

“A CHANGE IN THE AIR”:
STRATEGIC INNOVATION
AND THE COMBINED BOMBER OFFENSIVE

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DISCLAIMER

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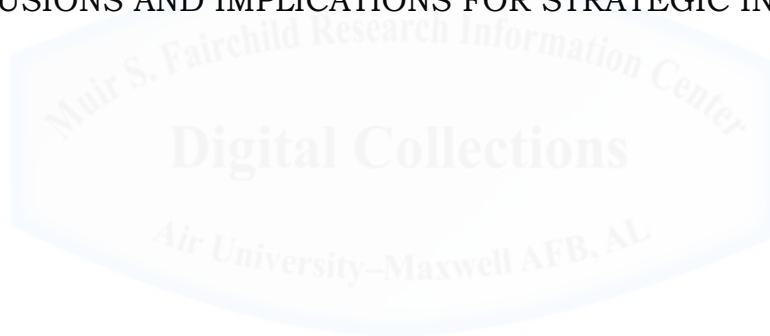


ABSTRACT

This thesis proposes a non-linear approach to strategic innovation and argues that innovation in this construct depends most upon perceiving the interaction of friendly, enemy, and third-party strategies. The author evaluates whether the military has the appropriate mechanisms to innovate strategy during long wars. Rather than to disprove existing theories of innovation that seek linear cause-and-effect relationships, this thesis incorporates them into a broader construct of innovation through emergence at key junctures during war. The analytical framework steps through a three-part case study of the Combined Bomber Offensive during World War II to unravel and correlate the interaction of contextual factors, key actors, and feedback processes leading to air superiority over Germany. Results of the study show that strategic innovation is a complex process influenced by military strategists, decision-makers, and their feedback processes. This study concludes that opportunity for increased tempo, dialogue between political and strategic actors, and a willingness to embrace complexity rather than apply reductionist approaches best contribute to innovation. The study implies that the changing character of war in the cyberspace domain necessitates continuous evaluation of processes as well as discourse between decision-makers and those whom they employ to aid their perception of the strategic environment.

CONTENTS

Chapter	Page
DISCLAIMER	ii
ABOUT THE AUTHOR.....	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
INTRODUCTION	1
1 ELEMENTS AND COMPLEXITY OF STRATEGIC INNOVATION	10
2 COMBINED BOMBER OFFENSIVE: INCEPTION TO CASABLANCA	44
3 FROM CASABLANCA TO QUEBEC.....	61
4 COMMITTEE OF OPERATIONAL ANALYSTS AND THE TRANSITION TO OVERLORD.....	78
CONCLUSIONS AND IMPLICATIONS FOR STRATEGIC INNOVATION ...	96



Introduction

Therefore no plan of operations extends with any certainty beyond the first contact with the main hostile force. Only the layman thinks that he can see in the course of the campaign the consequent execution of an original idea with all details thought out in advance and adhered to until the very end.

Gen Helmuth Von Moltke

America remains at war in the Middle East since the fall of 2001. As the Global War on Terror rounds out its first decade, perhaps the sharpest criticism levied on the Bush administration involved an apparent lack of an exit strategy¹—as if the fundamental question for strategy was never how to win, how to determine if you are winning, whether the war you are currently fighting is the same war you entered, but how to leave. In the fall of 2005, Henry Kissinger likened a progress lull in Iraq to the aftermath of the Tet offensive, “which at the time was widely perceived as an American setback but is now understood as a major defeat for Hanoi.”² If strategists in 1968 could not determine if the U.S. was winning, much less perceive the interaction of U.S., NVA, and Viet Cong strategies and suggest alternatives, then is the task any easier today? Kissinger’s argument suggests that long wars stagnate because the definition of progress becomes nebulous and militaries fail to innovate strategy; the war extends due to “momentum rather than by strategic analysis.”³ The central question of this thesis is to determine whether the military has the appropriate mechanisms for strategic

¹ CNN, "Powell: 'Good Strategy' in Iraq, Afghanistan," <http://edition.cnn.com/2003/ALLPOLITICS/09/07/sprj.irq.powell/index.html>. Sen Edward Kennedy was preeminent among the sharp critics of the Bush administration’s conduct of the war, challenging the lack of a clear exit strategy by September 2003.

² Henry A Kissinger, "Lessons for an Exit Strategy," *Washington Post*, August 12, 2005 2005.

³ Kissinger, "Lessons for an Exit Strategy."

innovation in a long war. If these mechanisms exist, under what contexts are they constrained or enhanced?

This thesis argues that strategic innovation during long wars depends most upon assessing and predicting the interaction of friendly, enemy, and third-party strategies. Strategic innovation in war derives from military input at critical junctures. Opportunities for strategic change may present as inevitable stalemates, often due to environmental factors such as harsh winter conditions, sand storms, or even mutual fatigue. Other times, these junctures must be sensed and facilitated by keen decision-makers and robust feedback processes. It is incumbent upon strategists to recognize when strategy must change, even when current strategy seems to be working. This chapter refines this core argument and establishes the framework for analysis.

A few definitions will provide clarity and articulate boundaries for discussion. In his multi-layered dialectic approach, Carl Von Clausewitz suggests war is “a chain of linked engagements each leading to the next,” and “strategy is the use of the engagement for the purpose of the war.”⁴ Strategy, as a multidisciplinary art, necessarily involves steering the sequence of military engagements. Steering, in the strategic sense, does not imply stopping to ask directions or opportunity and initiative likely are squandered. Eliot Cohen elaborates that taking the time for optimal deliberation increases the probability of failure: “steer a raft on a river that way, and you end up in the water.”⁵ The art of strategy thrives on perceptive anticipation and proactive assessment.

This notion of steering is important because the strategist cannot think solely in theoretical constructs or in isolation from context; the scope and rate of strategic change is subject to external influence. These external influences such as the international security environment,

⁴ Carl von Clausewitz, Michael Eliot Howard, and Peter Paret, *On War* (Princeton, N.J.: Princeton University Press, 1984), 177, 82.

⁵ Eliot Cohen, "Washington's Dithering on Libya," *The Wall Street Journal* 2011.

civilian oversight, alliance politics, and grand strategy interact with internal influences of strategy. Gartner adds, “The interactive nature of war makes assessment difficult because it adds many players, and actors need to formulate expectations on how they expect their adversaries to react.”⁶ Innovation hinges on the strategist’s grasp of this interaction between external and internal influences upon both friendly and adversary strategy.

In practice, the strategist focuses on the transitions from engagement to engagement during the course of a war as opportunities to influence momentum and seek favorable war outcome; sometimes strategic interaction even suggests new ends as “new information leads to new (or reaffirmed) choices.”⁷ However, there is a gap of uncertainty between influence, expectations, and reality. Thus, influencing strategy depends upon both the difficulty of obtaining information as well as managing interpretation of any information obtained. These two concepts correlate to Clausewitzian fog and friction.

Interpretation is a source of friction because the intelligence and assessment apparatus may be limited or potentially biased by organizational behavior; this is less a problem of information gathering and more a problem of exploitation and dissemination. Clausewitz recognizes that the “difficulty of *accurate recognition* constitutes one of the most serious forms of friction in war, by making things appear entirely different from what one had expected.”⁸ These are questions of what information is presented to decision-makers and what questions were asked to derive such information. How responsive is the assessment apparatus to the inevitable “countless minor incidents”

⁶ Scott Sigmund Gartner, *Strategic Assessment in War* (New Haven, Conn.: Yale University Press, 1997), 5.

⁷ Fred Charles Iklé, *Every War Must End*, 2nd rev. ed. (New York: Columbia University Press, 2005), 16.

⁸ Clausewitz, Howard, and Paret, *On War*, 117.

encountered during war?⁹ The strategist must recognize when such minor incidents add up to larger implications for the interaction of strategy.

Recognition is only a part of the strategic problem, for innovation also includes an action component. Strategic innovation is the process through which strategists recognize context, perceive patterns, manage uncertainty, and shift the momentum of means and ends.¹⁰ In this sense, recognition and awareness are enablers for action. Alan Beyerchen adds, "an expanded sense of the complexity of reality can help us be more successfully adaptive amid changing circumstances."¹¹ In Beyerchen's construct, strategic innovation during a long war is a complex process of adaptation. This process is driven not only by a strategist's perception, but also by his ability to articulate an argument and affect change.

There are times when strategic innovation occurs even when its roots are difficult to trace. In a non-linear system, this occurs because the outcome of strategy may not respond proportionally to the inputs that lead to change. Beyerchen declares, "Nonlinear systems are those that disobey proportionality or additivity. They may exhibit erratic behavior through disproportionately large or disproportionately small outputs, or they may involve 'synergistic' interactions in which the whole is not equal to the sum of the parts"¹² As strategic thought begins to incorporate complex-systems thinking into understanding the

⁹ Clausewitz, Howard, and Paret, *On War*, 119.

¹⁰ Wiebe E. Bijker, Thomas Parke Hughes, and T. J. Pinch, *The Social Construction of Technological Systems : New Directions in the Sociology and History of Technology* (Cambridge, Mass.: MIT Press, 1987), 137.

¹¹ Alan D. Beyerchen, "Clausewitz, Nonlinearity, and the Importance of Imagery," in *Complexity, Global Politics, and National Security*, ed. David S. Alberts (Washington, D.C.: National Defense University, 1997), 168.

¹² Alan Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," *International Security* 17, no. 3 (1992-1993): 62.

environment and problem solving¹³, it is appropriate to apply the same thinking to mechanisms of strategic innovation.

In addition to recognition and change, the process of innovation may also involve aspects of invention. In terms of business management practices, “strategic innovation involves exploring the unknown to create new knowledge and new possibilities.”¹⁴ The creative and explorative features of innovation are innately human. However, are the complex interactions of long-war strategy subject to innovative human machinations? Williamson Murray is optimistic: although “the process of innovation is an immensely complex one... Individuals can, and often do, exercise great influence over the process.”¹⁵ The framework of this paper includes an examination of the roles individuals play in shaping strategic innovation.

Strategic innovation is also both inhibited and enabled by contextual factors such as organizational theory, civil-military relations, doctrine, and technology, while assessment drives the innovation process. These factors are chosen as the framework for analysis because of their preeminent role in shaping the character of war and their thematic commonality among strategic discourse. Militaries are organizations; the ways decision-makers perceive organizations impacts their ability to effect change. Organizations are viewed alternatively as machines, “with great difficulty adapting to changing circumstances,” as organisms, driven primarily by survival, or as learning brains capable of

¹³ Harry R. Yarger, *Strategy and the National Security Professional : Strategic Thinking and Strategy Formulation in the 21st Century* (Westport, Conn.: Praeger Security International, 2008), 28-37. Yarger’s work includes a discussion on how volatility, uncertainty, complexity, and ambiguity (VUCA) can be used to frame the strategic environment.

¹⁴ Vijay Govindarajan and Chris Trimble, "Strategic Innovation and the Science of Learning," *MIT Sloan Management Review* 45, no. 2 (2004): 71.

¹⁵ Williamson Murray and Allan Reed Millett, *Military Innovation in the Interwar Period* (Cambridge ; New York: Cambridge University Press, 1996), 49.

“embracing uncertainty in a manner that allows new patterns of action to emerge.”¹⁶

The next three contextual factors are civil-military relations, doctrine, and technology. The civil-military relationship reflects the inevitable linkage between war and politics¹⁷. Suzanne Nielson argues, “although political leaders have the ultimate authority and responsibility in [implementing strategy], the effectiveness with which they interact with the military... will be vital to success.”¹⁸ The doctrine debate centers on the extent to which the “conceptual core... concerning how the force should be organized, trained and equipped,” influence strategic change.¹⁹ Finally, technology is considered because of its interaction with other factors and its role in shaping American views of air power.²⁰ This is important because strategists’ perceptions of technological change influences their persistence and ingenuity in matching means to ends.

Historical accounts of the CBO are rich with detail and extensive analysis of these contextual factors. For the purpose of this thesis, the focus is upon the interaction of decision-makers and contextual factors at specific junctures where opportunity for strategic innovation occurred. It is beyond the scope of this study to isolate or analyze the progress of individual threads of technological, doctrinal, or organizational development throughout the phases of the case study. The roles of key actors are discussed at each strategic junctures with the aim of

¹⁶ Gareth Morgan, *Images of Organization*, Updated ed. (Thousand Oaks: Sage Publications, 2006), 28,65,91.

¹⁷ Clausewitz, Howard, and Paret, *On War*, 87.

¹⁸ Suzanne C. Nielsen and Don M. Snider, *American Civil-Military Relations : The Soldier and the State in a New Era* (Baltimore: Johns Hopkins University Press, 2009), 10.

¹⁹ Harold R. Winton and David R. Mets, *The Challenge of Change : Military Institutions and New Realities, 1918-1941*, Studies in War, Society, and the Military (Lincoln: University of Nebraska, 2000), xii.

²⁰ Carl H. Builder, *The Masks of War : American Military Styles in Strategy and Analysis*, A Rand Corporation Research Study (Baltimore: Johns Hopkins University Press, 1989), 19.

dissecting the interaction of strategies. It is also important to evaluate the role assessment played in shaping decision-makers' perceptions and expectations.

It is assumed that ideas attributed to key leaders or strategists by historians originated either with those individuals or someone on their staff. It is important to differentiate innovation from invention in the development of strategy. For the purpose of this analysis, innovation is more about the marketing and enacting of ideas based on learning or perception of the environment rather than attributing creativity or original ideas—though in many cases, both occur with the same actor.²¹ Therefore, this study considers the role of the decision-maker in the right place to alter strategy more fundamental to strategic innovation than the role of the one who conceived an idea or implemented it at another's direction. In this sense, *identifying the need* to alter strategy can be as important as the prescription for change.

The aim of this thesis is to show that strategic innovation is a complex process involving military strategists, decision-makers, and feedback processes. Historical analyses often discount innovation by the military as coincidence, trial and error, directed by civilian oversight, or simply failure when causality or intent is not clearly attributable. Earlier innovation paradigms typically search for linear causality rather than evaluate innovation as the outcome of a non-linear interaction of various factors. The position of this thesis is not to pry open a fissure in the collective discussion of Barry Posen, Stephen Rosen, and Owen Reid Côté, but to suggest that synthesis of their various mechanisms for innovation leads to emergence of a richer theory of strategic innovation.

As the United States passes through decades neither fully mobilized against existential threats nor completely at peace, the preceding authors tend to oversimplify contextual factors seeking binary

²¹ Murray and Millett, *Military Innovation in the Interwar Period*, 267.

solutions (either at war or at peace) to complex and dynamic problems. Spanning the spectrum from peace through high-risk, high-intensity conflict such as the height of the Second World War, innovation is driven by assessment processes, while the intensity and scope of strategic interaction influences the complexity. Posen, Rosen, and Côté are not wrong; however, a fusion of their ideas, refocused upon innovation as a process leveraged through assessment, represents a whole more representative of reality.

Strategic innovation is not expressly overshadowed by Posen's balance-of-power politics and civilian intervention, nor it is dominated by Rosen's "perceptions of change in the structure of the international security environment," or the relationship of goals to military operations.²² A broad range of factors, including those mentioned above, may influence strategic innovation. In any event, analysis of the CBO will show that innovation most depends on recognition of strategic interaction. In other words, the mechanisms introduced by the preceding authors are always at play, either inhibiting or stoking the fires of innovation, but the flame itself is fueled by the ability of strategists to comprehend change in their environment, which depends on their methods of assessment.

Chapter 1 relates foundational research and provides the language for discussion of influential factors. Chapters 2 through 4 unfurl as a three-part case study of the Combined Bomber Offensive (CBO). Although the CBO may seem an unlikely case study in a long-war paradigm, its influences span the interwar period of doctrinal

²² Barry Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, Cornell Studies in Security Affairs (Ithaca: Cornell University Press, 1984), 221. Posen argues balance of power theory should not apply only to unitary national actors, but also as an influence upon decision makers. Also see Stephen Peter Rosen, *Winning the Next War : Innovation and the Modern Military*, Cornell Studies in Security Affairs (Ithaca: Cornell University Press, 1991), 35,57. Rosen affords primacy to environmental perception.

development through years of high-intensity conflict and last well beyond the point of existential threat to western liberal democracy. Chapter 2 analyzes the initial role of strategic bombing until January 1943 with a focus upon the relationship of interwar doctrine and technology, victory mechanisms, and expectations of the Allied leaders. This analysis includes the influence of bombing experience in Europe into the Casablanca Conference of January 1943. Chapter 3 spans the Casablanca Directive through Big Week in February 1944, dissecting the key players and processes amidst a dynamic strategic context. Chapter 4 analyzes the strategic debates framing preparation for Operation OVERLORD, the cross-channel invasion, focusing upon the role of the Committee of Operational Analysis (COA).



Chapter 1

Elements and Complexity of Strategic Innovation

*Nur die Fülle führt zur Klarheit,
Und im Abgrund wohnt die Wahrheit*
[Only wholeness leads to clarity,
and the truth lies in the abyss]

Johan Christoph Friedrich von Schiller

The purpose of this chapter is to tie a thread through many disparate concepts relating to a new approach to strategic innovation. Before employing the language of innovation, it is first necessary to unpack a variety of terms and factors to serve as analytical lenses for this thesis. The framework of this chapter proceeds from a discussion of strategic interaction and paradoxical logic to a delineation of long-war theory. Next, this chapter describes definitions and relationships from organizational theory, civil-military relations, and technology as contextual factors. Finally, these concepts fold together through a discussion of complexity and strategic assessment, which includes a perspective of victory mechanisms and measures of merit. In totality, this chapter sets the stage for a three-part case study of the CBO applying complexity theory to strategic innovation.

Strategic Interaction

Innovation at the strategic level of war depends upon two fundamental relationships. The first is the interaction of friendly and enemy strategies, and the second is the interaction of both the former with third parties as well as their environment. Neither is easily understood.

The interaction of friendly and enemy strategies is made difficult by the challenge of identifying causality for victory and defeat. Martin Van Creveld describes the paradoxical logic of strategy: “an action that has

succeeded once will likely fail when it is tried for the second time,” and conversely, “an operation having failed once, the opponent may conclude that it will not be repeated.”¹ Van Creveld’s concept of paradoxical logic derives from Clausewitz: “In war, the will is directed at an animate object that reacts.”² Van Creveld’s argument implies the strategist accurately perceives failure and success—a notion more difficult than simply identifying the last man standing. In order to leverage success and failure, strategists must perceive what changed for both sides after the engagement in order to best prepare for the next interaction.

Engagement in this sense does not refer to the tactical battlefield, but an attempt to evaluate causality and correlation when strategies meet.

Clausewitz’ theory suggests a relationship between this challenge of causality and the paradoxical logic of strategy as he declares, “effects in war seldom result from a single cause; there are usually several concurrent causes. It is therefore not enough to trace, however honestly and objectively, a sequence of events back to their origin.”³ The countless interactions and dynamic nature of friendly and enemy strategy may render causality improvable. Clausewitz describes this relationship by differentiating the art from the science of war; understanding war by perceiving the environment is art rather than science, and this means that strategists, decision-makers, and feedback processes must all understand the interaction of strategies.⁴

Further, it is often difficult to see whether battlefield victory translates to strategic success. Understanding strategy as an art necessitates coherent linkages between interactions at all levels from

¹ Martin Van Creveld, *The Transformation of War* (New York: Free Press, 1991), 120.

² Clausewitz, Howard, and Paret, *On War*, 149. For an additional discussion of Clausewitz and paradoxical logic see: Edward Luttwak, *Strategy : The Logic of War and Peace*, Rev. and enl. ed. (Cambridge, Mass.: Belknap Press of Harvard University Press, 2001), 13-14.

³ Clausewitz, Howard, and Paret, *On War*, 157.

⁴ Clausewitz, Howard, and Paret, *On War*, 149.

tactics through grand strategy. Coherence across levels of war suggests adaptability at higher levels can compensate for limited innovation at lower levels. This is not to suggest that optimal strategy can always overcome flawed tactics, but that strategic innovation also includes comprehending the interactions that occur at all levels of war. The strategist must differentiate tactical failure from operational or strategic success. An equally difficult challenge is to grasp when success at tactical or operational levels fails to inform successful strategy. Thus, the task of innovating strategy is far more complex than simply reacting to failure or even anticipating when success is unlikely to repeat.

Robert Jervis adds that the interaction of strategies also influences the environment: “Initial behaviors and outcomes often influence later ones, producing powerful dynamics that explain change over time and that cannot be captured by labeling one set of elements “causes” and the other “effects.”⁵ The strategist must grasp the meanings of success and failure, recognize their indicators, and innovate new strategy. Thus, “a continuous dynamic interaction ensues, capable of turning victory into disaster and disaster into victory.”⁶ Sometimes, even the meaning of victory changes during war as does the relationship between the means and ends required to win.

Long war Defined

While there are as many definitions of strategy as there are theorists, there is also no universally accepted definition of war. Debate about requirements for violence and state-level actors aside, theories of innovation fail to delineate the upper and lower bounds of war. More specifically, what is the difference between a war and a long war, and if so, what are the characteristics of long-war?

⁵ Robert Jervis, *System Effects : Complexity in Political and Social Life* (Princeton, N.J.: Princeton University Press, 1997), 48.

⁶ Van Creveld, *The Transformation of War*, 120.

Philip Babbitt argues long wars are epochal wars, including the period 1914-1990, during which “several conflicts that were thought to be separate wars by the participants, may comprise periods of apparent peace (even including elaborate peace treaties), and often do not maintain the same lineup of enemies and allies throughout.”⁷ The George W. Bush administration proclaimed in the 2006 Quadrennial Defense Review (QDR), that America was in its fourth year of a long war against “violent extremists who use terrorism as their weapon of choice.”⁸ Other historians assert America’s Global War on Terror (GWOT) was not a long war, but a phase of a long war beginning in 1945 with a new focus on “the threat posed by Islamic Radicalism.”⁹ For the purpose of this analysis, it is not important whether conflicts such as Vietnam, World War II, or the GWOT are categorized as long wars, or parts thereof. What matters is that they comprised series of operations with sufficient duration for strategic interaction and outcomes based upon innovation during conflict.

Models of Strategic Innovation

A variety of models purport to describe and predict mechanisms for Strategic innovation. At their locus is a combination of organizational theory, civil-military relations—often extending to state-level politics—and the roles of doctrine and technology. Individual theories argue precedence among these influences depending on a variety of contextual factors. Central among these contextual factors is whether the state including its military and its population are in crisis or at peace.

Theorists argue alternative factors are at play depending on wartime versus peacetime considerations. Stephen P. Rosen suggests, “Peacetime military innovation may be explainable in terms of how

⁷ Philip Bobbitt, *The Shield of Achilles : War, Peace, and the Course of History*, 1st Anchor Books ed. (New York: Anchor Books, 2002), 911, 19.

⁸ DOD, "Quadrennial Defense Review Report," (Washington, D.C.: electronic, 2006), v.

⁹ Andrew J. Bacevich, *The Long War : A New History of U.S. National Security Policy since World War II* (New York: Columbia University Press, 2007), x.

military communities evaluate the future character of war, and how they effect change in the senior officer corps,” while “Wartime innovation is related to the development of new measures of strategic effectiveness, effective intelligence collection, and an organization able to implement the innovation within the relatively short time of the war's duration.”¹⁰ Rosen concedes innovation is possible from within the military, but he is pessimistic on whether it can happen quickly enough to influence the outcome of war.

Barry Posen, on the other hand, suggests that the military will not innovate when conflict arises. Instead, Posen argues military organizations do not innovate they either experience failure or respond to external pressure; without this failure or civilian intervention, military doctrines are “offensive, disintegrated, and stagnant.”¹¹ Owen Coté’s characterization of Posen’s argument is apropos:

Posen's theory depends primarily upon civilian intervention. Thus, in the real world populated by real civilians, it becomes vulnerable on several flanks. First, Posen notes that civilians will not intervene in the details of military doctrine without seeing a clear and present danger. Thus, in peacetime when crises are not looming, this source of innovation often dries up as civilian executives focus on other problems. The theory also assumes that civilian executives both have access to the information and wield the political clout that they need to successfully intervene in the details of a service's military doctrine.¹²

The models of both Posen and Rosen suggest primary factors for innovation lie at polar extremes of wartime or peacetime environments. Posen relies upon Civil-military influences to trump organizational behavior. Rosen relegates civilian influence to the role of “control over the promotion of officers” during peacetime or measures of effectiveness

¹⁰ Rosen, *Winning the Next War : Innovation and the Modern Military*, 52.

¹¹ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 47,222.

¹² Owen R. Cote, "The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles" (Massachussetts Institute of Technology, 1996), 388.

during wartime.¹³ Whereas increasing levels of crisis suggest increasing degrees of wartime factors over peacetime factors, both models assume states are either at war or not.

The problem is that the modern character of war suggests a long-term political environment somewhere between war and peace. Both models allow for transitions between peace and war, but do not acknowledge cases where the state persists in the middle ground of crisis and stability. In long-war, innovation might be explained by a mix of Rosen's and Posen's factors, a different set of factors, or an overarching mechanism that subsumes all of them.

Different mechanisms for innovation may be present when significant portions of civilian elites, military, and affected population disagree about the nature and severity of the threat. To analyze and assess the validity and coherence of Rosen's and Posen's arguments, the terms peacetime and wartime require clear definitions. Peacetime means military forces are not significantly deployed and engaged in combat operations overseas, while wartime means that forces are deployed in support of major combat operations against an existential threat to U.S. national security. Between the two extremes, as ongoing debate reflects variance in perceived political, security, economic, and social considerations, is the *long-war environment*.

Organizational Behavior

Organizational factors influencing strategic innovation are manifold. Before evaluating the framework for these factors, it is important to describe the bounds of the organizational model. Allison and Zelikow assert the organizational actor "is not a monolithic nation or government but rather a constellation of loosely allied organizations on top of which government leaders sit."¹⁴ As such, action as a function of

¹³ Rosen, *Winning the Next War : Innovation and the Modern Military*, 21.

¹⁴ Graham T. Allison and Philip Zelikow, *Essence of Decision : Explaining the Cuban Missile Crisis*, 2nd ed. (New York: Longman, 1999), 166.

organizational output is limited by leaders' influence, organizational capacity for change, and willingness and capability of the organization to pursue suggested goals.

Leadership ability to pursue new strategy is not as simple as announcing new policy or directing organizational change. Allison and Zelikow categorize the options for leaders to alter governmental behavior as: "(1) triggering program A rather than program B within a repertoire; (2) triggering existing organizational routines in a new context; and (3) triggering several different organizations' programs simultaneously."¹⁵ Regardless of the desires of individuals internal or external to the organization, the ways and means of shifting strategy are dependent upon understanding militaries and components thereof as organizations.

Because organizations take time to change, leadership may yield to choosing among courses of action supplied by the organization rather than forcing new ones. Posen argues, "Changing enemies or allies may take less time than changing plans or procedures...[and] Decisions made long before the war will determine some operational possibilities during the war."¹⁶ In other words, the rate of change possible in the political environment often greatly outpaces the capacity of the military to effect commensurate strategy. A military is most likely to enter war by revalidating assumptions in "off the shelf" war plans and employing weapons according to existing doctrine than entering conflict with a fresh approach.

It takes strong leadership to overcome this organizational inertia. For example, in November 2001, Secretary of Defense Donald Rumsfeld demanded a briefing "on all of the major contingency plans' assumptions not the plans, but ... the assumptions."¹⁷ This was his only means of

¹⁵ Allison and Zelikow, *Essence of Decision : Explaining the Cuban Missile Crisis*, 174.

¹⁶ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 30-31.

¹⁷ Bob Woodward, *Plan of Attack* (New York: Simon & Schuster, 2004), 32.

propelling war plans any faster than “tweaking, micro-steps.”¹⁸ Rumsfeld understood that a fluid political context with uncertain alliance support could leave the military in a position to act upon invalidated plans. As a peacetime military transitions to war, the tendency is to cope with uncertainty by making assumptions or, worse case, leaving old assumptions unchallenged.

This idea of assuming away uncertainty is a cornerstone of organizational behavior. Morgan notes, “many of our basic conceptions of organization hinge on the idea of making the complex simple.”¹⁹ In Posen’s model, “organizations abhor uncertainty, and changes in traditional patterns always involve uncertainty... Additionally, those at the top of the hierarchy, who have achieved their rank and position by mastering the old doctrine, have no interest in encouraging their own obsolescence by bringing in a new doctrine.”²⁰

To military organizations, changes to strategy are a source of uncertainty. When decision-makers alter strategy, organizations cope with new uncertainty, just as uncertainty in the environment is a source of complexity for strategy. The natural tendency for strategists is to assert control by making assumptions about uncertain variables in order to simplify strategy. A mindset toward embracing complexity rather than assuming it away can yield greater dividends as long wars unfold.

When organizations cannot assume complexity away, they often deal with it by growing new capacity. Although leaner organizations may be more agile, organizations often respond to demands for flexibility by adding capacity rather than adjusting structure or tasks. This is a paradox for organizational change, because individual members may resist change and pursue personal stability by seeking resources outside

¹⁸ Woodward, *Plan of Attack*, 34.

¹⁹ Morgan, *Images of Organization*, 220.

²⁰ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 224.

the organization or advocating more manpower and materiel for the organization. Posen argues that organizational desire for expansion is a source of innovation.²¹ However, the results of organizational expansion can be increased inertia and decreased adaptability in the face of future uncertainty.

When Joint Force Commanders approach uncertainty problems from this mindset, they favor solutions that require additional capability or capacity rather than altering strategy. Such thinking leads commanders to equate unmet requests for forces with an increase in risk. Instead of leaping to this logic, the commander's first inclination should be to evaluate organizational inertia and press to mitigate uncertainty by adjusting strategy without augmenting means.

The essence of strategic innovation in the context of this thesis is to discern and implement improvements to strategy without necessitating sweeping change to fighting organizations. The challenge for strategists is to perceive changes in the environment and effect incremental change to organizations when required. Murray suggests, "Recognition of the problems involved in change and innovation is one thing, but it is equally difficult to secure the necessary changes in organizational environments – enshrouded by the fog of uncertainty – that will allow innovation to take place."²² In this sense, innovation requires both the perception and ability to effect change. However, even the most agile of organizations can take time to implement new strategies.

²¹ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 47.

²² Murray and Millett, *Military Innovation in the Interwar Period*, 49.

Role of the Maverick

The concept of a military maverick is essential to strategic innovation, yet contentious among academics. Rosen defines *maverick* as “an outsider who may have brilliant ideas but who has rejected the system and has been rejected by the system.”²³ In Rosen’s mind, the maverick is an anomaly to organizational behavior, which he dismisses by separating the maverick from the organization. In Posen’s model, military mavericks are implements of civilian control as they “provide the details of doctrinal and operational innovation” to civilians who lack the expertise.²⁴ Again, the problem of both models is one of degree. Both Rosen and Posen oversimplify.

In practice, a maverick’s innovative ideas need not be radical in nature, nor must maverick behavior permanently typecast an individual as an outsider. However, the more radical the idea to organizational trajectory, the more a maverick must assume the role of an outsider. A model suggested by Kurt Lang supports this relationship. Lang described the limit of internal military innovation using Janowitz’ trend-thinking: “Trend-thinking involves a proclivity for seeking to perfect and elaborate a concept or system already in existence.”²⁵ This viewpoint accepts Military officers’ penchant for extrapolating existing ideas, but not for radical change. Lang adds, “Official channels for sponsoring change are generally inhospitable to radically new ideas,” and military organizations tend to evaluate new concepts against strict performance criteria.²⁶ When Analysts develop performance criteria to suit existing strategy, then a maverick faces even greater hurdles in demonstrating the

²³ Rosen, *Winning the Next War : Innovation and the Modern Military*, 21.

²⁴ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 174.

²⁵ Kurt Lang, *Military Institutions and the Sociology of War; a Review of the Literature with Annotated Bibliography*, Sage Series on Armed Forces and Society (Beverly Hills,: Sage Publications, 1972), 61.

²⁶ Lang, *Military Institutions and the Sociology of War; a Review of the Literature with Annotated Bibliography*, 61.

necessity of changing strategy or employing a weapons system in a new way. In this sense, both the organizations and their feedback processes potentially impede strategic innovation.

In some circumstances, a maverick from within an organization can be more successful when arguing for innovative change rather than initiating the idea behind it. Lang's model supports this type of maverick behavior from within the organization: "Success generally came after the inventor linked up with a sponsor who then sold the idea through personal channels and contacts. These sponsors were often military mavericks, Billy Mitchell and Hyman G. Rickover being perhaps the most famous, but usually outsiders had to take up the cause before organizational resistance could be overcome."²⁷ In this sense, the maverick as a sponsor of innovation rather than inventor has greater flexibility to test the leadership and organizational adaptability while assuming less personal risk.

When the maverick's position exceeds the military leadership or organizational bounds for change, then the maverick must weigh the potential cost and benefit of assuming the role of the outsider. In this case, the relationship of civilian authority over the maverick as well as the military organization adds another layer of complexity. Rosen suggests, "Civilian intervention is effective to the extent that it can support or protect these officers."²⁸ The problem is that even if civilian leadership favors a maverick's ideas, the civilian may be subject to a different set of constraints. In other words, the civilian may risk political fallout from supporting a particular maverick. For mavericks to be successful in these circumstances, then argumentative skills and environmental perception must include not only the mechanisms for

²⁷ Lang, *Military Institutions and the Sociology of War; a Review of the Literature with Annotated Bibliography*, 61.

²⁸ Rosen, *Winning the Next War : Innovation and the Modern Military*, 21.

inducing strategic change from within the military, but the nuance of the political sphere as well.

Civil-Military Relations

Civil-Military relations contextually influence strategic innovation in three essential ways. The civil-military context reflects the political environment, establishes the medium for strategic discourse, and provides a mechanism for military accountability. A confluence of several foundational theories sheds light upon the influence of civil-military relations upon strategic innovation. Regardless of the particular style with which a given presidential administration interacts with the military, the military must acknowledge this character of the civil-military relationship as well as broader political considerations. In other words, as military strategists seek to perceive and understand environmental interaction, the civilian relationship forms a component of that environment.

First, Civil-military relations shape strategy by circumscribing the framework of the military environment. Huntington observes, “The social and economic relations between the military and the rest of society normally reflect the political relations between the officer and the state.”²⁹ In other words, the perspective through which the military perceives its relationship with society influences strategy. The opposite is also true; societies provide more for the military than ways and means, also purpose and moral support. A military derives its power from the society it serves.

The character of civil-military relations not only reflects the political environment, but also establishes a context for discourse between political and military entities. Eliot Cohen offers, “the challenge for a supreme leader lies not in choosing at which level of guidance or

²⁹ Samuel P. Huntington, *The Soldier and the State; the Theory and Politics of Civil-Military Relations* (Cambridge,: Belknap Press of Harvard University Press, 1957), 3.

abstraction to function, but rather in integrating the details with the grand themes, in understanding the forest by examining certain copses and even individual trees with great care.”³⁰ Without appropriate discourse with senior military officers, a president will be either detached from the reality of military capabilities or lost among the trees.

This discourse is an ongoing two-way exchange of understanding to the mutual benefit of both sides. Civil-military discourse is also the medium by which military decision-makers discern the political environment. Through this discourse, military strategists synchronize and subjugate military objectives to political objectives. Only by routine and continuous dialogue can both key civilians and military leaders maintain a keen sense of changes in the political and strategic environment. This discourse often occurs at high-level meetings and conferences, providing an essential component of strategic innovation.

Civilian control and military accountability are controversial features of civil-military relations. There are a variety of scholarly perspectives branching from or contrasting with Huntington’s seminal *The Soldier and The State*. Eliot Cohen captures the essence of Huntington’s argument of civilian control:

Huntington offers a recipe for ensuring civilian dominance over the armed forces, arguing as he does for a sharp division between civilian and military roles. "Objective control"—a form of civilian control based on efforts to increase the professionalism of the officer corps, carving off for it a sphere of action independent of politics—is, in his view, the preferable form of civil-military relations. He contrasts "objective control" with what he calls "subjective control," which aims to tame the military by civilianizing it, thus rendering it politically aware, or by controlling it from within with transplanted civilian elites.³¹

³⁰ Eliot A. Cohen, *Supreme Command : Soldiers, Statesmen, and Leadership in Wartime* (New York: Free Press, 2002), 212.

³¹ Cohen, *Supreme Command : Soldiers, Statesmen, and Leadership in Wartime*, 227.

Huntington's objective control concept may hinder strategic innovation by the military. While objective control demands rigid subordination within the ranks to civilian authority, it may also stifle the military strategist from maximizing perception of the environment. In other words, if the political context remains esoteric among the politicians, then the military strategist is left to grasp at an oversimplified perspective of highly complex systems. Military strategists may be more likely to simply implement organizational routines rather than to challenge assumptions, to incorporate broader thinking patterns, or to innovate.

Cohen's own theory debunks Huntington's "normal theory" of Civil-military relations in which there is a clear divide between the roles of the professional military officer and the statesman. Through his examination of highly engaged wartime statesmen, Cohen concludes:

political leaders must immerse themselves in the conduct of their wars no less than in their great projects of domestic legislation; that they must master their military briefs as thoroughly as they do their civilian ones; that they must demand and expect from their military subordinates a candor as bruising as it is necessary; that both groups must expect a running conversation in which, although civilian opinion will not usually dictate, it must dominate; and that that conversation will cover not only ends and policies, but ways and means."³²

Cohen blurs the lines—while he places a premium on dominant political leadership qualities, he also values ongoing communication to support the understanding of both parties. This *bruising conversation* is not necessarily limited to domestic concerns, yet still supports strategic innovation, as the meeting between Churchill and Eaker will show in the next chapter. To support strategic innovation, the dialogue must be two-way. The politician must listen as well as speak in order for both sides to benefit from improved mutual understanding.

³² Cohen, *Supreme Command : Soldiers, Statesmen, and Leadership in Wartime*, 206.

Feaver offers a third model, based upon agency theory. His view is less optimistic about the potential for genius in state leadership or the willingness of the military to cooperate. Feaver argues civil-military relations “is a game of strategic interaction, with civilians monitoring their military agents and military agents determining whether to work or shirk based on expectations the agents have about the likely consequences.”³³ In his theory, monitoring is necessary, and it must be backed by punishment. While expectations of punishment may effectively keep rogue military behavior in line, expectations of excessive punishment can also stifle strategic innovation. Agency theory clearly depends upon personalities and administration practices, but there is a fine line between punishing behavior and punishing discordant ideas. In order for mavericks to play a functional role in innovation, they must seize serendipitous opportunities for argumentation, with reasonable expectations that their ideas will be heard without incurring excessive punishment if their efforts fail.

Innovation is not always as simple as presenting ideas—both civilians and military leaders may seek to control strategy. Civilian authority is offset by the unique expertise required of military professionals, providing either side opportunity to exploit an information advantage... For example, if military leaders are disgruntled or out of sync with civilian oversight and present options favorable only to the military, strategic innovation falters. Feaver argues, “The military can shirk by shading its advice so the civilian principal chooses to give an order contrary to the one that he would have given had the military advice been more sincere.”³⁴ In this sense, the relationship becomes dysfunctional as the military exploits information advantage to guide political aims in accordance with organizational norms.

³³ Peter Feaver, *Armed Servants : Agency, Oversight, and Civil-Military Relations* (Cambridge, Mass.: Harvard University Press, 2003), 284.

³⁴ Feaver, *Armed Servants : Agency, Oversight, and Civil-Military Relations*, 287.

The inverse is also possible. At times, politicians desire strategic outcomes incongruous with military advice. Politicians can withhold information, handicapping military planning processes. Feaver asserts, “the principal can also shirk, by giving inadequate direction or uncertain guidance.”³⁵ This places the military in a position to make false assumptions or present options the organization is unable to achieve in order to appease presumed political objectives. In either case, the likely result is an incoherent strategy or misguided war aims.

Within the scope of this study, the focus is the degree to which civil-military relations interact with other influences of military strategy. Risa Brooks suggests, “Domestic relations between political and military leaders shape the institutional processes in which leaders evaluate their strategies in interstate conflicts.”³⁶ The value of her statement inheres in understanding that strategy is an ongoing process; if strategy is a document, then it fades into obsolescence before the ink dries. As such, the relationships between civilian and military leaders as well as their perceptions of their organizations continuously influence strategic innovation.

Inter-service Rivalry

Rivalry and competition within the military ranks may seem tangential to strategic innovation or more apropos of the military budgetary process. However, competition both between and within services can serve as a significant stimulant or depressant to strategic innovation, depending upon its relationship to other contextual factors. An examination of inter-service rivalry reveals its influence upon strategy through its relationship to the civil-military context, doctrine, and the security environment.

³⁵ Feaver, *Armed Servants : Agency, Oversight, and Civil-Military Relations*, 287.

³⁶ Risa Brooks, *Shaping Strategy : The Civil-Military Politics of Strategic Assessment* (Princeton, N.J.: Princeton University Press, 2008), 2.

Rivalry actually tends to dampen the civil-military relationship. Services tend to fight each other first then let the overarching authority either accept both arguments or sort out the differences. Lang offers, “The likelihood of head-on collisions between representatives of the armed forces and either the executive or legislative branch of civil government is reduced by inter-service rivalry.”³⁷ In essence, services do not have to fight for their interests with higher-level authorities if they can force another service to acquiesce.

These inter-service negotiations can, ironically, limit cooperation and potentially inhibit innovation. At a minimum, services are more likely to deconflict with each other than to fully integrate their strategy or doctrine with joint endeavors. Posen adds, “Because each service is concerned for its autonomy, a group of services is not likely to produce an agreed multi-service strategy or doctrine that does anything more than combine their independent service doctrines.”³⁸ Integration, in this sense, even if in the best interest of state power or optimal strategy, is perceived by services as compromise. If Posen’s model is correct, then rivalry undercuts incentive for cooperation among services. Innovative strategists must then incorporate this factor as they articulate the need for strategic change. Arguments will be more likely to succeed if services do not feel as though they are giving anything up—even if they are.

Inter-service rivalry may dis-incentivize cooperation, but it does not always inhibit innovation. Strategic innovation also depends upon the degree of risk at stake versus the potential rewards. Sapolsky suggests, “When there is expectation of significant reward or loss, the services may offer up not only information about their bureaucratic rivals, but also new ideas, ways of both improving American military

³⁷ Lang, *Military Institutions and the Sociology of War; a Review of the Literature with Annotated Bibliography*, 118.

³⁸ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 226.

capabilities and protecting primary roles.”³⁹ If significant risk of failure stimulates innovation at the service level, then the utility of this mechanism depends upon how early a strategist senses this elevated risk. Herein lies a paradox for inter-service rivalry and strategic innovation: each service must allow their component’s strategy to develop and interact with the enemy strategy long enough to perceive changes to the environment, but waiting too long could place another component at risk or lead to catastrophic failure.

In the realm of strategic innovation, application of Sapolsky’s and Côté’s models carry a step further. Sapolsky argues that a healthy level of fear even within “secure organizations... made to feel uncertain about their future,” drives “the need to think hard about their special talents and the contributions they might make to the nation’s security.”⁴⁰ This mentality shaped USAAF decision-making and organizational interests during WWII.

Although Sapolsky’s view falls short of insinuating that rivalry can induce radical changes, Côté proceeds further. Côté suggests not only “that interservice conflict can accelerate doctrinal change begun as a result of civilian interventions,” but also that “doctrinal innovation can occur even in the face of strong civilian and interservice opposition.”⁴¹ In other words, an organization driven strongly by self-interest may shirk a duty to cooperate with other organizations or refuse to nest its own objectives within those of its parent’s organization.

Côté contributes to Rosen and Posen’s dialogue by delineating inter-service from intra-service rivalry. Côté suggests that although Rosen allows for innovation without civilian intervention, he is truly speaking to intra-service rivalry: “these battles occur within a service

³⁹ Harvey Sapolsky, “The Interservice Competition Solution,” *Breakthroughs* V, no. 1 (1996): 1.

⁴⁰ Sapolsky, “The Interservice Competition Solution,” 3.

⁴¹ Cote, “The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles”, 13.

between members who have other organizational ties that bind them, and because they occur between combatants occupying different positions on a vertically defined hierarchy, resolution often occurs at a generational pace rather than in quick and decisive fashion.”⁴² During the CBO, for example, the bomber generals dictated strategy by dominating the military hierarchy until escort pilots gained some stature closer to D-Day. For example, Air Vice Marshall Sir Trafford Leigh Mallory was promoted to oversee combined air planning for D-Day as discussed in Chapter 3. If Rosen is right to suggest, “Power is won through influence over who is promoted to positions of senior command,”⁴³ then the implications affect not only organizational and service rivalry, but also the power to innovate strategy.

Technology

The relationship of technology to strategic innovation has both ideological and concrete components. The ideological component stems from two juxtaposed theories: technological determinism and social constructivism provide lenses through which strategists perceive agency and change. In other words, whether society shapes technology or whether technology shapes society influences the strategic innovation process as well as the development of capabilities. Because strategy must be adaptive to the environment and context while anticipating change, a balanced approach to maximizing the influence of technology on strategic innovation and the converse is most useful.

This balanced perspective of determinist and constructivist arguments informs the relationship of technology to other contextual factors as well. For example, technology and inter-service rivalry relate in America’s armed services because of competition for resources in a technology-driven society. The Air Force is particularly prone to such

⁴² Cote, "The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles", 384.

⁴³ Rosen, *Winning the Next War : Innovation and the Modern Military*, 35.

orientation. Carl Builder argued, “The Air Force, conceived by the theorists of air power as an independent and decisive instrument of warfare, sees itself as the embodiment of an idea, a concept of warfare, a strategy made possible and sustained by modern technology.”⁴⁴ The organization’s relationship with technology is thus part of the environment that a strategist must perceive in order to affect change.

Airpower advocates tend to seek technological solutions for ailing strategies. This tendency also relates to the more concrete influence of technology upon strategic innovation. This concrete component derives from the capacity to recognize solvable limitations and apply sufficient resources to advance technology during the war. For strategic innovation, this means decision-makers must resolve whether incremental improvements to existing technology can foster successful change, or whether infusion of significant new technology is required. Côté argues that strategists tend to favor the latter approach, despite “the sunk cost inherent in the existing investment in a given set of technologies.”⁴⁵ When resources are limited, figuring out where marginal technological improvement can yield disproportionate increases to strategic success is the most difficult challenge.

The relationship between uncertainty and technology also bears upon strategic innovation. This is because both uncertainty and technology impact feedback processes and the information available to analysts, strategists, and decision-makers. For example, decision-makers are limited by uncertainty in their ability to incorporate burgeoning technologies into their strategic thought. In other words, if information about new technologies is not adequately incorporated into strategic feedback processes, then decision-makers cannot factor this new technology into their perception of the environment. Put otherwise,

⁴⁴ Builder, *The Masks of War : American Military Styles in Strategy and Analysis*, 32.

⁴⁵ Cote, "The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles", 49.

we do not have enough information about technological advancement to know where it is going until discovery enables technology to progress. Technological uncertainty is a key challenge for innovating strategy because assumptions about forthcoming technology increase strategic risk. The more a strategist struggles to anticipate the role of technology in shaping the interaction of friendly and enemy strategy, the greater the risk of getting it wrong.

Technology is inherently related to uncertainty and strategists' perceptions of the environment through feedback and information-collection processes. As such, intelligence is a part of the feedback process to aid understanding of the enemy. Even as intelligence and reconnaissance systems advance, information about the enemy is always fleeting. Further, information about friendly or enemy innovation does not always reduce uncertainty within a given paradigm. As Rosen recalls, "A radically new weapon could not be dropped into war games that had been designed to simulate traditional forms of warfare without introducing large uncertainties into the simulation."⁴⁶ Strategists must grasp the limited and fleeting nature of available information, and the role of information in increasing and decreasing uncertainty. Strategic innovation depends upon this relationship of technology and uncertainty. Because both technology and strategy are dynamic factors, the strategist must continually evaluate the relationship of technology and strategy *before* war to the relationship of strategy and technology *during* war.

From another perspective, Posen's model portrays the relationship of technology to doctrine and the security environment. This relates to strategic innovation because as technologies mature, strategists must evaluate whether these new means can improve existing war fighting methods or whether new methods are warranted. Examining the interwar period, Posen observes, "In some cases the new technologies

⁴⁶ Rosen, *Winning the Next War : Innovation and the Modern Military*, 74.

were screwed on to old doctrine; in other cases they were integrated into new doctrines.”⁴⁷ During long wars, old technologies evolve as new technologies develop. The decision to modify old employment methods or develop new ones must not be arbitrary; it is based upon “the perception of an anomaly” in the old paradigm for which the new technology no longer fits.⁴⁸ This relationship of technology to doctrine informs the complex process of strategic innovation.

Lastly, Posen’s model describes an even broader interaction of contextual factors. Technology also reflects the civil-military relationship, organizational behaviors, and perception of the security environments. Posen declares, “the influence of technology is seldom direct, and is usually filtered through organizational biases and statesmen’s perceptions of the international political system.”⁴⁹ In this sense, technology takes on an important indirect role in shaping the strategic environment. Technology can lead to security dilemmas, while at the same time influencing doctrine and service culture. All of these factors can change during the course of a long war, yet the innovative strategist must discern when the role of technology may be deliberately influenced, and when strategy must respond to technology.

Complexity and Strategic Assessment

Assessment is a catalyst for innovation, but the grammar of strategic assessment is not universal. Vague and extraneous terminology confuses organizational performance and misinforms the assessment process itself. In order to proceed into discussion of how victory mechanisms, measures of merit, and assessment contribute to strategic innovation, it is first important to establish a common language

⁴⁷ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 237.

⁴⁸ Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago, IL: University of Chicago Press, 1996), 57.

⁴⁹ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 236.

for assessment in this context. Additionally, the information-management and decision processes employed to support assessment include inherent limitations worthy of discussion.

The roles and functions of analysis and assessment require dissection. Both analysis and assessment support innovation, yet serve different purposes. Analysis serves innovation by interpreting the environment, identifying and potentially resolving unknowns, clarifying and arranging information, and explaining outcomes. Yet analysis can be approached in different ways. For example, “Jomini was more concerned with patterns than with numbers, and Clausewitz’s approach to analysis was generally qualitative and philosophical.”⁵⁰ Analysts should be experts in the preceding activities. However, the formal analytical process does not *evaluate* results because in modern bureaucracies, analysts are not necessarily experts in the theory behind the subject under analysis.⁵¹

There are additional limitations to analysis. To elaborate upon these limitations, we must first break analysis down into two categories: operational and systems analysis. Carl Builder attempted to distinguish operations analysis from systems analysis in terms of inputs and purpose. He suggested, “*Operations analysis* typically deals with existing operations about which much is known or knowable,” while “*Systems analysis*... seeks to find and compare complex alternatives about which too little is known or knowable.”⁵² In this sense, traditional understanding of these two types of analysis links the expected purpose of the analysis to the character of the information to be analyzed. In reality the opposite case is also possible—operations analysis may receive very little information about military activities, whereas some systems

⁵⁰ Trevor N. Dupuy, *Numbers, Predictions, and War : Using History to Evaluate Combat Factors and Predict the Outcome of Battles* (Indianapolis: Bobbs-Merrill, 1979), 3.

⁵¹ Jacqueline Eaton, John Redmayne, and Marvin Thordsen, "Joint Analysis Handbook," ed. NATO (Lisbon, Portugal: Joint Analysis and Lessons Learned Centre, 2006), 3.

⁵² Builder, *The Masks of War : American Military Styles in Strategy and Analysis*, 98.

analysis may have *too* much information to be reasonably interpreted by normal methods.

Both methods are inconsistent with the nature of strategic interaction during long wars. In war, there is both too much and too little known about both ongoing and long-term decisions. To separate the two processes as they apply to innovation is to perform both of them incorrectly. Operational-level analysis must link to strategic aims and strive to answer the right questions, regardless of how much information is known or knowable, or risk disintegrating strategy. Disintegrated strategy may be coherent at the operational and tactical level, but fails to connect to strategic advantage. Alternatively, strategic-level systems analysis must incorporate operational performance as well as a complex understanding of the environment, or risk asking the wrong questions or projecting unattainable strategic goals.

Proceeding from analysis to assessment, value judgments, intuition, and perception become increasingly important. Brooks defines strategic assessment as "the process through which relations between a state's political goals/strategies and military strategies/activities are evaluated and decided."⁵³ Strategic assessment is closely linked to strategic innovation as the core of the feedback process. In this sense, assessment can be both formal and informal, just as the process can rely upon reductionism or embrace complexity.

The aim of assessment is to support innovation through a holistic understanding of the strategic interaction. In order to do this, assessment cannot remain explicitly at state political level but must also extend to the methods of employing instruments of power. Brooks adds, strategic assessment delves further down into "evaluating a state's operational plans and how they support political and military objectives; evaluating the likely international consequences of modifying military

⁵³ Brooks, *Shaping Strategy : The Civil-Military Politics of Strategic Assessment*, 34.

activity or undertaking particular military missions; and assessing a state's relative capabilities and how they bear on the efficacy of its alternative political strategies in a crisis or war."⁵⁴

The drive for these operational details, however, introduces a tension between understanding the complex environment and getting mired in it. Indeed, the greater the detail examined as part of the assessment process, the greater the risk of missing the larger picture. After all, strategic innovation is about grappling with complexity to outlearn the opponent. If, as Bousquet suggests, "The ability to adapt in such fluid situations is dependent on being able to discern patterns from the seemingly random,"⁵⁵ then assessment must aid the strategist to unravel the randomness.

Victory Mechanisms

In order for innovative strategy to secure a state's goals, it must be placed within the context of what strategy aims to achieve. In terms of assessing and achieving victory, there are two fundamentally different ways to view strategy: finite and perpetual. Robert Mandel offers a seemingly cogent definition suggesting finite strategy: "Strategic victory entails accomplishing the short-term and long-term national, regional, and global goals for which the war was fought. To determine achievement of these goals, strategic victory is composed of interrelated informational, military, political, economic, social, and diplomatic elements."⁵⁶ The problem with Mandel's definition is that it implies that war is conclusive and victory is definitive. Achievement of goals as a function of related elements simplifies the assessment process because individual lines of effort all seem to point to accomplishment of

⁵⁴ Brooks, *Shaping Strategy : The Civil-Military Politics of Strategic Assessment*, 35.

⁵⁵ Antoine J. Bousquet, *The Scientific Way of Warfare : Order and Chaos on the Battlefields of Modernity*, Critical War Studies (New York: Columbia University Press, 2009).

⁵⁶ Robert Mandel, *The Meaning of Military Victory* (Boulder, Colo.: Lynne Rienner Publishers, 2006), 16.

objectives. Thus, progress along lines of effort should correlate to progress toward war termination. In Mandel's view of war, there are desired end states and victory is the preferred outcome.

Robert Pape proposes his coercive mechanisms within this finite paradigm. Pape distills coercive airpower into punishment, risk, denial, and decapitation.⁵⁷ He offers linear cause-and-effect relationships based upon a rational actor model: "Punishment campaigns seek to raise the societal costs of continued resistance levels," whereas "risk strategies slowly raise the probability of civilian damage."⁵⁸ Although enemy civilian will is unpredictable and nearly impossible to assess, the idea is that civilian morale is either directly or indirectly targetable.

Pape also acknowledges targeting military capability. Also in a linear paradigm, "coercion by denial operates by using military means to prevent the target from attaining its political objectives or territorial goals."⁵⁹ This mechanism is more open-ended in terms of the ways in which enemy military means are denied. Either by destroying enemy fielded forces, industrial capacity, transportation, communication, etc., enemy's can no longer muster the forces to continue fighting—regardless of their will.

Victory is attained via these mechanisms when the enemy surrenders. As such, war termination serves as the end point of strategy. Iklé adds, "For any war effort--offensive or defensive--that is supposed to serve long-term national objectives, the most essential question is how the enemy might be forced to surrender, or failing that, what sort of bargain might be struck with him to terminate the war."⁶⁰ In other words, the war ends when the victor achieves acceptable terms.

⁵⁷ Robert Anthony Pape, *Bombing to Win : Air Power and Coercion in War*, Cornell Studies in Security Affairs (Ithaca, NY: Cornell University Press, 1996), 57.

⁵⁸ Pape, *Bombing to Win : Air Power and Coercion in War*, 18.

⁵⁹ Pape, *Bombing to Win : Air Power and Coercion in War*, 13.

⁶⁰ Iklé, *Every War Must End*, 17.

In the finite-strategy paradigm, these *acceptable terms* remain fixed from initiation of war. Gideon Rose joins the argument of static, finite, and discernible war: “Policymakers should have a clear sense of what will happen on the ground once military operations are finished—what local political and security arrangements will look like, who will maintain them and how.”⁶¹ What if the conditions for war and the environment in which it was fought changed?

An alternative view of strategy suggests perpetual flux and interaction of strategy and the environment. Everett Dolman offers that strategy in this mindset “shapes and guides military means in anticipation of an array of possible coming events,” such that “the goal of strategy is not to culminate events, to establish finality in the discourse between states, but to influence state’s discourse in such a way that it will go forward on favorable terms.”⁶²

Victory mechanisms in this paradigm do not require linear approaches to strategy. Parallel warfare provides one such example. Evoking John Boyd and John Warden, Steven Rinaldi argues that parallel warfare operates by distributing rather than concentrating force: “The object of parallel warfare is to so rapidly modify the environment that the enemy is incapable of reacting to the changes.”⁶³ In other words, the enemy system may become so shocked as to experience paralysis. Paralysis may occur even if effects upon enemy civilian morale or military means are indirect.

⁶¹ Gideon Rose, *How Wars End : Why We Always Fight the Last Battle : A History of American Intervention from World War I to Afghanistan*, 1st Simon & Schuster hardcover ed. (New York: Simon & Schuster, 2010), 285.

⁶² Everett C. Dolman, *Pure Strategy : Power and Principle in the Space and Information Age*, Cass Series--Strategy and History (London ; New York: Frank Cass, 2005), 6.

⁶³ David S. Alberts et al., *Complexity, Global Politics, and National Security* (Washington, D.C.: National Defense University, 1997), 289.

Pape's closest mechanism to paralysis is *decapitation*. He breaks this mechanism out along the Clausewitzian trinity⁶⁴: decapitation of political leadership by targeting key leaders, decapitation of the government by targeting the will of the populace, and decapitation of the military through disruption of command and control—three methods he finds unlikely, uncertain, and unpredictable, respectively.⁶⁵ Thus Pape argues, “strategic paralysis is virtually impossible to achieve,” as if the complexity and adaptability of the enemy system provides immunity to shock.⁶⁶ However, Pape's analysis is based upon isolating each mechanism and discrediting its independent causality.

The problem with Pape's linear mindset toward victory is that his construct does not account for interaction among victory mechanisms. The intent of this section is to show that reductionist approaches to applying and assessing airpower could misinform strategic innovation. The strategist should not ask *if leadership decapitation will win the war*, because a no answer might discount a broader perspective of complexity. The strategist who embraces complexity would ask *how might the enemy system respond to leadership targeting, how might this mechanism interact with the other elements of friendly strategy and the environment, and how might we secure advantage from possible outcomes?* Strategic innovation can be more about the synthesis of victory mechanisms than an attempt to identify the mechanism most likely to work on its own.

Measures of Merit

Measures of merit provide the baseline for guiding assessment and victory expectations. To the detriment of clarity, *merit* and *effectiveness* are used interchangeably by various authors. Rosen offers, “Taken together, the definition of the strategic goal, the relationship of military

⁶⁴ Clausewitz, Howard, and Paret, *On War*, 89. By Clausewitzian trinity, I am referring to the people, the commander and his army, and the government.

⁶⁵ Pape, *Bombing to Win : Air Power and Coercion in War*, 80-81.

⁶⁶ Pape, *Bombing to Win : Air Power and Coercion in War*, 84.

operations to that goal, and indicators of how well operations are proceeding can be thought of as a strategic measure of effectiveness.”⁶⁷ This supports Rosen’s theory for wartime innovation as he argues innovation is required “because an inappropriate strategic goal is being pursued, or because the relationship between military operations and that goal has been misunderstood.”⁶⁸ Measures of merit, provided they are answering the right questions with the right information, aid the strategist in perceiving when strategy should be altered or improved.

While measures of merit can aid recognition of strategic interaction, they are not without limitations. Iklé offers, “Some common ways of judging military success--such as territory gained or improvements in current force ratios--are insufficient or even misleading indicators for guiding the conduct of war.”⁶⁹ Intelligence required to continually evaluate force ratios requires a very high level of information. This includes not only fielded forces, but industrial and manpower capacity to produce more. Such figures necessitate assumptions about production rates, which may be influenced by an enemy’s ability to adapt or external factors.

Further, because war is interactive, assessment becomes increasingly difficult as more variables come into play. Gartner suggests, “The interactive nature of war makes assessment difficult because it adds many players, and actors need to formulate expectations of how they expect their adversaries to react.”⁷⁰ Whether or not assessment successfully aids the process, strategic innovation necessitates some perception of enemy behavior. Compounding this problem, effects upon enemy strategy are not always consistent. Robert Jervis comments, “The interaction of strategies helps explain the paradoxical fact that, because

⁶⁷ Rosen, *Winning the Next War : Innovation and the Modern Military*, 35.

⁶⁸ Posen, *The Sources of Military Doctrine : France, Britain, and Germany between the World Wars*, 237.

⁶⁹ Iklé, *Every War Must End*, 19.

⁷⁰ Gartner, *Strategic Assessment in War*, 5.

of other's reactions, some attributes or behavior that would seem to harm the actor in fact work to its advantage." ⁷¹ The assessment process itself must be dynamic enough to respond to changes in the environment and expectations of enemy strategy.

It is clear that assessment is complex, and expectations matter. In his discussion of measures of merit (he calls them indicators), Gartner fails to acknowledge the complexity of strategic interaction: "Sudden and dramatic movements of these indicators act as strong signals that decision makers' strategy is succeeding or failing."⁷² However, assessment is not so simple; environmental factors and the behavior of the enemy factor into the complexity of assessment, and shape expectations. Large swings in measures of merit may misinform or be independent of strategic interaction altogether. For example, a sharp decrease in guerilla activity during winter months may be an expected result of environmental influence, not an indicator of a successful or failing strategy. Not only choosing measures of merit, but also interpreting them is a fundamental challenge of assessment. To this, Clausewitz notes, "This difficulty of accurate recognition constitutes one of the most serious sources of friction in war, by making things appear entirely different from what one had expected."⁷³

The problem of perceiving the need to change a strategy lies in timely recognition. Gartner suggests, "Nations do not usually announce changes in strategy, and strategic changes might not be easily observed."⁷⁴ Optimal measures of merit can aid in detection of strategic error before failure occurs. Leaders who wait for a catastrophic failure may lose the opportunity to correct their position or achieve intended war aims. "Because of this latitude in fitting the pieces together, political as

⁷¹ Jervis, *System Effects : Complexity in Political and Social Life*, 47.

⁷² Gartner, *Strategic Assessment in War*, 4.

⁷³ Clausewitz, Howard, and Paret, *On War*, 117.

⁷⁴ Gartner, *Strategic Assessment in War*, 6.

well as military leaders can suddenly reverse their interpretation of the war. Initially, they may brush aside unfavorable data, and in interpreting uncertainties always stress the optimistic side of the range. Then, after some dramatic setback, they may suddenly see their world in a new and somber light and stress all the pessimistic possibilities.”⁷⁵ Strategic innovation aims to prevent dramatic swings of perspective, but to remain in tune with environmental influence and strategic interplay.



⁷⁵ Iklé, *Every War Must End*, 36.

Framework for Non-Linear Strategic Innovation Analysis

A new framework for non-linear strategic innovation emerges from the concepts analyzed in this chapter. This framework comprises six core elements, which will serve as criteria for assessing innovation in the CBO case study. Although there may be factors or implications for innovation outside of military purview, this framework focuses upon actions available to the military-strategic triad. For the purpose of this thesis, the military-strategic triad consists of key military decision-makers, strategists, and their feedback processes.

This thesis argues that the military-strategic triad can stimulate and influence strategic innovation by engaging in the following:

1. *Ensure all components of the triad grasp the ongoing interaction of strategy with the environment.* As discussed, an essential aspect of this task is a mindset of securing advantage rather than strategic end states. This view that systems remain in flux underscores strategists' pursuit of emergent opportunities.
2. *Employ victory mechanisms in parallel.* Strategists must see beyond the idea that enemy strategy responds directly to isolable friendly actions. For example, strategies may incorporate variable timing, tempo, and intensity of multiple simultaneous friendly actions. The parallel nature of these actions may result in an enemy response different from the sum of their individual effects.
3. *Entreat continuous dialogue with key political actors.* The purpose of this dialogue is not simply to exercise civil-military relations, but specifically to facilitate mutual understanding and enhance perception of the environment as conditions change. This continuous dialogue may require mavericks who are adept at selling ideas. These mavericks often leverage argumentative skills, networking, and timing. Mavericks may

rise from within organizations to act through the military-strategic triad and influence political actors to affect change.

4. *Encourage organizational acceptance of complexity and uncertainty.* This task may pose significant leadership challenges. Military organizations must respond to uncertainty with a mindset toward anticipating and adapting to change rather than growing new capacity by default. In terms of service culture, weapon-system stovepipes must adjust to roles as mutual joint-force enablers; this includes capabilities or mission sets traditionally viewed as decisive or independent. Part of this construct is to strive for intra- and inter-service integration rather than deconfliction when conditions require greater simultaneity and concentration of force. Theoretically, for an organization that internalizes complexity, every element is an enabler, nothing is decisive, and no element strives to prove that it independently causes victory.
5. *Appreciate the dynamic relationship of technology to strategy.* The essence of this task is to evaluate incremental changes to technology. This evaluation involves validating assumptions as technology influences doctrine, as well as perceiving new interactions between technology and the environment. This concept may not be unique to non-linear strategic innovation. However, technology bears an undeniable influence upon the character of war and the conditions favoring offense and defense. In other words, technology plays a part in the paradoxical logic of strategy. It is essential to understand how changes in technology affect the longevity of successful strategies, and new technologies sometimes dictate strategic change.
6. *Employ adaptive feedback processes.* This means that feedback mechanisms must be responsive to environmental and strategic

change as well as to the relationship with decision-makers and strategists. Non-linear strategic innovation is a process of learning and identifying patterns. Feedback processes must nurture learning by strategists and decision-makers as the processes themselves mature.

This framework serves three functions. The first is to assemble a testable construct for a new way of thinking about strategic innovation. The second is to provide an alternative lens through which past wars—as strategic interaction—may be interpreted. The third function is to suggest a methodology by which decision-makers, strategists, and analysts might evolve ways of incorporating non-linear thinking into successful approaches to future war.

The following three-part case-study of the CBO will analyze the path of innovation for strategic bombing in the European Theater of Operations based upon this framework. This thesis does not seek to prove that key decision-makers during the CBO intentionally employed a non-linear approach to strategic innovation, nor does this argument suggest that all six elements must be present or formalized for strategic innovation to occur. The purpose of this case study approach is to evaluate whether a new way of thinking about strategic innovation can shed light on the process through which strategists and decision-makers, employed feedback to develop strategy during the CBO. Additionally, we will compare this approach with more conventional views of the air campaign against Germany for validity.

Chapter 2

Combined Bomber Offensive: Inception to Casablanca

The Combined Bomber Offensive (CBO) represents much more than a bilateral fusing of British Bomber Command and The American 8th Air Force into night-and-day operations. The CBO, viewed either in total or as a sequence of decisions and outcomes, represents a complex case study for military innovation. The two-year period spanning the Casablanca Conference of February 1943 and the Dresden Raid of February 1945 reveal a blend of tested doctrine, organizational behavior, technological advancement, and civil-military influences. The CBO was not a doctrinally fixed strategic offensive against Germany, but a dynamic process marked by continuous evaluation of changing means and ends. A campaign that began as a desperate application of available resources against an existential threat to western liberal democracy evolved into a demonstration of airpower's potential to win the war or at least to improve the success of an Allied invasion.

The context of the CBO as innovation is broader than two years of flying operations. To understand how the military innovates during long wars requires an examination that spans Air War Plans Division (AWPD)-1 through the implications of the United States Strategic Bombing Survey (USSBS), concluded in September of 1945. Had 8th Air Force clung blindly to interwar doctrine or succumbed completely to intra-service rivalry with ground forces, we might posit counter-factual outcomes for World War II. Instead, innovation occurred and airpower matured in a dynamic strategic texture of internal and external influences. Analysis of the CBO reveals that military innovation emerged through the way problems were identified, which questions were asked, and how available means were applied in a process of continuous interaction.

The fundamental premise of this case study is that strategic success of air power in World War II hinged on air superiority and ultimate defeat of the Luftwaffe. Strategic bombing both pressured German war industry and enabled the Allied land invasion to unfold in a complex context of trial and error underpinned by innovation. Although a focus upon air superiority is present throughout the war, the priority, weight of effort, methods, and means devoted to its pursuit are inconsistent. This apparent inconsistency is explainable using the non-linear strategic-innovation framework. This framework will dissect decision-making and evaluate the role of innovation in steering air superiority back to the forefront. This chapter focuses on the first phase of American strategic bombing in Europe, from the test of inter-war airpower doctrine and American observations in England through the Casablanca conference.

Interwar Bombing Doctrine, Technology, and Organizational Needs

An understanding of innovative change during the CBO begins by studying the interwar baseline for strategic bombing doctrine. AWPDP-1 was the air estimate annex to the war plan borne out of the Rainbow 5 Joint Army-Navy board recommendations to President Roosevelt.¹ This air plan rested upon a premise that Air Forces “could play the primary role in forcing acquiescence... of the enemy state,” including destruction of social-economic-industrial systems, industrial means of war materiel, transportation systems, and direct attack upon enemy armed forces.² Put differently, developers of AWPDP-1 felt air power could take the war directly to the heart of enemy capacity and will to fight, independent of the ground battle. These high hopes for air power doctrine could spiral

¹ R. J. Overy, *The Air War, 1939-1945*, 1st ed., Cornerstones of Military History (Washington, D.C.: Potomac Books, Inc., 2005), 62.

² Haywood S. Hansell, *The Air Plan That Defeated Hitler* (Atlanta, Ga.: [Printed by Higgins-McArthur/Longino & Porter], 1972), 37.

higher during peacetime; but test of war would reveal whether the assumptions behind the doctrine could support an achievable strategy.

While a discussion of air power decisiveness is tangential to air power innovation during World War II, the subtext of organizational independence for the USAAF shaped the ways air power was conceived and applied. The USAAF during World War II remained under Army command in general, and Dwight Eisenhower in particular, in the European Theater of Operations. A tendency for air power enthusiasts to demonstrate independent effectiveness or primacy among war-making means seeped into doctrine. In addition, interwar airpower doctrine found a niche because “the power of isolationist feeling in the country at large, reflected and perhaps amplified in the halls of congress, remained forbiddingly strong.”³ AWPD-1 resultantly underscored, “If there was no national intention permanently to acquire territory, or to impose political suzerainty, then air power might be the primary instrument for enforcing agreement with our policies, supported as needed by the army and the navy.”⁴ The employment of air power in support of air power objectives seemed self-serving to Army leadership—especially when finite resources might otherwise more directly support land operations. Tension between the Air Corps’ and its parent service constrained overt attempts at air power innovation and complicated the arguments when opportunities arose.

Technology, organizational independence, and doctrine combined in a manner that later blinded USAAF leadership from seeing the right questions. This was acutely evident given the opportunity for Air Corps officials such as Carl Spaatz to observe the RAF in battle prior to American war entry. Biddle argues, “Spaatz held fast to [daylight precision bombing] ideas that defined the thinking and self-identity of his

³ Eric Larrabee, *Commander in Chief* (New York, NY: Harper & Row, 1987), 41.

⁴ Hansell, *The Air Plan That Defeated Hitler*, 37.

organization. Thus, he failed to realize, for instance, that acquiring a long-range escort fighter ought to be an immediate priority for the Americans. He reacted more flexibly to those things less dear to the heart of his service, such as the impact of bombing on morale.”⁵ Rather than prepare for war by challenging assumptions, Air Corps leadership condoned a strategy driven by service rivalry. As such, codified doctrine served as the independent variable in an equation for which technology became dependent. In other words, Air Corps’ reliance upon bomber defenses and acceptance of limited escort-fighter range justified organizational biases. In essence, prewar doctrine framed the strategic bombing problem in terms of perceived means. A broader viewpoint of strategy evaluates contextual blinders when framing the problem in order to identify shortfalls in means.

AWPD-1 inhibited strategic innovation because planning tied doctrine to production even though there was time to improve technology. According to Haywood Hansel, who participated in both plans’ development, AWPD-1 and its follow on AWPD-42 were approved “as guidance for production,” despite the fact that neither was directly accepted by the Joint Staff as war plans.⁶ Even in a long-war context, commitments to wartime production establish a technology baseline. In an uncertain environment, a tendency for strategists to *create knowns* presents tension with maintaining flexibility. Further complicating strategic innovation, even when technological requirements are identified, the tempo and value of improvements are by no means guaranteed.

⁵ Tami Davis Biddle, *Rhetoric and Reality in Air Warfare : The Evolution of British and American Ideas About Strategic Bombing, 1914-1945*, Princeton Studies in International History and Politics (Princeton, NJ: Princeton University Press, 2002), 206.

⁶ Hansell, *The Air Plan That Defeated Hitler*, 155.

Victory Mechanisms and Reframing the Environment

The first opportunity for innovation occurs at the point when strategy is formulated. There is no *zero* state for strategy because friendly and enemy strategies begin to interact with each other and their environment while still in conception—even if no action is taken. Harry Yarger suggests, “Actions taken or not taken by one state or actor always have the potential to affect other states and actors, particularly their role in the strategic environment and their perception of that role.”⁷ This becomes evident as strategic bombing forms part of the solution for U.S. strategy. Richard Overy describes the entering argument for air power: “at the very least it was expected that the air forces would so undermine German economic and military expansion that even in the event of the Anglo-American forces being outnumbered by Axis troops due to the German defeat of Russia, an invasion would still be possible.”⁸ By declaring the aims of air power both in terms of degrading German war potential as well as enabling a land invasion, the airmen set the stage for a protracted struggle of airpower and land-power dominance.

Meanwhile, German strategy responded to the prospect of Anglo-American bombing by accelerating actions on the Eastern front. Hitler attempted to increase aircraft production in 1942 while operational successes to isolate soviet war industry became pyrrhic, stalling out at Stalingrad.⁹ German air strategy focused upon supporting German land forces on the Eastern front through interdiction and close air support. Hitler’s perception of the strategic environment simply didn’t include patience for strategic bombing effects, moreover he sought to capture, rather than destroy, Russian industry. Murray offers, “Nowhere in his

⁷ Yarger, *Strategy and the National Security Professional : Strategic Thinking and Strategy Formulation in the 21st Century*, 43.

⁸ Overy, *The Air War, 1939-1945*, 62.

⁹ Williamson Murray and Air University (U.S.). Airpower Research Institute., *Strategy for Defeat : The Luftwaffe, 1933-1945* (Maxwell Air Force Base, Ala.: Air University Press, 1983), 125.

directive [for the summer 1942] did the *Führer* suggest using the Luftwaffe to strike Soviet industry or petroleum production; given the megalomaniacal extent of Hitler's summer aims and the weaknesses of the ground forces, the *Luftwaffe* would be completely employed in supporting the army's drive."¹⁰ In other words, Blitzkrieg was an expedient that did not favor the "long term solution" provided by strategic bombing.¹¹

The interaction of American and British strategies delayed the imperative for bombing innovation. American commitment to the European theater increased Britain's confidence in a favorable war outcome. British pragmatism for post-war status relied upon persistent access to its eastern colonial interests. Britain thus affixed airpower into its strategic gaze upon North Africa: "the prime task was to defend Egypt and the Suez Canal, first of all by arranging smaller combat aircraft in defense of the threatened territory, secondly by using medium bombers to harass the enemy's troop formations."¹²

These broadened Allied war objectives detracted from the coherence of the initial strategic bombing plan. Not only had AWPD-1 suggested targeting of the aircraft industry as a component of German war capacity, but strategists recognized "early on... that the initial target system would have to be the aircraft industry to gain control of the air."¹³ Although it seemed feasible to draw some aircraft away from the task of securing independent victory through airpower, decision-makers overlooked a critical side-effect: operations outside of the European theater diverted weight of effort away from defeating the Luftwaffe as an enabler. Pressure eased on the German aircraft industry as "the two

¹⁰ Murray and Air University (U.S.). Airpower Research Institute., *Strategy for Defeat : The Luftwaffe, 1933-1945*, 121.

¹¹ Jeremy Black, *World War Two: A Military History* (New York: Rutledge, 2003), 25.

¹² Overy, *The Air War, 1939-1945*, 41.

¹³ F. J. Bradley, *No Strategic Targets Left*, Limited ed. (Paducah, Ky.: Turner Pub. Co., 1999), 8.

most proficient Bomb Groups of the Eighth Air Force were despatched [sic] to North Africa to support the surface operations aimed at dislodging Rommel from that continent.”¹⁴ As a result, American strategic bombing strategy suffered through loss of concentration and the inability to launch sufficient parallel attacks upon Germany to secure air superiority.

American Bombing Begins

8th Air Force employment in Europe began seven months prior to the Casablanca conference. Strategic bombing reached its first critical juncture on 21 July 1942 as General Eisenhower “defined the task of the Eighth [Air Force] in terms of the contemplated invasion of the continent-to achieve air supremacy in western France and to prepare to support ground operations.”¹⁵ The question Eisenhower did not ask, nor could Gen Spaatz (commanding 8th bomber command) have answered, was whether air superiority could be achieved without direct and continuous pressure against German air power. Instead, daylight bombing unfolded slowly in “three phases marked successively by the increasing ability of the American force to provide its own fighter escort,” initially constrained by the range of British fighters.¹⁶

Escort range was, however, only a part of the problem. Early American bombing efforts were as inconsistent and unimaginative as they were conservative. Anthony Verrier described 8th Air Force bombing prior to the CBO as “sporadic... [yet included] little variety among the sorties; they merely picked up the option of daylight raids at the point where nearly the last of the major Bomber Command operations of this

¹⁴ David MacIsaac, *Strategic Bombing in World War Two : The Story of the United States Strategic Bombing Survey* (New York: Garland Pub. Co., 1976), 14.

¹⁵ United States. USAF Historical Division., Wesley Frank Craven, and James Lea Cate, *The Army Air Forces in World War II*, 7 vols. (Chicago: University of Chicago Press, 1948), 213.

¹⁶ United States. USAF Historical Division., Craven, and Cate, *The Army Air Forces in World War II*, 215.

type left off.”¹⁷ Without attempting to penetrate into the heart of Germany, 8th Air Force could attack with a sustainable loss rate. Verrier adds, “General Eaker's squadrons bombed from high level and suffered a missing rate of no more than two-and-a-half percent between 17 August and 31 December 1942.”¹⁸ Without an assessment apparatus during this period to facilitate decision-making about the efficacy of bombing, air strategy stagnated. Then, a routine meeting between heads of state catalyzed strategic innovation through the imperative for a combined Anglo-American bombing campaign.

The Context of Casablanca

If strategic innovation during World War II could be attributed to a pivotal decision, it would be at the Casablanca Conference in January 1943. However, to suggest that key conferences during WWII spawned strategic innovation would be oversimplification. Discourse at Casablanca demonstrates that innovation requires more than meetings, but strong political leaders, bold and articulate military subordinates, and an environment in which mavericks have a voice with facts to back their arguments. Discourse at Casablanca was not simply a discussion, but as Bousquet evokes Paul Edwards: “A discourse, then, is a way of knowledge, a background of assumptions and agreements about how reality is to be interpreted and expressed, supported by paradigmatic metaphors, techniques, and technologies, and potentially embodied in social institutions.”¹⁹ Innovation in this context cannot be isolated to the results of a meeting in the form of a signed directive; it was the process of achieving agreement based upon reframing the environment that comprised strategic innovation.²⁰

¹⁷ Anthony Verrier, *The Bomber Offensive*, Revised ed. (London: Pan Books, 1974), 99.

¹⁸ Verrier, *The Bomber Offensive*, 99.

¹⁹ Bousquet, *The Scientific Way of Warfare : Order and Chaos on the Battlefields of Modernity*, 14.

²⁰ U.S. Army, "Art of Design, Student Text, Version 2.0," ed. School of Advanced Military Studies (Ft Leavenworth, KS: School of Advanced Military Studies, March

The presence of Churchill and Roosevelt with Stalin's conspicuous absence enshrouded the meeting with grand strategic questions that went beyond winning the war. Historian Herman Wolk argues, "Churchill believed that hitting the underbelly of Hitler's Fortress Europe would force Germany to scatter its forces, making a final allied blow against the European continent less costly."²¹ A promise of *less costly* victory in Europe justified the commitment of forces in support of aforementioned British maritime interests. The British insisted "on clearing the Mediterranean sea lanes from Gibraltar to Suez, and that the capture of Sicily would do this."²² Grand strategic interests formed a subtext, but overt Casablanca discussion did not reopen debate of *Germany First* or American insistence on an eventual cross-channel invasion; Casablanca became a matter of what to do with strategic bombers—and how.²³

Interaction of Roosevelt and Churchill

Although historians disagree about the inevitability of axis offensive culmination by January 1943, "Axis powers had lost the initiative in both the west and Far East... Italy was close to defeat and the ring around Germany was drawing tighter month by month."²⁴ Allied leadership clearly recognized this change in the environment and gained a sense of confidence in eventual victory by 1943. Thus, the imperatives for strategic innovation became less about cooperation in the face of existential threat, and more about the various political interests at stake

2010), 129. The concept of environment reframing is explained in greater detail on page 64.

²¹ Herman S. Wolk, "Decision at Casablanca," *Air Force Magazine* 86, no. 1 (2003): 80.

²² Larrabee, *Commander in Chief*, 187.

²³ Wesley Frank Craven et al., *The Army Air Forces in World War II*, 7 vols. (Washington, D.C.: Office of Air Force History : For sale by the Supt. of Docs., U.S. G.P.O., 1983), 300.

²⁴ Overy, *The Air War, 1939-1945*, 73.

after “unconditional surrender” of the enemy.²⁵ Nevertheless, optimal alignment of the ways and means of US and British military capability served the individual and mutual interests of both countries.

Roosevelt gained confidence as a wartime President, particularly with respect to his relationship with Churchill as 1942 wound to a close. Although Roosevelt acquiesced to Churchill’s Mediterranean plan when announcing his support for TORCH in July of 1942, it was time to consider the next line of advance in a new context.²⁶ In order to consolidate a unity of effort upon Germany, the President undoubtedly felt “pressure from [Churchill] to abandon day bombing and to put all [the American] bomber force in England into night operations along with—and preferably under the control of—the RAF.”²⁷ However, Roosevelt’s shared enthusiasm for strategic bombing, even if mostly grounded in rhetoric, made him less likely to defer operational command of 8th Air Force or its methodology to British control.²⁸ To Roosevelt, even if strategic bombing had not yet demonstrated a capacity to independently bring Germany to its knees, it was still a symbol of American prestige. Roosevelt’s belief in American airpower set the stage for airmen to press for innovation as the heads of state deferred on controversial issues.

The dynamic of the conference indicated Churchill and Roosevelt prioritized grand strategic consensus rather than the feasibility or capability of specific details. In other words, as issues about strategic bombing methods became more contentious, they made less effort to seek resolution at the conference. Webster notes, “the document which was accepted by the conference sought to make no distinctions between, or to pass any judgment upon, the various and at least partly conflicting

²⁵ Craven et al., *The Army Air Forces in World War II*, 10.

²⁶ Craven et al., *The Army Air Forces in World War II*, 46.

²⁷ Wolk, “Decision at Casablanca,” 81.

²⁸ Overy, *The Air War, 1939-1945*, 104.

views which had contributed to the debate. It simply included them all.”²⁹ In other words, rather than to acknowledge areas of disagreement and to task intergovernmental working groups, the chosen course of action was to avoid conflict through ambiguous or conflicting language in the directive. This is another reason why the Casablanca directive itself did not reflect the essence of strategic innovation as it occurred at the conference.

Airmen Innovate Through Argumentation

The essence of strategic innovation is not simply an idea but also the successful argumentation and enactment of that idea. At Casablanca, the burden of the argument fell to the airmen. Roosevelt was not only willing to allow “the Air Forces to operate independently in virtually everything but name,” but he allowed prominent airmen room to do so as well. ³⁰ At Casablanca, Roosevelt permitted Arnold, Spaatz, Andrews, and Eaker to engage directly with Churchill despite their lack of preparation for the Conference vis-à-vis their British counterparts.³¹ In this sense, Roosevelt’s trust of his military subordinates at the limits of his own expertise was fundamental to strategic innovation. Dale Herspring argues, “key indicators of Roosevelt’s respect for his military subordinates were the access he provided them and the willingness he showed in listening to their viewpoints.”³² In this case, not only did Roosevelt listen to his airmen, but since he found their articulation of the strategic bombing arguments more credible and nuanced than his own, he gave them a platform.

²⁹ Charles K. Webster and Noble Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, History of the Second World War; United Kingdom Military Series (London,: H. M. Stationery Off., 1961), 12.

³⁰ Larrabee, *Commander in Chief*, 184,638.

³¹ Wolk, "Decision at Casablanca," 80-81.

³² Dale R. Herspring, *The Pentagon and the Presidency : Civil-Military Relations from Fdr to George W. Bush*, Modern War Studies (Lawrence: University Press of Kansas, 2005), 50.

Ira Eaker seized this platform for strategic innovation to quell the British arguments and reestablish a course for airpower. The British were concerned with the survivability of USAAF aircraft, yet “Eaker emphasized that the Eighth had been held back by lack of long-range fighter escort, the commitment to Operation Torch, and by poor weather.”³³ Eaker made four essential arguments: 1) that switching to night bombing could increase losses by placing American crews and equipment in a position for which they were ill-trained, 2) day bombing could attack point targets unserviceable by night area bombing, 3) day and night bombing could complementarily bring “24-hour pressure to bear on the enemy,” and 4) day bombing would force the Luftwaffe to fight.³⁴ Eaker understood the interactions of airpower employment on strategic, operational, and tactical levels, and leveraged his perception of the environment to his advantage.

Eaker’s brilliance demonstrated the pinnacle of strategic innovation through savvy argument. His strategic vision for airpower succeeded in convincing Churchill where the other three senior AAF generals failed because he grasped the nuance of contextual factors. Eaker’s first argument suited internal AAF organization and morale. Allowing aircrews to continue to fly in the manner consistent with their doctrine was an intangible benefit. The argument of precision capability of daylight bombing (whether true or not) suited the demands of the Combined Chief’s and targeting planners; this would stimulate technological focus on improving accuracy rather than giving up. Eaker’s third argument won over Churchill: “The RAF, flying at night, would be guided by fires set by day,” ensuring “The devils will get no rest.”³⁵ Eaker’s final argument may have seemed extraneous at the time, but it nevertheless demonstrated his genius.

³³ Wolk, "Decision at Casablanca," 81.

³⁴ Craven et al., *The Army Air Forces in World War II*, 302.

³⁵ Wolk, "Decision at Casablanca," 81.

The essence of Eaker's innovation was not an invention of a new approach, but in recognizing the need and prescribing a shift in strategy based upon the defensive potential of massed daylight bombing. Clausewitz argues, "every attack has to take into account the defense that is necessarily inherent in it, in order clearly to understand its disadvantages and to anticipate them."³⁶ Eaker recognized the inherent defensive capability necessary to preserve bomber forces while concentrating offensive operations against Germany. Heavy losses were still probable, but drawing out the Luftwaffe would threaten the Germany's strategic defense.

The key to an Allied invasion, and the means to unlock its success was to pursue relentlessly the air superiority mission through fighter escort when possible, but to persist with continuous pressure from bombers. At its core, Eaker's strategy was misconstrued and implemented as an attrition strategy for airpower. The Casablanca conference hinted at but failed to solidify the primacy of annihilating the Luftwaffe first. Only with air superiority established, could the bombers achieve their potential. To understand how the interaction at the conference was more important than the output, the Casablanca directive warrants analysis.

The Casablanca Directive

The Casablanca directive, although barely a page in length, diluted Eaker's ingenuity with its indecisiveness. It vaguely defined the CBO purpose as "the progressive destruction and dislocation of the German military, industrial and economic system, and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened."³⁷ The document diverted strategic focus from the support required of airpower in enabling a cross-channel

³⁶ Clausewitz, Howard, and Paret, *On War*, 525.

³⁷ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, 153.

invasion and pressed its hopes upon independent objectives for bombing. The directive goes on to fragment bomber economy of force by establishing bombing priorities as submarine construction, aircraft industry, transportation, oil plants, and other industrial targets, which “may be varied from time to time according to the developments in the strategical [sic] situation.”³⁸ In other words, either country could bomb according to its own doctrine despite the fact that the spirit of the conference had been to embrace the synergy of day and night operations against the same target areas.

Eaker’s vision was buried ineffectually into the fifth paragraph of the directive. Paragraph five encouraged planners to “take every opportunity to attack Germany by day, to destroy objectives that are unsuitable for night attack, to sustain continuous pressure on German morale, to impose heavy losses on the German day fighter force and to contain German fighter strength away from the Russian and Mediterranean theaters of war.”³⁹ In a sense, the Casablanca directive implied that pressure on the German homeland could cause German airpower to spread thin while potentially breaking under continuous pressure.

The problem was that this approach also spread the CBO too thin to fully exploit bombing potential. Ironically, direction for the bomber offensive noted the potential for non-linear effects: “The result attained with a given bombing effort does not vary directly with the scale of that effort, but tends to become progressively more fruitful as the effort increases. Moreover experience shows that, as the bombing effort mounts above a certain level the defenses become saturated and the aircraft casualty rate is reduced.”⁴⁰ Thus, a challenge for CBO

³⁸ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, 154.

³⁹ Craven et al., *The Army Air Forces in World War II*, 306.

⁴⁰ Hans Adolf Jacobsen and Arthur Lee Smith, *World War II, Policy and Strategy : Selected Documents with Commentary* (Santa Barbara, Calif.: Clio Books, 1979), 245.

innovation would be in maintaining and modifying a coherent strategy despite conflicting guidance.

This conflicting guidance had deeper roots than the Casablanca Conference itself, stemming from divergence of American and British bombing doctrine. Prior to the Casablanca Conference, Air Vice Marshall John C. Slessor proceeded to the U.S. to advocate combined bombing operations. British arguments to the American JCS reflected Trenchard's theory "that airpower must be applied independently in strategic bombing and not entangled with land campaigns."⁴¹ This concept struck a common chord with ACTS doctrine, but lacked the insistence of first establishing requisite air superiority.

Slessor's own theory of strategic bombing, first preceded by control of the air, may have rounded out the British argument for the CBO. Slessor had earlier published that "Air superiority will be gained and have to be constantly maintained by striking direct at those objectives which are of first importance to the enemy at the time... in spite of casualties, assisted in varying degree by diversions in the form of direct attack on the enemy's air forces."⁴² Perhaps as theory met practice, political leadership could not stomach the risk of expending the blood and treasure of the bomber force in a hope for results. In the context of late 1942, any argument for air superiority would evoke thoughts of the protracted struggle of the Battle of Britain. If Slessor and Eaker were right, the war could be won more quickly by defeating the Luftwaffe first through 24-hour bombing operations, but the politicians wouldn't risk the possibility that they were wrong.

In a sense, both Eaker and Slessor were Mavericks because they pursued changes to strategic trends. Neither were outsiders within their air organizations, but in the context of Casablanca, both were outsiders

⁴¹ Craven et al., *The Army Air Forces in World War II*, 297.

⁴² J.C. Slessor, *Air Power and Armies* (Tuscaloosa, AL: University of Alabama Press, 2009), 10.

to an environment infused with politics and grand strategy. Nevertheless, political sensitivities, organizational interests, and the chain of command restricted implementation of their ideas. The ideas that made the strongest arguments behind closed doors at the Casablanca Conference simply did not make the published guidance for the CBO. As a result, bombing would continue through trial and error for six months until another opportunity for strategic innovation occurred.

Conclusion

In terms of non-linear strategic innovation, this chapter yields several observations. First of all, it is clear that not all key decision-makers and strategists grasped the ongoing interaction of strategy with the environment, but dialogue at Casablanca aided the perception of some. In this case, political actors, rather the military, first demonstrated desire to pursue post-war advantage. At the same time, military leadership—Eaker in particular—aided politicians and other decision-makers to place a change in strategy into a broader context.

The meeting at Casablanca also shows strategic innovation need not always manifest itself as sweeping change to military plans or government policy. In fact, innovation may emerge as ideas presented at lower levels of military rank or subtle changes to strategic vision. Because the strategic environment remains in flux, successful innovation is not an *all or nothing* proposition. The essential contribution of strategic innovation, as manifested at Casablanca, is that it establishes conditions for successful strategy to continue to emerge over time.

Secondly, while target planning presented opportunities for parallel victory mechanisms, the means available for strategic bombing fell short. Broader political purposes redirected bombers to support a front in North Africa and to clear the Mediterranean. Daylight precision bombing against German industry and night area bombing to bolster daylight attacks and affect civilian morale could be considered parallel victory

mechanisms. However, lack of an adequate feedback process contributed to a poor understanding of the relative failure of initial air strategy to secure its objectives. Further, decision-makers lacked adequate control of timing, tempo, and intensity to obtain synergistic benefits of attacking multiple industries simultaneously.

Third, the long-war context emphasizes innovation as a process of interaction and learning. As strategic interaction involves both internal and external factors to military power, Casablanca shows that the catalysts for innovative change can be meetings at which decisive actors are present with the will to enact innovative change. Eaker undoubtedly shaped the questions asked at Casablanca and influenced how leadership perceived possible solutions. It is an important consideration for the framework of this thesis that military leadership sought interaction between Eaker and Churchill, thus establishing a precedent for ongoing discussion between political actors and senior military decision-makers.

Fourth, Air Corps strategists initially framed their environment based upon AWPDP-1. Unfortunately, AWPDP-1 was riddled with unchallenged assumptions, more in order to mitigate uncertainty than to help planners accept uncertainty as part of the problem. Further, AWPDP-1 led strategists to understand the German system as a static industrial web rather than a dynamic system interacting with the environment and Allied strategy.

Lastly, military leaders began to understand how technology would interact with bombing strategy at Casablanca. Eaker's argument based upon the defense inherent in massed bombing reflected prewar optimism about bomber superiority while beginning to expose concerns about enemy pursuit aircraft and lack of effective escort for the CBO. More opportunity for strategic interaction with continuous dialogue could help military leadership ask the right questions about technology.

Chapter 3

From Casablanca to Quebec

Innovation in the Combined Bomber Offensive after Casablanca would unfold through key decisions, operations, and phases throughout the war in the European Theater of Operations. As such, CBO air strategy did not remain static or merely respond to trial and error; it progressed in significant shifts as the interaction of a Clausewitzian *series of engagements* elapsed. The same confluence of contextual factors leading to the Casablanca directive continued interplay with both sides' strategies. Analysis and feedback processes began to formalize and inform ongoing strategic innovation. Strategic innovation shaped the conferences and subsequent air campaigns spanning January 1943 through Big Week in February 1944. Three themes of strategic innovation link the progress of the CBO in this period: refocusing ways and means, reframing the environment, and exploiting opportunity for advantage.

Divergent CBO Interpretations and Refocusing Air Strategy

During the first half of 1943, the CBO demonstrated limited success. In addition to problems with accuracy and battle damage assessment, bombing effectiveness diluted due to divergent interpretations by American and British air leadership. Sir Arthur Harris deviated from the Casablanca directive's intent to follow up on American daylight attacks with night attacks on the same industrial areas. Webster concludes that Harris "did not believe in the selective application of bombing whether it was carried out by area attack on 'associated' towns or by precision attack on particular targets."¹ Instead, Harris preferred to bomb large cities, seeking only to achieve indirect effects. Robert Pape argues, "Harris's strategy was to husband resources for periodic massive strikes on one city at a time," as he proceeded with

¹ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, 18.

incendiary raids against Essen, Cologne, Lubeck, Rostock, and Stuttgart.² Harris clung to the idea of winning through erosion of German civilian morale rather than systematic defeat of the Luftwaffe and German war industry. Unfortunately, the Casablanca Directive was ambiguous enough to support his area-bombing mentality despite the intent of the strategy behind the document. As a result, there was very little focus on keeping maximum pressure on the German air force and aircraft industry as the first priority.

Just as city bombing diverted concentration, so would continued bomber employment against the German U-boat threat, as directed by the Casablanca directive. However, during the Spring of 1943, the British abandoned the plan to attack submarine bases in spirit, if not in practice, prior to the Americans. A memo to Harris from AVM Bottomley on 6 April 1943 implores: “after consideration of the results so far achieved, it has been decided that the employment of your main bomber effort [against submarine bases] is for the present to be discontinued,” except against the Biscay U-boat bases, whereas “you may find it profitable to employ freshmen crews in these attacks.”³ This suggests that the British began to act upon feedback mechanisms earlier than the Americans did, even when such analyses contradicted the Casablanca directive. At the same time, it indicates British willingness to pay lip service to the details of the CBO. This gambit suited the organizational interest of training up green crews while holding the fabric of the political agreement in tact. In Feaver’s construct, sending inexperienced crews to a mission officially designated high priority is a method of *shirking* by the RAF, especially since there is no indication that the idea stemmed from their civilian oversight.⁴

² Pape, *Bombing to Win : Air Power and Coercion in War*, 270.

³ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, 155.

⁴ Feaver, *Armed Servants : Agency, Oversight, and Civil-Military Relations*, 3.

Meanwhile, American daylight bombing operations continued to focus upon the submarine pens. In an effort to determine the efficacy of Naval and port targets, “both British and American observers entertained profound doubts... conceded[ing] that the roofs of the submarine shelters, constructed as they were of reinforced concrete,” were impenetrable by any bombs available.⁵ As crews and analysts began to lose confidence in the assigned task, civilian oversight forged ahead. For the Americans, the apparent political desire to show solidarity with the shipping war in the Atlantic trumped a rational assessment of the limits of bombing technology.

Another argument suggests the Navy demanded AAF support in the battle of the Atlantic because U-boat attacks on supply ships bound for Europe were “essentially an army problem.”⁶ Regardless of whether or not the strategy was sound, it seemed the Navy exploited service rivalry to pull Army assets into support of Naval operations. Craven argues that B-24s specially modified for extended range and radar capability “contributed decisively... [and] forced the enemy to change his tactics.”⁷ Despite the bombers’ lack of ability to attack the U-boats, they potentially contributed to a quicker solution to the Atlantic problem. The larger question is whether diverting bombers from the air superiority campaign caused significant delay to air strategy over Germany, when the Navy might have forced this change in U-boat employment with its carrier aircraft alone.

In addition to poor observed results, divergent American and British bombing practices, and the U-boat question, a fourth factor increased the impetus for another Roosevelt-Churchill meeting. Sustainment and replacement of 8th Air Force aircraft and crews brought CBO strategy into

⁵ Craven et al., *The Army Air Forces in World War II*, 312, Craven et al., *The Army Air Forces in World War II*.

⁶ Craven et al., *The Army Air Forces in World War II*, 388-9.

⁷ Craven et al., *The Army Air Forces in World War II*, 394.

question. Craven offers, “During the months of January, February, and March, [8th Air Force] average combat strength sank lower than at any time since October 1942.”⁸ A waning ability to mass bombers without incurring excessive losses pressed American bombing doctrine to the breaking point. However, By April and increasing in May, P-47s (not yet with drop tanks) began escorting 8th Air Force bombers.⁹ The success of escort significantly aided bomber force strength and leadership willingness to increase the scale of bombing operations.¹⁰ It was now time for political leaders to chart a more detailed course ahead, whether or not they would acknowledge their differences in navigational proclivity.

TRIDENT Conference

As time lapsed between the start of the CBO and May 1943, Churchill and Roosevelt’s initial differences over bombing priorities were overcome by strategic success in other areas. By April, Axis supplies were choked out of Tunisia as Hitler desperately reorganized “control of German navy arms procurement in order to increase U-boat production.”¹¹ Even if bombing against the U-boats could not be proven successful, at least the Nazi’s appeared to be concerned about their losses in the Atlantic. Further, the recent Russian advances ameliorated the need to take pressure off of the Eastern front.¹² Both Roosevelt and Churchill were aware of this success and both postured mutual agreement rather than differences motivated by self-interest. In fact, Churchill suggested there

⁸ Craven et al., *The Army Air Forces in World War II*, 308.

⁹ Richard G. Davis, *Bombing the European Axis Powers : A Historical Digest of the Combined Bomber Offensive, 1939-1945*, 112

¹⁰ Richard G. Davis, *Bombing the European Axis Powers : A Historical Digest of the Combined Bomber Offensive, 1939-1945* (Maxwell Air Force Base, Ala.: Air University Press, 2006), 112, Craven et al., *The Army Air Forces in World War II*, 309.

¹¹ Davis, *Bombing the European Axis Powers : A Historical Digest of the Combined Bomber Offensive, 1939-1945*, 108, 13.

¹² Ray S. Cline, *Washington Command Post: The Operations Division*, United States Army in World War II: The War Department (Washington,: Office of the Chief of Military History, Dept. of the Army, 1951), 220.

was no plan to “discuss either the U-boat war or the bombing of Germany, because, except in detail, ‘there were no differences of opinion on these subjects.’”¹³ Of course, there were fundamental differences of strategic opinion and details below the head-of-state level, which presented opportunity for innovation at both of the next two conferences.

The purpose of the Trident Conference was to take the policy agreement of Casablanca, forwarded by 5 months of bombing experience, into a more refined plan toward victory. According to Craven, TRIDENT would “translate the Casablanca decisions into terms of specific commitments and detailed objectives.”¹⁴ In terms of the civil-military relationship, the need for a conference at Washington was not pushed down by the political leaders, but pulled by military necessity.

In the broader context of European-versus-Pacific-theater force allocation, organizational interests threatened grand strategic priorities. For example, Admiral King, as commander in chief, U.S. fleet, argued the Casablanca directive permitted him to “maintain and extend unremitting pressure against Japan,” which British insisted, “could be construed to permit a diversion of resources away from the war against Germany.”¹⁵ The resolution of this issue at the Conference was an agreement to discuss “any major Pacific offensive before it was undertaken.”¹⁶ In order to resolve conflicts among American and British services, civilian’s vested greater authority in the Anglo-American combined chiefs of staff, which possessed organizational interests of its own. At least an agreement for improved interaction at a higher level might keep lower-level commanders consistent with the grand strategic plan.

¹³ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, 23.

¹⁴ Craven et al., *The Army Air Forces in World War II*, 307.

¹⁵ Larrabee, *Commander in Chief*, 188-89.

¹⁶ Larrabee, *Commander in Chief*, 189.

Strategic innovation at the Trident conference inspired initiative and inventive approaches down to the tactical level. At such conferences military mavericks can persuade high-level leaders. This occurs because as strategists perceive stagnation, the risk-reward calculus during long wars may tip toward seeking payoff rather than sustaining net losses. Low-altitude daylight bombing is a quintessential example. Colonel Smart suggested B-24s flying at rooftop level could improve accuracy, decrease civilian casualties, mitigate effectiveness of German air defenses and fighters, and improve the probability of crews surviving if shot down.¹⁷ Trident presented a context for Col Smart to gain approval from Arnold and ultimately Roosevelt. The maverick Col Smart was able to overcome the organizational inertia of American high-altitude bombing only because appropriate decision-makers were present with open minds and an imperative for strategic change.

Strategic innovation at Trident also arose based upon input from the Committee of Operations Analysts. Data and analysis finally supported Eaker's air-superiority first mentality. The POINTBLANK Directive, signed on 14 May 1943, codified reasons for focusing the bombing effort upon the Luftwaffe: "If the growth of the German fighter strength is not arrested quickly, it may become literally impossible to carry out the destruction planned and thus create the conditions necessary for ultimate decisive action by our combined forces on the Continent."¹⁸ The CCS finally perceived defeat of the Luftwaffe as an *intermediate* objective—an essential enabler to the CBO before accomplishing principal objectives. Before five months of trials and the supporting analysis, the CCS had lacked argumentative clout to overcome interwar doctrine.

¹⁷ Larrabee, *Commander in Chief*, 242.

¹⁸ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, V.IV, p.275.

The limit of air-superiority innovation at Trident was in *how* air superiority should be achieved. Although the POINTBLANK Directive indicated desire “to initiate precision bombing attacks against German fighter assembly and engine factories immediately,” it also recognized the limitations of an insufficient heavy bomber force.¹⁹ Unfortunately, organizations led by bomber airmen were reluctant to press the importance of fighter escort to the forefront. Given limited numbers of bombers available to enact the desired massing tactics, escorted bombers served as decoys for the self-escorted “main striking force” instead of using escort to directly engage the Luftwaffe.²⁰ The collective perception of those present at Trident failed to inspire new approaches to applying technology or doctrine. Further, no maverick emerged with a new perspective on escort. This situation required a maverick to understand the context, challenge assumptions, recognize opportunity, and successfully argue for increased fighter production at the expense of bomber sustainment. As a result, strategic innovation stagnated.

QUADRANT Conference

The next meeting between Churchill and Roosevelt was held in Quebec in August of 1943.²¹ Although the Trident conference suggested a provisional date, the Quadrant conference finally secured the will and dedication of resources of both countries to achieve the cross-channel invasion in 1944.²² Also, a realization that “Hitler’s last hope of defeating the Russians had been smashed at Kursk,” also entered the equation.²³ Senior air component commanders would again find themselves caught

¹⁹ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v. IV p. 277.

²⁰ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v. IV p. 277.

²¹ Max Hastings, *Overlord : D-Day and the Battle for Normandy*, 1st Vintage Books ed. (New York: Vintage Books, 2006), 21.

²² Hastings, *Overlord : D-Day and the Battle for Normandy*, 21.

²³ Alexander Werth, *Russia at War: 1941-1945* (New York, NY: Carroll & Graf, 1964), 731.

between the necessary ambiguity of Anglo-American policy, a CCS seeking to secure primacy of the cross-channel invasion²⁴, and uncertain understanding of Germany as a complex system. For these innovative airmen, the desired outcome of the Quadrant conference was two-fold: reaffirm the emphasis on air superiority first and secure commitment for the resources to do it.

In terms of mating air strategy to targeting choices, senior air commanders continued to demonstrate resolve to influence a powerful Combined Chiefs of Staff. Entering into the Quadrant Conference, “Despite the efforts of both Arnold and Harris to retain the original conception of the bombing offensive, the CCS decided bombing should concentrate on defeating the Luftwaffe and disrupting enemy communications by a long term transportation plan.”²⁵ Although the CCS still valued air superiority, they sought to sway apportionment in favor of new target sets as well. In other words, the CCS was focused on placing all available means in direct support of the cross-channel invasion prioritizing unity of command above the economy of force of bombers. The Quadrant conference shows that organization interests and decision-makers perspectives can collide as targeting choices rise to the level of strategy. This effect is exacerbated when the opposing interests exploit ambiguities within the overarching policy.

The essential conceptual change for strategy at Quebec reflects Allied reframing of the environment. At its deepest level, the Combined Bomber Offensive through August 1944 rested upon a belief that bombing could defeat German will or capacity to fight both independently and decisively. The theory of airpower underwriting this strategy no longer seemed to match reality. Charles Webster offers, “This was not due to any great new decisions in the allied camp, but simply the passage of time, which

²⁴ Cline, *Washington Command Post: The Operations Division*, 223.

²⁵ Overy, *The Air War, 1939-1945*, 75.

had permitted a meeting of minds, the execution of preparations and the appointment of commanders.”²⁶ What Webster misses is that time is not causal, but incidental to the interaction of strategies leading to a perceivable change in the environment. In other words, feedback finally matured enough to aid strategist’s understanding that airpower *might* not win alone.

The feedback from bombing experience was slow but effective in aiding reframing and adaptation to the environment. In the *Art of Design* construct, adaptation “involves reframing the situation to align with new information and experiences that challenge existing understanding.”²⁷ At this point in the Combined Bomber Offensive, strategic decision-makers realized that aiding Russia by opening a second front superseded the hopes of independent airpower, and “the war would only end with the engagement and defeat of the German army in the field.”²⁸ The impact of this new understanding was to reprioritize airpower in order to best support a cross-channel invasion.

The increased focus on supporting ground power brought the methods and control of air superiority into the argument at Quebec. First, this change for the methods of air superiority reflected mission priorities. For example, prior to the conference, the efforts of British escort to elude rather than attack the German fighters, demonstrated Bomber Command’s focus on the accomplishing the bombing objectives rather than first gaining air superiority as an essential enabler. Thus, Bomber Command perceived that their “battle with the German fighter force was a battle of wits and not one of bullets or bombs.”²⁹ This was

²⁶ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v.III, pt.5, p.10.

²⁷ Army, "Art of Design, Student Text, Version 2.0," 129.

²⁸ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v.III, pt.5, p.10.

²⁹ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v.II, pt.4, p.26.

not to suggest that air power should not be applied wisely, but there was more to gain in this case by engaging the enemy when conditions were favorable.

Second, the reframing of air superiority was a function of leadership. As fighter capabilities, numbers, and tactics improved through 1943, the emphasis on air superiority would also fall to the fighter pilots. It was Portal who highlighted that “the most important aspect of the air contribution to *OVERLORD* would be air superiority over the beachheads,” leading to the bilateral agreement that a fighter pilot (Air Marshall Sir Trafford Leigh-Mallory) should assume planning responsibility.³⁰ As the long-standing strategic desire for air superiority became a tactical necessity of the POINTBLANK plan, there was little time left for ambiguous priorities and interpretation of overall bombing objectives.

Approach to OVERLORD

The final significant strategic shift prior to *OVERLORD* occurred in mid-February 1944. This time, without a formal conference including political leadership, the CCS directed another significant change in target priorities. This strategic shift continued the trend of steadily increasing emphasis on air superiority, while adjusting to new methods of attacking German industry. Without altering the basic mission of the CBO, the primary objective became “Depletion of German Air Force with primary importance upon German fighter forces by all means available,” with a focus on airframe and component production, ball-bearing production, and installations.³¹ It seemed that the more bombing strategy synchronized to supporting a ground invasion, the more some hopeful airmen grasped at perceived bottleneck targets or bombing for direct

³⁰ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v.III, pt.5, p.15.

³¹ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v. IV, apx 8, p.164.

political effect. Both latter cases forced weakening of focus on air superiority to the potential detriment of overall strategy.

Crossbow

The Crossbow operation illuminates an example of bombing to secure political ends without adequate feedback. Hitler's fantasy that secret weapons could save German victory led him to grant the V1 and V2 "great priority in the belief that as a result of rocket attacks on London there would be 'such a storm of protest and war-weariness that the Government will be overthrown.'"³² Since the V-weapons were instruments of terror, relying less upon accuracy or destruction and more upon instilling public fear, they were a political liability for Churchill. Even if the weapons posed little real threat to London, fear was significant enough to warrant the attention of CBO planners.

The problem with attacking the V-2 rocket sites (dubbed *Crossbow*) was that damaging underground targets required accuracy beyond the capacity of British or American bombers. Even the 12,000lb "earthquake bombs" were ineffective because although they struck within an average of ninety-four yards of their pathfinder markers, the latter tended to be "350 yards from the target."³³ There were simply too many sources of compounding errors to reasonably affect such pinpoint targets. As Davis describes Crossbow, beginning in December 1943, "For the next eight months the bombing of [V weapon] launch sites would consume more and more Allied resources and constitute a major strategic diversion."³⁴

Another side to this strategy is that the overt bombing of V-weapon sites appeased British public outcry even if the bombs themselves were ineffective. If this were the case, then Churchill's perception of the British domestic and German strategic environments was nothing short

³² Overy, *The Air War, 1939-1945*, 81.

³³ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v.II, pt.4, p. 184.

³⁴ Davis, *Bombing the European Axis Powers : A Historical Digest of the Combined Bomber Offensive, 1939-1945*, 203.

of profound. Further, the use of strategic bombing to stabilize popular support bolstered British patience for the American build-up on British soil prior to D-Day. In addition to Davis' claim above, and Webster's conclusion that V-weapon attacks constituted failure in "the high-level radar-directed marking technique of the pathfinder force," the V-weapon attacks may just have been brilliant strategic innovation on the part of Sir Winston Churchill—provided he had either the intuition or feedback mechanisms to do so deliberately.³⁵

Big Week

The final successful adjustment of the CBO involved seizing the advantage of the strategic and external environments. The February shift in CCS target priorities reflected Arnold's long-overdue proclamation for air superiority: "*Destroy the enemy air force wherever you find them, in the air, on the ground, and in the factories* [emphasis in original]."³⁶ This focus upon only "the Combined Bomber Offensive's highest priority objectives," in addition to being coordinating attacks by 8th Air Force, 15th Air Force, and bomber command, set the scene for "Big Week."³⁷ Exploiting good weather at the end of February 1944 did not by itself constitute strategic innovation for the Americans, but the opportunity for intense bombing operations over a short period increased the overall effectiveness of the bombing plan. As the Luftwaffe began to crumble, the CBO finally obtained the capacity to significantly affect the German system.

Before addressing the results and implications of Big Week, it is important to understand why its success was possible. There are three underlying reasons: organizational learning, appropriate assumption of

³⁵ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v.II, pt.4, p. 184.

³⁶ Murray and Air University (U.S.). Airpower Research Institute., *Strategy for Defeat : The Luftwaffe, 1933-1945*, 236.

³⁷ Davis, *Bombing the European Axis Powers : A Historical Digest of the Combined Bomber Offensive, 1939-1945*, 279.

risk, and breaking doctrinal barriers. First, in terms of escort tactics and air superiority doctrine, the American and British air forces proved more adaptive than the Luftwaffe. Craven notes, “by June [1943] the German fighter force, which remained the single serious obstacle to daylight bombing, had revealed most of its repertoire of tricks for which it became notorious later in the year—air-to-air bombing, rocket projectiles, fighter-borne cannon, and the tactics of coordinated attacks.”³⁸ This provided the Americans opportunity to develop defenses through firepower, formations, planning, and escort while building up end strength leading into 1944.³⁹ Big Week operations represent substantial increase in CBO potential. They waited for adequate conditions and the impetus to assume risk.

Secondly, by 1944 CBO commanders had grown accustomed to the risks assumed by their crews, but all organizations have limits. Due to the unprecedented concentration of force during Big Week (also known as Operation *Argument*), “it had been feared, not only by the British Air Staff, but also by the responsible American commanders themselves, that severe casualties would be suffered.”⁴⁰ According to Hansell, “the risks were so great and the conditions were so unfavorable [due to icing] that none of the subordinate commanders was willing to take responsibility for the launch... [until] General Spaatz quietly and firmly issued the order to go.”⁴¹ With *OVERLORD* looming, the opportunity to prove the CBO’s effectiveness hung in the balance--if not directly to dislocate German industry, then at least to enable the cross-channel invasion with air superiority. It was a *now-or-never* chance to take on the Luftwaffe in a high-risk, high-reward scenario, but success also hinged on solving the escort problem.

³⁸ Craven et al., *The Army Air Forces in World War II*, 666.

³⁹ Craven et al., *The Army Air Forces in World War II*, 668.

⁴⁰ Webster and Frankland, *The Strategic Air Offensive against Germany, 1939-1945*, v.III, pt.5, p.131.

⁴¹ Hansell, *The Air Plan That Defeated Hitler*, 181.

Third, the need to strike deep into Germany and directly engage the Luftwaffe pushed ACTS escort doctrine and fighter range past previous limits.⁴² Prior to the CBO, “a board convened especially to discuss the future development of pursuit aircraft... never connected the single engine pursuit aircraft and drop tanks with the bomber protection problem.”⁴³ The key finally came with increases in range and numbers of fighters. According to Williamson Murray, “a crash program had transitioned a significant number of pilots into P-51’s,” bringing 8th Air Force fighter support to “539 P-38J’s, 416 P-47D’s, and 329 P-51B’s.”⁴⁴ It was time to cut the fighters loose. In an act of keen perception and informed decision-making, “Doolittle released his fighters from earlier restrictions that had tied escort fighters close to bomber formations.”⁴⁵

For the CBO, Big Week had two critical outcomes. First, the morale of Bomber crews and confidence in their commanders soared as they “proved that they could fly into the worst the Luftwaffe could muster, as long as they had fighter escort, and they could do so with an overall loss rate of less than 5 percent.”⁴⁶ More importantly, Big Week targets were of such value to Hitler that the Luftwaffe rose to accept the challenge, as “American fighter escorts decimated the Luftwaffe’s fighter force.”⁴⁷ This synergistic effect of both attacking high-valued targets and seizing advantage to defeat the Luftwaffe constitutes the greatest operational success for the CBO in World War II—but it was also more. In spite of

⁴² Biddle, *Rhetoric and Reality in Air Warfare : The Evolution of British and American Ideas About Strategic Bombing, 1914-1945*, 207.

⁴³ Biddle, *Rhetoric and Reality in Air Warfare : The Evolution of British and American Ideas About Strategic Bombing, 1914-1945*, 207.

⁴⁴ Murray and Air University (U.S.). Airpower Research Institute., *Strategy for Defeat : The Luftwaffe, 1933-1945*, 237.

⁴⁵ Murray and Air University (U.S.). Airpower Research Institute., *Strategy for Defeat : The Luftwaffe, 1933-1945*, 237.

⁴⁶ Davis, *Bombing the European Axis Powers : A Historical Digest of the Combined Bomber Offensive, 1939-1945*, 286.

⁴⁷ Murray and Air University (U.S.). Airpower Research Institute., *Strategy for Defeat : The Luftwaffe, 1933-1945*, 237.

increases in German fighter production, Big Week as strategic innovation overcame over a year of mission dilution and secured air superiority for OVERLORD.

Conclusion

The first thirteen months of the CBO demonstrate a series of examples of strategic innovation. While these strategic shifts reflect varying degrees of magnitude and leadership responsibility, all demonstrate interaction of strategies and influence of contextual factors. Alan Millet is right to suggest “The outstanding, most expensive, and last to be mastered lesson of the war in the air was that air superiority was the operational sine qua non.”⁴⁸ However, it became strategically important only because of the way the war unfolded.

The environment changed significantly over these thirteen months. On the one hand, because strategic bombing failed to win decisively and early enough, the importance of air superiority to enable a ground invasion grew more important. On the other hand, air superiority earlier may have enabled more success of the original aims of strategic bombing. More importantly, because Russia turned the tide on the eastern front before the Allies could force German capitulation through airpower, the strategic environment changed. Air superiority grew ever essential in supporting the ground invasion because enduring peace after the war necessitated an American “man on the scene with the gun” in Berlin.⁴⁹

The period spanning Casablanca to Quebec fits clearly into the analytical framework of non-linear strategic innovation. Using elements of this framework to recap innovation during this period shows a progression toward informed environmental perception by CBO

⁴⁸ Allan Reed Millett and Williamson Murray, *Military Effectiveness*, 3 vols., Merishon Center Series on International Security and Foreign Policy (Boston: Unwin Hyman, 1988), 306.

⁴⁹ J. C. Wylie, *Military Strategy : A General Theory of Power Control*, Classics of Sea Power (Annapolis, Md.: Naval Institute Press, 1989), 72.

strategists and decision makers. At the start, Harris' reluctance to move beyond morale bombing indicated a failure on his part to perceive that his strategy failed to incur an advantageous response from Germany. Although he continued to press for technological advancement, his approach of attacking one city per night showed a tendency for a sequential approach to victory rather than a willingness to pursue parallel mechanisms.

The Trident conference indicates other results suggesting non-linear strategic innovation. Trident offered opportunity after Casablanca for improved perception and understanding by military and political actors. For example, since appropriate decision-makers for both the European and Pacific theaters were present, it was possible to discuss interaction of strategies in both theaters. This prevented squandering of European-theater resources to fight Japan before air superiority could be achieved over Germany. Also, Trident provides examples of how a well-positioned maverick can achieve significant strategic change, as did Col Smart. Meanwhile lack of a maverick to argue for fighter resources potentially delayed improvements to escort strategy until after Quebec.

Big Week also revealed additional insights using this framework. For example, feedback processes had matured, aiding decision-makers to perceive rates of change of strategic interaction previously beyond their grasp. Feedback drove the impetus behind the now or never approach to defeating the Luftwaffe as allied strategists now understood the potential for German aircraft production to regenerate. These improvements to feedback had two other implications. First, feedback aided Spaatz as a decision-maker to understand the context well enough to assume high risk in sending Big Week missions. Second, feedback aided Doolittle's understanding of fighter technology improvements and the need to employ escort differently to secure the greatest advantage from Big Week. As a result, big week presented an opportunity for CBO leadership to

manipulate the timing, tempo, and intensity of parallel mechanisms to seize a rapid multi-pronged offensive against German aircraft.



Chapter 4

Committee of Operational Analysts and the Transition to OVERLORD

A deeper level of understanding strategic innovation in the CBO requires evaluating the role of feedback mechanisms. In order to tease out the relationship of feedback to innovation we must take a step back to trace the evolution of assessment during the CBO and analyze how assessment influenced which questions were asked and which answers drove decision-making. This chapter examines the role of the Committee of Operational Analysts (COA) in shaping strategic innovation and its limitations due to organizational biases, process maturity, and coping with information scarcity and analytical shortcomings. Next, COA as a feedback mechanism itself is dissected in two illuminating examples: influence upon bombing for air superiority versus panacea targets; and the efficacy of the rail plan versus the oil plan during OVERLORD. These examples demonstrate not only similar trends of limitations internal to the feedback mechanisms, but other challenges of feedback in supporting innovation during the complex interaction of strategies.

Role of the Committee of Operational Analysis

Perhaps the two most haunting questions that guided CBO leadership were: “*What should we bomb?*” And, as David MacIsaac suggests, “*How effective is bombing?*”¹ The two questions are linked to strategy through their respective emphasis upon targeting and doctrine. The answers to both questions require not merely intelligence and assessment but keen environmental perception and robust feedback.

The inability of senior USAAF leadership to answer conclusively either question reached a breaking point as the targeting assumptions underlying AWPD-42 met skepticism just prior to the Casablanca

¹ MacIsaac, *Strategic Bombing in World War Two : The Story of the United States Strategic Bombing Survey*, 21.

conference.² According to the official history of the Committee of Operations Analysts, “On December 4, 1942, General Gates [then Colonel, as director of Management Control] addressed a memorandum to General Fairchild [then a Major General on the Joint Strategic Survey Committee] pointing out that there was nowhere within the war department [or JCS] a group of analysts and research workers whose duty was to assemble all pertinent data and draw conclusions therefrom.”³ Military insiders, responsible for answering analytical questions, began to recognize that no apparatus was in place to answer these questions, much less assess whether or not leadership was asking the right questions. The COA was not only formed and tasked to prepare a report for Gen Arnold, “the germ of the idea had been planted—there was established... a requirement for a continuing evaluation of the bomber offensive that would encompass both the assumptions underlying it and the results achieved by it.”⁴ For American air strategy, COA would comprise the feedback loop necessary to inform strategic innovation.

Implementing the COA as a consolidated entity served as both a strength and a weakness to strategic innovation. Craven adds, “The creation of the COA was an important step because for the first time the United States made the assimilation of industrial intelligence from all sources and the analysis of that information for the purposes of air target selection clearly the responsibility of a single agency.”⁵ On the one hand, its prominent position would give the COA the credibility it needed to influence strategy. On the other hand, this influence could lead to an

² MacIsaac, *Strategic Bombing in World War Two : The Story of the United States Strategic Bombing Survey*, 24.

³ Guido R. Perera, "History of the Organization and Operations of the Committee of Operations Analysts," (Maxwell AFB, AL: 16 November 1942 - 10 October 1944), 5.

⁴ MacIsaac, *Strategic Bombing in World War Two : The Story of the United States Strategic Bombing Survey*, 26.

⁵ Morgan, *Images of Organization*, 77.

overreliance upon its estimates and the potential to overlook its assumptions.

The importance of the COA is not that it could answer all of the questions or that it even got the answers right—and much of the time it did not. There is as much value to strategists in an uncertain environment from learning what the assessment process cannot do. As uncertainty grows due either to information scarcity or information overload, adaptive processes can break down. Gareth Morgan offers, “The greater the uncertainty, the more difficult it is to program and routinize activity by preplanning a response. Thus, as uncertainty increases, organizations typically find ways of controlling outputs... and by relying on continuous feedback as a means of control.”⁶ When the *activity* in Morgan’s assertion is *formulating strategy*, there is risk in allowing feedback processes too much automaticity in responding to strategic interaction. This tendency became evident during the CBO as target selection (as an output) drove decision-makers’ thought processes, reflecting an over-reliance upon feedback. In other words, the feedback process itself (in this case the COA) is part of the environment that must be sensed by the innovative strategist.

In support of Eighth Air Force operations prior to the Casablanca Conference, assessment processes reflected a desire for mathematical simplification of complex problems. Roger Martin describes this effect as, “Simplification makes us favor linear, unidirectional causal relationships, even if reality is more complex and multidirectional.”⁷ In other words, mathematicians used probability and statistics about bombing accuracy is an attempt to compensate for unknowns about target areas; this included an inherent assumption that all targets were equally susceptible to attack and destruction. Craven notes, “From the

⁶ Morgan, *Images of Organization*, 77.

⁷ Roger Martin, *The Opposable Mind: Winning through Integrative Thinking* (Boston, MA: Harvard Business Press, 2009), 77.

experience of the Eighth in twelve missions against assorted targets it was concluded that 100 bombers dispatched on each successful mission would effect satisfactory destruction on that part of the target area within 1,000 feet of the aiming point... evaluated in terms of the number of circles of 1,000 foot radius in which destructive effect had to be produced.”⁸ This methodology was based exclusively upon a rough probability of damage estimates. There was no means in place by which *satisfactory destruction* could be evaluated against the production capacity of an installation, much less tied back to the overall aims of the war effort. In this sense, a better question to guide COA would be: *How best can we employ to our strategic advantage?*

As a maturing feedback process, the COA was susceptible to bias in favor of positive feedback or negative feedback. Peter Checkland suggests positive feedback “induces instability by reinforcing a modification in performance.”⁹ Positive feedback bias suggests that the committee’s outputs would continue to reinforce ineffective bombing practices in spite of poor or unconfirmed results. Put differently, the COA had a tendency to convince decision-makers that the problem could be a need for more bombing rather than to challenge underlying assumptions. Craven’s research discovered post-flight reports “especially in the early days, reflected a natural desire, from the line combat crew to AAF headquarters, to prove the case for daylight bombing.”¹⁰ If reports provided to analysts are optimistically biased, then the positive feedback cycle is accelerated, and strategic innovation is likely inhibited.

Appropriate impetus for improving environmental perception requires appropriate negative feedback. Checkland offers, “in negative feedback the modification is such as to reduce the difference between actual and

⁸ Craven et al., *The Army Air Forces in World War II*, 354.

⁹ Peter Checkland, *Soft Systems Methodology: A 30-Year Retrospective* (New York, NY: John Wiley & Sons, 2006), 85.

¹⁰ Craven et al., *The Army Air Forces in World War II*, 224.

desired performance.”¹¹ Strategists must evaluate not only the quality of the information provided to and from the feedback mechanism, but also this potential for underlying biases. The case for inflicting paralysis on the German U-boat program, as introduced in the previous chapter, also indicates an example of negative feedback generated by the COA.

The COA recognized that “it would be impossible to paralyze the Axis submarine effort within the next 12 to 18 months by attempting to destroy submarines from the air... whether the attempt is made by attacking the submarines at the building yards, operating bases, at sea, or two or more of these concurrently.”¹² The COA thus attempted to downplay *paralysis* as a defeat mechanism and reshape expectations as to the required timeline and resources required for success. The COA then extended its recommendation, suggesting in lieu of paralysis, “effective *control* may be obtained and maintained by convoy air protection, supplemented by air attacks on submarines in transit and regular air attacks on the operating bases.”¹³ Further, the COA assessment grasped the complexity of a dynamic environment, noting that expectations for control “will vary as submarine and antisubmarine tactics and devices change, and [are] affected by a multitude of other factors.”¹⁴ Clearly, the U-boat campaign was a case where feedback processes supported innovation in terms of shifting some resources back to the primary CBO focus, while other contextual factors may have extended the campaign longer than strategically necessary.

There may be a tendency for analytical groups to insist they have found an answer or to overestimate the viability of the answer they

¹¹ Checkland, *Soft Systems Methodology: A 30-Year Retrospective*, 85.

¹² Perera, "History of the Organization and Operations of the Committee of Operations Analysts," An Appreciation of the Air Effort Against Submarines, p. 9.

¹³ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," An Appreciation of the Air Effort Against Submarines, p. 9.

¹⁴ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," An Appreciation of the Air Effort Against Submarines, p. 9.

found. This is, in part, a coping mechanism for information overload. Groupthink can lead analysts to perceive an answer as the best one due to the challenge of making sense of other information. Irving Janis suggests information overload “contributes to groupthink tendencies, which, in turn, greatly aggravate the detrimental effects of the overload on the mental efficiency of decision-makers.”¹⁵ In other words, the feedback process can respond to information overload by contributing to perception problems for strategists and decision-makers rather than alleviating them. An example would be the COA’s argument for attacking factories because damage to industrial buildings could be verified by a plethora of photographic evidence, even if the machine parts themselves were undamaged.

A tendency for analytical groups to force answers is also due to the specialization of analysts in their respective areas. Roger Martin captures this relationship of specialization as it applies to business productivity: “Functional specialization is especially inimical to integrative thinking because it undermines productive architecture—the keeping in mind of the whole while working on the individual parts.” Similarly, such analyses pose problems for a non-linear perception of war because the analysis of the parts may not reveal the dynamic nature in strategy of the whole. Beyerchen highlights this complexity in Clausewitz’ writing: “But in war, as in life generally, all parts of the whole are interconnected and thus the effects produced, however small their cause, must influence all subsequent military operations.”¹⁶

Bombing for Air Superiority

By the end of the war, even senior ground commanders reflected favorably upon the importance of the strategic bombing contribution to air superiority, as if they had favored it all along. For example, General

¹⁵ Irving Janis, *Groupthink: Psychological Studies of Policy Decisions and Fiascoes* (Dallas, TX: Houghton Mifflin, 1982), 196.

¹⁶ Beyerchen, “Clausewitz, Nonlinearity, and the Unpredictability of War,” 82.

Omar Bradley, whose own frustrated experience with heavy bombers included the fratricide of more than 100 U.S. troops at St. Lo, saw the value in Eaker's plan by war's end.¹⁷ In Bradley's assignment to support the Strategic Bombing Survey, he concluded:

The achievement of air supremacy was a necessary precondition of successful invasion. Defensively, the German air force had to be prevented from attacking Allied ports, marshalling areas, shipping, depots, beachheads, and movement...Offensively, dominance of the air was required to bring the full weight of Allied air power against the enemy as he attempted to defend the beachhead and, later, to prevent the uncoiling of Allied land power; the manifold ways in which Allied air power defended ground forces against the enemy and paved the way for ground victory forms the central theme of this report. This victory over the Luftwaffe was achieved. It was compounded of many ingredients, including (a) strategic attacks against fighter aircraft production; (b) tactical attacks against airfields and depots; (c) tactical superiority in air operations and combat; and (d) the destruction by strategic air attack of German aviation gasoline output. It is not yet possible to assign weights to these factors, measuring the responsibility of each for the destruction of enemy air power. It is sufficient now to note that in point of time the campaign against the Luftwaffe was begun by strategic bombardment.¹⁸

This excerpt reveals Bradley's acceptance that airpower contributed materially to allied success given the complexity of strategic interaction. Thus, the reaction of German strategy to the threat of allied air power placed the Luftwaffe at greater risk, and translated to increased effectiveness and survivability of Allied land power. Bradley's observation also recognizes air superiority was not won by strategic bombing, tactical attacks, or fighter sweeps alone, but by a combined effort of all three. The outcome of this multi-faceted approach to air

¹⁷ Davis, *Bombing the European Axis Powers : A Historical Digest of the Combined Bomber Offensive, 1939-1945*, 389.

¹⁸ Omar Bradley, *Effect of Air Power on Military Operations, Western Europe* (12th Army Group, 1945), 2-3.

superiority exemplifies the non-linear components and holistic nature of strategy; the outcome of the CBO achieved a goal much more successful than the direct effects of all of the individual bombing efforts combined. The question is to what extent could or did feedback processes contribute to the successful accomplishment of air superiority.

Although strategic innovation is a complex process, rarely attributable to one person or causal factor, evidence suggests that COA played a key role in shaping the eventual focus on air superiority. The COA demonstrated its influence suggesting three fundamental alterations to the bombing program in preparation for OVERLORD. First of all, the COA relayed to decision-makers a coherent analysis of German reactions down to the tactical level. A report prepared in preparation for OVERLORD suggested, "The defensive tactics of the German Air Force and the production facilities behind it are constantly changing. Tactical changes may require the inclusion of certain classes of targets within the aircraft industry which were previously considered of secondary importance; production changes within the industry will necessitate frequent shifts in the priority of individual installations."¹⁹ In this sense, COA primed decision makers not to settle into standard targeting options but to stay attuned to German efforts to disperse and redeem aircraft production.

Secondly, by the end of the war, the COA adeptly analyzed and prioritized German aircraft industry targets. The committee recommended target priorities factored in the time required to take effect, beginning with front-line fighter strength, to longer production delays. Ironically, in at least one instance early in the CBO, a COA report implicated priorities when no such analysis occurred. As Perera claims: "These [industrial] target systems, although not rated formally in order of

¹⁹ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," Suggested Bombardment Program in Preparation for Overlord, p. 2.

priority were nevertheless inserted in the report in that order.”²⁰ War planners trusted COA analysis without verifying the intent of the data, which served to increase the COA influence since these priorities were never formally questioned.

Nevertheless, the COA’s evaluation of how to earn air superiority through peeling back the German aircraft industry proved vital. Prioritizing, the COA recommended “the relative value of attack upon various classifications of targets” working from immediate to long-term effects on enemy fighters: final assembly, major component manufacture, integrated assembly and manufacture, engine assembly, and repair facilities.²¹ It may have been the exigencies of a forthcoming land invasion that drove the COA to push for immediate results. However, at no earlier point in the CBO did strategists successfully argue for a maximum effort against aircraft by order of their production sequence.

In the same vein, COA’s third essential contribution to an air-superiority strategy was what they argued strategic bombing should stop doing—everything else. Guido Perera closed his OVERLORD recommendation with: “concentration of attack upon a very few industrial segments offers the greatest chance of serious damage. Therefore it seems necessary to exclude several target systems... because of the great possibility that attack upon these systems would produce no effective aid to OVERLORD within the time specified for that operation. Target systems thus excluded are: Submarine building yards, submarine bases, petroleum, synthetic rubber and tires, military transport vehicles.” The Allies won Air superiority by consolidating efforts against the Luftwaffe and stopped frittering away resources on secondary missions. The COA’s advice was largely incorporated except with regard to the

²⁰ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," 44.

²¹ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," Suggested Bombardment Program in Preparation for Overlord, p. 2.

elimination of petroleum targets, which was wisely superseded by the Oil plan.

Complexity of Assessing Industrial Paralysis

The COA did not always possess reliable information about the interactive effects of allied targeting on the enemy strategy. For example, Rosen argues, “poor wartime data also played a pivotal role in choosing and then assessing the damage done to ... the ball-bearing factories.”²² The problem with attempting to isolate and eliminate a single industrial component is that it assumes a static and linear nature of the enemy system. In Bomber Harris’ words, efforts to isolate industrial “bottlenecks” such as ball-bearings or petroleum targets constituted “panacea mongering.”²³ In this sense, the *panacea* is the notion that a complex enemy system will collapse upon the destruction of a single node.

Even in the aftermath of war, such bottlenecks are difficult to prove. As for the case of the COA’s ball-bearing plant recommendation, Craven argues “Subsequent intelligence indicates that the committee somewhat overestimated the vulnerability of ball-bearing plants and underestimated the feasibility of effecting economies in the use of bearings, possibly also of stocking them.”²⁴ Perhaps the economies could be affected if the enemy took no steps to mitigate the losses. However, enemy strategy is adaptive. The USSBS concluded with another perspective: “German equipment was redesigned to substitute other types of bearings wherever possible...[and] there is no evidence that the attacks on the ball-bearing industry had any measurable effect on essential war production.”²⁵ The case of ball-bearings shows that not all

²² Rosen, *Winning the Next War : Innovation and the Modern Military*, 162.

²³ Biddle, *Rhetoric and Reality in Air Warfare : The Evolution of British and American Ideas About Strategic Bombing, 1914-1945*, 199.

²⁴ Craven et al., *The Army Air Forces in World War II*, 358.

²⁵ Franklin D'Olier, *The United States Strategic Bombing Survey: Summary Report (European War) (Pacific War)* (Maxwell AFB, AL: Air University Press, 1945), 15.

changes in strategy constitute sound innovation, and innovation depends on incorporating a complex sense of the enemy environment and the interaction of strategies.

The Rail plan versus the Oil Plan

Harris was right about the limited utility of attacking ball-bearings, and his similar sense about attacking petroleum warrants deeper analysis. As the buildup to OVERLORD reached crescendo by March 1944, so did the voices of dissent over how best to apply air power. The two front-running options were the rail plan and the oil plan. The rail plan, principally supported by Sir Arthur Tedder (as Eisenhower's Deputy) and the various ground commanders, involved "creat[ing] a 'railway desert' that would prevent the enemy from moving his reserves into the assault area and generally from shifting troops and supplies behind his own lines."²⁶ The plan digressed from the established framework of strategic bombing and used heavy bombers to interdict the enemy. This mindset reflected COSSAC's (Lt Gen Frederick Morgan) fears that the greatest risk to the OVERLORD operation was "Our ability to drive off the German reserves rather than the initial breaking of the coastal crust," and concern for disrupting "the inevitable German counter-attack."²⁷ Senior American airmen, however, thought this was not an *efficient* use of strategic bombers.

At the core of the argument is whether it is best to apply a weapon toward a coherent end by a method for which it is ill-suited, or to apply the weapon toward an end tangential to overall war aims by a method for which it is best suited. Historian Max Hastings reports a consensus between Spaatz and Gen Hoyt Vandenburg that "It is of paramount importance the Combined Bomber Offensive continue without interruption and the proposed dispersion of the 8th air force to support of

²⁶ MacIsaac, *Strategic Bombing in World War Two : The Story of the United States Strategic Bombing Survey*, 18.

²⁷ Hastings, *Overlord : D-Day and the Battle for Normandy*, 27.

OVERLORD is highly dangerous.”²⁸ Hastings concludes, “senior air force officers... could not grasp that this was the decisive operation of the war in the west, to which every other ambition must be subordinate.”²⁹ The problem with this critique of airmen as organizationally biased, blinded by their own doctrine, and insubordinate, is that it misunderstands Spaatz’ perception of economy of force.

J.F.C Fuller offered, “To understand what the physical progress of war means, we must apply economy of force to hitting power, to protective power, and to movement... To progress is to economize; to retrogress is to squander; to stand still is to rot.”³⁰ Applying Fuller’s concept does not imply that airpower would be ineffective at supporting the ground offensive; it means that employing bombers to a method with expectations beyond their reasonable accuracy was to squander force. Feedback suggested bomber attacks on marshaling yards and railroad hop facilities were ineffective.³¹ In the final analysis, “The attacks on German railroads from October to December 1944 failed to produce significant military effects, as is evident by the success of the German Reichsbahn in transporting by rail 22 divisions and three brigades to the starting lines for the ARDENNES offensive in a period of one and one-half months.”³² The bombers were better suited to destroying petroleum reserves than railways. The question is to what extent would continued attacks on petroleum aid the land invasion, especially since the COA recommended against it?

The Oil plan, heralded by Spaatz, sought to “assure air superiority [over] the German Air Force... by attacking its fuel supply especially the

²⁸ Hastings, *Overlord : D-Day and the Battle for Normandy*, 41-42.

²⁹ Hastings, *Overlord : D-Day and the Battle for Normandy*, 42.

³⁰ JFC Fuller, *Foundations of the Science of War*, p.206-207

³¹ Hansell, *The Air Plan That Defeated Hitler*, 189.

³² Bradley, *Effect of Air Power on Military Operations, Western Europe*, 14.

synthetic oil refineries.”³³ Spaatz’ argument was that reducing petroleum stocks would lead to a reduced capacity for the Luftwaffe. The USSBS concluded the opposite causal relationship: “With the reduction of German air power, oil became the priority target in the German economy.”³⁴ Both are true; the two missions were mutually reinforcing. Degrading the air defenses of petroleum targets enabled larger scale attacks, culminating in “consumption of oil exceed[ing] production from May 1944 on.”³⁵ Further, “By destroying Germany’s fuel sources, the allies would eliminate Germany’s ability to train the replacement pilots that spiraling attrition rates demanded.”³⁶ The relationship between the Luftwaffe and German petroleum simply did not reach adequate focus until D-Day became imminent.

COA’s Analytical Challenges

Use of the COA revealed the tendency for decision-makers to choose options best supportable by analysis. In other words, targets they could analyze were preferred over targets with insufficient data. This tendency is most pronounced when planners seek directly verifiable effects. Strategists may begin to rely upon analysis rather than intuition and shy away from bombing methods incurring indirect or less visually identifiable effects. For example, Eisenhower’s initial selection of the rail plan over the oil plan reflected that “most of the invasion planners could visualize and calculate satisfactorily to themselves the effects, and particularly their presumed immediacy, of the railway attacks, it was not

³³ MacIsaac, *Strategic Bombing in World War Two : The Story of the United States Strategic Bombing Survey*, 19.

³⁴ D'Olier, *The United States Strategic Bombing Survey: Summary Report (European War) (Pacific War)*, 20.

³⁵ MacIsaac, *Strategic Bombing in World War Two : The Story of the United States Strategic Bombing Survey*, 19.

³⁶ Murray and Air University (U.S.). Airpower Research Institute., *Strategy for Defeat : The Luftwaffe, 1933-1945*, 266.

so easy to visualize the results of the oil attacks.”³⁷ This suggests a case where decision-makers must evaluate the reasons behind the strength of the stronger argument and ensure that the weaker argument is not discounted based on availability of evidence rather than the merits of its logic. Formalized analysis is not a substitute for a strategist’s nuanced perception of the enemy.

Another example of this tendency to choose targets supportable by evidence is the conspicuous failure of the COA to recommend attacks upon electrical power. Although evidence provided to the COA about the vulnerability of electrical plants or redundancy of power generation German industry was suspect, their oversight was nevertheless significant. Craven argues, “the failure of the Allies to attack German electric power and the failure of the COA to recommend it both stem from a lack not of prescience but of adequate information regarding the situation as it currently prevailed.”³⁸ Historians such as Craven and Cate or the composers of the USSBS are quick to forgive agencies that needed better information in hindsight. However, the lesson for strategy is less magnanimous: decision-makers must be relentless in their pursuit of accurate data and emergent patterns rather than assume away that which is difficult to determine.

COAs Roots with the Oil Problem

If targeting petroleum and aircraft sustainability proved the best air strategy, why did the COA not recommend it earlier? The fact that the COA predated the Casablanca Conference by only 3 months had a significant impact on the duration of the war. Guido Perera, second ranking member of the COA, admitted that a comprehensive study on axis oil was desired for consideration by Roosevelt, Churchill, and their staffs prior to Casablanca, but “the scope of the problem was such that it

³⁷ MacIsaac, *Strategic Bombing in World War Two : The Story of the United States Strategic Bombing Survey*, 19.

³⁸ Craven et al., *The Army Air Forces in World War II*, 362.

was impossible to complete a report in time for submission.”³⁹ The COA simply didn’t have the resources or the traction to influence decision-makers early enough in the war.

Further, the COA could operate only with the information they had available, relying extensively upon outside estimates. The need to prioritize outside information only compounded the problem. Perera adds, “Although stock estimates of all petroleum products submitted to the committee varied between two months’ and six months’ requirements at the then rates of consumption, it was concluded that the Axis position, particularly as regarded by aviation gasoline, was closely balanced and might become critical.”⁴⁰ Unfortunately, it seems this information was lost in priority among the recommendations of the other various subcommittees. Even if the winning plan was at the fingertips of the analysts, they are not strategists; the core of strategic innovation is the ability to couple the analysis to a nuanced understanding of strategic interaction and assign priorities. This was beyond the capacity for the COA as a fledgling organization.

This understanding of the COA’s limitations adds another layer of depth to the conflict between Tedder’s rail plan and Spaatz’ oil plan. Spaatz sought support from the JCS, despite the fact that Eisenhower now commanded the CBO, because Spaatz felt he “could not guarantee to General Eisenhower that the effects of the attack [on oil] would be decisive prior to the date fixed for OVERLORD.”⁴¹ Of course, this information derived from the COA. Eisenhower’s eventual acceptance of oil attacks were pivotal to OVERLORD success, demonstrating “that the use of 100-pound bombs upon the refinery areas of synthetic oil plants

³⁹ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," 15.

⁴⁰ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," 16.

⁴¹ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," 104.

could achieve results far greater than had been thought.”⁴² A significant oversight of the feedback process was a failure to inform air strategists of the ease with which bombing improvements could yield results on refineries.

The COA played an essential role in directing targeting priorities away from synthetic oil even earlier in the war. Eaker was misled by a preliminary COA estimate in 1943 that synthetic oil processing columns “would require almost direct hits,” and discussion of other potential vulnerabilities was inconclusive.⁴³ Further, such analytical limitations impeded decision-makers’ (such as Eaker’s) comprehension of how the allied bombing strategy might interact with the Germans’ ability to sustain the Luftwaffe. For example, “Allied intelligence having tended during 1941-42 to overestimate German aircraft production, in 1943 was inclined increasingly to underrate the recuperative powers of that industry.”⁴⁴ The lesson here is that although the defeat of the Luftwaffe remained a high priority throughout the CBO, the *way* allied bombing could achieve this objective changed as opposing strategies met. By the end of the war, aircraft produced mattered less since the Germans lacked the petroleum resources to fly them anyway.

Conclusion

As strategies interact in war, innovation relies upon analysis and feedback in order for decision-makers to perceive change. As the CBO developed, so did the maturity of formalized feedback processes. However, examination of the COA suggests that it is subject to contextual factors as well as limitations with information handling, process maturity, and groupthink. It became as important for strategists

⁴² Perera, "History of the Organization and Operations of the Committee of Operations Analysts," 105.

⁴³ Perera, "History of the Organization and Operations of the Committee of Operations Analysts," Western Axis Oil Industry As Bombardment Target; para 10.

⁴⁴ Craven et al., *The Army Air Forces in World War II*, 708.

and decision-makers to learn how to use the COA as it was for the COA to begin to understand its own limitations.

In terms of the non-linear strategic innovation framework proposed in this thesis, the COA struggled throughout the war to grasp the ongoing interaction of strategy with the environment. Despite the COA's broad range of specialized experts, it failed to correlate indirect results achieved by attacking recommended target sets. Interestingly, Rosen praised the COA's ingenuity for comparing "the total production capacity of a given industry to the minimum enemy requirements for that commodity to determine surplus industrial capacity," then going on to estimate how long it would take to affect that industry.⁴⁵ However, Germany was a complex adaptive system, and these predictions assumed a static opponent. Steven Rinaldi offers, "Backup systems, workarounds, repairs, tactical, and strategic substitution, and human ingenuity provide the [enemy] with flexibility and adaptability in the face of disasters."⁴⁶ Only as the COA increased resources and gathered influence with a mandate to show short-term results toward a specific objective (air superiority) did complexity emerge from its linear recommendations.

As Gen Bradley acknowledged, the COA clearly supported parallel victory mechanisms by the approach to OVERLORD. The COA aided strategists by concentrating on various related aspects of the German aircraft industry, including petroleum, while demonstrating the confidence to eliminate other long-standing target sets. The key challenge for a feedback process in supporting parallel victory mechanisms is to identify both correlations between direct and indirect effects and patterns in resultant enemy strategy. The COA may not have

⁴⁵ Rosen, *Winning the Next War : Innovation and the Modern Military*, 162.

⁴⁶ Alberts et al., *Complexity, Global Politics, and National Security*, 292.

achieved this capability by the end of the war, but its recommendations showed that both were learning and evolution in the right direction.

In terms of encouraging organizational acceptance of complexity and uncertainty, the COA was arguably no more successful than decision-makers and strategists throughout the war. Analysts' tendency to rely upon probability, statistics, and photographic evidence reached limitations in damage assessment, much less perceptions of emerging patterns of enemy behavior. On the positive side, increased credibility and reliance upon the COA toward the end of the war encouraged the feedback process to move beyond automatic outputs and oversimplification.

The most significant restriction to feedback-process adaptability was that communication with decision-makers seemed to flow only in one direction at a time. That is, the COA gathered information and sought to answer questions asked by decision-makers. Strategists were left to interpret and recommend changes. Increasing levels of interaction among analysts, strategists, and decision-makers enhances strategic innovation because more learning occurs by all three entities. Analysts better understand which information they need and how to rate its importance; strategists better perceive the environment and strategic interaction; and decision-makers better learn which questions to ask. This process only began to streamline by the spring of 1944, and the strategy to defeat Germany emerged as a non-linear process of strategic innovation.

Chapter 5

Conclusions and Implications for Strategic Innovation

This thesis began by asking whether the military has the appropriate mechanisms for strategic innovation in a long war, and further, if these mechanisms exist, under what contexts are they constrained or enhanced? The methodology was to reexamine innovation through a lens of complexity theory and to evaluate where foundational theories of innovation were assimilated into a broader perspective of long-war strategic innovation. Rather than to capture and nail down clear cause-and-effect relationships between actors and strategic outcomes, the evidence of this thesis demonstrates that *the process of strategic innovation is a non-linear system*.

A review of the principal conclusions from the preceding three-part case study of the CBO validates mechanisms available to the military to affect strategic innovation and link to the elements of the non-linear strategic innovation analytical framework as proposed:

1. Ensure strategists, decision-makers, and feedback mechanisms grasp the ongoing interaction of strategy with the environment.
2. Employ victory mechanisms in parallel.
3. Entreat continuous dialogue with key political actors.
4. Encourage organizational acceptance of complexity and uncertainty.
5. Appreciate the dynamic relationship of technology to strategy.
6. Employ adaptive feedback processes.

Observations based upon the above framework fall into three categories: influence of traditional contextual factors, the role time on interaction, and the evolving maturity of assessment apparatus. Organizational behavior and civil-military relations influence strategic innovation dependent upon broader considerations. The CBO case revealed that while organizations often exhibit biases and resistance to change, organizational interests do not consistently impede or support strategic innovation. Whereas the USAAF inhibited innovation by

suppressing the need to accelerate fighter production, the RAF fostered innovation through shirking U-boat base attacks. Perhaps the more important implication is that the explanatory utility of an organizational lens can be limited because organizations exhibit patterns of behavior based upon malleable interests rather than fixed tendencies.¹ In this construct, organizational behavior must fit into the context of interests. Organizational interests can trump a tendency for stagnant strategy if feedback processes or mavericks successfully steer organizational decision-makers toward accepting broader goals.

The relationship of politicians to senior military decision-makers in the CBO contributed an intricate dynamic. With the exception, perhaps, of Eisenhower's ascendancy to a stratus above normal military authority in 1944, the political sphere enshrouded military objectives. However, whereas Posen may suggest Roosevelt drove innovation at Casablanca, events did not transpire as clearly. In fact, Churchill and Roosevelt contributed by remaining amenable to strategic innovation while neither directly drove the process. The politicians were essential to strategic innovation because they helped determine and shape the environment, established purposeful constraints and restraints, and maintained longer views toward postwar advantage rather than decisive victory. However, it is misleading to identify civilians as proximate causes in a non-linear framework, because innovation does not successfully emerge *but for* the presence of other elements of the non-linear strategic innovation framework.²

¹ Patrick Porter, *Military Orientalism : Eastern War through Western Eyes*, Critical War Studies Series (New York: Columbia University Press, 2009), 18. Porter's argument relates to cultural realism as a way of explaining a variety of strategic factors, although a similar argument applies here to the utility of organizational behavior.

² Proximate cause and the but-for test are commonly applied terms for describing causality in tort law. For a description of conventional usage, see: David W. Robertson, "Causation in the Restatement (Third) of Torts: Three Arguable Mistakes," *Wake Forest Law Review* 44 (Winter, 2009): 1008-9.

The latent lesson is that senior military officers *engaged the political process* by requesting and participating in discourse with their political masters. This discourse contributes to a mutual reaffirmation of ways and means. This is not to suggest that military leaders hold politicians accountable, but that through discourse, politicians held themselves accountable to their own thought processes. Some aspects of policy can be left—by design—to interpretation at lower levels of command. This is especially true when the effort to commit to details at the political level might undercut the very aims of the policy itself. Political discourse is a vital mechanism through which military decision-makers induce strategic innovation. This observation suggests that neither Posen, nor Rosen, nor Côté were incorrect; but the most correct description of innovation is a combination civilian influence (not necessarily intervention), military perception of the security environment, measures of merit, and even service politics. None of these factors are independently sufficient for strategic innovation, but all of them inform how strategists, decision-makers, and feedback processes frame their environment and understand strategic interaction.

Activity stimulates interaction. Allan Stam offers, “time affects the interaction of military strategies, rendering once innovative strategies ineffective.”³ There are also deeper implications for increased interaction in a short period of time. As tempo increases, complex outcomes can occur. Opportunities for increased tempo may lead to strategic results unachievable at slower tempos over longer periods of time. For example, parallel attacks may force parts of an enemy system below an unrecoverable threshold with too little opportunity to adjust strategy. Increased tempo also presents improved opportunity for strategists to recognize the efficacy of applied strategy as interaction helps them

³ Allan C. Stam, *Win, Lose, or Draw : Domestic Politics and the Crucible of War* (Ann Arbor: University of Michigan Press, 1996), 71.

understand their environment. This effect became evident during Big Week, as more sorties were launched against more targets in a short period of time. The denial victory mechanism for the CBO remained the same, but more facets of CBO air strategy came to bear against German defenses leading to a much higher degree of air superiority otherwise attainable.

As the tempo of war accelerates, it becomes more difficult for both sides to alter their course significantly; but this does not mean that assumptions should remain unchallenged. Doolittle's decoupling of escort fighters from bombers at the right time exploited tactical advantage to enhance the strategic outcome. The lesson for strategic innovation is deeper than challenging assumptions and exploiting tactical opportunities. Opportunity for increased tempo is a mechanism by which military strategists can exploit strategic innovation, provided they understand the implications of increasing interaction.

Another aspect of time influences perception and feedback yet seems paradoxical to increased tempo: patience. In order for strategists to maximize influence of strategic innovation, they must strike a delicate balance between allowing strategic interaction to develop without missing opportunity. This is a challenge because American society can be inimical toward patience at a strategic level given a culture expectant of unambiguous results. Colin Gray finds, "American society confronts problems or condition in the engineering spirit of the resolute problem-solver...[as] American policy makers seek near-term results."⁴ The lesson for the strategist is that time can be part of the environment. When time compression is possible, or near-term results are expected (such as an impending ground invasion), there may be advantages. However, advantage may also lurk in allowing conditions to develop while a better understanding of the environment emerges.

⁴ Colin S. Gray, *Explorations in Strategy* (Westport, CT: Praeger, 1998), 91.

The next lesson for strategic innovation is that Combatant Commanders must evaluate the assessment apparatus early and often. During long wars, preexisting feedback processes are unlikely to evolve or contribute effectively to innovation without adapting as war unfolds. Both formal and informal feedback must be seen not only as part of a larger strategy cycle, but as an integral cognitive part of perceiving environmental change. Another way of viewing this concept is that capturing and analyzing the right info relates to asking the right questions as an iterative process. In this sense, assessment is a tool not only for evaluating the enemy system but also for self-assessment. The Committee of Operational Analysts began as an analysis function, evolved into an assessment function, but never reached a level of interaction with decision-makers to reinforce mutual perception. As the CBO revealed, feedback is a mechanism for triggering strategic innovation, and decision-makers must not hesitate from encouraging feedback processes to evolve with continuous discourse.

Maturity and responsiveness of the assessment apparatus profoundly relates to strategic innovation as a complex process. The more difficult it is for decision-makers (as actors) to understand friendly and enemy strategies as systems, the greater the challenges for the feedback process. Jervis concludes, "If systems are troublesome, for actors, they also pose methodological problems for analysts by complicating the concepts of power and causation, confounding standard tests of many propositions, and undermining yardsticks or indicators of the success of policies."⁵ The key to this lesson is that both the decision-maker and the feedback apparatus must have a *shared and reasonably accurate perception of the environment*. Otherwise, analysts will not choose useful measures of merit, or even if they do, decision-makers may reject them for answering the wrong questions.

⁵ Jervis, *System Effects : Complexity in Political and Social Life*.

Rosen may be right that the COA itself was an important wartime innovation, but his idea that “it was more important to have reliable wartime data than a sophisticated measure of effectiveness,” is inconsistent with this complex view of strategic innovation.⁶ Rosen’s reliance upon actionable data and measures of effectiveness suit his paradigm. Admittedly, both are useful and reinforcing tools to aid strategists in their perception of strategic interaction during war. However, whereas Rosen finds them causal in a chain of innovation, this thesis shows that, although feedback processes may often be necessary, they are not sufficient for complex strategic innovation.

Analysis and assessment may facilitate understanding and suggest options, but they are not substitutes for perception. A strategist cannot assume away that which is difficult to determine without assuming considerable risk. This is not only about the risk of failing to achieve war objectives, but also of potentially failing to secure the best long-term advantage.⁷ Changes in a decision-maker’s mindset toward embracing complexity rather than assuming it away can yield greater dividends as long wars unfold.

The final answer to the central question of this thesis is that a combination of civilians and military decision-makers, strategists, and feedback processes provide mechanisms for strategic innovation. However, none of them *cause* innovation; they are essential participants. Their relationships to each other, to their environment, to friendly, enemy, and third-party strategies underwrite their perceptions. In the final analysis, because strategic innovation is complex process, the foremost challenge is not to reduce and simplify innovation but to embrace the complexity of strategy. Only then can we establish the

⁶ Rosen, *Winning the Next War : Innovation and the Modern Military*, 164.

⁷ Dolman, *Pure Strategy : Power and Principle in the Space and Information Age*, 6.

conditions for strategic innovation and enable emergence of successful strategy.



Implications for the Modern Character of War

The information environment is changing the character of war with implications for strategic innovation. As warfare through the cyberspace domain matures, faster rates of information flow increase the tempo of interaction among systems. Yet the role of decision-makers, strategists, and feedback mechanisms in shaping strategic innovation remains unchanged. Thus, as the COA struggled to evolve to meet the needs of Anglo-American strategy-makers, modern feedback processes are also apt to fall behind. Feedback processes must continue to expose enemy strategy, test its resolve and weaknesses, and assess changes in behavior that support better-informed innovation by strategists.

Implications for assessment maturation are twofold: self-improving feedback and reshaping expectations for non-linearity. Current feedback mechanisms are often labor-intensive, unresponsive to local conditions, and generally channeled one-way—up the chain. Worse, they often fail to evaluate whether leadership is asking the right questions by leaving assumptions unquestioned. This new character of war enabled by the cyberspace domain enables bootstrapping of feedback mechanisms. As Doug Engelbart's programmers "would use the augmentation system to build the augmentation system," output of feedback mechanisms should reshape feedback mechanisms.⁸ For example, assessment practices could use computational power to search for correlations between multitudes of variables such as enemy behaviors, resource production, and friendly action without a priori expectations. Emerging correlations would drive attention toward adding additional relevant variables.

Another implication for feedback processes in the new character of war is the myth of predictable effects. Libicki posits, "If one cannot predict the effects of information warfare on the adversary, one cannot

⁸ Adam Brate, *Technomanifestos: Visions from the Information Revolutionaries* (New York, NY: Texere, 2002), 128.

begin to trade it off for or synchronize it with other forms of warfare.”⁹ This idea is rooted in the same expectations that strategic bombing could decisively choke bottlenecks. Libicki likewise goes too far in bridging linear mentality to a non-linear environment.

Through intelligence, war gaming, and testing, we can only hope to manage expectations. Expectation management includes not only isolating as many factors as possible, but also preparing decision-makers for unintended outcomes—and that unintended outcomes may present additional opportunities. As warfare extends into cyberspace, it is important to consider that cascading effects can exceed the impact of the initial attack. The National Research Council claims, “the indirect effects of weapons for cyberattack are almost always more consequential than the direct effects of the attack.”¹⁰ Evolving feedback processes cannot eliminate uncertainty or guarantee second or third-order effects, but improvements to feedback processes can inform risk and mitigate unforeseen circumstances, while contributing to decision-makers’ perceptions of a dynamic environment.

Lastly, the DoD feedback apparatus requires complete overhaul from squad leaders through the Joint Force Commanders. A fresh approach to using cyberspace for enhanced user-level input, analysis, and receipt across services, ranks, and weapons systems need not be a long-term goal. Similarly, real-time collaboration need not stop within military channels. As Libicki notes, “In the information era, DoD needs to tap into smart people, many of whom do not work for the DoD directly.”¹¹ Only then will decision-makers stop pulling for data to

⁹ Martin C. Libicki and Rand Corporation, *Conquest in Cyberspace: National Security and Information Warfare* (New York, NY: Cambridge University Press, 2007), 99.

¹⁰ William A. Owens, Kenneth W. Dam, and Herbert Lin, *Technology, Policy, Law, and Ethics Regarding U.S. Acquisition and Use of Cyberattack Capabilities* (Washington, DC: National Academies Press, 2009), 18.

¹¹ Libicki and Rand Corporation, *Conquest in Cyberspace: National Security and Information Warfare*, 69.

support their plan, and start participating in collective knowledge sharing to aid their intuition. This is the future of strategic innovation. Because strategy is complex, continuous, and interactive, feedback is of paramount importance to its continual emergence.



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