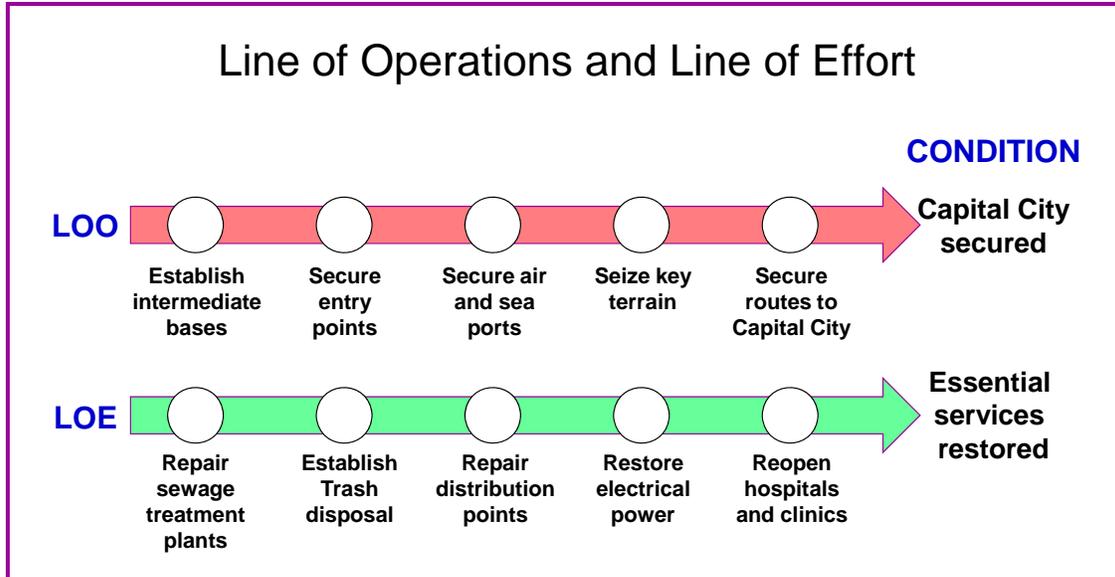
Figure VI-3. Line of Operations and Line of Effort

d. *Center of gravity* is a key operational design element and relevant to the early design effort. Early identification of friendly and enemy COGs will affect the operational approach. The JFC's approach must address the enemy COG if one can be identified this early. Particularly in a crisis, there is tension between the value of detailed COG analysis and the necessity of developing a broad operational approach to drive detailed planning. The enemy's COG should be evident in large-scale combat operations, and simply identifying it in the operational approach may be sufficient for planning to continue. In operations such as counterinsurgency, early identification of the COG may be more difficult and may require detailed analysis beyond the time when the JFC approves the operational approach. In this case, the JFC could provide a best guess of the COG based on the J2's current JIPOE and the commander's judgment. Just as the JFC will continue to revise initial planning guidance and intent statements throughout planning, the JFC and staff will continue to revise the operational approach based, in part, on the fidelity of additional COG analysis.

Note to the Reader

The requirement to frame the problem and write a problem statement early in design raises a question concerning how the problem relates to one or more centers of gravity. Both are important to developing the operational approach, but the caution to planners is that jumping to COG analysis too early in design can constrain creative thinking about the problem. Critical factors analysis (critical vulnerabilities, capabilities, and requirements that support COG determination) is linear in nature, while understanding a complex operational environment and an ill-defined problem involves iterative critical and creative thinking. COG analysis seems to reduce causality in a system to a single factor (hub of all power), while the factors that comprise the problem could range beyond the COG.

Strategic and operational COGs could be readily apparent in some situations, such as during the 1990-91 Persian Gulf Conflict when planners were faced with a complicated (but not ill-defined) problem that required a clear-cut military solution. However, current challenges in Iraq and Afghanistan reflect the ill-defined nature of the problem and the potential inadequacy of straightforward COG analysis in these circumstances. Even when a strategic COG is apparent based on the nature of the strategic problem, operational-level COGs can remain veiled until the joint force can develop the situation. Given sufficient time, planners should defer COG analysis until they have at least an initial problem frame, because identifying the factors that comprise the problem should facilitate COG analysis. The eventual operational approach should effectively address both the problem and centers of gravity.

e.   Particularly in crisis action situations, the operational approach is necessarily broad so that the JFC can provide guidance as soon as possible to inform subsequent detailed planning. The methodology is iterative in nature, and details uncovered during further mission analysis, COA development, and JIPOE will help refine the operational approach.

f.   As the operational approach emerges, the staff devises assessment indicators of progress that should be eventually incorporated in the plan or order and used during execution. Certain assessment indicators act as triggers during the operation to help the commander determine the necessity to revisit the original operational approach, reframe the problem, and perhaps revise the original operational approach. In particular, the staff designs *reframing indicators* to identify conditions in the operational environment that have changed or that are not well understood. **These indicators could reveal a shift in the problem such that the current approach may no longer be valid.** Some reframing indicators will be CCIR candidates. See paragraph 5d in Chapter VII for more information.

g.   The operational approach should promote mutual understanding and unity of effort throughout the echelons of command and partner organizations, a key consideration as the commander develops the approach. For example, the nature of our multinational partners' strategic objectives could influence the approach to achieving the commander's strategic and operational objectives. The availability of host-nation support, diplomatic permission to overfly nations, access to en route air bases, and the allocation of strategic mobility assets are examples of factors that should be known before the commander approves the approach for subsequent detailed planning. Likewise, the operational approach can be a valuable tool for briefing senior leaders and a mechanism for achieving consensus on the problem, the specific nature of strategic objectives and the desired end state, the conditions necessary to achieve the end state, and potential issues related to Phase V (Enable Civil Authority).

h.   The operational approach must address both resources and risk. Because the operational approach will drive subsequent planning, the commander must be reasonably confident that the approach's level of risk is acceptable and the approach can be accomplished with the resources expected to be available. Rarely does one organization

directly control all the necessary resources. Therefore, the JFC should consider the capabilities of other partners and establish relationships to ensure sufficient resources. Likewise, the commander and staff identify and consider risk throughout the iterative application of design. Collaboration, coordination, and cooperation among multinational military and civilian partners are essential to identifying potential options for mitigating risk, conserving resources, and achieving unity of effort. These are easier to identify if military and civilian partners participate in design from the outset to build trust and confidence in the effort and one another. The commander's planning guidance explains the acceptable level of risk and either outline or direct development of risk mitigation measures.

3. Publishing the Operational Approach

a. JP 5-0 states, "The commander provides a summary of his current understanding of the operational environment and the problem, along with his visualization of the operational approach, to the staff and to other partners through commander's planning guidance."[5] The format for the commander's planning guidance varies based on the personality of the commander and the level of command, but should adequately describe the logic to the commander's understanding of the operational environment and of the problem and the description of the operational approach.

b. JP 5-0 states that the planning guidance may include the following elements:[6]

(1) **A description of the operational environment.** A combination of narrative and graphics that describe the operational environment and key relationships and tensions.

(2) **A definition of the problem to be solved.** A narrative problem statement that includes the required timing to solve the problem.

(3) **A description of the operational approach.** A combination of a narrative and graphics that describe end state objectives, desired conditions, and potential LOOs and LOEs. **Figures VI-4** and **VI-5** are examples of ways to depict the operational approach.[7] **Note that both figures depict a comprehensive approach that requires actions or support of interorganizational partners**. The JFC should secure the other partners' commitment to these actions, or a higher authority should direct these actions, before the JFC releases the operational approach to drive detailed planning.

(4) **Operational limitations.** A description of constraints and restraints.

(5) **The commander's initial intent.** A description of the purpose of the operation, desired strategic end state, military end state, and operational risks associated

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[5] JP 5-0 p. III-16.

[6] Ibid., paraphrased from p. III-16.

[7] Figure VI-4 is from JP 5-0, p. III-15. Figure VI-5 is from MCWP 5-1, p. J-2.

with the operation. It also includes where the commander will and will not accept risk during the operation.

Operational Approach -- an Example

Supported Objectives

1. Positively influence people
2. Trained and professional security force
3. Civil security operations
4. Literacy rate improved
5. Population has access to essential services
6. Qualified and trained civil service
7. Diminish illegal networks
8. Revenues increased

Desired Conditions

A. Populace regularly, readily interacts with provincial government
B. Civil servants maintaining regular work hours and actively pursuing their responsibilities
C. Available and trained security forces employed effectively by the provincial government
D. School attendance increased
E. Improved conditions for basic services
F. Increased investment/projects in the provinces

**Figure VI-4. Operational Approach – an Example**

Operational Approach – Another Example
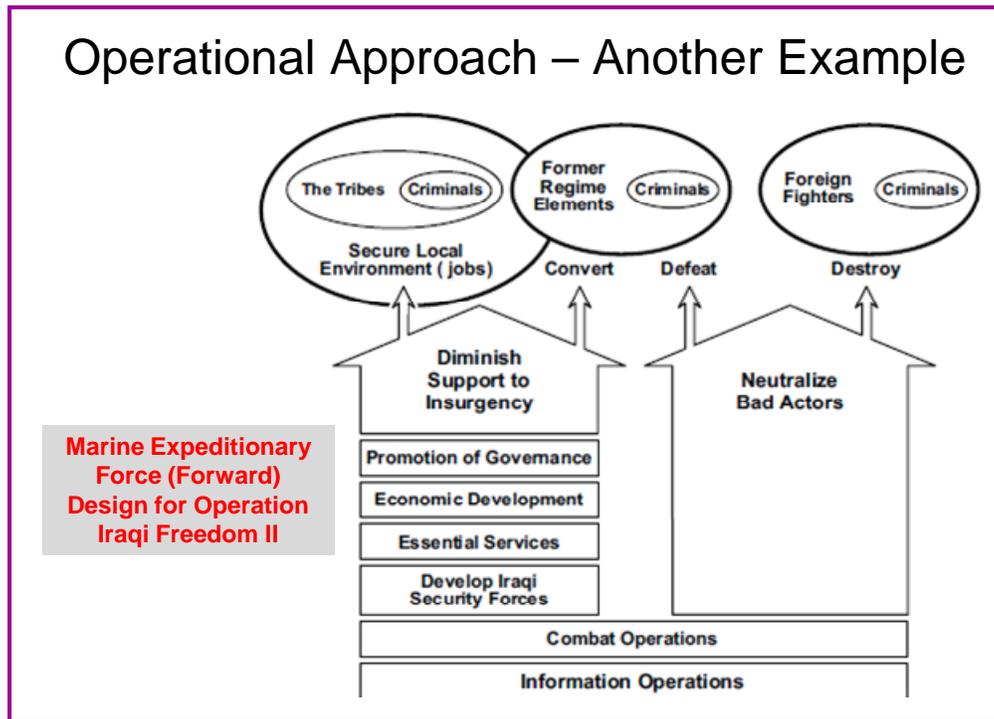
Figure VI-5. Operational Approach – Another Example

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CHAPTER VII
THE INTERACTION OF OPERATIONAL DESIGN AND PLANNING

> *"Operational design is distinct from, yet complements, operational planning. Planning is the act of using the mental model (visualization), produced during operational design discourse, to act in the physical world."*
>
> **US Special Operations Command J8-S Briefing**
> **Operational Design Primer, 4 Feb 09**

> *"When the hardest part of the problem is identifying and describing the problem, engineering functions alone are inadequate and design is essential. Otherwise, absent a design process, military planners will default to doctrinal norms, building plans based upon familiar patterns rather than upon an understanding of the particular situation and how individual actions contribute to the overall goal."*
>
> **TRADOC Pam 525-2-500**
> **Commander's Appreciation and Campaign Design, 28 Jan 08**

1. Introduction

a. As the above quotes indicate, some writers suggest that design is distinct from, yet complements, detailed planning. This perspective promotes the belief that design and planning should be described as related but separate and that the commander should have specific design teams that provide results of their efforts to planners who will then prepare the detailed plan. However, whether a distinct design effort occurs before or in conjunction with formal planning is likely determined by operational circumstances, complexity of the problem, available resources, and the commander's preference. For example, peacetime *deliberate planning* associated with a theater campaign plan and for potential contingencies could allow the time necessary for the commander to form a dedicated design team, marshal external subject matter experts, conduct extended discourse, and develop a broad operational approach before any detailed planning begins. However, the limited time typically associated with *crisis action planning* circumstances will require design activities to occur in close conjunction with (or as part of) mission analysis. **In any case, design and planning are not mutually exclusive**.

b. Perspectives regarding how best to accomplish design are converging but continue to differ. Likewise, joint, Army, and Marine Corps doctrine contain related but not identical descriptions of how design and planning relate. The joint community's JP 5-0 states:

> *"Operational design and JOPP are complementary elements <u>of the overall planning process</u>."*[1] *(underline added)*

The Army's FM 5-0 states:

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[1] JP 5-0 p. IV-1.

"Planning consists of two separate, but closely related components: a conceptual component and a detailed component. The conceptual component is represented by the cognitive application of design. The detailed component translates broad concepts into a complete and practical plan. During planning, these components overlap with no clear delineation between them."[2] (underline added)

Based on their view of design, the Marine Corps includes *functional planning*[3] between conceptual and detailed planning and has renamed *mission analysis* as *problem framing*:

"A fundamental responsibility of command, design is present not only in planning, but also throughout the planning-execution-assessment continuum. This publication emphasizes the importance of understanding the problem, the environment, the enemy, and the purpose of an operation. This awareness is fundamental to the first step in planning*—formerly named* mission analysis*— and has, accordingly, been renamed* problem framing *to better convey its purpose and importance."*[4] (underline added)

c.   Joint doctrine's perspective is that operational design begins early and continues throughout planning and execution. This is consistent with the perspectives of Services that have written extensively about design in their doctrine. **The challenge is not that early planning efforts cannot accommodate the philosophy, critical thinking, and techniques of design. Instead, the challenge may be one of retooling the most important planning step—mission analysis—in joint and Service education and training**. The rest of this chapter will discuss the interaction of operational design and JOPP with a focus on mission analysis.

2.   Planning Initiation, Mission Analysis, and Operational Design

a.   **Figure VII-1** shows the joint operation planning process steps. The figure highlights *planning initiation* and *mission analysis*, since the design effort can begin immediately on identification of a directed or anticipated planning requirement.

b.   *Planning initiation* is usually a transient step in JOPP, since most commanders and staffs begin mission analysis immediately after the commander's initial guidance. The commander provides enough guidance to the staff and subordinate commands to get the process going. This guidance could specify time constraints, outline initial coordination requirements, or authorize movement of key capabilities within the JFC's authority. The guidance would typically be brief when responding to a contingency for which a plan exists, but initial guidance in the face of new planning requirements (unplanned contingencies) would typically be more extensive.

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[2] FM 5-0, p. 3-1.

[3] Marine Corps Warfighting Publication (MCWP) 5-1, *Marine Corps Planning Process*, 24 Aug 10, p. 1-2.

[4] Ibid., Foreword.

c.   The joint force's *mission* is the task or set of tasks, together with the purpose, that clearly indicate the action to be taken and the reason for doing so. **The primary purpose of *mission analysis* is to understand the operational environment, the problem, and purpose of the operation and to issue appropriate guidance to drive the rest of the planning process.** The JFC and staff can accomplish mission analysis through a number of activities that develop, analyze, and provide the information essential to subsequent detailed planning (see **Figure VII-2**). Although some activities occur before others, mission analysis typically involves substantial parallel processing of information by the commander and staff, particularly in a crisis-action situation.

Joint Operation Planning Process

Step 1:
Initiation

Step 2:
Mission Analysis

Step 3:
Course of Action (COA) Development

Step 4:
COA Analysis and Wargaming

Step 5:
COA Comparison

Step 6:
COA Approval

Step 7:
Plan or Order Development
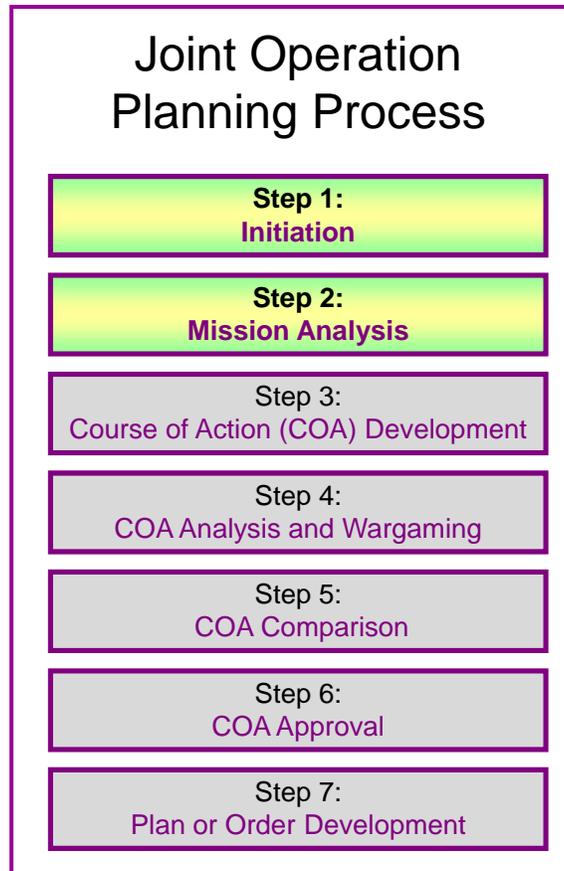
Figure VII-1. Joint Operation Planning Process

d.   During *deliberate planning* (absent typical time restraints of a crisis), some commanders might choose to delay certain activities normally associated with mission analysis in order to focus the staff on the early operational design effort. In these situations, the commander and staff would concentrate on activities typically associated with early mission analysis, such as understanding higher headquarters guidance, framing the operational environment, confirming strategic objectives and the military end state, and determining the fundamental problem that must be solved.

e.   However, *crisis-action planning* rarely affords time for the relaxed approach described above. As the JFC and lead planners work initial design-related issues, many other command and staff activities occur in parallel. Functional staff sections create or

update staff estimates, organizations prepare for deployment, and the joint force headquarters forms (if one does not already exist). An extreme case might even require deployment of combat forces as a flexible deterrent option before planning for the larger operation or campaign moves beyond a complete mission analysis or COA development. **Faced with an ill-defined military problem in a crisis-action situation, the commander may have to issue planning guidance, an initial intent, and a draft mission statement (key products of mission analysis) while still refining the operational approach**.

f.   As Chapter V mentioned, among the most important considerations in mission analysis (and essential to effective operational design) is the necessity to resolve different perspectives with higher authority and subordinate commanders. **This is not a step in the process per se, but should be an iterative pursuit throughout mission analysis by both the commander and staff with respective counterparts.** The higher command's initial warning order or other planning directive seldom contains a comprehensive or final solution to the exact nature and underlying causes of the crisis or of the approach to solving the problem. Commanders at all levels should frame their situation, define the problem for themselves from their respective vantage points, and share their understanding with their superiors and subordinates. Superiors usually have a broader contextual perspective that helps them understand how the potential operation relates to the larger strategy and desired national end state. But subordinate commanders often have a better understanding of the circumstances and nuances that comprise the specific crisis, and must share this perspective with their superiors early in planning and throughout execution. A significant goal of this interaction during early planning is to achieve consensus quickly on a shared understanding of the situation. This consensus benefits from candid discourse between superiors, subordinates, peers, and staff, as well as strategic awareness at all levels.[5]

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[5] Paragraph is paraphrased from SAMS *Art of Design* student text.

Mission Analysis Activities

▶ **Analyze higher headquarters planning activities and strategic guidance**

▶ **Review initial planning guidance, including the commander's understanding of the operational environment, the problem, and operational approach (if one exists)**

▶ **Develop known facts and planning assumptions**

▶ **Determine and analyze operational limitations**

▶ **Determine specified, implied, and essential tasks**

▶ **Develop initial mission statement**

▶ **Conduct initial force allocation review**

▶ **Develop risk assessment**

▶ **Develop mission success criteria**

▶ **Develop commander's critical information requirements**

▶ **Prepare staff estimates**

▶ **Prepare and deliver mission analysis brief**

▶ **Publish commander's updated planning guidance, intent statement, and refined operational approach**

Many activities occur concurrently

Figure VII-2. Mission Analysis Activities

g.   The centerpiece of design as described in various writings seems to be the iterative, collaborative, critical, and creative discourse and learning that occurs **to develop understanding**. The Army's FM 5-0 states:

> "**Design *is a methodology for applying critical and creative thinking to understand, visualize, and describe complex, ill-structured problems and develop approaches to solve them.*** *Critical thinking captures the reflective and continuous learning essential to design. Creative thinking involves thinking in new, innovative ways while capitalizing on imagination, insight, and novel ideas.*"[6]

As stated earlier in this chapter, the purpose of mission analysis is also to develop understanding—the understanding sufficient to develop a product (guidance) that gives direction to the rest of the planning process. At the beginning, both design and mission analysis share essential elements (strategic objectives, current situation, higher headquarters guidance, etc.) that provide initial context. Several of the mission analysis activities in **Figure VII-2** pertain directly to operational design or to its products, and the desired result (guidance to give direction to detailed planning) is fundamentally the same. So the tension between differing perspectives on design and planning is with how they are executed and not with the necessary results. **In essence, early design is mission analysis.**

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[6] FM 5-0, p. 3-1.

h.   **The emphasis on design as conceptual planning highlights the importance of s***ynthesis* **to mission analysis**. Understanding a complex operational environment and ill-defined problem requires beginning from a particular perspective, assimilating information from a variety of sources, using critical thinking to test hypotheses, and forming new perspectives that could be substantially different from the starting point**. Synthesis is essential even when execution begins since execution is essentially a form of hypothesis testing**. The hypothesis that underpins the operational approach could prove invalid soon after first contact with a thinking, adaptive adversary.

3.   Operational Design Elements and the Planning Process

a.   **Figure VII-3** lists joint doctrine's current operational design elements.[7] Many of these are traditional elements, such as *center of gravity* (COG), *line of operations*, and *culmination*. Others, such as *effect* and *line of effort*, are more recent additions to the list based nuances of irregular warfare and on how the joint community's thoughts on planning and design have continued to evolve. Some design elements are important to the design effort early in mission analysis. For example, *line of operations* and *line of effort* are particularly useful for arranging series of activities, tasks and other factors along geographic and functional lines to describe the broad approach to set conditions and achieve *objectives*. Chapter V discussed the role of *end state*, *objective*, and *termination* in establishing an initial baseline understanding of how the operational environment should look when operations conclude.

b.   Identification of friendly and enemy COGs is one of the most important early requirements confronting the JFC's staff. The JFC's operational approach must address the COG if one can be identified this early in the planning process. Particularly during crisis-action planning, there is tension between the value of detailed COG analysis and the necessity of developing a broad operational approach to drive the rest of the planning process. The enemy's COG should be evident in large-scale combat operations, and simply identifying it in the operational approach may be sufficient for planning to continue. In operations such as counterinsurgency, early identification of the COG may be more difficult, and may require detailed analysis beyond the time when the JFC approves the operational approach. In this case, the JFC could provide a best estimate of the COG based on the J2's current intelligence and the staff's design efforts. Just as the JFC will continue to revise initial planning guidance and intent statements throughout planning, the JFC and staff will continue to revise the operational approach based, in part, on the fidelity of additional COG analysis.

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[7] JP 5-0, p. III-18.

Elements of Operational Design

|	
▸ **Termination**	▸ **Direct and indirect approach**
▸ **Military end state**	▸ **Anticipation**
▸ **Objective**	▸ **Operational reach**
▸ **Effect**	▸ **Culmination**
▸ **Center of gravity**	▸ **Arranging operations**
▸ **Decisive point**	▸ **Forces and functions**
▸ **Line of operations**	▸ **Line of effort**
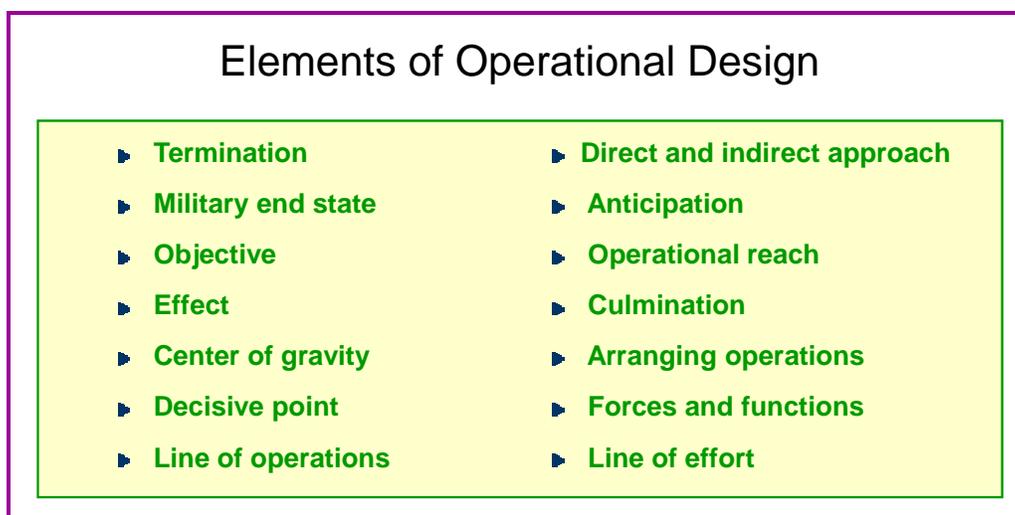
Figure VII-3. Elements of Operational Design

c. The staff will continue to refine their understanding of the problem, the operational environment, and the design elements mentioned above throughout subsequent JOPP steps. They will also consider other design elements such as *timing*, *tempo*, *leverage*, and *balance* that may not have been useful during mission analysis. For example, the staff will consider the adequacy and risk of each COA during wargaming and analysis relative to addressing the enemy's strategic and operational COGs. The results could refine the LOOs and LOEs identified during mission analysis, and could even cause significant changes to the operational approach. The eventual OPLAN or OPORD will capture results primarily in paragraph 2 (*Mission*) and paragraph 3 (*Execution*) based on the commander's approved COA.

Refer to Appendix B for more information on COG analysis, *decisive point*, and the *direct versus indirect approach*, an element of operational design related to the operational approach.

Refer to Section B in Chapter III of JP 5-0, *Joint Operation Planning*, for details on all elements of operational design.

4. **Detailed Planning**

a. Given a perspective that early design efforts (*understand the environment*, *understand the problem*, and *develop the operational approach*) represent *conceptual planning* and are part of mission analysis (paragraph 2g in this chapter), then the remaining JOPP steps constitute *detailed planning*, which occurs during both deliberate and crisis action planning circumstances. **This is not an attempt to establish *conceptual planning* and *detailed planning* as formal terms. It is simply an acknowledgment of how many in the community view their characteristics and relationship.** The ultimate products of *deliberate planning* are campaign and contingency *operation plans* for a broad range of activities based on requirements identified in the *Guidance for Employment of the Force*, *Joint Strategic Capabilities Plan*, or other planning directives. *Crisis action planning* occurs in response to an imminent crisis and typically produces an

operation order in anticipation of near-term execution. JOPP steps apply to both deliberate and crisis action planning.

   b.   As **Figure VII-4** shows, operational design continues during detailed planning. The operational approach, incorporated in the JFC's planning guidance, drives follow-on planning steps. The approach is also a product the commander and staff can use to explain the operational problem and the broad solution to superiors, subordinates, other interorganizational partners. The staff continues to refine and focus the operational approach during subsequent JOPP steps until they produce the final plan or order. They consider additional elements of operational design, such as *operational reach* and *decisive point*, as these elements become more relevant. Detailed planning can cause COA and CONOPS adjustments that remain consistent with the operational approach, and changes will occur during execution as well. But changes that constitute a fundamental shift in the approach will usually require the staff to begin a *reframing* effort. See Chapter IX, Operational *Design and Planning during Execution*, for more information on reframing and redesign.
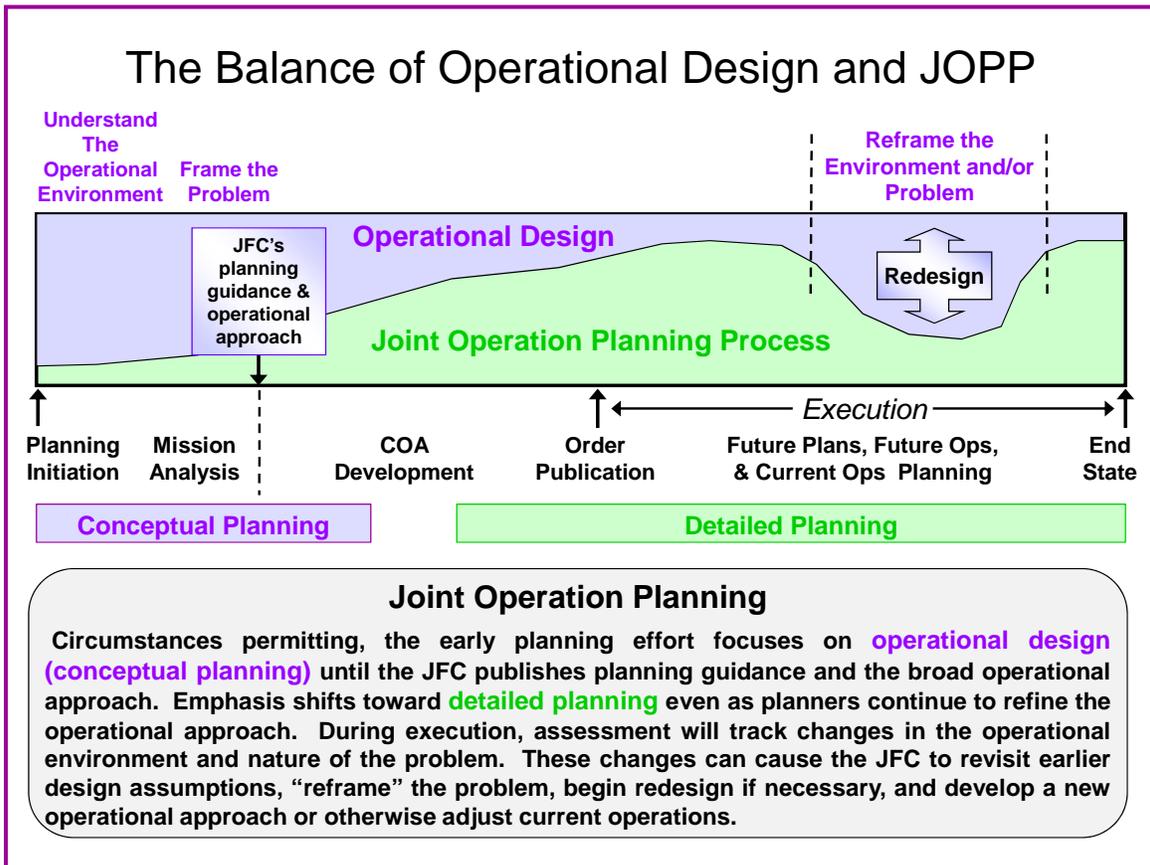

Figure VII-4. The Balance of Operational Design and JOPP

5. Assessment

a. General

(1) *Assessment* is a process that measures progress of the joint force toward mission accomplishment. The focus is on determining progress toward the desired system state of the operational environment and delivering relevant reliable feedback into the planning process to adjust operations during execution. Commanders continuously assess the operational environment and the progress of operations, and compare them to their initial vision and intent. Commanders adjust operations based on their assessment to ensure objectives are met and the military end state is achieved.

(2) As the operational approach emerges during mission analysis, the staff devises assessment indicators of progress that should be incorporated in the plan or order and used during execution. Certain assessment indicators act as triggers during the operation to help the commander determine the necessity to revisit the original operational approach, *reframe the problem*, and perhaps revise the original operational approach. **In particular, the staff designs *reframing indicators* to identify conditions in the operational environment that have changed or that we don't understand and that could cause a shift in the problem such that the current approach may no longer be valid**. Assessment indicators are candidates for the list of priority intelligence requirements and the JFC's CCIR.

(3) **Assessment is continuous and directly tied to the commander's decisions** throughout planning, preparation, and execution of operations. Staffs help the commander by monitoring the numerous aspects that can influence the outcome of operations and provide the commander timely information needed for decisions. **The CCIR process is linked to the assessment process** by the commander's need for timely information and recommendations to make decisions. The assessment process helps staffs by identifying key aspects of the operation that the commander is interested in closely monitoring and where the commander wants to make decisions. Examples of JFC's critical decisions include when to transition to another phase of a campaign, what the priority of effort should be, or how to adjust command relationships between component commanders.

(4) **JFCs and their staffs determine relevant assessment actions and measures during planning.** They consider assessment measures as early as mission analysis, and include assessment measures and related guidance in commander and staff estimates. They use assessment considerations to help guide operational design because these considerations can affect the sequence and type of actions along LOOs and LOEs. During execution, they continually monitor progress toward accomplishing tasks, creating desired conditions, and achieving objectives. Assessment actions and measures help commanders adjust operations and resources as required, determine when to execute branches and sequels, and make other critical decisions to ensure current and future operations remain aligned with the mission and end state. Normally, the joint force J-3, assisted by the J-2, is responsible for coordinating assessment activities. For subordinate

commanders' staffs, this may be accomplished by equivalent elements within joint functional and/or Service components. The chief of staff facilitates the assessment process and determination of CCIRs by incorporating them into the headquarters' battle rhythm. Various elements of the JFC's staff use assessment results to adjust both current operations and future planning.

(5) Friendly, adversary, and neutral diplomatic, informational, and economic actions that occur in the operational environment can affect military actions and objectives. When relevant to the mission, the commander also must plan for using assessment to evaluate the results of these actions. This typically requires collaboration with other agencies and multinational partners — preferably within a common, accepted process — in the interest of unified action. For example, failure to coordinate over-flight and access agreements with foreign governments in advance or to adhere to international law regarding sovereignty of foreign airspace could result in mission delay, failure to meet US objectives, and/or an international incident. Many of these organizations may be outside the JFC's authority. Accordingly, the JFC should consider these issues during operational design and grant some joint force organizations authority for direct coordination with key outside organizations — such as USG interagency elements from DOS or the Department of Homeland Security, national intelligence agencies, intelligence sources in other nations, and other combatant commands — to the extent necessary to ensure timely and accurate assessments.

(6) Likewise, our interorganizational partners provide another source of both formal and informal information and perspective on positive and negative results of friendly force actions, and they may have capabilities that can contribute to the joint force's assessment ways and means. Because they may be present in areas unoccupied by US military forces, for example, our partners can help the JFC assess the receptiveness by the local population of the JFC's communication strategy themes and messages.

b. **Levels of War and Assessment**

(1) Assessment occurs at all levels and across the entire range of military operations. Even in operations that do not include combat, assessment of progress is just as important and can be more complex than traditional combat assessment. **As a general rule, the level at which a specific operation, task, or action is directed should be the level at which such activity is assessed.** To do this, JFCs and their staffs consider assessment ways, means, and measures during planning, preparation, and execution. This properly focuses assessment and collection at each level, reduces redundancy, and enhances the efficiency of the overall assessment process. See **Figure VII-5**.

(2) Assessment at the operational and strategic levels typically is broader than at the tactical level (e.g., combat assessment) and uses MOEs that support strategic and operational mission accomplishment. Strategic- and operational-level assessment efforts concentrate on broader tasks, effects, objectives, and progress toward the end state. Continuous assessment helps the JFC and joint force component commanders determine if the joint force is "doing the right things" to achieve objectives, not just "doing things

right." The JFC also can use MOEs to determine progress toward success in those operations for which tactical-level combat assessment ways, means, and measures do not apply.

(3) Tactical-level assessment typically uses MOPs to evaluate **task accomplishment**. The results of tactical tasks are often physical in nature, but also can reflect the impact on specific functions and systems. Tactical-level assessment may include assessing progress by phase lines; neutralization of enemy forces; control of key terrain or resources; and security, relief, or reconstruction tasks. Assessment of results at the tactical level helps commanders determine operational and strategic progress, so JFCs must have a comprehensive, integrated assessment plan that links assessment activities and measures at all levels.

Assessment Levels and Measures

Level	Guidance
National Strategic	◆ **End State and Objectives**
Theater Strategic	◆ **End State & Mission** ◆ **Objectives** ◆ *Conditions* ◆**Tasks**
Operational	◆ **Mission** ◆ **Objectives** ◆ *Conditions* ◆**Tasks**
Tactical	◆ **Mission** ◆ **Objectives** ◆ **Tasks**

Reframing indicators **identify changes in the operational environment or problem that can cause the commander's operational approach to become invalid.**

Progress to create conditions and accomplish objectives is assessed using *measures of effectiveness* -- MOEs (are we doing the right things?)

Progress to accomplish tasks is assessed using *measures of performance* -- MOPs (are we doing things right?)

Combat tasks (particularly fires) use *Combat Assessment*

Battle Damage Assessment — **Munitions Effectiveness Assessment**

Reattack or Future Targeting

Figure VII-5. Assessment Levels and Measures

(4) **Combat assessment** is an example of a tactical-level assessment and is a term that can encompass many tactical-level assessment actions. Combat assessment typically focuses on determining the results of weapons engagement (with both lethal and nonlethal capabilities), and thus is an important component of joint fires and the joint targeting process (see JP 3-60, *Joint Targeting*). **Combat assessment is composed of three related elements: battle damage assessment, munitions effectiveness assessment, and future targeting or reattack recommendations.** However, joint force functional and Service components can also apply combat assessment methodology to

other tactical tasks not associated with joint fires (e.g., disaster relief delivery assessment, relief effectiveness assessment, and future relief recommendations).

    c.   **Assessment Process and Measures**

    (1) **The assessment process uses MOPs to evaluate task performance at all levels of war and MOEs to determine progress of operations toward achieving objectives.** MOEs help answer questions like: "are we doing the right things, are our actions producing the desired effects, or are alternative actions required?" MOPs are closely associated with task accomplishment. MOPs help answer questions like: "was the action taken, were the tasks completed to standard, or how much effort was involved?" Well-devised measures can help the commanders and staffs understand the causal relationship between specific tasks and desired effects.

> **KEY TERMS**
>
> **measure of performance** — A criterion used to assess friendly actions that is tied to measuring task accomplishment.
>
> **measure of effectiveness** — A criterion used to assess changes in system behavior, capability, or operational environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect.
>
> **reframing indicator** — An assessment indicator that helps identify changes in the operational environment that could cause a shift in the problem such that the current approach may no longer be valid.

    (a) **MOEs assess changes in system behavior, capability, or operational environment.** They measure the attainment of an end state, achievement of an objective, or creation of an effect; they do not measure task performance. These measures typically are more subjective than MOPs, and can be crafted as either qualitative or quantitative. MOEs can be based on quantitative measures to reflect a trend and show progress toward a measurable threshold. The *Measuring Progress in Conflict Environments Framework* provides good examples of MOEs that have been vetted by the interagency, cover all five sectors of stability operations, and address both drivers of conflict and institutional performance in dealing with them.[8] Some examples include:

    1. Dispute resolution mechanisms exist and are being used to clarify or resolve remaining vital issues among parties to the conflict

    2. Percent of military-aged population that expresses an inclination to support or join a violent faction. (by identity group)

    3. Degree to which members of formerly warring factions and competing identity groups can travel freely in areas controlled by their rivals.

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[8] Office of the Secretary of Defense, *Measuring Progress in Conflict Environments (MPICE) – A Metrics Framework for Assessing Conflict Transformation and Stabilization*, Version 1.0, August 2008.

<u>4.</u>   Detainees/prisoners are subjected to torture, cruel, or inhuman treatment, beatings or psychological pressures (by identity group)

<u>5.</u>   Safe and sustainable return of displaced persons and refugees to former neighborhoods

<u>6.</u>   Estimated percentage of gross domestic product accounted for by illicit economic transactions

<u>7.</u>   Level of public satisfaction with electrical power delivery (by identity group and region).

<u>8.</u>   Perception that ethnic identity polarizes society (by identity group).

<u>9.</u>   Perception of heads of households that, under normal conditions, they are able to meet their food needs either by growing foodstuffs/raising livestock or purchasing food on the market

(b) **MOPs measure task performance.** They are generally quantitative, but also can apply qualitative attributes to task accomplishment. MOPs are used in most aspects of combat assessment, since it typically seeks specific, quantitative data or a direct observation of an event to determine accomplishment of tactical tasks. But MOPs have relevance for noncombat operations as well (e.g., tons of relief supplies delivered or noncombatants evacuated). MOPs also can be used to measure operational and strategic tasks, but the type of measurement may not be as precise or as easy to observe.

(2) The assessment process and related measures and reframing indicators should be **relevant, measurable, responsive,** and **resourced** so there is no false impression of accomplishment. Quantitative measures can be helpful in this regard.

(a) **Relevant.** MOPs and MOEs should be relevant to the task, effect, operation, the operational environment, the end state, and the commander's decisions. This criterion helps avoid collecting and analyzing information that is of no value to a specific operation. It also helps ensure efficiency by eliminating redundant efforts.

(b) **Measurable.** Assessment measures should have qualitative or quantitative standards they can be measured against. To effectively measure change, a baseline measurement should be established prior to execution to facilitate accurate assessment throughout the operation. Both MOPs and MOEs can be quantitative or qualitative in nature, but meaningful quantitative measures are preferred because they are less susceptible to subjective interpretation.

(c) **Responsive.** Assessment processes should detect situation changes quickly enough to enable effective response by the staff and timely decisions by the

commander. The JFC and staff should consider the time required for an action or actions to produce desired results within the operational environment and develop indicators that can respond accordingly. Many actions directed by the JFC require time to implement and may take even longer to produce a measurable result.

(d) **Resourced.** To be effective, assessment must be adequately resourced. Staffs should ensure resource requirements for data collection efforts and analysis are built into plans and monitored. Effective assessment can help avoid duplication of tasks and unnecessary actions, which in turn can help preserve combat power.

(3) Commanders and staffs derive relevant assessment measures and reframing indicators during the planning process and reevaluate them continuously throughout preparation and execution. They consider assessment measures during mission analysis, refine these measures in the JFC's planning guidance and in commander's and staff's estimates, wargame the measures during COA development, and include MOEs and MOPs in the approved plan or order. An integrated data collection management plan is critical to the success of the assessment process, and should encompass all available tactical, theater, and national intelligence sources.

(4) Just as tactical tasks relate to operational- and strategic-level tasks, effects, and objectives, there is a relationship between assessment measures. By monitoring available information and using MOEs and MOPs as assessment tools during planning, preparation, and execution, commanders and staffs determine progress toward creating desired effects, achieving objectives, and attaining the military end state, and modify the plan as required. Well-devised MOPs and MOEs, supported by effective information management, help the commanders and staffs understand the linkage between specific tasks, the desired effects, and the JFC's objectives and end state.

d. **Reframing Indicators**

(1) Reframing indicators are not the same as MOEs or MOPs, which are oriented on measuring progress toward creating effects or conditions, achieving objectives, and reaching the endstate. A reframing indicator should be structured to identify a condition in the operational environment that has changed, or that we didn't understand, that could cause a shift in the problem such that the current operational approach may no longer be valid. Although many reframing indicators will not meet the requirement for CCIR, some reframing indicators could be included in CCIR if they represent information that would cause the commander to consider near-term reframing and potential redesign. An example of such information could be the impending alliance of a regional nation with the enemy that would shift the balance of power in spite of an earlier design assumption that this alliance would not occur.

(2) Reframing indicators should support the commander's ability to understand, learn, adapt, and reframe as necessary. These indicators typically orient on the operational environment's key nodes, relationships, capabilities, enablers, and actions of

stakeholders, all of which might affect the fundamental components of the operational approach. Examples of such information include the following:

      (a) Changes in the original problem statement.

      (b) Significant changes in the enemy composition.

      (c) Significant changes in the expected enemy approach.

      (d) Significant changes in friendly capability.

      (e) Higher HQ policy changes or directives that change the desired endstate.

      (f) Unexpected lack of friendly progress toward objectives.

      (g) Shifts in international support and/or domestic will.

      (h) Key assumptions prove to be invalid.

(3) Many CCIRs, MOEs, MOPs, and reframing indicators can seem to overlap given the potential purposes of the information. Some reframing indicators, MOEs, and MOPs will become CCIRs because of their importance to the mission and necessity for a commander's decision. In any case, reframing indicators will compete directly with CCIR and MOE/MOP for limited assessment resources. With CCIR tied directly to the commander's decisions, and MOE/MOP providing typically responsive feedback on progress, there will be pressure to move assets earmarked for reframing indicators to a seemingly more productive CCIR or MOE/MOP. This tension may develop because most reframing indicators may not change very quickly and the changes may be more subtle. An increase in enemy activity and intensity may increase the asset support requirements for CCIR and MOE/MOP. However, this same enemy increased activity may be an indication of their effort to change the operational environment or shift the problem. Shifting resources committed to reframing indicators may degrade or eliminate our ability to sense the shift in the environment or problem at a crucial time.

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CHAPTER VIII
ORGANIZING FOR OPERATIONAL DESIGN AND PLANNING

> *"Design does not occur in isolation; much of the information available to the commander comes from staff actions, primarily in the form of analysis. Accordingly, staff actions should be viewed as concurrent and complementary—versus sequential—activities. For example, understanding the nature of the problem, to include the purpose of the operation, provides the context to drive task analysis. Conversely, the learning gained through task analysis deepens the understanding of the problem and contributes to design."*
>
> **Marine Corps Warfighting Publication (MCWP) 5-1**
> ***Marine Corps Planning Process***
> **24 August 2010**

1. Introduction

a. A key issue related to organizing for operational design is whether current doctrinal staff organization and processes are adequate to design requirements outlined earlier in the handbook. JP 5-0 does not mention "design" teams or other organizational changes resulting from the community's increased emphasis on design. However, the revision of JP 3-33, *Joint Task Force Headquarters* (in progress), should address adjustments to a JTF's planning organization if any are necessary in order to accommodate operational design requirements. The primary process adjustment described in JP 5-0 is the emphasis on operational design early in the planning process and the requirement for an operational approach as a key product of design and a component of the commander's planning guidance. MCWP 5-1 does not mention specialized design teams and emphasizes that design and planning are inextricably linked; the implication is that the Marine Corps does not endorse separate design teams. The Army's FM 5-0 mentions design teams in conjunction with the following explanation:

> *"In leading design, commanders typically draw from a select group within the planning staff, red team members, and subject matter experts internal and external to the headquarters. The commander selects these individuals based on their expertise relative to the problem. The commander expects these individuals to gain insights and inputs from areas beyond their particular expertise—either in person or through reachback—to frame the problem more fully. Design serves to establish the context for guidance and orders. By using members of the planning staff to participate in the design effort, commanders ensure continuity between design and detailed planning as well as throughout the operations process. These are purpose-built, problem-centric teams, and the commander may choose to dissolve them once they complete the design effort."*[1]

b. A number of factors complicate coherent planning and make a deliberate approach to early operational design problematic. A JTF is typically a temporary

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[1] FM 5-0, p. 3-6.

organization formed in response to crisis action circumstances. It is disbanded after it fulfills its purpose. A JTF HQ faces significant early planning challenges because planning for the operation is typically occurring as the JTF is being formed. Organizational variations will exist among different JTF HQs based on a variety of factors such as the mission and the nature of the Service component designated as the JTF HQ. The Service/functional component HQs will integrate selected staff members and liaison with the JTF HQ, but the training, education, and experience of these staff members can vary greatly.

c. Chapter III covered the commander's key role in operational design. Using the JTF HQ as a baseline, this chapter will highlight two joint staff organizations also essential to the design effort. While many members of the joint force staff can contribute to operational design, **the design effort focuses on the roles of the Plans Directorate (J-5) and the Intelligence Directorate (J-2)**.

2. The Joint Force J-5

a. Combatant commands, sub-unified commands, and JTFs generally organize in similar ways to conduct design and planning, and operational design and JOPP are common to all. Each command has a staff directorate that is functionally responsible for planning; typically this is the J-5, Plans Directorate (**Figure VIII-1**). **The J-5 is the joint force's focal point for planning and operational design and is typically responsible to the JFC for producing the operational approach and planning guidance.** As JP 3-33 describes, the JTF J-5 develops, updates, reviews, and coordinates joint OPLANs required for successful accomplishment of JTF mission(s). During execution, the J-5 will prepare OPLANs or OPORDs as directed to support *future operations* and *future plans* planning requirements. The overall JTF organization and mission dictates the actual J-5 composition.
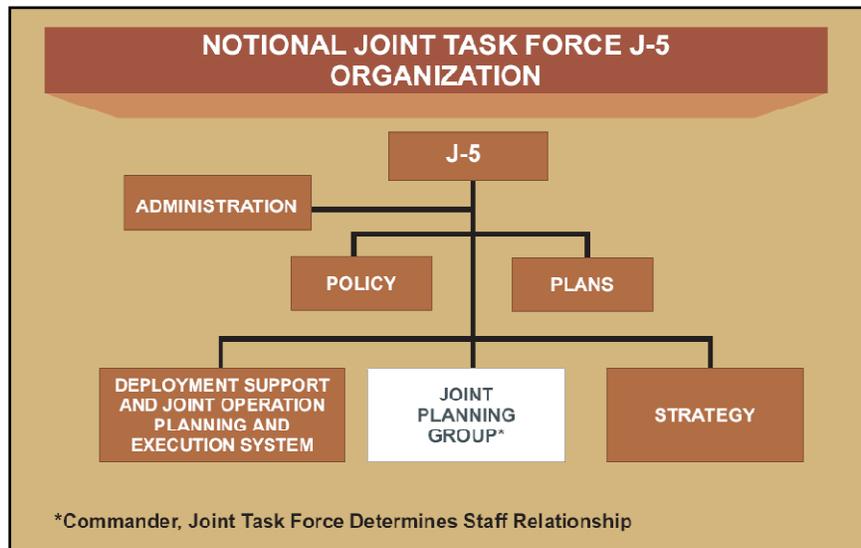

Figure VIII-1. Notional Joint Task Force J-5 Organization

b.   Typically, the J-5 establishes a *joint planning group* (JPG) to integrate planning efforts. The JPG should include representation from all JTF principal and special staff sections, Service/functional components, and interorganizational partners as required. **Figure VIII-2** depicts a notional JPG composition, which varies based on the planning activities being conducted. Normally, all supporting components will have permanent representation in the JPG in order to provide continuity of focus and consistency of procedure.
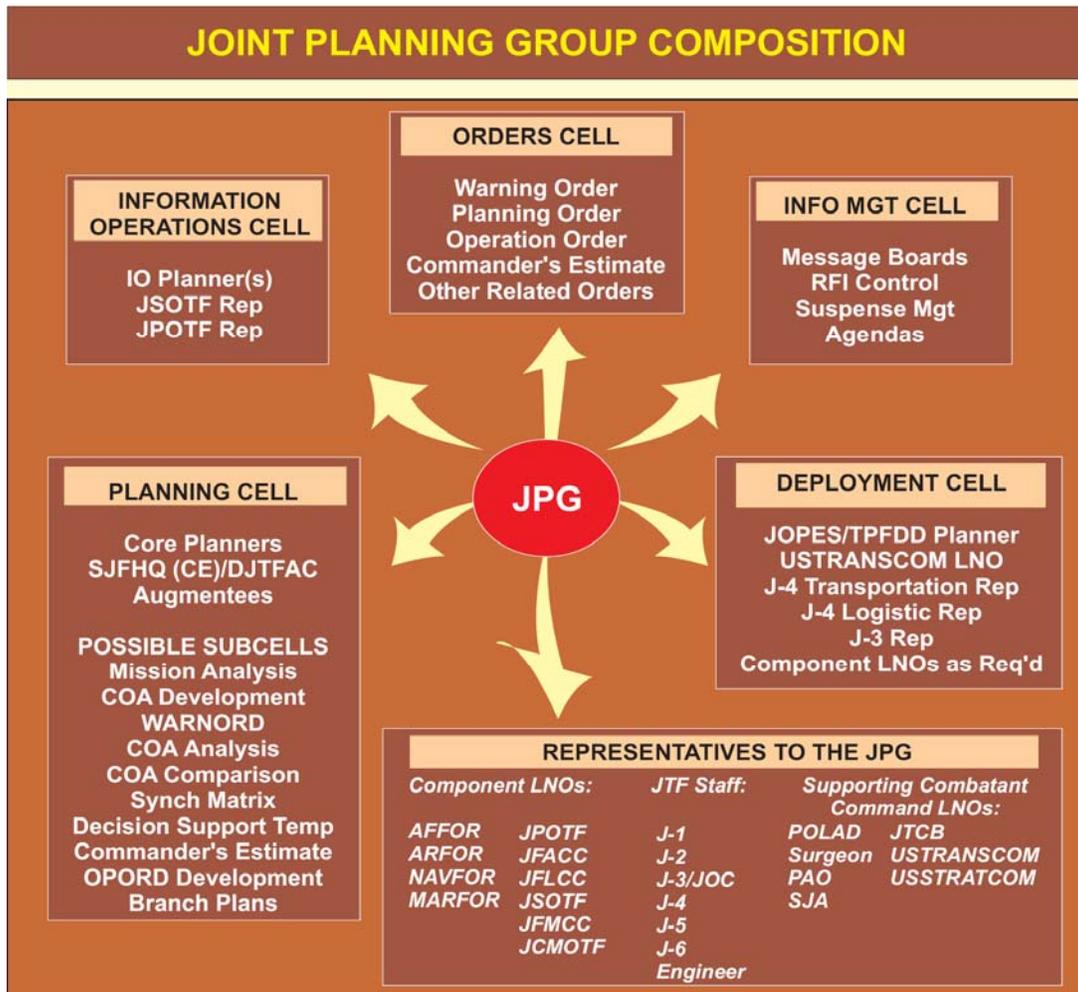

Figure VIII-2. Joint Planning Group Composition

c.   The primary purposes for forming a JPG are to conduct crisis action planning at the beginning of an operation, assist in OPLAN and OPORD development, and perform *future plans* planning.   The JPG often is the focal point for OPORD development. Early designation of a JTF will facilitate forming the JPG and beginning design and detailed planning. It may be possible to form a JPG without the JTF being fully organized and staffed.

d.   A core JPG can be expanded with "on-call" subject matter experts for select planning requirements. These representatives typically will be needed when the JPG does not have the required subject matter expertise in a particular subject **as can occur**

when trying to frame the problem during early operational design. Subject matter experts might come from Service component commands, interorganizational partners, and elsewhere on the JTF staff. As with other aspects of joint operations, the J-5 should include interorganizational partners in the JPG's composition when appropriate. Representatives from other US agencies and multinational partners can bring both specific expertise and additional perspective to the group to inform early operational design and planning in general.

e. **The JPG chief forms** *planning teams* (**Figure VIII-3**) **to address specific planning requirements and organizes each planning team with the appropriate functional expertise and administrative support.**
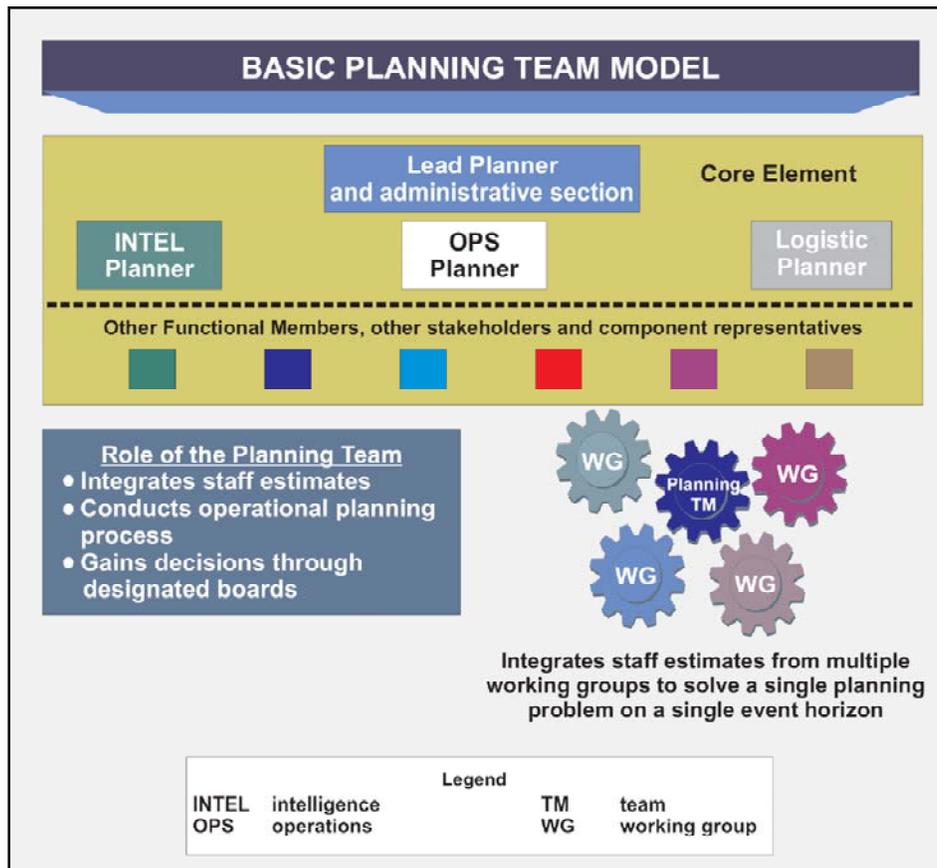

Figure VIII-3. Basic Planning Team Model

(1) A **planning team** is a functional element formed within the HQ to solve problems related to a specific task or requirement. A planning team normally consists of a lead planner, functional planners, component or major subordinate command representatives, and other stakeholders as required. Planning teams are formed for specific planning tasks, and are often disbanded when the task is complete. However, a team also can transition to another task. For example, one or more planning teams may shift to branch planning to support the initial phase of the operations while another team begins sequel planning for the next phase after completing the initial OPORD or OPLAN. Other planning teams may plan for a later phase such as termination of the joint operation

and transition of the JTF to another military force, UN, regional organization, or civilian organization.

(2) Since multiple planning teams are usually working on planning tasks simultaneously, the JPG chief supervises their efforts to ensure their products meet the needs of the command group and other customers. Likewise, the JPG chief also interfaces with the command group to ensure it provides required guidance, intent, and decisions to support the planning effort.

f. **Working Group.** A *working group* **(WG)** (see **Figure VIII-4**) is an enduring or ad hoc organization within a JFC's HQ, and is formed around a specific function whose purpose is to provide analysis to users. The WG consists of a core functional group and other staff and component representatives. Working groups and planning teams are complementary organizations particularly relevant to the planning effort. WGs enhance planning by providing functional staff estimates to multiple planning teams. In contrast, planning teams integrate the functional concepts of multiple functional WGs into plans and orders. Any of the principal functional staff directorates can form working groups.
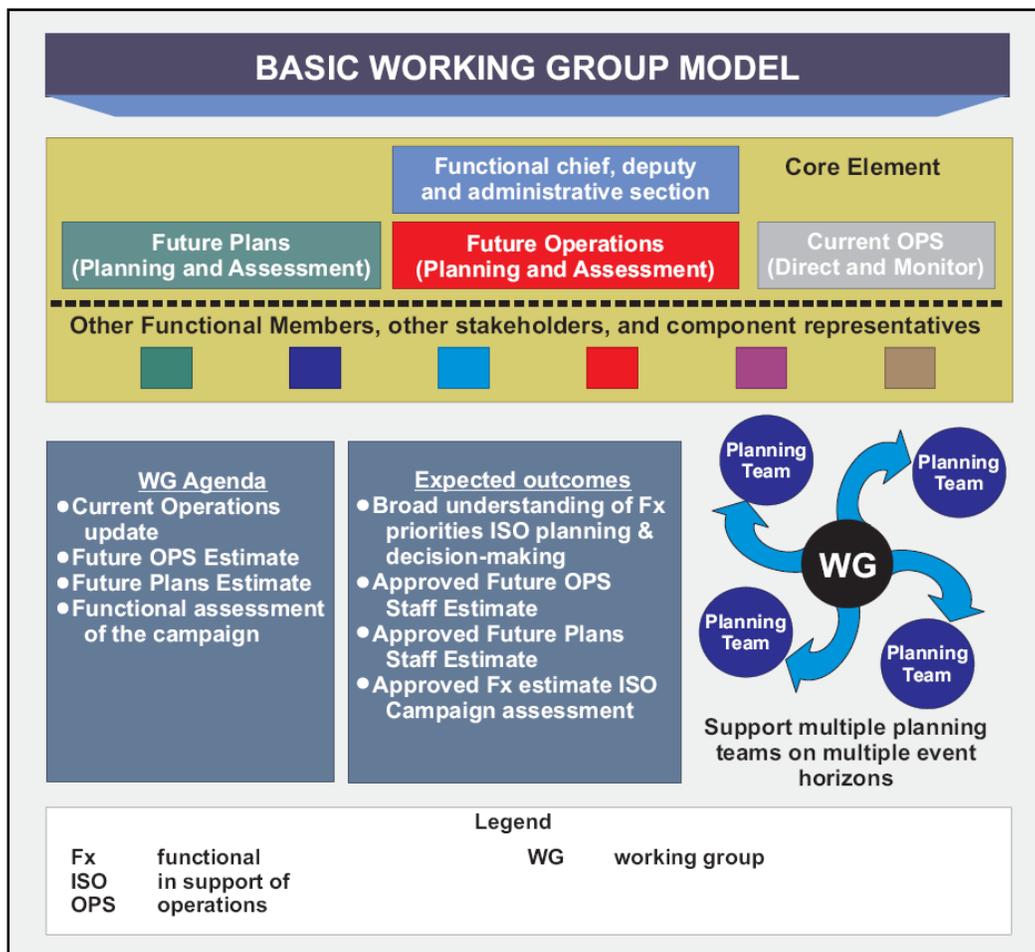

Figure VIII-4. Basic Working Group Model

Refer to JP 3-33 *Joint Task Force Headquarters* (16 Feb 07), for a detailed list of the J-5's primary responsibilities.

3. The Joint Force J-2

a. The joint force HQ typically has an Intelligence Directorate, J-2 (**Figure VIII-5**). The intelligence directorate's primary function is to satisfy the JFC's and staff's intelligence requirements by planning, conducting, collecting, analyzing, and disseminating reliable and timely intelligence pertinent to intentions, indications and warning, IO, targeting, assessment, and a description of the current operational environment characteristics. Within the scope of the essential elements of information, the J-2 participates in joint staff planning and in coordinating, directing, integrating, and controlling intelligence efforts. **The J2 is the joint force's focal point for developing an understanding of the operational environment.**
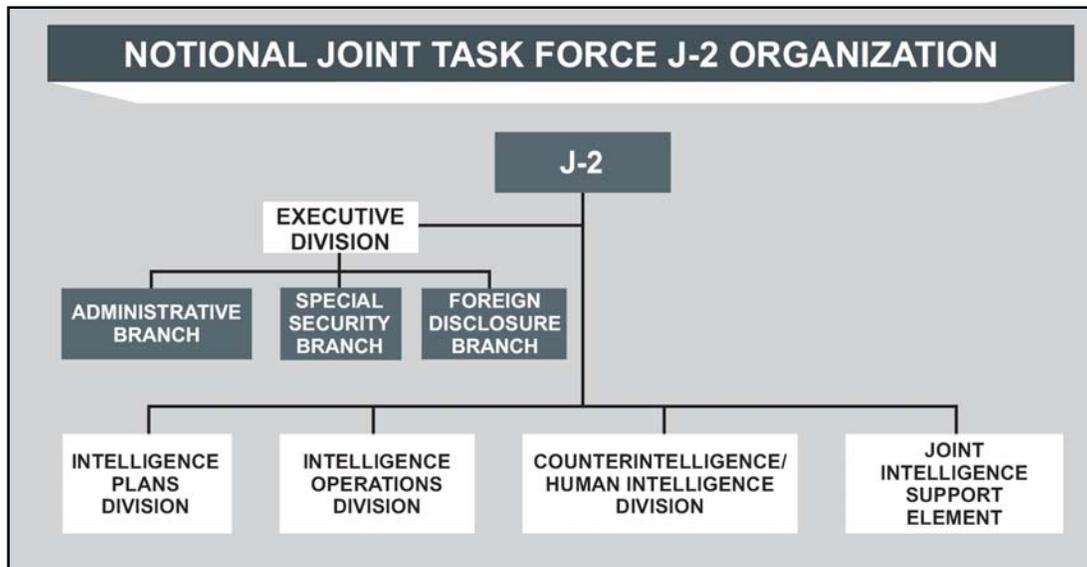

Figure VIII-5. Notional Joint Task Force J-2 Organization

b. The combatant command joint intelligence operations center (JIOC) is the primary intelligence organization providing intelligence to joint warfighting at all levels. The JTF's joint intelligence support element (JISE) is the JTF J-2's focal point for multi-disciplined, all-source analysis, fusion, collection management, and dissemination. The JISE utilizes reach-back capabilities to the combatant command JIOC and Defense Intelligence Operations Coordination Center.

c. The JISE is the hub of intelligence activity in the JOA and is responsible for providing CJTF, JTF staff, and JTF components and subordinate task forces with the adversary air, space, ground, and maritime situation. The JISE implements processes to integrate all intelligence functions and disciplines that enables more agile and responsive intelligence operations across the JTF in support of the CJTF's intelligence requirements. The JISE's approach stresses persistent awareness and local precision and is characterized by net-centric and fused operations, capabilities, planning, and

organizations that together yield timely, assured, survivable, and actionable intelligence.

    d.   JIPOE is the joint process through which the joint force intelligence directorate manages the analysis and development of products that help the commander and staff understand the complex and interconnected operational environment.[2] **Of particular relevance to operational design is the J-2's responsibility to lead the staff's effort and manage and develop products that provide a systems understanding of the operational environment as part of JIPOE.[3]** This will require cross-functional participation by other joint force staff elements and collaboration with other intelligence agencies, USG agencies, and nongovernment centers that possess relevant expertise. **Thus the J2 is a core player in the early design effort and must be responsive to the commander's operational design priorities.** The commander can help the J2 by specifying critical information requirements early in the process to focus JIPOE toward specific products that support the design effort. These products help the commander understand how the joint force's actions might affect the relevant political, social, economic, informational, and other factors that comprise the current environment and affect the end state.

    e.   **The Red Team**[4]

        (1) The J-2 staff also provides a *red team* to role-play and model the adversary's intentions and potential reactions to the joint force's actions. A red team can aid a commander and the staff to think critically and creatively; to see things from varying perspectives; to avoid false mind-sets, biases, or group thinking; or use inaccurate analogies to frame the problem.   **In essence, a red team provides the JFC and staff with an independent capability to challenge the organization's thinking**.

        (2) The red team crosses staff functions and time horizons in JOPP. This characteristic makes this red team unlike a red cell, which is composed of members of the staff of the intelligence directorate of a joint staff (J-2) and performs threat emulation; likewise, this team is not the same as a joint intelligence operations center red team that is an additive element on the J-2 staff to improve the intelligence analysis, products, and processes. Red teaming is not restricted to the J-2. The JFC can supplement the J-2's team with other functional subject matter experts or create separate functional red teams focused on specific LOOs, LOEs, or specific problem areas.

        (3) The JFC should consider forming the red team early in design. A robust, well-trained, imaginative, and skilled red team can aggressively pursue the adversary's point of view during early operational design and later COA wargaming. The red team develops critical decision points, projects adversary reactions to friendly actions, and estimates effects and implications on the adversary forces and objectives. This team helps

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[2] JP 2-10.3, *Joint Intelligence Preparation of the Operational Environment*, 16 June 2009, describes the JIPOE process in detail.
[3] JP 3-0, p. IV-4.
[4] Red team text is taken primarily from JP 5-0, July 2011.

the JFC identify weaknesses and vulnerabilities in the operational approach. Throughout planning and execution, the red team can:

(a) Broaden the understanding of the operational environment;

(b) Assist the commander and staff in framing problems and defining end state conditions;

(c) Challenge assumptions;

(d) Consider the perspectives of the adversary and others as appropriate;

(e) Aid in identifying friendly and enemy vulnerabilities and opportunities;

(f) Assist in identifying areas for assessment as well as the assessment metrics;

(g) Anticipate the cultural perceptions of partners, adversaries, and others; and

(h) Conduct independent critical reviews and analyses of plans to identify potential weaknesses and vulnerabilities.

f. The intelligence process, including JIPOE, has become increasingly more sophisticated and capable, although human intelligence remains a great challenge. However, some writers question whether our current intelligence process and products alone provide the kind of analysis sufficient to understand the true nature of the problem and environment.

> *"Many see this as a G2 problem... the comment "isn't this already captured in the Annex B?... Don't we already have this information? Somebody in the command knows this!" were frequent. The "monograph/thesis/dissertation example" proved helpful here... I pointed out that most people assembled known knowledge in the "library phase" (analysis). Our next step is to "write the thesis" in the synthesis phase. We're taking known knowns and assembling them to develop new understanding. Surprisingly, most of the group "got that."[5]*

Refer to JP 3-33 *Joint Task Force Headquarters* **(16 Feb 07), for a detailed list of the J-2's primary responsibilities.**

Refer to JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment***, for details on JIPOE.**

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[5] SAMS *Art of Design* Student Text Version 2.0, p. 153. This observation was provided by a former SAMS student who had been participating in design during operations.

4.   The Design Team

a.   The purpose of the preceding text in this chapter is to make the point that the commander can marshal significant intellectual and organizational resources to support operational design and planning. The J-5 (with access to skilled planners) and the J-2 (with access to internal and external intelligence resources) or their representatives are key members of any team tasked to design a solution to a complex planning problem. The J-2's JIPOE effort provides the data and analysis that supports understanding the operational environment, although other members' specialized interpretations of environmental forces and relationships are essential as well. **So the key issue regarding the organization's ability to "do design" might not be one of resources; instead it might be an issue of education and training in critical and creative thinking and acceptance of the underpinning philosophy**.

b.   As described earlier, the J-5 can form planning teams to accomplish a variety of planning tasks. However, a task to plan the staging and onward movement of forces from their assembly areas to an area of operations is not the same as the task to develop a coherent explanation of the operational environment, define the environment state desired when operations conclude, and produce the commander's operational approach that achieves that state. For the latter task, **the JFC or J5 might decide to form a specialized planning team, perhaps called the "design" team.** This team could focus specifically on operational design at the very beginning of JOPP to help develop the broad conceptual *operational approach* that will complement the commander's planning guidance and inform detailed planning. Among other options, a small design team could be the core of a larger planning team and participate from early conceptual planning through COA analysis and CONOPS development. The members of this team could be responsible for monitoring various aspects of the approach during execution, and would likely participate in reframing and redesign if necessary.

c.   Available time, personnel resources, complexity of the planning problem, and other factors will affect the decision on whether to form a design team and who will lead it. If this team is formed, it should be tailored to the unique situation at hand as well as available individuals from the staff. The most favorable circumstances for this team would be during peacetime contingency planning, when the time and flexibility allow for critical thinking, discourse with the commander, and postponement of most detailed planning actions until the JFC approves the operational approach. In many crisis action planning situations, time constraints and the key members' other responsibilities may preclude initially forming a dedicated design team unless one had previously existed to support development of a contingency plan that is now being executed.

d.   The J-2, J-3, and J-5 principals or deputies are key participants in early operational design, whether or not a design team is formed. The J-2 leads the effort to frame the operational environment, and the J-5 focuses on developing the ends-ways-means relationships, managing planning resources, and drafting the operational approach as part of the commander's planning guidance. The commander adds other functional subject matter experts to this initial effort as the situation dictates. While the commander

might lead or participate in the design team, experience shows that situations such as crisis-action planning and planning during execution pull the commander in many directions. In a video teleconference in mid-2010, planners from one combatant command commented to handbook authors that they "never saw their commander," while planners from another combatant command stated that they rarely met with the J-5.

e.   Many sources on design have written about the importance of critical thinking to complex problem solving. The Army's School of Advanced Military Studies *Art of Design* Student Text reinforces this perspective throughout. **Critical and creative thinking in group mode (as in a design team) can benefit by a team member who is trained to facilitate a group through the interaction that enables such thinking**.

f.   Operational design begins early, regardless of how the JFC chooses to organize the effort. All geographic combatant commands have peacetime contingency-planning requirements, so opportunities exist for the CCDR and/or prospective JTF commanders to form a design team and exercise a creative design methodology while developing or updating actual contingency plans. **Peacetime practice facilitates crisis-action execution**. Development of theater campaign plans and subordinate contingency plans is peacetime provides an excellent opportunity to bring SMEs together for design sessions to help them understand approaches to critical thinking that can result in a deeper understanding of the problem and operational environment. Peacetime use of a design methodology will help produce better products in a crisis even if time constraints and other factors prohibit the JFC from forming a separate design team.

CHAPTER IX
OPERATIONAL DESIGN AND PLANNING DURING EXECUTION

> *"The enemy always gets a vote in the outcome, so commanders are well advised to heed the often-quoted warning that 'no battle plan survives contact with the enemy.' This challenge can be greater in counterinsurgency, counterterrorism, and similar operations than it is in larger-scale combat, since the enemy has more flexibility to determine when, where, and whether or not to fight."*
>
> **General James Mattis**
> ***Vision for a Joint Approach to Operational Design***
> **6 October 2009**

1. Introduction

a. Execution begins when the President decides to use a military option to resolve a crisis or conduct less urgent operations to achieve strategic objectives. Only the President or Secretary of Defense can authorize the Chairman of the Joint Chiefs of Staff to issue an execution order (EXORD). The EXORD directs the supported commander to begin military operations and conveys guidance not provided earlier.

b. The CJCS monitors the deployment and employment of forces, acts to resolve shortfalls, and directs action needed to ensure successful completion of military operations. **Execution continues until the mission is accomplished, revised, or the operation is terminated.** The crisis action planning process may be repeated continuously as circumstances and missions change.

2. Execution

a. The CJCS publishes the EXORD that defines the unnamed day on which operations commence or are scheduled to commence (D-day), the specific time an operation or exercise begins (H-hour), and directs execution of the OPORD. The CJCS's EXORD is a record communication that authorizes execution of the COA approved by the President and SecDef and detailed in the supported commander's OPORD. It may include further guidance, instructions, or amplifying orders. In a fast-developing crisis the EXORD may be the first record communication generated by the CJCS. The record communication may be preceded by a voice announcement. **The issuance of the EXORD is time-sensitive.** The format may differ depending on the amount of previous record correspondence and applicability of prior guidance. (Joint Operation Planning and Execution System (JOPES) Volume I contains the format for the EXORD. Information already communicated in previous orders should not be repeated unless previous orders were not made available to all concerned. The EXORD need only contain the authority to execute the operation and any additional essential guidance, such as D-day and H-hour.

b.   Throughout execution, the Joint Staff monitors movements, assesses achievement of tasks, and resolves shortfalls as necessary. The CJCS should monitor the situation for potential changes in the applicability of current termination criteria and communicate them to all concerned parties.

c.   The supported commander issues an EXORD to subordinate and supporting commanders upon receipt of the CJCS's EXORD. It may give the detailed planning guidance resulting from updated or amplifying orders, instructions, or guidance that the CJCS's EXORD does not cover. The supported commander also monitors, assesses, and reports achievement of objectives; ensures that data are updated in the JOPES database; and re-plans, re-deploys, or terminates operations as necessary, in compliance with termination criteria directed by the President or SecDef.

d.   Subordinate and supporting commanders execute their OPORDs, revalidate the sourcing and scheduling of units, report movement of organic lift, and report deployment movements through the JOPES database. These commanders conduct the operation as directed and fulfill their responsibilities to sustain their Service forces in the OA.

e.   USTRANSCOM components validate transportation movement planned for the first increment, adjust deployment flow, reschedule as required, and continue to develop transportation schedules for subsequent increments. Both status of movement and future movement schedules are entered in the JOPES database.

f.   During execution, the JFC assesses the deployment and employment of forces, measures progress toward mission accomplishment, adapts and adjusts operations as required to reach the end state. **This continual assessment and adjustment creates an organizational environment of learning and adaptation to the changing environment.** Adaptation can range from minor operational adjustments to a radical change in the operational approach. When fundamental changes have occurred that challenge existing understanding, indicate a shift in the environment or problem, or invalidate the current approach to solving the problem, it is time to review the original assumptions, redesign as necessary, and develop a new operational approach. The environmental or problem changes could be so significant as to require a review of the end state and discussions with higher authority to determine if the end state is still viable.

3.   Planning during Execution

a.   Planning continues as execution begins, with an initial emphasis on producing the OPORD if one does not yet exist. As the operation progresses, planning generally occurs in three distinct but overlapping timeframes: *future plans*, *future operations*, and *current operations* as **Figure IX-1** depicts.

(1) **The joint force J-5's effort focuses on *future plans*.** The timeframe of focus for this effort varies according to the level of command, type of operation, JFC's desires, and other factors. Typically the emphasis of the future plans effort is on planning

the next phase of operations or **sequels** to the current operation. In a campaign, this could be planning the next major operation (the next phase of the campaign).

PLANNING DURING EXECUTION

Command Group prioritizes joint force planning efforts and provides guidance and direction throughout the process

Long-term Planning

J-5
Future Plans

• **Develop Initial OPLAN or OPORD**
• **Sequel (next phase) planning**

"What's Next?"

Near-term Planning

J-3
Future Operations

• **Refine OPLAN or OPORD based on current situation**
• **Plan for branches to current operations**

"What If?"

Current Operations Planning

J-3
Current Operations

• **Issue OPORD and/or FRAGORD**
• **Monitor, assess, direct, and control execution**

"What Is?"

CAP products

OPLAN   operation plan;   OPORD   operation order;
FRAGORD   fragmentary order;   CAP   crisis-action planning

Figure IX-1. Planning during Execution

(2) Planning also occurs for **branches** to current operations (*future operations planning*). The timeframe of focus for *future operations* planning varies according to the factors listed for *future plans*, but the period typically is more near-term than the *future plans* timeframe. *Future* planning could occur in the J-5 or JPG, while *future operations planning* could occur in the joint operations center or J-3.

(3) Finally, *current operations* planning addresses the immediate or very near-term planning issues associated with ongoing operations. This occurs in the joint operations center or J-3.

b.   During execution, accomplishment of the plan's tasks will be monitored and measured for how successfully each objective was completed, along with the input of new data and information as it is obtained to allow selection of branches or sequels, if applicable, or the plan to be modified as necessary. Execution of a plan does not end the planning process. The staff may reenter the planning cycle at any point to receive new guidance, provide an IPR, modify the plan, decide if and when to execute branches or sequels, or terminate the operation. Planning also continues for future operations.

c.   **Staff Cross-Functional Interaction in Support of Decision-making.** During execution, the cross-functional organization of the staff must be responsive not only to planning requirements for current operations, but must also support the JFC's mid- and

long-term planning needs. **Figure IX-2** is a notional depiction of cross-functional support to these planning horizons.
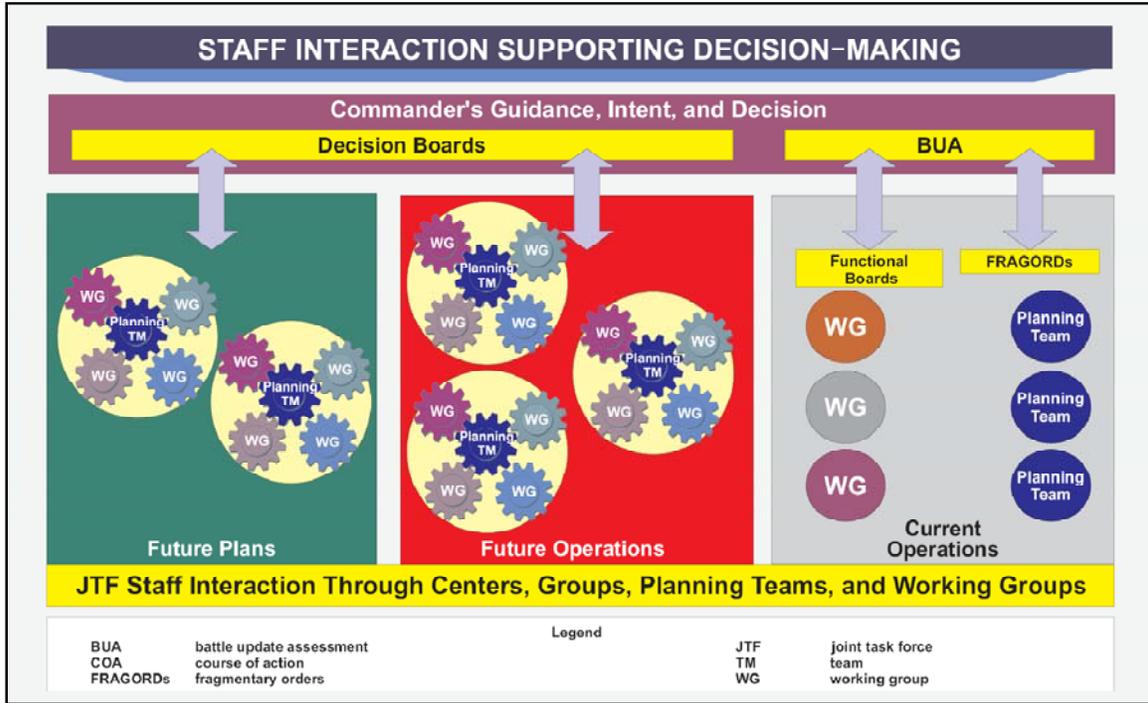

Figure IX-2. Staff Interaction Supporting Decision-Making

(1) Based on the complexity of the planning problem and time available, **future plans** and **future operations** planning teams interact with both internal elements (e.g., WGs, cells) and external elements (other HQ, agencies, and organizations). These teams normally will locate in the JPG or in one of the principal staff directorates depending on the nature of the specific planning task. Various decision boards provide guidance and decisions during this process.

(2) In contrast to the future operations and future plans planning teams, the **current operations** planning teams normally complete their assigned planning tasks without significant interaction with other staff elements (e.g., WGs). Generally, these teams are established in the joint operations center (JOC) under the supervision of the J-3's chief of operations due to the immediate nature of planning requirements. The J-3 or JOC chief keeps the JFC informed of ongoing near-term planning initiatives through appropriate mechanisms such as commander's critical information requirements (CCIR), serious incident reports, and battle update assessments.

4. Operational Design during Execution

a. The degree to which operational design continues during execution depends on a variety of factors related to the complexity and scope of the mission, the problem, and the operational environment. Simple problems often require simple solutions with no requirement for a distinct design effort before or during execution. Even complicated

circumstances, such as large-scale, force-on-force combat operations that require operational design, can have well defined and achievable operational and strategic objectives, a primary focus on the military system, and limited or no long-term post-combat stability operations. Still, planning branches and sequels in these circumstances usually requires selected elements of operational design even if a deliberate design team effort is not required. However, commanders and staff should be cautioned by the following example:

> *"Complicated problems in a stable context may not need a standing design team. Unfortunately, problem situations do not come with signposts warning of oncoming complexity. The solution to a complicated problem may give rise to unforeseeable side effects and the recognition of complexity. For example, the technical problem of how to provide fresh water to a remote community might be solved by building a well. But if the location of the well provides unequal access, some sub-groups may lose power and influence, catalyzing a cascade of complex social processes."[1]*

b.   Ill-defined problems typically represent the greatest challenge to the longevity of the JFC's original operational approach once execution begins. They require the most deliberate monitoring, assessment, and planning for potentially fundamental shifts in the problem and operational environment that could drastically change the original operational approach. Because the current context and situation are always evolving during execution, it is likely that our understanding of the problem will also evolve.

c.   Conditions will change during operations because forces are interacting with the operational environment. The JFC's and staff's ability to learn as the operation progresses depends on their ability to recognize changes as they occur. Recognizing often subtle changes as they develop over time can be essential to mission success, especially those changes that fundamentally affect the operating environment or significantly shift the problem. Recognizing that the problem and environment have changed is essential to knowing when the commander might have to change the operational approach. **Even when indicators are inconclusive, numerous events or circumstances can trigger a requirement to restart deliberate operational design:**

(1) A major event causes "catastrophic change" in the environment.

(2) A scheduled periodic review shows a problem.

(3) An assessment challenges understanding of the existing problem and the relevance of the operational approach.

(4) Failure to make required progress.

(5) Unanticipated success.

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[1] SAMS *Art of Design* Student Text Version 2.0, p. 21.

(6) Key assumptions or hypotheses prove invalid.

d.   As Chapter VIII discusses, specialized reframing indicators are instrumental in recognizing design-related changes in the problem or operational environment. These indicators should support the commander's ability to understand, learn, and adapt, and should cue commanders to rethink their understanding of the operational environment, the problem, or both. When this occurs, the JFC should consult with superior, subordinate, and supporting commanders, because it may be time to begin a dedicated reframing and redesign effort. **Reframing results from a shift in understanding that leads to a new perspective on the problems or their resolution. Reframing involves significantly refining or discarding the hypotheses or models that form the basis of the design concept**.[2] Based on the circumstances and consultation, the JFC may determine one of three ways ahead:

(1) The current joint operation plan is adequate, with either no change or minor change (such as execution of a branch)—the current operational approach remains feasible.

(2) The joint operation plan's mission and objectives are sound, but the operational approach is no longer feasible or acceptable—a new operational approach is required.

(3) The mission and/or objectives are no longer valid, thus a new joint operation plan is required—a new operational approach is required to support the further detailed planning.

> *"Commanders conduct operations subject to continuous assessment of results in relation to expectations, modifying both the understanding of the situation and subsequent operations accordingly. …if aspects of the operational environment change significantly, the commander may decide to begin a reframing effort and revise earlier design conclusions and decisions that led to the current design inadequacies. This might result in small adjustments to current operations or a branch to the plan, or reframing could require a sequel involving a new operational approach, new objectives, and organizational realignments."*
>
> **General James Mattis**
> **Vision for a Joint Approach to Operational Design**
> **6 October 2009**

5. Reframing and Redesign

a.   "**Reframing** is restarting the design in the event that the JFC's understanding of the OE or of the problem have changed to such a degree that a different operational approach is warranted."[3] The commander decides to initiate redesign when reframing

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[2] FM 5-0, p. 3-12.
[3] US Army War College, *Campaign Planning Handbook AY 11*, p. 22.

indicators or obvious changes in the operational environment render the operational approach no longer feasible, acceptable, or suitable. Redesign involves significantly refining or discarding the hypotheses or models that form the basis of the original operational approach.

b. ***Redesign* is essentially the same as operational design that occurred before execution**, but it should be facilitated by what the JFC and staff have learned about the environment learned as operations have progressed to this point in time. Conversely, redesign could be greatly time-compressed if the problem and environment have changed due to unexpected failure or other adverse circumstances rather than from the unexpected success of the original operational approach.

c. During redesign, the JFC and staff must challenge their shared understanding and review expectations of actor behavior against the evidence. Organizations are strongly motivated to reflect and reframe following failure, but they tend to neglect reflection and reframing following successful actions. Redesign may be equally important in the wake of success. By its very nature, success transforms the environment and affects its tendencies, potentials, and tensions. To guard against complacency, the commander and staff should question their current understanding and reframe as the environment changes and they gain new knowledge.[4]

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[4]Ibid.

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CHAPTER X
OPERATIONAL IMPLICATIONS AND CONCLUSION

"U.S. military power today is unsurpassed on the land and sea and in the air, space, and cyberspace. The individual Services have evolved capabilities and competencies to maximize their effectiveness in their respective domains. Even more important, the ability to integrate these diverse capabilities into a joint whole that is greater than the sum of the Service parts is an unassailable American strategic advantage."

Admiral M.G. Mullen
Chairman of the Joint Chiefs of Staff
Capstone Concept for Joint Operations, January 2009

1. Introduction

a. Integrating the individual Services' diverse capabilities in joint operations, especially in unified action with our interorganizational partners, begins with operational design. The best conceivable operational approach will be ineffective without the capabilities to execute it, even with comprehensive understanding of the problem and the operational environment.

b. The joint community often thinks of capabilities in terms of systems, organizations, people, and their integration. Because design is an intellectual activity, however, future initiatives to improve our capability reside in three primary areas: doctrine, education, and training.

2. Doctrine

a. **Sound joint training and education rests on a foundation of sound joint doctrine**. The 1995 and 2001 versions of JP 3-0, *Joint Operations*, discussed operational art and a number of "facets" of operational art such as *center of gravity* and *direct versus indirect approach*. In 2006, JP 5-0, *Joint Operation Planning*, included separate chapters on the joint operation planning process and operational art and design. This version expanded the discussion of elements of operational design (the former facets), but it did not discuss a design methodology per se.

b. The new JP 5-0 moves operational design to the forefront. It covers the commander's role in operational art and design and incorporates a 13-page section focused on design methodology titled, "Developing the Operational Approach." This is followed by an updated section on the elements of operational design.

c. The above notwithstanding, there is potential for improvement. The design methodology section in JP 5-0 provides an overview of the primary operational design components but not the details important for a more thorough understanding. Moreover, there is no discussion of the critical thinking that could be considered the essence of operational design. Unlike operational art that relies on the intangibles of *vision*,

i*ntuition*, and *judgment*, an individual's ability to think critically (or at least more effectively) can be enhanced through education and training. See the paper at Appendix C, "Thinking Critically about Critical Thinking: A Fundamental Guide for Strategic Leaders" for an approach to this challenge.

d. There are two reasonable options for expanding the detail on operational design in joint doctrine. One is to add detail to JP 5-0; the other is to create a separate related joint publication. Two reasons favor the second option. First, the revised JP 5-0 is already about 250 pages long. It also is relatively broad in scope since it covers the role of strategic direction and the details of JOPP in addition to operational art and design. A supporting publication that focused on the details of operational design could better support schoolhouse education and field application. Second, there is precedent for a supporting product. The 25 Jan 02 JP 5-00.1, *Joint Doctrine for Campaign Planning*, was a supporting JP to the 1995 JP 5-0, *Doctrine for Planning Joint Operations*. This supporting publication was consolidated with the 2006 revision of JP 5-0 as part of a questionable initiative to reduce the number of joint doctrine publications.

3. Education and Training

a. A good doctrinal base should provide the foundation and impetus for an appropriate level of education and training. However, this must begin with Service education and training programs at relatively low levels. Service education and training provide a solid foundation in Service planning processes. Education related to JOPP for mid-grade officers only occurs when they attend Joint Professional Military Education (JPME) Level II, typically at the National Defense University's Joint Forces Staff College. Joint training on JOPP and operational design for junior officers typically occurs only when their Service organization operates as part of a joint force in exercises or actual operations, and then only if the officer is involved in the joint planning effort.

b. Service instruction in military planning for officers begins in the Service basic courses. While there are commonalities in planning approaches, particularly between the Army and Marine Corps, differences in perspective exist due to the individual Services' cultures, capabilities, and employment methods. Many Service HQs have requirements to be ready to operate either as a JTF HQ or as the JTF's Service component for a contingency. One possible way to push proficiency in JOPP and operational design to lower levels is to require the members of all Service HQs designated as "JTF-capable" or as the primary Service component HQs of a joint force to meet minimum standards in JOPP proficiency.

c. The ability of commanders and planners to think critically and creatively represents an area of significant potential with respect to thinking through complex operational environments and ill-defined problems. This is an area of emphasis at some Service schools (such as SAMS at Fort Leavenworth) that focus on advanced military studies. However, only a relatively small proportion of officers attend these schools, and there is no guarantee that they will fill key planning positions when a regional crisis occurs. Commander's can compensate somewhat by arranging for key individuals who

will lead the operational design effort to be trained as facilitators in processes and tools that encourage critical and creative thinking.

4. Conclusion

a.   As mentioned in the opening quotation in Chapter I, "**Design does not replace planning, but planning is incomplete without design.**" Operational design's added value to traditional joint operation planning, when appropriately reinforced through education and training, should be a recognition by commanders and staffs at all levels that not all problems are created equal, and that an immediate, obvious solution to a problem may not be the right solution. Among other benefits, an understanding of design should stimulate greater collaboration between higher, lower, and adjacent organizations to ensure a common understanding of the environment, the problem, and the approach to solve the problem.

b.   *Design* ideas are already having a positive effect in the joint community. A number of Service doctrine publications incorporate design ideas, and JP 5-0 has significantly improved joint doctrine's discussion of operational design and its interaction with JOPP. Some organizations use aspects of *design* in current operations. Nonetheless, most problems, particularly those that are ill-defined, are not solved by the military instrument alone, so still ahead is the challenge of collaborating on design processes and initiatives with our interorganizational partners. This handbook, as well as initiatives cited above, should stimulate further refinement of joint doctrine, education, and training and the application of operational design in joint operations.

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APPENDIX A
VISUALIZING THE OPERATIONAL ENVIRONMENT

> *"Any attempt to reform the university without attending to the system of which it is an integral part is like trying to do urban renewal in New York City from the twelfth story up."*
>
> **Ivan Illich (1926 - 2002) Austrian-born US writer**

This appendix contains two sections to help analysts think about how to analyze and depict systems in the operational environment. **Section A** discusses one alternative for how JIPOE analysts can provide a systems "visualization" to support a JFC's counterdrug operations in a hypothetical narcotics scenario. **Section B** contains six charts that list typical PMESII subsystems.

SECTION A. VISUALIZING SYSTEM RELATIONSHIPS

1. Overview

When the US conducts combat operations, the impact of those operations is rarely confined to a single country. In many cases, there are implications that cross regional PMESII systems and subsystems, and could have global impact as well. Likewise in operations such as counterdrug, combating terrorism, and counterinsurgency, the adversary typically will act in ways and within networks that cross nation-state borders. In fact, these networks can have a significant influence on the traditional, established nation-state and regional systems. For example, a terrorist network can commit terrorist acts in three countries, have a safe haven and base of operations in a fourth country, and receive supplies and other aid from a fifth country.

2. Counterdrug Operations Vignette

a. Following is a hypothetical example that demonstrates how analysts can think about nodes, links, and the way a system works in order to identify key nodes and the potential actions that can create the desired end-state conditions in the operational environment. In this vignette, the CCDR has tasked the J-2 to analyze an existing narcotics network and collaborate with the J-5 and interagency representatives to determine how to ensure that a key country's powerful **insurgent organization does not receive funding from the narcotics trade** (the commander's desired effect). The J-2 develops an understanding of how the regional narcotics system functions, and then determines the best way to present this to the J-5 and commander so they can develop COAs and design a concept of operations. During this process, intelligence analysts use tools such as *association matrices* and *measures of node centrality* described in Chapter II. The J-2 presents the results to the commander and staff graphically using a series of *network analysis diagrams* to describe the narcotics network's operations.

b. **Figure A-1:** In this region of the commander's AOR, opium is used as a form of microfinance. Often, **farmers** ❶ will take loans, occasionally of goods-in-kind, based on the promise to grow opium and repay the loan with the produced opium. This may allow a farmer to get through a particularly harsh winter or obtain particularly expensive things (car, house, wife, etc…). Socially, there is a clear prohibition against the production of illicit narcotics and almost all farmers recognize and agree with the prohibition. However, most opium farmers simply cannot ignore the economic realities of opium farming. In many cases, the opium broker also will run a legitimate business that also deals in opium in the local **bazaar** ❷.
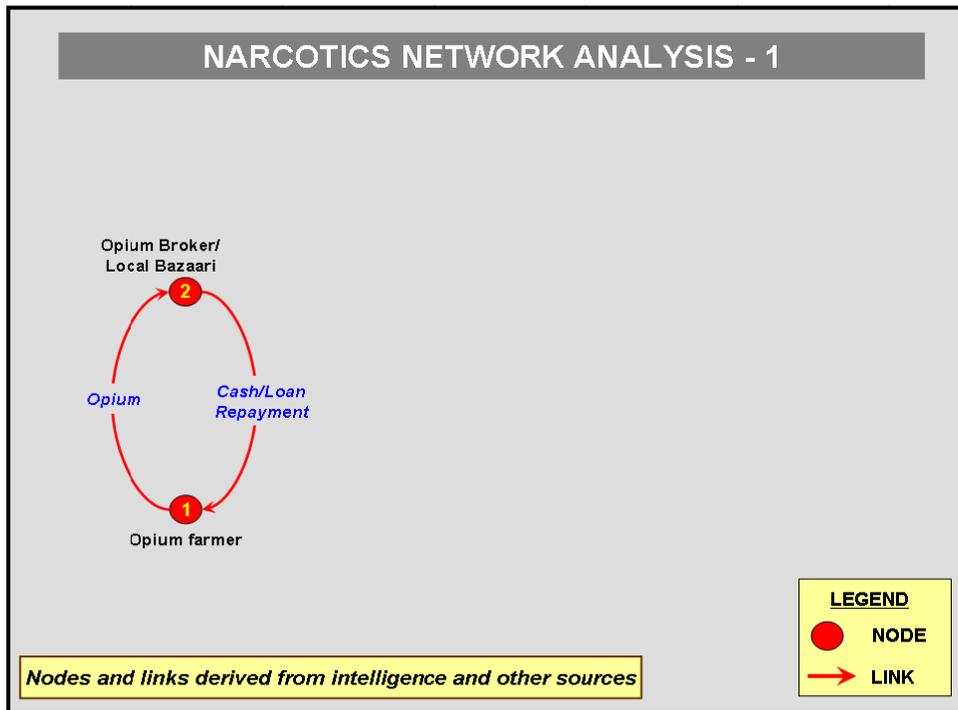

Figure A-1. Narcotics Network Analysis -1

c.   **Figure A-2:** The J-2 knows that the real money-making step in the narcotics system is the <u>conversion of opium to heroin</u>. Opium is valuable as an ingredient of heroin.   The opium is converted to heroin in **labs** ❸.   The term "lab" means any place the precursors, opium, and chemists are.   No sophisticated tools are required.   A lab may be a simple hut.   Precursor chemicals must be smuggled into country and can be obtained either directly from the **smuggling networks** ❹ or often at local **bazaars** ❷.   While there are legitimate uses for many precursor chemicals worldwide, none exist in country. "**Chemists**" ❺ are the people with the knowledge of how to convert opium into heroin. The J-2 **knows** that these are not chemists in any Western sense. Many have no idea about chemistry at all, and may even be illiterate. They do, however, know the "<u>recipe</u>" to convert opium to heroin, which is a limited skill in the region.
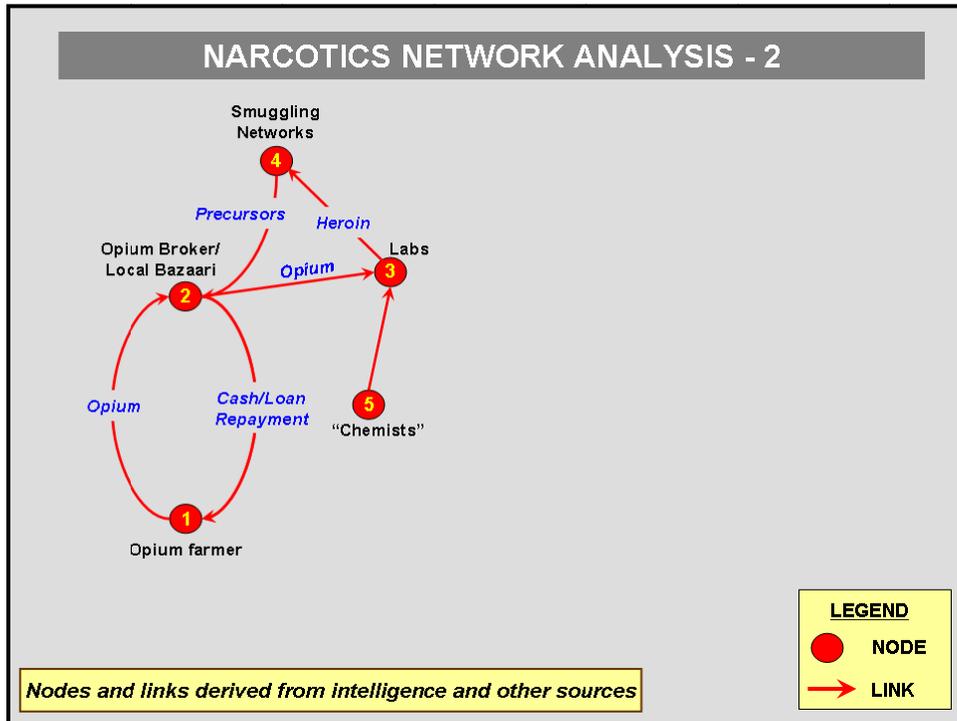
Figure A-2. Narcotics Network Analysis – 2

d.   **Figure A-3:** There is little narcotics use in country (given the extreme poverty, there would be little profit in that market). Therefore, heroin has to be smuggled to **overseas markets** ❻. **Narco-barons** ❼, typically based in-country, are key individuals who control vast segments of the country's narcotics trade and have access to massive wealth (probably 100s of millions to billions of US dollars). Many have sizable personal militias. They are the primary profit makers from the sale of narcotics overseas. Haji Bashir Noorzai (currently in US custody awaiting trial in US District Court) was a showcase example of a narco-baron. Their primary means of getting money from the overseas' markets is through **banks** ❽ and the use of the **hawala** ❾. Narco-barons may also exert direct control over the smuggling networks ❹, certain "chemists" ❺, the labs ❸, and opium brokers ❷.   Additionally, by using their immense wealth narco-barons are often able to obtain political protection from local and national **politicians** ❿.
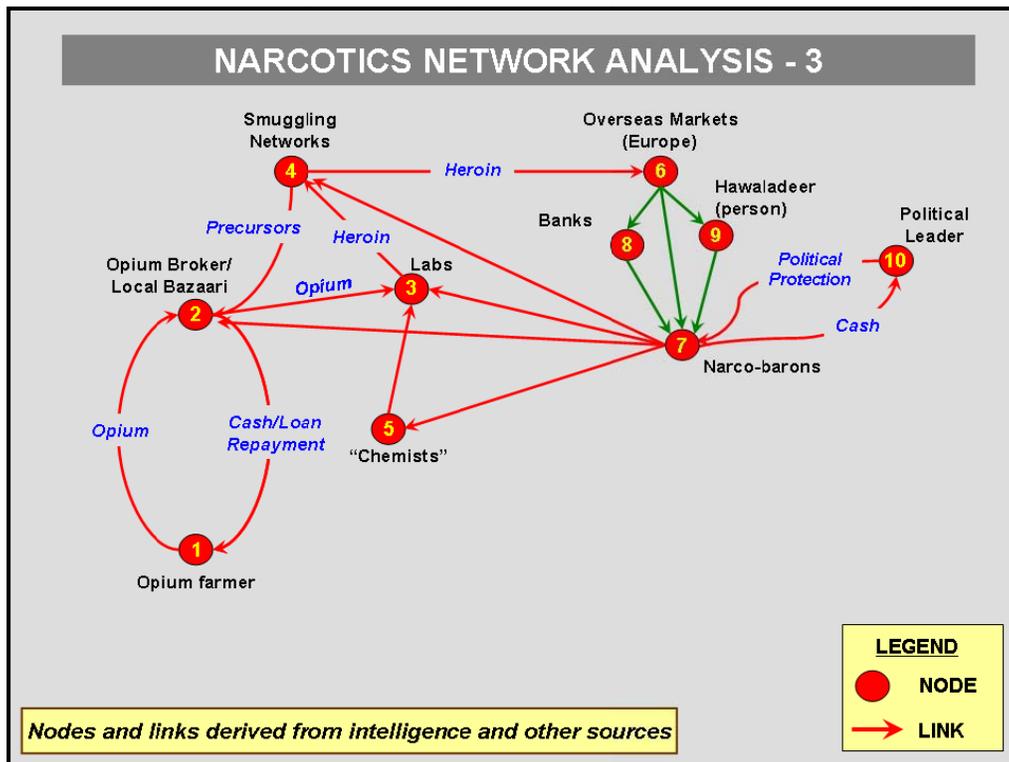

Figure A-3. Narcotics Network Analysis – 3

e. **Figure A-4:** Current intelligence supports the conclusion that the **Taliban** [the insurgents (**11**)] benefits indirectly from the narcotics trade. The Taliban almost certainly obtains funds by "taxing" farmers ❶ and opium brokers ❷ in areas where it has a strong presence. The Taliban also probably receives sizeable contributions from narco-barons ❼. This may be a form of protection payments, but narco-barons may also seek to perpetuate the lack of enforcement enabled by the continuing instability created by Taliban operations. Also, the same smuggling networks ❹ responsible for moving narcotics out of country also are likely responsible for the "backflow" movement of arms and personnel into country, directly benefiting the Taliban.

f. As intelligence analysts have been refining their understanding of the narcotics network, they have been considering how best to create the commander's desired effect—that the **insurgent organization does not receive funding from the narcotics trade**. Analysts conclude that the nodes and links directly related to the conversion of opium to heroin are important, and that the country's labs and their chemists are key to the entire system. Perhaps opium could be smuggled out of country and the conversion could occur at labs in other countries. But this is much more difficult for the opium brokers, and severely reduces the profitability of narcotics in country. Since the conversion occurs in the labs, attacking them directly could affect the entire system. But these makeshift labs are <u>transient</u> (where the right people and material are present for brief periods), and may be too difficult to identify and interdict.
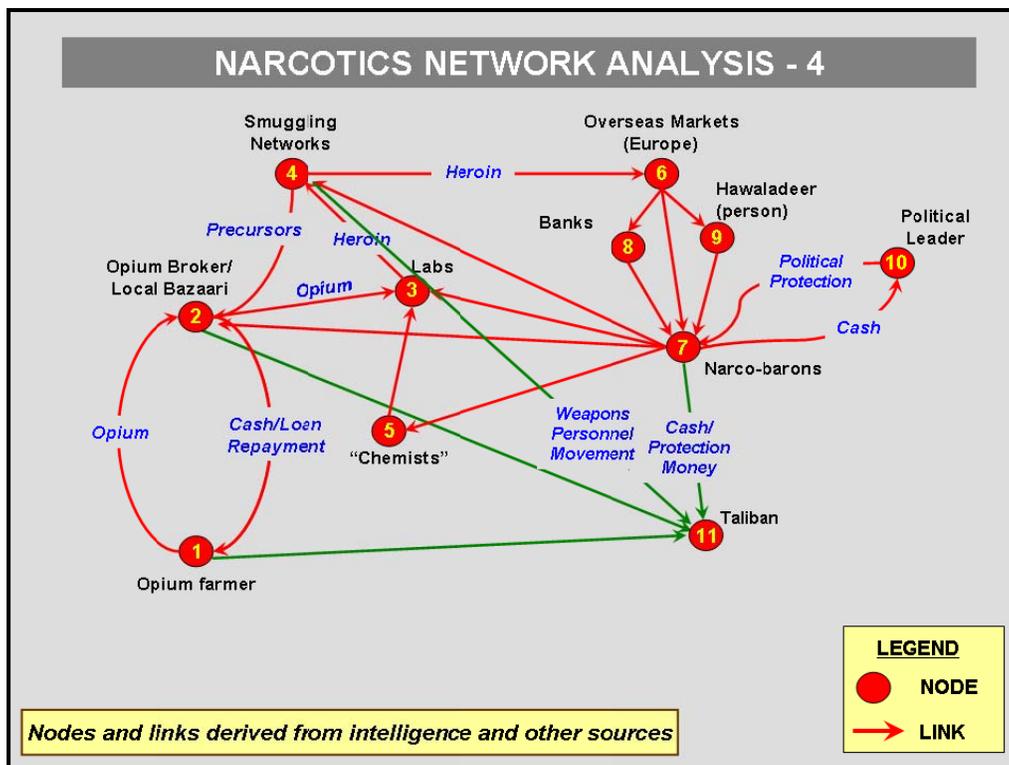

Figure A-4. Narcotics Network Analysis – 4

g.   **Figure A-5:**   How then can the joint force affect the ability of the labs to convert opium to heroin? The J-2 identifies three factors that could limit lab operations. First, the joint force can work with the host country to <u>interdict the supply of opium</u> (❶ and ❷) to the labs. Second, <u>interdicting the precursors</u> (❷ and ❹) is likely to have a significant impact on labs. Third, the knowledge of how to convert opium to heroin is limited to the chemists, so <u>Identifying, locating, and confining a sufficient number of chemists</u> ❺ <u>should</u> have a huge impact on labs. Success in these three areas should limit heroin production and movement overseas, reduce the amount available in overseas markets, and reduce or eliminate the flow of money to the Taliban from the sale of narcotics. The J-2 also assesses that the given the wide-ranging influence the narco-barons ❼ exert on the narcotics trade, interdicting them directly also is likely to have a significant impact on the system. Since the labs and the chemists are commonly co-located and vital to the production of heroin, the J-2 designates them as **key nodes** in the network (see discussion of key nodes in Chapter IV).
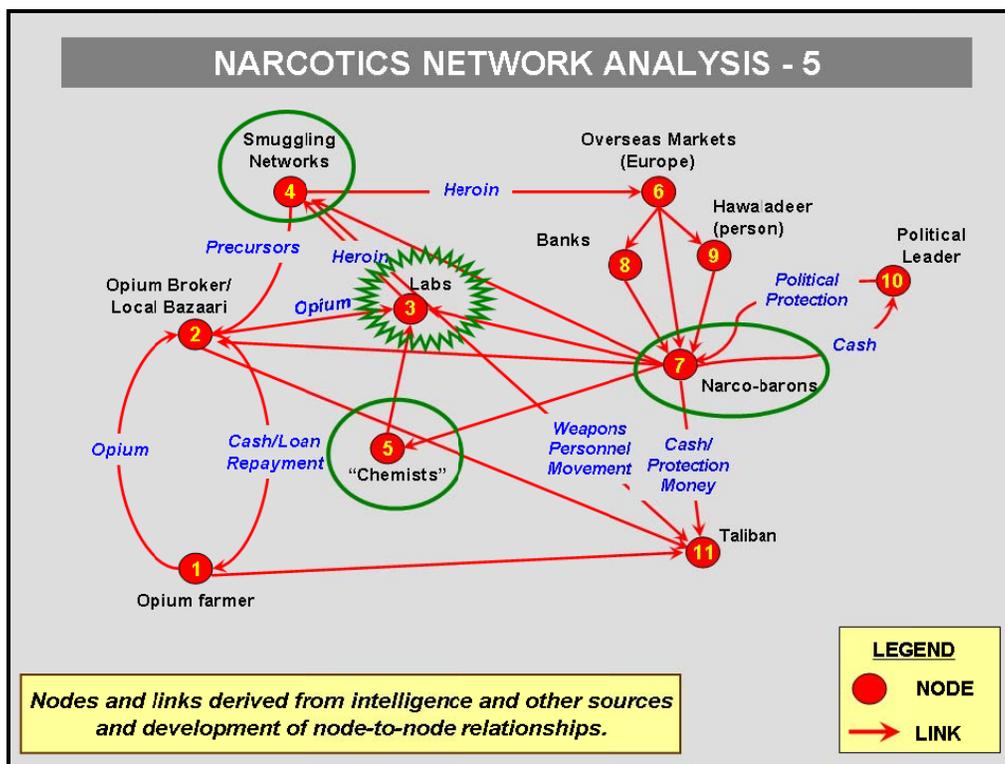

Figure A-5. Narcotics Network Analysis – 5

h.   **Figure A-6:** Collaboration between the J-2, J-5, and other selected staff members has increased as the J-2 develops a more extensive understanding of how the narcotics network functions. In particular, the J-5 becomes fully involved at the point of considering potential diplomatic, informational, military, and economic (DIME) actions that can influence the network to create the commander's desired effect.   The combatant command's joint interagency coordination group likely will participate in this process.   The process will evolve later to development of potential COAs and a concept of operations, but the present focus is on identifying discrete actions against specific nodes in the system.   Once the J-2 briefs the participants, this cross-functional group identifies a number of possible actions.

(1) **Diplomatic.** Apply pressure against political leaders ❿ to cease their political protection of narco-barons; share information with international banks ❽.

(2) **Informational.**   Target opium farmers ❶ with public affairs messages and information operations to influence them to accept alternative income for the opium crop.

(3) **Military.** Capture and arrest narco-barons ❼; capture chemists ❺ and destroy labs ❸; interdict smuggling networks ❹ to cut flow of precursors.

(4) **Economic.** Freeze narco-barons' assets at international banks ❽; work with host country to provide economic alternatives for opium farmers ❶.
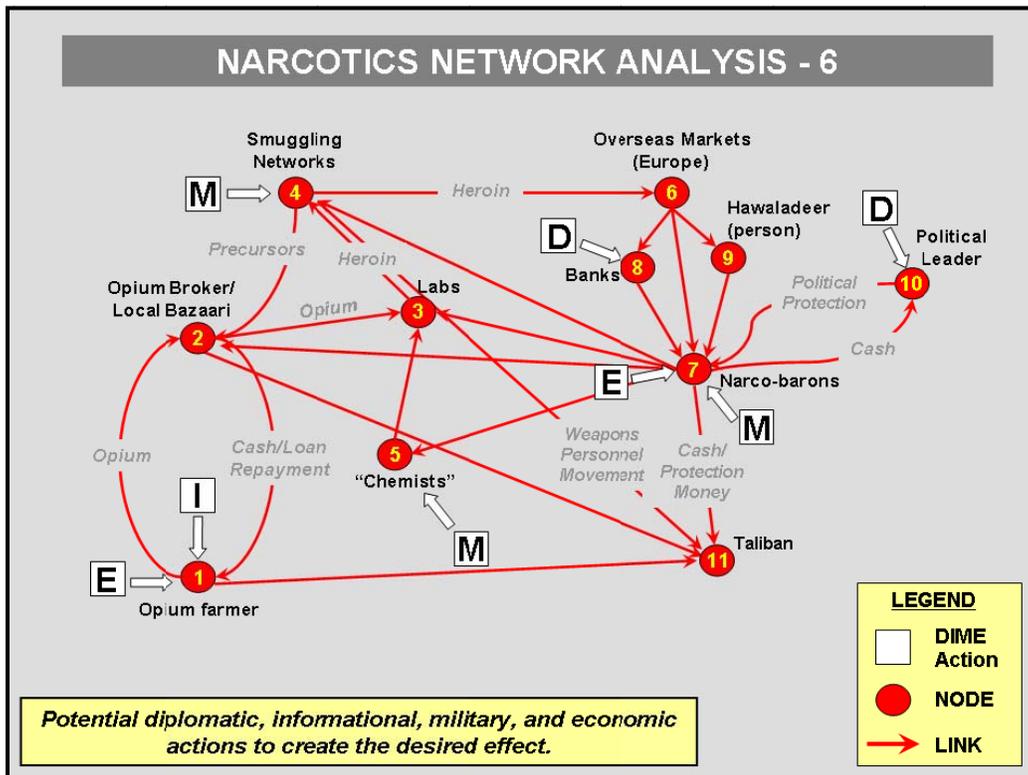

Figure A-6. Narcotics Network Analysis 6

i.   The J-5 can now develop alternative COAs based on the J-2's systems analysis and an understanding of potential actions against various nodes. Interagency collaboration during COA development is essential in this example, because the feasibility (and thus the validity) of a COA may depend on the agreement and capability of one or more agencies to execute specific tasks. The J-5 also must consider potential undesired effects. For example, the income alternative for opium farmers and brokers must be achievable, or they will lose operating capital and their livelihood, perhaps turning them against the larger coalition effort.

j.   The foregoing is a simple hypothetical example of thinking about how a network functions, determining the key node-link relationships from the perspective of a specified desired effect, and identifying potential actions that the joint force can take against nodes in the network to achieve the desired effect. The actual analysis would be significantly more complex, and would encompass a multitude of nodes and links across PMESII systems. Although the J-2 leads this analysis as part of JIPOE, the effort is cross-functional in nature, with participation from the rest of the joint force staff and various military and other agency representatives based on the JFC's objectives and desired effects. Clearly displaying the relevant networks and their key node-link relationships in a graphical component of the intelligence estimate and other intelligence products can greatly enhance the JFC's and staff's understanding of how the networks function and how they can be affected.

SECTION B. TYPICAL PMESII SYSTEMS AND SUBSYSTEMS

1.   Introduction

a.   Figures A-7 through A-12 in this section depict typical PMESII systems and some of the many subsystems in each. Understanding the composition and interaction of systems relevant to the joint operation at hand will help the JFC and staff determine how best to set the right conditions to achieve objectives and accomplish the mission. The composition of relevant systems will vary from country to country and from operation to operation. As the examples in Section A demonstrate, some systems will be "transnational" rather than purely "nation-state" in nature. Awareness of these variations from operation to operation will help the JFC avoid the creation of undesired effects.

b.   The figures are not comprehensive and are not intended as predictive tools. They reflect only a basic relationship of some subsystems to others. Actual relationships can be extremely complex, confusing, and ambiguous. In underdeveloped countries the subsystems may function largely on informal relationships that are difficult to map.

2.   A Political System

The political system is comprised of the central and local governments, political organizations (including political parties and interest groups), and regional/international actors who receive and process political system demands (see **Figure A-7**). Examples of considerations for analysis include:

- The predominant political ideology and what and who constitutes its major defining policies

- Sense of national identity to include strengths or weaknesses

- The constitutional basis for government

- Assessment of the quality of governance

- Separation of powers from religion and state

- Degree of centralization of power between the military and state

- Role ethnic and religious groups play in government
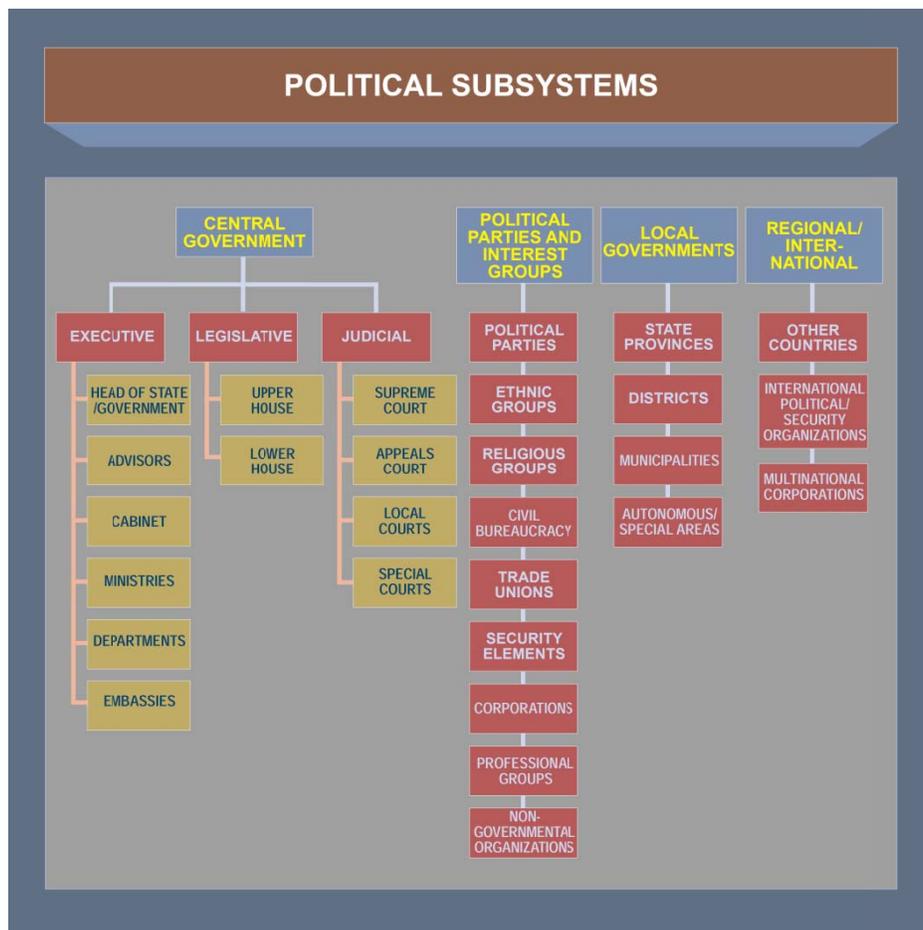
Figure A-7. Political Subsystems

- Strength of political influence on the military

- Toleration (or presence of) opposition groups

- Characterization of political relationships with regional neighbors to include points of friction

3. A Military System

The analyst examines a military system in regards to national objectives, protection of the government, and that country's population. Components of subsystems (see **Figure A-8**) are examined in order to identify essential subsystems and assess the value those subsystems provide to the system as a whole. Consideration for analysis include:

- Military role in the development of national strategy

- Potential and realized threats (external and internal)

- Characterization of military and civilian relationship
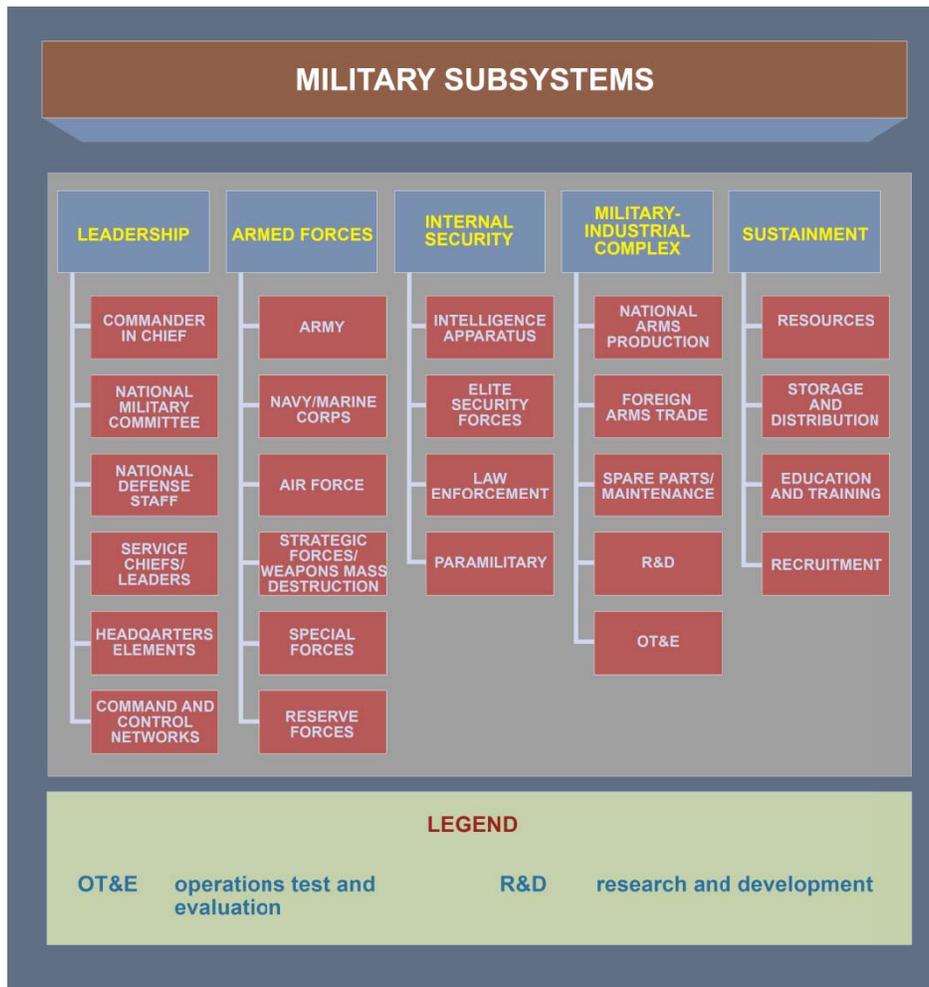
Figure A-8. Military Subsystems

- Role of demographics in military leadership

- Factors regarding the development and maintenance of a military

- Influences (positive and negative) affecting combat readiness

4.   An Economic System

The analyst examines an economic system in regards to the sum total of production, distribution, and consumption of all goods and services in a country (see Figure **A-9**). That sum can be thought of as the combination of the formal and informal economies. Examples of considerations for analysis include:

- Type of economic model (capitalism, social, other).

- Major industrial engines of the economy (manufacturing textile/apparel, vehicle, or machine tools).

- Agriculture base.

- Economic relationship with other countries and with international trade (imports, exports and the balance of payments)

- Health of domestic markets

- Opportunities available for people to borrow money or own businesses
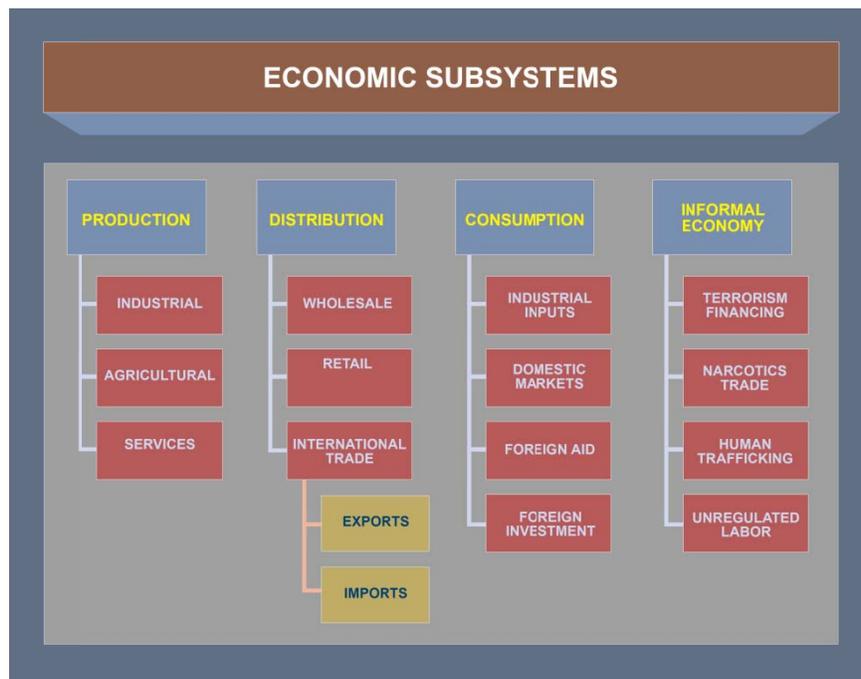
Figure A-9. Economic Subsystems

- Relationship with the country to foreign investors and the international community for foreign aid and debt relief

- Labor force - skilled and fully employed

- Factors regarding the informal economy (terrorist financing, narcotics trade, trafficking in humans, unregulated labor and smuggling)

- Impact of corruption, accountability and transparency on the economic system

- Sources of economic tension

5. A Social System

The goal of the analyst is to identify the system's framework (see **Figure A-10**) in order to evaluate and dissect social interactions. Considerations for analysis include:

- Cohesion of socio-religious groups

- Causes of societal pressures and discontent
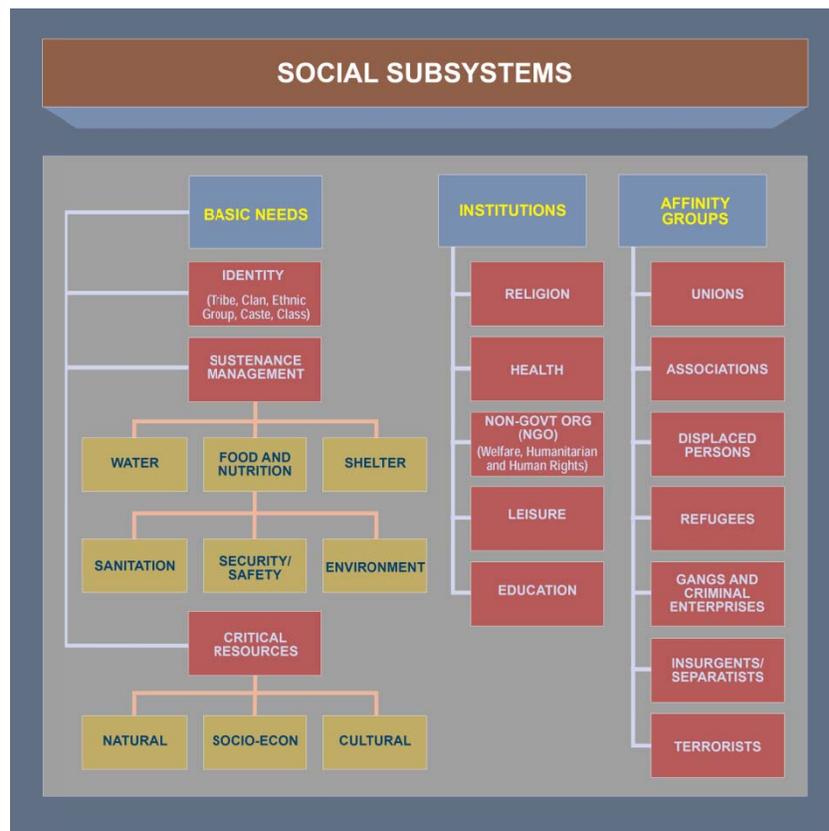
Figure A-10. Social Subsystems

- Impact of immigration and emigration

- Availability of food and medical supplies

- Educational and economic opportunities

- Role of IGOs and NGOs

- Types and extent of crime

- Presence and impact of separatist and terrorist groups

- Cultural differences among population

- Tolerance for religious freedom

6. An Infrastructure System

Primary subsystems of an infrastructure system include: utilities, transportation, industry, and public facilities (see **Figure A-11**). Research is dedicated to the discovery of relationships, dependencies, and vulnerabilities within and across various infrastructure subsystems. Considerations for analysis include:
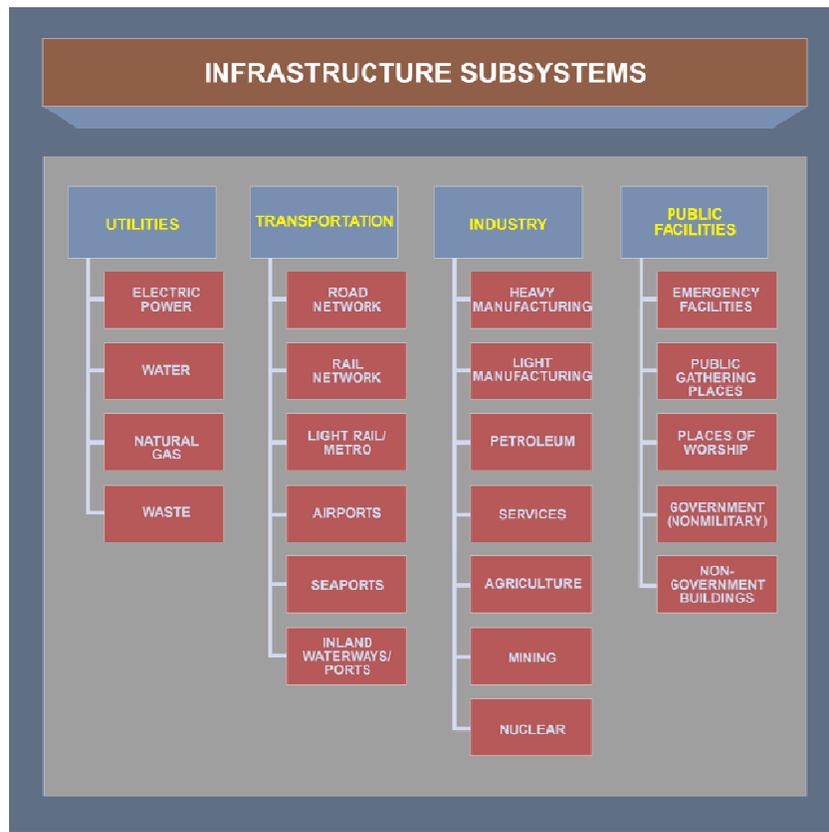

Figure A-11. Infrastructure Subsystems

- Utility network which supports industry and the population

- Sufficiency of water and wastewater facilities

- Adequacy of transportation network

- Contribution of industrial facilities to the economy and national self-sufficiency

- Adequacy of public facilities meeting the needs of the population

7.   An Information System

Research is dedicated to the examination of an information system in regards to national objectives, communication capabilities, and operations in support of a focus area. Primary subsystems include: global information, national information, and defense information networks (see **Figure A-12**). Essential subsystems must be identified and assessments made as to the relative value essential subsystems provide to the system as a whole. Considerations for analysis include:

- Capabilities of national communications systems

- Location of critical communications facilities
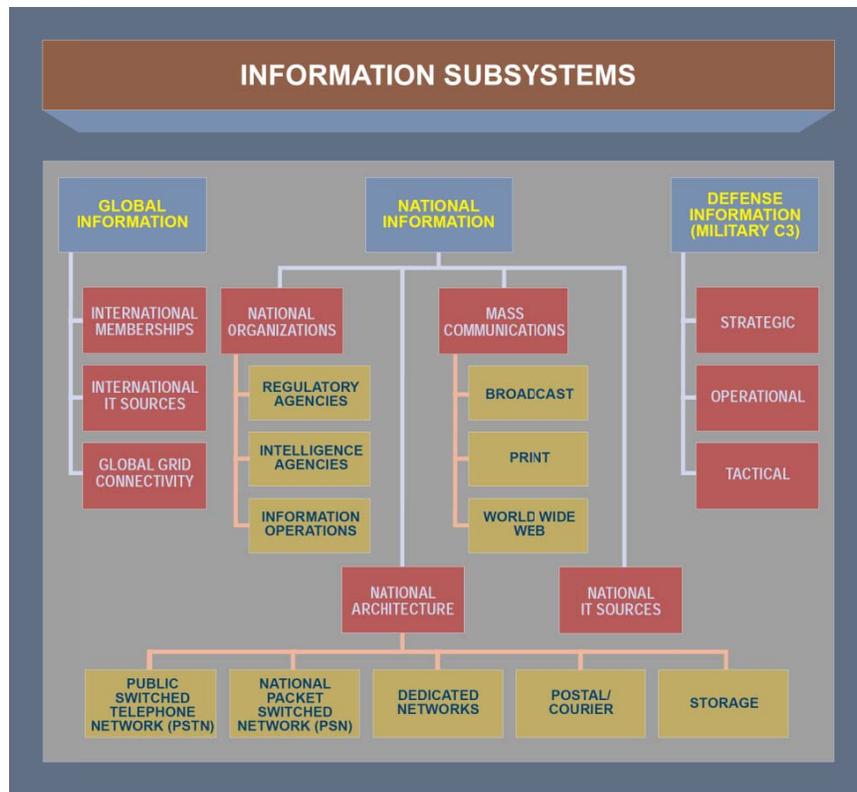
Figure A-12. Information Subsystems

- Foreign support to internal telecommunications

- Programs that support national, technical, and academic research

- Assessment of hardware and software technology standards

- Censorship of the media

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APPENDIX B
OPERATIONAL DESIGN ELEMENTS[1]

> *"In preparing for battle I have always found that plans are useless, but planning is indispensable."*
>
> **General Dwight D. Eisenhower**
> **34th president of the United States, 1953–1961 (1890–1969)**

> *War is an art and as such is not susceptible of explanation by fixed formula"*
>
> **General George S. Patton, Jr.,**
> **Success in War,**
> **The Infantry Journal Reader, 1931**

1. Introduction

a. This appendix supports the handbook's discussion of *operational design* with a more detailed explanation of the individual elements and their role in design and planning.

b. Commanders and planners can use operational design and its intellectual tools (design elements) when planning any joint operation, from simple to complex. **Operational design begins when the commander anticipates or receives a requirement to plan an operation, and it continues throughout planning and execution.** Design should produce the conceptual linkage of the operation's ends, ways, and means. Commanders and planners use various **elements of operational design** — intellectual tools that help them visualize the arrangement of joint capabilities in time, space, and purpose to accomplish the mission. Earlier chapters discussed elements such as *lines of operations* and *effort*, *end state*, and *objective*. This appendix provides more information on *center of gravity*, *decisive point*, and *direct and indirect approach*—three elements also important early in mission analysis to understanding the operational environment and developing a broad operational approach.

2. Center of Gravity

a. One of the most important tasks confronting the JFC's staff during planning is identifying and analyzing friendly and adversary COGs. A COG is a source of power that provides moral or physical strength, freedom of action, or will to act. It is what Clausewitz called "the hub of all power and movement, on which everything depends…the point at which all our energies should be directed." An objective is always linked to a COG. There may also be different COGs at different levels, but they should be nested. At the strategic level, a COG could be a military force, an alliance, political or military leaders, a set of critical capabilities or functions, or national will. At the operational level, a COG often is associated with the adversary's military capabilities—such as a powerful element of the armed forces—but could include other capabilities in

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[1] The information in this appendix comes from the JP 5-0, August 2011.

the operational environment. In identifying COGs it is important to remember that irregular warfare focuses on legitimacy and influence over a population, unlike traditional warfare, which employs direct military confrontation to defeat an adversary's armed forces, destroy an adversary's war-making capacity, or seize or retain territory to force a change in an adversary's government or policies. Therefore, in an irregular warfare environment, the enemy and friendly COG will most likely be the same population.

b. **COGs exist in an adversarial context** involving a clash of moral wills and/or physical strengths. They are formed out of the relationships between adversaries, and they do not exist in a strategic or operational vacuum. COGs are framed by each party's view of the threats in the operational environment and the requirements to develop/maintain power and strength relative to their need to be effective in accomplishing their objectives. Therefore, commanders not only must consider the enemy COGs, but they also must identify and protect their own.

c. The COG construct is useful as an analytical tool to help JFCs and staffs analyze friendly and adversary sources of strength as well as weaknesses and vulnerabilities. This process cannot be taken lightly, since a faulty conclusion resulting from a poor or hasty analysis can have very serious consequences, such as the inability to achieve strategic and operational objectives at an acceptable cost. The selection of COGs is not solely a static process by the J-2 during JIPOE. Planners must continually analyze and refine COGs due to actions taken by friendly forces and the adversary's reactions to those actions. **Figure B-1** shows a number of characteristics that may be associated with a COG.
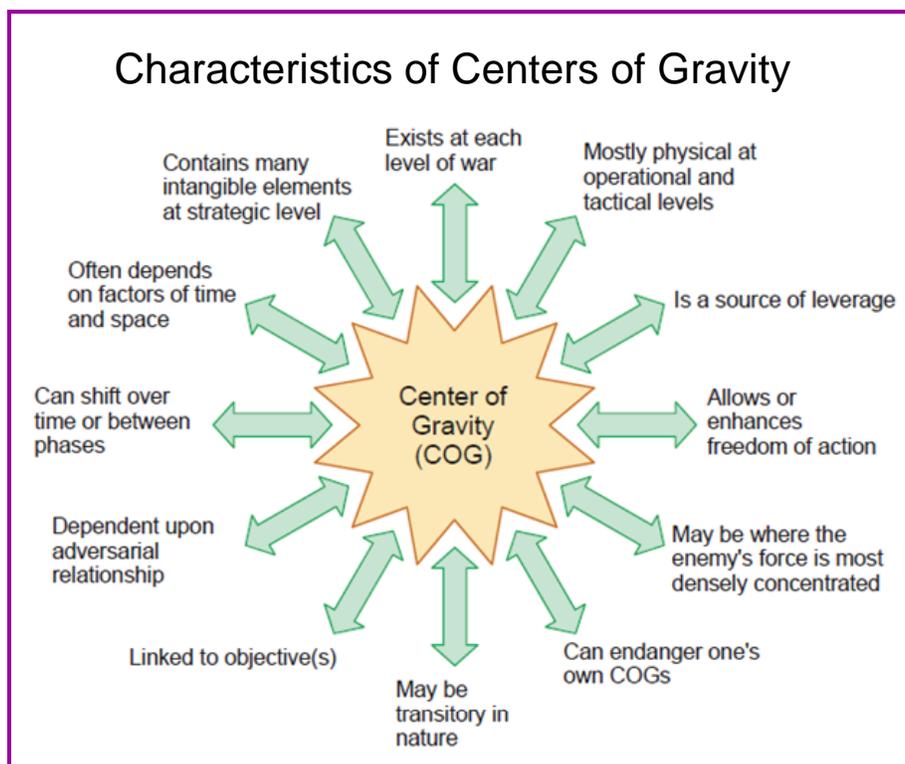

Figure B-1. Characteristics of Centers of Gravity

d.   Analysis of friendly and adversary COGs is a key step in operational design. Joint force intelligence analysts identify adversary COGs, determining from which elements the adversary derives freedom of action, physical strength (means), and the will to fight. The J-2, in conjunction with other operational planners, then attempts to determine if the tentative or candidate COGs truly are critical to the adversary's strategy. This analysis is a linchpin in the planning effort. Others on the joint force staff conduct similar analysis to identify friendly COGs. Once COGs have been identified, JFCs and their staffs determine how to attack enemy COGs while protecting friendly COGs. The protection of friendly strategic COGs such as public opinion and US national capabilities typically requires efforts and capabilities beyond those of just the supported CCDR. An analysis of the identified COGs in terms of critical capabilities, requirements, and vulnerabilities is vital to this process.

e.   Understanding the relationship among COGs not only permits but also compels greater precision in thought and expression in operational design. Planners should analyze COGs within a framework of three *critical factors—*capabilities, requirements, and vulnerabilities—to aid in this understanding. **Critical capabilities** are those that are considered crucial enablers for a COG to function as such, and are essential to the accomplishment of the adversary's assumed objective(s). **Critical requirements** are the conditions, resources, and means that enable a critical capability to become fully operational.   **Critical vulnerabilities** are those aspects or components of critical requirements that are deficient or vulnerable to direct or indirect attack in a manner achieving decisive or significant results. In general, a JFC must possess sufficient operational reach and combat power or other relevant capabilities to take advantage of an adversary's critical vulnerabilities while protecting friendly critical capabilities within the operational reach of an adversary.

f.   When identifying friendly and adversary critical vulnerabilities, the JFC and staff will understandably want to focus their efforts against the critical vulnerabilities that will do the most decisive damage to an adversary's COG. However, in selecting those critical vulnerabilities, planners must also compare their criticality with their accessibility, vulnerability, redundancy, ability to recuperate, and impact on the civilian populace, and then balance those factors against friendly capabilities to affect those vulnerabilities. The JFC's goal is to seek opportunities aggressively to apply force against an adversary in as vulnerable an aspect as possible, and in as many dimensions as possible. In other words, the JFC seeks to undermine the adversary's strength by exploiting adversary vulnerabilities while protecting friendly vulnerabilities from adversaries attempting to do the same.

g.   A proper analysis of adversary critical factors must be based on the best available knowledge of how adversaries organize, fight, think, and make decisions, and their physical and psychological strengths and weaknesses. JFCs and their staffs must develop an understanding of their adversaries' capabilities and vulnerabilities as well as factors that might influence an adversary to abandon its strategic objectives. They must also envision how friendly forces and actions appear from the adversaries' viewpoints.

Otherwise, they may fall into the trap of ascribing to an adversary attitudes, values, and reactions that mirror their own.

   h. Before solidifying COGs into the plan, planners should analyze and test the validity of the COGs. The defeat, destruction, neutralization, or substantial weakening of a valid COG should cause an adversary to change its COA or prevent an adversary from achieving its strategic objectives. If analysis and/or wargaming show that this does not occur, then perhaps planners have misidentified the COG, and they must revise their COG and critical factors analysis. The conclusions, while critically important to the planning process itself, must be tempered with continuous evaluations and reassessments because derived COGs and critical vulnerabilities are subject to change at any time during the campaign or operation. Accordingly, JFCs and their subordinates should be alert to circumstances during execution that may cause derived COGs and critical vulnerabilities to change and adjust friendly plans and operations accordingly.
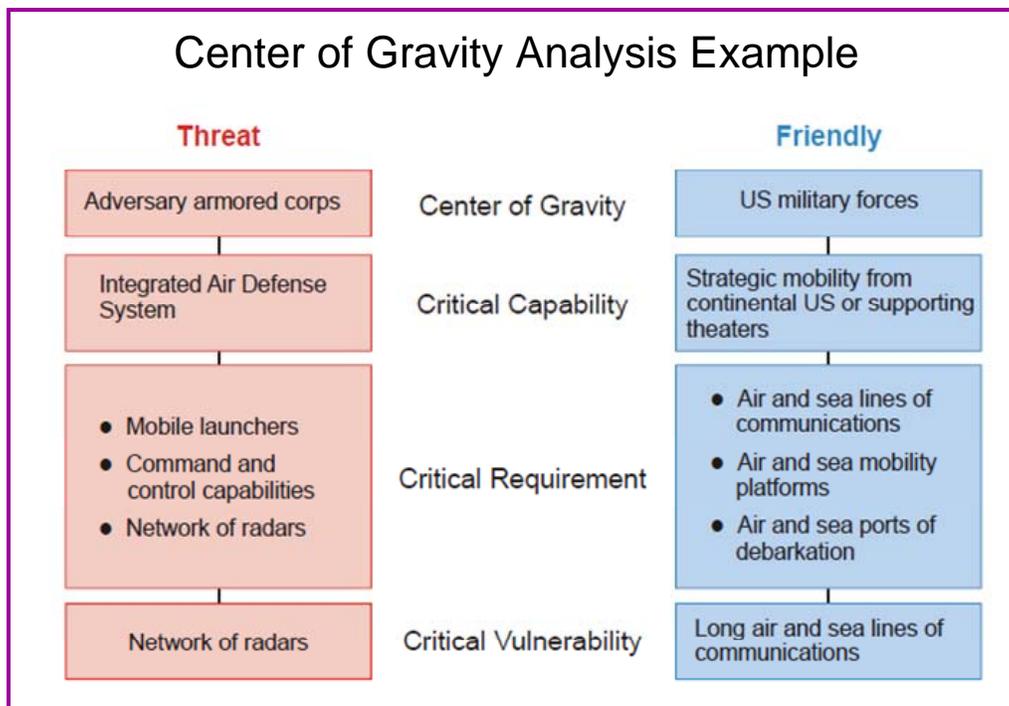

Figure B-2. Examples of Centers of Gravity

   i. Commanders must also analyze friendly COGs and identify critical vulnerabilities (see **Figure B-2**). For example, long sea and air lines of communications (LOCs) from the continental United States (CONUS) or supporting theaters could be a critical vulnerability for a friendly COG. Through prior planning and coordination, commanders can mitigate the potential impact of challenges such as the failure of foreign governments to provide overflight clearances to US or multinational forces. A friendly COG could also be something more intangible in nature. During the 1990–1991 Persian Gulf Conflict, for example, the Commander, US Central Command, identified the coalition itself as a friendly operational COG and took appropriate measures to protect it, to include deployment of theater missile defense systems. In conducting the analysis of

friendly vulnerabilities, the supported commander must decide how, when, where, and why friendly military forces are (or might become) vulnerable to hostile actions and then plan accordingly. The supported commander must achieve a balance between prosecuting the main effort and protecting critical capabilities and vulnerabilities in the OA to protect friendly COGs.

For more information on COGs and the systems perspective, see JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment***.**

3.   Decisive Point

a.   **A *decisive point* is a geographic place, specific key event, critical factor, or function that, when acted upon, allows a commander to gain a marked advantage over an adversary or contributes materially to achieving success (e.g., creating a desired effect, achieving an objective).** Decisive points can greatly influence the outcome of an action. Decisive points can be physical in nature, such as a constricted sea lane, a hill, a town, WMD material cache or facility, or an air base; but they could include other elements such as command posts, critical boundaries, airspace, or communications and/or intelligence nodes. In some cases, specific key events also may be decisive points, such as attainment of air or maritime superiority, commitment of the adversary's reserve, opening a supply route during humanitarian operations, or gaining the trust of a key leader. In still other cases, decisive points may have a larger systemic impact and, when acted on, can substantially affect the adversary's information, financial, economic, or social systems. When dealing with an irregular threat, commanders and their staffs should consider how actions against decisive points will affect not only the enemy, but also the relevant population and their behavior and relationships with enemy and friendly forces, and the resultant impact on stability in the area or region of interest.

b.   The most important decisive points can be determined from analysis of critical factors. Understanding the relationship between a COG's critical capabilities, requirements, and vulnerabilities can illuminate direct and indirect approaches to the COG. It is likely that most of these critical factors will be decisive points, which should then be further addressed in the planning process.

c.   There may often be cases where the JFC's combat power and other capabilities will be insufficient to affect the adversary's COGs rapidly with a single action. In this situation, the supported JFC must selectively focus a series of actions against the adversary's critical vulnerabilities until the cumulative effects of these actions lead to mission success. Just as a combined arms approach is often the best way to attack an enemy field force in the military system, attacking several vulnerable points in other systems may offer an effective method to influence an enemy COG. The indirect approach may offer the most effective method to exploit adversary critical vulnerabilities through the identification of decisive points. **Although decisive points are usually not COGs, they are the keys to attacking or protecting them.**

d.   Although campaigns or operations may have numerous decisive points, only a few will truly have operational or even strategic significance relative to an adversary's or our friendly COGs. The art of identifying decisive points is a critical part of operational design. Normally, there are far more decisive points in a given OA than can be attacked, seized, retained, controlled or protected with the forces and capabilities available. Accordingly, planners should study and analyze potential decisive points and determine which offer the best opportunity to attack the adversary's COGs, extend friendly operational reach, or enable the application of friendly forces and capabilities. The commander then designates the most important decisive points for further planning and allocates sufficient resources to produce the desired effects against them. Afterward, the supported JFC should assign sufficient forces and assets for attacking, seizing, retaining, controlling, or protecting these decisive points.

4.   Direct and Indirect Approach

a.   **The *approach* is the manner in which a commander contends with a COG. A direct approach attacks the enemy's COG or principal strength by applying combat power directly against it.** However, COGs are generally well protected and not vulnerable to a direct approach. Thus, commanders usually choose an indirect approach. **An indirect approach attacks the enemy's COG by applying combat power against a series of decisive points that lead to the defeat of the COG while avoiding enemy strength.**
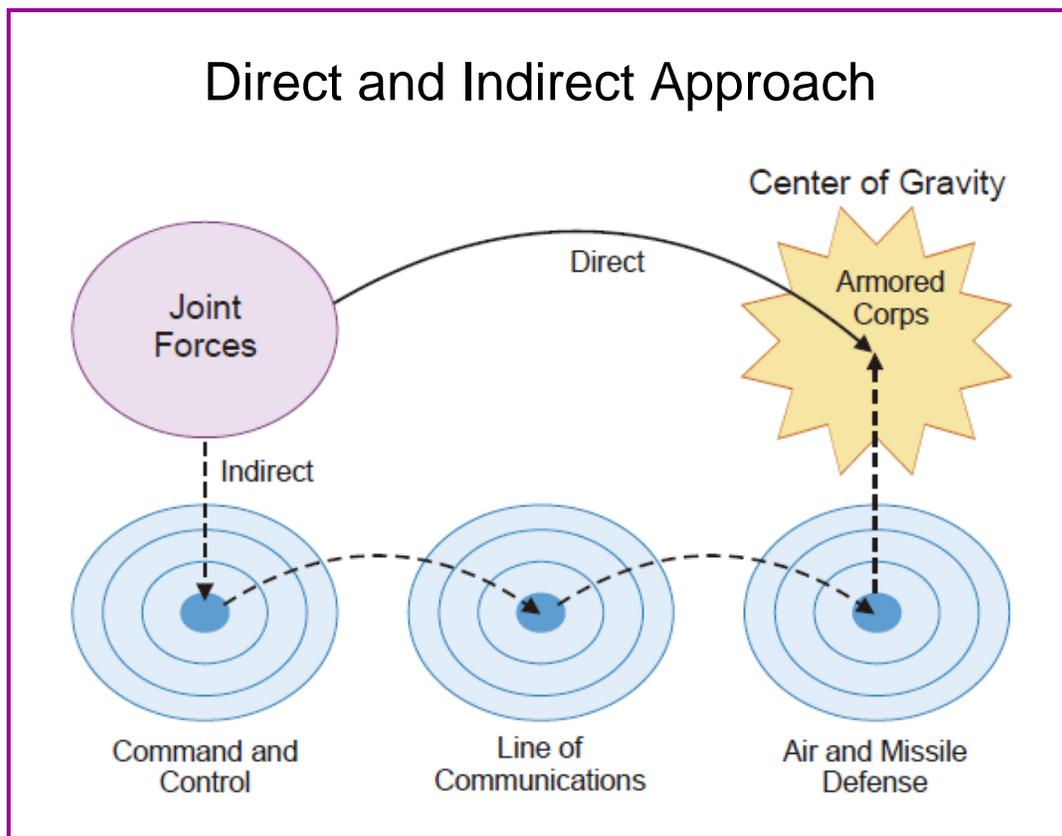

Figure B-3. Direct and Indirect Approach

b.   Direct attacks against adversary COGs resulting in their neutralization or destruction provide the most direct path to victory. Since direct attacks against adversary COGs mean attacking an opponent's strength, JFCs must determine if friendly forces possess the power to attack with acceptable risk. **In the event that a direct attack is not a reasonable solution, JFCs should seek an indirect approach until conditions are established that permit successful direct attacks** (see **Figure B-3**). In this manner, the adversary's derived vulnerabilities can offer indirect pathways to gain leverage over its COGs.

c.   At the strategic level, indirect methods of defeating the adversary's COG could include depriving the adversary of allies or friends, emplacing sanctions, weakening the national will to fight by undermining the public support for war, and breaking up cohesion of adversary alliances or coalitions.

d.   At the operational level, the most common indirect method of defeating an adversary's COGs is to conduct a series of attacks against selected aspects of the adversary's combat power. For example, the JFC may sequence combat actions to force an adversary to divide its forces in theater, destroy the adversary's reserves or elements of the adversary's base of operations, or prevent or hinder the deployment of the adversary's major forces or reinforcements into the OA. Indirect methods of attacking the adversary's COGs (through critical vulnerabilities) could entail reducing the adversary's operational reach, isolating the force from its command and control (C2), and destroying or suppressing key protection functions such as air defense. Additionally, in an irregular warfare environment, a persistent indirect approach will help enable a legitimate and capable local partner to address the conflict's causes and to provide security, good governance, and economic development.

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APPENDIX C
THINKING CRITICALLY ABOUT CRITICAL THINKING

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**THINKING CRITICALLY ABOUT CRITICAL THINKING:
A FUNDAMENTAL GUIDE FOR STRATEGIC LEADERS**

Colonel (Retired) Stephen J. Gerras, Ph.D.
Professor of Behavioral Sciences
Department of Command, Leadership, & Management
U.S. Army War College

August 2008

THINKING CRITICALLY ABOUT CRITICAL THINKING:
A FUNDAMENTAL GUIDE FOR STRATEGIC LEADERS

> *"Technological advances alone do not constitute change. The most dramatic advances in military operations over history have been borne of ideas – ideas about warfighting, organization and doctrine. The Army's most critical asset will not be technology; it will be critical thinking."[1]*
>
> **AUSA Torchbearer National Security Report, March 2005**

> *"Most Army schools open with the standard bromide: We are not going to teach you what to think…we are going to teach you how to think. They rarely do."[2]*
>
> **BG David A. Fastabend and Robert H. Simpson, February 2004**

In the post Cold War security environment many senior leaders in the Army and throughout the Department of Defense have asserted a need to develop better critical thinking skills.[3] The requirement for better critical thinkers stems from a realization that the complexity, uncertainty, and ambiguity characteristic of the current environment mandates a need to refrain from Cold-War thinking methodologies and assumptions. As the epigraphs (above) suggest, there is a large gap between the Army's desire to develop critical thinking skills and what actually happens. This gap is due not only to a general lack of understanding of what critical thinking is, but also a lack of education by both faculty and Army leadership on how to develop critical thinkers.

The purpose of this paper is to analyze the concept of critical thinking and then make suggestions for how the Army can close the gap between the need to develop critical thinkers and what is actually happening. This paper is not just for Training and Doctrine Command (TRADOC) organizations; rather, it is to serve leaders throughout the Army in their efforts to develop their own critical thinking skills, while creating a climate that develops the same skills in their subordinates. This document is a user's guide to critical thinking. Most of the contexts, examples, and recommendations are Army-centric, although everything in this paper is applicable to all military services and governmental organizations.

One of the main impediments to the robust understanding and use of critical thinking, both inside and outside the military, centers on a lack of a common definition. No one discipline owns the construct. Most of the material about critical thinking derives from philosophy, education, and psychology.[4] There are, however, competing schools of

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[1] Association of the United States Army, Torchbearer National Security Report (Arlington, Virginia: Institute of Land Warfare, Association of the United States Army, March 2005), 21.

[2] BG David A. Fastabend and Mr. Robert H. Simpson, "Adapt or Die" The Imperative for a Culture of Innovation in the United States Army," Army Magazine, February 2004, 20.

[3] Association of the United States Army, 21.

[4] Susan C. Fischer and V. Alan Spiker, Critical Thinking Training for Army Officers: Volume One: A Model of Critical Thinking (Alexandria, Virginia: U.S. Army Research Institute for the Behavioral and Social Sciences, May 2004), 3.

thought on what critical thinking is and how to best develop it. In most cases a multidisciplinary assessment of a topic leads to a richer body of research, however, in the case of critical thinking it seems to have led to competing and incomplete views of the topic. My goal is not to evaluate various views of critical thinking. Instead, I hope to provide a guide with which to enhance an individual's critical thinking skills.

As a starting point, I will use Diane Halpern's broad definition of critical thinking as a foundation: "Critical thinking is the use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is used to describe thinking that is purposeful, reasoned, and goal directed."[5] In essence, critical thinking is about improving one's judgment. Whether we are evaluating the information on a power point slide in a Pentagon briefing, reading a newspaper article, or participating in a discussion with an Iraqi mayor, critical thinking is the <u>deliberate</u>, <u>conscious</u>, and <u>appropriate</u> application of reflective skepticism. Some Army leaders refer to the "critical" in critical thinking as mere fault finding with either a conclusion or the process by which a conclusion was reached. Fault finding is not what critical thinking entails. The word "critical" really has to do with purposeful, reflective and careful evaluation of information as a way to improve one's judgment.

The question is, "How do we develop these judgment skills in Army leaders?" One way is to teach logic and reasoning skills that are typically the focus of philosophy. Another way is to emphasize questioning and self-reflection skills that are usually the focus of education and psychology.[6] Additionally, there are generally two schools of thought on how to develop critical thinking skills: context-free and context-dependent. Context-free development focuses upon teaching critical thinking skills irrespective of any specific subject. Context-dependent development centers on teaching the same skills but with a particular field of study. Based on my experience at the War College, I think the best way to teach critical thinking skills to military leaders is to provide context-dependent skill development that incorporates both the critical reasoning contributions of philosophy with the questioning and self-reflection focus from the fields of education and psychology.

Therefore, I argue that critical thinking skills are best developed by: (1) providing knowledge from a multidisciplinary perspective about critical thinking skills, (2) practicing the application of these skills in a context-dependent setting under the purview of a facilitator or knowledgeable leader, and (3) creating a healthy environment, in both TRADOC schools and organizational units, that encourages and motivates a desire to routinely apply critical thinking skills to important issues. The next section of this paper describes a general model that serves as a starting point for developing a lexicon, context,

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[5] Diane F. Halpern, Thought & Knowledge: An Introduction to Critical Thinking, 4th ed. (Mahway, NJ: Lawrence Erlbaum Associates, 2003), 6.
[6] A good example of this perspective is presented in: Richard Paul and Linda Elder, Critical Thinking, Tools for Taking Charge of Your Learning and Your Life (Upper Saddle River, NJ: Prentice Hall, 2001),

and mental template for the development and application of critical thinking for developing strategic leaders.

A Critical Thinking Model

This paper provides a model and accompanying terminology to inform the military community of a way to look at critical thinking. Whether in a lunchtime conversation with a friend about democracy in the Middle East, or developing courses of action in Iraq within the structure of the military decision making process (MDMP) a well-developed critical thinker will mentally ensure his thought process is not proceeding down the road without due application of reflective skepticism. Renowned critical thinking experts Paul and Elder assert:

> *A well-cultivated critical thinker raises vital questions and problems, gathers and assesses relevant information, and can effectively interpret it; comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards; thinks open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and communicates effectively with others in figuring out solutions to complex problems.* [7]

The model offered here is a derivative of the Paul and Elder model, with significant additions and clarifications centered in the 'evaluation of information' element. The elements of the model are:

CLARIFY CONCERN,

POINT OF VIEW,

ASSUMPTIONS,

INFERENCES,

EVALUATION OF INFORMATION, and

IMPLICATIONS.

Picture yourself as a Brigade Combat Team (BCT) commander recently deployed to Iraq. Your predecessor informs you that in your Area of Operations over the past two months the number of civilians killed from improvised explosive devices/vehicle-borne improvised explosive devices (IEDs/VBIEDs) is twice the average of any sector in the country. He advises that his brigade has increased their vigilance and number of patrols in susceptible areas, but due to unit redeployment challenges, they have not really done much differently to improve the situation. As the brigade commander, you direct your staff to present some options for reducing the number of civilian deaths.

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[7] Ibid, XX.

As the brigade commander thinks about how to reduce civilian deaths, he will be much more effective if he reasons within the framework of some critical thinking model. The critical thinking model presented is <u>not</u> meant to be a completely <u>sequential</u> process. As mentioned earlier, it is a derivative of the elements of reasoning presented by Paul and Elder.[8] Although the model starts with the element CLARIFY CONCERN, the model is not necessarily linear. It is more important that critical thinkers process information and reason within the vocabulary of the model, than it is that they rigorously adhere to the model in any lock-step systematic pattern. This point will be made clearer later.

Critical thinking is purposeful, directed thought. It is not easy, as it requires explicit mental energy. The great majority of the decisions and issues we face throughout the day do not require critical thinking. The route we drive to work, what clothes we wear to a party, and what book to read on Saturday are examples of decisions or concerns that do not normally require critical thinking and can be made in an "automatic" mode of cognitive thought. What is an "automatic" mode of cognitive thought? If you have ever driven down the Interstate at 70 miles per hour and at some point recognized that you are not quite sure where you are or do not actually remember driving the last five miles it is probably because your mind is in a kind of automatic processing mode. Most people have had this experience. How is it that our brains will permit us to operate a 5000 pound vehicle, moving at 70 miles per hour, within several feet of large tractor trailers moving equally fast? The explanation is that over time, driving even at a high rate of speed has become an "automatic" routine. To conserve mental energy our brains tend to reduce focus, especially with seemingly routine activities. Unfortunately, most decision makers make judgments on significant issues using an "automatic" mode as opposed to taking the time and investing the energy for a more "controlled" thought process.[9] Exercising controlled thought involves the deliberate use of elements of critical thinking. Examples of when critical thinking are probably called for include assessing a Power Point presentation on courses of action for an upcoming military operation, preparing to meet with an Iraqi governor to discuss joint security issues, and proposing to your future spouse. Knowing when to reign back on automatic processing in order to conduct a conscious assessment of the parameters of the situation is more art than a science. But it is almost certainly safe to say that "if you're in doubt as to whether to conduct critical thinking on an issue, you probably ought to apply critical thinking." The main point is that most routine decisions that we make on a day-to-day basis do not involve critical thinking; however, once you become familiar with the concepts and terminology of critical thinking, you should habitually ask yourself whether the issue being considered warrants the application of critical thinking methodology.

The model portrayed in Figure C-1 will be discussed in detail throughout the remainder of the paper. There are, however, some points that require highlighting. First,

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[8] Ibid, 52.

[9] For a good discussion on automatic versus controlled processing, see Robert G. Lord and Karen J. Maher, "Cognitive Theory in Industrial and Organizational Psychology," in *Handbook of Industrial and Organizational Psychology*, ed. Marvin D. Dunnette and Leaetta M. Hough, (Palo Alto: Consulting Psychologists Press, 1991).

the clouds in the center, POINT OF VIEW, ASSUMPTIONS, and INFERENCES, are meant to demonstrate that this is generally a non-linear model. Your ASSUMPTIONS, for instance, will affect whether you perceive an issue to be worthy of critical thinking and your POINT OF VIEW will impact how you define the boundaries of the issues. Although there are arrows going from CLARIFY CONCERN to EVALUATE INFORMATION (implying linearity), there is also a reciprocal arrow going in the reverse direction to suggest that as you are EVALUATING INFORMATION, you may end up redefining the concern. If, for example, you are seeking to CLARIFY CONCERN regarding some inappropriate behavior by your teenage son or daughter, the EVALUATION OF INFORMATION may indicate that the "real" issue has to do more with the nature of the relationship between you and your child than the actual behavior prompting initial concern. The non-linear nature of the model will be more evident as you read about the components.

The model starts with an individual perceiving some stimulus. As mentioned before, we oftentimes respond to the stimulus by defaulting to our known view of the world, which is an "automatic" response. In most cases, the automatic mode is appropriate and the perceiver should proceed to make a decision, use judgment, etc. However, if the topic is complex, has important implications, or there is a chance that strong personal views on the issue might lead to biased reasoning, then thinking critically about the issue makes good sense.

A critical element, and often the first step, in critical thinking methodology is to CLARIFY the CONCERN. For anyone familiar with the Paul and Elder model, this element is an aggregation of their elements: Purpose and Central Problem.[10] This is not as straightforward as it seems.

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[10] Paul and Elder, 103.
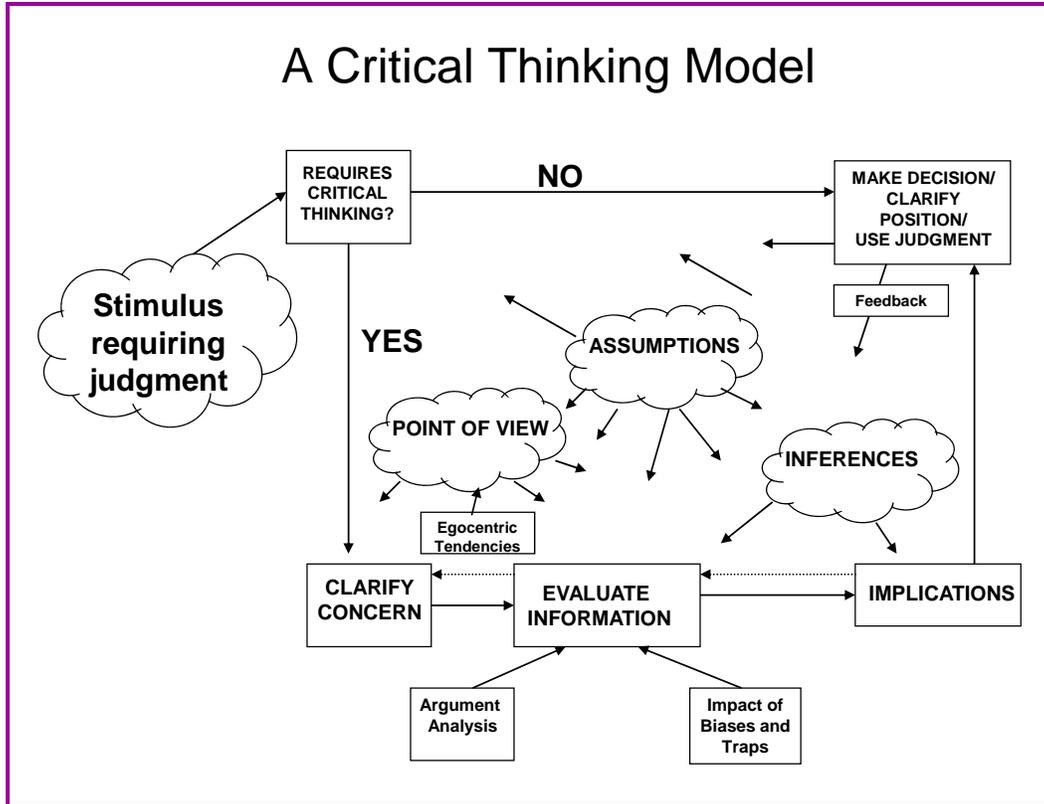
Figure C-1: A Critical Thinking Model

The problem or issue needs to be identified and clarified up front, yet consistently revisited as other elements of the model are considered. The term 'concern' is preferred over the term 'problem' because a critical thinker must be proactive as well as reactive. In many cases, the critical thinker will encounter information that causes him to identify related or subsequent issues that should be addressed. A critical thinker ensures that he has considered the complexities of the problem at hand and focused his mental energy appropriately. An assessment needs to determine whether the concern has unidentified root causes or unaddressed sub-components. A critical thinker must ensure that the problem or issue is not framed in a way that unduly limits response options. A phrase often asked by leaders that exemplifies their attempt to CLARIFY the CONCERN is, "what are we trying to accomplish here (e.g., at a meeting, during a situation, etc.)?"

In the case of the new brigade commander in Iraq, a cursory attempt at concern clarification would probably conclude the concern is that the average number of civilians killed over the last two months is much higher than anywhere else in country. From a critical thinking perspective, however, the brigade commander should also be asking questions like, "Where are the data coming from? Are there other motivations for the people presenting the data that may be improperly framing the issue? Is there a more systemic issue or problem that has caused this increase in deaths that needs to be addressed before we focus on the IED/VBIED attacks?" As an example, at a War College presentation by a General Officer returning from Iraq, the General described a situation in which his command, in an effort to identify the root causes of attacks in their area of operation, eventually figured out that there was a strong inverse correlation

between functioning civil infrastructure such as electrical power, sewer, and water service and the number of attacks in that sector. As a result, in an effort to improve stability, the unit focused on civil infrastructure improvement as well as offensive military operations.

Additionally, as mentioned earlier, as the brigade commander thinks about the other elements in the model (e.g., ASSUMPTIONS, INFERENCES, EVALUATION OF INFORMATION), he needs to revisit the CLARIFY CONCERN step to ensure that the correct issue is being addressed. For instance, while conducting an evaluation of information, the brigade commander might realize that while the average number of deaths has increased in the last two months, this high average is driven by only two significant attacks when VBIEDs exploded near buses. In fact, the actual number of attacks had decreased significantly. This evaluation of information from a critical thinking standpoint might lead to a re-labeling the concern from "how to reduce the average number of civilian deaths in the AO" to "how to reduce the number of VBIED attacks in populated areas or how to protect the civilian population from terrorist attack." Each has a unique answer. For complex questions, we want to limit the scope of a problem to be addressed – or, at least, to be very deliberate that we are scoping correctly.

Another element of the critical thinking model is POINT OF VIEW. Paul and Elder posit that, "Whenever we reason, we must reason within some point of view or frame of reference. Critical thinkers strive to adopt a point of view that is fair to others, even to opposing points of view."[11] Assessing an issue from alternative points of view is sometimes difficult for War College students. By the time an accomplished lieutenant colonel or colonel has reached this level, they are sometimes inclined to believe that they have figured out how the world works, and, moreover, that their view is correct. Many would argue that our General Officer community is prone to the same myopia. Good critical thinkers, however, do their best to recognize their own point of view, and to consider and even understand and empathize with the view of others on an issue. Empathy is not a characteristic of "soft leaders;" rather, it is a characteristic of smart, thoughtful, and reflective leaders. The more an infantry battalion commander can put himself in the shoes of the town mayor, the greater the likelihood that his decisions will be successful from not only a U.S. standpoint, but from an Iraqi or Afghanistan perspective as well. This congruence will enable long-term solutions and build respect and trust that is absolutely critical in the contemporary operating environment. Noted leadership developer Bruce Avolio asserts, "Leadership development is fundamentally a shift in perspective…The shift occurs when you stop to reflect on an opponent's view to fully understand how he or she can believe the position he or she has taken and then refused to move from that position."[12]

As we attempt to empathize with the viewpoint of others our own <u>self awareness</u> becomes increasingly important. Leaders need to be self-aware of the **egocentric**

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[11] Ibid, 98.

[12] Bruce J. Avolio, *Leadership Development in Balance* (Mahway, NJ: Lawrence Erlbaum Associates, 2005), 77.

tendencies that are probably the most significant barrier to effective critical thinking.[13] Egocentrism is a tendency to regard oneself and one's own opinions or interests as most important. Military officers, for instance, are typically very successful individuals who have a wide range of interests. From academics to sports, leadership jobs to hobbies, a typical officer has in most cases been hand-picked for military commissioning and advancement based on a track record of success. Therefore, typical military leaders have exceptional confidence with respect to both who they are and the validity, accuracy, and correctness of their views. This confidence is a critical ingredient in making them effective leaders who motivate, guide, and care for America's sons and daughters. This enhanced confidence only increases as rank and responsibility progress because the senior leaders have been continuously rewarded for their judgment and decision-making. Unfortunately, as we see at the War College on a daily basis, this constant positive reinforcement, in the form of promotion and selection for key billets, in some cases encourages an absolutist frame of reference within an overly narrow point of view. As mentioned earlier, seasoned faculty will assert that some War College students routinely think that they have figured out how the world works and they are exceedingly confident that their view is correct. This egocentric leaning tends to insulate leaders with regard to their actual thinking processes and often presents a significant obstacle to empathizing with and considering the viewpoint of others. In previous years War College students have had a negative emotional response to this assertion. It is important to highlight that I am not claiming that egoism (extreme selfishness or self-importance) underlies strategic leader thought, but that egocentrism (believing your mental models of the world are the correct ones) is a natural phenomenon, is routinely found in War College students (and faculty), and is a barrier to good thinking.

Maybe an example will help highlight the subtle, yet important, influence of egocentric thinking. In an recent "advice to readers" type column in the newspaper a 16-year-old girl wrote a letter saying that she was in love and wanted to know if a 16-year-old can actually be in love. In response to this column's response to the girl that stated she should wait a few years before committing to marriage, an 86-year-old man wrote back and said that he had met his wife when he was 16 and that they had been happily married for 70 years. He therefore asserted that the girl should ignore the advice columnist's response to "wait a few years." This is a great example of the impact of egocentric thinking. As you can probably infer, the 86-year-old man provided his advice in good faith and probably thinks it is the best advice since it is what he did. His advice is not based on any egotistic tendencies or feelings of self-importance. However, a quick review of the poverty and quality-of-life statistics for girls who get married at 16 will quickly show that, on average, this girl would be making a drastic mistake to get married at age 16. This elderly man let his egocentric tendencies get in the way of good critical thinking (e.g., evaluating the information and understanding the high risks of a teenage marriage).

Paul and Elder describe several egocentric tendencies that are relatively common in military culture. Egocentric memory is a natural tendency to forget information that does

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[13] Paul and Elder, 214.

not support our line of thinking. Egocentric myopia refers to thinking within an overly narrow point of view. Egocentric righteousness describes a tendency to feel superior based on the belief that one has actually figured out how the world works. Egocentric blindness is the natural tendency not to notice facts and evidence that contradict what we believe or value. [14] In an interesting study from the 1960s related to egocentric blindness researchers provided smokers and nonsmokers a taped speech that discussed the strong relationship between smoking and cancer. As the subjects listened to the taped speech a large amount of static was present in the audio recording. The subjects in the experiment could reduce the static by pressing a button, at which time the message became easier to understand. The results showed that smokers were less likely to press the button to reduce static than nonsmokers. In fact, the greater the amount of cigarettes smoked, the less the smokers pushed the static button. Similarly, nonsmokers did not reduce the static as much as a smoker when the message in the tape conveyed that smoking was not hazardous to your health. This experiment supports the assertion that individuals tend to ignore information that is in dissonance with already held beliefs. As you progress through your War College year, be sensitized to the tendency to ignore, or not listen to, ideas that are in opposition to your own. Challenge yourself to "push the static reduction button" when you are presented information that is contrary to the opinions you have developed throughout your life.[15]

Fortunately, just as egocentrism can prevent us from appreciating the underlying thinking processes that guide our behavior, critical thinking, especially in the form of appreciating multiple points of view, can help us learn to explicitly recognize that our point of view is always incomplete and sometimes blatantly self-serving and wrong.[16]

As critical thinkers assess the point of view of someone presenting information to them, they not only need to be aware of their egocentric tendencies, and attempt to empathize with the various other relevant points of view, they also need to apply some measures of critical reasoning to the assessment. As an example, when a senior commander is presented with recommendations for a courts-martial by a subordinate unit, it is probably smart to evaluate who the recommender is, ask yourself what biases they bring to the issue (based on past statements or previous recommendations), ask yourself if there are any factors that might interfere with the accuracy of this person's judgment, and also probably query the environment to see if there is evidence from any other source that corroborates this person's statements or recommendations.[17] This assessment protocol would apply to any information source, whether that source is face-to-face, in written text, or via the public media.

A third component of the model is ASSUMPTIONS. This is a concept that should be very familiar to a military officer. An assumption is something which is taken for

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[14] Ibid, 234.

[15] Brock, Timothy C., and Balloun Joe L., "Behavioral Receptivity to Dissonant Information." Journal of Personality and Social Psychology 6 (1967): 413-28.

[16] Ibid 233.

[17] Anne Thomson, *Critical Reasoning: A practical introduction*, 2nd ed. (New York: Routledge, 2002), 44.

granted.[18]   Within the scope of critical thinking, however, the concept of an assumption is somewhat different than that which we use to provide boundaries in the military decision making process. As critical thinkers, we need to be aware of the beliefs we hold to be true that have formed from what we have previously learned and no longer question.[19]   We typically process information based on assumptions about the way the world works that are ingrained in our psyche and typically operate below the level of consciousness. We have assumptions about fat people, late people, blonde women, and barking dogs.   These are sometimes referred to as mental models or schemas.   The brigade commander in Iraq makes inferences, forms opinions, and makes decisions that are largely rooted in his assumptions about cause-effect relationships with respect to the way the world works.   He probably has assumptions about the way people should interact, about what a good leader looks like, about how a typical town should appear (in terms of organization and cleanliness), and about how responsible an individual is for what happens in his or her life. All of these assumptions and many more will affect his judgment with respect to possible courses of action for dealing with increased civilian casualties. The arrows in the model show that assumptions influence all aspects of the model: our Point of View, Inferences, whether we decide a problem is worthy of critical thinking, and many other components of our thought processes. The more in touch an individual is with his assumptions, the more effective a critical thinker he will be.

If our focal BCT commander, for example, assumes that the primary cause of most of the problems in Iraq is a lack of willingness by the populace to affect a solution, he will evaluate the efficacy of courses of action with this assumption in mind. He might not support any course of action that relies on the Iraqis. Whether or not this is an accurate assumption is, in fact, irrelevant. What matters is that the brigade commander implicitly draws upon his assumptions as part of the critical thinking process. More importantly, the brigade commander needs to create a command climate where subordinates feel they can surface and question assumptions they believe are relevant to the concern at hand. Peter Senge in his seminal book The Fifth Discipline highlights the importance of dialogue, as opposed to discussion, in a learning organization. He posits, "In dialogue, a group explores complex difficult issues from many points of view. Individuals suspend their assumptions but they communicate their assumptions freely."[20] In order to suspend assumptions, leaders must first be aware of them. This reflective self-inquiry, in relation to a specific concern, is extremely important in the critical thinking process, as is the creation of a climate in which individuals feel free to communicate their assumptions and to question others.

Another component of the critical thinking model that needs to be considered is INFERENCES.   Critical thinkers need to be skilled at making sound inferences and at identifying when they and others are making inferences. An inference is a step of the mind, or an intellectual leap, by which one concludes that something is true in light of

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[18] Ibid, 26.
[19] Paul and Elder, 70.
[20] Peter M. Senge, *The Fifth Discipline* (New York: Doubleday, 1990), 241.

something else being true, or seeming to be true.[21] Whereas an *assumption* is something we take for granted, an *inference* is an intellectual act in which we conclude something based on a perception as to how the facts and evidence of a situation fit together. If a soldier sees an Iraqi man approaching with his hands hidden behind his back, he may infer that the man is probably hiding a weapon and intends to do him harm. This inference is based on the assumption that Iraqi men who hide their arms when approaching are very likely dangerous and quite probably insurgents or terrorists.

Critical thinkers strive to become adept at making sound inferences.[22] Ask yourself, "What are the key inferences made in this article, presentation, etc.?" Then ask yourself if the inferences are justified, logical and follow from the evidence. Remembering the earlier components of the model, obviously, inferences are heavily influenced by the Point of View and Assumptions we bring to the issue. This explains why two officers viewing the same power point slide, an information source, may come to completely different conclusions in terms of what the data means or represents. An interesting exercise I do at the War College to make this relationship more salient is to provide students brief information, and then ask them to identify their inferences and underlying assumptions. This exercise never fails to show that people make very different inferences from the same stimulus, and as would be imagined, these inferences are based on very diverse assumptions. Once these assumptions are identified, they, along with the inferences, can be questioned, examined, and discussed.

In terms of our brigade commander in Iraq it is easy to see the importance of inferences. As an example, if an Iraqi informant tells the brigade interpreter that the local police captain is aligned with the terrorists, the brigade commander may infer that this information is useless and therefore direct that no action be taken on the intelligence. In this case the commander's underlying assumption that informants are untrustworthy and typically lie impacts his inference and subsequent directive. The brigade S-3, however, may have a different assumption about the efficacy of informant intel and might think the correct course of action will involve bringing the police captain in or at least putting him under observation. From a critical thinking perspective, both the commander and the S-3 should be aware that they are each making an inference based on an underlying assumption. They should question their underlying assumptions and ensure that other equally valid considerations have been entertained before drawing inferences from the available information.

Although many of the components of the critical thinking model derive from Paul and Elder's work, the essential strength of this paper, and my view of critical thinking, focuses on how we evaluate information. This part of the paper is rooted in literature dealing with managerial decision-making and philosophy. The following sections are not meant to de-emphasize that, when evaluating information, critical thinkers need to assess the validity of concepts, policies, information, evidence, and data; rather, I suggest that this process needs to occur with the critical thinker alert to the impact of biases and

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[21] Paul and Elder, 70.
[22] Ibid, 102.

logical fallacies described below. As a member of the War College faculty I am surprised at how often students are deceived by information. The next step in the model is: EVALUATION OF INFORMATION. In this section I will describe how military officers typically evaluate information and make decisions using the Military Decision Making Process (MDMP). I will then discuss the shortcuts humans habitually take that often lead to decision-making biases. Finally, I will overview many of the logical fallacies that undermine information evaluation.

Rationality and the MDMP

The Military Decision Making Process is a rationally-based tool that usually leads to an effective decision. As leaders, decision-making is a key characteristic of our job description and it carries a significant burden for evaluating mounds of data and information, preparing creative alternatives for evaluation, and then prioritizing and weighting assessment criteria capable of identifying the best decision. Effective officers recognize that decision making is one of those challenges that benefits from critical thinking.

MDMP and any rational decision making model are typically rooted in several assumptions. First, the model assumes that the problem or goal is clearly definable. Second, the information that is required to make a decision is available or can be acquired. Third, there is an expectation that all options generated can be adequately considered, compared, and evaluated to identify an optimal solution. Fourth, the environment is presumed to be relatively stable and predictable, and finally, there is sufficient time for working through the decision making processes. Much research has been conducted on how people actually make decisions, especially under circumstances of high pressure, short timeframes, and with ambiguous, unpredictable information. Nobel laureate Herbert Simon[23] proposed the term "bounded rationality" to describe the condition in which the limitations just noted cause decision makers to make seemingly irrational decisions (or at a minimum, sub-optimized decisions that simply have to do with negotiating constraints that restrict a fully rational framework. Such irrational decisions typically result from a reliance on intuitive biases that overlook the full range of possible consequences. Specifically, decision-makers rely on simplifying strategies, or "general rules of thumb" called heuristics, as a mechanism for coping with decision making in the volatile, uncertain, complex, and ambiguous (VUCA) environment. Critical thinkers need to not only appreciate the framework for assessing their own thinking, but also need to appreciate the heuristics that most people rely upon when making decisions. The concept of heuristics relates strongly to the "automatic" mode of cognitive thought described earlier.

Heuristics as aids to decision making are not bad; in fact, if we did not use heuristics we would probably be paralyzed with inaction. As an example, you might have a heuristic for which coat to wear to class each day. Your heuristic might be, "if there's frost on the car, I wear the parka." Without this heuristic short cut, you would have to

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[23] Simon, Herbert A. *Models of Man*. (New York: John Wiley and Sons, 1957).

check the thermometer and compare it to a chart that prescribed the correct coat to wear under certain temperature conditions. Heuristics help leaders to make good decisions rapidly a significant proportion of the time. Unfortunately, however, heuristics also can lead decision makers into making systematically biased mistakes. Cognitive bias occurs when an individual inappropriately applies a heuristic when making a decision.[24] As critical thinkers, we need to be aware of cognitive biases in order to more effectively evaluate information. In addition to the heuristics presented below, critical thinkers need to assess whether the premises of the argument (yours or someone else's) are true or false, and may possibly lead to a fallacious argument or a wrong decision. Identifying unacceptable, irrelevant, and insufficient premises serves to advantage critical thinkers in evaluating arguments for fallaciousness.

Biases and Heuristics

Three general heuristics are typically described in the psychology and management literature: (1) the availability heuristic, (2) the representativeness heuristic, and (3) the anchoring and adjustment heuristic.[25] Each is briefly elaborated below.

The <u>availability heuristic</u> acknowledges that people typically assess the likelihood of an event by the ease with which examples of that event can be brought to mind. Typically, people will recall events that are recent, vivid, or occur with high frequency. This heuristic works well in most instances; however, a critical thinker needs to be aware of the biases that result from expeditious process. For example, a Division Commander doing Officer Efficiency Reports (OERs) on two equally capable battalion commanders might be inclined to give the battalion commander who challenged him at the last Unit Status Report (USR) a lower rating. The recentness and vividness of the challenge might cause the Division Commander to overlook the impressive accomplishments of this particular battalion commander and accord a rating that is actually inconsistent with the officer's performance. This would be, in effect, a poor decision.

Reconsider our brigade commander in Iraq. Imagine that on the morning prior to his staff brief on possible courses of action to deal with the terrorist threat he has a conversation with a brigade commander from a sister division. In that discussion the other brigade commander mentions that the only successful way he's been able to deal with terrorist attacks is to increase his information operations campaign by providing accurate information of terrorist attacks through the local mosque. The brigade commander will then process information during the staff brief with the comments of the sister brigade commander at the forefront of his thoughts. This may or may not lead to a good decision. What is important is that the brigade commander understands this tendency to process information within the context of like-situations that can be easily recalled from memory. The environment and circumstances in his brigade sector may not

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[24] Max H. Bazerman, *Judgment in Managerial Decision Making* (Hoboken, NJ: John Wiley & Sons, 2002), 6-7.

[25] Ibid, 6-7.

be at all conducive to the same solution as in the sister brigade. Critical thinking and self-reflection can help prevent this error.

At the strategic level, it's easy to posit the influence of the availability heuristic in the early years of American involvement in Vietnam. Decision makers had recent and vivid impressions of the failure of appeasement in WWII and the success of Korea to serve as a basis for imagining likely scenarios if the U.S. did, or did not, get involved in Vietnam. In regards to decision making and Iraq, it could be argued that Americans inappropriately applied the relatively peaceful conclusion to the Cold War and apparent ease of democratic change in the Eastern-Bloc countries to the Middle East, where democratic change will be anything but easy. This can be explained, at least in part, by the availability heuristic.

The representativeness heuristic focuses on the tendency for people to make judgments regarding an individual, object, or event by assessing how much the item of interest is representative of a known item. Several biases emanate from this heuristic; two of the most prevalent are insensitivity to sample size and regression to the mean.

Sample size bias occurs when decision-makers improperly generalize the reliability of sample information. A War College student recently provided an example of this tendency during a seminar discussion about the challenges returning soldiers from combat face while assigned to Army Posts, out of harm's way. The student asserted, "When I was a lieutenant my battalion commander told me the story of Sergeant Smith, who got the Medal of Honor in Vietnam, but was eventually discharged from the Army because he received numerous punishments for misconduct in the 1970s. Let's face it, the tougher the warrior, the harder it is for them to adjust to peacetime." In response to this student's assertion the rest of the Seminar nodded their heads. A critical thinker, however, would have recognized (and raised the issue) that there are obviously many tough warriors who transition to a peacetime Army and continue productive service to their country. In the Abu Ghraib incident, many would argue that Congress, the international community, and some of the American populace unfairly generalized the behavior of a few soldiers to the entire American Army. From the other angle, we have all seen the Commander's Inquiry saying that the reason for the poor decision making by the soldiers involved in the incident was due to lack of training. The net result is that six months later the entire Army is sitting through chain teaching on one subject or another, despite the fact that the actual incident was limited to a very small group of violators.

In our Iraq example, imagine a battalion commander briefing the brigade commander and saying, "I placed our Raven Unmanned Aerial Vehicle (UAV) under the control of the company commanders and yesterday it enabled us to take out three bad guys." There might be a tendency of the brigade commander to then recommend this solution to the other battalions when, in fact, this success is based on one day and one event. If two battalions had said they had tried this technique and that it had worked 15 or 20 times in the last couple of weeks, then the sample size would have been large enough to conclude that this was definitely a viable solution. Recognize, too, that this bias does not mean that we should not try new techniques even if we have a small sample size; rather, it is

meant to highlight that there are significant risks that a critical thinker needs to be aware of when generalizing a one-time incident to an entire population or environment.

Another bias related to the representativeness heuristic is <u>regression to the mean</u>. This bias is based on the fact that extreme high or low scores tend to be followed by more average scores. Therefore, when predicting future performance, decision-makers assume poor performers will stay poor (i.e., they are representative of poor performers) and strong performers will stay strong. Unfortunately (or fortunately), extremely low or high performance will typically be followed by a performance level closer to average. This is why the sports teams that make the cover of <u>Sports Illustrated</u> tend to lose, and the mutual fund that was the strongest performer last year is probably not the one to buy this year. An awareness of regression to the mean for our brigade commander in Iraq would hopefully cause him to investigate to determine "why" there has been an increase in attacks. If no apparent cause exists for the increase, a critical thinker might be a little more patient before reprioritizing resources to address a problem that will level out in the near future, and may in fact not be the most pressing issue faced by the unit at the current time. Applying regression to the mean at the strategic level enables a better assessment of OIF casualty data. In the first ten days of April of 2006, there were thirty combat deaths. The media highlighted that this number already exceeded the combat deaths from March of 2006, implying an increase in the intensity of the war. A critical thinker, however, would note that the March 2006 casualty numbers were the lowest in two years; hence, regression to the mean would probably be a better explanation for the April numbers than automatically assuming the intensity of the war had increased significantly.

Biases derived from anchoring and adjustment include <u>insufficient anchor adjustment</u> and <u>overconfidence</u>. In terms of anchoring, research has shown that decision-makers develop estimates by starting from an initial anchor, based on whatever information is provided, and adjusting from there to yield a final answer.[26] Military personnel have mastered this bias. For a host of reasons, probably closely associated with constant personnel turnover and a lack of total knowledge about a specific job due to constant Permanent Change of Station (PCS) moves, military personnel base estimates "on last year's numbers." Whether we're talking about a unit's budget, how long a war will take, or how many casualties we will have, we use previous numbers and experience as an anchor and adjust accordingly, rather than use current information to develop a value. A practical application of ways to deal with this bias can be seen in negotiations. It is usually good to initiate the first offer in a negotiation if you have reasonable belief that you understand the bargaining zone. The opening offer will serve as the anchor and will most likely create a range for possible negotiation that will be more advantageous to you.

In our Iraq scenario, the brigade S-3 might tell the commander that the previous brigade conducted 15 patrols a day in the southern sector. Fifteen patrols will thus become an anchor. The courses of action for dealing with the terrorist situation might, therefore, include a recommendation to increase the number of patrols to 20 a day. A

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[26] Ibid, 27.

critical thinker, however, will realize that the 20/day recommendation is based on the anchor of 15 from the previous unit. He would then ask "why 20; why not 60 or why not 4?" to force his staff to re-assess the troop to task requirements afresh.

Overconfidence describes a bias in which individuals tend to be overconfident of the infallibility of their judgments when answering moderately to extremely difficult questions. As an example, when receiving a briefing from a subordinate and you ask him to estimate the probability of an event occurring, keep in the back of your mind that this probability is inflated. If the subordinate says, "sir, we have a 90% probability of eliminating all the enemy in the city," a critical thinker will remember this bias and assume that a more realistic estimate would be substantially lower. The Army's "can do" culture, tends to reinforce the subordinate commander's over-inflated estimates as proxy measures of confidence in the command – and they might be completely wrong, or right.

Other Biases, Traps and Errors

The confirmation trap describes a condition in which people tend to seek confirmatory information for what they think is true and either fail to search for – or discard inconsistent and disconfirming evidence. This bias highlights the need for subordinates to provide candid feedback to their superiors, and more importantly, for superiors to encourage their subordinates to give them all the news – good or bad. Failure to make a concerted effort to be absolutely candid will typically lead to a situation in which the boss looks for information that supports his decision, while discounting information, no matter how valid and important, that challenges his decision. As critical thinkers evaluating an issue, we need to appreciate this bias and know that it's a natural tendency that we need to overcome, no matter how painful it is on our ego (yes, this bias is clearly related to egocentric tendencies such as egocentric memory and blindness). At the strategic level, the Bay of Pigs decision by the Kennedy Administration is a poster-child for the confirmation trap. Similarly, in 2004 it was not hard to find a Sunday morning talk show pundit arguing that it was almost certainly the case that, once they were persuaded that Iraq had WMD, President Bush and Prime Minister Blair placed more weight on evidence that supported their position than on that which challenged it (i.e., Hans Blix's view). They may have tried to keep open minds, but once committed to what you see as the truth, it becomes very hard to assess all the evidence impartially.

If our Iraq brigade commander believes that the increase in attacks is due to guidance from the local Imam, he (and probably his direct-reports) will have a tendency to search for information that supports this perspective. He will also be inclined to discount valuable information that might lead to another cause.

The fundamental attribution error describes a phenomenon in which people tend to have a default assumption that what a person does is based more on what "type" of person he is, rather than the social and environmental forces at work in that situation. This default assumption causes leaders to sometimes attribute erroneous explanations for behavior to a person when the situation/environment provides a better explanation.

When a soldier comes late to work, our first thought is "that individual doesn't care/is incompetent, etc." when in fact he or she could have a perfectly acceptable reason for being late. At the strategic level, an example of this would be a conclusion that the reason the critical negotiation failed is because General Jones blew it, as opposed to attributing the failure to the large range of environmental conditions that were more likely to have caused the failure.

Similarly, we are more likely to attribute our successes to internal factors and our failures to external factors. This is the <u>self-serving bias</u>. When we ask our child why he did poorly on a test, he responds that "the teacher asked questions that weren't in the book;" if we ask him how come he received an "A," he'll say "because I'm smart." Similarly, a person not selected for promotion is more likely to say, "The system is broken," than "I'm just an average performer." In his book, *Good to Great*, Jim Collins looks at those factors that allow good companies to turn into great companies.[27] Collins asserts that the leaders of the comparison companies (those that did not make the list of great companies) tend to "look out the window for something or someone outside themselves to blame for poor results, but would preen in front of the mirror and credit themselves when things went well."[28] When processing issues and questions, critical thinkers understand that the bias to accept responsibility for success while attributing failure to other sources permeates human cognition (and again, this is related to egocentric tendencies).

Critical Reasoning/Logical Fallacies

Besides developing an understanding of biases and heuristics as a means to improve one's ability to evaluate information critically, a strong critical thinker will also assess the soundness of the arguments presented. This aspect of critical thinking is strongly rooted in the field of philosophy. For the purpose of this paper, I will keep this section at pragmatic levels and not focus primarily on the difference between deductive and inductive reasoning or how to evaluate the veracity of syllogisms. Rather, based on my seminar experience at the US Army War College, I will describe the nine most common errors students make in constructing and evaluating arguments.

When we make an argument we offer reasons as to why others should accept our view(s) or judgment. These reasons are called premises (sometimes evidence) and the assertion that they allegedly support is called the conclusion.[29] A sound argument meets the following conditions: (1) the premises are acceptable and consistent, (2) the premises are relevant to the conclusion and provide sufficient support for the conclusion, and (3) missing components have been considered and are judged to be consistent with the conclusion. [30] If the premises are dubious or if they do not warrant the conclusion – then

[27] Collins, Jim. *Good to Great, Why Some Companies Make the Leap and Others Don't*, (New York: HarperCollins Publishers Inc, 2001).

[28] Ibid, 35.

[29] Schick, Theodore, Jr., and Vaughn, Lewis. *How to Think About Weird Things – Critical Thinking for a New Age, 3rd Ed*. (New York, NY: McGraw Hill, 2002), 298.

[30] Halpern, 203.

our argument is fallacious.[31] Unfortunately, as I see in the daily conversations among senior field grade officers at the War College, logically fallacious arguments can be psychologically compelling. Officers, since many have never really learned the difference between a good argument and a fallacious one, are often persuaded to accept and believe things that are not logically supported. As critical thinkers evaluating information, you need to ask yourself: Are the premises acceptable? Are they relevant? Are they sufficient? If the answer to any of these questions is no, then the argument is not logically compelling. What follows are the nine most common logical fallacies I have observed in the military context.

Arguments against the person. When someone tries to attack the person presenting an argument and not the argument itself, they are guilty of this fallacy. A common War College example of this is the denigration of a position with a politically categorizing statement such as: "That guy is just a left-wing liberal." Instead of assessing the argument or position based on the premises and conclusion, the argument is ignored and the arguer is attacked. Our new brigade commander in Iraq during a battle update briefing might inadvertently discount some important intelligence because the briefer, who has a bias against Special Forces, framed the presentation of the intelligence by saying, "I'm not sure of the validity of this intelligence because it came from the ODA (Operational Detachment Alpha) working in our area." Awareness of this fallacy should cause critical thinkers to constantly be aware of their own biases and prejudices to ensure that they do not fall victim to a seemingly convincing argument that is, in reality, based on an unsupported attack on a person or group advancing the information.

False Dichotomy.   When someone presents a complex situation in black and white terms, i.e., they present only two alternatives when many exist, they are committing the fallacy of false dichotomy. Military officers often present information this way. "Sir, we can either commit the ten million dollars to force protection or start preparing our response to '60 Minutes' when our troops get blown up." This illustrates a false dichotomy. In this case, there is a wide range of other alternatives (spend 3 million dollars, for instance) that are not presented in this argument. As we work to develop more innovative and creative leaders, the ability to identify false dichotomies becomes even more important. Rather than reducing complex issues to a choice between two extreme positions, critically thinking leaders need to use their creative juices to identify the wide range of possible alternatives that are actually available. Our brigade commander may be briefed, "Sir, we either provide the security for the protest Sunday or pre-place evacuation vehicles for the guaranteed terrorist attack." In reality, there is a large continuum of courses of action to include having the U.S. provide outer-ring security while the Iraqis provide local security.

Appeal to Unqualified Authority. A valid technique to support a premise is to cite a trusted authority on the topic. A fallacy occurs, however, when the authority cited is weakly credentialed for the matter at hand. In the hierarchical and rank-centric military, this is an especially salient fallacy. Although either a Command Sergeants Major or a

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[31] Schick and Vaughn, 298.

General Officer is knowledgeable about many things, in many cases neither one may be an expert on some particular issue. Yet, there is a tendency to communicate their position on an issue as evidence with which to support our position. Many active duty military are frustrated when 24-hour news channels, for instance, feature a retired Army General discussing the efficacy of the Air Campaign in Kosovo or a long-retired Special Forces Major assessing the problems with the current ground campaign in Fallujah being fought by the Marines. Unfortunately, the American public at large does not understand military rank structures, nor do they understand the tenuous link that a retired Special Forces Major has with what is actually going on anywhere in Iraq. The net result is the many people are mislead by appeals to unqualified authorities and hence are convinced of the validity of what is, in fact, a fallacious argument.

False Cause.   This is a common fallacy in which someone argues that because two events occurred together and one followed the other closely in time, then the first event caused the second event. Night follows day, but that does not mean that day "caused" the night. Similarly, just because attacks in an Iraqi city decreased the day after a new President was elected in the U.S. one should not infer that the U.S. Presidential election caused the decrease in attacks. They are probably completely exclusive. Without getting into a description of scientific methodology, suffice it to say that there are many reasons one event may follow another, yet bear no causal relationship. We have all seen the case where a new leader comes into the unit and the unit does much better or much worse on a measurable evaluation (gunnery, Command Inspection, etc.). We almost always assume the positive or negative change is due to the new leader, when in fact it could be due to a wide range of other explanations such as lower level key personnel changes, new equipment, or even regression toward the mean or it's opposite. In a complex and stressful environment such as Iraq, leaders are especially vulnerable to the false cause fallacy. Soldiers are being wounded and killed; everyone wants to find a cause for the attacks in order to eliminate it. Critical thinkers will ensure that presented causes of bad events are, in fact, causally related to the bad result being explained.

Appeal to Fear.   This involves an implicit or explicit threat of harm to advance your position. A fear appeal is effective because it psychologically impedes the listener from acknowledging a missing premise that, if acknowledged, would be seen to be false or at least questionable.[32] An example of this fallacy would be for a prosecutor at a Courts Martial to argue that the defendant needs to be convicted because if the person is not put in jail, the spouse of the juror might be the next victim. In reality, what the defendant might do in the future is irrelevant for determining his guilt at the Courts Martial. An example of this fallacy would be for a company commander to argue to the brigade commander, "if we don't detain and question every young male in the southeast corner of the town you can count on deadly IED attacks along the Main Supply Route each day." In this case the company commander is distracting the brigade commander from the weak and questionable premise that every young male is planting IEDs by focusing attention on the fear of losing more soldiers to IEDs.

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[32] Patrick Hurley, Critical Thinking: Excerpts from Patrick Hurley, A Concise Introduction to Logic, 8th ed. for Strategic Leadership U.S. Army War College (Belmont, CA: Wadsworth/Thomson Learning, 2004), 115.

Appeal to the Masses. This fallacy focuses on an assertion that if something is good for everyone else, it must be good for me. Advertisements try to convince us that "everyone" is seeing a movie, trying a new taco, or wearing a new set of jeans; therefore, you should too. In a military context, we often hear a comment like, "Sir, all the other TRADOC posts have already gone to this system." Unfortunately, popularity is not always a reliable indication of sensibility or value.[33]

Slippery Slope. The fallacy of slippery slope occurs when the conclusion of an argument rests upon an alleged chain reaction and there is not sufficient reason to conclude that the chain reaction will actually take place. As an example, during 2007 there was much discussion in political-military circles concerning U.S. support for President Musharraf in Pakistan. A typical argument favoring support for Musharraf at all costs usually proposed that not supporting Musharraf would lead to instability in Pakistan, at which time the Islamic extremists would take over and then you would end up with a bunch of nuclear weapons controlled by Islamic extremists. Many would argue that this is a slippery slope argument because the dire consequences of not supporting Musharraf, or any military leader in Pakistan, are not supported by the actual facts such as the low number of Islamic extremists in Pakistan and the historical power of the Pakistan Army. Similarly, many Americans argue against National Security Agency (NSA) listening of phone conversations placed from potential terrorists overseas to U.S. numbers by suggesting that allowing this monitoring will lead to the NSA listening to all phone calls of American Citizens which will eventually cause Americans to have private, personal phone calls made across town monitored by Uncle Sam. The alleged chain reaction in this case is clearly not supported and should not be used as a premise to convince the listener not to support NSA monitoring of potential terrorist's phone calls to the U.S. from overseas.

Weak Analogy. Analogies are an effective way to communicate concepts, especially complex ones. An analogy occurs when one situation is put side-by-side to another, and a similarity is pointed out. Quite often these analogies are strong and are useful in illustrating a valid point. The fallacy of weak analogy is committed when the analogy used is not strong enough to support the conclusion that is being drawn.[34] As an example, several recent editorials posited that the United States should deal with the Iranian nuclear threat just like we dealt with the Cuban Missile Crisis (i.e., out of the box thinking as opposed to offensive military force or traditional diplomacy). In this case they are arguing that the Iranian nuclear issue is similar to the Cuban Missile Crisis and therefore warrants a similar response. One might argue that although in both cases the U.S. was concerned about nuclear proliferation in a rival country, the dissimilarities are too vast (e.g., peer competitor sponsorship in the case of Cuba, impact of radical Islam in Iran) to argue that the techniques for dealing with Iran should replicate what we did with Cuba. Therefore, the conclusion that we should deal with Iran in 2006 much like we did with Cuba in1962 appears to be an example of a weak analogy fallacy. As an additional

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[33] Schick and Vaughn, 302.

[34] Hurley, 139.

example, there were many pundits in late 2003 that argued that U.S. forces in Iraq should mirror the British tendency to discard battle gear when dealing with Iraqis as the proper way to engage the population and create stronger community ties. Unfortunately, these pundits did not understand, or intentionally ignored, the fact that Shiite populations in Basra (where the British were operating) were significantly different, in terms of threat posed than were the Sunnis in the Sunni triangle (where U.S. forces were). They were guilty of a weak analogy fallacy.

Red Herring. The red herring fallacy is committed when the attention of a reader or listener is diverted with the insertion of some distracting information that is flashy, eye-catching and generally not relevant to the topic at hand. It is intended to divert the listener's attention.[35] In recent years it has not been uncommon for Army leaders to respond to questions about the lowering of standards for new enlistees and recruitment challenges by responding that current re-enlistment rates are higher than ever, especially for units returning from Iraq. They do not really address the issue of recruiting, but instead subtly change the focus of the conversation to retention. Similarly, anti-OIF interviewees often change the focus from whether democracy is good for Iraq or whether the U.S. forces have made life better for Iraqis by highlighting the number of the battle-amputees and combat deaths. In this case they are changing the focus from a discussion on the merits of U.S. policy by inserting an emotional issue guaranteed to distract and redirect the listener's attention.

Logical fallacies are very common and they are typically convincing. Recently, for example, in a TV documentary about alternate medicines, a U.S. Senator defended his Congressional bill to exclude vitamins and herbal medicines from USDA review by saying, "At least 100 million Americans use vitamins and other supplements every day and they can't all be wrong (appeal to masses); I know many Senators who also use these products (appeal to unqualified authority); this is just another case of the liberal left trying to intrude on the daily life of the average American (arguments against the person)." The average viewer probably thought these arguments made sense, but as critical thinkers, we need to assess arguments, especially important and relevant arguments, to identify fallacious reasoning. Bad judgments prompted by fallacious reasoning that draw upon invalid and questionable evidence are the enemy of critical thinkers.

In accord with the critical thinking model, as we EVALUATE THE INFORMATION presented we need to keep in mind our tendency to let biases influence our decision-making. Additionally, we need to be aware of the traditional types of fallacious reasoning that are often used, sometimes intentionally and sometimes out of ignorance, to try and convince us to support an argument.

The last component of the model is IMPLICATIONS. Critical thinkers need to understand the short-term consequences of accepting the inferences initially posited, of accepting any opposing perspectives, or of accepting the perspective developed through

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[35] Hurley, 125.

critical thinking. They obviously also have to appreciate the long-term consequences of the information they accept and the decisions they make. This includes the 2nd and 3rd order effects. Critical thinkers ask themselves, "what if my assumptions are incorrect? What if the variables I think are defined are actually uncertain or quite different from what I think? What things haven't I considered that I need to consider." Many of these questions will be ignored or minimized if the egocentric tendencies discussed earlier override sound judgment. As part of "implications" the critical thinker needs to analyze the impact of his decision on all relevant stakeholders. A stakeholder is a person, group, or unit that has a share or an interest in a particular activity or possible decision.[36]

Our brigade commander trying to reduce civilian deaths may come to a decision after going through the components of the critical thinking model that he needs to increase his Information Operations campaign through the local mosque and tell the populace that the increase in attacks is due to bad guys from out of the sector coming into the sector. Assuming he made this decision cognizant of his own viewpoint and assumptions, and that it was based on sound information and inferences, he now needs to consider the implications of this decision. What if the Imam at the mosque is not as trustworthy as he thinks? What if the populace knows that the attacks are actually coming from terrorists who live in the area, not outside operatives…will the brigade Commander lose credibility? What if the populace starts to overwhelm his intelligence assets with reports of purported bad guys? Does he have the force structure to do something about it? Who are the stakeholders in this case? The Commander needs to assess his course of action along many lines, including the impact on his troops, adjacent units, local populace, Iraqi military and police forces, and higher headquarters.   The bottom line is that a critical thinker will consider all these things, and many more possibilities, in a deliberate and conscious manner either within the boundaries of the military decision-making process or outside of it.

Remember that critical thinking is purposeful thinking. Depending on the time available, a critical thinker will process information using reflective judgment with an end result being a decision, a clarified position on an issue, etc. The critical thinking diagram shows several feedback arrows leaving the final box and heading back towards the heart of the model. These arrows are intended to suggest that once a critical thinker makes a decision, for instance, he then needs to evaluate his information processing in light of the outcome. If, initially, the critical thinker thought the issue was not worthy of critical thinking and proceeded across the top of the diagram in an automatic mode and later realized this type of issue was not as simple as he thought, he would then need to store that in memory so that the next time a similar situation presented itself he would use the components of critical thinking as opposed to automatic processing. The outcome of the decision/judgment should also cause the decision maker to reevaluate his point of view, assumptions, and inferences, along with how he evaluated information.   The bottom line is that like most process models, there's a strong feedback component to the critical thinking model.

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[36] Thomas L. Wheelen and J. David Hunger, Strategic Management and Business Policy, 3rd ed. (Reading, MA: Addison-Wesley Publishing Company, 1989), 89-90.

The preceding section is intended to provide a simple critical thinking model to facilitate the development of critical thinking skills. My intent is to provide a basic understanding of the concepts presented, but probably just as important, to also inculcate the terminology of critical thinking into daily military lexicon. Military leaders need to continuously ask themselves, "Is this something I need to think about critically? How are my point of view and egocentric tendencies affecting the way I look at this? What's the point of view of the person presenting the information? What are my assumptions? Are we making the correct inferences based on the data provided? Are there data we need to consider and can access? Is the information true, or at least plausible? Are the conclusions warranted by the evidence? Are biases and traps affecting our judgment? Have I considered all the implications? The more we can introduce these terms into Army culture, the better the prospect for increasing our critical thinking skills. The next section will assess the current state of critical thinking in the military.

Critical Thinking in the Military

The Army clearly has some structural and cultural processes and norms that should facilitate critical thinking. The Military Decision Making Process (MDMP) is a rational, methodological approach for making decisions. Followed correctly, it should lead to the best (or at least better) decision given the degree of uncertainty and complexity of the situation. The real challenge is that each step of MDMP is accompanied by a wide range of opportunities for a failure in critical thinking with a consequent bad decision. From receiving the Commander's initial guidance, to generating Courses of Action; from evaluating Courses of Action to listing Assumptions, the reader can hopefully appreciate that biases, egocentric tendencies, poor inferences, and fallacious reasoning can lead the MDMP astray in very significant respects. If the Commander thinks his intuition is infallible and that that last way he dealt with a seemingly similar problem will work in this case, you can see how the availability heuristic, along with egocentric righteousness, might well lead the staff right down the wrong road. Lee's actions at Gettysburg, following on the heels of his success at Chancellorsville, might illustrate this point. At the end of the day a critical thinker will appreciate the value of MDMP, yet at the same time he or she will appreciate the potential impact of a lack of critical thinking on all steps of the process.

Besides MDMP, the military has other processes and norms that facilitate critical thinking. For one, the military is extremely diverse. Rich and poor, black and white, Jew, Christian, Muslim and non-believers all serve in the U.S. military. This diversity, by definition, can be a structural hindrance to obstacles to critical thinking as diversity helps to challenge bias, egocentric myopia, and egocentric blindness. Of course, the success inherent in leveraging diverse viewpoints and opinions depends on the commander's ability to listen to them.

Unfortunately, the combination of our diversity and emphasis on MDMP, which should help the Army elicit strong critical thinkers, does not seem to overcome the wealth of challenges the Army faces as it attempts to become better at critical thinking. Our

biggest obstacle lies in the hierarchical nature of the Army and its accompanying cultural norms. Reflective skepticism as a technique to improve judgment, and hence decisions, is very difficult to embrace if you are not comfortable disagreeing with your boss, or even the boss's boss. This becomes especially difficult if ranking senior leaders, because of continued accolades and promotions bestowed tend to represent the egocentric tendencies described earlier. Unfortunately, senior leaders who have failed to take the careful steps to ensure the information they receive from their subordinates is "ground truth" even if it disagrees with their view, seem to many to be more the rule than the exception (At this point, you should be nodding your head in agreement – be careful – <u>you</u> are somebody's boss's boss – How do you get the right information?).

Compounding this individual egocentric view, the U.S. Army, because of its preeminence among the world's land powers, has tended to develop an ethnocentric view that our way is the best way. The impact of this ethnocentric (in addition to egocentric) view of the world is that the Army often struggles with cultural awareness, which is based on some of the critical thinking faults described in this article. The intense focus of the Army recently to develop culture-savvy officers is a testament to this shortcoming and a first step toward meaningful change.

The hierarchical nature of the Army causes a secondary effect in terms of developing critical thinking skills through its resistance to dialogue as a form of interaction. Senge asserts, "There are two primary types of discourse: dialogue and discussion. Both are important to a team capable of continual generative learning, but their power lies in their synergy, which is not likely to be present when the distinctions between them are not appreciated."[37] In order for dialogue to occur, whether in a command and staff meeting in a troop unit or in staff group at the Captain's Career Course, several things need to occur. Most important among these is a requirement that participants must regard one another as colleagues; additionally, someone must serve as a facilitator who "holds the context" of dialogue.[38] Fastabend and Simpson posit, "Critical thinking is also an aspect of environment. To foster critical thinking, Army teams must at times leave rank at the door. 'Groupthink' is the antithesis of critical thinking and exists in organizations in which subordinates simply mimic the thinking of their superiors."[39] For the Army to develop its critical thinking capability, it needs to educate, train and select officers who are comfortable with putting their position power (i.e., rank) to the side in an effort to facilitate better judgment through reflective skepticism. Jim Collins in *Good to Great* found that the leadership in the great companies was not only about vision, it was "equally about creating a climate where truth is heard and brutal facts confronted. There is a huge difference between the opportunity to "have your say" and the opportunity to be heard. The good-to-great leaders understood this distinction, creating a culture wherein people had a tremendous opportunity to be heard and, ultimately, for the truth to be

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[37] Senge, 240.
[38] Ibid, 243.

[39] Fastabend and Simpson, 21.

heard."[40] This requirement applies not only to unit leaders, but also, and probably more importantly, to facilitators/instructors in the TRADOC educational system.

Given these challenges and obstacles to an Army environment which highlights critical thinking, how do we make the Army better at critical thinking? First, we need to teach leaders the knowledge, skills, and terminology associated with critical thinking. It is an acquirable intellectual skill. As mentioned earlier, the best way to teach critical thinking skills to Army leaders is to provide context-dependent skill development. Within the Officer Education System in TRADOC, for instance, officers need to be exposed to the model components presented here; however, the real meat of critical thinking development will occur as TRADOC instructors and facilitators highlight critical thinking opportunities throughout the presentation of the vast array of topics covered in a TRADOC curriculum.

This recommendation, however, has several antecedents to success. First, TRADOC needs to develop in its instructors the requisite skills to enable critical thinking in a context-dependent environment. Most important among these is the ability to facilitate dialogue. TRADOC instructors need to understand when it is appropriate to offer direct presentation, when it is best to have a discussion, and most importantly, when to facilitate a context-dependent dialogue to develop critical thinking skills. Second, not only does TRADOC need to develop the facilitation skills of its instructors, it needs to assign instructors to TRADOC slots that have the background, intelligence, and requisite knowledge, skills and abilities to ensure success. This is not the first paper to argue that the quality of TRADOC instruction needs to be raised. The secondary effect, which is too often overlooked, of a strong TRADOC critical thinking climate is that the graduates will then report to troop units where they can model some of these behaviors when dialoguing about important topics. This position is consistent with Fastabend and Simpson who posit, "Army leaders must create an environment where critical thinking is the norm and reasoned debate replaces unspoken dissent. Critical thinking is a learned behavior that is underpinned by education. The Army education system, moreover, can be our most effective lever of cultural change. Many of our most important cultural shifts can trace their origins to the school house."[41]

Admittedly, critical thinking skills will develop, to some degree, in the TRADOC school environment. But the majority of critical skill development that needs to occur in troop assignments will happen only as the culture of the Army migrates to one that places a high value on critical thinking skills in a contemporary operating environment where leaders must deal with extreme complexities, assorted ambiguities, and continuing uncertainties. Within the constraints of the Army Force Generation (ARFORGEN) model, it simply makes sense that during the first year of the cycle a new battalion commander and his subordinates would attend some facilitated critical thinking training that could then be modeled throughout future cycles by the battalion commander. If the

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[40] Collins, 74.
[41] Ibid, 21.

Army really cares about critical thinking, we need to devote time and resources to its development.

Conclusion

The development of critical thinking skills is imperative for a successful United States Army. A goal of this paper is to identify some of the concepts and terminology that can serve as a foundation for discussions about critical thinking. The benefits of critical thinking have been discussed. Some relevant issues currently facing the military would also benefit significantly from the application of critical thinking. First, as the Army tries to develop a culture of innovation across the force it needs to be emphasized that creative and out-of-the-box ideas are important and valuable, but only to the extent that critical thinking is applied to help identify viable creative solutions to real problems. Creative thinking involves a divergence of thought; critical thinking involves a convergence of thought to weed through the poor ideas in order to identify the good ones. Without critical thinking, creative thinking tends to be wasteful of time and energy.

Second, as mentioned earlier, the egocentric and ethnocentric tendencies of Army officers are a barrier to developing cultural awareness. As critical thinking skills develop so will the ability to empathize with other points of view, an important capability of a culturally-savvy officer. Finally, as Army leaders learn how to facilitate dialogue as a means to encourage critical thinking, a secondary effect will be an empowerment of subordinates to contribute to the military decision making process. Most studies on decision making show the benefit of collecting various points of view and perspectives to the overall quality of the final decision. In addition to decision quality, numerous studies show that empowered subordinates will also show higher job satisfaction and a desire to remain in the military.[42] The context for the Army is not getting simpler – the sophisticated understanding of the context must be matched with sophisticated decision making. The application of the Critical Thinking skills discussed in this Chapter will begin to move our leaders, and our Army, in that direction.

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[42] Katherine I. Miller and Peter R. Monge, "Participation, Satisfaction, and Productivity: A Meta-analytic Review," in *Leaders & The Leadership Process*, 4th ed., ed. Jon L. Pierce and John W. Newstrom (Boston, McGraw-Hill 2006), 314.

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APPENDIX D
HISTORICAL EXAMPLES OF OPERATIONAL DESIGN[1]

> *"Only through studying history can we grasp how things change; only through history can we begin to comprehend the factors that cause change; and only through history can we understand what elements of an institution or a society persist despite change."* [2]
>
> **Peter N. Stearns**
> **The American Historical Association**

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[1] These historical examples are taken verbatim from USJFCOM Joint Warfighting Center Pamphlet 10, *Design in Military Operations*, 20 September 2010.
[2] http://www.historians.org/pubs/free/WhyStudyHistory.htm

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UNDERSTANDING THE ENVIRONMENT:

PLANNING THE STRATEGIC BOMBING CAMPAIGN AGAINST GERMANY, 1944-1945

Earlier efforts against the German air force (*Luftwaffe*) and its supporting industry—despite some significant setbacks—had borne fruit in that the Anglo-American Allies achieved air superiority to a degree that would provide for success invading Nazi-held Europe. The *Luftwaffe* had been seriously weakened as a day fighter force and was withering away in early 1944. The key question was, now that the Allies had the wherewithal to mount sustained bombing campaigns throughout most of the Reich, what were the Nazi critical vulnerabilities that, once attacked, would most quickly end the war?

There were three major views held in various quarters of the Anglo-American strategic air coalition. Air Chief Marshal Sir Arthur T. "Bomber" Harris of the British Bomber Command, espoused continuing night area bombing of German cities as the Royal Air Force had done since 1942. The goal of such operations was to inflict as much infrastructure damage as possible to both reduce industrial output and to degrade civilian morale. The Allied firebombing of Hamburg during the last week of July, 1943, was the best example of success in accomplishing the former objective. The commander of the newly formed United States Strategic Air Forces in Europe, LtGen Carl A. "Tooey" Spaatz, held a different view. The Allies had long agreed that attacks on fascist oil production facilities were important, but past results had fallen short of expectations. Given new long-range fighters (the P-51 Mustangs) that could escort bomber formations, the proximity of Allied air bases in Italy to targets normally beyond the range of airfields in England, and the demise of the *Luftwaffe*, Spaatz calculated that the time was right to heavily weight the strategic air offensive against this target set. But the last view was held by an airman not directly serving within the coalition air component; British Air Chief Marshal Sir Arthur Tedder was the Deputy to the Supreme Commander, U.S. General Dwight D. Eisenhower. Tedder became the most vocal proponent to attack German logistical lines of communications, principally, railroad facilities. When Tedder had been the Allied Air Commander in the Mediterranean he learned from his science advisor, Professor Solly Zuckerman, that such attacks proved very effective in disrupting German operations in the early stages of the Italian Campaign.[3]

Zuckerman's December 1943 study was controversial and quickly challenged by American airmen in Italy conducting OPERATION STRANGLE; attacks against bridges and viaducts were seen as more profitable than the strikes on rail marshalling yards Zuckerman advocated.[4] Still on one point both Zuckerman and American Office of Strategic Services advising U.S. airmen in Italy agreed: attacks on supply lines would not be effective alone without simultaneous ground assault; as Zuckerman put it, "…it is

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[3] David Eisenhower, *Eisenhower At War, 1943-1945* (New York: Random House Publishers, 1986), 114.
[4] John F. Kries, General Editor, *Piercing the Fog: Intelligence and Army Air Force Operations in World War II* (Washington DC: Air Force History and Museums Program, 1996), 188.

appreciated that air attacks on his supply lines cannot produce a critical situation unless his rate of consumption is raised."[5]

But overall agreement by senior Anglo-American air commanders could not be achieved in the first few months of 1944. Tedder, Zuckerman, and the Allied Expeditionary Air Force commander, Air Chief Marshal Sir Trafford Leigh-Mallory, proposed the "Transportation Plan" to hit enemy rail marshalling yards, bridges, and tunnels within France during the weeks prior to the D-Day landings. The British Prime Minister, Winston Churchill, was against it since he suspected such attacks would cause heavy French civilian casualties—this was politically unacceptable given that the Allies were intending to "liberate" France, not kill its inhabitants.[6] "Bomber" Harris was against it because he believed his aircrew were not trained for such precision missions and "Tooey" Spaatz did not like it as he didn't want to divert strategic strike resources away from attacking German petroleum infrastructure.[7] The British Chief of the Air Staff, Air Chief Marshal Sir Charles Portal, directed "Bomber" Harris to experiment with night precision strikes against twelve German aircraft component factories and six railroad marshalling yards. These were very successful and even Harris had to concede complete satisfaction with the results.[8]

In frustration, Eisenhower called for a stakeholder meeting to finalize the air campaign concept leading up to the Normandy landings. On 25 March, 1944, Portal chaired the meeting and brought a high degree of clarity to the proceedings, ensuring all got their say but that free discussion of the issues and various interpretations of the supporting intelligence and analysis were aired.[9] Eisenhower, while agreeing that Germany's oil production capacity had to be the primary target, also supported Tedder's transportation targeting plan as the second priority since he believed it would provide the best chance to help the Allies get ashore on D-Day and stay there. Following the 25 March decision, Tedder created the Transportation Targets Committee, which would later become the Railway Targets Committee. Focused on planning attacks against rail facilities in France before D-Day, its efforts were justified after the invasion in an all-source intelligence report, dated 6 July, which said: "The evidence is already conclusive that these operations have had a disastrous effect on enemy logistics."[10]

While there were many intelligence sources the Allies leveraged in understanding how the German strategic logistical system worked and how Allied actions affected it, the deployment of Ground Survey Teams into the field to assess bombing impacts on German transportation proved essential in refining Tedder's and Zuckerman's understanding of this Nazi vulnerability. American and British intelligence specialists, along with French Operations Research personnel, provided reports essential to learning

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[5] Ehlers, *Targeting the Third Reich: Air Intelligence and the Allied Bombing Campaigns*, (Lawrence, KS: University of Kansas Press, 2009), 188.
[6] Robin Neillands, *The Bomber War: The Allied Air Offensive Against Nazi Germany* (New York: The Overlook Press, 2001), 313.
[7] Ibid.
[8] Ibid, 313-314.
[9] Eisenhower, 184-190
[10] Neillands, 225.

how the Germans conducted rail operations, particularly regarding damage mitigation and repair measures. Marshalling yards, particularly locomotive repair shops, were again shown to be the critical node to attack. But would this same understanding of enemy critical vulnerability, demonstrated in France, prove to be true regarding German strategic logistics in the Nazi homeland?

Tedder and Zuckerman were convinced that it was.[11]   Through careful analyses of many sources, to include the ground-survey reports and captured railway records, they challenged prevailing conventional wisdom in another stakeholder meeting on 24 October, 1944. While Eisenhower again sided with Spaatz and others maintaining oil infrastructure bombing as the first priority for strategic strike, Tedder's insistence that transportation attacks must be accelerated nonetheless, coupled with his persuasive analyses, were convincing enough for participants to create a new working committee on transportation on the 29th. Tedder's 25 October 1944 plan called for complementary ground and air action that would bring the Reich transportation system to its breaking point. Continuous and sustained ground action would create heavier enemy demands for petroleum products, ammunition, and supplies, while persistent air bombardment against both oil and transportation targets would exponentially degrade German logistical effectiveness to the point where the Nazi national economy would collapse and with it, German forces in the field.   It is interesting to analyze Eisenhower's oft-criticized decision to maintain a "broad front" ground offensive in light of this. A descendant of the Railway Targets Committee, the new Combined Strategic Targets Committee Working Committee (Communications) executed assessment functions and targeting recommendations.

Skillful Allied concentration on bombing Reich national transportation in Germany began to tell in short order.   By 23 November, it became clearer that oil and transportation infrastructure strikes, particularly the marshalling yards of the *Reichsbahn*, was having marked impact on German economic functioning when conducted in tandem. On 19 February, Supreme Headquarters, Allied Expeditionary Force G-2, assessed that "…the entire enemy industrial output is in grave jeopardy as a result of increasing inability of the enemy's communications….to meet the demands made upon them." Eisenhower's intelligence staff recommended that it was "…all the more urgent that as much effort as possible should be directed as soon as possible against the Ruhr communications."[12]   One modern historian credits the transportation attacks as breaking down within four months of the start of the bombing, critically disabling coal distribution and creating conditions where "every form of industrial production was in decline or had ground to a halt."[13]

There was never any doubt that effectively attacking German oil infrastructure would degrade the military capability of *Wehrmacht* forces in the field.   Not only was Tedder's

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[11] Ibid, 344.

[12] Ibid, 324.

[13] Alfred C. Mierzejewski, *The Collapse of the German War Economy, 1944-1945: Allied Airpower and the German National Railway* (Chapel Hill, NC: University of North Carolina Press, 1988), xi.

key understanding of the criticality and vulnerability of German transportation important to accelerating this degradation, Portal's ability to reconcile alternative viewpoints into a cohesive understanding of the environment proved sufficient for Eisenhower's decision on unified coalition design for the air offensive, leading to decisive results in action.

FAILURE IN UNDERSTANDING THE ENVIRONMENT:

THE VIET CONG ORDER OF BATTLE CONTROVERSY, 1967

In late 1966, the Secretary of Defense, Robert McNamara, learned that the Military Assistance Command Vietnam (MACV) Commander General William C. Westmoreland's strategy of attrition was not reaching its goal. American and South Vietnamese action against the communist Viet Cong guerrillas operating in South Vietnam had not yet created the "crossover point"—the point where enemy insurgent losses were greater than they could replaced. Late in November, Presidential assistant Robert Komer told McNamara that he disagreed, although he knew of Central Intelligence Agency efforts indicating that "a reappraisal of the strength of communist regular forces which is currently underway indicates that accepted (i.e., MACV) estimates of the strength of Viet Cong irregular forces may have drastically underestimated their growth, possibly by as much as 200,000 persons."[14]

What was going on? Sam Adams, a junior CIA analyst, had returned from information gathering trips in Vietnam in early 1966, trying to figure out why the crossover point had not been reached. His analysis of captured VC documents did not make sense. If the enemy's own statistics on desertions and defections were to be believed, then the crossover point should have been reached a long time earlier. So it had to be that the estimated VC order of battle—the organization and strength of the indigenous enemy guerrillas—everyone had been working from was wrong.

The VC OOB estimate had been changing for quite some time. Sam Adams's colleague at CIA, George Allen, had wrestled with the J2 of Westmoreland's predecessor, General Harkins, over the figures when the interagency Joint Evaluation Center was set up at MACV in the early 1960s. Allen was then employed by the Defense Intelligence Agency (DIA) and was critical of MACV J2 analytical methods. Allen's criticisms were not welcome by the military intelligence officers, especially since Allen was not part of the command and was a civilian. DIA was being cut out of the picture by the MACV and the experience soured Allen who transferred to CIA. Allen was an old Indochina hand and was interested in understanding what was termed "Viet Cong Infrastructure" (VCI)—what fielded, fed, trained, and supplied the main force guerrillas that MACV naturally focused on.

Trouble was, MACV J2 hadn't been tracking the VCI. They tracked main force guerrilla units. Both Allen and Adams quickly realized this was the source of the problem—"body count," desertion, and defection was happening in both enemy main force units and the VCI. But only the main force unit strengths and organization were being articulated in the official MACV VC OOB estimates.

The stage was set for a clash between the Washington CIA analysts and the MACV military intelligence organization with "boots on the ground." Westmoreland saw the

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[14] C. Michael Hiam, *Who the Hell Are We Fighting? The Story of Sam Adams and the Vietnam Intelligence Wars* (Hanover, NH: Steerforth Press, 2006), 81.

VC and North Vietnamese Army main force units as the "roots of the struggle" and the guerrilla militia and political elements as "the vines," possibly because of then-contemporary American understanding of how Mao's Red Army had fought and won the Chinese Civil War after the Second World War.[15]

After a meeting on 6 February 1967 in Honolulu between stakeholders on the VC OOB issue, the MACV J2, Brigadier General Joseph A. McChristian, directed an effort to improve VC OOB estimating, incorporating new standards that Adams endorsed. But a deal had been reached between CIA's leadership and the J2 that MACV's estimates would be considered authoritative. The numbers had not changed despite what seemed to be new methods.[16]

At the White House in April, 1967, General Westmoreland assured President Johnson that "the VC/NVA 287,000 order of battle is leveling off" and that "as of March, we reached the 'cross-over point'—we began attriting more men than Hanoi can recruit or infiltrate this month." But after he returned to Saigon, McChristian came in during the second week of May to see him with revised figures that the OOB wasn't what everyone thought—it was probably closer to half a million, which included the VCI. Westmoreland just looked at his J2 and said, "If I send that…to Washington, it will create a political bombshell." One of the J2's MI colonels, Gains B. Hawkins, who briefed the MACV commander in more detail on May 28 remembered that Westmoreland …"voiced concern about the major increase in the irregular forces and infrastructure that we had found. He expressed concern about possible public reaction to the new figures—that they might lead people to think we had made no progress in the war." Lieutenant Kelly Robinson recalled Westmoreland saying, "What am I going to tell Congress? What is the press going to do with this? What am I going to tell the President?" McChristian transferred to Fort Bragg three weeks later.[17]

Matters came to head when coordinating the Special National Intelligence Estimate (SNIE) 14.3-67 on communist ability to prolong the war. Intended for the President and the Joint Chiefs of Staff, the debate pit CIA analysts on one side with DIA and MACV on the other. Despite meeting after meeting to get resolution on the issue, progress was deadlocked. As George Allen remembers it, the new MACV J2, Phillip B. Davidson was particularly strident on the matter of OOB numbers above the 300,000 "line."[18]

George Carver, the senior CIA delegate, offered a compromise SNIE position to Westmoreland to achieve intelligence community consensus and eliminate potential sources of confusion. Only "main force" units would be covered by statistics, and when SNIE 14.3-67 was published, total Viet Cong were listed at 188,000 to 208,000. Nevertheless, Director of Central Intelligence Richard Helms felt uncomfortable enough

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[15] Hiam, 71.
[16] Hiam, 90-96.
[17] Hiam 100-102.
[18] George W. Allen, *None So Blind: A Personal Account of the Intelligence Failure in Vietnam* (Chicago, Ivan R. Dee, Publishers, 2001), 249.

with the SNIE OOB controversies that he wrote the following in the cover memo attached to the version sent to the President:

The new estimate is sensitive and potentially controversial primarily because the new strength figures are at variance with our former holdings…. I have considered not issuing this Estimate and after considerable consultation, believe this would be a mistake…. In short, the charge of bad faith or unwillingness to face the facts would be more damaging than the issuance of this document which can stand on its own feet."[19]

On November 15th, 1967, Westmoreland flew to Washington DC. The briefing he presented characterized many of the VCI organizations as "home guards" who were part-time participants, often unarmed, including "personnel of all ages" with "a high percentage of females." In the view of MACV, these "essentially low grade fifth columnists" were judged to "not represent a continual or dependable force and do not form a valid part of the enemy's military forces." The State Department's William Bundy remarked that this was not a good assessment when it seemed clear that "…these forces do inflict casualties and are also included in the military loss totals on a regular basis."[20]

The press covered Westmoreland's reports that the cross-over point had been reached and the VC were increasingly forced to fill the ranks of the South Vietnamese guerrillas with levies from the North. While some in the press questioned the strength estimates, by the end of 1967 it appeared to many Americans that, indeed, "the end begins to come into view."[21]

The communist Tet Offensive in January 1968 changed everything. A major miscalculation in Hanoi and in the senior leadership of the VC, the Tet offensive aimed to empower mass uprisings in the cities against the Saigon regime but instead turned into a major communist military disaster. Indigenous VC main force units as well as the VCI cadres were gutted after Tet—and as Westmoreland had predicted—VC losses could only be made good by bringing in replacement drafts from the North.[22] But political reverberations in the United States made such an Allied victory ring hollow. Robert McNamara's February replacement as Secretary Defense, Clark Clifford, judged that the negative repercussions within American public opinion were not due to journalists or the protesters: "Our policy failed because it was based on false premises and false promises."[23] In March, President Johnson announced on national television he would not run for re-election that year.

Phillip Davidson summed up the controversy in his retrospective:

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[19] Ibid, 252.

[20] John Prados, *The Hidden History of the Vietnam War* (Chicago: Ivan R. Dee, 1998), 126-127.

[21] Hiam, 124-126.

[22] Don Oberdorfter, *Tet! The Turning Point of the Vietnam War* (New York: Da Capo Press, 1971), 329.

[23] Clark Clifford and Richard Holbrooke, *Counsel to the President: A Memoir*, (New York: Random House, 1991), 473-474.

> *…unrecognized in 1967 and later by the participants, the fundamental question in dispute was not what was the composition and strength of the enemy force opposing the United States in Vietnam, but in mid-1967 what phase of revolutionary war was the enemy in, and towards what phase was he moving? Adams, the anchor of the CIA position, and his CIA cohorts believed that the war in 1967 was a Phase I insurgency. Even as late as 1975, Adams maintained that the war in the South in 1967 was an insurgency. McChristian took this same position. Their insistence, then, in including the Communist political infrastructure…in the Enemy Order of Battle made sense if the war was, in reality, a Phase I insurgency. In fact, in such an insurgency these civilian/political elements should have been emphasized over the enemy's main force and local force units.*

> *On the other side of the controversy, Westmoreland and the MACV staff sensed, largely by intuition, that the war had already progressed from a Phase I insurgency into a Phase II (a combination insurgency and conventional war) and was swiftly moving towards Phase III (conventional war)….Seeing a conventional war in the offing, the MACV staff emphasized the enemy's main and local force units as the key elements of enemy strength. The guerrillas and the civilian elements of the enemy force structure were remnants of a past phase and were of minor relevance to the conventional war which was fast approaching.[24]*

The VC never recovered their former capabilities after the 1968 Tet Offensive. Subsequent Communist offensives against South Vietnam in 1972 and 1975 were waged primarily by conventional forces fighting in conventional warfare styles.

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[24] LTG Phillip B. Davidson, USA (Ret.), *Secrets of the Vietnam War* (Novato, CA: Presidio Press, 1990), 67.

FRAME THE PROBLEM:

THE DECISION FOR THE INCHON LANDINGS, 23 AUGUST, 1950

Within four days of the opening of the Korean War in 1950, General of the Army Douglas MacArthur began to conceive of an amphibious counterstroke such as the kind he mounted against the Japanese in the South West Pacific Area in World War II. On July 2nd, a little over a week since the war began, MacArthur, his Chief of Staff MG Edward "Ned" Almond, and G3 BG Edwin K. "Pinky" Wright's Joint Strategic Plans and Operations Group (JPSOG) began planning for OPERATION BLUEHEARTS, an amphibious assault to take place on July 22nd at the port of Inchon, using the Army's 1st Cavalry Division and a regimental combat team from the Marines.[25] But the situation became so grave on the Korean peninsula that both the Marine RCT and 1st Cavalry Division had to be committed to bolster LGEN Walton Walker's Eighth U.S. Army on the congealing Pusan Perimeter, thus spelling the end to BLUEHEARTS. Nevertheless, MacArthur did not give up on his idea of landing at Inchon. This latest evolution was termed OPERATION CHROMITE.

Despite MacArthur's enthusiasm for this plan, other senior leaders had misgivings. Chairman of the Joint Chiefs of Staff General Omar Bradley and the Chief of Staff of the Army, General J. Lawton "Lightning Joe" Collins, were both veterans of the European Theater of Operations. They readily recalled a similar concept attempted on the Italian peninsula in 1944—OPERATION SHINGLE, an amphibious landing at Anzio which was intended to break open an operational stalemate south of the landing but failed, becoming a drain on theater resources to prevent it from being thrown back into the sea. The Joint Chiefs of Staff pressed MacArthur for details on his plans when he expressed displeasure at their proposed timeline for introduction of the 1st Marine Division into the war. MacArthur neatly summed up his views—without mentioning Inchon—in his response:

> *Operation planned mid-September is amphibious landing of a two division corps in rear of enemy lines for purpose of enveloping and destroying enemy forces in conjunction with attack from south by Eighth Army. I am firmly convinced that early and strong effort behind his front will sever his main lines of communication and enable us to deliver a decisive and crushing blow….The alternative is a frontal attack which can only result in a protracted and expensive campaign.[26]*

For senior Army leaders Bradley and Collins, this looked a lot like Anzio; it even appeared to be roughly the same size—a two-division Corps attack—for a similar purpose. If this were not enough, even MacArthur's subordinate commanders involved in CHROMITE planning had their doubts regarding the chosen landing site. The

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[25] D. Clayton James, *The Years of MacArthur: Triumph and Disaster, 1945-1964* (Boston: Houghton-Mifflin Publishers, 1985), 465.

[26] Robert Debs Heinl, Jr., Colonel, USMC, *Victory at High Tide: The Inchon-Seoul Campaign* (Baltimore, MD: The Aviation and Nautical Publishing Company of America, 1979), 24.

physical characteristics of the environment at Inchon were daunting: (1) one of the largest tidal variations in the world—a 32-foot range between high and low tide; (2) a low tide revealing mud flats and swampy bottomlands which would bog amphibious ships and landing craft; (3) fast currents which rarely were below three knots, making landing craft maneuvering difficult; (4) only one major approach channel which dead-ended and could be easily blocked by a sunken or disabled ship; (5) little sea-room to maneuver; (6) a hydrography that lent itself to mining operations; (7) high ground and terrain that could provide cover, concealment, and good line of sight for land-based coastal artillery; and (7) no beaches that were worthy of the name—landing areas were seawalls at the port sites and rocky outcroppings with patches of sand at Wolmi-Do island. U.S. Navy officers had little positive to commend this landing site. Vice Admiral Arthur D. Struble, commander of the U.S. Seventh Fleet, commented, "If ever there was an ideal place for mines, it was Inchon." Commander Monroe Kelly observed, "Make up a list of amphibious 'don'ts,' and you have an exact description of the Inchon operation." Lieutenant Commander Arlie G. Capps provided the most famous assessment: "We drew up a list of every natural and geographic handicap—and Inchon had 'em all." Even MacArthur's Chief of Staff, "Ned" Almond, admitted that Inchon was "…the worst possible place we could bring in an amphibious assault." If that was not enough, tidal characteristics were best on 15 September—providing the most water over the mudflats-- and would not be so good again until 11 October. The operation had to be mounted then if the Pusan Perimeter was to be given significant succor.

There was little disagreement regarding the understanding of the environment. Eighth Army was fighting for its life to maintain the Pusan Perimeter against NKPA offensives. Inchon was a terrible place to conduct an amphibious assault given the physical conditions there. The issue was describing the problem in such a way that the solution appeared obvious. For MacArthur, the solution was obvious. The challenge was articulating the problem in such a way that all could see how well CHROMITE would solve it.

There were certainly other options on the table for consideration. "Pinky" Wright's JPSOG came up with two others apart from Inchon: one concept called for an amphibious assault at Kunsan, the second, at Chumunjin on the east coast.

General Collins and Admiral Forrest Sherman, the Chief of Naval Operations, were sent on a fact-finding trip by the JCS to MacArthur's headquarters in Tokyo. Sherman was able to speak with VADM Struble in Sasebo, telling him that he supported the Inchon concept despite the difficulties.[27]

At 1730, on August 23rd, the senior officers gathered in the paneled sixth-floor conference room between MacArthur's and Almond's offices. Admiral Sherman was there, as were Generals Collins and Edwards representing the JCS; Admirals Arthur D. Radford (Commander, U.S. Pacific Fleet), VADM Turner Joy (Commander, U.S. Naval Forces Far East and McArthur's naval commander), and RADM James H. Doyle (Commander, TF 90); Major Generals Almond (designated X Corps commander for

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[27] Ibid, 39-40.

CHROMITE), MG Doyle O. Hickey (Deputy Chief of Staff), Clark L. Ruffner (Chief of Staff, X Corps), and BG Wright. Neither Marine generals Lemuel C. Shepherd Jr. of Fleet Marine Forces Pacific nor Oliver P. Smith, the 1st Marine Division commander, were invited to attend. The meeting kicked off with an 80-minute long description of all aspects of the amphibious operation by nine officers from Amphibious Group 1. RADM Doyle concluded the presentation with the comment to MacArthur, "General, I have not been asked nor have I volunteered my opinion about this landing. If I were asked, however, the best I can say is that Inchon is not impossible." MacArthur responded that if the amphibious force could not make it, they'd then have to withdraw. Doyle replied that they could not: "Once we start ashore, we'll keep going."[28]

Collins then brought up other options—why not land at Kunsan, to the south? Why not Posun-Myong, just below Seoul? It was not long after this exchange that MacArthur rose from his chair and gave a compelling explanation of how he saw the military problem. It took him 45 minutes, was conducted completely without notes, and was characterized by those present as "one of the most compelling declarations of his career." According to MacArthur himself, the major points to his audience were these:

> *The bulk of the Reds are committed around Walker's defense perimeter. The enemy, I am convinced, has failed to prepare Inchon properly for defense. The very arguments you have made as to the impracticability involved will tend to ensure for me the element of surprise. For the enemy command will reason that no one would be so brash as to make such an attempt. Surprise is the most vital element for success in war….*

> *The Navy's objections as to tides, hydrography, terrain, and physical handicaps are indeed substantial and pertinent. But they are not insuperable. My confidence in the Navy is complete, and in fact I seem to have more confidence in the Navy than the Navy has in itself. The Navy's rich experience in staging the numerous amphibious landings under my command in the Pacific during the late war, frequently under somewhat similar difficulties, leaves me with little doubt on that score.*

> *As to the proposal for a landing at Kunsan, it would indeed eliminate many of the hazards of Inchon, but it would be largely ineffective and indecisive. It would be an attempted envelopment which would not envelop. It would not sever or destroy the enemy's supply lines or distribution center, and would therefore serve little purpose. It would be a "short envelopment," and nothing in war is more futile. Better no flank movement than one such as this. The only result would be a hookup with Walker's troops on his left. It would be better to send the troops directly to Walker than by such an indirect and costly process. In order words, this would simply be sending more troops to help Walker "hang on," and hanging on was not good enough. No decision can be reached by defensive action in Walker's perimeter. To fight frontally in a breakthrough from Pusan will be bloody and indecisive. The enemy will merely roll back on his lines of supply and communication.*

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[28] Ibid, 40.

But seizure of Inchon and Seoul will cut the enemy's supply line and seal off the entire southern peninsula. The vulnerability of the enemy is his supply position. Ever step southward extends his transport lines and renders them more frail and subject to dislocation. The several major lines of enemy supply from the north converge on Seoul, and from Seoul they radiate to the several sectors of the front. By seizing Seoul I would completely paralyze the enemy's supply system—coming and going. This in turn would paralyze the fighting power of the troops that now face Walker. Without munitions and food they will soon be helpless and disorganized, and can easily be overpowered by our smaller but well-supplied forces.

The only alternative to a stroke such as I propose will be the continuation of the savage sacrifice we are making at Pusan, with no hope of relief in sight. Are you content to let our troops stay in that bloody perimeter like beef cattle in the slaughterhouse? Who will take the responsibility for such a tragedy? Certainly, I will not….

If my estimate is inaccurate and should I run into a defense with which I cannot cope, I will be there personally and will immediately withdraw our forces before they are committed to a bloody setback. The only loss then will be my professional reputation. But Inchon will not fail. Inchon will succeed…[29]

The next day, the Admirals and Marine Generals Shepherd and Smith met in VADM Joy's office for a meeting. They agreed that the Army planners weren't fully considering the difficulties involved in Inchon and that another; better, landing area had to be found that could serve just as well in cutting off the North Korean supply lines. "Nothing of a concrete nature developed," noted Shepherd, who was able to subsequently meet with MacArthur. Shepherd and Almond had a conversation prior to that meeting where Shepherd learned that Seoul was the real objective and Inchon had been decided upon. MacArthur walked in after 45 minutes and led the Marine general to his office. Shepherd brought up his wish for an alternative objective for CHROMITE, but MacArthur responded with a 30 minutes explanation why Seoul had such strategic importance, given the situation. He finished his analysis with, "For a five dollar ante, I have an opportunity to win $50,000, and I have decided that is what I'm going to do."[30]

JCS telegrammed MacArthur on 29 August: "We concur after reviewing the information brought back by General Collins and Admiral Sherman in making preparations and executing a turning movement by amphibious forces on the west coast of Korea, either at Inchon in the event the enemy defenses prove ineffective, or at a

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[29] Douglas MacArthur, General of the Army, *Reminiscences* (New York: McGraw-Hill Book Company, 1964), 349.
[30] Heinl, Jr., 43.

favorable beach south of Inchon if one can be located….We understand that alternative plans are being developed to best exploit the situation as it develops."[31]

OPERATION CHROMITE was executed as planned on 15 September. When Walker launched his breakout offensive from the Pusan perimeter the next day, he was rebuffed. On the USS Mount McKinley, MacArthur held a conference on 19 September with Admirals Struble and Doyle, Generals Shepherd and Almond, and other senior leaders, telling "Pinky" Wright to dust off the plan for the Kunsan landing as it appeared Walker was going nowhere. News began to filter in that same time that the North Koreans opposite Walker were crumbling; they began a retrograde that quickly degenerated into rout. Seoul was declared liberated on 25 September. The first of Walker's ground units linked up with CHROMITE elements just north of Osan on 27 September. The Kunsan landing never occurred.[32]

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[31] William Manchester, *American Caesar: Douglas MacArthur, 1880-1964* (Boston: Little, Brown, and Company, 1978), 576.

[32] James, 481.

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FAILURE TO FRAME THE PROBLEM

THE WAR AGAINST THE U-BOATS, JANUARY-JUNE, 1942

If the Americans were not fully prepared for the Japanese attack on Pearl Harbor in December of 1941, they were completely unready for German's U-Boat offensive, code named DRUMBEAT, against the eastern seaboard of the United States the following month. Germany had declared war on the United States on December 11th and soon deployed its submarines into American waters.

The primary coastal defenses were borne by the U.S. Coast Guard and U.S. Army. To defend the eastern seaboard, the Coast Guard had only 51 old training aircraft, 18 scout aircraft, 6 patrol aircraft, 3 fighter and 3 torpedo aircraft, 4 sub chasers, 4 armed yachts, 2 obsolete gunboats, 3 patrol boats, and 7 cutters with only 3 in full working order. The Army Air Force had 9 B-17 bombers, 6 B-18s, and 31 B-25s stationed out of Virginia, New York, and Massachusetts; at the outset, six of these aircraft flew ASW air reconnaissance sorties per day. The Navy had destroyers, but they were earmarked for other duties and not immediately made available for coastal ASW.[33]

The Eastern Sea Frontier (ESF) command watch diary entry for 16 January 1942 indicated contacts with enemy submarines by Army planes, Navy planes and blimps. "Bombs dropped by an Army plane and by the K-G (blimp). Results unknown." Oil and debris washed up on the Long Island shore. American destroyers weren't patrolling the New York seacoast to hunt U-Boats; many were forming up near New York Harbor to escort AT-10, a troop transport convoy, to England. Others were still in port or conducting training.

The Navy was able to know where the U-Boats would patrol. The British Tracking Room communicated German U-boat patterns transiting to, patrolling, and returning from stations off the American coast. But that's not where the bulk of the U.S. Navy's surface ASW effort was focused. The allocation of naval ASW assets reflected an understanding of the problem to be sufficiently guarding transatlantic convoys, not patrolling the home waters of the United States.

By 7 February, the Chief of Naval Operations, ADM Earnest J. King, would direct the ESF to deploy and arm U.S. Coast Guard cutters against the submarine threat. He also authorized production and deployment of coastal patrol craft to help. But these would take a while to get into action and become effective. In the meantime, the principal surface ASW weapon was the Navy destroyer—and transatlantic convoy escort was seen as its principal duty. For King, protection of the first few troop convoys to England had to be the top priority for political—as well as military—reasons.[34]

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[33] Perry Moore, "Drumroll In the Atlantic," *Against the Odds Magazine, No. 22* (Phoenixville, PA: The Rowland Group, April, 2008), 7.

[34] Clay Blair, Hitler's *U-Boat War: Vol 1: The Hunters, 1939-1942* (New York: Random House, 1996), 692

But events would soon disabuse military planners of that notion. From January through April of 1942, only one convoy (ON-67 in late February) made contact with the Germans and lost six ships in the vicinity of the Newfoundland Bank. Many merchantmen were so confident that they did not even darken ship when in the open oceans. In contrast, by 24 February, 62 ships had been lost off U.S. and Canadian coasts, with 9 more sunk in the Caribbean. During the month of March, 70 out of 74 ships sunk in the Atlantic went down in North American coastal waters—this out of a total loss of 79 Allied ships worldwide for that period. The statistical analysis was sobering: nearly 42% of the destroyer force was deployed where less than 7% of sunk tonnage was lost. Conversely, where nearly 50% of the shipping tonnage was lost, less than 5% of the destroyer force was assigned there.[35]

By the end of March, what destroyers were on duty in the waters offshore were varying their patrol schedules; there were some smaller patrol craft involved, and U.S. aircraft and blimps maintained vigil over high traffic transit areas. But the seacoast towns and cities were still alight at night, aiding German navigation and target detection. Coastal shipping inbound and outbound still moved singly and used no zig-zag pattern many with their ship lanterns alight, merchantmen radio discipline was lax. U.S. Navy and Army ASW aircraft were not able to follow up submarine sightings with effective attacks. The Canadians were different—they followed British practices and soon U-Boat commanders gave up there and went to warmer waters off the U.S.[36]

For the German U-Boat crews, it was the beginning of what they called "The Second Happy Time." For the British, they were quite unhappy to be losing cargoes carried by ships flying the Union Jack in waters they could not be allowed to protect. An exchange of correspondence between the Prime Minister, Winston Churchill, and U.S. President Franklin D. Roosevelt led to the dispatch of the Officer In Charge of the British Tracking Room to help the Americans. Upon his arrival, he was told by RADM Richard S. Edwards, ADM Earnest J. King's deputy chief of staff, that, "the Americans wished to learn their own lessons and that they had plenty of ships with which to do so." The British OIC retorted, "The trouble is, Admiral, it's not only your bloody ships you are losing. A lot of them are ours!"[37]

Admiral King agreed to learn British methods and set up a mirror copy of the British Tracking Room in the Main Navy Headquarters, Washington DC. Churchill even loaned twenty ASW trawlers from England to help patrol the U.S. Atlantic coast, a "pay back" for a 1940-41 Lend-Lease loan of 50 old U.S. destroyers to England and Canada. Other sources of help were not immediately welcome. Members of the oil industry attempted to recommend that the U.S. military put guns on their merchant ships with trained crewmen, use Civil Air Patrol aircraft to spot U-Boats, and impose blackout conditions on the coasts. Of these, only the first recommendation was acted upon immediately.

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[35] Michael Gannon, Operation Drumbeat: *The Dramatic True Story of Germany's First U-Boat Attacks Along the American Coast in World War II* (New York, Harper and Row, 1990), 266-267.
[36] Ibid, 308-309.
[37] Patrick Beesly, *Very Special Intelligence: The Story of the Admiralty's Operational Intelligence Centre 1939-1945* (London: Hamish Hamilton, Publishers, 1977), 115.

Integrating civilian efforts was deemed too procedurally problematical and both the Amy and Navy were unsure of enforcing President Roosevelt's Executive Order 9066 of 19 February, authorizing them to assume lighting control of the seacoast, given local civilian pressures not to do so. While shielding and dimming was mandated, blackouts were never ordered through June of 1942.[38]

Spotting and forcing U-Boats to submerge for long periods, reducing their effectiveness, was the job of the Army's First Bomber Command charged with long-range air patrol of the Atlantic coastline. It was not enough, so the ESF Commander begged for Navy squadrons. Spare PBY Catalina flying boats and other smaller observation aircraft were found for the mission. By April, the ESF had 126 aircraft; the next month it had 172 and by June a grand total of 206, including the Fleet Airship Wing blimps.[39]

ADM King even eventually came around to authorizing the use of civilian assets in helping the ASW fight in American coastal waters. As with the military aircraft, the primary threat to U-Boats was in spotting them—which meant they had to submerge to avoid a follow-up attack. Staying submerged for long periods of time meant the submarines were hiding, not transiting or finding/attacking targets. Leveraging civilian aircraft under Army Air Force command and watercraft under Coast Guard auspices were seen as emergency measures and adopted. Eventually these measures would be terminated as the Battle of the Atlantic moved away from the U.S. Coasts in 1943. But U-Boat commanders would feel pressure from these "bees" once they began operations in earnest. From January to June 1942, however, this was not yet a reality.

Army Chief of Staff George C. Marshall lamented on 19 June 1942 that, "The losses by submarines off the Atlantic seaboard and in the Caribbean now threaten our entire war effort."[40] The German success of DRUMBEAT was not because the Americans did not understand the nature of the threat or the environment. It was not an intelligence failure. British experience and intelligence was made readily available. It was because senior American military leadership could not conceive of what the ASW problem really was in an integrated fashion—and this was a failure of Operations.[41] Indeed, U.S. military planners had other priorities in play that complicated measures to address the threat of DRUMBEAT. While it was natural for the British to focus on the German threat to commercial shipping (theirs in particular), the U.S. focus was on materially providing tangible support to the war overseas—particularly in furnishing even a small contingent of aircraft and soldiers to Europe and in prosecuting desperate efforts in the Pacific against the advancing Japanese. With those competing priorities firmly in view throughout January to June of 1942, the true military problem posed by the U-Boat threat only became clear after the damage of DRUMBEAT had already been done.

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[38] Gannon, 342-345

[39] Ibid, 349-351.

[40] Ibid, vi.

[41] Ibid, 241

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DEVELOP THE OPERATIONAL APPROACH:

PLANNING FOR OPERATION ANVIL-DRAGOON, 1943-1944

As the British and American allied powers considered options to conquer the continent of Europe from the Nazis occupiers, plans for an amphibious assault across the English Channel into France (SLEDGEHAMMER, then ROUNDUP, and finally OVERLORD) were complemented by a simultaneous landing on the south of France (ANVIL). The military problem was a simple one; the Germans could not be allowed to mass their still considerable military power against the cross-channel main effort, stalemating it or—at worst—throwing it back into the sea. To solve this problem, a number of supporting efforts would be necessary to distract Nazi leaders and keep them from significantly reinforcing against any major assault. One would eventually be a major deception operation, codenamed FORTITUDE. Another would be to get assurances from the Soviets that they would time a major offensive on the Russian Front coincident with the invasion of Europe. Yet another would be a strategic air campaign against German logistical lines of communications. There would also have to be the threat of more landings and ground offensives elsewhere in Western Europe that the Germans would be concerned about.

As simple as these ends were, the ways and means for mounting OPERATION ANVIL would prove elusive until just after D-Day.

To British Prime Minister Winston Churchill, OVERLORD and ANVIL were complementary—and ANVIL was mandatory only so long as the assumptions behind it remained true. The first assumption was the idea that both operations could be conducted simultaneously to keep the Germans guessing which was the main attack. The other was the notion that there was no other good option open to the Allies other than ANVIL to keep Nazi forces from massing against forces conducting OVERLORD. There were other good reasons for ANVIL as well. French divisions under De Gaulle were better postured to enter France through the southern approach as they had been forming and training in North Africa. This would be far easier than having to transport them to an overcrowded southern England and from there to the continent, or to the continent directly from North Africa after OVERLORD established a lodgment. Originally, ANVIL had been conceived as an amphibious feint with but a single ground force division, but eventually became a large Franco-American operation involving ten divisions that were otherwise uncommitted in the Mediterranean. No Commonwealth ground divisions were involved.[42]

But then the Allied understanding of the environment changed. In the fall of 1943, U.N. forces had bogged down in their ground offensive up the mountainous Italian peninsula well short of Rome. A proposed amphibious assault at Anzio—SHINGLE-- for early 1944 to break the deadlock was estimated to require more naval (particularly amphibious lift), ground, and air forces than originally planned for. The British were keen on this particular amphibious "end-run" and the drive to Rome. Commitment of

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[42] David Eisenhower, *Eisenhower At War, 1943-1945* (New York: Random House Publishers, 1986), 103

forces to this effort appeared to jeopardize feasibility of the ANVIL concept if it was to be mounted at the same time as OVERLORD, given the preparatory timelines of both.

American commitments in the Pacific—notably the Solomons Campaign—precluded transferring amphibious lift assets to the European Theater, which seemed to belie Roosevelt's public "Germany First" strategy. If that wasn't enough of a complicating factor, the requirement for amphibious lift in OVERLORD for the assault phase increased from three divisions to five as planning for the invasion of France progressed. The shortage of amphibious lift—particularly Landing Ship Tank (LST) assets—was judged so severe as to require postponement of OVERLORD.

On January 21st, 1944, General Eisenhower chaired a meeting with his allied deputies in London to discuss resource requirements for OVERLORD. SHINGLE was set to commence on the night of the 22nd. British General Bernard Law Montgomery opened the meeting with his assessment that OVERLORD was not feasible unless ANVIL was abandoned so that those amphibious lift resources could be made available for the cross-channel assault. Eisenhower countered that the Russians had been told that ANVIL would occur, seven French divisions in North Africa needed to get into the campaign and that would only happen through entering southern France. The Supreme Allied Commander maintained that ANVIL would be canceled "as a last resort" and only if he was convinced OVERLORD could not succeed otherwise. Admiral Bertram Ramsey, the Allied naval commander, backed up Montgomery's assessment that the naval requirements could not be met if ANVIL was to go forward. The Allied air commander, Air Chief Marshal Leigh-Mallory, argued that cancelling ANVIL would provide needed airlift for the airborne assault phase of OVERLORD. None of Eisenhower's commanders weighed in support of ANVIL.

Two options emerged as a way out of the impasse between Eisenhower and his deputies. One was to go back to the original idea for ANVIL—a single division amphibious feint. The other was to mount ANVIL later. Postponing ANVIL after executing OVERLORD offered a number of attractive advantages. First, scarce amphibious list and airborne assault assets could be shifted back from England to the Mediterranean to support ANVIL once it was certain that the OVERLORD force was ashore to stay. Secondly, a postponement gave U.N. forces in Italy more time to capture Rome if SHINGLE failed to accomplish that—and capturing Rome was a precondition to getting Churchill's concurrence for ANVIL.

It was apparent just a few days after the meeting that SHINGLE indeed failed to accomplish what was set out for it. Worse, requirements to sustain the hemmed-in beachhead included a large amount of amphibious lift that were earmarked for ANVIL. In the minds of the British, this was an American problem—they could either transfer needed resources from the Pacific theater to solve the shortfall, or they could cancel ANVIL to do it. The British Chiefs of Staff saw the Italian theater as presenting the best option to tie down German divisions in ongoing operations; ANVIL would be an unnecessary diversion and wasn't going to be linked adequately with OVERLORD given

that these could not be mounted simultaneously and that the French Riviera was a long way from the beaches of Normandy. [43]

American opinion on both sides of the Atlantic hardened in favor of ANVIL and wheels were set in motion to ensure the resources needed to execute it and OVERLORD were available. Grim determination persisted throughout the continuous bad news coming from the Anzio beachhead throughout January and early February, 1944. If anything, the deadlock in Italy convinced American decision makers that nothing good could come from pitting more strength against formidable enemy strength—a way around would have to be found. But American commitment to ANVIL would be matched with American commitment to providing more resources—provided their British allies concurred with the operational approach ANVIL represented. On 18 February, Eisenhower met once again with his deputies in London, and—this time—they agreed that ANVIL could be executed, provided the resources were found for it and OVERLORD to cover identified shortfalls. Eisenhower then presented his case to the British Chiefs of Staff; while he understood ANVIL would have to occur sometime after OVERLORD, there were still advantages to be reaped even beyond introducing the French divisions into the campaign. In his view, the Germans might strip the French Riviera defenses to try to contain the OVERLORD offensive; thus, even a two-division assault would provide an operational flanking maneuver that would greatly assist the liberation of France.

The British continued to insist that Italy was accomplishing in fact what ANVIL could offer in theory, and their insistence grew louder as American forces earmarked for the operation were kept from reinforcing exhausted divisions on the Italian peninsula. The Americans answered back that the Germans were capable of reorganizing their defenses to run an economy of force operation against the U.N. in Italy, freeing up as much as fifteen divisions for commitment elsewhere, divisions that ANVIL could attract instead of Normandy. [44]

By April, planning for OVERLORD had gone far enough into the campaign that the advantages of a subsidiary landing in southern France were glaringly apparent. The Combined Chiefs of Staff made a compromise that the capture of Rome would be paramount with a review of ANVIL made on 15 June 1944. But without a British commitment to ANVIL, the JCS refused to make a commitment to diverting landing craft from the Pacific; Sir Alan Brooke vowed that history would never forgive the Americans "for bargaining equipment versus strategy and for trying to blackmail us into agreeing with them by holding the pistol of withholding landing craft at our heads."[45]

The OVERLORD invasion and the offensive against Rome would succeed; ANVIL was set for execution in mid-August. But the British were never comfortable with this operational approach and continued to lobby for the primacy of the Italian offensive or landings in Greece or the Balkans that would pre-empt Soviet designs there as well as

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[43] Ibid, 129.
[44] Ibid, 181.
[45] Ibid, 193.

keep German forces away from France. The debate over ANVIL grew heated in June of 1944 as the British made their case for shaping the post-war political map of Europe to contain Stalin. Eisenhower had up to this point kept his options open on the ANVIL question as the tough fighting in the Normandy bocage raged on. ANVIL's execution date had been agreed for August 15th, but the British hoped it would be either cancelled or launched against the Balkans. On the evening of June 23rd, Eisenhower made his final decision that ANVIL would go in against the southern coast of France and summed up his operational approach in a formal statement:

> *OVERLORD is the decisive campaign of 1944. A stalemate in the OVERLORD area would be recognized by the world as a defeat, and the result on Russia might be far reaching. It is imperative we concentrate our forces in direct support of the decisive areas of northern France.*

> *ANVIL, with an invasion of the Bay of Biscay precluded, then provides the most direct route to northern France where the battles of the Ruhr will be fought. Moreover, ANVIL initially will contain an appreciable number of German divisions, will give us a port through which reinforcements from the U.S. can be deployed, and will open a route for an advance to the north where these reinforcements can fight on the main battlefield of France.*

> *….Our forces in Italy do not directly threaten an area vital to the enemy who, therefore, has the initiative in deciding whether or not to withdraw out of Italy.*

> *….France is the decisive theater. This decision was taken long ago by the Combined Chiefs of Staff. In my view, the resources of Great Britain will not permit us to maintain two major theaters in the European War, each with decisive missions.[46]*

The British would continue to press for abandonment of the southern France landing concept until the commencement of the 15 August DRAGOON amphibious assault by the U.S. Seventh Army on the Riveria coast against weak German defenses. In less than a month, this force drove up the Rhone valley and linked up with the OVERLORD forces racing across France at Dijon. A "considerable number" of German divisions were thus trapped in Southwestern France.[47] With many of the Channel ports still in German hands, a third of the total supply allocations for the forces in France eventually came through Marseilles, once the Rhone railway was repaired. U.N. forces in Italy continued their slow, grinding offensive up the northern portion of the peninsula.

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[46] Ibid, 318.

[47] Dwight D. Eisenhower, *Crusade In Europe* (New York: Doubleday and Company, 1948), 310.

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GLOSSARY
PART I − ABBREVIATIONS AND ACRONYMS

CCDR	combatant commander
CCIR	commander's critical information requirement
CJCS	Chairman of the Joint Chiefs of Staff
COA	course of action
COG	center of gravity
DOD	Department of Defense
DOS	Department of State
EXORD	execute order
FM	field manual
HQ	headquarters
J-2	intelligence directorate of a joint staff; intelligence staff section
J-3	operations directorate of a joint staff; operations staff section
J-5	plans directorate of a joint staff; plans staff section
JFC	joint force commander
JIOC	joint intelligence operations center
JIPOE	joint intelligence preparation of the operational environment
JISE	joint intelligence support element
JOPES	Joint Operation Planning and Execution System
JOPP	joint operation planning process
JP	joint publication
JPG	joint planning group
JPME	joint professional military education
JTF	joint task force
LOE	line of effort
LOO	line of operations
MCWP	Marine Corps Warfighting Publication
MDMP	military decision making process
MOE	measure of effectiveness
MOP	measure of performance
OPORD	operation order
OPLAN	operation plan
PERT	program evaluation and review technique
PMESII	political, military, economic, social, information, infrastructure

SecDef   Secretary of Defense

TRADOC   Training and Doctrine Command

US   United States
USG   United States Government

PART II − TERMS AND DEFINITIONS

assessment. **1. A continuous process that measures the overall effectiveness of employing joint force capabilities during military operations. 2. Determination of the progress toward accomplishing a task, creating a condition, or achieving an objective.** 3. Analysis of the security, effectiveness, and potential of an existing or planned intelligence activity. 4. Judgment of the motives, qualifications, and characteristics of present or prospective employees or "agents." (JP 3-0, Aug11)

battle damage assessment. The estimate of damage composed of physical and functional damage assessment, as well as target system assessment, resulting from the application of lethal or nonlethal military force. (JP 3-0, Aug 11)

branch. The contingency options built into the base plan used for changing the mission, orientation, or direction of movement of a force to aid success of the operation based on anticipated events, opportunities, or disruptions caused by enemy actions and reactions. (JP 5-0, Aug11)

campaign. A series of related major operations aimed at achieving strategic and operational objectives within a given time and space. (JP 1-02)

campaign planning. The process whereby combatant commanders and subordinate joint force commanders translate national or theater strategy into operational concepts through the development of an operation plan for a campaign. (JP 5-0, Aug 11)

center of gravity. The source of power that provides moral or physical strength, freedom of action, or will to act. Also called **COG.** (JP 1-02)

commander's critical information requirement. An information requirement identified by the commander as being critical to facilitating timely decision making. Also called **CCIR.** (JP 3-0, Aug 11)

condition. 1. Something essential to the appearance or occurrence of something else. (Webster's) 2. Those variables of an operational environment or situation in which a unit, system, or individual is expected to operate and may affect performance. **3. A**

physical or behavioral state of a system that is required for the achievement of an objective. (JP 3-0, Aug 11)

decisive point. A geographic place, specific key event, critical factor, or function that, when acted upon, allows commanders to gain a marked advantage over an adversary or contribute materially to achieving success. (JP 1-02)

effect. 1. The physical or behavioral state of a system that results from an action, a set of actions, or another effect. 2. The result, outcome, or consequence of an action. 3. A change to a condition, behavior, or degree of freedom. (JP 1-02)

end state. The set of required conditions that defines achievement of the commander's objectives. (JP 1-02)

interorganizational partners. A term that refer collectively to USG departments and agencies; state, territorial, local, and tribal agencies; foreign military forces and government agencies; nongovernmental agencies; and the private sector. (JP 3-08, Jun 11)

joint force. A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments operating under a single joint force commander. (JP 1-02)

joint operation planning process. An orderly, analytical process that consists of a logical set of steps to analyze a mission, select the best course of action, and produce a joint operation plan or order. Also called **JOPP.** (JP 5-0, Aug 11)

joint operations. A general term to describe military actions conducted by joint forces and those Service forces employed in specified command relationships with each other, which of themselves, do not establish joint forces. (JP 3-0, Aug 11)

joint planning group. A planning organization consisting of designated representatives of the joint force headquarters principal and special staff sections, joint force components (Service and/or functional), and other supporting organizations or agencies as deemed necessary by the joint force commander. Also called **JPG.** (JP 1-02)

line of effort. In the context of joint operation planning, using the purpose (cause and effect) to focus efforts toward establishing operational and strategic conditions by linking multiple tasks and missions. Also called **LOE.** (JP 5-0, Aug 11)

line of operation. A line that defines the interior or exterior orientation of the force in relation to the enemy or that connects actions on nodes and/or decisive points related in time and space to an objective(s). Also called **LOO.** (JP 5-0, Aug 11)

link. 1. A behavioral, physical, or functional relationship between nodes. 2. In communications, a general term used to indicate the existence of communications facilities between two points.   3. A maritime route, other than a coastal or transit route, which links any two or more routes. (JP 1-02)

major operation. 1. A series of tactical actions (battles, engagements, strikes) conducted by combat forces of a single or several Services, coordinated in time and place, to achieve strategic or operational objectives in an operational area. 2. For noncombat operations, a reference to the relative size and scope of a military operation. (JP 3-0, Aug 11)

measure of effectiveness. A criterion used to assess changes in system behavior, capability, or operational environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect. Also called **MOE.** (JP 1-02)

measure of performance. A criterion used to assess friendly actions that is tied to measuring task accomplishment. Also called **MOP.** (JP 1-02)

mission. 1**. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore. (JP 3-0)** 2. In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task. (JP 3-0) 3. The dispatching of one or more aircraft to accomplish one particular task. (JP 3-30) (JP 3-0, Aug 11)

node. 1. A location in a mobility system where a movement requirement is originated, processed for onward movement, or terminated. (JP 3-17) 2. In communications and computer systems, the physical location that provides terminating, switching, and gateway access services to support information exchange. (JP 6-0) **3. An element of a system that represents a person, place, or physical thing.** (JP 1-02)

objective. 1. The clearly defined, decisive, and attainable goal toward which every operation is directed. 2. The specific target of the action taken which is essential to the commander's plan. (JP 5-0, Aug 11)

operational approach. A description of the broad actions the force must take to transform current conditions into those desired at end state. (JP 5-0, Aug 11)

operational art. The cognitive approach by commanders and staffs—supported by their skill, knowledge, experience, creativity, and judgment—to develop strategies, campaigns, and operations to organize and employ military forces by integrating ends, ways, and means. (JP 3-0, Aug 11)

operational design. The conception and construction of the framework that underpins a campaign or major operation plan and its subsequent execution. (JP 1-02)

operational design element. A key consideration used in operational design. (JP 5-0, Aug 11)

operational environment. A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (JP 1-02)

operational level of war. The level of war at which campaigns and major operations are planned, conducted, and sustained to achieve strategic objectives within theaters or other operational areas. (JP 3-0, Aug 11)

reframing. — A process of revisiting earlier design hypotheses, conclusions, and decisions that underpin the current operational approach. (Handbook)

reframing indicator. A criterion used to assess changes in system behavior, capability, or operational environment that could cause a shift in the problem such that the current operational approach may no longer be valid. (*Planner's Handbook for Operational Design*)

sequel. The subsequent major operation or phase based on the possible outcomes (success, stalemate, or defeat) of the current major operation or phase. (JP 5-0, Aug 11)

system. A functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements; that group of elements forming a unified whole. (JP 1-02)

termination criteria. The specified standards approved by the President and/or the Secretary of Defense that must be met before a joint operation can be concluded. (JP 1-02)

unified action. The synchronization, coordination, and/or integration of the activities of governmental and nongovernmental entities with military operations to achieve unity of effort. (JP 1-02)

unity of effort. Coordination and cooperation toward common objectives, even if the participants are not necessarily part of the same command or organization - the product of successful unified action. (JP 1-02)

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