

# Maneuver from the Air Domain

A Monograph

by

Maj Keith M. Anderson  
United States Air Force



School of Advanced Military Studies  
United States Army Command and General Staff College  
Fort Leavenworth, Kansas

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Name of Candidate: Maj Keith M. Anderson

Monograph Title: Maneuver from the Air Domain

Approved by:

\_\_\_\_\_, Monograph Director  
G. Scott Gorman, PhD

\_\_\_\_\_, Seminar Leader  
Walter H. Schulte, COL, AR

\_\_\_\_\_, Director, School of Advanced Military Studies  
Henry A. Arnold III, COL, IN

Accepted this 26th day of May 2016 by:

\_\_\_\_\_, Director, Graduate Degree Programs  
Robert F. Baumann, PhD

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## **Abstract**

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US Air Force doctrine stresses the maneuverability of air power, but gives little guidance on what it actually means to maneuver. Doctrinally, maneuver is the combination of movement and fires, but for the Air Force the emphasis has shifted to movement to merely deliver fires. This is evident in that doctrine regards the maneuver potential of air power as simply engagement at any time, anywhere. This study proposes that air forces do more than deliver fires; that there is a latent form of maneuver warfare in the air domain, not laid out in doctrine and therefore not understood by airmen. To foster understanding, is to answer a fundamental question – what is maneuver from the air domain? The methodology applies the characteristics of air power to the physical and cognitive maneuver mechanisms developed in the 1980s as part of broader maneuver warfare theory. The result is a proposed definition of maneuver from the air as employment of air power to dislocate, disrupt or overload an enemy, ultimately providing freedom of movement to friendly forces. Ultimately, air power employment and results from two case studies - Operation Rolling Thunder and Operation Iraqi Freedom - support that the proposed definition is a useful way to define maneuver from the air domain.

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## Acronyms

AFCENT	Air Forces Central Command
AOD	Air Operations Directive
CENTCOM	Central Command
CIA	Central Intelligence Agency
FM	Field Manual
GPS	Global Positioning System
ISR	Intelligence, Surveillance, and Reconnaissance
JAOP	Joint Air Operations Plan
JFACC	Joint Force Air Component Commander
JSTARS	Joint Surveillance Target Acquisition Radar System
MEF	Marine Expeditionary Force
MEZ	Missile Engagement Zone
OODA	Observe-Orient-Decide-Act
OPLAN	Operations Plan
SAM	Surface-to-Air Missile
SEAD	Suppression of Enemy Air Defenses

## Introduction

The US military and the US Air Force in particular, operates some of the most advanced and capable aircraft in the world. These aircraft are able to perform relatively amazing feats; they can strike targets anywhere on the globe, fly several times the speed of sound, and evade sophisticated enemy defenses, just to name a few. With this level of “movement potential,” it would seem that air power and the idea of maneuver should go hand-in-hand. Maneuver itself is a relatively simple concept, defined in Joint Publication 1-02 as “employment of forces...through movement in combination with fires to achieve a position of advantage with respect to the enemy.”<sup>1</sup> By this account, air power seems even better suited to the task, as current platforms can deliver a multitude of fires and possess movement capability of such speed, range, and flexibility that, according to Air Force doctrine, air power can impact all levels of war simultaneously.<sup>2</sup> Something is missing however, because while doctrine stresses the maneuverability of air power, it gives very little guidance on what it means to maneuver.

In contrast to the US Army, which spent the 1970s and 1980s exploring the nuances of maneuver as a larger framework for warfare, Air Force doctrine today regards the maneuver potential of the air domain as simply the ability to engage the enemy anywhere at any time.<sup>3</sup> Considering that outlook, it seems that at some point, for the Air Force, “movement in combination with fires” became “movement to deliver fires.” The basis of this study is that air forces do more than just deliver fires. Instead, there is a latent form of maneuver warfare in the air domain, which has always existed, which goes on today, but is not spelled out in doctrine and therefore not universally understood by airmen. As a start to promoting that understanding, this

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<sup>1</sup> Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: Government Printing Office, 2010), 155.

<sup>2</sup> Air Force Doctrine Document (AFDD) 1, *Basic Doctrine* (Washington, DC: Government Printing Office, 2015), 25.

<sup>3</sup> *Ibid.*, 55.

study seeks to answer a fundamental question – what is maneuver from the air domain?

Simply placing the doctrinal definition of maneuver in an air power context is not enough. Ultimately, it would be true to define maneuver from the air domain as simply “use of the movement and firepower capabilities of air assets to achieve a position of advantage.” That definition however, lacks depth; it contains insufficient detail to eventually move from a conceptual discussion of what maneuver from the air domain is, to a practical one of how to execute it. To that end, this study proposes that maneuver from the air domain can be understood as employing the unique capabilities of air power to place the enemy at a disadvantage through the mechanisms of *disruption*, *dislocation*, or *overload*. Air power can disrupt the enemy by avoiding his strengths and attacking his center of gravity directly, functionally dislocate the enemy by negating his strengths at a critical place or point in time, or overload the enemy by exceeding his mental and physical capacity to adapt.

Why does maneuver not hold the same place of prominence in Air Force doctrine that it does in Army doctrine?<sup>4</sup> In other words, if the previous assumption that there is a latent form of maneuver warfare implicit in the air domain is true, why is it not explicit in doctrine? There may be no definitive answer to these questions, but consideration of possible causes may shed some light, and also provide context for the rest of this study. Two such causes worth a brief examination are the learning of incomplete lessons from air power history, and the institutional narratives that existed in the Air Force during the maneuver debates within the Army.

In July 1941, Lieutenant Colonel Harold George became the head of the newly formed Air War Plans Division, which General Hap Arnold assigned the job of developing a plan for air operations against Germany. Although the original task was to identify industrial production requirements for a possible war effort, George realized that he could not forecast accurate aircraft

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<sup>4</sup> Army Doctrine Publication (ADP) 3-0, *Unified Land Operations* (Washington, DC: Government Printing Office, 2011), iii. One way the Army executes decisive action is through the core competency of combined arms maneuver, a maneuver mechanism discussed in detail later in this study.

numbers without understanding their purpose.<sup>5</sup> Therefore, after a marathon planning session, George delivered an estimate backed up by a detailed analysis of 154 targets that the members of the division felt if destroyed, would defeat the German war machine.<sup>6</sup> Whether Germany would have collapsed had these targets been destroyed is unknown, because ultimately the plan did not come to fruition. The bomber aircraft of the day lacked the precision to destroy the required targets reliably, and a large part of their contribution came instead through enabling attrition of the Luftwaffe fighters that rose in defense.

A little less than fifty years later, Colonel John A. Warden III and his team within the Air Force Checkmate section developed a plan to use strategic conventional bombing against Iraqi centers of gravity to isolate Saddam Hussein and force him to withdraw his troops from Kuwait.<sup>7</sup> As the plan called for a concentration of seven hundred attacks per day for six consecutive days, Warden name it “Instant Thunder” as a play on the slower moving and largely ineffective “Rolling Thunder” of Vietnam.<sup>8</sup> Warden based Instant Thunder on his “five rings” model – a system of systems method of analyzing the enemy and targeting the key nodes most likely to convince the leadership to capitulate. Similar to the WWII planners before him, Warden’s plan consisted of just eighty-four targets, of which none were Iraqi fielded forces.<sup>9</sup> The actual air campaign that took place during Desert Storm retained much of the strategic nature envisioned by Warden, but one of its most notable achievements was actually the attrition it caused; by the time

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<sup>5</sup> Mark Clodfelter, *Beneficial Bombing* (Lincoln, NE: University of Nebraska Press, 2010), 94.

<sup>6</sup> *Ibid.*, 93.

<sup>7</sup> Joseph F. Birchmeir, “The Reliability of Warden’s Theory of the Use of Airpower” (School of Advanced Studies Monograph, US Army Command and General Staff College, 2005), 19.

<sup>8</sup> Michael R. Gordon and General Bernard E. Trainor, *The Generals’ War* (Boston, MA: Little, Brown and Company, 1995), 83.

<sup>9</sup> *Ibid.*, 86.

land operations began, Republican Guard and other Iraqi ground forces had suffered around fifty percent attrition by air.<sup>10</sup>

Essentially, George and Warden sought a common goal, separated by fifty years – to use the unique three dimensional movement capabilities of aircraft to bypass the enemy’s fielded forces, bring about its collapse by striking at key nodes, and avoid a protracted war of attrition. In short, they sought to leverage movement rather than firepower to place the enemy at a disadvantage. The mechanism was what modern USAF doctrine calls strategic attack, “offensive action specifically selected to achieve national strategic objectives...”<sup>11</sup> The fact that the initial plans did not proceed as envisioned is both expected in war, as well as acceptable, since the overall outcomes were still generally favorable to the United States. The broader implication of these shifts to attrition however, is that viewing the cases retrospectively provides not incorrect, but incomplete lessons about employing air power – take Desert Storm as case in point.

One can hardly argue with results – in addition to the attrition of Republican Guard troops during Desert Storm, air power destroyed a quarter of their armor, sunk the Iraqi Navy, and 293 Iraqi military aircraft were either destroyed or evacuated to Iran.<sup>12</sup> The Gulf War does not provide an incorrect lesson about air power, because the ability to reach and attrite the enemy with firepower is certainly an advantage for the joint force. Viewed through the lens of tangible attrition, it is not surprising that a view of air power as best used to deliver fires might emerge. For planners looking back on the conflict, there may be a desire to emulate an “air power

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<sup>10</sup> Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington, DC: Government Printing Office, 1993), 119.

<sup>11</sup> Air Force Doctrine Document (AFDD) Annex 3-70, *Strategic Attack* (Washington, DC: Government Printing Office, 2014), 5.

<sup>12</sup> Eliot A. Cohen, “The Mystique of U.S. Airpower,” *Foreign Affairs*, January/February, 1994, accessed January 15, 2016, <https://www.foreignaffairs.com/articles/1994-01-01/mystique-us-air-power>.

product” that contributed to victory by also emulating the attritional processes that created it.<sup>13</sup> Post-war lessons are incomplete in this case, because focusing on tangible destruction overshadows the potential Warden recognized, for air power to actually preclude large-scale attrition. Thus, one reason doctrine may not focus on maneuver is because recent history suggests it does not need to – in short, the perception may be simply that attrition works.

Another possible cause of the underdeveloped appreciation of maneuver in the Air Force may be the organizational structure that developed and was present in the 1970s and 1980s when Army maneuver discussions were ongoing. Throughout WWII, air advocates like General Arnold were equally concerned with justifying an independent service as with winning the war overall.<sup>14</sup> The Pacific theater was an apt proving ground, in which a coercive punishment strategy of firebombing and nuclear attacks was at least a major causal factor in the Japanese surrender.<sup>15</sup> Regardless of the other factors that may have played a role, to those writing the air power narrative, the message was clearly that air power through strategic bombing had prevented an invasion and saved countless American lives.<sup>16</sup>

The strategic attack narrative proved enduring, and the Strategic Air Command organization built around it would dominate the newly formed US Air Force organizational structure for almost fifty years. Originally led by WWII bomber pilot General Curtis Lemay,

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<sup>13</sup> Donald A. Schön, *Educating the Reflective Practitioner* (San Francisco, CA: Jossey-Bass, 1987), 109. “The imitator has access to observation of the process AND of the product and may regulate his selective construction by reference to either or both of these.”

<sup>14</sup> Clodfelter, *Beneficial Bombing*, 230. Clodfelter makes multiple references in the book about General Arnold’s desire to be decisive in the Pacific since air power had not precluded a land invasion in Europe. This citation references Arnold’s insistence on continued raids on Japan after the atomic bombs to ensure air power’s role in the victory did not go overlooked.

<sup>15</sup> *Ibid.*, 186. The Tokyo raid described here as “the world’s most devastating air attack”; Robert A. Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca, NY: Cornell University Press, 1996), 20. Pape describes how the coercive punishment strategy that he does not otherwise recommend, can work when nuclear weapons are in play.

<sup>16</sup> Clodfelter, *Beneficial Bombing*, 230.

Strategic Air Command was formed in 1946 and existed for four and half decades until it was deactivated in 1992.<sup>17</sup> As the dominant organization in the Air Force, it was responsible for two legs of the nuclear triad, controlled all land based bomber aircraft, intercontinental ballistic missiles, strategic reconnaissance aircraft, and almost all tanker aircraft.<sup>18</sup>

The existence of Strategic Air Command in and of itself was not the problem, and its nuclear deterrent mission was certainly crucial during the Cold War. However, the sheer size and dominance of the organization may have limited Air Force agency in developments toward more maneuver-centric warfare, even though US Army doctrine in the 1980s actually recognized the importance of air power to that end. Specifically, the AirLand Battle concept in the 1986 version of Field Manual 100-5 expressed that the “devastating firepower” possessed by air assets should be used to attack “not only those enemy forces in contact, but enemy forces held in reserve or rear echelons as well” in order to “deny the enemy the time and space to employ forces effectively.”<sup>19</sup> In other words, the Army wanted support from air power to attack elements of the enemy unreachable by ground units, in order to limit the enemy’s freedom of action.

The conception of air power usage within AirLand Battle appealed more to Strategic Air Command’s counterpart, Tactical Air Command. AirLand Battle held greater sway in Tactical Air Command in the years leading up to Operation Desert Storm primarily because that community “believed in hitting what the Army asked it to hit.”<sup>20</sup> Such support, while beneficial

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<sup>17</sup> Phillip S. Meilinger, *Bomber: The Formation and Early Years of Strategic Air Command* (Maxwell AFB, AL: Air University Press, 2012), xiii; “Air Force Global Strike Command,” United States Air Force, accessed January 14, 2016, <http://www.af.mil/AboutUs/FactSheets/Display/tabid/224/Article/104462/air-force-global-strike-command.aspx>.

<sup>18</sup> Office of the Historian, Headquarters Strategic Air Command, *Development of Strategic Air Command: 1946-1976* (Washington, DC: Government Printing Office, 1976), 184. At the end of Vietnam, SAC controlled 3,212 missiles, three strategic reconnaissance wings, and 1,136 aircraft, including 645 tankers.

<sup>19</sup> Field Manual (FM) 100-5, *Operations* (Washington, DC: Government Printing Office, 1986), 47.

<sup>20</sup> Gordon and Trainor, *The Generals’ War*, 85.

to the Army, was in part due to Tactical Air Command's need to find purpose within the joint community, in order to claim its relevance against the juggernaut of Strategic Air Command. Ultimately, classification of air power as a maneuver force likely made some headway in the 1980s and 1990s, but the dominance of Strategic Air Command at the time suggests the idea was hardly widespread, possibly explaining its near absence in Air Force doctrine.

These examples are but two plausible reasons for why the same appreciation for maneuver present in the US Army did not develop in the US Air Force. The emphasis should be on the word "appreciation" because, as this study assumes, the ability to maneuver from the air does in fact exist; its meaning however is not appreciated by airmen, as the concept is underrepresented in Air Force doctrine. True realization of air power's maneuver potential in a practical sense requires a plan for action – a "how to" guide for those airmen brought up to view the chief capability of their service as putting bombs on target anytime and anywhere. Before application however, comes conceptual understanding, which drives the aim of this study to first understand the meaning of maneuver from the air domain.

As the discussion and analysis of this study illustrates, a hypothesis that maneuver from the air domain equates to using air power to disrupt, dislocate, or overload an enemy essentially signifies that the maneuver mechanisms developed by the US Army in the 1970s and 1980s apply equally to the air. With this in mind, a basic premise is that maneuver warfare by nature of being a theory, applies across a broad range of contexts. Hence, the methodology of this study applies the concepts of maneuver warfare theory to develop the meaning of maneuver from the air domain. The first section traces the development of maneuver warfare, and its physical and cognitive mechanisms. The second section applies those mechanisms to the employment of air power and ends with a proposed statement of maneuver from the air domain. Finally, sections three and four weigh the usefulness of that proposal against air power as actually employed in two operations – Rolling Thunder during Vietnam, and Operation Iraqi Freedom.

## Maneuver and Maneuver Warfare Theory

The concept of maneuver warfare may be a relatively recent addition to the US military lexicon, but the idea is not new. In his book *The Art of Maneuver*, Robert Leonhard identified a diverse group of warriors, theorists and militaries throughout history that practiced or wrote about the basic principles of maneuver.<sup>21</sup> Within the US Army, maneuver warfare entered the limelight as the subject of a debate in the late 1970s and 1980s following an article by William Lind, in which he questioned the validity of the 1976 edition of Field Manual (FM) 100-5.<sup>22</sup> His main critique was that in seeking to “fight outnumbered and win,” against the Soviet Union, Army doctrine had placed too much emphasis on increasing the lethality of battlefield technologies. The doctrine assumed that new weapons would restore the primacy of the defensive, thereby balancing the odds in the Fulda Gap. Lind saw such thinking as attritional – essentially, that the only way to win was to develop ways to inflict more damage on the enemy than they could inflict on friendly forces.<sup>23</sup> Considering the sheer size of the assumed Soviet numerical overmatch, his question was whether waging a successful defensive war of attrition was actually possible.

The concept of attrition warfare that Lind questioned, and the maneuver warfare he eventually came to advocate, are related. Maneuver warfare is the antithesis of attrition warfare with regard to the application of maneuver tactics, but understanding why means first answering the question: what is maneuver? The doctrinal definition of maneuver has undergone minor changes over time, but the emphasis has always been on movement and firepower. Leonhard

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<sup>21</sup> Robert Leonhard, *The Art of Maneuver: Maneuver-Warfare Theory and AirLand Battle* (New York, NY: Ballantine Books, 1991), 27-58. Examples include Sun Tzu, Genghis Kahn, Napoleon, the post WWI Soviet military, and the WWII-era German military.

<sup>22</sup> William S. Lind, “The Theory and Practice of Maneuver Warfare,” in *Maneuver Warfare: An Anthology*, ed. Richard D. Hooker (Novato, CA: Presidio Press, 1993), 3. In his article, Lind references his original work as the subject of a fifteen-year debate over maneuver warfare.

<sup>23</sup> William S. Lind, “Some Doctrinal Questions for the United States Army,” *Military Review: Professional Journal of the US Army* 57, no. 3 (March 1977), 54-56.

defined maneuver based on the 1985 edition of FM 100-5-1 as “the movement of forces supported by fire to achieve a position of advantage from which to destroy or threaten destruction of the enemy.”<sup>24</sup> A crucial point of clarification here is that “maneuver” and “maneuver warfare” are *not* synonymous. Leonhard stressed that fires are a purely tactical action, constrained to the battlefield and therefore not directly applicable at the operational and strategic levels.<sup>25</sup> Therefore, the difference between maneuver and maneuver warfare is that the former is a set of tactical actions, while the latter is a framework within which to apply them. Furthermore, as the following discussion highlights, maneuver understood as movement and fires is applicable to both the maneuver warfare *and* attrition warfare frameworks.

The so-called “maneuverists” of the 1970s and 1980s pointed out the differences between attrition warfare and maneuver warfare, which stemmed from the basic question of how to use movement and firepower. Attrition emphasizes firepower, meaning movement occurs to facilitate a better firing position from which to attrite the enemy. Maneuver warfare emphasizes movement, meaning firepower serves to fix, deceive or suppress the enemy while some portion of the force moves around or through it to a position of advantage.<sup>26</sup> In simple terms, maneuver warfare is summed up by the idea of a force dichotomy, explained by Sun Tzu as separate “ordinary” and “extraordinary” forces within the army. Sun Tzu said that in battle, the ordinary force should seek to pin down the enemy’s front line while the extraordinary force moves to envelop or outflank it.<sup>27</sup>

Another way to contrast attrition and maneuver warfare is through the intent of the attack.

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<sup>24</sup> Leonhard, *The Art of Maneuver*, 18.

<sup>25</sup> *Ibid.*

<sup>26</sup> John F. Antal, “Thoughts About Maneuver Warfare,” in *Maneuver Warfare: An Anthology*, ed. Richard D. Hooker (Novato, CA: Presidio Press, 1993), 61; William S. Lind, *Maneuver Warfare Handbook* (Boulder, CO: Westview Press, 1985), 19.

<sup>27</sup> Leonhard, *The Art of Maneuver*, 31.

Whereas attrition seeks to attack the enemy's strength, maneuver warfare seeks to attack its weakness.<sup>28</sup> In Sun Tzu's force dichotomy, the enemy strength is the front line, and the weakness is its flanks. The attack he described reflects maneuver warfare both because it emphasizes movement of the extraordinary force, and because its object is the weakness of the enemy flank. Applying attrition to the same scenario, the object of the attack would be the enemy's front line, and the movement of all forces focused on positioning to that end.

Consideration of an opponent's strengths and weaknesses helps provide some additional specificity and rounds out the discussion of maneuver tactics applied to the attrition and maneuver warfare frameworks. Attrition emphasizes firepower and seeks the enemy's strength; the force still executes movement, but only to facilitate a better position from which to continue to bring fire on that strength. Maneuver warfare emphasizes movement and seeks the enemy's weakness; the force still delivers fire against the enemy's strength, but only to facilitate movement toward its weakness.

By the mid-1980s, maneuver ideas clearly held sway over the development of US Army doctrine as evidenced by the fruition of AirLand Battle in the 1986 edition of FM 100-5. AirLand Battle reflected maneuver warfare principles in asserting that "The best results are obtained when powerful blows are struck against critical units or areas whose loss will degrade the coherence of operations in *depth*, and thus most rapidly and economically accomplish the mission" (emphasis added).<sup>29</sup> Interestingly, the manual makes multiple references to attacking in depth using air interdiction, either with organic rotary wing attack aviation, or through synchronization with Air Force fixed-wing assets. Implicit in this, is that as a part of AirLand Battle, the US Army saw air power as having the ability to be the "extraordinary force" from Sun Tzu's dichotomy.<sup>30</sup> The

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<sup>28</sup> Antal, "Thoughts About Maneuver Warfare," *Maneuver Warfare: An Anthology*, 61.

<sup>29</sup> FM 100-5, 1986, 14.

<sup>30</sup> *Ibid.*, 18, 25.

limited discussion of maneuver in Air Force doctrine does recognize this idea, stating “airpower adds flanks in other dimensions that make the vertical and virtual battle as important as the horizontal battle.”<sup>31</sup>

### Physical Maneuver Mechanisms

Understanding the interaction between movement and firepower yields some insight on how to fight a maneuver-centric battle, but not how to fight a maneuver-centric campaign. As such, the next logical question in the discussion is how to conceptualize maneuver at the operational level. The distinction is an important one to this discussion, because air power is not constrained by battlefield lines, so to answer “what is maneuver from the air domain” requires taking a larger look. This section argues that the maneuver warfare and attrition warfare frameworks are themselves the larger expression of maneuver at the operational level. As such, the maneuver warfare framework specifically, contains physical and cognitive mechanisms through which to link movement and firepower to achieving strategic objectives.

The operational level of war is that “at which campaigns and major operations are planned, conducted, and sustained to achieve strategic objectives within theaters or operational areas.”<sup>32</sup> An “operation” itself is “a sequence of tactical actions with a common purpose,” meaning that major operations and campaigns are simply tactical actions executed at a larger scale and for a common purpose.<sup>33</sup> Examining the two definitions side-by-side therefore, supports an often-stated heuristic that the operational level is the link between tactics and strategy. By that logic, the intent is to find the mechanism which links maneuver tactics – movement and fires – to strategic objectives. Here there is a parallel to the idea of operational art.

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<sup>31</sup> Air Force Doctrine Document (AFDD) Annex 3-0, *Operations and Planning* (Washington, DC: Government Printing Office, 2015), 60.

<sup>32</sup> JP 1-02, 186.

<sup>33</sup> *Ibid.*, 176.

Operational art as defined in Army Doctrinal Reference Publication (ADRP) 3-0 is “the pursuit of strategic objectives, in whole or in part, through the arrangement of tactical actions in time, space, and purpose.”<sup>34</sup> In the case of maneuver, the tactical actions are movement and fires, and their arrangement in time, space, and purpose establishes which framework is in use. If movement enables fires, attrition warfare is the framework; if fires enable movement, maneuver warfare is the framework. In either case, the framework itself is the mechanism through which to employ movement and fires to progress toward the strategic objectives.

In an essay published in 1993, John Antal wrote that with regard to maneuver, armies adopt either an *attritional style of operational war fighting*, or a *maneuver style of operational war fighting*.<sup>35</sup> Essentially, he was arguing that movement and fires are the building blocks to construct either an attrition or maneuver-centric approach at the operational level. Either way, the ends served are still the strategic objectives, but how to reach them depends on the chosen operational framework within which movement and fires are applied. This concept reflects Lind’s argument that both attrition and maneuver warfare pursue the strategic *ends*, possibly with the same *means*, but using different *ways*. Whereas firepower-heavy attrition focuses on operations to “close with and destroy,” movement-heavy maneuver warfare focuses on operations to “bypass and collapse.”<sup>36</sup> Put another way by Antal, “To win by attrition, a force must kill or incapacitate the enemy until the enemy can no longer resist” and “Maneuver warfare on the other hand, is based on a desire to circumvent the problem and attack from a position of advantage.”<sup>37</sup>

*Ultimately then, the attrition warfare and maneuver warfare frameworks themselves represent the*

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<sup>34</sup> Army Doctrine Reference Publication (ADRP) 3-0, *Unified Land Operations* (Washington, DC: Government Printing Office, 2012), 4-1.

<sup>35</sup> Antal, “Thoughts About Maneuver Warfare,” *Maneuver Warfare: An Anthology*, 66.

<sup>36</sup> Lind, “The Theory and Practice of Maneuver Warfare,” *Maneuver Warfare: An Anthology*, 9.

<sup>37</sup> Antal, “Thoughts About Maneuver Warfare,” *Maneuver Warfare: An Anthology*, 62-63.

*operational level application of maneuver tactics.* Turning now to maneuver warfare as the sole focus for the rest of this discussion, there are several specific physical mechanisms through which to employ movement and firepower to progress toward achieving the strategic objectives.

The most basic premise of maneuver warfare is that “Above all, it glorifies defeating the enemy through means other than attacking his strength.”<sup>38</sup> There are three general paths to success within the framework. The first is *preemption*, which is “defeating or neutralizing the enemy before the fight has begun.” The second is *dislocation*, which is “rendering the enemy’s strength irrelevant by removing the enemy from the decisive point, or – preferably – by removing the decisive point from them.” The last is *disruption*, which is neutralizing the enemy by successfully attacking or threatening his center of gravity.”<sup>39</sup> This discussion of the physical maneuver mechanisms focuses on the dislocation and disruption that take place after combat operations begin, as tools to exploit the maneuver potential of air assets.

### *Dislocation*

Maneuver warfare theory suggests that there are two ways to manipulate the relationship between the enemy and a decisive point. The first is positional dislocation, which literally removes the enemy from the decisive point, either through defeat, or by forcing movement. The second is functional dislocation, which is less about the decisive point as a physical location, and more about combatting the enemy’s capabilities at that location, or at a certain point in time.<sup>40</sup> Leonhard argued that functional dislocation is the primary dislocation method in maneuver warfare, understood as “an attempt to nullify the strengths of the enemy by making them irrelevant at the critical moment.”<sup>41</sup> Functional dislocation is at the heart of combined arms

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<sup>38</sup> Leonhard, *The Art of Maneuver*, 79.

<sup>39</sup> *Ibid.*, 79-80.

<sup>40</sup> *Ibid.*, 66-69.

<sup>41</sup> *Ibid.*, 92.

theory, which seeks to negate an enemy's strength by creating an unsolvable choice dilemma.

Combined arms theory is about structuring and employing forces in such a way that they are both less vulnerable to the enemy's strength, and are able to negate that strength by rendering the enemy unable to use it. To accomplish these things, combined arms theory relies on the complimentary principle and the dilemma principle, respectively. The complimentary principle states that by grouping various combat arms together, the strength of each arm compliments the weakness of others, rendering the force less vulnerable overall. The dilemma principle states that complimentary capabilities of a combined arms force can put the enemy in a dilemma of choice, in which any action it takes in one area opens it up to attack in another.<sup>42</sup> The two principles work in concert to functionally dislocate the enemy by negating his strength. Together they protect the combined arms force from the enemy strength, as well as negate its importance by rendering the enemy vulnerable to attack in multiple ways that play against the strength.

Leonhard illustrated functional dislocation using the example of an enemy armored unit established in a favorable firing position, against an oncoming assault from a combined arms force of armor and infantry. If the enemy chooses to remain in position and engage the oncoming armor with its main guns, it is vulnerable to close-quarters attacks from the advancing infantry. If the enemy repositions to engage the oncoming infantry with secondary weapons, it is vulnerable to attack from the main guns of the advancing armor. The combination of armor and infantry thus present the enemy with an unsolvable choice dilemma because the unit is vulnerable regardless of the choice it makes. The combined arms force works to functionally dislocate the enemy by negating the inherent strength of its defensive position in favorable terrain.<sup>43</sup> In terms of the dichotomy, the force the enemy chooses to engage automatically becomes the "ordinary" force, and the other becomes the "extraordinary."

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<sup>42</sup> Ibid., 93-94.

<sup>43</sup> Ibid., 91-98. The discussion provided here is a brief summary of Leonhard's full description of the armor choice dilemma.

## *Disruption*

The other physical mechanism within maneuver warfare theory is disruption, which seeks to neutralize the enemy by attacking or threatening its center of gravity. This concept is contentious from the start because there is great debate over what truly constitutes a center of gravity. Whether described as a focal point, a “nest of critical factors,” or translated from Clausewitz as the “hub of all power,” the unifying aspect of all the descriptions is the degree centrality of the center of gravity; its high level of connectedness to elements in the system of which it is a part.<sup>44</sup>

A crucial point in viewing the center of gravity through the lens of maneuver warfare is that the theory advocates pursuing enemy weaknesses rather than strengths. As a result, from a maneuver standpoint, the enemy’s center of gravity is its critical vulnerability rather than its source of strength. The best analogy is that of a chess game in which the queen wields the most power as the strongest piece, but the game ends when one player captures the king. Removing the queen significantly decreases the other player’s capabilities, but the king is the most important piece because he is the critical vulnerability – capture him and the war ends.<sup>45</sup>

From a maneuver perspective, disruption is an even better tool than dislocation because to the greatest extent it avoids “having to physically destroy the entire physical component of the enemy force” and because more than dislocation, it “capitalizes upon the intangibles of war – psychology, morale, surprise, and fear.”<sup>46</sup> This point leads to the last general aspect of maneuver

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<sup>44</sup> Michael Evans, “Centre of Gravity Analysis in Joint Military Planning and Design: Implications for the Australian Defense Force,” *Security Challenges*, vol 8, No.2 (Winter 2012), 85, 87-88. Evans provides multiple perspectives on what a COG is; Carl von Clausewitz, *On War*, translated and edited by Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984), 595; Ben Ramalingham, *Aid on the Edge of Chaos* (New York, NY: Oxford University Press, 2013), 198.

<sup>45</sup> Leonhard, *The Art of Maneuver*, 20. Discussion here is a brief synopsis of Leonhard’s chess analogy.

warfare before moving to a specific discussion of the air domain. Aside from the physical, positional maneuver described so far, there is another side to maneuver warfare that seeks to use speed and unpredictability to affect the cognitive processes of the enemy.

### Cognitive Maneuver Mechanisms

Leonhard focused his attention almost exclusively on the positional nature of maneuver warfare, but others such as Lind, opened the aperture further to consider that maneuver is characterized “not only by moving in relation to the enemy to gain positional advantage, but also – and even more so – to moving faster than the enemy, to defeating him through superior tempo.”<sup>47</sup> Movement and firepower are still important in this expanded view, but when combined with speed, their importance becomes twofold. Not only does a maneuver force use firepower to facilitate movement to a positional advantage, but also to create unexpected, dangerous situations for the enemy.<sup>48</sup> The idea of cognitive maneuver then, is to put the enemy at position of disadvantage through surprise and shock, which generates confusion and disorder to the point that the enemy loses cohesion and is unable to fight as an effective, organized force.<sup>49</sup> Lind argued that the mechanism to surprise and cause confusion for the enemy is to intentionally be a driver of change, which is to say that the force must have a high tempo of operations.<sup>50</sup> This idea was rooted firmly in his assessment of the value of tempo according to John Boyd.

In his *Maneuver Warfare Handbook*, Lind emphasized the importance of Boyd’s

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<sup>46</sup> Ibid., 73-74.

<sup>47</sup> Lind. “The Theory and Practice of Maneuver Warfare,” *Maneuver Warfare: An Anthology*, 4

<sup>48</sup> William S. Lind, *Maneuver Warfare Handbook* (Boulder, CO: Westview Press, 1985), 19.

<sup>49</sup> Ibid., 6-7.

<sup>50</sup> Lind. “The Theory and Practice of Maneuver Warfare,” *Maneuver Warfare: An Anthology*, 8.

Observe-Orient-Decide-Act (OODA) loop, with a focus on the speed of internal decision-making. In the simplified version of the OODA loop, an organization observes itself, the enemy, and the environment, orients itself with respect to a snapshot of those observations at a point in time, makes a decision on the basis of that orientation, and then acts. Lind argued that the essence of maneuver is “being consistently faster through however many OODA loops it takes until the enemy loses his cohesion – until he can no longer fight as an effective, organized force.”<sup>51</sup> The idea is that consistently moving through the loop faster than the enemy generates a condition in which the enemy is always taking action based on observed conditions that no longer exist. Over time, the enemy falls further behind until any action it takes is ineffectual or counterproductive. Lind’s interpretation of the OODA loop had an internal focus because it stressed the speed of one’s own decision-making as the primary mechanism to throw the enemy out of synch. While the speed of internal decision-making is certainly a key factor to cognitive maneuver, what Lind did not do was consider external ways to affect the enemy’s decision cycle as well.

In *Science, Strategy and War*, Frans Osinga argued for a greater depth of meaning to the OODA loop beyond a faster decision-making cycle. This is not to say he would view Lind’s analysis as wrong, as his evaluation of Boyd’s work did acknowledge speed as a critical factor. Osinga suggested however, that it is not always absolute speed that matters, but a varying of decision-making tempo that keeps the enemy off guard, and unable to recognize patterns.<sup>52</sup> The other significant aspect of Osinga’s work was his emphasis on the “more complete” expression of the OODA loop, and the importance of the orientation step therein. As the process through which an organization makes sense of what it observes, orientation is at the core of Boyd’s theory because it represents the mechanism through which to evolve, adapt and learn.<sup>53</sup> The goal then, is

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<sup>51</sup> Lind, *Maneuver Warfare Handbook*, 5-6.

<sup>52</sup> Frans P.B. Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (New York, NY: Routledge, 2007), 235-236.

<sup>53</sup> *Ibid.*, 237.

to cause confusion and disorder by disrupting or incapacitating the enemy's cognitive ability to adapt.<sup>54</sup>

In his original presentation, *Patterns of Conflict*, Boyd argued for two mechanisms to degrade an enemy's ability to adapt. The first is disorientation, a "mismatch between events one observes or imagines and events (or efforts) he must react or adapt to."<sup>55</sup> This is essentially the argument put forth by Lind, in which the speed of an organization's internal decision-making causes the enemy to orient on conditions that no longer exist. The other mechanism is overload, which is "a welter of threatening events/efforts beyond one's mental or physical capacity to adapt or endure."<sup>56</sup> Overload suggests that along with internal decision-making processes, a military organization can also act externally, by causing a shock that degrades the enemy's ability to adapt by targeting his mental or physical capacity. The aim of both mechanisms is to "magnify friction, shatter cohesion, produce paralysis, and bring about [the enemy's] collapse."<sup>57</sup>

Thus, although tempo does not simply refer to "fast OODA-looping," it is still the crucial piece within cognitive maneuver. Internal to a military organization, varying decision-making tempo causes cognitive mismatch that disorients the enemy, limiting his ability to adapt. Externally, a high tempo of actual operations overloads the enemy, also limiting adaptability by going past his physical or mental ability to cope. The second case is particularly significant when viewing the enemy as a system, in which the interconnectedness of elements means attacking only one will likely not cause complete system collapse. In such cases, a high tempo of operations against many elements is important because without it, the enemy will have time to properly orient, and adapt defenses to counter further sequential attacks.

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<sup>54</sup> *Ibid.*, 236

<sup>55</sup> John R. Boyd, "Patterns of Conflict" (lecture, 1986), slide 117.

<sup>56</sup> *Ibid.*

<sup>57</sup> *Ibid.*

## **Maneuver from the Air Domain**

Maneuver expressed as simply “movement and fires to gain a position of advantage with respect to the enemy” lacks depth of detail as a definition in any domain, including in the air. Understanding what it means to maneuver entails understanding the mechanisms through which to apply movement and firepower in order to develop practical ways to fight in a maneuver-centric way. The mechanisms identified here are dislocation, disruption, and overload, with an emphasis on the fact that movement and firepower applied through them at a high tempo will generate both positional advantage, *and* cause surprise, confusion, and disorder within the enemy force.

Although the authors in the 1970s and 1980s wrote about these mechanisms primarily with respect to the land domain, maneuver warfare is ultimately still a theory, conceptual in nature and therefore applicable to all domains. The argument presented here therefore, is that there is not some form of maneuver unique to the air domain. Instead, understanding maneuver from the air domain entails applying the unique capabilities of air power to the mechanisms within the larger maneuver warfare theory. As such, this section presents a view of air power applied first to the general concept of maneuver warfare, followed by specifics on how air power fits into the physical mechanisms of dislocation and disruption, and the cognitive maneuver mechanism of overload.

Recalling the maneuver warfare framework in a broad sense, forces operating within it seek to avoid enemy strengths, and use firepower to facilitate movement to a position of advantage. Army doctrine through the construct of AirLand battle actually expressed the potential for air power to do just that. It argued that air assets should attack “not only those enemy forces in contact, but enemy forces held in reserve or rear echelons as well.”<sup>58</sup> This is essentially an

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<sup>58</sup> FM 100-5, *Operations*, 1986, 47.

expression of air power in an interdiction role, defined in current Air Force doctrine as “air operations conducted to divert, disrupt, delay, or destroy the enemy’s military surface capabilities before it can be brought to bear effectively against friendly forces.”<sup>59</sup> On the surface, this seems attritional – aircraft use movement only to facilitate better fires on rear echelons – but when viewed in the larger *joint* context, it is maneuver-centric for two reasons.

First, as envisioned by FM 100-5, aircraft essentially execute a vertical flanking movement to attack the enemy’s weakness in the form of vulnerable rear echelon forces. That those aircraft do not necessarily need fires on the front line to facilitate their movement is irrelevant – within the larger joint fight, they are still seen to be executing in accordance with the principles of the extraordinary force. Second, FM 100-5 argues that air interdiction gives commanders an opportunity to counterattack by degrading the enemy’s flexibility and denying his reinforcements, and that close air support enhances the opportunity to break through the enemy lines.<sup>60</sup> The implication is that air-delivered fires provide freedom of movement for the ground force. Thus, aircraft can in fact use superior movement to facilitate fires, which appears attritional, but in the *larger* sense, the purpose of those fires serves the greater movement of the joint force to a position of advantage.

## Dislocation

Focusing on the dislocation mechanism, the previous discussion implies that functionally dislocating the enemy from the air equates to using air power capabilities within some form of combined arms. The Army conception of destructive combined arms integrates capabilities to present the enemy with a choice dilemma, but focuses on unit types like infantry, artillery or armor.<sup>61</sup> In the modern Air Force, a unit-type framework is problematic because many platforms

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<sup>59</sup> Air Force Doctrine Document (AFDD) Annex 3-03, *Counterland Operations* (Washington, DC: Government Printing Office, 2014).

<sup>60</sup> FM 100-5, 1986, 47.

serve multiple roles and conversely, many capabilities exist across a range of platforms. Therefore, it is appropriate to consider combined arms in the air domain not as types of *units* or *platforms* working in concert, but instead to focus on the *capabilities themselves*, irrespective of platform type. The capabilities of air assets create effects that are complimentary and that negate enemy strengths by introducing an unsolvable choice dilemma. This thinking is in line with the Air Force concept of an effects based approach to operations, which is “about creating effects, not about platforms, weapons, or particular methods.”<sup>62</sup>

To use an example similar to Leonhard’s armor and infantry combined arms team, suppose an enemy’s integrated air defense system is a defensive strength that friendly air forces wish to functionally dislocate. One way to accomplish this would be to combine suppression of enemy air defense and counter air attack missions targeted against individual surface-to-air missile (SAM) systems, or the sector operations center. The SAM operators face a choice dilemma because the suppression and attack missions are complimentary. If they target the SEAD aircraft, they reveal their position and are vulnerable to strike from the attackers. If they target the attackers, they are vulnerable to electronic attack and reactive fires from the suppression aircraft. If they do nothing in attempt to hide their individual positions, the attack aircraft destroy the sector operations center, rendering the entire air defense system less effective.

Although the example highlights specific mission types that appear complimentary, it is the effects they create through their capabilities that matter. By doctrine, counter air attack missions seek to “destroy, disrupt, or degrade counter air targets on the ground...through kinetic or non-kinetic effects.” SEAD missions on the other hand are “designed to neutralize, destroy, or degrade enemy surface-based air defenses by destructive or disruptive means.”<sup>63</sup> The two sound

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<sup>61</sup> ADRP 3-0, 1-15.

<sup>62</sup> AFDD Annex 3-0, 21.

<sup>63</sup> Air Force Doctrine Document (AFDD) Annex 3-01, *Counterair Operations* (Washington, DC: Government Printing Office, 2016), 25.

remarkably similar but are doctrinally separate because whereas the former covers a broad range of targets, the latter focuses on a specific threat category that can require specific capabilities. Regardless of the specific aircraft type, SEAD-capable aircraft are able to detect, identify and provide the approximate location of enemy targeting radars, with the effect of providing threat awareness to the attack aircraft.<sup>64</sup> Others have the capability to jam the targeting radars, with the effect of providing access for the attack aircraft to strike, if required.<sup>65</sup> These two specific capability and effect pairs compliment the weakness of attack aircraft that may be unable to locate or jam the enemy targeting radars on their own. The capability of the attack aircraft to strike the threat compliments the weakness of SEAD aircraft, often configured only for self-protection.

This is but one example of using combined arms in the air to present the enemy with a choice dilemma, but there are countless others. For example, grouping escort and strike missions together can present an enemy air force with an unsolvable choice dilemma; if they choose to engage the strikers they risk being shot down by the escorts, and conversely, if they engage the escorts, the strikers will likely reach their targets.<sup>66</sup> Grouping the capabilities inherent in ISR missions with counter land missions can present an enemy ground force with an unsolvable choice dilemma. If it remains static or dispersed to avoid detection and attack from the air, it is vulnerable to an opposing ground force advance. Conversely, if it moves to contact or masses for defense, ISR aircraft detect its movements and it is vulnerable to attack from strike aircraft.

The second example is an important one, because it highlights that air assets can employ

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<sup>64</sup> “High-Speed Anti-Radiation Missile Targeting System,” United States Air Force, accessed February 17, 2016, <http://www.af.mil/AboutUs/FactSheets/Display/tabid/224/Article/104602/high-speed-anti-radiation-missile-targeting-system.aspx>.

<sup>65</sup> “EA-18G Growler Airborne Electronic Attack Aircraft,” United States Navy, accessed February 17, 2016, [http://www.navy.mil/navydata/fact\\_display.asp?cid=1100&tid=950&ct=1](http://www.navy.mil/navydata/fact_display.asp?cid=1100&tid=950&ct=1).

<sup>66</sup> AFDD Annex 3-01, 26. “Escort missions are flown over enemy territory to target and engage enemy aircraft...”

combined arms not just in the air, but also as part of a joint combined arms team. Reflecting back on Leonhard's original concept of combined arms, it becomes apparent that adding airpower only worsens the enemy's choice dilemma because he must contend with complimentary threats across multiple domains. In fact, rotary-wing attack aviation served exactly that function in the Army's original AirLand Battle concept in 1986.<sup>67</sup>

## Disruption

Disruption – attacking the enemy's center of gravity – is the physical maneuver mechanism best reflected in US Air Force history and doctrine. During WWI, planners on both sides grappled with exactly how to integrate air power into their military structures, but understood the broad implications of aircraft that could bypass field fortifications to operate behind the enemy's front lines.<sup>68</sup> Essentially, they recognized aircraft as having the capability to be Sun Tzu's extraordinary force. After the war, Sir Hugh Trenchard of the British Royal Air Force put forth the idea of strategic bombing as a method to interrupt the industrial production and transportation of the enemy state, while simultaneously causing alarm and general loss of morale among the people.<sup>69</sup> Air power advocates in the US Army saw an opportunity for greater autonomy through strategic bombing, and consequently placed heavy emphasis on it during the interwar years, throughout WWII, and beyond.

Strategic attack, the term used in modern doctrine, in the US Air Force's main mechanism for disruption. Strategic attack “involves the systematic application of force against enemy systems and centers of gravity, thereby producing the greatest effect for the least cost in lives, resources, and time” and “may achieve strategic objectives without necessarily having to

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<sup>67</sup> FM 100-5, 1986, 42-43.

<sup>68</sup> Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas About Strategic Bombing, 1914-1945* (Princeton, NJ: Princeton University Press, 2002), 3.

<sup>69</sup> *Ibid.*, 37

achieve operational objectives as a precondition.”<sup>70</sup> This echoes back to the chess example, in which taking the queen provides an operational advantage, but is not a prerequisite for taking the king, nor necessary to end the game overall. Although the Air Force possess specific “strategic” bombers with nuclear capability, it is once again not the platforms or weapons that count, but the capability inherent in the air domain to engage centers of gravity directly, without the need to engage fielded forces first.<sup>71</sup>

Strategic attack would appear to be perfectly in line with the concept of maneuver by disruption, however the former takes a much broader view on the focus of attacks, and what actually constitutes a center of gravity. First, strategic attack targets not only centers of gravity, but also enemy systems overall, either by attacking the nodes directly or by affecting the linkages between them.<sup>72</sup> Second, strategic attack doctrine does not identify the center of gravity in accordance with Leonhard’s view of the critical vulnerability. In fact, doctrine refers to the center of gravity variously as a balance, or leverage point, a source of power, and a focal point that holds a system together.<sup>73</sup> The unifying idea between these is that affecting the centers of gravity within an enemy system creates “significantly more change than would be achieved by affecting parts of the system that are not centers of gravity.”<sup>74</sup> Thus, although the conception of centers of gravity within strategic attack does not match Leonhard’s definition, the overall intent of attacking specific elements to create disproportionate effects remains. Ultimately then, strategic attack is not the same as disruption; it is a tool through which to accomplish disruption.

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<sup>70</sup> AFDD Annex 3-70, 2, 5.

<sup>71</sup> *Ibid.*, 4.

<sup>72</sup> *Ibid.*, 14. Doctrine gives an example of some possible nodes: leadership, a strategy, the means to carry it out, and key infrastructure that supports the system, allowing it to act on the strategy.

<sup>73</sup> *Ibid.*, 6, 30.

<sup>74</sup> *Ibid.*, 6.

## Overload

From the previous discussion, cognitive maneuver seeks to degrade the enemy's capacity for adaptation, and comprises both having a faster decision-making process than the enemy, and intentionally slowing the enemy's decision-making process down. One method, which Boyd called disorientation, focuses on the internal decision-making tempo of an organization as it proceeds through the OODA loop. Disorientation generates surprise and confusion by creating a cognitive mismatch between what the enemy observes and orients on, and actual friendly actions, which adversely affects his ability to adapt.<sup>75</sup> Disorientation does require actions as an expedient to create a divergent reality from what the enemy perceives, but the decision-making process still facilitates those actions. Thus, since the focus of disorientation is the tempo of consecutive OODA loops, it is not domain specific; there is arguably little difference between employing disorientation in the air domain, and any other domain. The other method, overload, focuses externally in that it seeks to degrade the enemy's ability to adapt by exceeding his mental or physical capacity to do so.<sup>76</sup> In this second case, the air domain does present unique opportunities through the capabilities of speed and parallel attack.

The mechanism of overload in Boyd's *Patterns of Conflict* is a conflation of surprise and shock, which represent exceeding mental and physical capacities respectively. Surprise exceeds the enemy's mental capacity because it is "disorientation generated by perceiving extreme change over a short period of time." Shock exceeds the enemy's physical capacity because it is a "paralyzing state of disorientation generated by extreme or violent change over a short period of time."<sup>77</sup> The overall aim of both, as expressed by Boyd is to exploit multiple vulnerabilities and

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<sup>75</sup> Boyd, "Patterns of Conflict," slide 117.

<sup>76</sup> Ibid.

<sup>77</sup> Ibid., slide 115-116. On slide 116, Boyd explains that surprise and shock work together to create overload.

weaknesses in order to pull the adversary apart.<sup>78</sup> Boyd did not include his understanding of “extreme” change in his original presentation, however his emphasis on short periods of time and multiple vulnerabilities suggest that overload of an enemy’s physical capacity through shock entails attacking in many places, as close to simultaneously as possible.

A useful way to think about employing air power to overload an enemy is through the lens of John Warden’s five rings model. In his first major written work, *The Air Campaign*, Warden represented the enemy as a system of subsystems, which he labeled leadership, key production, infrastructure, population and fielded forces. He arranged these visually as the concentric circles of a dartboard with leadership in the middle, to show that targeting the inner rings would cause rippling effects through the outer ones.<sup>79</sup> Warden’s early conception of how to use his model favored disruption; he recommended focusing efforts on the leadership ring in the center to cause significant change through all the other sub-systems. Attacks on the outer rings on the other hand would primarily provide access to, or put indirect pressure on the center.<sup>80</sup> Air power then, is the ideal tool for Warden’s model because it can bypass the outer rings and attack the center directly.

The other aspect of Warden’s model that aligns more with overload is the idea that an enemy can have multiple centers of gravity. Although Warden focused on leadership as the center of his model, he also contended that each of the rings or, subsystems, has its own center of gravity, linked to the other subsystems.<sup>81</sup> In his more recent writing, Warden argues that along with the ability to strike at the center, air power is an ideal tool because it can bypass fielded

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<sup>78</sup> Ibid., slide 117.

<sup>79</sup> Col John A. Warden III, *The Air Campaign* (Lincoln, NE: toExcel Press, 2000), 146.

<sup>80</sup> Howard D. Belote, “Warden and the Air Corps Tactical School,” *Airpower Journal* 13, no.3 (Fall 1999).

<sup>81</sup> Col John A. Warden III, “Strategy and Airpower,” in *Airpower as Strategy: The Strategic Concepts of John Warden and John Boyd*, ed. John Andreas Olsen (Annapolis, MD: Naval Institute Press, 2015), 20.

forces to strike multiple centers of gravity in parallel. His theory is that simultaneous attack of as many centers of gravity as possible causes compounding effects through all the rings, denying an adversary the ability to react and adapt, leading to complete system collapse.<sup>82</sup> This idea is completely in line with Boyd's description of extreme change leading to physical overload. Ultimately then, while the tempo of the OODA loop is important in all domains, the ability to maneuver from the air domain in the cognitive sense, comes primarily from air power's unique ability to overload the enemy through multiple, rapid, parallel attacks that exceed his physical capacity to adapt.

#### Summary – What is the Purpose of Maneuver from the Air Domain?

Section two traced the evolution of maneuver warfare theory in the US military, starting with disagreement over the plan for “active defense” of the Fulda Gap in 1976, and culminating in the development of Air Land Battle doctrine.<sup>83</sup> This section began with the assertion that maneuver from the air domain entails using the unique attributes of air power within specific mechanisms of maneuver warfare theory – dislocation, disruption, and overload. After further analysis, the hypothesis is that maneuver from the air domain means using the movement and firepower capabilities of air power to place the enemy at a disadvantage in three ways:

1. Through its unique ability to move three dimensionally, air power *disrupts* the enemy by vertically outflanking his strengths to attack his centers of gravity directly.
2. Through combining complimentary capabilities either in the air domain, or across domains, air power presents unsolvable choice dilemmas, thereby functionally *dislocating* the enemy by negating his strengths.
3. Through rapid, parallel attacks on multiple nodes within an enemy system, air power

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<sup>82</sup> Ibid., 47

<sup>83</sup> Leonhard, *The Art of Maneuver*, 130. The tenants of FM 100-5 mentioned at the beginning of this chapter comprise the active defense tactics advocated by William DePuy.

*overloads* the enemy, causes disorientation, and degrades his ability to adapt by exceeding his mental and physical capacity to do so.

A final question worth asking before moving on to historical case studies is: what is the purpose of maneuver from the air domain? The answer to that question goes back to the most basic tenant of the maneuver warfare framework – firepower enables movement. Although the stated hypothesis references placing the enemy at a position of *disadvantage*, it is important to remember, that maneuver is about movement to a position of *advantage* for the friendly force. Therefore, whether airpower is dislocating the enemy's strengths, disrupting the enemy by attacking his centers of gravity, or overloading his capacity to adapt, the result should be increased freedom of movement for other assets in the air domain, or for the joint force overall. Understanding the basic purpose of maneuver is important in judging the usefulness of the hypothesis because it provides criteria with which to evaluate historical examples. For example, an instance where air power enables freedom of movement, and its employment is in accordance with the hypothesis, supports that the hypothesis is a useful definition of maneuver from the air. Conversely, if there is an instance in which air power does *not* enable freedom of movement, but its employment is also *not* in accordance with the hypothesis, it actually supports that the hypothesis may still be a useful definition. With those ideas in mind, the discussion now turns to two historical case studies. The first, Operation Rolling Thunder during the Vietnam War, is an example in which air power employment did not demonstrate maneuver from the air domain. The second, Operation Iraqi Freedom, is an example in which air power used each of the maneuver mechanisms from the hypothesis to generate freedom of movement.

### **Vietnam – Operation Rolling Thunder**

To say that the United States military and the American people came away from Vietnam with feelings of resentment and defeat would be an understatement. After the success of Operation Desert Storm, and almost twenty years after the end of the Linebacker II air raids,

President George H. W. Bush confirmed the enduring nature of the Vietnam stigma when he said, “By God, we’ve kicked the Vietnam syndrome once and for all.”<sup>84</sup> From an air power perspective, the results were particularly troubling; air operations over Southeast Asia were the largest ever conducted, with the eight million tons of bombs eclipsing the amount dropped on both Germany and Japan combined in WWII. Hanoi however, remained intact, and ultimately, the communist regime of North Vietnam emerged triumphantly from the war.<sup>85</sup> The purpose of this chapter is to examine the employment of air power during Operation Rolling Thunder from a maneuver-centric perspective. It argues that Rolling Thunder was not an example of maneuver from the air domain, because its air operations were in contrast to the overload and dislocation mechanisms, and subsequently, they did not enable freedom of movement in any domain.

#### Context

Regardless of whether right or wrong, the perceptions of civilian leaders as to the nature of the war in Vietnam shaped the nature of air power employment within it. In 1964 and 1965, many policymakers in the United States government viewed the conflict as another part of the larger Soviet effort to weight the balance of power in favor of the communist bloc.<sup>86</sup> Despite the fact that Ho Chi Minh had driven out most of his rivals before the departure of the French, and that his greatest strength was his grip on nationalist sentiment, the State Department did not see the conflict as primarily Vietnamese.<sup>87</sup> They referred to the situation as a *communist*, rather than a *North Vietnamese* act of aggression against South Vietnam, creating the impression that the

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<sup>84</sup> Benjamin S. Lambeth, *The Transformation of American Air Power* (Ithaca, NY: Cornell University Press, 2000), 12.

<sup>85</sup> Wayne Thompson, “Operations over North Vietnam,” in *A History of Air Warfare*, ed. John Andreas Olsen (Washington, DC: Potomac Books, 2010), 107.

<sup>86</sup> Col Dennis M. Drew, *Rolling Thunder, 1965: Anatomy of a Failure* (Maxwell AFB, AL: Air University Press, 1986), 6.

<sup>87</sup> Thompson, “Operations over North Vietnam,” in *A History of Air Warfare*, 107.

situation was a small part of a larger problem.<sup>88</sup>

This fixation on the larger communist threat shaped the employment of the military, and air power in particular, because it made risk of escalation a major factor in the calculus of US leadership. Memories of the Chinese assault across the Yalu River during the Korean War weighed heavily on policymakers, who wanted to avoid a similar situation in Vietnam. In addition to the Chinese, General William Westmoreland, the commander of Military Assistance Command, Vietnam, remarked that there was “an almost paranoid fear of nuclear confrontation with the Soviet Union” which was a factor in many major decisions in Washington.<sup>89</sup> Thus, President Lyndon Johnson was very careful in his statement of America’s limited purpose in 1965: “Our objective is the independence of South Vietnam and its freedom from attack,” and “we will do only what is absolutely necessary.”<sup>90</sup> Ultimately, this stated US policy of limited war in Vietnam, against a nationalistic opponent who was arguably fighting an unlimited war of unification, would have significant consequences for the military.

President Johnson had distinctly positive and negative goals for the military; those attained by applying military force, and those attained by limiting it, respectively. His positive goal was an independent and non-communist South, and his negative goal was to avoid escalating the conflict to the point of direct Chinese or Soviet intervention.<sup>91</sup> Based on these goals, the role of the military was obscure, in that there was no contemplation of “winning” in the sense of defeating or destroying the enemy. Instead, the role of the military was to “get Hanoi and North Vietnam support and direction removed from South Vietnam” by persuading the enemy through

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<sup>88</sup> Drew, *Anatomy of Failure*, 7.

<sup>89</sup> *Ibid.*, 9.

<sup>90</sup> *Ibid.*, 10-11.

<sup>91</sup> Mark Clodfelter, *The Limits of Air Power: The American Bombing of North Vietnam* (Lincoln, NE: University of Nebraska Press, 2006), xv.

an increasing level of force, that they could not win.<sup>92</sup> Thus, the overall context of Vietnam was a limited war in which gradualism became the defining characteristic of a military force intended to coerce the North Vietnamese without further escalating the conflict.

#### Planning and Execution

Planning for air operations in Southeast Asia began in March 1964, when the White House directed the Joint Chiefs of Staff to develop options to put pressure on North Vietnam, including the use of air attacks against industrial and military targets.<sup>93</sup> The task was a difficult one from the beginning because, as General Westmoreland had identified, there were two wars to fight in Vietnam – one against the main conventional forces of the North, and another against the Viet Cong guerilla forces in the South.<sup>94</sup> In response to the directive, air planners developed OPLAN 37-64, a sixteen-day air operation against ninety-four targets in Laos, Cambodia, and North Vietnam. Each target was chosen based on its potential to reduce the North's material support to the guerillas, limit its capability to take direct action, and impair its capacity to continue as an industrially viable state.<sup>95</sup> In the larger sense, what the air planners had actually done was apply a model very similar to that of WWII against North Vietnam, by selecting targets such as airfields, supply and ammunition depots, bridges, and petroleum, oil and lubricants facilities.<sup>96</sup> OPLAN 37-64 never came to fruition however, because the American objective was to persuade rather than destroy North Vietnam or limit its industrial capacity. Thus what the results of the essentially “unrestrained” bombing campaign would have been are unknown, as President Johnson ultimately opted for a more gradual approach.

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<sup>92</sup> Drew, *Anatomy of Failure*, 11.

<sup>93</sup> Lambeth, *The Transformation of American Air Power*, 14.

<sup>94</sup> Drew, *Anatomy of Failure*, 12.

<sup>95</sup> *Ibid.*, 29.

<sup>96</sup> Lambeth, *The Transformation of American Air Power*, 14.

The first air attacks occurred in August of 1964, when Congress approved the Tonkin Gulf resolution, which essentially gave President Johnson the authority to begin an aerial war.<sup>97</sup> Rather than adopt the Joint Chiefs' plan, he opted for limited, retaliatory strikes in response to North Vietnamese and Vietcong attacks. With each attack over the course of seven months, the Joint Chiefs advocated for a large retaliation, but in each case Johnson rejected their proposals over concern of escalation, stating "We don't want a wider war [because the North Vietnamese] have two big brothers that have more weight and people that I have." It was not until March 13, 1965 that he approved Operation Rolling Thunder, a sustained but gradual approach meant to impede the flow of men and weapons flowing south.<sup>98</sup>

Rolling Thunder had five objectives: reduce North Vietnam's activities by affecting its will; improve the balance of morale; provide the United States with a bargaining counter; reduce the infiltration of men and materiel from the North; and show the world the lengths to which the United States would go for a friend.<sup>99</sup> Despite the intent of OPLAN 37-64 to attack North Vietnam as if it were a WWII-era industrial nation, subsistence agriculture actually formed the basis of its economy, and the North therefore depended on military imports from its communist allies to bolster its small manufacturing industry.<sup>100</sup> Because North Vietnam did not produce much of the materiel flowing southward, Rolling Thunder became a campaign of interdiction, but one hamstrung by limitations based on the perceived risk of escalation. President Johnson placed large portions of the rail network between China and Hanoi off-limits and steadfastly refused to allow mining of, or air attacks on the principal port of Haiphong. Additionally, a twenty-five

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<sup>97</sup> Ibid., 15.

<sup>98</sup> Ibid., 15-16.

<sup>99</sup> Drew, *Anatomy of Failure*, 34.

<sup>100</sup> John T. Smith, *Rolling Thunder: The Strategic Bombing Campaign – North Vietnam 1965-1968* (St. Paul, MN: Phalanx Publishing, 1995), 228-229; Thompson, "Operations over North Vietnam," in *A History of Air Warfare*, 108.

nautical mile restricted zone centered on Hanoi prevented air assets from attacking what industry did exist around the city.<sup>101</sup> From a tactical standpoint, Johnson forbade strikes on North Vietnamese air bases, would not allow attacks on surface-to-air missile sites until the summer of 1965, and even then, only if they fired on American aircraft first.<sup>102</sup>

The US Air Force and Navy executed Rolling Thunder from 1965 to 1968, when the Tet Offensive essentially brought the operation to a halt. In that time, the intensity of strikes had increased in accordance with the intent of gradualism, but Johnson had also ordered the bombing halted several times in order to give the North Vietnamese an opportunity to change course while saving face. Such a change never happened, and although the North's primitive transportation system sustained significant damage, there were no indications of willingness to end support to the Viet Cong.<sup>103</sup> From a purely statistical standpoint, Rolling Thunder appeared to have significant impact on the North Vietnamese. By October 1968 the attacks were reported to have destroyed seventy-seven percent of all ammunition depots, over sixty percent of petroleum storage facilities, nearly sixty percent of the North's power plants, over fifty percent of all major bridges, and forty percent of all railroad shops.<sup>104</sup> Despite these numbers however, Rolling Thunder was arguably a failure, not only because it failed to adversely affect the will of the North and bring it to the bargaining table, but because it failed to reduce the infiltration of men and materiel to the Viet Cong. The evidence was the Tet Offensive itself; the Viet Cong and North Vietnamese regular forces received enough materiel to launch a major offensive, and the majority of those materials had come across the border from China, or through the port of Haiphong, to be carried down the Ho Chi Minh trail into South Vietnam.<sup>105</sup>

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<sup>101</sup> Thompson, "Operations over North Vietnam," in *A History of Air Warfare*, 108, 110.

<sup>102</sup> *Ibid.*, 109; Lambeth, *The Transformation of American Air Power*, 18.

<sup>103</sup> Drew, *Anatomy of Failure*, 38-39, 41.

<sup>104</sup> *Ibid.*, 42

Although the Tet Offensive itself was a relative failure for the North Vietnamese, from their perspective, the gradual pace of Rolling Thunder led to other results that were ostensibly positive. First, the destruction caused by the raids allowed the government to mobilize a nationalist sentiment in the large but mostly agrarian population. This meant that there were literally hundreds of thousands of people enlisted to rebuild the bombed out portions of the North Vietnamese transportation network, and since that network was rudimentary, they were well suited to the task.<sup>106</sup> Second, in addition to the slow pace of air attacks both before and during the operation, the “no-strike” restrictions placed on aircraft during Rolling Thunder allowed the North to significantly build up both its fighter aircraft force and its ground based air defense systems. In August of 1964, North Vietnam possessed only around 1,400 anti-aircraft guns with associated acquisition and fire control radars. By the start of Rolling Thunder in March of 1965, Hanoi had received thirty MiG-15 and MiG-17 fighters, a number that would double by June. Additionally, the SA-2 surface-to-air missile system made its debut in North Vietnam in April of 1965 and went on to proliferate rapidly across the country.<sup>107</sup> All totaled, by August of 1967, North Vietnam possessed around 200 surface-to-air missile sites, at least 7,000 anti-aircraft guns, a force of over eighty fighters ranging from the MiG-15 to the new MiG-21, and a ground-controlled intercept radar system to guide them.<sup>108</sup>

#### Analysis

Operation Rolling Thunder was an application of air power that was antithetical to the mechanisms of maneuver warfare. Because of its gradual building pace and frequent operational pauses, it did not overload the North Vietnamese system, and because of its restrictions, it did not

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<sup>105</sup> Smith, *Rolling Thunder*, 213.

<sup>106</sup> *Ibid.*, 219, 245.

<sup>107</sup> Lambeth, *The Transformation of American Air Power*, 17.

<sup>108</sup> Clodfelter, *The Limits of Air Power*, 131.

allow combined arms from the air to dislocate the strength of the North's growing air defense system. This section examines both of these statements in detail, and further asserts that Rolling Thunder was not an example of maneuver from the air because the operations that comprised it did not enable freedom of movement to a position of advantage.

There were arguably two related reasons why Rolling Thunder was unable to exceed the physical capacity of the North Vietnamese, and why the operation was therefore not an example of overload. The first and most obvious was the gradual build up of attacks over a three-year period, interspersed with operational pauses. Overload in the physical sense according to John Boyd requires shock, or a "paralyzing state of disorientation generated by extreme or violent change over a short period of time."<sup>109</sup> When viewed in isolation, the destructive statistics of Rolling Thunder are impressive, but spaced out across three years, they did not create shock in the North Vietnamese system nor degrade its ability to adapt, as evidenced by the continued flow of supplies to the South. Whether the sixteen-day plan proposed by the Joint Chiefs in 1964 would have successfully changed the views of the North Vietnamese leadership or halted its support to the Viet Cong is questionable, but based on its time span alone, it would have been a more maneuver-centric application of air power.

The second, but related reason that Rolling Thunder was not an example of the overload mechanism was the narrow range of its intended targets. Boyd stressed that a key objective of overload is to exploit *multiple* weaknesses in order to pull the enemy apart, implying that attacking only one part of the enemy system will never exceed his physical capacity to react and adapt.<sup>110</sup> Warden then argued for the efficacy of airpower because of its ability to attack *multiple* centers of gravity simultaneously, causing a state of system collapse beyond that which the enemy can adapt to compensate for.<sup>111</sup> The common thread is that air power must attack more

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<sup>109</sup> Boyd, "Patterns of Conflict," slide 117.

<sup>110</sup> Ibid.

than one node in the enemy system in order to cause overload, but Rolling Thunder was primarily an interdiction campaign. Although national leadership authorized some additional targets such as cement factories, power plants, and petroleum storage facilities in the spring of 1967, the three-year bombing campaign almost exclusively targeted the North Vietnamese transportation system south of the 20th parallel.<sup>112</sup> As the American national leadership sought to increase the pressure on Hanoi, the amount of missions committed to Rolling Thunder grew, but many were “armed reconnaissance” sorties, permitted to attack only military trucks moving south.<sup>113</sup> In total, during 1967 Air Force and Navy aircraft flew 108,000 sorties, but only 9,740 of them were flown against deliberate, fixed targets from the authorized list.<sup>114</sup> Ultimately, the second reason Rolling Thunder was not an example of overload was that it did not effectively target multiple nodes or linkages within the North Vietnamese system in parallel. Instead, it focused heavily on the narrow goal of interdicting material moving southward on what was in the end, a highly redundant and resilient transportation system.

Regardless of its execution, to truly conclude that Rolling Thunder was not an example of maneuver by overload requires an assessment of whether it enabled freedom of movement. In terms of its gradual pace, Rolling Thunder actually *restricted* the freedom of movement for all aircraft because it gave the North Vietnamese time to adapt by building up their air defense system and acquiring an air force of their own. In actuality, the SA-2 missile system was largely ineffective against American fighter aircraft, but as the number of systems increased, they had the effect of forcing the fighters below 3,000 feet and into the heart of the anti-aircraft artillery

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<sup>111</sup> Warden, “Strategy and Airpower,” in *Airpower as Strategy: The Strategic Concepts of John Warden and John Boyd*, 47.

<sup>112</sup> Smith, *Rolling Thunder*, 333-338. These pages provide a description of all 58 Rolling Thunder packages flown during the operation.

<sup>113</sup> *Ibid.*, 58.

<sup>114</sup> *Ibid.*, 337.

envelope. Essentially, the combination of low altitude anti-aircraft fire, medium altitude surface-to-air missile systems, and all altitude MiG fighters created a situation in which *no* altitude was safe.<sup>115</sup> Many aircraft risked flying below 3,000 feet, in an attempt to avoid the SA-2 systems and surprise the MiGs, but ultimately over eighty percent of all US aircraft lost were shot down in the low altitude regime.<sup>116</sup> In this case, firepower did not enable freedom of movement, but actually inhibited it, because the enemy had time to acquire defensive systems that presented US aircraft with an unsolvable choice dilemma in terms of the altitude at which they could operate.

In addition to indirectly limiting friendly freedom of movement, the gradual pace and limited targets of Rolling Thunder actually enabled freedom of movement for the enemy. The North Vietnamese transportation system was rudimentary, but it had a high level of redundancy, making effective interdiction of supplies a dubious prospect from the start.<sup>117</sup> The destruction that Rolling Thunder did produce, allowed the North Vietnamese to rally popular support to their cause, and the gradual pace permitted them to adapt by reorganizing “their society to withstand the bombing so they could continue their support” to the Viet Cong in the South.<sup>118</sup> Because attacks from the air focused mainly on the transportation system, Hanoi did not have to siphon off portions of its massive manual labor force for other projects. Instead, hundreds of thousands of people repaired the lines of communication and in fact, introduced additional redundancy by continuously building new roads, bridges and bypasses.<sup>119</sup>

Rolling Thunder was also not an example of maneuver from the air because national level restrictions prevented aircraft from employing effective combined arms to dislocate the strength

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<sup>115</sup> Lambeth, *The Transformation of American Air Power*, 18.

<sup>116</sup> *Ibid.*

<sup>117</sup> Smith, *Rolling Thunder*, 219.

<sup>118</sup> *Ibid.*, 213.

<sup>119</sup> *Ibid.*, 219. It was estimated that the North Vietnamese only used around fifteen percent of their road capacity at any one time.

of the North Vietnamese air defenses. In terms of the air-to-air threat, a combined arms package of escort, suppression, and strike aircraft could not attack the five main MiG airfields, because each was situated within the twenty-five nautical mile protected zone around Hanoi.<sup>120</sup> With respect to the surface-to-air threat, political restrictions prohibited dedicated packages of F-105F “SAM killer” aircraft from preemptively seeking out and destroying North Vietnamese SA-2 sites. As a result, F-105F aircraft flew in combined arms packages with strike aircraft in order to suppress enemy radars electronically, but they still could not fire on any missile site unless it fired first. In essence, aircraft employed combined arms for their own protection, but were unable to leverage it to permanently dislocate the strength of the North’s defenses, leading American airmen to feel as though they were being asked to fight with one arm behind their back.<sup>121</sup>

Evidence that Rolling Thunder was not an example of maneuver by dislocation once again comes from the fact that it limited, rather than enabled freedom of movement. The combination of the operation’s gradual pace, and the restrictions on offensive action against both surface-to-air missile sites and enemy airfields allowed the North Vietnamese to build a robust defensive system. Because restrictions further prohibited aircraft from functionally dislocating either aspect of the defensive strength, they instead had to employ combined arms to defend against it. The result was that the Air Force and Navy were “obliged to devote many aircraft to air defence [sic] countermeasures rather than bombing their primary targets.”<sup>122</sup> Therefore, due to the restrictions placed on Rolling Thunder, the defensive requirement of operations limited overall freedom of movement in the air, because they absorbed countless sorties that could have been better leveraged elsewhere.

In summary, to be successful, air forces attempting to overload the enemy must both

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<sup>120</sup> Lambeth, *The Transformation of American Air Power*, 18.

<sup>121</sup> *Ibid.*, 18-19.

<sup>122</sup> Smith, *Rolling Thunder*, 215.

attack a wide range of nodes in the enemy system, and attack those nodes in the shortest time possible. Doing both creates shock, an essential condition that exceeds the enemy's physical capacity to react and adapt. Air power employed during Rolling Thunder did not accomplish either and therefore does not illustrate the principles of maneuver by overload. Similarly, to be successful in an effort to functionally dislocate an enemy's strength, air forces must be able to leverage combined arms to create an unsolvable choice dilemma. Surface-to-air missile operators in North Vietnam did not face such a dilemma because they always had a choice to simply not fire on American aircraft. As a result, aircraft on Rolling Thunder missions flew in combined arms packages for self-defense, but political restrictions meant they were able to functionally dislocate North Vietnam's air defenses only when directly engaged.

To be fair, the objectives of Rolling Thunder were never to collapse the North Vietnamese system by air, nor to bring down its air defenses. The President and his counselors saw it as "a means to support the expanding combat role of American ground forces" by denying support to the Viet Cong, and "as a means to inflict pain on the North while the ground troops demonstrated the Communists' inability to win in South Vietnam."<sup>123</sup> The intent of the operation however, does not change the fact that with respect to both overload and dislocation, the air operation did not enable freedom of movement, and therefore is not example of air power used in a maneuver-centric way.

In closing this case study, an obvious question is: why look at an example of air power *not* used according to the maneuver mechanisms proposed in the hypothesis? The most basic tenet of maneuver warfare theory is that fires should enable movement. Therefore, the test for whether a force operates in a maneuver-centric way is whether the firepower it applies and the tempo of its operations seeks to enable freedom of movement to a position of advantage. To determine if the hypothesis is a useful way to represent maneuver from the air domain, a

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<sup>123</sup> Clodfeter, *The Limits of Air Power*, 66.

“negative example” is helpful. The maneuver mechanisms obviously need not always be successful, but by looking at a case where operations actually *hindered* freedom of movement, those operations can then be weighed against the hypothesis. If the operations both resulted in a loss of freedom of movement, *and* are in contrast to the maneuver mechanisms in the hypothesis, it provides support that those mechanisms are in fact a useful way to define maneuver from the air. Operation Rolling Thunder provides exactly that sort of negative example – its operations were not in accordance with dislocation or overload and ultimately hindered freedom of movement, suggesting that air power employed in a contrasting way to the hypothesized mechanisms is *not* maneuver from the air.

### **Operation Iraqi Freedom**

On March 20, 2003, US Army and Marine Corps forces crossed the Kuwaiti border and began their drive toward Baghdad, kicking off Operation Iraqi Freedom. Although the original intent was concurrent ground and air assaults, a failed regime decapitation attempt had forced General Tommy Franks to move the ground invasion up by thirty-six hours, and ahead of planned air operations, in order to prevent the Iraqis from setting fire to southeastern oil fields.<sup>124</sup> The decisive phase of the campaign lasted just under three weeks, leading some to contend that the often-cited moniker “shock and awe” referred not to the size of the force, nor the scope of its effects, but rather to the speed of its advance. Indeed some of the “most memorable images of Operation Iraqi Freedom are of American armored columns roaring along highways...”<sup>125</sup>

This chapter examines air operations immediately before and during Operation Iraqi Freedom, with the goal of highlighting instances of maneuver from the air. Combat operations in Operation Iraqi Freedom were truly a joint endeavor and as such, the speed of the ground force

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<sup>124</sup> Benjamin S. Lambeth, *The Unseen War: Allied Air Power and the Takedown of Saddam Hussein* (Annapolis, MD: Naval Institute Press, 2013), 80.

<sup>125</sup> William R. Hawkins, “Iraq: Heavy Forces and Decisive Warfare,” *Parameters* 33, no.3 (Autumn 2003): 62.

advance was indeed remarkable, but also jointly enabled. General David McKiernan, the Combined Forces Land Component Commander, was in large part able to keep a high tempo of advance, because he knew air power covered his flanks.<sup>126</sup> More than just covering the flanks however, this chapter argues that the ground force was able to accomplish its rapid advance largely because of maneuver from the air domain.

## Context

Although linked with the US Global War on Terror, the final straw justifying the invasion in 2003, was Saddam Hussein's repeated violation of United Nations Resolution 1441, which called for unimpeded access of weapons inspectors to verify Iraq's disarmament after the first Gulf War.<sup>127</sup> The roots of the conflict however, go back to the termination of Operation Desert Storm, and Hussein's ability to not only hold onto power, but also a large portion of his most capable military forces.

On March 3, 1991, Iraq signed the cease-fire agreement that ended Operation Desert Storm, but in terms of US military objectives, the campaign was not necessarily a complete success.<sup>128</sup> The goals of the operation, set forth by President George H.W. Bush in August of 1990 included "security and stability of the Persian Gulf," which was later translated by General Colin Powell to mean the destruction of the Republican Guard.<sup>129</sup> As coalition forces moved into

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<sup>126</sup> Walter J. Boyne, *Operation Iraqi Freedom: What Went Right, What Went Wrong, and Why* (New York, NY: Forge, 2003), 78.

<sup>127</sup> "United Nations Security Council Resolution 1441," United Nations, accessed January 6, 2016, <http://www.un.org/Depts/unmovic/documents/1441.pdf>.

<sup>128</sup> Kevin M. Woods, *The Mother of All Battles* (Annapolis, MD: Naval Institute Press, 2008), 318.

<sup>129</sup> George H. W. Bush, "Address to the Nation Announcing the Deployment of United States Armed Forces to Saudi Arabia," August 8, 1990, George Bush Presidential Library and Museum, accessed January 6, 2016, <http://bush41library.tamu.edu/archives/public-papers/2147>; Lt Col Matthew C. Gaetke, "Certainty is Illusion: The Myth of Strategic Guidance" (School of Advanced Studies Monograph, US Army Command and General Staff College, 2015), 41.

Kuwait, retreating Republican Guard forces sustained heavy casualties from the air, prompting negative responses from the media about the so-called “highway of death.”<sup>130</sup> Not wanting to “screw this up with a sloppy, muddled ending” and with the advice of General Powell, President Bush ordered the cease-fire, allowing half of the Republican Guard forces to escape.<sup>131</sup>

Saddam Hussein’s continued power in Iraq was not a failure in and of itself, as his ouster was never the objective of the operation, but his retention of a large portion of his best military forces did have important implications. Saddam used the survival of the Republican guard as evidence in his narrative that Iraq had won the war simply because it had not lost.<sup>132</sup> Emboldened by his ability to hold onto power against the coalition, and still in possession of his best troops Hussein was in a position to consolidate his power through campaigns against both the Kurdish and Shiite populations, which prompted the United States to establish no-fly zones in both northern and southern Iraq.<sup>133</sup> Ultimately, failure to destroy the Republican Guard at the end of the first Gulf War led to Air Force assets in theater under the auspices of Operations Northern and Southern Watch, which would be a crucial factor leading up to Operation Iraqi Freedom.

The other important factor emerging from Desert Storm was an increasing focus on airborne ground surveillance and precision guided munitions. Over the course of the war, GPS capability had proved indispensable, as had the E-8 Joint Surveillance Target Acquisition Radar System (JSTARS). The Air Force had even pushed the latter into action five years ahead of schedule in order to make use of its ability to locate moving targets on the ground.<sup>134</sup> The other important development was the laser guided precision munitions that made up about nine percent

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<sup>130</sup> Gordon and Trainor, *The Generals’ War*, 418.

<sup>131</sup> *Ibid.*, x.

<sup>132</sup> Woods, *The Mother of all Battles*, 270

<sup>133</sup> Gordon and Trainor, *The Generals’ War*, 466 – 468. The United States had specifically promised to protect the Kurds.

<sup>134</sup> Boyne, *Operation Iraqi Freedom*, 31.

of the total dropped during the war. These weapons proved highly accurate, but were of limited use in poor weather. The result was an effort spurred by the Air Force Chief of Staff after the war to develop GPS guided munitions that would be effective in all conditions.<sup>135</sup> In the years after Desert Storm, the Air Force would continue to develop all three of these technologies, and they would prove crucial to combat in Operation Iraqi Freedom.

### Planning and Execution

On September 17, 2001, President George W. Bush signed an order to begin planning military operations in both Afghanistan and Iraq. This was a challenge for planners from the outset, as the last update to the Iraq plan had occurred in 1998, did not take into account developments in precision munitions, and called for deployment of about 500,000 troops.<sup>136</sup> This was at odds with Secretary of Defense Donald Rumsfeld's vision of a smaller, more lethal force, and the plan would go through two-dozen revisions before settling on 250,000 coalition personnel, of which only 50,000 to 60,000 were Army and Marine Corps combat troops.<sup>137</sup> The significantly reduced troop numbers for Iraqi Freedom thus made it truly a case in which the United States needed to "fight outnumbered and win."

The final plan for Operation Iraqi Freedom had six objectives: drive out the regime; identify, isolate and eliminate weapons of mass destruction; drive out terrorists; secure oil fields; deliver humanitarian aid; and help Iraqis rebuild their country.<sup>138</sup> The overall ground scheme of maneuver focused on speed – V Corps and the I Marine Expeditionary Force were to move north from Kuwait, bypassing any cities in their path toward Baghdad, using air power and long range

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<sup>135</sup> Ibid., 32.

<sup>136</sup> Lambeth, *Unseen War*, 11-12, 16

<sup>137</sup> Anthony H. Cordesman, *The Iraq War: Strategy, Tactics, and Military Lessons* (Washington, DC: Center for Strategic and International Studies Press, 2003), 36-37.

<sup>138</sup> Lambeth, *Unseen War*, 19

indirect fires to neutralize Iraqi forces before they could engage head on. For the air component, General Mosely's plan focused on seven priorities: strategic attack against Iraqi leadership and command and control, air superiority, countering theater ballistic missiles, counter land operations, support to special forces, ISR, and lastly counter sea operations.<sup>139</sup>

One of the key contributions of air power during Operation Iraqi Freedom actually occurred before "official" combat operations began, through Operation Southern Focus. During a briefing on February 7, 2002, Secretary Rumsfeld and General Franks asked what the Air Force could do under the auspices of Operation Southern Watch to draw down the Iraqi air defense system before ground operations began. This was crucial, as land based surface-to-air missile systems were Iraq's only potential counter to coalition air power.<sup>140</sup> The question was important, because General Mosely's initial assessment was that any operation would require a ten to fourteen day preparatory air campaign to simultaneously take down Iraqi southern air defenses and the so-called "Super-MEZ" of air defenses around Baghdad.<sup>141</sup>

Under Southern Watch, strikes on Iraqi air defenses had been retaliatory in nature, but this changed on June 1, 2002 with the approval of Operation Southern Focus, which was billed as a way to conduct intensified operations in response to supposed "more numerous and more threatening attacks." That Iraq had coincidentally launched more than 100 missiles against US aircraft and penetrated the no-fly zone multiple times throughout 2001, only served as additional evidence to justify Southern Focus.<sup>142</sup> The operation reached full swing in the last three months of 2002, when aircraft struck as many targets as during the entire previous year. There was an

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<sup>139</sup> Ibid., 31-35.

<sup>140</sup> Ibid., 61; Cordesman, *The Iraq War*, 32.

<sup>141</sup> Lambeth, *The Unseen War*, 22. "MEZ" is the Missile Engagement Zone of a surface-to-air missile system, meaning the range that it can effectively target aircraft. The Super-MEZ around Baghdad was a large bubble of overlapping MEZ airspace that coalition air power would have to secure before providing support to ground forces there.

<sup>142</sup> Ibid., 61, 64.

additional threefold increase in strikes in the first three months of 2003, before the start of ground operations in March.<sup>143</sup> The end result of Southern Focus as stated by General John Jumper was that “we felt that [Iraq’s air defenses] were pretty much out of business by the execution of 1003V.”<sup>144</sup>

Combat air and ground operations on D-day were supposed to be concurrent, but this changed on March 19, when the CIA reported that Saddam Hussein and his sons would be at a known location on March 20. This gave General Franks an opportunity to decapitate the regime, but also presented significant challenges.<sup>145</sup> Planners knew the strike would give the invasion away and assumed the Iraqis would rush to set fire to the country’s southeastern oil fields. This meant the ground forces not only needed to begin their advance ahead of schedule, but that they would have to do so before the planned aerial bombardment.<sup>146</sup> The change of plans generated a high level of concern, with some arguing that advancing the ground force before preparatory air attacks was not only against doctrine, but also put the troops in danger due to lack of direct support.<sup>147</sup> Despite these concerns, when the decapitation event failed, ground forces were able to advance ahead of schedule successfully, in large part because Southern Focus had already established air superiority over southern Iraq, and therefore air assets were available immediately.

As V Corps and I MEF began their advance, the air component focused on undermining or eliminating Iraqi resistance, in order to allow General McKiernan to maneuver without need to pause in response to the enemy.<sup>148</sup> Of the 24,196 US sorties flown, seventy-nine percent

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<sup>143</sup> Boyne, *Operation Iraqi Freedom*, 53-54.

<sup>144</sup> Lambeth, *The Unseen War*, 73. 1003V was the official operational plan number assigned to Operation Iraqi Freedom.

<sup>145</sup> *Ibid.*, 74.

<sup>146</sup> Cordesman, *The Iraq War*, 60.

<sup>147</sup> Boyne, *Operation Iraqi Freedom*, 49. The argument here, from the Marines, was that aircraft would focus on air superiority missions rather than interdiction or close air support.

supported counter land operations with interdiction or close air support.<sup>149</sup> Rather than the tactical attrition of Desert Storm, US aircraft now used GPS precision-guided munitions to paralyze and disrupt the enemy, enabling the ground force to cover approximately 350 miles in a little less than three weeks.<sup>150</sup> Air power covered the flanks of the ground force, protected its lines of communication, and prevented time-consuming engagements with Iraqi forces by interdicting them before they could make contact. Overall, the speed of the advance was due in large part to the fact that the Iraqis were never able to mass a big enough force to slow the American troops, and it was principally the air technologies developed in the years since Desert Storm that prevented them from doing so.<sup>151</sup>

Although air assets provided counter land support in a variety of ways, the effort to keep the ground advance moving came down to a relatively straightforward process: “Anytime a [enemy] unit moved, it was acquired by the JSTARS, and its coordinates generated into GPS for targeting by precision guided munitions.”<sup>152</sup> The ability of the JSTARS to detect enemy movement on the ground with its “moving target indicator” radar, coupled with GPS guided munitions translated to successful air strikes in all weather. This capability was particularly significant beginning March 24 when a massive sandstorm swept across southern Iraq, trapping the 3rd Infantry Division on the enemy side of the Euphrates River, surrounded by Iraqi forces. Informed by real-time surveillance from JSTARS and RC-135 Rivet Joint aircraft, terminal air controllers embedded with the division called in hundreds of precision strikes through the storm and onto Iraqi positions.<sup>153</sup> During the same period, Republican Guard forces attempted to move

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<sup>148</sup> Lambeth, *The Unseen War*, 96.

<sup>149</sup> Cordesman, *The Iraq War*, 27.

<sup>150</sup> *Ibid.*, 76; Lambeth, *The Unseen War*, 127 – 128.

<sup>151</sup> Lambeth, *The Unseen War*, 140.

<sup>152</sup> Boyne, *Operation Iraqi Freedom*, 95.

south from Baghdad and Karbala under the cover of the sandstorm, to engage the advancing troops. While the initial reports were difficult to confirm, once Republican Guard units started moving, Air Force sensors immediately acquired them, GPS fixed their positions, and attack aircraft engaged them with precision guided munitions through the storm.<sup>154</sup>

Overall, the major combat operations at the start of Operation Iraqi Freedom were a success story not just for air power, but for joint integration as well. Air power was a major factor in the rapid advance of the Army and Marine Corps, but that advance itself contributed to the conditions that made the air strikes so effective. Based on lessons learned from Desert Storm, the defending Iraqi units had dispersed to allow their best chance at survival against air attacks. The ground assault however, forced them to consolidate to defend, making them more susceptible to attack from the air.<sup>155</sup> The component commanders likewise embodied the joint mentality throughout the operation. General McKiernan relied on air power to mitigate the risks associated with a rapid advance launched ahead of schedule, and General Mosely made his commitment to the ground force known in stating, “I will make it my life's work that the Iraqi air force will not fly.”<sup>156</sup> These sentiments however did not stop some, like General Charles Horner, the Joint Force Air Component Commander from Desert Storm, from advocating a “new air-land dynamic” stating that “the primary maneuver force on the battlefield is the aircraft overhead.”<sup>157</sup> In light of that claim, the last section of this chapter examines the air maneuver carried out during Operations Southern Focus and Iraqi Freedom.

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<sup>153</sup> Lambeth, *The Unseen War*, 101-102.

<sup>154</sup> Boyne, *Operation Iraqi Freedom*, 92.

<sup>155</sup> Lambeth, *The Unseen War*, 103.

<sup>156</sup> *Ibid.*, 120. Statement to General Franks in regard to the counter air effort.

<sup>157</sup> Boyne, *Operation Iraqi Freedom*, 166.

## Analysis

Before Operations Southern Focus and Iraqi Freedom, Saddam Hussein's military still possessed at least two major strengths. The first was its integrated air defense network, which was still one of world's most dense, despite losses in the Gulf War.<sup>158</sup> After Desert Storm, CENTCOM estimated that Iraq had retained about 210 surface-to-air missile launchers and 150 early warning radars; by the start of Southern Focus, some sources indicated the number of launchers had grown to almost 400.<sup>159</sup> The other strength was the numerical superiority in personnel and equipment of the regular army and remaining Republican Guard divisions. At the start of the operation, Iraq possessed about 390,000 troops to coalition's 250,000 personnel, of which only 50,000 to 60,000 were American combat troops. In terms of equipment, the Republican Guard boasted an estimated 2,200 to 2,600 main battle tanks, compared to just 850 for the United States.<sup>160</sup> Both of these strengths had to be dislocated to facilitate the seizure of Baghdad, in order to meet the primary objective to drive out Hussein's regime.

During Southern Focus, the US Air Force employed functional dislocation to negate the strength of Iraq's southern air defense network, through combined arms executed from the air domain. Three months prior, aircraft patrolling the no-fly zone had transitioned to an ISR focus, mapping the entire southern region and locating all the air defense components within it.<sup>161</sup> Starting September 5, 2002, combined arms formations of suppression and attack aircraft initiated a string of attacks on every sector operations center south of the thirty-third parallel with GPS precision guided munitions, and targeted individual radars and missile launchers as well.<sup>162</sup>

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<sup>158</sup> Cordesman, *The Iraq War*, 33.

<sup>159</sup> *Ibid.*

<sup>160</sup> *Ibid.*, 36, 40.

<sup>161</sup> Lambeth, *The Unseen War*, 61.

<sup>162</sup> *Ibid.*, 66.

Execution followed a pattern very similar to the generic SEAD example presented earlier in this paper – essentially, suppression capabilities provided access for attack aircraft. On the surface level, the immediate effect of Southern Focus was the destruction of over a third of the Iraqi launchers and radar sites, but of greater importance was the resulting localized air superiority. It enabled freedom of movement for all aircraft operating in southern Iraq, and more importantly, allowed an immediate shift in the weight of effort from counter-air to counter-land. It follows that the suppression operations of Southern Focus also facilitated freedom of movement for the ground force, because the ability for air power to focus immediately on counter-land operations significantly lowered the risk of an earlier than planned advance from Kuwait. Ultimately, the dislocation operations of Southern Focus were an example of maneuver because they enabled freedom of movement across both the air and land domains.

To functionally dislocate the numerical strength of the Iraqi ground forces, the US Air Force executed both combined arms from the air, and acted as part of a joint combined arms team. As the preceding discussion suggests, air power negated the strength in size of the Iraqi Army and Republican Guard because it ensured that the full weight of those forces was never able to engage American ground troops. Even during a massive sandstorm that would have otherwise rendered attack aircraft unable to find their targets, the complimentary capabilities of the JSTARS identified Republican Guard units on the move, allowing the attackers to target them with GPS weapons.<sup>163</sup> Of even greater importance was the complimentary nature of the combined arms team of air and ground forces together; air power prevented major engagements through interdiction and close air support, and the ground force advance compelled the dispersed Iraqis to consolidate their positions, rendering them more vulnerable to air attacks.<sup>164</sup> The result of joint

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<sup>163</sup> Boyne, *Operation Iraqi Freedom*, 92; Lambeth, *The Unseen War*, 70. Defensive counter air patrols were also complimentary. They pushed north of the 33rd parallel in order to protect assets supporting the main invasion.

<sup>164</sup> Lambeth, *The Unseen War*, 103.

combined arms was once again, freedom of movement. Without a requirement to engage in pitched battles against Iraqi forces, General McKiernan was able to advance on Baghdad, pausing only when the sandstorm prohibited further movement.

With regard to disruption, the fact that the CENTCOM commander was willing to risk a last minute change to the timing of the entire operation to attempt a regime decapitation indicates that planners saw Saddam Hussein and his sons as the strategic center of gravity. Reflecting on the chess analogy, identifying with any certainty, the “king piece” whose capture ends the war is certainly a difficult task, but in this case, Saddam and his sons were likely the critical vulnerability. That the Iraqi military was structured more to prevent a coup than to defend the country is evidence to the centrality of the Hussein regime, and the fact that Saddam arrayed his best Republican Guard troops around himself in Baghdad rather than engage them against the coalition adds weight to the argument.<sup>165</sup> Thus, over the course of the operation, strategic attack missions targeted a number of nodes in the Iraqi system, but from a maneuver perspective, the single greatest attempt at disruption was the decapitation attempt that kicked off the conflict.<sup>166</sup>

While ultimately unsuccessful, the attack was itself an example of combined arms from the air; the mission incorporated strike aircraft with precision guided weapons, stealth capable strategic attack assets, suppression assets, and electronic jamming platforms.<sup>167</sup> From a tactical standpoint, the attack was a success in that it destroyed the intended target area, but the reports that Saddam and his sons were present proved incorrect. Intelligence is obviously not always correct, but the larger implication is that while not a combat arm, intelligence is a particularly important component of combined arms from the air. Aircraft may be able to collect imagery,

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<sup>165</sup> Cordesman, *The Iraq War*, 36.

<sup>166</sup> *Ibid.*, 66. Strategic attack targeted command and control, regime security and other leadership targets.

<sup>167</sup> Lambeth, *The Unseen War*, 76-77. Platforms included the F-117, F-15E, F-16CJ, EA-6B, as well as Tomahawk Cruise Missiles.

signals, and electronic intelligence, but the ability to leverage human intelligence is a complimentary capability that can be crucial to disruption operations – particularly when the center of gravity is a specific person or group of people.

The last maneuver mechanism used during Operation Iraqi Freedom was overload. Proof that air power exceeded the capacities of the Iraqi military is in the actual resistance it put up, especially toward the end of major combat operations. For example, when the 3rd Infantry Division entered the presidential district of Baghdad on April 8, they were opposed only by harassing fire from paramilitary organizations. At that point, of the Republican Guard's 850 tanks and 550 artillery pieces originally placed to defend the capital, only nineteen, and fifty remained, respectively.<sup>168</sup> Those numbers of course, sound like attrition, but the weak resistance was not just due to outright destruction of troops and equipment. In fact, it was also because “many [Iraqi troops] fled to their homes, took off their uniforms and waited for the end.”<sup>169</sup>

Confronted with overwhelming air power that their own air force and crippled air defenses could not counter, by April 8 the Iraqi ground forces had lost all coherence. Republican Guard troops were scattered, unable to organize or employ above the brigade level, and the regular army to the south had no organized structure at all.<sup>170</sup> The collapse however, was not simply a result of attacks against equipment and troop formations. After G-day, in addition to interdiction and close air support, the air component continued to target the remaining air defenses around Baghdad, Iraqi leadership, and command, control and communications infrastructure.<sup>171</sup> The Iraqi troops faced extreme and violent change along multiple lines in parallel; they were under attack from the air themselves, they could not retreat under the

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<sup>168</sup> Ibid., 139.

<sup>169</sup> Boyne, *Operation Iraqi Freedom*, 130.

<sup>170</sup> Cordesman, *The Iraq War*, 109-110. As of April 8, the Iraqi air force had not flown a sortie.

<sup>171</sup> Lambeth, *The Unseen War*, 84; Murray and Scales, *The Iraq War*, 69.

protection of an air defense umbrella, and the national leadership was either in hiding, or unable to communicate with them for effective command and control. The result was an overwhelmed, overloaded force, unable to react or adapt. Faced with mounting pressure from the air, in the end “much of the result was psychological as well as physical, in many cases the bombing of several vehicles was enough to convince Iraqi troops to give up the fight and go home.”<sup>172</sup>

Operation Iraqi Freedom is a prime example of air power employed in a maneuver-centric way, as all of the physical and cognitive mechanisms of maneuver warfare theory were present within in. While ultimately unsuccessful, the decapitation attempt was an example of disruption, aimed at the critical vulnerability of Saddam Hussein and his sons. Through Southern Focus, the US Air Force used combined arms to functionally dislocate the strength of the Iraqi air defense system before major combat operations began. Combined arms with the ground force also served to dislocate the Iraqi army and the Republican Guard by preventing it from bringing its numerical strength to bear in a major engagement. Lastly, the weight of air attacks on multiple nodes of the Iraqi system served to overload the physical and mental capacity of its troops, shattering their cohesion. If the purpose of maneuver-centric warfare is to enable freedom of movement to a position of advantage, air power in Operation Iraqi Freedom was indeed a crucial maneuver element. Because of air operations, the ground force was able to advance at an unprecedented speed, unhindered by the necessity to protect its flanks, worry about its supply lines, or engage in any pitched battles during its race to Baghdad.

### **Conclusion**

The original hypothesis was that maneuver from the air domain means using the movement and firepower capabilities of air assets to place the enemy at a disadvantage through disruption, dislocation, or overload. Implicit in that hypothesis was an assumption that as a theory, maneuver warfare is applicable across all domains, despite its origins in the land domain.

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<sup>172</sup> Lambeth, *The Unseen War*, 125-126.

As such, the hypothesis represented an application of the unique attributes of air power along the physical and cognitive mechanisms inherent in maneuver warfare theory. Additionally, a basic premise was that maneuver from the air domain exists, and occurs in practice, regardless of whether it is defined in doctrine. Therefore, the intent of the analysis was not to prove that maneuver conforms to the proposed definition, but instead to demonstrate that the proposed definition is a useful conception of a maneuver capability that already exists in the air domain.

With regard to testing the hypothesis, the ultimate criteria for whether an instance of air power usage reflects maneuver from the air domain is its results. Specifically, from the basic tenets of maneuver warfare theory, a force that executes in a maneuver-centric way should facilitate freedom of movement for itself, or some other part of the force. With this in mind, the case studies examined specific examples of air power employment, with the aim of determining whether its application enabled freedom of movement, and subsequently whether it conformed to the mechanisms of the hypothesis.

Overall, the two case studies suggest that the hypothesis presents a useful definition of maneuver from the air domain, but in different ways. Operation Rolling Thunder during the Vietnam War was a “negative example” in which air power employment did not conform to the mechanisms of the hypothesis, and actually inhibited friendly freedom of movement. As a negative example however, it is still useful. Air power employment during Rolling Thunder was antithetical to the maneuver mechanisms stated in the hypothesis. Its gradual pace and limited target set were in contrast to the requirements of overload, and its restrictions generated a situation in which combined arms defended against the North’s air defenses instead of functionally dislocating them. Consequently, the results of Rolling Thunder were a decrease in freedom of movement for aircraft, as they battled an ever-increasing air defense umbrella, wasting numerous assets for self-protection.

Operation Rolling Thunder provides support to the hypothesis although it was *not* an example of maneuver from the air, because it did not seek to, nor did it succeed in enabling

freedom of movement. Even so, consideration of the air power employed in that operation and its results still supports the usefulness of the hypothesis. If air power utilized as it was during Rolling Thunder actually hindered friendly freedom of movement, it suggests that the *employment was not maneuver from the air*. Crucially however, the employment of air power in this case, was also in exact opposition to the maneuver mechanisms stated in the hypothesis.

The second case study, Operation Iraqi Freedom, provided additional, positive support to the usefulness of the hypothesis. Air power during the operation used all three of the maneuver mechanisms, resulting in increased freedom of movement across both the air and land domains. It is impossible to judge the attempt at disruption through decapitation of the regime since the attack was unsuccessful, but both dislocation and overload were very effective. Through Operation Southern Focus, air power functionally dislocated the strength of the Iraqi southern air defenses, enabling freedom of movement in the air. Furthermore, because aircraft could effect an immediate shift to supporting counter-land operations, air power during Southern Focus also enabled freedom of movement on the ground. Additionally, and in combination with the ground forces, air power functionally dislocated the numerical strength of the Iraqi army and Republican Guard by locating and interdicting them before they could engage friendly forces. Finally, by attacking multiple nodes in the Iraqi military system in a short time, air power overloaded the Iraqi's mental and physically capacity. Rather than adapt to the situation, many gave up the fight, left their units and returned home.

Taken as a whole, Operation Iraqi Freedom was an example of maneuver from the air because air power employment directly enabled freedom of movement of the ground force, as evidenced by its ability to move from Kuwait to Baghdad in just under three weeks. More importantly, air power enabled freedom of movement through employment in accordance with the maneuver mechanisms from the hypothesis. Therefore, air operations during Operation Iraqi Freedom support the hypothesis because they both conformed to the maneuver mechanisms and enabled freedom of movement.

## Looking forward – A “How to” for Air Maneuver at the Operational Level

The purpose of this study has been to answer a simple question – what is maneuver from the air domain? The broader goal however, has been to provide a basic understanding of what maneuver from the air domain is, in order to facilitate a future conception of how to execute it. To that end, the starting assumption was that, while correct, it is not enough to simply say that maneuver from the air is movement and fires to achieve a position of advantage. The intent of that assumption was to drive toward a definition with more depth, to enable an easier transition to practical considerations. In truth, the physical and cognitive mechanisms identified in the analysis arguably straddle the line between the methods that define what maneuver is, and how to actually execute it, at least at the tactical level. Moving forward now from the conceptual to the practical, this final section presents a brief look ahead to developing an understanding of how the Air Force can execute maneuver, specifically at the operational level.

Of the maneuver mechanisms developed in this study, disruption and overload require little additional explanation to arrive at some idea of a “how to.” Air power, and the US Air Force specifically, affects disruption through strategic attack; the challenge is to identify the correct center of gravity. Overload of the enemy might require careful timing, access through air defenses, and so forth, but ultimately, accomplishing it entails parallel attacks on the enemy in multiple places, to degrade his ability to adapt. Functional dislocation through combined arms however, requires more development because it can occur at both the tactical and operational levels of war. The examples presented in this study represent complimentary capabilities, combined to accomplish tactical tasks. How then, can the Air Force execute combined arms from the air in the broader sense, to shape campaigns at the operational level?

If, as the preceding analysis suggests, combined arms in the air generally entails grouping together complimentary capabilities created by specific tactical mission sets, at the operational level it theoretically entails grouping together complimentary capabilities inherent in the larger core functions of the Air Force. These core functions as expressed in doctrine are: strategic

attack, counter-air, counter-land, counter-sea, airspace control, air mobility, global integrated ISR, and personal recovery operations.<sup>173</sup> Each core function comprises specific mission types, which create the capabilities that planners must combine in the air domain, or across domains. At the operational level, choosing the combination of core functions in part includes deciding which will be the priority of effort, and which the weight of effort. Priority of effort denotes the function of highest importance, while weight of effort denotes the function allocated the greatest amount of sorties, munitions, etc. The two are not the same because “due to its range, speed, and flexibility, air power can compress time.”<sup>174</sup> Hence, the priority of effort might be counter-air while the weight of effort supports ground forces through counter-land operations. This was exactly the case during Operation Iraqi Freedom, in which the weight of effort supported counter-land operations, but the priority was still to degrade Baghdad’s air defenses to ensure air superiority when ground forces arrived there.<sup>175</sup> Because a loss of air superiority generally endangers both air and ground forces, if an enemy contests the airspace, the weight of air assets must immediately shift back to counter-air as the priority of effort. It is the speed, range and flexibility of air power that makes the shift possible and allows for a clear distinction between priority and weight of effort in the air domain. Furthermore, as the primary variables that planners can manipulate, control of the priority and weight of effort given to core air functions provide a plausible theory for how to shape maneuver at the operational level.

For the US Air Force, operational maneuver is planned and controlled through the Air Operations Center, the command and control mechanism through which the Joint Force Air Component Commander (JFACC) exercises operational and tactical control of most air assets.

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<sup>173</sup> Air Force Doctrine Document (AFDD) 4, *Air Force Operations* (Washington, DC: Government Printing Office, 2013), 20-45. The 2013 edition of this publication contained all the Air Force core functions. They have since been split into various doctrine annexes. There are other core Air Force functions for the space and cyberspace domains that are not referenced here.

<sup>174</sup> AFDD) 1, 25.

<sup>175</sup> Lambeth, *The Unseen War*, 84.

Within the Air Operations Center, the “home of air maneuver” is arguably the Strategy Division, which “supports the achievement of joint force objectives by developing, refining, disseminating and assessing the JFACC’s air, space, and cyberspace operations strategy for all phases of a campaign.”<sup>176</sup> More specifically, the Strategy Division creates two pieces of guidance that shape the employment of maneuver from the air – the Joint Air Operations Plan (JAOP) and the Air Operations Directive (AOD).

The JAOP essentially codifies how the air component will contribute to the overall joint scheme of maneuver. It lays out the plan of how to “integrate and coordinate operations across all phases of air power” and is “based on the strategy to task methodology which consists of objectives, effects, and tasks.”<sup>177</sup> In terms of the preceding discussion, through creation of the JAOP, the Strategy Division determines the priority of effort and weight of effort given to each air-centric core function to achieve required effects. The JAOP becomes a part of the overall operational plan, and its priorities and weights communicate how the air component will leverage maneuver. Changing conditions can alter the plan however, so as the operation becomes more dynamic, the AOD becomes increasingly important.

The Strategy Division issues the AOD on a regular basis in order to guide the Air Operations Center in producing and executing an Air Tasking Order that matches the changing nature of the operation. The AOD is the “JFACC’s written guidance which ensures...operations effectively support the combined/joint force objectives while retaining the flexibility to adjust to the dynamics...of military operations.”<sup>178</sup> In short, the Strategy Division enables maneuver by adjusting the priority and weight of effort in real-time, through guidance contained in the Air Operations Directive, to meet the joint task force commander’s objectives in a dynamic

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<sup>176</sup> Air Force Instruction (AFI) 13-1, *Operational Procedures – Air Operations Center (AOC)* (Washington, DC: Government Printing Office, 2011), 22.

<sup>177</sup> *Ibid.*, 23.

<sup>178</sup> *Ibid.*

environment. The difference between the JAOP and the AOD is that the former is broad guidance for the employment of air power, and generally created ahead of time as part of the overall operational plan. The latter changes on a recurring basis to meet the shifting priorities passed from the joint task force commander to the JFACC. By apportioning forces to air-centric core functions and laying out the specific tasks and effects required, both are instrumental to operational level maneuver from the air domain.

The premise of this study has been that maneuver exists and airmen practice it, even if not codified in doctrine. This section has proposed that at the operational level, members of the Strategy Division shape maneuver through their processes within the Air Operations Center. The question then becomes: is it possible after over a decade of experience in Iraq and Afghanistan that maneuver from the air domain has become a foreign concept even to those who are meant to shape it? The priority of effort and weight of effort have aligned almost entirely with the counter-land core function in both conflicts for quite some time. As Lieutenant Colonel Clint Hinote argued in his book examining centralized control and decentralized execution, the AFCENT Air Operations Center in some ways has been “relegated to a help desk for airpower” to which tactical level requests for air power come in like “trouble tickets.”<sup>179</sup>

Assigning both the priority and weight of effort to the counter-land core function is not necessarily wrong if it is required, however, there are two problems inherent in the situation Hinote described. First, the Strategy Division could fall out of practice if not required to actually shape operational maneuver, especially at the dynamic pace required at the start of Operation Iraqi Freedom. Second, the purpose of the Air Operations Center is to centralize control of air

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<sup>179</sup> Lt Col Clint Hinote, *Centralized Control and Decentralized Execution: A Catchphrase in Crisis?* (Maxwell AFB, AL: Air University Press, March 2009), 24.

assets to meet the joint task force commander's objectives at *all* levels of war, but recently it seems to be shifting its primary focus to tactical operations. Operational level maneuver from the air domain however, is about adjusting the priority and weight of effort given to tasks at the tactical level, in order to affect the operational level and above, not to simply execute those tactical tasks in a vacuum. In the end, air domain planners may have to wait until the next conflict involving major combat operations to determine if they are still up to the challenge of properly shaping maneuver from the air at the operational level of war.

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