

Welcome back to *Campaigning*! This Joint Forces Staff College e-journal was dormant for a few years, but was recently reinvigorated by a dedicated cadre of faculty members to further promote idea sharing and to leverage the intellectual curiosity of faculty, students, and practitioners. As General Dempsey stated in his recent White Paper on *America's Military – A Profession of Arms*, “continued success in our profession depends upon a Joint force with the requisite thinking skills necessary for leading security operations around the world in the 21st Century.” Today’s Joint Forces Staff College has a unique opportunity to tap into the rich experiences of almost 1,500 JPME students per year. *Campaigning* again offers a venue to promote critical thinking, professional inquiry, and valuable discourse in a variety of subjects related to joint operations spanning all levels of war.

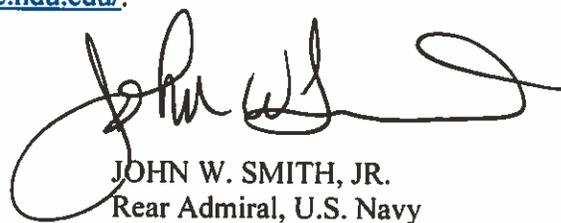


Joint security professionals must be capable of operating in a collaborative, context-based problem solving environment while developing shared understanding. The ability to analyze and process information into knowledge, however, is only the first part of a successful collaborative endeavor. The ability to effectively organize and effectively distribute that knowledge so others can act on it is the second half of a successful collaborative effort. Effective communication is hard work and successful communicators must develop the ability to clearly express their thoughts and intentions to facilitate professional collaboration. *Campaigning* is meant to be a Joint Forces Staff College peer-reviewed journal serving as a forum for students, faculty, and practitioners to provide broad joint professional military education community insights into the application of joint warfighting principles. Our hope is that this journal will promote more critical analysis and strategic thinking on current and future operations at the operational level of war.

This current issue of *Campaigning* features an article from our leaders at the Joint Staff J-7, with an essay entitled “Campaigning Perspectives Through the Lens of Joint Doctrine and Education.” Joint and Combined Warfighting School military faculty members, LTC George Shatzer, USA, and Lt Col Ericka Flanigan, USAF, present thought-provoking essays on “Military Design and Creativity” and “Campaigning the Pivot” respectively. Finally, four recent student writing teams present essays on unity of effort, cyber infrastructure, command and control, and weapon evolution.

The Joint Forces Staff College continues to deliver quality Joint Professional Military Education through a wide variety of venues. Through creativity, innovation, and agility, the College remains a leader in the education, preparation, and qualification of national security professionals. *Campaigning* is our effort to share some of this great work associated with the College. We hope you enjoy this most recent edition of our *Campaigning* e-journal. Let us know what you think.

Please visit our website at <http://www.jfsc.ndu.edu/>.



JOHN W. SMITH, JR.
Rear Admiral, U.S. Navy
Commandant

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Campaigning Perspectives Through the Lens of Joint Doctrine and Education

**Jerome M. Lynes, USMC COL (Ret), JS J7 Deputy Director, Joint Education and Doctrine
Dr. Jerry West, J7 Education Advisor; and LTC George Katsos USAR**

“The first thing for a commander in chief to determine is what he is going to do, to see if he has the means to overcome the obstacles which the enemy can oppose to him.....

Napoleon Maxim LXXIX

I. Introduction

The Joint Staff Joint Force Development Directorate is pleased to present this guest article commending the Joint Force Staff College’s (JFSC) renewal of *Campaigning*. Beginning with its initial publication in Fall 2006, *Campaigning* has served as a useful forum for intellectual discourse and exchange of ideas among students, faculty, planners and senior leaders alike without fear of retribution. Looking forward, we expect nothing less.

This article looks at campaigning through the lens of two key pillars for joint force development: joint doctrine and joint professional military education (JPME). Emphasis is placed on the need for rigorous discourse on the relationship among campaigning, campaign planning, operational art and the profession of arms. Our intent is to inform discourse from a Joint Staff J-7 Joint Force Development directorate perspective. As we continue our effort to operationalize and institutionalize the lessons learned after a decade of war, we look forward to leveraging *Campaigning* as a useful venue for advancing the profession of arms.

II. Campaigning and Joint Doctrine: What We Know

Joint doctrine enhances the operational effectiveness of joint forces by providing fundamental principles that guide the employment of U.S. military forces toward a common objective.¹ Within U.S. joint doctrinal publications, the term, *campaigning*, is not specific to doctrine, but is best understood in the context of its baseline term—campaign. In the military sciences, the term “military campaign” applies to a large scale, long duration, and significant military event incorporating a sequence of inter-related military operations or battles forming a distinct part of a larger conflict often called a war.²

The U.S. keystone publication that captures planning within joint doctrine is Joint Publication (JP) 5-0, *Joint Operations Planning*. Planning at the operational level of warfare is conducted using operational art (skill, knowledge, experience, creativity, and judgment) to organize military forces. Within JP 5-0, a traditional military campaign is defined as “a series of related major operations aimed at achieving strategic and operational objectives within a given time and space.” Planning for a campaign is appropriate when the contemplated military operations exceed the scope of a single major operation. The *CJCS Joint Strategic Capabilities Plan (JSCP)* and *Guidance for Employment of the Force (GEF)* task combatant commanders (CCDRs) to develop campaign plans. Within the United States, the campaign plan operationalizes a CCDR's theater or functional strategy and translates strategic concepts into unified actions or “ways.” CCDRs will use their campaign plans to articulate resource requirements or “means” in a comprehensive manner rather than on an incremental basis. In addition, campaign plans provide a vehicle for conducting a comprehensive assessment of how the geographic CCDR's activities are contributing to the achievement of intermediate military objectives and strategic end states or “ends.” When the scope of military operations exceeds the

authority or capabilities of a single CDR, such as a threat from transnational terrorists and weapons of mass destruction,³ the President or Secretary of Defense (SecDef) directs the CJCS to implement global planning procedures leading to campaign plans.

Stepping outside of our own doctrine, it is germane to note the perspectives on *campaigning* by our closest allies and that the use of the word, *campaigning*, can cause confusion. The British describe *campaigning* as the military contribution to and interaction with other partners within a joint operation.⁴ Within NATO Allied Joint Doctrine, the term, campaign, as well as *campaigning*, are addressed in Allied Joint Doctrine (AJP) 01(D), *Allied Joint Doctrine*,⁵ and Allied Joint Publication (AJP)-5, *Allied Joint Doctrine for Operational-Level Planning*.⁶ AJP-01(D) defines campaign as “a set of military operations planned and conducted to achieve a strategic objective within a given time and geographical area.”⁷ Within British doctrine there are four documents that address the term, campaign: Joint Doctrine Publication (JDP) 0-01, *British Defense Doctrine*;⁸ JDP 01 *Campaigning*;⁹ JDP 3-00, *Campaign Execution*,¹⁰ and JDP 5-00, *Campaign Planning*.¹¹ The British define campaign as a set of military operations planned and conducted to achieve strategic objectives within a given timeframe and geographical area, which normally involve joint forces, frequently in concert with other instruments of national or multinational power. The definition is similar to the U.S. definition but also addresses allied or multinational participation. Accordingly, in this context, British and U.S. doctrine differ.

III. Campaigning and Operational Art: What We Think We Know

Developing leader competencies required to excel in the operational art is one of the primary challenges of joint officer development. In practice, planners who excel in the operational art have the ability to translate strategy into assignable tasks that achieve a desired

end-state quickly and at the least cost to personnel and other resources. It requires an extensive understanding of how interrelated factors may influence the planning and execution of a campaign or operation. With planning processes occurring largely at the operational level of warfare, there is always the danger of individuals at the strategic and tactical levels losing sight of one another as evidenced throughout the history of warfare including lessons learned from the most recent decade of war findings.¹² Operations planned for and conducted at the strategic level of warfare must include a tactical view of things, or the result may be to select tactically unachievable objectives. Likewise, operations at the tactical level must support the strategic level to ensure that ground-level operations are relevant to the main strategic objective(s). From a U.S. joint doctrine perspective, operations and operational support will continue to take primacy over all other activities and considerations. This is a particular challenge at the strategic level of warfare in which departmental, corporate, and joint force commander priorities intersect; however, every strategic decision must be measured against the effect, positive or negative, that it will have on the commander's ability to effectively execute his assigned missions.

The U.S. joint force uses a top-down strategy-driven approach to plan and execute operations and activities. Developed by the combatant commander and staff using the cognitive approach also known as operational art, a campaign plan operationalizes strategy by integrating activities of ongoing operations. Operational art translates strategy into operational objectives and ultimately tactical actions. It requires a planner to (a) identify the military conditions or end-state that constitute the strategic objective; (b) decide the operational objectives that must be achieved to reach the desired end state; (c) order a sequence of actions that lead to fulfilment of the operational objectives; and (d) apply the military resources allocated to sustain the desired

sequence of actions. The challenge is cultivating strategic leaders who understand the complex security environment and excel in synthesizing the contribution of all instruments of national power into effective operational designs.

Regarding operational design challenges, operational design concepts are difficult to teach as well as grasp in practice. Operational design is the practical extension of operational art — it guides the development of a concept of operations and detailed planning documents. Design elements are the tools of operational design. They provide structure for the plan; help to arrange actions in time, space, and purpose; and help to visualize how the operation will unfold. Design is not a function to be accomplished, but rather a living process. The essence of “operational art” lies in being able to produce the right combination of effects in time, space, and purpose relative to neutralize, weaken, destroy (consistent with desired end state/Commander’s intent), or otherwise exploit it in a manner that best helps achieve military objectives and attain the military end state. Developing planners with the competencies to understand the security environment and principles of operational designs persists as a major challenge to joint education and training programs.

IV. Campaigning and Joint Education: How to Think

Joint Education and Doctrine are not prescriptive or dogmatic about what to think. Rather they are interdependent and about *how to think*. All U.S. Services’ Senior Level Colleges (SLC) teach campaigning principles in compliance with the CJCS Officer Professional Military Education Policy¹³. Campaigning is taught at each of the JPME institutions in compliance with OPMEP Learning Area 3 (Theater Strategy and Campaigning). JPME emphasis under Learning Area 3 is focused on developing the cognitive ability of planners to analyze the theater of responsibility using current national strategic guidance to compile a

regional assessment as the foundation for theater strategy, campaign planning, and security cooperation planning. Campaigning is taught as part of the JFSC 10-month Joint Advanced Warfighting (JAWS) curriculum that is built on three interrelated fields of study: Foundations in the History and Theory of War, Strategic foundations, and Operational Art and Campaigning. JAWS strives to populate the Joint Staff and combatant commands with “world class warfighters” who are capable of critical analysis in the application of all aspects of national power across the full range of military operations. By conducting graduate-level education, JPME curricula prepare campaign planners to operate in highly uncertain and chaotic security environments by teaching them “how” to think.

Additionally SLC JPME Phase I/Phase II learning objectives for Learning Area 4 focus on joint warfare, theater strategy, and *campaigning* in a joint, interagency, intergovernmental, and multinational Environment (JIIM). Students are taught how campaigns and operations support a comprehensive approach to achieving national objectives and relate to the national strategic, national military strategic, theater strategic, and operational levels of war.

There are challenges to be noted, however. The 2012 CJCS-directed Review of Joint Education (ROJE) identified a number of gaps in the capabilities of our institutions to develop leader attributes required for complex and uncertain security environments envisioned for Joint Force 2020. Table 1 summarizes areas that require improvements across joint education and training programs including the need for improved emphasis on cultural, interagency and intergovernmental considerations in the planning process.

CJCS Review and additional J-7 Emphasis Recommendations
----- <i>CJCS Review</i> -----
<ul style="list-style-type: none"> • <i>Interagency considerations in the planning process</i> • <i>Intergovernmental considerations in the planning process</i> • <i>Cultural considerations in the planning process</i> • Cyberspace/cyber warfare • Informational and economic instruments of national power • <i>Operations in the JIIM environment</i>
----- <i>Additional Recommendations</i> -----
<ul style="list-style-type: none"> • Writing for precision of thought Transitions and transfer of authority • Improve assessments • Build relationships • Host-nation partnering • Improve language and cultural proficiency

Table 1. Potential Areas for Additional Emphasis¹⁴

V. Campaigning and The Future Security Environment: What We Don't Know

It is common in *complex* decision making to classify events into recognizable categories that enable *simplified* decision making. Also, cultural biases often lead to narrowly framed problems with a corresponding narrow range of responses that unconsciously impede critical thinking and could exclude at least some alternatives. Planning is necessarily a reductionist

process aimed at disaggregation of a problem into assignable tasks. Complex adaptive systems theory states that a system cannot be understood as the sum of its parts but needs to be seen as an organic whole. To manage complexity, the operational system needs to be understood in its entirety. In addition, the theory of complex adaptive systems, which describes, among other things, the behavior of social systems, shows us that few problems will remain static.

In the future operating environment, most problems will, at best, share only superficial similarities, and there is a danger of oversimplification and false categorization in planning and design. To be confident that a plan reflects the best approach, rather than simply the most accessible, there will always be a place for imagination and creativity. Also, emphasis must be placed on the development of planners who embrace complexity in operational design and decision-making. The institutional goal must be to develop creative planners who are critical thinkers equipped with the knowledge, skills and abilities to break cultural biases, eschew old habits of thought, question the status quo, visualize a better solution, and devise operationally-sound and integrated responses to complex ill-structured problems.

Table 2 shows six desired leader attributes (DLAs) approved for adoption by the CJCS to address future requirements for Joint Force 2020 leader development. Introduced by the Chairman's 2012 White Paper on Joint Education, these DLAs reflect a complex security environment based on the findings of *J7 Capstone Concepts for Joint Force 2020* and *Enduring Lessons from the Last Decade of Operations*. While subject to change as the security environment changes, the DLAs reflect the Chairman's priorities for institutionalizing JF 2020 leader development across the joint enterprise with emphasis on developing leaders with the necessary knowledge, competencies, character and attributes that reflect the highest standards of

the military profession of arms. The CJCS FY14 Annual Guidance to Joint Staff Directorates is aimed at institutionalizing these DLAs as part of the force-wide effort to advance the profession of arms. FY14 joint education and doctrine program initiatives to meet the CJCS guidance for institutionalizing the DLAs represent topics for discourse in future *Campaigning* articles.

<p><i>“I approve the adoption of the following desired leader attributes (DLAs) for Joint Force 2020 Leader Development:” 18th CJSC¹⁵</i></p>
<ol style="list-style-type: none">1. The ability to understand the security environment and the contributions of all instruments of national power2. The ability to anticipate and respond to surprise and uncertainty3. The ability to anticipate and recognize change and lead transitions4. The ability to operate on intent through trust, empowerment, and understanding5. The ability to make ethical decisions based on the shared values of the Profession of Arms6. The ability to think critically and strategically in applying joint warfighting principles and concepts to joint operations

Table 2: CJCS-Approved Desired Leader Attributes for Joint Force 2020 Leader Development

VI. Closing Thoughts: Implications to Joint Force Development

Going forward, much of the discourse within the joint doctrine and education components of Joint Force Development will center on campaign planning and execution matters, operational design, and institutionalizing desired leader attributes informed by CCJO 2020 and lessons

learned from the recent decade of war. As we continue to renew our commitment to our profession of Arms, it is imperative that we as a joint force continue in our effort to preserve joint doctrine by capturing and recording the many hard lessons learned. We must also ensure that joint training and education are underpinned by the wisdom of extant practice – that which the joint force has proven to work and has been codified in joint doctrine. In addition, we must continue to rely on JPME institutions to imbue students with the knowledge and critical thinking skills required to embrace complex decision-making at the operational-level of joint, multinational, and interagency operations. To that end, the JFSC *Campaigning* e-journal provides a superb venue for discourse among planners and stakeholders across the joint force development community.

¹ JP 1, Doctrine for the Armed Forces of the United States, 25MAR13, ix.

² The term, campaign, derives historically from a place of annual wartime operations by the armies of the Roman Republic known as the Plain of Campania. However, over the term has broadened over the course of time to have little relevancy to its original connotation.

³ JP 5-0, Joint Operations Planning, 11AUG11.

⁴ JDP 0-01.1, United Kingdom Supplement to the NATO Terminology Database SEP2011.

⁵ AJP 01(D), Allied Joint Doctrine, 2010.

⁶ AJP-5, Operational-Level Planning, 2013.

⁷ AAP-06, NATO Glossary of Terms and Definitions, 3APR13.

⁸ JDP 0-01, British Defence Doctrine, NOV2011.

⁹ JDP 01, Campaigning, DEC2008.

¹⁰ JDP 3-00, Campaign Execution, OCT2009.

¹¹ JDP 5-00, Campaign Planning, JUL2013.

¹² J7 Joint and Coalition Operations Analysis, Enduring Lessons from the Last Decade of Operations, Vol. I -II

¹³ CJCS Officer Professional Military Education Policy, CJCS 1800.1D

¹⁴ CJCS Report, Review of Joint Education, 28 June 2013

¹⁵ CJCS Memo 0166-13- Desired Leader Attributes for Joint Force 2020, 28 June 2013

Creativity Lost: Joint Doctrine and Design

By LTC George Shatzer, U.S. Army

When we think of creative geniuses, names such as da Vinci, Mozart, Einstein, and Jobs typically come to mind. Rarely does the average person, or even a military professional, consider names such as Washington, Mahan, von Moltke, or MacArthur as being synonymous with creativity. Yet, creativity is *the* key element for success in military operations and winning wars.¹ It is essential to sound strategic thinking and drives the adaptation and innovation necessary to outwit and defeat thinking adversaries.² Many view war as an art, or at least as a rational blending of art and science. It follows that military professionals should appreciate creativity for its importance and be versed in its principles and practices. Unfortunately, many do not. This article will focus on just one aspect of this lack of creativity in military thinking: joint doctrine on operational design. Over the past several years, joint doctrine on operational art and design has lost many important concepts found in design theory. This has resulted in a body of joint doctrine with a noticeable lack of emphasis and understanding of the critical role of creativity.

To be fair to joint doctrine, the seemingly simple concept of creativity is difficult to investigate or even describe. Scientists, theologians, psychologists, artists, and researchers have struggled to define and illuminate the creative process for centuries. Our general understanding of creativity has advanced considerably over the past few decades though as newer scientific discoveries in areas such as technology and artificial intelligence have helped to refine our existing knowledge of human psychology and cognition.³ In recent years, joint doctrine attempted a similar leap forward by incorporating the new concept of operational design to

improve its previous understanding of operational art and campaign planning. Before discussing this development in detail, we should first define some terms.

In any profession, people often refer to the highest form of that particular practice as an art. Regardless of the field, professional artistry refers to an exceptional level of competence in the face of unique, ambiguous, and demanding situations.⁴ The term “operational art” entered U.S. military doctrine via the U.S. Army in 1986. At that time, the Army described operational art as “the employment of military forces to attain strategic goals in a theater of war or theater of operations through the design, organization and conduct of campaigns and major operations.”⁵ Joint doctrine currently defines operational art as “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.”⁶ Note the significant shift in meaning between the two definitions. Originally, operational art was merely about employing forces, but today it is also about creativity and imagination in doing the same. Certainly, in terms of recognizing the importance of creativity, this is a positive course of development for joint doctrine.

Note, too, that design as a function appears in the 1986 definition of operational art. It would take another twenty years though for the U.S. Army to develop a workable concept of what design and designing meant in a military context.⁷ The current Army Design Methodology (ADM) – or often just “design” – is fundamentally concerned with recognizing and dealing with a lack of clarity in real-world situations. Beyond this basic idea lie apparently inherent contradictions that frustrate efforts to provide an adequate, concise definition of design. The U.S. Army freely acknowledges this difficulty⁸ and preeminent design writers deliberately leave the question open-ended.⁹ The tension between problems and solutions, and between description

and understanding, is what seems to frustrate many. As we will see later, many view design as an effort to *find* problems, *not* solve them. Others recognize the need for practical solutions and thus emphasize the imperative for concrete plans and tangible action. Similarly, some contend that design is about seeing relationships and causal dynamics – a higher level of understanding that can become lost in the unending drive for more information and description. Regardless, design is an extension and application of art that must do more than make aesthetic expressions.¹⁰ Thus, joint doctrine defines the term operational design as “the conception and construction of the framework that underpins a campaign or major operation plan and its subsequent execution.”¹¹ We will use the term “military design” to encompass Army and joint design practices and to distinguish it from design practices in other professional fields.

The conception of anything requires imagination and creativity. A general definition of creativity is the making of something new and valuable.¹² This can be refined considerably into levels and forms of creativity as well. Two distinct levels of creativity are psychological and historical. Psychological creativity refers to an idea that is new to the person who conceived it, though others may have thought of it in the past. A truly novel idea that has never appeared in the world before (as far as anyone knows) belongs to the level of historical creativity. Ideas within each level of creativity can result from three forms of creative thinking: combination, exploration, and transformation. Defining these forms of creativity will become more important later. For now, it is sufficient to say that in military operations and in operational design, we should strive for transformational creativity, the deepest form, in which we create new ideas that we could not have thought of before without changing our style of thinking, seeing, and behaving.¹³

Few would initially think of military operations as truly transformational though the term is often over-used in describing any kind of change within military organizations. Yet, this is precisely what military operations do even if the concepts or forms of operations themselves are not novel. For better or for worse, U.S. military operations have had transformational impacts throughout our history in which entire nations, including our own, were never the same after them: Yorktown, Gettysburg, Wounded Knee, Hiroshima, Inchon, Hue, and Baghdad, are just a few examples. Understanding the creativity required to successfully wield such transformational potential is vital. Yet, this understanding is sorely lacking in joint doctrine, which has lost or subdued several foundational design concepts that relate directly to creative thinking.

Clearly, it is important to appreciate the philosophy and rationale behind a practice. Failing to do so can lead to rote and dangerous misapplications of that practice when conditions do not warrant it, or at least call for its modification. So it is with joint doctrine on military design that has adopted design terms and methods without the proper understanding of their philosophical roots and deeper meanings.¹⁴ Joint doctrine has, in effect, “overlearned” certain messages of design, taking them as a set of procedures to follow regardless of the situation, while failing to acknowledge or appreciate others.¹⁵

The concept of the “worldview” is one such idea lost in joint doctrine. Joint doctrine fails to recognize that the practice of design rests on the notion that worldviews are mere perspectives and are not reality themselves. In military design, these worldviews or perspectives are often termed “frames” or “models.” Both words connote that they are limited devices representing something less than a full understanding of the actual environment. Tellingly, both terms rarely appear in joint doctrine on military design. Instead, doctrine characterizes understanding the operational environment as essentially developing descriptions of what is:

The operational environment is the composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. It 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 the adversary, friendly, and neutral actors that are relevant to a specific joint operation...The commander must be able to describe both the current state of the operational environment and how the operational environment should look when operations conclude (desired end state) to visualize an approach to solving the problem.¹⁶

In sharp contrast, the language of Soft Systems Methodology (SSM), an alternative way of thinking and dealing with problematical situations that heavily influenced the Army's early thinking on design,¹⁷ states that, "...models *can never be descriptions* of (part of) the real world. Each of them expresses *one way of looking at and thinking about* the real situation, and there will be multiple possibilities" (emphasis in the original).¹⁸ The point of developing models is to structure a way of thinking about the problem or the situation, not to hold them up as descriptions of reality itself.

Within the function of understanding the environment in military design, joint doctrine recommends adopting a systems perspective to deal with the complexity of the situation:

One way of developing solutions is to view these interrelated challenges from a systems perspective. In this systems analysis, it is critical to consider the relationship between all of the aspects of the system. To produce a holistic view of the relevant enemy, neutral, and friendly systems as a complex whole within a larger system that includes many external influences, analysis should define how these systems interrelate. Most important to this analysis is describing the relevant relationships within and between the various systems that directly or indirectly affect the problem at hand.¹⁹

This position is at odds once again with SSM and its grounding in “soft” versus “hard” systems. Where SSM built upon and advanced beyond the systems engineering perspective of interrelated discreet systems, military design doctrine retained the "hard" view of the world as a set of systems. The familiar PMESII diagram below illustrates this view: ²⁰

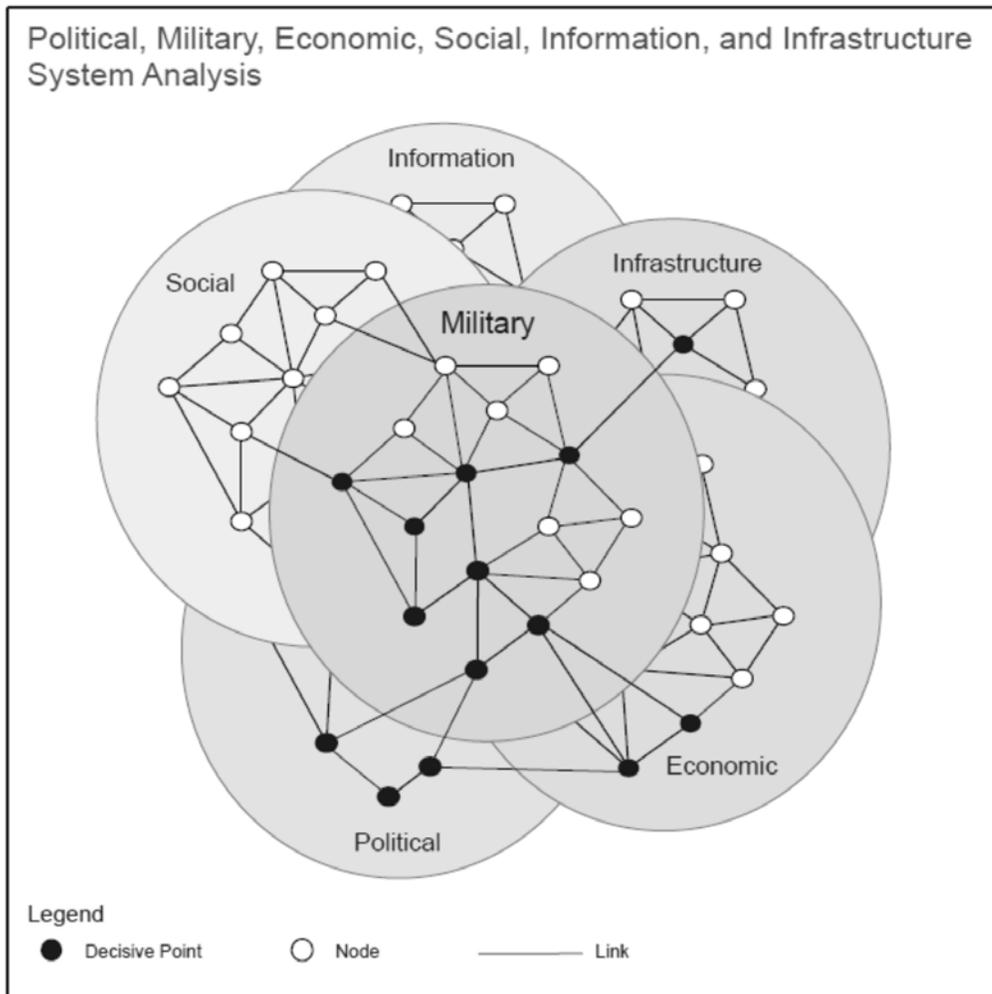


Figure 1 - PMESII Analysis Diagram

According to SSM, this type of systems approach in military design doctrine fails to acknowledge the existence of conflicting worldviews:

In order to incorporate the concept of worldview into the approach being developed, it was necessary to *abandon the idea that the world is a set of systems*. In SSM the (social) world is taken to be very complex, problematical, mysterious,

characterized by clashes of worldview. It is continually being created and recreated by people thinking, talking, and taking action. (Emphasis added)²¹

The notion of clashing worldviews enables us to begin understanding ourselves, our adversary, and the environment. If we fail to penetrate the adversary's rationality, then we never fully understand his worldview.²² This simple, yet vital, point is mostly lost in military design doctrine.²³

The intent of a systems perspective is not to view the world with it, but rather to view our thinking of the world with it. The "hard" systems view of military design perceives the environment as a set of systems that can be engineered. The "soft" systems view sees complexity and confusion, but believes that learning about it can be organized. The system models that we develop thus are guides with which to question, explore, and learn about the situation, not represent the situation itself. Put simply, our thinking is systemic; the world is not.²⁴ As we shall see later, the contrasting of ideas and exploration of worldviews incites creative thinking.

Another concept from early military design thinking obscured in current joint doctrine is the "theory of action." Early writing on military design discusses theory of action as a critical aspect of the overall design effort. In essence, theory of action is the complement to the problem statement and is a hypothesis providing insight into the larger, more detailed solution to the problem. Critically, it is a "creative spark that inspires the design team [and] provides focus to maintain coherence of the design effort...in order to realize the shared vision."²⁵ It is akin to the notion of "operational idea" or the organizing principle around which the entire scheme of military operations is organized.²⁶ Other design practices such as architecture, express the concept as the "primary generator," which narrows in on a limited set of constraints and

characteristics that move quickly towards central ideas suggesting solutions.²⁷ The theory of action appeared in a 2009 article within this diagram of the elements of military design:²⁸

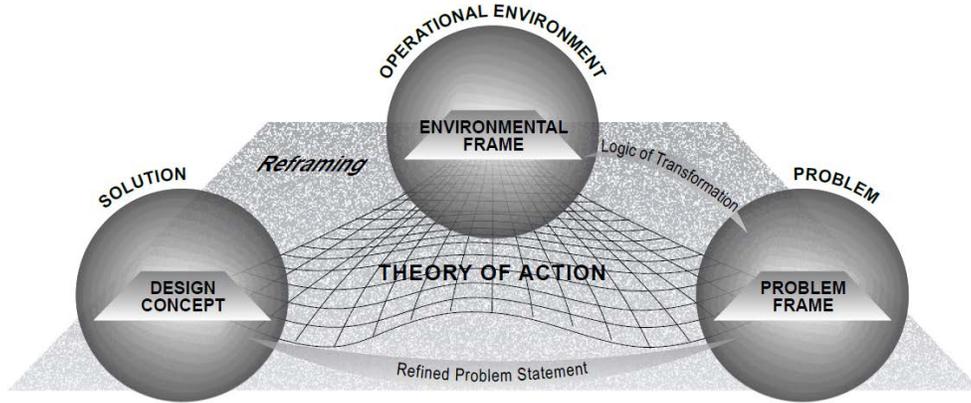


Figure 2 - Design Activities

Curiously, just a year later another article on military design in the same publication dropped all mention of theory of action, instead obtusely describing that a design concept would somehow result from understanding of the environment, the problem, and a desired end state. That article offered this diagram:²⁹

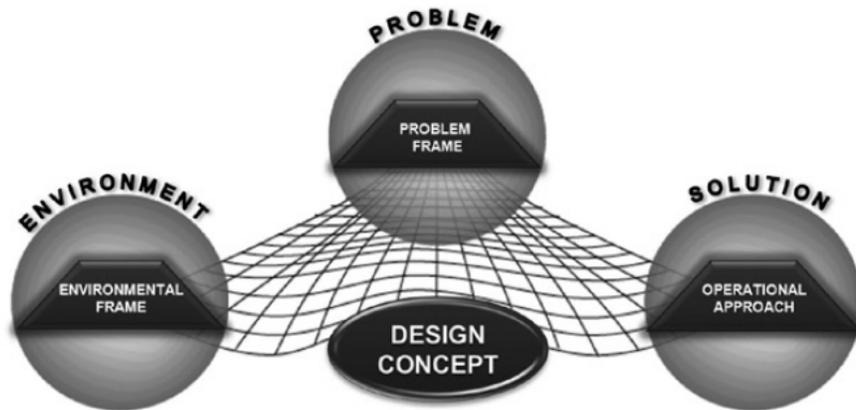


Figure 3 - Design Activities (Revised)

Note that while the theory of action web remains in the second diagram, the term itself is absent. Additionally, “design concept” has moved out of the solution frame and has become the new label for the web with the design concept described as an output. Theory of action initially appeared as an embedded principle for sparking creativity and tying together all design efforts leading to a design concept in the solution frame. Then it disappeared and the design concept seemed to move to stand in its place as an output. In effect, the creative essence of military design was stripped out and repacked into the result of the overall design process. Theory of action is mentioned a few times in some recent Army design literature, but appears nowhere in joint doctrine.³⁰ However, joint doctrine does briefly describe “defeat and/or stability mechanisms” that sound very much like the theory of action and operational idea:

Defeat and stability mechanisms complement COG [center of gravity] analysis. While COG analysis helps us understand a problem, defeat and stability mechanisms suggest means to solve it. They provide a useful tool for describing the main effects a commander wants to create along a LOO [line of operations] or line of effort.³¹

Unfortunately, defeat and stability mechanisms are discussed only briefly in joint doctrine. They appear as one aspect of just one of the thirteen elements of military design, hardly occupying a central place in driving the creative process of military design.

Another major difference between the previous military design diagrams is the disappearance of the “reframing” concept, which appears also to have led to the near disappearance in joint doctrine of framing altogether. As noted earlier, the design concept of framing is simply the adopting of a perspective that allows one to make sense of a problematic situation.³² Inherent in this concept is the notion of reframing – purposefully changing perspectives to further learning. Framing and reframing, and the role each plays in

understanding and questioning our goals and strategies, is the very essence of design.³³ As a result, reframing also lies at the heart of creative thinking.

Framing is fundamentally about initial learning and critical thinking (critical thinking and its role in fostering creative thinking will be discussed later). We can think of framing very literally as observing a scene through an opening that necessarily limits viewing everything in front of us. We carefully explore everything within that frame, but exclude that which lies outside the limits of the frame. We have built this frame. It serves as a point of reference and provides focus since it permits us to concentrate on those things we deem most relevant. Then we reframe. We rebuild or shift our frame to adopt a new perspective, which will invariably teach us something we did not know previously. We will see something new; we will see differences. In appreciating the differences between our various frames, we begin to develop ideas that will suggest solutions to our problematical situations. We gain new insight that will help defeat our indecision and allow us to come to grips with the situation. We begin to create. Leonardo da Vinci called this strategy of perspective shifting (known today as divergent thinking) *saper vedere* – “knowing to see.”³⁴ Unfortunately, doctrine has lost the idea of reframing as an essential catalyst for creativity.

As shown in the military design diagrams presented earlier, reframing began to disappear from pre-doctrinal writings on the overall design effort. Additionally, early discussion of reframing focused excessively on its relationship to execution and assessment of operations, and not on its value in generating and creating solutions.³⁵ Characterized as a way to reconsider or amend ideas and solutions once they were developed, reframing in military design comes well after the initial period of learning and creative thinking. This represents a significant break from foundational thinking on design as seen in non-military practices such as SSM, where the

repeated building and analysis of new frames is an important aid to early thinking and is a precursor to building of models.³⁶ This early mischaracterization of reframing carried forward into current U.S. Army doctrine, which fails to acknowledge its role in creating ideas, stating only that reframing “reviews what the commander and staff believe they understand about the operational environment, the problem, and the desired end state.”³⁷ Army doctrine compounds this error by stating that commanders *decide* to reframe based on certain factors, strongly implying that reframing may not always be necessary and that it lies apart from the effort to generate initial ideas. Additionally, joint doctrine barely mentions reframing; limiting it to a role in execution only when changing circumstances may warrant the reconsideration of the problem and development of new options.³⁸ This serious mistake removes an essential creative mechanism from military design and planning. Just as troubling in joint doctrine is the lack of meaningful discussion of framing itself. It mentions frames and framing only a few times, and primarily in the context of just gathering facts to correctly identify the problem.³⁹

The neglect of worldview and reframing leads to yet another unfortunate problem with joint doctrine and its treatment of military design – the preference for description over understanding and explanation. This bias is not easy to detect as joint doctrine includes promising language such as:

Operational design supports operational art with a general methodology using elements of operational design for understanding the situation and the problem. The methodology helps the JFC [joint force commander] and staff to understand conceptually the broad solutions for attaining mission accomplishment and to reduce the uncertainty of a complex operational environment.⁴⁰

However, a careful read of doctrine reveals an emphasis on fact-finding and process that significantly detracts from building actual understanding. This becomes most apparent in joint doctrine discussions of understanding strategic direction, understanding the operational environment, and mission analysis. The surprisingly brief section on understanding strategic

direction mentions nothing about understanding the why of strategy (only defining the ends, ways, and means) and strongly implies that strategic guidance is essentially a given.⁴¹ The discussion of understanding the operational environment tellingly calls for the commander to “describe” both current and end states. Additionally, a figure intended to illustrate this aspect of understanding is a process, input/output type diagram that exclusively expresses its required outputs as descriptions.⁴² This diagramming of process and its output of mere descriptions repeats in the section on mission analysis.⁴³ Joint doctrine is so lacking in its discussion on learning and true understanding in design that the joint staff devoted an entire chapter and detailed appendix to the topic in a separate handbook on military design issued shortly after the publication of the primary doctrine on design.⁴⁴

One might object that description leads to understanding and we are splitting semantic hairs in this particular criticism of the doctrine. Clearly, understanding must start with and include description, but the distinction between the two is critically important. In dynamic social conflicts such as war, the gathering of additional facts (describing more of the “what”) can never be complete. Even if we could know everything, it would not necessarily improve our ability to explain (understanding the “why”). What we know of human (social) systems is fleeting because the systems are so sensitive and the relationships and dynamics involved are constantly changing.⁴⁵ Ultimately, it takes investigation, testing, and reasoning to fill in the inevitable gaps of knowledge (making sense, which is the beginning of creative thinking) to begin to understand relationships and dynamics.⁴⁶ Yet, even this level of understanding, while scientific in nature, is not enough. We must then use this understanding to create vision – imagining what is possible, what could or should be. This creative imagining of the future is then what allows us to act in order to create that future. In essence, the distinction here is one between a scientific, or

primarily descriptive, perspective and that of a design, or primarily prescriptive, perspective.⁴⁷

This relates back to the discussions of worldview and framing. Joint doctrine takes an essentially objectivist view in that it emphasizes technical competence, relating to facts, and applying detailed models to achieve an approved end state. What it mostly lacks is a constructionist view of design that emphasizes creative thinking, recognizing potentials, and building of worldviews to advance learning.⁴⁸

A doctrinal preference for scientific, descriptive, objectivist views is not surprising given military culture and its strong emphasis on discipline and structure. An unfortunate side effect is a tendency toward convention, resistance to new thinking, and aversion to risk.⁴⁹ All three of these afflictions stymie creativity and thus inhibit operational effectiveness. Conventional thinking and logic are fine for applying formula and algorithms to solve structured problems (and have utility in creativity, as we shall see later). They do not result in new ideas by themselves and can actually inhibit creative thinking because they offer a comfortable, tried-and-true method that is an easy alternative to the inherent risk of innovation. Risk aversion is understandable in all fields (the military in particular) when invaluable ideals and resources are on the line. Yet the need for risk and risk-taking, and even a *need* for failure, are essential elements of creativity.⁵⁰ For both individuals and organizations, risk is a powerful motivator that focuses creative energy. Motivation, regardless of its source, is a necessary ingredient of creativity.⁵¹ The “geniuses” listed at the beginning of this paper all toiled for decades to build the knowledge and experience necessary to be experts in their field and develop the mental capacities for innovative thought.

The very nature of innovation is to counter convention. Innovative thought is necessarily a questioning of and an assault on old ideas. The act of creating new understanding, of learning, is thus destructive. Destruction of convention is the essence of design.⁵² Without it, we could

not effectively critique what we see and we would not advance beyond initial description.⁵³

Without it, we could not recognize problems or the potential for change. We would not be able to create. Joint doctrine correctly states “Through the application of operational design, commanders seek innovative, adaptive options to solve complex challenges.” Yet, the very nature of doctrine is the preservation of convention and it offers no meaningful examination of creativity in military design.

The function of critique (critical thinking through analysis that leads to judgments) has a vital, but at times misunderstood, role in creativity and military design. Joint doctrine itself and related writings tend to focus heavily on critical thinking at the expense of creative thinking.⁵⁴ These works overlook or understate the role of critical thinking as a process to find (create) problems, not solve them. Design theory recognizes that problems and solutions arise together and that designers must contribute problems, not only solutions.⁵⁵ Critique discovers and creates problems through the process of problematization – “the search for inconsistencies or incoherencies in the logic of the methods or the deeper structures being applied.”⁵⁶ Note that we are referring here to the *critique of thinking and actions*, not the situation or the environment. Fundamentally, we are questioning and altering worldviews and the logic behind them. See the inset for a simple illustration of the difference involved. None of the questions posed there

Issue: Uncertainty regarding US access to an allied Host Nation (HN)

<p>Problem Solving (Seeking Description, Applying Logic) <i>Gathering more information to answer what questions:</i></p> <ul style="list-style-type: none">• What has HN legislature said?• What does the SOFA authorize?• What do HN military officers tell us?• What does the US Embassy say?• What bases does the US need access to?	<p>Problem Finding (Seeking Understanding, Altering Logic) <i>Learning through asking how and why questions:</i></p> <ul style="list-style-type: none">• Why would HN restrict or grant access?• How does US strategy or behavior affect HN perspectives?<ul style="list-style-type: none">• Why does the US need HN access?• How do we change HN views?
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stand-alone. Clearly, those in the right box relate to those in the left box. The trouble with joint doctrine is that it fails to provide any substantial indication that military design can and should deal with the type of questions depicted on the right – the how and why questions that go beyond description of the environment and deal with understanding our thinking about the environment.

Joint doctrine rightly drives military design to develop solutions – imaginative thinking cannot be divorced from the requirement to solve problems. However, design encourages us to think about solutions in terms of creating room for enabling change, not as a set of systems to be implemented.⁵⁷ Yet, this is precisely what doctrine recommends with its sole depiction of an operational approach relying on lines of operations, defeat and stability mechanisms, and a static end state. Joint doctrine forgoes any substantive discussion of the use of critical thinking to examine our thinking and understanding. Instead, it over-emphasizes determination of facts, identification of problems in the environment, and developing solutions – all without the requisite grounding in the vital role that creativity plays to make military design and, ultimately, mission success possible.

As noted earlier, research on creativity is a vast field with few hard answers. Like design, this research faces the daunting task of making sense of complex human thoughts, motivations, and actions. What follows is very brief accounting of creativity – the various styles, forms, stages, methods, and devices that frequently appear in the writings and research on design and creative thinking. Paired with that is an illustration that attempts to capture these ideas. Also included are some general principles to consider which may help to prevent creativity from disappearing out of the military design process.

Creativity is grounded in knowledge and experience. The more a person knows and sees, the greater skill, repertoire, or “material” a practitioner has with which to play and create.

Naturally, there is the accompanying danger of being trapped by old, irrelevant ideas. Yet, while a novice might be able to bring new ideas and fresh perspectives, he or she will struggle to recognize the patterns (or common sense) of a field and will not be able to distinguish the value of these ideas. A novice, too, will likely lack the motivation to expend the mental energy required to create since he or she will only feel risk and such other factors remotely.

In other words, only the expert will be able to think critically about the situation. The expert understands the patterns and algorithms (doctrine) that defines the typical space. With this level of appreciation, the expert can relate this to new information gathered and detect the salient differences that begin to suggest areas for novel ideas – potentials for creativity. Perhaps a formula or typical rule will be sufficient to solve the problem at hand, and if so the expert is best positioned to apply these means. Since the problems and situations of military design deal with complex human social interactions, it is unlikely that simple best practices will be sufficient.

Early in the effort to make sense of a new situation, it can be helpful to make use of analogies. By understanding the commonalities between the situation at hand and with something else quite different, we begin to see features in a new way that suggest potential for solutions we might otherwise have missed. This relates directly to the most basic form of creating – taking similar ideas we are familiar with and combining them in some new way (so-called “bisociation”).⁵⁸ These novel combinations cannot just be random though. These adaptations must make sense and they must have value. A deep store of knowledge enables the expert to see and judge this.

As military conflict goes, we are probably not able to make do with a reconfiguring of known ideas, but they suggest a starting point. This point could be called an organizing

principle, operational idea, theory of action, or perhaps even inspiration. The theory of action does not have to be perfect (or even correct) at this point, but it provides structure to continue our studying and thinking about the situation. It provides a reference mark with which to understand the constraints⁵⁹ at play and to build a rich perspective, or frame, of the situation. We are exploring the environment and how we see it. This is an active examination of the limitations and search for possibilities in which mapping, diagraming, and modelling constantly occur as means to make sense of the situation. Heuristics – general rules, not hard formulas – are used to question and test concepts and ideas (considering the negative is one such very popular heuristic for altering the map of the situation).⁶⁰ However, this is all still in the realm of structured thought using known styles. Even though this synthetic thinking can produce great novelty, we are in need of something greater.

The highest, most original form of creativity where we transform our ideas, thinking, and actions results from innovative thinking. Limitations are not just explored, they are challenged and changed. Frames are layered and woven together (assemblages)⁶¹ and they are destroyed and rebuilt as many times as necessary (reframing). Heuristics are created for modifying heuristics. In essence, we are examining not just the environment or the situation; we are examining and altering our thinking about the situation (self-reflection). In doing so, we seek to create ideas that we simply could not have thought of before without changing the way we thought.

Joint doctrine has actually done a fair job of attempting to incorporate the amorphous notion of design into a form that all military professionals can readily understand and apply. In particular, the structure and process of designing has carried over quite well into joint doctrine on military design. Unfortunately, somewhere along the way, the creative essence of design was

lost in favor of methods that emphasized critical thinking and description to the near exclusion of innovation and learning. Joint doctrine confuses the model and drawing artifacts it generates with reality itself and thus loses what might be the essential truth of warfare – that human conflict is principally about conflicting worldviews. Joint doctrine also drops or fails to emphasize other creative concepts such as theory of action, framing and reframing, self-reflection, and the need to find and create problems (not just solutions). Without creativity and creative thinking, our attempts to address complex human situations will tend to the usual and mundane. We cannot afford to give our enemies this vital edge – they *will* take advantage of it.

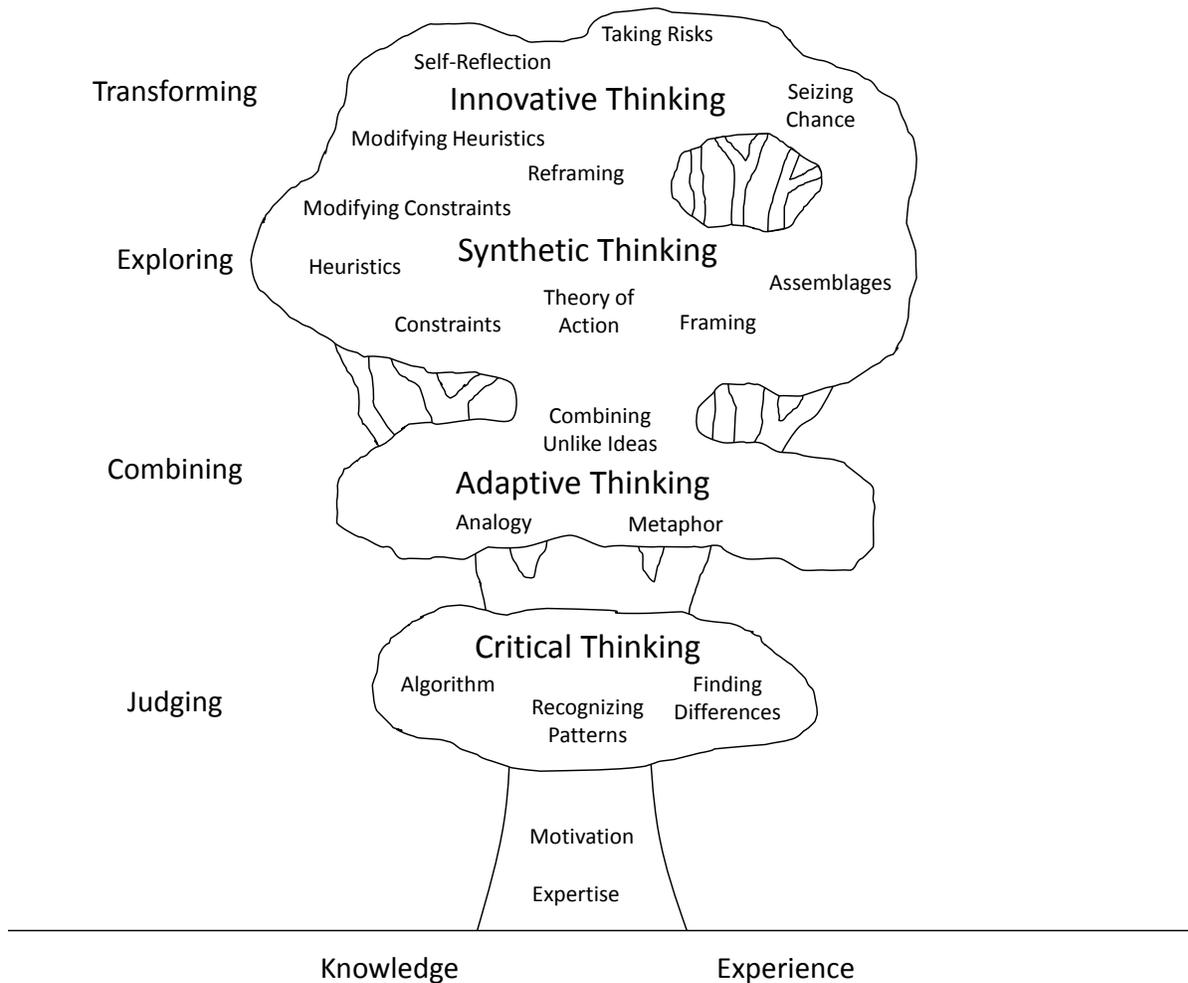


Figure 4 - A Very Simple Model of Creative Thinking⁶²

Creative Thinking Principles for Military Design

- Reflect on and critically evaluate your thinking. Self-reflection creates the diversity, novelty, and variety of creative thought. Don't just think about the situation, think about your thinking of the situation. In the drive to identify and solve problems, first "problematize" the situation by questioning logic and searching out differences and inconsistencies in thinking. To be creative, we must be prepared to reject, assault, and destroy conventional thinking that does not help our cause.
- Suspend your disbelief – nearly any idea has positive potential in and of itself or in its ability to generate other ideas. Step into situations, advocate the qualities you want; become an experimenter, test alternatives; judge your work and your thinking.
- Begin with an idea (an organizing principle, a theory of action, or an aesthetic) even if it is arbitrary. This will provide form and direction to the design effort, but be prepared to change it. Early on, feel free to work between the specific (detail) and the general (whole) – the design will appear to make itself.
- Framing, building assemblages, and reframing drive creativity by constructing and then shifting perspectives. Use any popular technique that works: brainstorming, multiple hats, sentence completion, morphological analysis, etc. Remember, your frames create a reality; they do not record it.
- Build narratives throughout designing. Writing narratives not only serves as a valuable record of work, but also facilitates creation by forcing the designer to fill in gaps of understanding in order to adequately communicate ideas and concepts.
- Modelling, mapping, and drawing is a powerful tool to understand information and to see new connections and ideas. But it is the act of creating them that is valuable, not necessarily the products themselves. Don't be trapped by them – any representation can block creativity. Pair drawing with narrative building to avoid stale or frozen thinking. Remember, your *drawings and models are not reality, they are representations of what you perceive* about a situation.
- Combine unrelated ideas. Associating seemingly unrelated things breaks the mind free of conventional logic and helps generate ideas and options that would otherwise remain hidden behind habit.
- Use the "inverse heuristic" to explore the range of an idea. What opposite function might an operation perform? Dualities and opposites are not divided; they are joined by a common center.
- Use analogies to understand a situation better. The more distant the similarity in the analogy, the more we are forced to think about the situation in a new way.
- Explore constraints and then change them (make up new ones even) to see new possibilities.
- Don't get caught in an unending search for more facts and data. Complex human situations constantly change; no level of knowledge will ever allow for complete understanding or the ability to make predictions. Understand relationships and dynamics – ask more "how" or "why" questions than "what" questions.

¹ Milan N. Vego, "On Military Creativity," *Joint Forces Quarterly*, no. 70 (3rd quarter 2013): 89.

² For a good discussion of the imperative for innovation and adaptation in the modern conflict environment, see David A. Fastabend and Robert H. Simpson, "The Imperative for a Culture of Innovation in the U.S. Army: Adapt or Die," *Army* 54, no. 2 (Feb 2004): 14-27. For more on the importance of creativity and its role in strategic thinking, see Charles D. Allen and Stephen J. Gerras, "Developing Creative and Critical Thinkers," *Military Review* 89, no. 6 (Nov-Dec 2009): 77-8.

³ A review of research into creativity is beyond the scope of this article. For excellent summaries of this field, see Margaret A. Boden, *The Creative Mind: Myths and Mechanisms* (London: Routledge, 2004), 1-87; and Rene Victor Valqui Vidal, "Creativity for Problem Solvers," *AI & Society: The Journal of Human-Centred Systems and Machine Intelligence* 23, no. 3 (2009): 409-432.

⁴ Donald A. Schon, *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions* (San Francisco: Josey-Bass Inc, 1987), 22.

⁵ For thorough reviews of the development of the U.S. concept of operational art, see Michael R. Matheny, *The Roots of Modern American Operational Art* (Carlisle, PA: U.S. Army War College) http://www.au.af.mil/au/awc/awcgate/army-usawc/modern_operations.pdf. (accessed December 17, 2013); and

Bruce W. Menning, "Operational Art's Origins," In *Historical Perspectives of the Operational Art*, ed. Michael D. Krause and R. Cody Phillips (Washington, DC: Center of Military History, 2005), 3-18.

⁶ U.S. Department of Defense, *Joint Publication 5-0: Joint Operation Planning* (Washington, DC: Government Printing Office, 2011), GL-13.

⁷ For a brief history of the development of the Army Design Methodology, the basis for operational design in joint doctrine, see U.S. Army Combined Arms Center, *The Art of Design: SAMS Student Text, Version 2.0*, prep. School of Advanced Military Studies (2010), 1-4. This text is probably the single best resource on military design currently available. Though a bit over-worked in parts, it provides an excellent reader on the theory and application of military design.

⁸ U.S. Army Research Institute for the Behavioral and Social Sciences, *Army Design Methodology: Commander's Resource*, by Heather Wolters et al (Arlington, VA: 2012), 4-7.

⁹ See for example Bryan Lawson, *How Designers Think: The Design Process Demystified* (Oxford, GB: Elsevier Ltd, 2006), 33.

¹⁰ Lawson, *How Designers Think*, 88.

¹¹ *Joint Publication 5-0*, GL-13.

¹² This basic definition of creativity appears nearly universally. See for example, Allen and Gerras, "Developing Creative and Critical Thinkers," 78; Boden, *The Creative Mind*, 1; and Michael Michalko, *Creative Thinking: Putting Your Imagination to Work* (Novato, CA: New World Library, 2011), xiv.

¹³ Boden, *The Creative Mind*, 6. For a detailed discussion of the levels and forms of creativity, see Boden, 1-6.

¹⁴ *The Art of Design*, 37-40, provides a good discussion of the importance of philosophy and the philosophical roots of military design.

¹⁵ Schon, *Educating the Reflective Practitioner*, 155. See also U.S. Department of Defense, *Planner's Handbook for Operational Design*, prep. Joint Staff, J-7 Joint and Coalition Warfighting (Washington, DC: Government Printing Office, 2011), X-1 to X-2 for an acknowledgment that joint doctrine lacks an emphasis on critical thinking.

¹⁶ *Joint Publication 5-0*, III-8.

¹⁷ Peter Checkland and John Poulter, *Learning for Action: A Short Definitive Account of Soft Systems Methodology and its use for Practitioners, Teachers and Students* (West Essex, GB: John Wiley & Sons Ltd, 2006), 3-22 provides an excellent, concise account of Soft Systems Methodology. References to Checkland's various works on SSM appear throughout *The Art of Design: SAMS Student Text*. Stefan J. Banach and Alex Ryan, "The Art of Design: A Design Methodology," *Military Review* 89, no. 2 (Mar-Apr 2009): 106 cites Checkland and is an important early snapshot of the development of design and the concepts that would become the Army Design Methodology.

¹⁸ Checkland and Poulter, *Learning for Action*, 10-11.

¹⁹ *Joint Publication 5-0*, III-10 to III-11.

²⁰ *Joint Publication 5-0*, III-10.

²¹ Checkland and Poulter, *Learning for Action*, 21-22.

²² *The Art of Design*, 150.

²³ *Joint Publication 5-0*, III-5 briefly mentions appreciating the adversary's view in its list of items for Red Teams to consider and in the short description of tendencies (III-11). However, these mentions focus on *what* an adversary's thinking might be, not on *why* it might be that way.

²⁴ *The Art of Design*, 53.

²⁵ Banach and Ryan, "The Art of Design," 111.

²⁶ Milan N. Vego, *Joint Operational Warfare: Theory and Practice* (Washington, DC: Government Printing Office, 2009), IX-103.

²⁷ Lawson, *How Designers Think*, 188-9.

²⁸ Banach and Ryan, "The Art of Design," 114.

²⁹ Edward C. Cardon and Steve Leonard, "Unleashing Design: Planning and the Art of Battle Command," *Military Review* 90, no. 2 (Mar-Apr 2010): 7.

³⁰ Theory of action appears a few times in *The Art of Design*, 210 and 221, but is never defined or discussed in any detail. Theory of action does not appear in *Joint Publication 5-0* or its companion publication on operations, *Joint Publication 3-0: Joint Operations*.

³¹ *Joint Publication 5-0*, III-29.

³² *The Art of Design*, 322.

³³ *The Art of Design*, 46.

³⁴ Michalko, *Creative Thinkering*, 79. This description of creativity beginning with divergent thinking, developing an initial understanding and then reframing (or restructuring, or transforming conceptual spaces, or simply just taking new perspectives), appears throughout literature on creativity. For example, see also Keith Sawyer, *Group Genius: The Creative Power of Collaboration* (New York: Basic Books, 2007), 85-9; Boden, *The Creative Mind*, 294; and Vidal, "Creativity for Problem Solvers," 416-7).

³⁵ Banach and Ryan, "The Art of Design," 113; as well as Cardon and Leonard, "Unleashing Design," 11.

³⁶ Checkland and Poulter, *Learning for Action*, 23-53.

³⁷ U.S. Army, *Army Doctrine Reference Publication 5-0: The Operations Process* (Washington, DC: Government Printing Office, 2012), 2-11.

³⁸ *Joint Publication 5-0*, II-18 and D-5. See also *Planner's Handbook for Operational Design*, IX-6 to IX-7. Perhaps most disappointing is the complete lack of discussion of framing and reframing in the body of U.S. Department of Defense, *Insights and Best Practices Focus Paper: Design and Planning*, prep. Joint Staff, J-7 Deployable Training Division (Suffolk, VA: 2013). Oddly, framing and reframing are mentioned in the executive summary only.

³⁹ *Joint Publication 5-0*, III-1, III-5, III-14, and D-5. Also, note that the joint equivalent of the Army design diagrams, shown in *Joint Publication 5-0* on page III-3 has also dropped all mentions of frame. The "Problem Frame" and "Environmental Frame" from the Army diagrams became "Identify Problem" and "Where We Are" respectively.

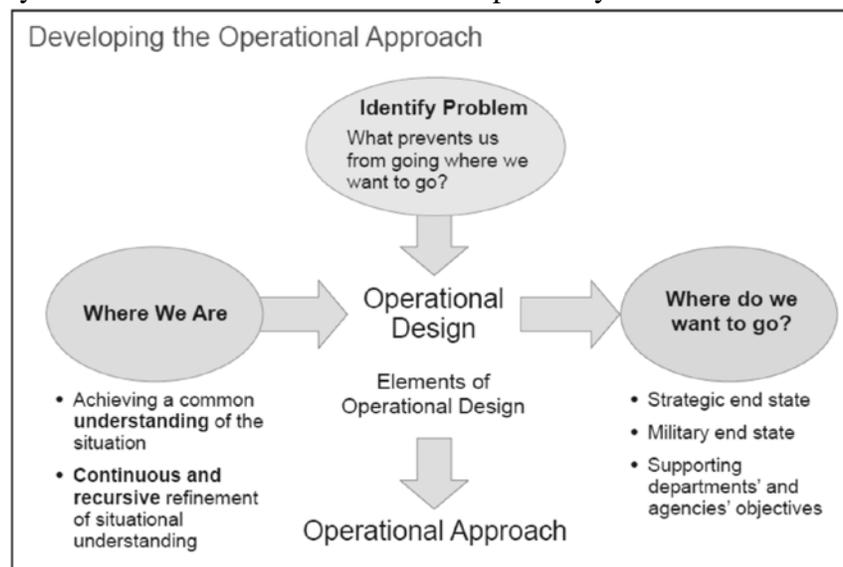


Figure III-2. Developing the Operational Approach

⁴⁰ *Joint Publication 5-0*, III-2.

⁴¹ *Joint Publication 5-0*, III-7.

⁴² *Joint Publication 5-0*, III-8.

⁴³ *Joint Publication 5-0*, IV-5.

⁴⁴ *Planner's Handbook for Operational Design*, Chapter V and Appendix A. Despite this worthy attempt to correct an obvious problem with the doctrine, the handbook's depictions of relations and causality in its sample diagrams still fall short of true explanation, and at best, offer just additional description.

⁴⁵ Boden, *The Creative Mind*, 249.

⁴⁶ Shimon Naveh, Jim Schneider, and Timothy Challans, *The Structure of Operational Revolution: A Prolegomena* (Booz Allen Hamilton: 2009), 118.

⁴⁷ Lawson, *How Designers Think*, 125.

⁴⁸ Schon, *Educating the Reflective Practitioner*, 217-8.

⁴⁹ Jock Stirrup, "Inside and Outside the Box: Individual Creativity versus Military Orthodoxy," *RUSI Journal* 150, no. 6 (Dec 2005): 47-8. For other detailed discussions of military culture and how it inhibits critical and creative thinking, see Allen and Gerras, "Developing Creative and Critical Thinkers," 78-80; Fastabend and Simpson, "The Imperative for a Culture of Innovation

in the U.S. Army,” 17-8; and Naveh, Schneider, and Challans, *The Structure of Operational Revolution*, 78.

⁵⁰ Keith Sawyer, *Group Genius: The Creative Power of Collaboration* (New York: Basic Books, 2007), 54-5.

⁵¹ Boden, *The Creative Mind*, 270-271.

⁵² *The Art of Design*, 46.

⁵³ Naveh, Schneider, and Challans, *The Structure of Operational Revolution*, 79.

⁵⁴ See *Joint Publication 5-0*, Chapters III-IV for a sense of this bias. See also *Planner’s Handbook for Operational Design* which mentions creativity multiple times but also dedicates an entire annex (C) to critical thinking, but not creative thinking. See also Allen and Gerras, “Developing Creative and Critical Thinkers”; and Fastabend and Simpson, “The Imperative for a Culture of Innovation in the U.S. Army” for articles whose weight heavily favors critical thinking over creativity.

⁵⁵ Lawson, *How Designers Think*, 124.

⁵⁶ Naveh, Schneider, and Challans, *The Structure of Operational Revolution*, 118.

⁵⁷ Checkland and Poulter, *Learning for Action*, 162.

⁵⁸ From the research work of Arthur Koestler as cited in Boden, *The Creative Mind*, 33 and Vidal, “Creativity for Problem Solvers,” 411.

⁵⁹ Lawson, *How Designers Think*, 90-110. By constraints, we refer not to the joint military definition, but more broadly to a general design practice consideration of the factors or features we desire of the solution or that affect the solution.

⁶⁰ Boden, *The Creative Mind*, 66.

⁶¹ Michalko, *Creative Thinking*, 152-4. See also Ben Zweibelson, “Three Design Concepts Introduced for Strategic and Operational Applications,” *PRISM* 4, no. 2 (Jun 2013): 91-6, for further discussion on assemblages and their potential for learning and creativity.

⁶² The form of this diagram (the tree) is taken from Lawson, *How Designers Think*, 54. The content on creative thinking is a composite of common themes and ideas that appear in the variety of other sources used for this article, in particular: Boden; Michalko; Lawson; Schon; Checkland and Poulter; Vidal; and Naveh, Schneider, and Challans.

⁶³ The principles listed are drawn from the entire body of sources as well. The ideas represented here appear with remarkable consistency throughout these sources, in particular: Boden; Michalko; Lawson; Schon; Checkland and Poulter; Vidal; Naveh, Schneider, and Challans; and U.S. Army Combined Arms Center, *The Art of Design*.

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Campaigning the Pivot

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The reposition of military assets, political interests, and resources to the Pacific will be America's number one priority as planning takes place throughout the next decade. Given this priority, senior leaders – political, civil-servant, and military – must consider feasible solutions for the Pacific that are fiscally tenable, militarily proportional, and decisively effective. Collectively, the campaign's end state must promote a positive American influence with partners across the Pacific while satisfying national security interests at home. Considering the complexity of the pivot, the United States should adopt a campaign that engenders the most optimal solution: a blend of balanced diplomacy and proportional warfare.

Balanced Diplomacy

Diplomacy in the Pacific is not a new phenomenon to the United States' PACOM Theater Campaign Strategy. Across the broad spectrum, the United States has always been a maritime Pacific nation, in terms of trade, statehood, and warfighting. Looking back to the Nineteenth and Twentieth Centuries, Administrations such as Hayes, Cleveland, McKinley, Taft, Roosevelt, Truman, and Eisenhower, all sought and achieved significant political and military resolve in the Asia-Pacific region. Consider the magnitude of influence gained in the Pacific by Administrations such as McKinley's – with the Annexation of Hawaii in 1896; Franklin D. Roosevelt's challenges and ultimate victories during World War II; and Truman and Eisenhower's incredible post-war Pacific achievements.

So why *now* is there a call to the Pacific? Consider the possibility that the swing of U.S. strategy away from Europe and the Middle East has everything to do with it. The decade-long wars in Iraq and Afghanistan have resulted in strategic refocus of long-term American influence

elsewhere. The current of change has indicated that for many reasons, the Asia-Pacific is the region in most need of American interest, resources, and attention.

Former U.S. Assistant Secretary of Defense, Joseph Nye is known for advocating the balanced approach when it comes to U.S. dealings with China. In fact, as far back as 1995, Nye analyzed U.S. influence in the Pacific and made three key conclusions:

(1) History, geography, demographics and economics unavoidably make the United States a Pacific power; (2) the Asia-Pacific region is not capable of orchestrating a 'normal' or stable balance of power without full American participation, and would move toward an arms race and creation of regional security dilemmas if the U.S. detached itself from Asian security politics; and (3) Japan's defence burden-sharing role allows the United States to more readily project global power.¹

Conclusively, Nye assessed that the most effective method for U.S. involvement in the Pacific included continuing as a regional leader with political commitments to Pacific partner nations, while concurrently encouraging economic and strategic interdependence between Asian-Pacific states. Nye emphasized the criticality of continued bilateral security agreements, multilateral security dialogues and active participation in regional politics.²

Proportional Warfare

Since the pivot to the Pacific is a priority, one must assume the security environment presents challenges to which the United States is compelled to respond due to U.S. national security interests or those security interests critical to our Pacific partners. For example, tensions on the Korean Peninsula are a serious, persistent issue for the region, as is the disputed territory in the South China Sea, which has been a recently escalated item of contention. In November 2013, the United States sent two B-52 bombers through China's newly declared air defense zone in the East China Sea. Yet the event went largely unchallenged with no Chinese intercept, and

even little protest to the activity. Save relatively isolated events such as this, the East China Sea and Senkakus disputes are largely one between nations in the region, not directly involving the United States.

When balancing proportional force requirements, it is critical to analyze realistic threats. It may be easy to downplay hostilities in the Asia-Pacific region when a truly heated war has been raging for over a decade in the Middle East; however, aggression in the Asia-Pacific must not be discounted. Chinese forces have demonstrated aggression directly against U.S. forces in the past. Take for instance Chinese harassment of U.S., Philippine and Japanese operations in the area. One such instance was the April 2001 event involving a collision over the South China Sea between a U.S. Navy EP-3 reconnaissance plane and a People's Liberation Army (PLA) naval F-8 fighter. More recent events have included Chinese naval harassment of U.S. survey ships, Philippine, and Japanese vessels in the South China Sea. These events illustrate that international tensions exist, and can even flare temporarily, but it also proves that armed conflict between the United States and China is not likely. In almost all cases, even if a military reaction is involved, a call for proportional response is the most prudent course of action. United States' strategy in the region should always hold the influence of soft power with highest regard, especially in a theater that may require more diplomacy than violence.

As for China and the United States, there has been no serious peril – save cyber finger-pointing, and decades old disagreements over regional issues like Taiwan. Military confrontation between China and the United States seems implausible, yet both sides continue to wargame scenarios. Meanwhile in reality, the two countries share many common security interests, such as monitoring the North Korean political-military landscape, curbing terrorist factions in the region, and maintaining vigilance on declining political environments in South

East Asia that could ignite into violence. These common interests, alone, should inspire pivot planners to seek robust efforts for bi-lateral Chinese-American security cooperation exercises. Success toward this effort demands telegraphing as much of the playbook as possible. In order to build a sense of trust, the openness of dialog is what the Pacific problem calls for-- more transparency from all military, political, and diplomatic levels.

“To have the militaries not communicating just doesn’t make a lot of sense,” said Admiral Samuel Locklear, Commander, United States Pacific Command.³ This new approach to U.S.-Chinese mil-to-mil communication is working. For example, in May 2014, China will participate for the first time in Exercise Rim of the Pacific (or RIMPAC), the world’s largest multinational maritime training event. Locklear says this commitment represents a level of mil-to-mil trust not previously experienced, as American and Chinese military assets will be training side-by-side. Multi-lateral training, like RIMPAC, should be an important part of the calculus in the pivot’s campaign to encourage mutual understanding and trust. In this case, robust forces are utilized for partnership building, not as tools of intimidation.⁴

RECOMMENDATIONS

As the United States shifts its focus out of Afghanistan, the United States Department of Defense enters a time of transition; both strategic and fiscal in nature. Abrupt rebalance to a theater where there is mostly stability should be approached with rational balance; especially considering the *lack* of stability elsewhere. Campaigning the pivot should embrace a foundation based on sound diplomacy and proportional military presence.

This section offers three recommendations: 1) Synchronize hard and soft power, 2) Enrich Security Cooperation Agreements, and 3) Assess proportional military assets required.

Synchronize Hard and Soft Power

Strategically speaking, the United States has many priorities in the year 2014: unsettled nuclear issues with Iran, looming potential involvement in Syria, and ongoing instability on the African continent are among the many concerns on the State Department's hotlist every day. Priorities such as these underscore the importance of diplomatic channels, while nodding to the demand for proportional alignment of hard and soft power, alike. The task at hand then is *how* to most optimally balance all available hard and soft power across the spectrum.

Most importantly, Department of State and Department of Defense must clearly synchronize a well-defined campaign strategy where a blend of hard and soft power effectively wield influence. Much can be accomplished by creative uses of soft power alternatives. The rebalance campaign must call for a *true balance* of hard and soft power projection. The United States must reconsider the defense "hard power" option, and *reconsider* how other instruments of soft power or *smart power* might be used toward the same end.

Enrich Security Cooperation Agreements

Southeast Asia offers an opportunity for active Political-Military (Pol-Mil) engagement which will lessen the need for a more costly alternatives later. Active Pol-Mil engagements expand regional confidence, give substance to our security commitments, deter conflicts, and ensure continued access to interests in the region. Accordingly, strategic trends in Southeast Asia and the Pacific require the United States to ascribe greater importance to Pol-Mil engagement if the United States intends to limit its scope of future military involvement.

Such cooperation is not unprecedented, as the United States has successfully engaged Asia-Pacific nations for peaceful partnerships in the past. In fact, the United States has five

standing Collective Defense Arrangements, including two multi-national agreements: the Agreement between the United States and Australia and New Zealand, and the Southeast Asia Treaty; and three bilateral agreements: the Philippine Treaty, the Japanese Treaty and the Republic of Korea Treaty.⁵ These arrangements were made without coercion, and at the time of signing took to heart all concerned parties' interests into the agreement. These Collective Defense Arrangements were generally signed for independent reasons, satisfying individual and unique sets of security interests. Moreover, these agreements set precedent in the Asia-Pacific and illustrate that much can be accomplished through a bilateral approach.

Thus, notwithstanding talks of sequestration and subsequent military downsizing, deterrent capability in Southeast Asia must remain a critical focus to counter the emerging threats from China, North Korea, and Russia. One way to accomplish such is by emphasizing visibility of pre-existing U.S. Theater Security Cooperation relationships in Southeast Asia to demonstrate firm determination to defend U.S. interests and allied treaty nations in this critical region. United States security is indeed strengthened by maintaining a global and regional set of international relations. These relationships are vital elements in the U.S. approach to regional stability. Such relationships range from formal alliances to less formal support, such as humanitarian assistance regimes. Moreover, they allow the United States to anticipate crises, thwart potential threats, and inspire peaceful resolution of differences.⁶

It is recognized that with the vast socio-economic diversity within Southeast Asia, there is no single recipe for successful partnerships in the Asia-Pacific. Security cooperation requires an active and cooperative relationship not only with the United States but between neighbor nations. Thus, U.S. relationships with all nations of the region, such as: Malaysia, Singapore, Thailand, Cambodia, Indonesia, and the Republic of the Philippines will continue to be valued

highly, both bilaterally and in the context of regional stability. For example, such support was realized in late November 2013, when U.S. Pacific Command stood up joint task Force 505, providing relief to the Philippines in the wake of Typhoon Haiyan.⁷

Additionally, as the United States continues to develop a relationship with countries like Vietnam and Myanmar, it will add depth and resilience to those ties which are traditionally regionally isolated. Ultimately, by strengthening U.S. relationships with sovereign nations we can anticipate playing a *supporting* role, where others are politically and militarily enabled to contain problems within their own borders.

Reassess appropriate military assets needed to fulfill rebalance objectives

The first recommendation of this study is a proposal to reconsider necessary military forces in the Pacific. Consider for a moment a theater where there is – for the most part – peace. How would the United States be justified in dedicating so many resources at such a great expense to a theater of peace? Especially given the looming budgetary impacts for the Defense Department, prudent and practical force considerations must be made.

These questions must be asked: Does the rebalance require 60 percent of the entire U.S. Navy fleet? Is it proportional to the rebalance objectives to ask for \$24 billion in moving Marines from Japan and building up infrastructure on Guam, Australia, and Hawaii? If budget cuts materialize as expected in 2014, the Secretary of Defense confirmed that the Defense Department expects to have 1) the smallest Navy since 1915, 2) the smallest Air Force ever, and 3) the smallest U.S. ground force since 1940.⁸

The rebalance runs the risk of putting a disproportionate share of assets into one area. This could adversely impact rapid response time to other equally-threatening crises, such as

emergencies in the Middle East. Explicitly, pivot planning must not discount volatile areas elsewhere. Policy makers should challenge the question that if the United States fulfills its proposed move of military assets to the Pacific, have we diminished our deployment readiness and timeliness for military response to “the next 9/11” scenario?

Considerations for military assets to the Pacific rebalance must take into account “enduring presence” in places like the Middle East with potential *immediate* need of military operations. For example, on November 24, 2013, Afghan Loya Jirga elders, called for a limited post-2014 U.S. military mission as they drafted a new bilateral security agreement with the United States. This commitment is deemed essential by members of both sides to counter terrorist efforts in establishing sanctuary and gaining momentum in a post-NATO Afghanistan, and will require some military assets to remain.⁹ Finally, with sequestration now in effect, the Combatant Commands must fully reassess force requirements considering strategic priority, force size, elements of scale, deployment locations, and overall force readiness. Together, these factors will be critical for the future of the rebalance to the Pacific as well as proportional force sustainment in other theaters.

Conclusion – Priorities and Patience

When looking deeply at campaign solutions in the Pacific, one might consider clarifying priorities. Well defined long-term *priorities* and the simple concept of *patience* just may be the winning combination for successful campaign in the Pacific. Conflict resolution takes time. Case in point is the Pacific, which has taken U.S. diplomatic attention, military presence, and time – 60 years – to solidify peaceful partnerships.

The fundamental recommendation promoted here is for U.S. senior leaders to reconsider the appropriate level of hard power in the Asia-Pacific; a region where increased non-military alternatives might produce better results. With a closer look, leaders might find that the forces and expenditures projected to the Pacific create unnecessary military force movement that could damage deployment readiness and generate asset availability problems in other Combatant Command Areas of Responsibility. Enormous hard power may be the wrong way to shape the Pacific. Many Association of Southeast Asian countries welcome U.S. presence as a way to counter-balance regional saber-rattling from China and North Korea; however, others in the region may interpret the rebalance as excessive influence.

¹ Tow, *Seeking Convergent Security*, 176.

² Nye, "Case for Deep Engagement," 90-102.

³ Miles, "Locklear Welcomes Cooperation," 5 Nov 2013.

⁴ Haegel, "DoD Invites China to RIMPAC," 19 Aug 2013.

⁵ U.S. Department of State, *Collective defense Arrangements*, 2013.

⁶ *Ibid.*

⁷ Rowland, "Task Force for Typhoon", 2 Dec 2013.

⁸ Munoz, "Panetta Details Cuts," 14 Nov 2011.

⁹ Akulov, "US to Stay in Afghanistan after 2014," 26 Nov 2013.

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**Crisis Navigation:
The Evacuation of Dunkirk as a Case Study in Achieving Unity of Effort**

By Maj Isham Nichols, USAF, LCDR Andrew Roy, USN, MAJ Robert Schmor, USA,
and Lt Col William Webb, USAF

Few undertakings occupy a more distinguished place in Western military history than the May 1940 evacuation of the British Expeditionary Force (BEF) from Dunkirk, France. In just nine days, over 300,000 British and French soldiers escaped from certain capture or death at the hands of the advancing German Army.¹ In postwar British and American portrayals of the evacuation, the “Miracle at Dunkirk” takes on mythic dimensions by extolling the patriotic British citizens who sailed their vessels into harm’s way and saved their army against nearly impossible odds.² During the war, the British Ministry of Information and press outlets welcomed the evacuated troops home as heroes and emphasized the skill and daring of “Operation Dynamo.”³ Prime Minister Winston Churchill inspired the defiance of the British people and used the remarkable achievement of the evacuation to build up the public confidence.⁴ The “Dunkirk spirit” became synonymous with perseverance.

This focus on the heroism of individual British citizens rescuing their military countrymen, however, detracts from a more clear-eyed assessment of how British actions, especially those of the Royal Navy, contributed to success in Dunkirk. Without a more thorough understanding of what made this civil-military operation work, today’s Joint Force and interagency partners lose an opportunity to draw lessons for contemporary challenges. The success of Dunkirk occurred because the Royal Navy provided crucial command and control to integrate, synchronize, and employ disparate military and civilian capabilities to execute the evacuation of the BEF. An examination of how the Royal Navy established coordination cells and mechanisms, integrated additional maritime and civilian capabilities, and synchronized

military and civilian capacity will demonstrate how the Royal Navy achieved unity of effort and mission success in the evacuation of Dunkirk. An exploration of such factors also offers several lessons for today's Joint Force and interagency partners. To better assess the importance of the Royal Navy actions, however, a historical overview of what precipitated the Dunkirk evacuation is in order.

The operational situation requiring the evacuation of the BEF from Dunkirk sits within the larger backdrop of a British-French Alliance caught by surprise at the speed, firepower, and, at times, deceptiveness of the German Blitzkrieg. A series of quick military victories by German forces over Poland, Denmark, and Norway in 1939-40, brought the BEF into Europe to reinforce the defense of France.

On 10 May 1940, German forces bypassed the heavily fortified Maginot Line on the French-German border and invaded the Netherlands, Luxembourg, and Belgium. The German Army seemed unstoppable, quickly overwhelming Allied forces in those countries and sweeping into France. Allied leadership at this point assumed the Germans would head straight for Paris, as they had attempted to do in World War I. Unbeknownst to them, the German Army had used the assault through the Low Countries to draw attention from their main armor-led attack coming from the Ardennes Forest along the France-Luxembourg-Germany border.⁵ Allied leadership realized too slowly that the Germans had achieved tactical surprise by advancing almost due west towards the coast. Within two weeks, the Allies were cut off, surrounded, and contained within northwestern France.⁶ On 24 May, German armored forces, under orders from Hitler, halted 15 miles from the port city of Dunkirk.⁷

By 20 May 1940, as the fortunes of the Allied forces in France waned, the Admiralty (the Royal Navy headquarters) tasked then Vice Admiral Bertram Ramsey, the navy Flag Officer

commanding at the port of Dover, to initiate formal planning for the evacuation of the BEF from France. In planning for the evacuation, Ramsey and his staff originally assumed that both the approaches to and the coastal ports of Calais, Boulogne, and Dunkirk, would be free from attack.⁸ Tactical successes achieved by the German forces invalidated this assumption as they seized Boulogne on 22 May and Calais on 26 May. The British therefore modified the evacuation plan and sought an orderly withdrawal of the BEF to the coast centered on the village of Dunkirk. As the evacuation progressed, however, Allied Forces came under fire from German land and air forces.

At Operation Dynamo's earliest planning stages, insightful Royal Navy staff officers realized that successful evacuation of BEF personnel would require additional civilian maritime capacity. On 14 May, over one week prior to the seizure of the port of Calais, Vice Admiral Lionel Preston, the Director of the Small Vessels Pool, asked the British Broadcasting Corporation (BBC) to send out radio messaging requesting all serviceable and available British vessels on the east coast of England to assemble in the Port of Dover by 26 May, the first planned day of evacuation activities.⁹ The Admiralty and the government, however, kept the exact purpose behind such an assembly secret from the public.



Figure 1. Evacuation Map¹⁰

The need for additional maritime capability soon became evident on the first full day of Operation Dynamo, 27 May 1940. The Royal Navy began evacuation operations with seven ships and only evacuated 7,669 personnel.¹¹ Aggressive air strikes by the German Air Force further compounded the challenge of evacuation efforts. Throughout the day, heavy German air bombardment of the village and port of Dunkirk destroyed the main piers. Captain W. G. Tennant, a member of Ramsay's staff, arrived at Dunkirk with a 172-man team late on the 27th to assume duties as Senior Naval Officer in Charge, Dunkirk. Surveying the destruction of the piers and the general condition of the port facilities, Tennant modified the evacuation procedures.¹²

Large breakwaters, called ‘moles’ by the British, were still intact and sheltered Dunkirk harbor from wind and tides. Understanding that pier side loading was the most efficient means to transfer large numbers from shore to ship, Captain Tennant made the risky decision to instruct Royal Navy ships to moor alongside these rocky breakwaters since no accessible piers remained. This process, while dangerous because of tides and the fact that moles were not designed for ship mooring, did help evacuate BEF soldiers.¹³ Such cumbersome loading and evacuation procedures, however, proved time consuming and placed vessels at high risk of damage or destruction from German airstrikes.¹⁴ Realizing the need for more maritime capacity, the Royal Navy established several key coordination structures and mechanisms to incorporate civilian maritime capacity and expertise, and thus synchronize their efforts to facilitate the evacuation.

In Admiral Ramsay’s control center under Dover Castle, his staff made space for and worked alongside representatives from the Board of Trade, Ministry of Sea Transport, and the Ministry of Shipping. The combined efforts of this small team from several government agencies proved invaluable for “controlling, organizing, fueling and supplying not only [Royal Navy vessels] but a variety of merchant vessels.”¹⁵ Involvement of the Ministry of Sea Transport proved important, as this agency secured and paid for the expenses incurred by civilian vessels participating in the evacuation.¹⁶

Royal Navy coordination with the Ministry of Shipping also proved critical for obtaining the necessary civilian vessels. The Ministry of Shipping initially obtained 40 privately owned small boats as part of this interagency coordination. The Ministry’s continued efforts on behalf of the Royal Navy, buoyed by Preston’s initial outreach to the BBC to call upon private boat owners to sign up for the small craft registry, eventually netted over 300 small boats.¹⁷ These small craft ferried over 99,000 personnel from the beaches of Dunkirk to larger troop carrying

ships offshore, providing a critical alternative to loading at the mole piers. All manner of vessels found employment in the operation: frigates, minesweepers, destroyers, tugs, trawlers; in short, anything that could be used to haul soldiers. As Rear Admiral Wake-Walker, the officer in charge of ship efforts off of Dunkirk noted on 31 May,

I saw for the first time the strange procession of craft of all kinds that has become famous. Tugs towing dinghies, lifeboats and all manner of pulling boats, small motor yachts, motor launches, drifters, Dutch skoots, Thames barges, fishing boats [and] pleasure steamers,' arriving in the nick of time to rescue Britain's surrounded Army.¹⁸

The vessels were manned by a mixture of civilians, merchant marines, and retired and active Royal Navy officers.

These Royal Navy staff coordination efforts with other government agencies contributed directly to its ability to secure more shipping for the evacuation. The toll of combat on these civilian vessels, however, soon required the Royal Navy to coordinate with the civilian population in order to replenish crews. In several instances, direct bomb hits or near misses on vessels by German aircraft would damage engineering compartments and incapacitate their crews from concussion effects. As critical engineering crews were lost in the operation, the Royal Navy coordinated with the British Shipping Federation to pull civilian engineers of all sorts to Dover. These newly acquired engineers quickly repaired damaged engines, and then served as engine room crews despite having no prior maritime experience.¹⁹ The ability to gather personnel with such skill sets would have proved impossible through the Royal Navy's efforts alone. Coordination with civilian government agencies proved crucial to obtaining the civilian talent necessary to fill critical shortfalls in Operation Dynamo.

As efforts to procure more vessels for the evacuation bore fruit, the Royal Navy also had to address the challenge of integrating a wide array of disparate maritime capabilities

participating in the evacuation. In many cases, civilian vessels had inexperienced crews of volunteers, including the vessel owners. In addition to these volunteers, naval officers, in the early stages of Operation Dynamo, scoured the docks and ports near and around Dover with the instructions to commandeer any boat that was usable.²⁰ In cases where crews declined to participate, vessels came into Royal Navy custody, forcing officers to find replacement crews for the boats.²¹ Finally, the Royal Navy faced the challenge of integrating the remnants of Dutch, Belgian, and French navy ships into Operation Dynamo.

To respond to these challenges, the Royal Navy demonstrated the willingness and ability to flex their personnel not only in coordination activities with other agencies, but also by dispersing their collective maritime experience throughout the combined civil-military fleet. Royal Navy officers positioned themselves on the shore and all manner of civilian vessels both large and small. These men served as liaison officers, ensuring that requirements relayed between Captain Tennant and the Dover HQ translated into vessels taking the correct approaches to evacuation positions.²² In cases where the Royal Navy did not place its own personnel on board, it provided civilian crews charts and detailed instructions on where to sail and how to best use their particular vessel to assist with evacuation efforts.²³ This dispersion of naval expertise across Operation Dynamo vessels proved crucial to the successful evacuation of over 300,000 soldiers from the beaches of France.

Besides the establishment of coordination mechanisms and the integration of civil and military capabilities, Royal Navy planners achieved unity of effort by effectively synchronizing civil and military capacity. On 27 May, the first full day of evacuation, it became clear that the most direct route from Dover to Dunkirk would fall under fire from German guns at Calais, making it too dangerous for effective passage. Ramsay's staff at Dover thus ordered the

establishment of alternate routes from Dover to Dunkirk. Minesweepers under destroyer escort soon opened a navigable route through the fixed French minefields on the approaches to Dunkirk.²⁴ The Navy then distributed updated navigation charts to civilian masters of evacuation vessels and routed them to Dunkirk via this new mine swept channel during the daylight or past Calais under the cover of darkness. Having identified the problem of German guns at Calais, the Dover staff effectively synchronized the Navy's unique minesweeping capability with the growing civilian fleet sea traffic, thereby providing a relatively safe evacuation route between Dover and Dunkirk.

Another critical synchronization point for the Royal Navy involved whether to route vessels to the Dunkirk port proper or to nearby beaches. Tennant's shore coordination party provided situation reports on the conditions of the port and beaches to the staff at Dover. Armed with at least some information as to the prevailing conditions, the staff would issue sailing orders to civilian vessels that specified where exactly they should go upon arrival in the vicinity of Dunkirk. Though far from perfect, this more precise routing, enabled by the Navy's unique command and control capacity, helped to better utilize civilian vessels as conditions changed rapidly due to weather, pier loading, and enemy actions.²⁵

Despite the critical role played by the Royal Navy and the smart leveraging of its personnel, some accounts tend to overlook just how much thought and planning lay behind the success of Operation Dynamo. From the war period itself, the Royal Navy's official *Battle Summary of the Dunkirk Evacuation* notes, "Operation 'Dynamo' was an improvisation, in which the initiative of those taking part largely took the place of planning."²⁶ Upon reading such an appraisal, it appears that those Navy officers in the field—or in this case at sea—took the initiative and overcame the Royal Navy Headquarters' poorly staffed plan. Such an assertion,

however, proves unwarranted in light of the evidence of Royal Navy efforts in Britain. Naval staff officers at Dover proved themselves as disciplined planners and action takers, rather than rear-echelon liabilities. Until the middle of May, no one had the expectation of evacuating the BEF. While the Royal Navy's aforementioned Battle Summary described the fine staff work at Dover as an "improvisation," today's joint doctrine would categorize it as effective Crisis Action Planning.

There can be no doubt that the little ships of Dunkirk lore contributed to the seemingly miraculous evacuation of the BEF from France. This traditional view, however, overlooks the central role played by the Royal Navy in executing Operation Dynamo through its establishment of coordination mechanisms, integration of capabilities, and synchronization of capacity. An honest accounting of the Dunkirk evacuation, separated from the understandable need of wartime Britain to rally around the idea of the "Dunkirk spirit," yields several valuable lessons for today's Joint Force.

First, in any complex crisis action, the U.S. government organization or agency with the best understanding of the problem environment and capacity to synchronize interagency actions should lead initial response efforts. Not only did Royal Navy ships transport the vast majority of the BEF back to Britain, but the Navy provided the command and staff structure necessary to execute such a complex, short-notice crisis operation.²⁷ In other words, while the Navy's sealift capacity proved valuable, it was the staff structure at Dover and dispersion of Navy officers on multiple civilian vessels that proved indispensable to the synchronized movement of so many vessels in hostile compressed sea space over a short time.

The centrality of the Royal Navy in the Dunkirk evacuation should in no way diminish the role of the "little ships." The adage "every little bit counts" certainly rang true in May 1940.

Even though the Dover staff correctly envisioned that the main evacuation effort would be by Navy destroyers, these astute staff officers nevertheless worked the phones, leveraged liaison officers from the Board of Trade and the Ministry of Sea Transport, and, with civilian government counterparts, scoured Britain's waterfronts for any vessel capable of fulfilling this special service. Put simply, thousands of BEF soldiers would not have lived to fight another day had there not been shallow-draft vessels to ferry them out to larger Navy ships offshore. And those small vessels would not have been available if Ramsey's planners focused solely on what the Navy itself could provide. Today's Joint Force must emulate the Dover planners' commitment to utilizing any capability, no matter how small, that could make a difference.

Operation Dynamo also shows the Joint Force the significance of establishing effective integration protocols at the outset of any planning effort, regardless of temporal urgency. From the operation's earliest planning stages, staff officers at Dover welcomed the presence of the aforementioned interagency liaison officers. Though the "short-fused" nature of the evacuation did not lend itself to establishing formal integration protocols, the willingness of all participants to collaborate is the critical first step in any interagency effort. As today's joint planners develop contingency plans, they should formally integrate the interagency wherever possible to encourage and reinforce such collaboration. Inherent in such integration is the inclusion of representatives from the appropriate agencies throughout the Joint Operation Planning Process (JOPP).

Formal inclusion of all potential partners in planning derives numerous benefits, of which two are noteworthy. First, the lack of an integration scheme to identify and pool smaller, potentially disparate capabilities throughout the JOPP, runs the risk of underutilizing the contributions of future "little ships." Even worse, if smaller organizations that attempt

participation in planning efforts feel ignored or marginalized by the “M” of the DIME, they likely will be less inclined to integrate their efforts with those of the military. In such a case unity of effort will prove impossible to achieve. Just as the Dover planners saw capacity in an unarmed merchant tug, today’s joint planners must seriously consider that any agency or civilian counterpart with the will to participate can make a difference, even if their contribution may, on the surface, seem out of place with military involvement. The best way to guard against such marginalization of non-military actors comes through formal integration of these personnel in a joint staff’s planning efforts. This practice has the potential to make planning meetings longer, larger, and perhaps more inefficient, but the benefits of a “big tent” philosophy will pay dividends in execution as the widest array of capabilities and expertise is brought to bear during a crisis.

A second benefit deriving from formal inclusion of all interested agencies in the JOPP comes in the opportunity to engender a greater culture of cooperation between the military and other interagency and non-government partners before a crisis occurs. Extreme circumstances such as the German Army pushing the BEF into English Channel have a tendency to compel cooperation since in-fighting or stove-piping could yield immediate negative consequences. In planning, however, such urgency is not always present, so formal agreements that integrate all relevant agencies would prove useful.

A final lesson for the Joint Force and interagency partners is that various types of government and non-government capacity are only useful if a synchronizing effort is in place to use them well. At Dunkirk, the Royal Navy provided both the preponderance of force and staff capacity. In future contingencies, however, planners should not assume that one organization or agency will be the key provider of both operational and planning capacity. In crisis action or

deliberate planning, planners from across the Interagency should first ensure that a lead agency can organize, synchronize, and control forces and capabilities – before introducing personnel and resources into a crisis environment. Despite the desperate situation in Dunkirk, the Royal Navy exhibited the discipline to establish coordination, integration, and synchronization schemes at Dover prior to sending vessels across the English Channel. Joint Force staffs, especially Operational Planning Groups, should take similar considerations into account when developing their own contingency and crisis action plans.

The Royal Navy's conduct during Operation Dynamo demonstrates the importance of an organization addressing challenges of coordination, integration, and synchronization with disparate partners to accomplish a mission. Only through attending to these themes can an organization draw upon necessary capabilities beyond its own to persevere in adverse and challenging situations. Like the Royal Navy of World War II, today's Joint Force possesses capable individuals, disciplined planning methods, and an organizational culture with the ability to bring command and control presence to ambiguous and dangerous situations.

¹ W.J.R. Gardner, *The Evacuation from Dunkirk: Operation Dynamo, 26 May-4 June 1940* (London: F. Cass, 2000), 209-10.

² Penny Summerfield, "Dunkirk and the Popular Memory of Britain at War, 1940—58," *Journal of Contemporary History* 45, no. 4 (October 2010): 792-3 accessed September 19, 2013, doi: 10.1177/0022009410375260.

³ Nicholas Harman, *Dunkirk, the Patriotic Myth* (New York: Simon and Schuster, 1980), 235-37.

⁴ Norman Gelb, *Dunkirk: The Complete Story of the First Step in the Defeat of Hitler* (New York: William Morrow and Company Inc., 1989), 312.

⁵ Patrick Turnbull, *Dunkirk: Anatomy of Disaster* (New York: Holmes and Meier Publishers Inc., 1978), 74.

⁶ Gardner, x.

⁷ Norman L. R. Franks, *Air Battle Dunkirk, 26 May-3 June 1940* (London: Grub Street, 2000), 10.

- ⁸ Harman, 129.
- ⁹ A.J. Barker, *Dunkirk: The Great Escape*, (New York: David McKay Company Inc., 1972), 87.
- ¹⁰ Major General Julian Thompson, *Dunkirk: Retreat to Victory* (New York: Arcade, 2008), 223.
- ¹¹ Gardner, 124.
- ¹² Gardner, 124.
- ¹³ Harman, 143-44.
- ¹⁴ Harman, 144.
- ¹⁵ Gardner, 94.
- ¹⁶ Barker, 104.
- ¹⁷ Gelb, 158.
- ¹⁸ Hugh Sebag-Montefiore, *Dunkirk: Fight to the Last Man* (Cambridge: Harvard University Press, 2006), 412.
- ¹⁹ Barker, 120-121.
- ²⁰ Sebag-Montefiore, 380.
- ²¹ Gelb, 244.
- ²² Neil McKay, Lisa Osborne, Alex Holmes, *Dunkirk*, directed by Alex Holmes (2004; London: BBC, 2013), YouTube.
- ²³ Barker, 105.
- ²⁴ Gardner, 19-20.
- ²⁵ Gardner, 50-1.
- ²⁶ Gardner, 122.
- ³⁰ Thompson, 296.

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The Virtual Band-Aid: DOD Must Be the Lead for Critical Cyber Infrastructure Defense

Maj Brian Earp, USAF, MAJ Joseph Gilbert, USA, and LCDR J. Darrick Poe, USN

“[O]ur enemies [seek] the ability to sabotage our power grid, our financial institutions, and our air traffic control systems. We cannot look back years from now and wonder why we did nothing in the face of real threats to our security and our economy.”¹ After signing an executive order on cyberspace defense in February, President Barack Obama spoke to the desire and need to harden our cyber-defenses against attacks on the United States’ critical infrastructure. The President charged the Department of Homeland Security (DHS) as the lead agency for coordinating the protection, prevention, mitigation, and recovery from cyber incidents. Although this task follows the legal precedents in United States (U.S.) Code (e.g., Title 10, Title 18, Title 32, etc.), as well as the historic tasks to protect the homeland, the extreme differences between cyberspace and the classic air, land, sea, and space domains necessitate using alternate approaches. The Department of Defense (DOD) is currently posturing forces for cyberspace operations in the present and future, and should also focus on protecting the homeland from attacks through cyberspace. DOD must immediately assume the lead role for the defense of critical U.S. infrastructure in cyberspace due to DOD’s current capabilities and investments, as well as the global nature of cyberspace.

Background

The classification of cyberspace as the fifth warfighting domain was a shot across the bow to many—even in the military. This decision energized the DOD while the rest of the government and the civil sector struggle to keep pace. When internet architects first implemented plans for a globally connected web of computers, they focused their design on

accessibility and redundancy with security only as an afterthought. While citizens and corporate entities had many years to learn about the dangers inherent in cyberspace, vulnerabilities still exist, especially in aging systems like those that control U.S. critical infrastructure. Previous research demonstrated that this problem requires immediate attention, and recently the President enacted U.S. policy through a Presidential Policy Directive (PPD) and an Executive Order (EO) addressing critical infrastructure. With a growing adversarial presence in cyberspace, the policy guidelines may not be directed appropriately.

Cyberspace is arguably the fastest growing domain within DOD, and because the commercial sector shares this domain with DOD, the United States collectively must take aggressive steps to secure cyberspace. Unlike the challenges the military faces in the land, sea, air, and space domains, cyberspace is not a physical place that a unit can occupy. It exists exclusively behind the 1s and 0s of a computer and the movement of information via electromagnetic signals. The ease and convenience of the internet makes cyberspace a primary source for communication, business, and movement of financial assets. Unfortunately, these traits also make it the ideal planning and coordination tool for state and non-state actors to conduct illicit activities. Recognizing the importance of quickly re-enforcing the U.S. governmental presence in cyberspace, on February 12, 2013, President Obama issued an executive order to manage the federal government responsibilities focused on improving cyber infrastructure and cyber security.²

Prior to the current policies, DHS already had multiple authorities to act to secure U.S. cyberspace. Most recently, these included the 2008 National Security Presidential Directive 54, the Homeland Security Presidential Directive (HSPD) 23 (both classified directives), and the 2003 HSPD-7, as well as numerous other documents that established and affected DHS's

responsibilities.³ In February, Presidential Policy Directive (PPD) 21⁴ and Executive Order (EO) 13636⁵ established presidential level policy for cyber security of critical infrastructure. These documents outline the U.S. policy for mitigating and responding to cyberspace attacks against critical infrastructure and appoint DHS as the lead agency. PPD-21 directs the Federal Government to do the following: 1) Refine and clarify functional relationships across the Federal Government to advance the national unity of effort to strengthen critical infrastructure security and resilience; 2) Enable effective information exchange by identifying baseline data and systems requirements for the Federal Government; and 3) Implement an integration and analysis function to inform planning and operations decisions regarding critical infrastructure.⁶ Executive Order 13636, Improving Critical Infrastructure Cyber security, complements PPD-21 and applies a whole of government approach for the United States' National Security interest in cyberspace.⁷ EO 13636 clarifies tasks for cyberspace information sharing and privacy and civil liberties protections.⁸ Further, EO 13636 directs the Secretary of Homeland Security to establish a consultative process to coordinate improvements.⁹ Additionally, the EO tasks the Secretary of Commerce to direct the Director of the National Institute of Standards and Technology to lead the development of a framework to reduce cyber risks.¹⁰ To address cyber security or cyber infrastructure vulnerabilities, the order directs the creation of policy and gives the primary coordination responsibility to DHS. Section 8 of the order directs DHS to take responsibility for coordinating and submitting an annual report on cyber infrastructure and security directly to the President.¹¹ This document also outlines significant responsibilities for other agencies of the Federal government such as the Department of Commerce (DOC) and DOD. The President assigned matters concerning infrastructure to DOC even though the majority of cyberspace attacks in the world originate outside the United States where DOC has little presence or

authority and where DOD has significant authority.¹² The intent of PPD 21 and EO 13636 is to mandate a whole of government solution to cyberspace incidents within the United States. Further, the President assigned DHS as the lead agency and DOD as a supporting agency due to the restrictions imposed by Title 10 of U.S. Code.

In addition to the complications added by the legal restrictions constraining operations within the geographic boundaries of the United States, most of the cyberspace infrastructure within the United States is owned and operated by the commercial sector. Therefore, private companies own the majority of the networks and infrastructure on which cyberspace traffic transits and cyberspace attacks occur. For this reason, DHS started the Enhanced Cybersecurity Services (ECS) program. “The ECS is a voluntary program based on the sharing of indicators of malicious cyber activity between DHS and the participating Commercial Services Providers. The purpose of the program is to assist the owners and operators of critical infrastructure to enhance the protection of their systems from unauthorized access, exploitation, or data exfiltration through a voluntary information sharing program”.¹³ The program is a partnership with DHS/DOD and the private sector to share information and to increase the security capacity of existing cyber security systems. The partnerships and relationships developed between DHS/DOD and the private sector are a key part of the protection and defense of critical U.S. infrastructure in cyberspace.

It is easy to conclude that the current laws and policies constraining cyberspace protection within the United States uniquely position DHS to be the supported agency in U.S. cyberspace defense. Among other important missions, DHS can investigate and arrest cyber-criminals operating inside the United States. Further, DHS currently has the legal mandate established by the President to evaluate our nation’s cyber infrastructure and to address any

vulnerabilities. While these aspects are an important first step, further analysis reveals a dark side in which critical U.S. infrastructure remains unprotected by the very nature of cyberspace and the huge investment gap between DHS and DOD.

Previous cyber security research also suggested DOD as the lead agency for critical infrastructure and homeland cyber defense for reasons other than those argued in this paper. Three papers from the Joint and Combined Warfare School have addressed the issue of DOD protecting critical infrastructure in cyberspace, but all three were written prior to PPD-21 and EO 13636. Because of this, they do not fully address the current U.S. policy. First, Schweichler, Zuniga, and Morton argue that policies and authorities in 2012 should alter the way that DOD approaches the cyberspace response based on the fact that the United States is currently in a response-oriented mode that reacts to cyberspace threats instead of proactively defending against them.¹⁴ Second, King, Stuckey, and Tovar declare that the DOD should lead the charge for national cyber security threats for two reasons. First, they argued that the legislation in 2012 was too ambiguous. Second, they claimed that DOD's cyberspace proficiency in 2012 was better suited to defense.¹⁵ When the President signed PDD 21 and EO 13636 in February of 2013, most researchers focused on critical infrastructure protection prior to the U.S. policy defined in the EO and PPD. Another source argues that the United States should focus more on resilience between public and private sectors rather than incident response frameworks.¹⁶ Although previous research echoes similar themes presented in this research, the recent release of PPD-21 and EO 13636 creates open source policy applicable across the entire U.S. Government.

Analysis

The legal aspects and current policy concerns fail to account for the global aspect of cyberspace. In this radically different domain, DOD is already poised with huge human, technical, and hardware cyberspace investments that it could quickly orient towards cyber defense for critical U.S. infrastructure. Cyber-security requires a whole of government approach, but counter to current policy, DOD must immediately lead in order to apply its tremendous cyber investment to protect against the threat to critical U.S. infrastructure in the global cyber domain.

Cyber is Different

While defense of cyber infrastructure within the U.S. appears similar to many of the missions currently planned and implemented at U.S. Northern Command, the global nature of the cyber domain immediately obviates the comparison. In order to attack the United States in either the land, air, or sea domains, you must first physically approach the United States in those domains. Cyberspace, by its very nature, has no specific physical locale. Joint Publication 6-0 even states “The [Global Information Grid (GIG)] operates, through cyberspace, as a globally interconnected, end-to-end, interoperable network-of-networks, which spans traditional boundaries of authority. Given the inherent global reach of the GIG, many [Network Operations (NETOPS)] activities are not under the command authority of a using Combatant Commander. Therefore, a great deal of coordination and collaboration (unity of effort) is essential to fully enable NETOPS capabilities.”¹⁷ With only an internet connection, anyone sitting anywhere in the world can attack the United States. Further, U.S. Cyber Command (USCYBERCOM) members rely on military and civilian communications and power infrastructure within the United States in order to conduct global operations. Whereas a terrorist attack against a U.S.

military base located in the United States does not necessarily pose a direct threat to U.S. operations in the Pacific or Middle East, a cyber attack on U.S. critical infrastructure could cause cascading effects that restrict command and control as well as the ability of the United States to conduct global cyberspace operations.

In a world where an enemy can attack the United States through cyberspace from anywhere with global impact, Title 10 of U.S. Code constrains the U.S. military to actions outside the United States except for special allowances by the Posse Comitatus Act. While these laws prescribe restraining DOD forces within the United States, the nature of cyber war dictates a different framework for cyberspace. The Department of the Army's ATTP 3-39.32 governs how military forces may defend themselves from attack on military bases within the United States, to include posturing for defense during times of heightened awareness.¹⁸ By its very nature, the instantaneous global reach of cyberspace defies previous spatial classifications and redefines cyber infrastructure throughout the United States as part of DOD's "cyber base". Accordingly, the U.S. military must provide adequate defensive measures to protect from attacks. Even though nearly all of the cyberspace infrastructure is privately owned and physically resides off government property, DOD has a right and necessity to protect it. This is similar to the right of individual Soldiers, Sailors, Airmen, and Marines, or even military forces transiting the United States, to self-defense.¹⁹ While Title 10 and Posse Comitatus currently restrict ground, air, and naval forces within the United States, they do not impact their operations external to the country. As mentioned above, cyberspace requires the use of infrastructure within the United States for DOD cyber operations abroad. By its very nature cyberspace is an instantaneous global domain absent a physical location and this fact alone drives the need for DOD as lead in cyber protection of critical U.S. infrastructure.

DOD Investments

In addition to the global aspect of cyberspace, the hardware, technical, and human capital cyber investments are key requirements for the agency that leads in U.S. efforts to defend critical infrastructure. In general, analyzing DOD and DHS budgetary documents, DOD's total budget is roughly ten times larger than DHS, and DOD's cyber budget is roughly 100% greater when comparing equivalent cyberspace expenditures.^{20,21,22,23,24} This cyber investment allows DOD to use the full spectrum of operations required for operating and defending U.S. cyberspace against global threats. Additionally, DOD investments allow for rapid integration and far surpass the recent budgetary gains made by DHS in cyberspace.

USCYBERCOM investments pave the way to support the DOD cyberspace operations, both offensive and defensive, and the United States must capitalize on these investments by applying them for U.S. defense of critical infrastructure. The Fiscal Year 2013 President's Budget for USCYBERCOM provides \$182 million dollars, and 937 personnel. According to General Keith B. Alexander, USCYBERCOM Commander, USCYBERCOM made substantial progress in building capabilities to perform its missions²⁵. The dual-hatted nature of the National Security Agency (NSA) Director and USCYBERCOM Commander contributes heavily to the unity of effort between arguably the two most important agencies with respect to cyberspace. Additionally, the geographic proximity of USCYBERCOM, NSA, and the Defense Information Systems Agency (DISA) at Fort Meade, MD offers an ideal situation for information sharing and responsiveness within DOD. DHS, in comparison, needs many years to form these close interagency ties without the benefits of the dual-hatted commander and geographic proximity.

In terms of technical investments, the EINSTEIN program is a fundamental DHS program for cyberspace indicator and warnings. In Fiscal Year 2013, DHS allocated \$345 million to expand the EINSTEIN program, a key part of the National Cybersecurity Protection System (NCPS) providing integrated intrusion detection, analytics, information sharing, and intrusion prevention systems.²⁶ Although the NCPS will assist with many necessary capabilities, it is only a defensive mechanism and USCYBERCOM would provide the vehicle for any non-defensive measures through cyberspace. Also, most indicators show the EINSTEIN program not meeting stated goals and already \$41 million dollars over budget.²⁷ While 13-year programs are often over budget, the very nature of an over budget, under-performing program highlights the necessity of using all of the U.S. cyber capabilities that currently exist to quickly protect this critical infrastructure. These technical and political gaps are inherent problems in the current framework with DHS as the cyber infrastructure defense lead, illustrating how DOD is better postured as the immediate lead for critical infrastructure protection in cyberspace.

Besides hardware and technical investment, DOD invested in human capital with the newly created cyber forces residing within USCYBERCOM and subordinate units. USCYBERCOM built and fielded cyber mission teams to provide cyberspace capabilities to service and combatant commanders. The teams focus on three primary areas: Cyber National Mission Forces defend against national level mission threats, Cyber Combat Mission Forces support combatant commander's objectives, and Cyber Protection Forces operate and defend the DOD information environment.²⁸ DHS does not currently have this capability and it would take a large push to man, train, and field a similar force. The vast technical capability of USCYBERCOM is not valuable without the human capital investments that understand and use these capabilities. Beyond simply assigning personnel, GEN Alexander remarked that

USCYBERCOM is building capabilities for planning, doctrine, and thinking²⁹. Cyberspace planning is a new field and USCYBERCOM currently trains future cyber warriors to respond to combatant commander's requirements as well as national level needs. The cyber vulnerabilities of critical infrastructure within the United States require immediate leveraging of DOD's hardware, technical and human capital investments in cyberspace by making DOD the lead agency for U.S. efforts to defend critical infrastructure.

Conclusion

The tenuous future of cyberspace security illustrates the need for the United States to better posture against attacks on critical infrastructure. The global threat and pervasiveness of cyberspace creates a landscape and architecture in which enemies may originate from any geographic location on earth. No matter the enemy's intentions, DOD must defend cyberspace on a global scale. Because of the current posture of DOD and the global cyber threat, DOD is the nation's best choice to lead the effort to protect cyberspace.

Alongside DOD's global positioning, investments in manpower and technology far exceed DHS' ability to defend the United States. The current challenge is to harness these capabilities not only for Title 10 DOD operations, but to extend them in defense of U.S. critical infrastructure. Expanding the scope of the DOD capabilities is a fiscally responsible action and allows DHS to focus on addressing future needs instead of duplicating present DOD competences. The immediate cyber threat necessitates changes to presidential policy and legislative action to make DOD the lead for cyber defense of critical US infrastructure.

Recommendations

Current U.S. policy and legal authorities acknowledge DHS as the lead for protecting U.S. critical infrastructure in cyberspace. However, the United States assumes risk if the administration and lawmakers retain current policy. The United States lies at a critical crossroads—either assume a great risk with DHS as lead federal agency, or appoint DOD as lead with a better trained and postured force. Unfortunately, the growing threat and global nature of cyberspace create an environment demands immediate action, and the U.S. government must not postpone this decision any longer. DOD must take the lead in the protecting the U.S. critical infrastructure in cyberspace with both a short term and long term capacity.

The immediate recommendation for DOD to lead the United States in critical infrastructure defense in cyberspace pivots on DOD's previous investments and capabilities. DHS's EINSTEIN program offers one example in which cyberspace defense programs need more time and money than originally advertised to combat an existing threat. This uncertainty in the immediate timeframe requires a revision of the current cyber protection PPD and EO, giving the lead responsibility to DOD. Along with changes to policy, lawmakers need to enact the legislation that defines cyberspace operations in a different manner from traditional Title 10 operations to allow for full cooperation with other agencies within the U.S. The laws may address only cyberspace operations supporting critical infrastructure protection, but the current restrictions do not allow for operations within the United States by the U.S. military. In addition to these expansions in authority, the U.S. National Guard and Air National Guard must recognize their ability to conduct Title 32 operations to protect the critical infrastructure of the state. Enacting the changes to U.S. policy and legislation along with empowering the state resources creates a powerful force ready to combat threats to U.S. critical infrastructure in the near term.

An immediate change also requires the forethought to develop a long-term fiscally responsible solution and to negotiate the current cyberspace protection diasporas contained in multiple organizations. The DOD remains globally postured to provide indicators and warnings, develop appropriate requirements for information sharing, and develop robust response mechanisms capable of providing the nation with response capabilities to defend critical infrastructure. The ability to act globally is a cornerstone of DOD operations and is not a central component of other U.S. departments and agencies such as DHS or DOC. Additionally, any new legal framework must address DOD's fundamental role to protect critical infrastructure affecting global U.S. bases in perpetuity. DOD must apply resources not only to counter threats against U.S. critical infrastructure, but also against global attacks that may threaten vital U.S. interests. Finally, the U.S. Government can reduce redundancy and unnecessary expenditures by assigning DOD as the lead for protecting against global attacks and U.S. attacks. Ultimately, assigning DOD as the lead for protecting critical infrastructure in cyberspace in the long term assures fiscally prudent protection against the global threat.

These immediate and long-term needs largely require changes to policy and legislature for multiple reasons. The United States must immediately transition the lead for critical infrastructure protection in cyberspace from DHS to DOD through policy while also providing the necessary legal protection to conduct operations in the United States and abroad. Likewise, DOD must continue to prevail against these threats due to the global nature of cyberspace and the inherent responsibility to provide worldwide protection vital to U.S. interests. Without these policy changes, the United States assumes great risk to critical infrastructure. Each day that the United States cannot prepare adequate defenses, the enemy is better postured to conduct attacks at a time and place of their choosing.

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Command and Control of the Arctic Region

By LTC H. Jay Brock IV, USA, Maj Steve Bury, USAF, and CDR Brian Rower, USN

To improve the efficient and effective command and control of the Arctic Region, USNORTHCOM must develop a subordinate command that leads and coordinates all the efforts of USNORTHCOM, USEUCOM, and USPACOM to pursue the United States strategic objectives in the Arctic Region. Currently, the Unified Command Plan (UCP) designates USNORTHCOM as the primary combatant command to advocate on Arctic issues in coordination with USEUCOM. However, there are myriad of international military partners, government agencies, and private organizations with interests in the Arctic that interact with all three of the above combatant commands making the lead military organization difficult to ascertain in many circumstances. As the Arctic region continues to increase in importance and the United States endeavors to work more closely with these disparate organizations and international partners, it will be increasingly crucial that a single entity has the exclusive lead on the Arctic region.

The strategic importance of the Arctic Region is likely to increase significantly in the next several decades. The combination of increasing territorial claims of the Arctic littoral countries (United States, Canada, Russia, Sweden, and Denmark (Greenland)) and non-Arctic nations, coupled with sea ice recession, is rapidly becoming a new focal point for U.S.-Russia conflict that could inflame a new “cold war” and will likely expand far beyond the realm of U.S.-Russian relations into the domains of our national security and crucial economic interests. This new focal point will involve nations staking claims over highly lucrative natural resources and will compel increasingly problematic international relations with Arctic and non-Arctic nations. The United States military national command authority must assert a more proactive command

and control relationship than what is presently in place to protect U.S. national security and economic interests.

Background

The Arctic Research and Policy Act (ARPA) of 1984, defines the Arctic as:

All United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers [in Alaska]; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain.¹



FIGURE 1²

Receding ice caused by global warming offers potential access to lucrative resources and shipping shortcuts. A U.S. Geological Survey estimates that the region contains 13% of the world's undiscovered oil reserves (approximately 90 billion barrels of oil) and 30% of the

undiscovered gas reserves (approximately 1,670 trillion cubic feet of natural gas).³ Estimates vary, but some scientists estimate the Arctic will be almost ice free in the 2030s.⁴ As a result, maritime transit of the Arctic is expected to increase significantly. Increased traffic, along with environmental stresses such as illegal fishing, over-fishing, and pollution, increases concerns that the trends in Arctic climate change may overwhelm the adaptive capacity of some Arctic ecosystems and reduce or even eliminate populations of living resources.⁵

Apart from the environmental and commodity concerns, there are several factors that further complicate Arctic issues for the three Combatant Commands that will make coordination and conflict resolution in the region problematic. Russia's definition of its Exclusive Economic Zone (EEZ) in the Arctic, increased Russian shipping traffic, tremendous growth in Chinese shipping traffic through the Arctic, and the increased need for NATO countries to address security concerns with many different entities, each play a role in complicating Arctic matters.

In 2007, Russian polar explorer Artur Chilingarov made controversial headlines when he planted a Russian flag under the North Pole. The Russians claim the underwater mountain range known as Lomonosov Ridge is an extension of their territory. If this claim is validated by the United Nations, it would designate a large percentage of the region within the Russian EEZ.⁶ This could have a significant impact on the fact that more than 50% of the United States' fish stock comes from the United State's EEZ off of Alaska.⁷ Additionally, Russia continues to invest in icebreakers that will provide further commercial access to the Arctic. The northern route commercial maritime usage by Russian vessels has increased from 4 ships in 2010 to an estimated 50 this year. As usage rates continue to increase, Russia will more routinely transit an area where it already has been assertive about staking very contentious territorial rights.⁸ There

is clearly a great deal more at stake than simply research and the ability to take navigational shortcuts.

In a similar vein, last summer, China sent its first icebreaker, the Snow Dragon, over the top of Russia, from Shanghai to Iceland. This September, marked the first voyage of a commercial container vessel from China to Europe using an Arctic rather than a southerly sea route via the Suez Canal, cutting travel time by two weeks and distance by 2,400 nautical miles.⁹ China's largest shipping company (COSCO) expects to expand its commercial shipping through the northern route and by 2020, as much as 15 percent of Chinese trade is projected to pass through Arctic waters.¹⁰ The projected increase in traffic and political and economic interest in the Arctic will likely escalate conflict in the region. Additionally, the political-military landscape is also a complicating factor in the region, since 12 of the Arctic Council members are part of the North Atlantic Treaty Organization (NATO) and are keenly aware of the increased need to address security concerns prompted by the burgeoning traffic and economic importance of the Arctic, while a host of issues such as sovereignty and control remain outstanding. The region requires a more coherent vision that will untangle the many complicated issues in the Arctic, which will undoubtedly put the United States and Canada as key political, economic and military partners in the spotlight on defining this vision.¹¹ President Obama issued the first-ever U.S. National Strategy for the Arctic Region (USNSAR) in 2013. Though the document does not address any specific unity of effort aspects for the region, it is important to examine the strategy to understand the United States goals for the Arctic.

U.S. National Arctic Strategy for the Arctic Region

The purpose of the USNSAR is to articulate the priorities, challenges, and opportunities for this increasingly high-profile region of the world. While the President has characterized the Arctic as “peaceful, stable and free of conflict,” the political, economic, and military landscape will likely be impacted to the same degree as the epic geographical changes we are seeing as the Arctic ice recedes in the region.¹²

The Arctic strategy is guided by the principles of safeguarding peace and stability, leveraging the best possible information to inform decision making, and pursuing innovative arrangements and partnerships in consultation and coordination with Alaskan natives. These principles provide the foundation of support for three lines of effort (LOEs) within the USNSAR: advance U.S. security interests, pursue responsible Arctic region stewardship, and strengthen international cooperation.¹³ While the strategic vision for the Arctic is well articulated, the strategy also alludes to the fact that the fabric of economics, diplomacy, ecology, and, perhaps most importantly, unity of action are tenuously woven together and susceptible to the rapid changes we are currently witnessing in the region. In the context of unity of effort, advancing U.S. security interests and strengthening international cooperation are crucial areas that have shortfalls that must be addressed in the near-term to serve the long-term national strategic goals.

To advance the strengthening international cooperation LOE, the USNSAR outlines four objectives, some of which must be pursued more diligently in the future. The pursuit of arrangements that promote Arctic prosperity and security and the objective of accession to the law of the sea convention are two objectives that illustrate this need. The USNSAR appropriately claims success in working with the Arctic Council to secure a higher degree of public safety and partnership. The signature of the Arctic search and rescue cooperation

agreement in Nuuk, Greenland in May 2011, dubbed “the SAR agreement,” certainly points to that success, with former Secretary of State Hillary Clinton as the U.S. signatory and Secretary of the Interior, Ken Salazar in attendance. The presence of the Secretaries of State and Interior gives credence to the level of importance of the region since it was the first time cabinet-level U.S. officials took part in the Arctic Council and resulted in the Council’s first legally binding document.¹⁴

U.S. diplomatic efforts in other areas, however, have been less forthright and cooperative. The United States has been slow to pursue bilateral and multilateral arrangements to support security. The United States vetoed an Arctic Council effort to make security in the region a working group focus issue.¹⁵ Additionally, the United States is the only Arctic state that is not a signatory to the United Nations Convention on the Law of the Sea (UNCLOS).¹⁶ The United States signing UNCLOS would strengthen legal standing and potentially the sovereignty claims of over 600 nautical miles of the continental shelf extending from Alaska. By thwarting efforts to add security to the Arctic Council’s working group issues, it may hinder the standing of this crucial issue that must be addressed. Both the UNCLOS and the formal addition of security to the Arctic Council’s agenda would give the United States additional credibility as it pursues other objectives, such as cooperation with other interested parties who are not Arctic states. An example is China, which has a great interest in the natural resource potential of the Arctic and the ability to freely transit the region.

From the DoD perspective, the 2010 Quadrennial Defense Review advocates for accession to the UNCLOS, alludes to the shortfalls in the Arctic, and reinforces the need to work not only through the inter-agency but also with international partners by stating the following:

The Department of Defense and its interagency partners must be able to more comprehensively monitor the air, land, maritime, space and cyber domain for potential

direct threats to the United States.... This effort includes enhanced coordination with Canada for the defense of North America.... Special attention is required to develop domain awareness tools for the Arctic approaches as well.¹⁷

It is probable that recognition of these shortfalls prompted the United States and Canada to sign the “Tri-Command Framework for Arctic Cooperation” and the “Tri-Command Training and Exercise Statement of Intent” in December 2012. These agreements promote enhanced cooperation and interoperability between USNORTHCOM, Combined Joint Operations Canada (CJOC), and NORAD.¹⁸ These moves to promote U.S.-Canadian military cooperation suggest a growing understanding of the critical role bi-lateral partnership is playing in the Arctic region and that the need for unity of action must also increase. Additionally, the Canadian military began hosting an annual meeting called *The Arctic Chiefs of Defence Staff (CHOD) Forum*. This meeting first started in 2012 prior to Canada assuming the Chairmanship of the Arctic Council in 2013.¹⁹ Canada likely started this meeting for several reasons. Among them is the desire to get a better understanding of other countries’ views on the Arctic from the national defense perspective and how those views impact their own defense posture. Canada has the largest claim to Arctic territory, is second only to Russia in terms of the amount of coastline to safeguard, and is eager to leverage its bilateral relationship with the United States as well as multi-laterally with other international partners. The need to forge these types of partnerships with other Arctic nations surely is also driven by the fact that Canada has several territorial disputes with the United States and Denmark and would like to resolve them during their Arctic Council chairmanship.

By taking the lead, Canada is undoubtedly positioning itself to be a leader in defense and policymaking in the region, and it behooves the United States to take a greater role in working with Canada and managing controversial disputes that continue to be a hallmark of the region

even though they are not characterized by openly hostile international relations. This underscores the need for a coherent command and control relationship that emphasizes unity of action.

Analysis and Discussion

JP 3-0, Joint Operations, defines unity of command as the operation of all forces under a single responsible commander who has the requisite authority to direct and employ those forces in pursuit of a common purpose. Our joint doctrine considers unity of command an essential element of command and control and a requisite for achieving unity of effort, defined as coordination and cooperation toward common objectives, even if the participants are not necessarily part of the same organization. Unity of effort is the goal during joint operations or operations involving multiple commands. To determine if we have unity of effort in the Arctic Region, it is important to examine existing relationships between government agencies and departments with interests in the Arctic.

Combatant Commands

Combatant Commanders utilize a Command Arrangement Agreement (CAA) to establish formal CCDR responsibilities between overlapping areas of mutual interest. Currently no CAA exists between USNORTHCOM and USEUCOM and the CAA between USNORTHCOM and USPACOM is outdated and does not reflect changes in the Unified Campaign Plan (UCP) on Arctic issues.

USEUCOM has the Theater Security Cooperation (TSC) responsibility with six of the eight Arctic States and seven of the twelve observer nations. USNORTHCOM has TSC responsibility for one of the Arctic Council members and USPACOM has TSC responsibilities for five of the observer nations. USEUCOM engages Arctic partners, primarily through the Arctic Security Forces Roundtable (ASFR) that USEUCOM created as an annual gathering of

senior military and coast guard leaders from the twelve main countries who either have coastlines above the Arctic Circle, or who have significant interest in the region. The militaries and Coast Guards of the United States, Canada, Denmark, France, Finland, Germany, Iceland, the Netherlands, Norway, Russia, Sweden and the United Kingdom support their national civil authorities in case of an emergency above the Arctic Circle and could potentially be asked to support one another due to few resources in a large area.²⁰ Far East Russian engagement is as much a USNORTHCOM issue as it is USPACOM issue. The seam for this engagement is the Bearing Sea, which is in both the USNORTHCOM and the USPACOM AORs. USEUCOM has overall responsibility for TSC with Russia. The AOR dynamics make for a challenging environment for coordinating a coherent policy and message for Arctic engagement not only with Russia but also with all the other nations involved in Arctic issues.

Further complicating command and control in the Arctic is the existence of Joint Task Force-Alaska (JTF-AK) in USNORTHCOM and Alaska Command (ALCOM) in USPACOM. ALCOM serves as a sub-unified command under PACOM responsible for “maximizing theater force readiness for Alaskan service members and expediting worldwide contingency force deployments from and through Alaska as directed by the Commander, USPACOM.”²¹ USNORTHCOM recently stood up JTF-AK and designated it as the lead for the Arctic Region, making it the lead organization for the Armed Forces.²² The mission of JTF-AK is to deter, detect, prevent, and defeat threats within the Alaska Joint Operations Area (AK JOA) to protect U.S. territory, citizens, and interests, and conduct Civil Support, as directed.²³ The same officer, currently Lt Gen Handy, commands both JTF-AK and ALCOM. Though this could be used as an argument that there is unity of command in the Arctic, the existence of two subordinate commands focused on the same region from two separate combatant commands is redundant.

Additionally, the current command structure does not include a USEUCOM entity under the single commander.

United States Coast Guard

Another key player in the Arctic is the U.S. Coast Guard (USCG). As the only Armed Service outside of DOD and tasked with multiple statutory missions directing a presence in the Arctic, the USCG is in a unique position to interact and influence military, interagency, and commercial communities. The USCG published its first-ever Arctic Strategy in May 2013. The document serves as a theater strategy that outlines the ways, ends, and means to achieve national strategic objectives in the region over the next 10 years.

The USCG addresses Arctic issues through a variety of commands, agencies, international organizations, and working groups. Though the USCG is involved in literally dozens of councils and partnerships, an examination of the primary relationships is a necessary step in determining if the United States has unity of effort in the Arctic region. The USCG has personnel assigned to all three combatant commands with interests in the Arctic. Additionally, the USCG has several initiatives developed to pursue Arctic interests. There are plans to establish an Arctic Center of Expertise at the United States Coast Guard Academy (USCGA). The purpose of the organization is to serve as an institution that works with the Department of Homeland Security (DHS) Science and Technology Directorate to pursue safe and responsible maritime activity in the Arctic region. Additionally, the USCG plans to stand up an Arctic Strategy Board within DHS and pursue a strategic front for the Arctic through the assignment of a USCG officer on the National Security Staff (NSS).²⁴ The USCG assigns an officer to lead policy development in the areas of Arctic Region Policy and Maritime Security. The NSS does not interact with combatant commands, though it affects command and control in the Arctic by

setting the strategic priorities for the nation and delegating the execution of priorities to the responsible agencies.

Conclusion and Recommendations

The United States has not achieved unity of effort in pursuing its Arctic Strategy. Though there has been an increased focus, and new strategies have been published at the national and Coast Guard levels, there are too many agencies and departments pursuing Arctic interests through different channels. The result is a broad and shallow effort across multiple fronts based on good intentions, but with multiple seams and gaps. Though there is coordination between combatant commands, the U.S. does not have a single command charged with pursuing all national interests in the region. Currently, three combatant commands pursue interests in the Arctic through different channels. Additionally, the USCG works within combatant commands, and operates independently in a number of other Arctic councils and forums that are not coordinated through any of the three combatant commands.

A potential fix to this problem is the establishment of a subordinate/sub-unified command within USNORTHCOM which leads and is solely responsible for all DOD Arctic efforts. The establishment of an Arctic Command (ARCTICOM) would place all resources and direction under a single command. This one command would assume the missions of both ALCOM and JTF-AK, allowing both organizations to be consolidated into one. Establishing ARCTICOM also would require realigning other commands, such as US Army Alaska, within the AOR. This realignment would offer an opportunity to examine redundancies in the region. In an environment where DOD officials are currently reviewing the validity and reorganization of combatant commands, consolidating a subordinate command and JTF is certainly a valid option which could be included in a future UCP.

Establishing an ARCTICOM also opens an opportunity to increase and streamline DOD and USCG coordination in the Arctic. As the only Service with statutory requirements to operate in the Arctic, it makes sense to include the USCG in a new subordinate command dedicated to the Arctic. Additionally, designating the commander or deputy commander position of a new ARCTICOM as a USCG position would assist in coordinating DOD and USCG efforts in the region and increase DOD access to the numerous partnerships and councils the USCG engages in on an annual basis. This arrangement would be similar to the USNORTHCOM requirement that the Commander or Deputy Commander be a National Guard Officer, giving representation to the Reserve Component that will perform much of the defense support to civil authority (DSCA) missions within the command. Establishing a USCG presence in ARCTICOM would aid in consolidating multiple lines of effort in an immature, but crucial, region for our country. As progress is made at the national strategic level for the Arctic, command and control must also evolve to keep pace, provide coherence, and adjust to the new realities of the region.

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Weapon Evolution: The Birth of Lethal Autonomous Robotics Systems

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Due to recent technological developments in unmanned weapon systems and the increased use of weaponized Remotely Piloted Vehicles (RPV) by the United States, there is a growing international concern over the development of autonomous weaponized systems (otherwise known as Lethal Autonomous Robotics or LARs). Fear that our current understanding of the nature of war cannot support LARs, the fact that existing legislation is not sufficient to regulate them, and the unpredictability of their effects on our future world is driving some agencies such as Human Rights Watch and the United Nations Human Rights Council to advocate for a ban on all development, testing, and use of LARs (Docherty, 2012). Despite these concerns, the inevitability of the technology development, coupled with the advantages these types of systems can provide both on and off the battlefield, necessitates that the United States develop a comprehensive policy regarding these systems. The United States should continue to develop and test LARs technology and should take a lead role in the international effort to ensure the use of LARs is in compliance with recognized rules of warfare.

History of weapons technology development:

The introduction of new technologies in warfare has often presented questions concerning the suitability and degree of acceptance of new weapons. There was a time when the use of feathered arrows and catapults were outlawed in warfare because they provided an unfair advantage. A weapon as primitive as the crossbow was outlawed because there was virtually no risk to the user and therefore violated the principle of chivalry that defined the professional soldier at that time. Submarines were considered unethical because they could not comply with

accepted laws of the sea and pick up survivors after an attack (Krishnan, 2009). These concerns and prohibitions did not stop the development and eventual use of these weapons in war, and did not stop the continuing advancement of associated technologies for uses other than war. There is no reason to think that mankind will change that custom now and universally comply with a development moratorium. Examining the current state of the field may offer some context to the question of introducing these systems into modern warfare.

Evolution of unmanned autonomous weapon systems:

Unmanned weapon systems are becoming commonplace on the battlefield and can be divided into three categories based on the amount of human interaction required:

- **Human-in-the-Loop Weapons:** Robots that can select targets and deliver force only with a human command (Human Rights Watch, 2012).
- **Human-on-the-Loop Weapons:** Robots that can select targets and deliver force under the oversight of a human operator who can override the robots' actions (Human Rights Watch, 2012).
- **Human-out-of-the-Loop Weapons:** Robots capable of selecting targets and delivering force without any human input or interaction (Human Rights Watch, 2012).

It is also useful to understand the difference between automated and autonomous systems. For our purposes we will define system types as follows:

- **Automated System:** Has the ability to execute precise pre-programmed actions in a well defined and controlled environment.
- **Autonomous System:** Has the ability to adapt to unpredictable and changing environments.

There are several examples of unmanned automated weapon systems currently employed by military forces: land mines, Phalanx close-in weapon system, South Korea's SGR-1 Sentry Robot, and Israel's Sentry Tech and Guardian UGV systems, to name a few. For the purpose of this discussion, we will focus on autonomous, human-out-of-the-loop systems which are still in development. The United States is a leader in this technology, but China, Germany, Israel, South Korea, Russia, and the United Kingdom are also developing capabilities and experts predict that full autonomy for weapons could be achieved in the next 20 years (Human Rights Watch, 2012). As lethal systems are initially deployed, they may include humans in the decision-making loop, at least as a fail-safe — but as both the decision-making power of machines and the tempo of operations potentially increase, that human role will likely slowly diminish (Waxman, 2012). Technology is not a runaway train that moves forward with no purpose. Humans advance their capabilities because it improves their lot in life and they will continue to do so because of the many benefits both military and non-military that this technology will bring. These advantages are significant and must be considered.

Advantages that we cannot ignore:

The United States may see a reduction in overall military manpower required to accomplish its missions. LARs could also significantly reduce the likelihood of U.S. casualties during those missions. The speed, precision, and stealth that LARs provides could give U.S. commanders a distinct advantage on the battlefield. Highly accurate algorithms could also reduce the possibility of fratricide or civilian casualties. Currently, the Pentagon is struggling to solve the problem of providing assured communications to remotely piloted systems to allow them to be effective in an Anti-Access, Area Denial (A2AD) environment. Having a weapon system that can operate independently would alleviate that requirement and provide a great strategic

advantage. As we will examine later, autonomous weapon systems with artificial intelligence architectures capable of operating with no human interference, once programmed, could remove several negative human factors during war: failure to follow lawful orders, indiscriminate killing and rape of unarmed population, and high logistical costs associated with supporting troops in a remote combat zone.

Additionally, the research required to develop LARs will occur in and benefit many other categories of research. Artificial intelligence, computer processing components, power generators, and energy storage are just a few of the fields that will make contributions to these systems. The advancement of technology is inevitable. Complex systems consist of components that may or may be designed with a specific purpose in mind. The Graphical User Interface (GUI), commonly known as the “computer mouse” (introduced by the Apple Computer Co. in 1983 and later used by Microsoft in its Windows software) was developed by the Xerox Corporation in its advanced research facility. The glass used on the common smart phone, often referred to as “Gorilla glass” was developed in the 1960s for use in aviation and automotive applications because of its light weight and durability. It was not until 2006 that the product was identified for its most common current use. The specific use of the technology was not necessarily envisioned by the scientists who invented it. This phenomenon is common in the development of complex systems. Robotic technology designed to facilitate operations in a Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) environment is always being developed. Artificial Intelligence equipped devices would have virtually unlimited applications in environments that are unfriendly or lethal to humans. Autonomous sensors, explosive disarmament, and search and rescue missions soon could be accomplished independently by robots and eliminate additional risk to humans. Space exploration will require

the development of robotics as man's ambitions to reach the stars continue. Even with today's technology there is little that a man can do in the international space station that could not be done by a robot and the robot is cheaper and safer. Is it difficult to imagine that the components that make up these systems could be slightly modified or combined to create some form of weapon system for use in war?

It is this fact, perhaps more than any other that validates the necessity for the United States to continue its LARs research and develop the international standards for their employment. Any moratorium that specifically restricts the development of LARs technology will almost certainly be ineffective in application. The "component" technology will continue to advance, and at some point one side or the other will decide that it is in their interests to commit to the development of LARs technology. As a leading player in international affairs, it would be irresponsible for the United States to ignore this field of weapons research. There are those who believe differently.

Opposition issues:

The Human Rights Watch Report "Losing Humanity: The Case against Killer Robots," calls for a multi-lateral treaty to ban the "development, production, and use" of LARs. The report also calls for the United States to "establish a professional code of conduct governing the research and development of autonomous robotic weapons, especially those capable of becoming fully autonomous, in order to ensure that legal and ethical concerns about their use in armed conflict are adequately considered at all stages of technological development." The United Nations (Heyns, 2013) and International Red Cross (Cross, 2013) recently have stated positions on the issue and other countries are making advancements and pushing for international cooperation.

Several issues of concern have been cited. They can be grouped into three categories:

Technology, Legal, and Moral/Ethical.

- **Technology Shortcomings:** What are the true capabilities of these systems, the risk of malfunctions, and who will be held accountable if they do malfunction and violate the principles of warfare?
- **Legal:** How will these systems comply with the legal principles of warfare concerning the requirements for discrimination, proportionality, and humane treatment?
- **Moral/Ethical:** Is the use of LARs in warfare consistent with our values as a nation?

First, we will address the risk of malfunction. Entire genres of pop culture are based on the concept of artificially intelligent machines turning against their makers. One of the most popular manifestations of this is The Terminator character perfectly portrayed by Arnold Schwarzenegger. In Terminator 2, the robot has a conversation with a young John Connor whom he has been programmed to protect.

John Connor: You just can't go around killing people

The Terminator: Why?

John Connor: What do you mean why? Cause you can't.

The Terminator: Why?

John Connor: Because you just can't, OK? Trust me on this.

While this sounds like an extraordinarily simple concept, it actually illustrates a very complex problem in the development of LAR systems. How does one prevent these systems from malfunctioning and targeting incorrect objectives or causing extensive collateral damage? While

this is important, and needs to be addressed, it is hardly a problem that is unique to LARs systems.

- On March 11, 2012 Staff Sergeant Robert Bales slipped away from his post in Kandahar, Afghanistan and slaughtered 16 Afghan civilians in their homes. He brutally shot defenseless men, women, and children and burned their bodies. Possible mitigating circumstances include post-traumatic stress after four combat tours, a brain injury, and family issues. SSgt Bales was sentenced to life in prison without chance of parole.
- On 22 April 2004 Corporal Pat Tillman, a former NFL player, was killed in a “friendly fire” incident near the Afghan-Pakistan border. During a confusing engagement, he and an accompanying member of the Afghan militia were misidentified as enemy soldiers and shot at and killed by U.S. troops.
- On 7 May 1999, during the NATO bombings of Yugoslavia, five U.S. JDAM guided bombs hit the People’s Republic of China embassy, killing three Chinese reporters. Investigations revealed that personnel at the CIA had identified the wrong coordinates for a Yugoslav military target on the same street (Wikipedia, 2013).

The list of these tragedies goes on. The harsh reality is almost certainly more of these types of mistakes occur than are recognized as such or documented. It is an unfortunate and tragic part of the fog and friction of war. The incidents discussed above happened partially, if not totally, because of the human factor. Post-traumatic stress, fatigue, family issues, and carelessness all contributed to these tragedies because humans were in the loop. Humans are not perfect. In fact, they are easily influenced by factors like danger, hunger, emotion, and inability to compartmentalize problems; none of which is true of machines. Admittedly, machines have

their own limitations, but the objection that they will not be perfect is not sufficient grounds to cease development. The human systems we use now are far from reaching that standard.

Additionally, there is the issue of accountability. There is a fear that in the event of a failure of an autonomous weapon system that leads to unintended engagements, establishing accountability would be difficult. DoD Directive 3009.09 21 Nov 2012 Paragraph 4b adequately addresses this. “Persons who authorize the use of, direct the use of, or operate autonomous and semi-autonomous weapon systems must do so with appropriate care and in accordance with the law of war, applicable treaties, weapon system safety rules, and applicable rules of engagement (ROE).” The U.S. military has a proven track record of holding its leaders accountable for the actions of subordinates and performance of equipment entrusted to them. We have discussed previously how advanced technology and weapons superiority can provide advantages to dominate on the battlefield, so it is no surprise that throughout history many of these advantages have received scrutiny concerning their legality. LARs is certainly no different. In the law of armed conflict, actors are subject to specific principles of warfare that have been developed over several centuries of conflict. *Jus ad bellum* defines the conditions under which states are entitled to use force against each other, and *jus in bello*, defines the obligations of the belligerents once they are engaged in an armed conflict. It is important to understand how LARs could be employed in accordance with *jus in bello* principles of warfare, the laws of armed conflict, and the norms of the international community.

The *jus in bello* is based on four fundamental principles: military necessity, proportionality, discrimination (or distinction), and humaneness (Krishnan, 2009). The principle of military necessity dictates that military force should only be used against the enemy to the extent necessary for preventing the current hostile action to continue or a repeated attempt of the same

or similar action. The principle of proportionality prohibits attacks if the expected incidental loss of civilian life, injury to civilians, damage to civilian objects or a combination thereof would be excessive in relation to the concrete and direct military advantage anticipated (International Committee of the Red Cross, 1977). The principle of discrimination is addressed in the Protocol I Additional to the Geneva Conventions. Article 48 states “In order to ensure respect for and protection of the civilian population and civilian objects, the parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives.” The principle of humaneness “summarizes in some sense all other principles of the law of armed conflict and is the essence of Just War Theory. War should not cause more suffering than is necessary for deciding the war – even among those that have agreed to fight it.”

Indiscriminate weapons such as land mines or poison gas received strong international prohibitions. Others, such as submarines or aircraft, initially met with scrutiny but eventually were accepted as legitimate instruments of war. Where will LARs fall out? Article 36 of the 1977 Additional Protocol to the Geneva Convention lays out the requirements for new weapons. Although the United States is not party to Article 36, it is generally accepted as the international standard. Neither Article 36 nor the time-tested *jus in bello* principles listed above point to autonomous weapon systems being inherently unlawful or justify banning the development and testing of such systems. They do emphasize the significant legal challenges that are presented with employing autonomous weapon systems in certain environments. It is a mistake, when imagining legal or ethical issues of autonomous weapons, to start with the most difficult operational environment for which a lawful fully autonomous weapon would be the hardest to design (Waxman, 2012). The urban environment has a multitude of possible scenarios and a

high probability of interaction which could result in civilian casualties or property damage. Other scenarios present less of a challenge. Autonomous systems, such as the U.S. Navy Phalanx system, are already engaging in machine on machine confrontations at sea. Unmanned Undersea Vehicles (UUVs) operating in the undersea domain are unlikely to encounter non-combatants and would be a likely candidate for autonomous weapon employment. As technology develops, employment in more environments could be possible. Sensor development has been improving rapidly for many years. The science of artificial intelligence is fairly new, but is making great strides. It is quite possible that advances in this technology and algorithms will allow systems to accurately evaluate military necessity and be more discriminating, precise, and humane than their human counterparts in order to minimize collateral damage. The international standards are in place. Provided we incorporate established legal precedents into R&D, testing, employment, and tactics for autonomous weapon systems, our gradual move to augmenting existing manned units with LARs can be regulated properly and meet our legal obligations on the battlefield.

Finally, opponents say that the use of LARs is morally and ethically wrong and will normalize armed conflict. It is true that LARs increase the distance, physical and emotional, between users and the lethal force they inflict. This is the goal of most modern weapon systems. Looking at war as a sport that should be played between two equally matched opponents is idealistic and foolish. Armed conflict is not a game, but an instrument of political power. Fairness is neither required nor desired when defending our nation and way of life. Similar to nuclear stockpiles, LARs may well be a critical deterrent that prevents a costly war. New technologies in warfare have often presented moral/ethical questions and challenges, but technological advancements can reduce the amount of collateral destruction in war and render

previously accepted high-risk tactics unacceptable. One of the primary tactics by the allies in World War II was to bomb civilian population centers of the Axis powers. Because it was deemed a military necessity and possibly because the allies won, that tactic was not punishable as a war crime at the Nuremberg trials. Military necessity dictates that military force should only be used against the enemy to the extent that it is necessary to win the war (Krishnan, 2009).

Today, the arbitrary targeting of civilian population centers is against the internationally accepted rules of warfare. Why? At least one factor was the advancements in weaponry that allowed precision targeting of enemy positions and assets. Mass carpet bombing now violates the principle of military necessity, and possibly several others. It was not only the values of society that changed the law. It was the development of new technologies.

Summary:

As demonstrated above, it is unrealistic to think that the United States can unilaterally control the advancement of any technology or weapon type. The recent development of Lethal Autonomous Robotics (LARs) has presented a new wrinkle to the continuous ethical decisions that accompany the science of warfare. The historical context of weapons is important to consider. Is LARs any more revolutionary to us than the catapult was to the ancient Greeks in 399 B.C.? Would the outcome of WWII and the resulting global dominance of the United States have occurred if ethical concerns had stopped the Manhattan Project? It is unlikely that Nazi or Soviet nuclear research would have ceased merely because the United States was persuaded by the moral argument. A Soviet Union with a nuclear arsenal unchecked by an equivalently armed United States could have produced dire consequences. America is an exceptional country. It is not driven by ancient tribal struggles, has enjoyed peaceful co-existence with its neighbors, and

has been historically gracious in its benevolence in victory. It has possessed global military superiority for almost 70 years, and yet has exercised extraordinary restraint in using it. There may come a time when the burden of global leadership will shift from the United States, but that time has not yet arrived. Given the substantial advantages provided by LARs, we must assume that they will be developed. Therefore, the United States has an obligation to continue the research, development, and testing of these systems, focusing efforts particularly on those systems operating in domains where the possibility of fratricide or civilian casualties is low. The United States should also work with the international community to develop and enforce an international policy on the use of these advanced weapons systems to ensure their use complies with rules of armed engagement under recognized agreements.

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