

Operations Odyssey Dawn and Unified Protector: Another Win for Warden's Theory

A Monograph

by

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Abstract

Operations Odyssey Dawn and Unified Protector: Another Win for Warden's Theory, by Maj Kurt Distelzweig, 41 pages

This monograph analyzes the planning and execution of Operations Odyssey Dawn and Unified Protector in Libya in 2011 to support Colonel John Warden's theory of warfare. United Nations Security Council resolutions established two operational objectives, a no-fly zone and the protection of civilians, with the major limitation of prohibiting foreign ground forces from the operations. Because of this limitation, airpower was the primary instrument used to achieve the operational objectives. The operational objectives are the framework for this analysis. The methodology consists of three parts. First, Warden's theory is presented and can be simplified as first achieving air superiority, then using air interdiction and close air support missions to target the enemy as a system of five rings through centers of gravity. The theory provides the evaluation criteria. Next, arrangement of tactical actions toward the operational objectives is displayed through the reconstruction of key events. The third section evaluates the tactical actions against the evaluation criteria from Warden's theory in the framework of the two operational objectives. Analysis shows the planning and execution of Operations Odyssey Dawn and Unified Protector supports the main principles of Warden's theory of warfare.

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Introduction

Despite its inability to hold ground over time, air power has – in the right circumstances – the possibility of achieving an effect that is beyond the capacity of other services in the armed forces.¹

—Anders Nygren, *The NATO Intervention in Libya*

On Saturday, 19 March 2011, French combat aircraft entered Libyan airspace at 1:30 p.m. Seeking to obtain an immediate impact, the aircraft aimed at armoured vehicles just outside Benghazi. At night, US Navy ships and Royal Navy submarine HMS *Triumph* launched 112 Tomahawk land-attack missiles (TLAM) against critical nodes of Libya's IADS and fixed-site surface-to-air missile systems. These cruise missile strikes were followed by three B-2 offensive counter-air sorties against key airfields in Libya. With the Libyan air defences having absorbed serious losses, US Air Force F-15Es from Royal Air Force (RAF) Lakenheath, United Kingdom, and F-16CJs from Spangdahlem Air Base, Germany, as well as US Marine Corps AV-8B Harrier IIs, supported by US Navy EA-18 Growler stand-off jamming aircraft, flew follow-on attacks against Gadhafi's forces outside Benghazi.²

—Christian Anrig, *Air and Space Power Journal*

These actions began Operation Odyssey Dawn, a military operation designed to enforce United Nations Security Council Resolutions 1970 and 1973. Operations Odyssey Dawn and Unified Protector are the respective names for the United States and North Atlantic Treaty Organization-led operations enforcing the two resolutions. This monograph focuses on the air operations as part of the campaign, highlighting the other restrictions detailed in the resolutions. The two main operational objectives, supported using all necessary measures, were the protection of civilians and a no-fly zone. There was one major restriction in that no foreign occupying ground force could be used. With no foreign ground force available, airpower alone had to achieve the objectives of the operation.

¹ Kjell Engelbrekt, Marcus Mohlin, and Charlotte Wagnsson, eds., *The NATO Intervention in Libya: Lessons Learned from the Campaign*, Contemporary Security Studies (New York: Routledge, 2014), 123.

² Christian Anrig, "Allied Airpower Over Libya: A Preliminary Assessment," *Air and Space Power Journal* (Winter 2011), 91.

Question

The goal of this monograph is to answer the primary question: Did the planning and execution of Operations Odyssey Dawn and Unified Protector, with the objectives of a no-fly zone and the protection of civilians, follow Colonel John Warden's theory of warfare? The primary question leads into secondary questions. Were there any intentional departures from the theory? Finally, did the results of the operations invalidate any parts of the theory?

Hypothesis

The planning and execution of Operations Odyssey Dawn and Unified Protector followed Colonel John A. Warden's theory of warfare, based on the importance of air superiority and attacking the enemy as a system, even if this was not the intended methodology. Air superiority was the main method of establishing the no-fly zone. With air superiority, attacking the enemy as a system by targeting the centers of gravity with interdiction and close air support missions, achieved the second objective, protection of civilians.

Methodology

To answer the research question, it is necessary to first describe Warden's theory and derive evaluation criteria. This information is primarily from his book, *The Air Campaign*, revised in 2000, and a journal article he published in the *Air and Space Power Journal* in 2011.³ Secondary sources include publications from Air University at Maxwell Air Force Base, such as journal articles and monographs from the School of Advanced Air and Space Studies. Additional secondary sources are from other scholarly journals.

The second part of the monograph focuses on key events of the two operations. This reconstruction shows the arrangement of tactical actions. This information is necessary for the analysis in the third section to determine if the operations followed Warden's theory. Primary

³ John A. Warden III, *The Air Campaign: Planning for Combat*, rev. ed. (San Jose: toExcel, 1998); and John A. Warden III, "Strategy and Airpower," *Air and Space Power Journal* (Spring 2011).

operation sources are unclassified documents from the United States and the North Atlantic Treaty Organization. These documents include information on the goals of the operations and the types of military targets. Some examples are reports to Congress and daily mission statistics. The secondary sources are scholarly journals to provide additional information on the operations.

The third part of the monograph assesses the operations in relation to Warden's theory within the framework of the operational objectives. Analysis compares the information gathered in the second section against the theory presented in the first. The main topics for the analysis are the two North Atlantic Treaty Organization Security Council Resolution objectives of a no-fly zone and the protection of civilians. The types of targets, application of airpower, and the synchronization or linearity of the operation discussed in section two provide factors for comparison within the evaluation criteria of air superiority and attacking the enemy as a system from section one. This analysis then supports or refutes the hypothesis of this monograph.

Colonel John Warden III

Before describing Warden's theory, it is important to identify Warden's goals in writing *The Air Campaign* and describe the professional experiences that shaped his thinking. Warden offered that his work is "a philosophical and theoretical framework for conceptualizing, planning, and executing an air campaign."⁴ Warden was also very clear that his theory is focused at the operational level.⁵ It is necessary to understand Warden's bias that may influence the theory in order have a complete understanding of it. Warden's background shows the nature of his combat experience and how it shaped his theory on airpower. The background and biases influenced the assumptions in the theory and provide context when analyzing Operations Odyssey Dawn and Unified Protector.

⁴ Warden, *The Air Campaign*, xv.

⁵ Ibid., xiii.

Background

John Warden was born in 1943 in Texas and graduated from the US Air Force Academy in 1965.⁶ Following his commission, Warden attended pilot training. By his retirement, Warden had accumulated over 3,000 flying hours in the F-4, F-15, and OV-10, and flew more than 250 combat missions in Vietnam.⁷ Warden was the commander of the 36th Tactical Fighter Wing in Germany flying F-15s. His last assignment was commandant of the US Air Force Air Command and Staff College.⁸ Warden served on the Air Staff and was head of CHECKMATE, a planning office, during the first Gulf War.⁹ In addition to his bachelor's degree, Warden obtained a master's degree from Texas Tech University and was a graduate from Squadron Officer School, Air Command and Staff College, and the National War College. While at the National War College, Warden wrote his thesis on air operations planning, which provided the theme of the book, *The Air Campaign*.

Examining Warden's flying career provides some insight into his tactical thinking. Warden arrived in Vietnam on January 29, 1969, to fly the OV-10 Bronco.¹⁰ In his first six months he was based at Tay Ninh, northwest of Saigon, and assisted the First Air Cavalry Division with reconnaissance and close air support. In this time, Warden saw that "air power could secure lines of communication in ways that land power could not."¹¹ His second observation was that aerial firepower through close air support could provide significant advantage to ground forces, but only if the airpower could arrive on time. Warden's experience

⁶ David R. Mets, *The Air Campaign: John Warden and Classical Airpower Theorists*, rev. ed. (Maxwell Air Force Base: Air University Press, 1999), 55.

⁷ Warden, "Strategy and Airpower," 77.

⁸ Ibid.

⁹ Mets, *The Air Campaign*, 56.

¹⁰ John Andreas Olsen, *John Warden and the Renaissance of American Air Power* (Washington, DC: Potomac Books Inc., 2007), 19.

¹¹ Ibid, 20.

showed that the ground battle was often decided before airpower could apply any influence. In this arena, Warden deemed close air support “an ineffective application of air power.”¹² Warden’s second six-month assignment in Vietnam was at Nakhon Phanom Royal Thai airbase, near the Mekong River.¹³ Here air interdiction replaced his previous mission of close air support. This mission involved identifying enemy infrastructure and logistic targets. Additionally, Warden was now exposed to more enemy air defense threats. Expending large strike packages to interdict menial tactical targets along the Ho Chi Minh Trail, while dodging significant enemy air-to-air and surface-to-air threats, further expanded Warden’s views of airpower capability and limitations. In his Vietnam farewell speech, Warden expressed that, while he was proud of his country and his service, he was concerned “airpower was being misused” and “strategy applied force incorrectly.”¹⁴

Warden’s next assignment was flying the F-4 Phantom II, a multi-role (air-to-air and air-to-ground) fighter aircraft, at Torrejon Air Base, Spain.¹⁵ In this assignment, Warden studied the operational war plan in Europe. He composed an essay where he outlined the operational objectives which he contended were incorrectly focused on close air support and not what he believed to be the more important mission, air superiority. Based on his experiences in Vietnam, where close air support was not decisive and a lack of air superiority threatened interdiction missions, this essay was the foundation of Warden’s theory.

The last aircraft that Warden flew in the military was the F-15C Eagle. It is an all-weather, highly maneuverable, air-to-air, fighter aircraft. The primary mission of the F-15C is air superiority. Flying the Air Force’s newest fighter aircraft, and a true air-to-air only platform, reinforced Warden’s belief in the importance in air superiority. Through his time flying the Eagle,

¹² Ibid.

¹³ Ibid.

¹⁴ Ibid., 22.

¹⁵ Ibid., 23.

Warden participated in exercises where he tried new tactics. One example was Warden expanding air-to-air formations from the traditional two- or four-ship formations to groups as large as twenty-four aircraft.¹⁶ This allowed larger packages of strike aircraft and the operational commander could focus airpower mass on a specific point. This is just one example of Warden validating tactics to further develop his operational focus.

Warden's flying experiences were a major influence in his understanding of the tactical and operational levels of warfare. As a young pilot, Warden's 266 combat missions in Vietnam provided a unique perspective of airpower. Through his two Vietnam assignments, he experienced the capabilities and limitations of airpower in combat. These experiences were the foundation for his theory. His follow-on flying assignments then provided him with the capability to test tactical aspects of his theory. His assignment to the National War College provided him with the opportunity to fully formulate the theory.

Theory

The previous sections detailed Warden's goal in writing, his background, and his possible biases. Dr. David R. Mets, a professor at the School of Advanced Air and Space Studies, provides the assumptions he believed Warden used:

1. Human behavior is complex and unpredictable.
2. Material effects of military action are more predictable.
3. Air superiority is prerequisite for victory or even survival.
4. The offense is by far the stronger form of air war.
5. Victory is and always has been achieved in the mind of the enemy commander—everything must be directed toward that end.
6. Americans are even more sensitive to friendly and even enemy casualties than ever before.¹⁷

The goal, biases, and assumptions provide the framework underlying Warden's theory. Warden's theory consists of two main sections. First, the enemy must be considered as a system consisting of five rings each with its own center of gravity. The second section is the necessity of air

¹⁶ Ibid., 50.

¹⁷ Mets, *The Air Campaign*, 58-9.

superiority in order to attack the enemy system through interdiction and close air support. Additionally, these two sections provide the criteria to evaluate Operations Odyssey Dawn and Unified Protector.

Five rings

Sun Zi, also known as Sun Tzu, wrote, “he who knows his opponent and knows himself will not be imperiled in a hundred battles.”¹⁸ In an effort to know the adversary, Warden recognized “opponents are complicated things with many moving and static parts, but we can simplify our analysis by seeing them as a system.”¹⁹ Warden’s enemy as a system model consists of five rings organized like a bullseye. Leadership is in the center. Working outward from the center are processes, infrastructure, population, and fielded forces.

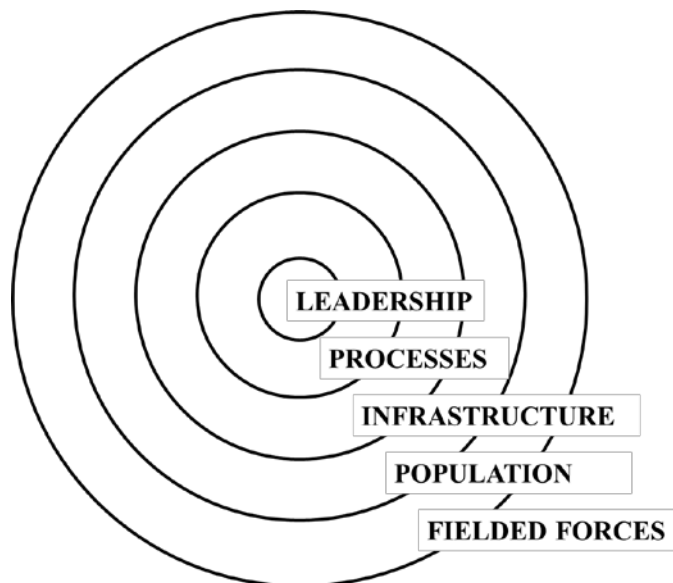


Figure 1. Warden’s Five Rings Model

Source: Created by author.

¹⁸ Sun Zi, *The Art of War: Sun Zi's Military Methods* (Translations from the Asian Classics), Reprint ed. (New York: Columbia University Press, 2009), 87.

¹⁹ Warden, “Strategy and Airpower,” 66.

Warden defined the rings further. If the leader of the opposition is directing the action, removal of the leader will normally result “in a reversal of direction or significant deceleration.”²⁰ Processes as the second ring describe placing the opponent in “a position that makes impossible any pursuit of objectives that conflict with our [objectives].”²¹ An example of targeting processes is implementing a blockade. Infrastructure as the third ring targets a group’s ability to wage war. Infrastructure is part of all opponents and a “nation-state or a group needs some amount of infrastructure to function.”²² Reducing an opponent’s infrastructure reduces the fighting capability of the opponent. Population is the fourth ring. Opponents need assistance from the population to conduct their operation. Depending on the type of opponent and the type of operation, the amount of support varies, but it is still a targetable component. The final ring is fielded forces.

Carl von Clausewitz presented the importance of the enemy’s fielded forces in his book, *On War*. Clausewitz wrote, “if we wish to gain total victory, then the destruction of his armed forces is the most appropriate action.”²³ Warden differed from Clausewitz by having the fielded forces as the outer ring and not the center of effort. Warden reasoned that when an opponent loses part of its fielded force, “it does one of three things in order of likelihood: organize and send more; negotiate to buy time to send more or hope for something good to happen; or agree to offer peace terms when the terms look more attractive than continuing to fight.”²⁴ These choices are up to the opponent. Recalling that Warden’s first assumption is unpredictable human behavior, he sought to reduce this uncertainty. By prioritizing fielded forces last, the opponent is not forced

²⁰ Ibid., 68.

²¹ Ibid.

²² Ibid.

²³ Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984), 92.

²⁴ Ibid., 69.

into the decision matrix until the only option is to cease hostilities. This reduces uncertainty and is why Warden disagreed with Clausewitz on the priority of attacking the opponent's fielded force.

Centers of gravity

Warden proposed that within each of the five rings is a center of gravity. Warden's definition of a center of gravity is "that point where the enemy is most vulnerable and the point where an attack will have the best chance of being decisive."²⁵ Warden's definition encompasses the joint definition as "a source of power that provides moral or physical strength, freedom of action, or will to act."²⁶ Both are similar in that an attack on the *source of power* can be decisive. Clausewitz shared a similar belief calling the center of gravity "the hub of all power and movement, on which everything depends."²⁷ Regardless of the term—center, source, or hub—Clausewitz and Warden identified centers of gravity as a decisive part of the enemy.

Warden's definition also makes clear that the centers of gravity represent a vulnerability. If the enemy knew the source of his power, which is probable, it is also likely that it would be heavily defended. The center of gravity as a whole is typically not vulnerable, but there are vulnerabilities within the center of gravity. Joint doctrine defines center of gravity vulnerabilities as "an aspect of a critical requirement which is deficient or vulnerable to direct or indirect attack that will create decisive or significant effects."²⁸ This definition matches Warden's assertion that attacking the center of gravity can be decisive. Labeling the center of gravity as vulnerable may not be completely correct, but recognizing the vulnerabilities within it can lead to the decisive action.

²⁵ Warden, *The Air Campaign*, 7.

²⁶ Joint Publication (JP) 5-0, *Joint Operation Planning*, (Washington, DC: Government Printing Office, 2011), xxi.

²⁷ Clausewitz, *On War*, 595-6.

²⁸ JP 5-0, GL-8.

Warden provided further analysis on each ring's center of gravity. Attacking each of the ring's centers of gravity has a different effect on the enemy. Warden proposed a force will "realize a far higher return on investments (whether bombs, bullets, or bullion)" by attacking the inner rings over the outer.²⁹ He did not insinuate that the outer rings should not be targeted, but "expect the cost of dealing with the outer rings to be quite high in comparison to the return on the operation."³⁰ By understanding the enemy's centers of gravity, friendly forces can target them to produce the desired end state.

Air superiority

Air superiority is the key to Warden's theory. The opening paragraph of his first chapter describes its importance:

Since the German attack on Poland in 1939, no country has won a war in the face of enemy air superiority, no major offensive has succeeded against an opponent who controlled the air, and no defense has sustained itself against an enemy who had air superiority. Conversely, no state has lost a war while it maintained air superiority, and attainment of air superiority consistently has been a prelude to military victory.³¹

This statement underpins Warden's emphasis on air superiority. Air superiority "permits offensive air operations against an enemy target at a reasonable cost, and it denies that same opportunity to the enemy."³² In an effort to eliminate confusion when analyzing the case study, where the official reports contain terms that do not match with Warden's terms, it is helpful to provide and analyze the definitions used in Warden's theory and in US military doctrine.

Warden's definition of air superiority "means having sufficient control of the air to make air attacks—manned or unmanned—on the enemy without serious opposition and, on the other hand, to be free from the danger of serious enemy air incursions. Within the category of air

²⁹ Warden, "Strategy and Airpower," 69.

³⁰ Ibid.

³¹ Warden, *The Air Campaign*, 10.

³² Ibid., 21.

superiority, there are variations.”³³ Warden listed the variations of air control within his definition of air superiority:

Air supremacy, for example, means the ability to operate air forces anywhere without opposition. Local air superiority gives basic air freedom of movement over a limited area for a finite period of time. Theater air superiority, or supremacy, means that friendly air can operate any place within the entire combat theater. Air neutrality suggests that neither side has won sufficient control of the air to operate without any danger.³⁴

Current Air Force doctrine provides robust definitions of air control:

Air parity. A condition in the air battle in which one force does not have air superiority over others. This represents a situation in which both friendly and adversary land, maritime, and air operations may encounter significant interference by the opposing air force. Parity is not a “standoff,” nor does it mean aerial maneuver has halted. On the contrary, parity is typified by fleeting, intensely contested battles at critical points during an operation with maximum effort exerted between combatants in their attempt to achieve some level of favorable control.

Air superiority. “That degree of dominance in the air battle of one force over another that permits the conduct of operations by the former and its related land, sea, air, and space forces at a given time and place without prohibitive interference by the opposing force” (JP 1-02). Air superiority may be localized in time and space, or it may be broad and enduring.

Air supremacy. “That degree of dominance in the air battle of one force over another that permits the conduct of operations by the former and its related land, sea, air, and space forces at a given time and place without *effective* interference by the opposing force.” Air supremacy may be localized in time and space, or it may be broad and enduring. This is normally the highest level of air control to which air forces can aspire.³⁵

Warden and current Air Force doctrine are close in definition and use the same terminology for the highest two levels of air control, supremacy and superiority. These two levels can be limited or enduring. The third type uses two different terms, parity and neutrality, but again the meanings are similar. Warden is not as precise as Air Force doctrine in applying time and space constraints to supremacy, or enduring capability to superiority, but the overall levels of control are similar.

³³ Ibid., 10.

³⁴ Ibid., 10-11.

³⁵ “Air Force Doctrine Volume IV: Operations,” Curtis E. Lemay Center, accessed March 26, 2014, <https://doctrine.af.mil/download.jsp?filename=Volume-4-Operations.pdf>.

These small differences become more significant when Warden's theory is used to analyze the two operations in the final section of this monograph.

Warden provided some components of how air superiority is achieved. The first step is the subordination of all other operations in order to attain air superiority. Warden specifically stated that this does not mean no other operations begin until air superiority is established but "no operations should be commenced if it is going to jeopardize the primary mission, or is going to use forces that should be used to gain air superiority."³⁶ Warden conceded there might be exceptions to this rule, like an enemy surprise attack that requires additional resources, but warns that this should not be the norm. Achieving air superiority should not only occur from the air. Army ground forces, naval surface forces, and surface-to-air missiles and guns can be used to achieve this objective. Integrating these assets with aircraft can expedite the process.

Warden concluded with three basic factors that affect air superiority: materiel, personnel, and position. Materiel includes aircraft, supplies, and infrastructure for direct support.³⁷ Personnel are the pilots and other "very highly skilled people who man combat systems, who have special talents to begin with, and who require extensive training before becoming useful in battle."³⁸ Position covers the location and vulnerability of air bases, ground battle lines, and infrastructure.³⁹ These three factors provide the framework for planning to achieve air superiority.

Interdiction

Once aircraft achieve air superiority, they can then fly interdiction missions. For Warden, interdiction is "any operation designed to slow or inhibit the flow of men or materiel from the

³⁶ Warden, *The Air Campaign*, 13.

³⁷ *Ibid.*, 15.

³⁸ *Ibid.*

³⁹ *Ibid.*

source to the front, or laterally behind the front.”⁴⁰ Joint doctrine defines interdiction as “actions to divert, disrupt, delay, or destroy the enemy’s military surface capability before it can be used effectively against friendly forces, or to otherwise achieve objectives.”⁴¹ It is possible that a military capability does not need to be located at the front to be used effectively, creating some difference between the definitions, but for the scope of this analysis, the meanings are similar enough to explain the role of this piece of Warden’s theory.

Warden divided ground action into six categories to visualize interdiction. The categories are: in retreat, static defense against an enemy offensive, offensive operations on both sides, offensive operations against a static defense, against a retreating enemy, and against self-sufficient forces. Using categories and historical examples, Warden asserted that interdiction is most effective when pressure is on the enemy and he must move major forces and equipment quickly.⁴² His examples also highlighted how air superiority permitted successful interdiction operations and the lack of air superiority hindered success.

Warden provided some considerations in interdiction operations. He highlighted the increased risk and warned, “one modern aircraft and a highly trained pilot probably are too high a price to pay for one old truck, loaded with rice, driven by a private.”⁴³ This statement is a clear reference to his experiences in Vietnam. His final warning is that interdiction missions should not be attempted without air superiority, except under unusual circumstances. A possible compromise is when that mission supports both air superiority and ground operations. An example of this type of mission would be a strike against petroleum plants and transportation networks. This type of attack could support both objectives and reduce a strategic capability.

⁴⁰ Ibid., 72.

⁴¹ Joint Publication (JP) 3-0, *Joint Operations*, (Washington, DC: Government Printing Office, 2011), III-24.

⁴² Warden, *The Air Campaign*, 80.

⁴³ Ibid., 84.

Close air support

Defining close air support is a challenge as it can look like interdiction; furthermore, procedure, coordination, and target-types do not always provide a clear difference. Warden recognized that this distinction is difficult but attempts a definition nonetheless. Close air support is “any operation that theoretically could and would be done by ground forces on their own, if sufficient troops or artillery were available.”⁴⁴ Joint doctrine defines close air support as “air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces.”⁴⁵ These definitions are not similar and Warden qualified this difference. He claimed it is not important that the definitions match only that “air-and ground-commanders go through a mental exercise to differentiate between close air support and all other air operations.”⁴⁶ This is necessary because ground commanders determine where close air support is used. Without a common understanding by both ground and air commanders, airpower may be used incorrectly.

Warden provided some examples of how to use close air support. He recognized that every ground commander would like as much airpower as possible but this is unmanageable. By viewing close air support as an operational ground reserve, both the Airman and the Soldier can “put proper value on a scarce and valuable commodity.”⁴⁷ Close air support should be used “quickly and decisively” as a “shock weapon that is most effective when concentrated in space and time.”⁴⁸ There is a difference between the use of close air support and a ground reserve. Airpower can cover large distances quickly and therefore provide a much faster response than a

⁴⁴ Ibid., 87.

⁴⁵ JP 3-0, GL-6-7.

⁴⁶ Ibid.

⁴⁷ Ibid., 89.

⁴⁸ Ibid., 90.

ground force. Unfortunately, loiter time is limited and eventually the aircraft will have to return to station. A ground force will take longer to arrive, but can remain in the area. Close air support can provide firepower quickly, but not for an extended period. Finally, Warden reminded commanders that every close air support sortie is one less interdiction sortie. Weighing the benefits of each will determine where best to apply airpower.

Warden described the enemy as a system. Targeting the centers of gravity of the five rings can defeat the system. In order to target the enemy, friendly forces must have air superiority. With air superiority, air interdiction and close air support missions can destroy the centers of gravity. According to Warden's theory, these actions will achieve the objectives and lead to the desired end state. This monograph uses these criteria from Warden's theory for analyzing Operations Odyssey Dawn and Unified Protector in section three. The next section highlights key events from the two operations. These events provide the details concerning tactical actions necessary for analysis in section three.

Operations Odyssey Dawn and Unified Protector

The United Nations Security Council met on February 26, 2011, to express "grave concern at the situation in the Libyan Arab Jamahiriya and [condemn] the violence and use of force against civilians."⁴⁹ This resolution continued by "*deploring* the gross and systematic violation of human rights, including the repression of peaceful demonstrators, expressing deep concern at the deaths of civilians, and rejecting unequivocally the incitement to hostility and violence against the civilian population made from the highest level of the Libyan government."⁵⁰ The resolution concluded by imposing an arms embargo, travel ban, and asset freeze, while referring the case to the International Criminal Court.

⁴⁹ United Nations Security Council, "Resolution 1970: Peace and Security in Africa," (S/RES/1970), Official Record (New York, 22 February 2011), 1. The country of Libya is referred to as Libyan Arab Jamahiriya in some documents. This monograph will refer to the country as Libya except when quoted.

⁵⁰ Ibid.

As the conditions in Libya continued to decline, the United Nations Security Council met again on March 17, 2011. In this meeting, the Council highlighted “the failure of the Libyan authorities to comply with resolution 1970 (2011), [while] *expressing* grave concern at the deteriorating situation, the escalation of violence, and the heavy civilian casualties.”⁵¹ In addition to the previously imposed restrictions, the United Nations Security Council added two additional actions, the protection of civilians and a no-fly zone. The Council authorized Member States, “to take all necessary measures...to protect civilians and civilian populated areas under threat of attack in the Libyan Arab Jamahiriya, including Benghazi, while excluding a foreign occupation force of any form on any part of Libyan territory.”⁵² The no-fly zone established “a ban on all flights in the airspace of the Libyan Arab Jamahiriya in order to help protect civilians” and authorized the Member States “to take all necessary measures to enforce compliance with the ban on flights.”⁵³ The Council’s direction to the Member States was clear. First, it authorized *all necessary measures* to accomplish the objectives. Second, the Council clearly excluded a foreign occupation force. These restrictions limited the Member States options in how to proceed with this operation. The methods used previously in Operations Iraqi Freedom and Enduring Freedom were not viable as they used Member State’s soldiers in the objective country. For this operation, airpower was the only military option available for the establishment and enforcement of the no-fly zone and the protection of the civilians.

Strategic objectives

President Obama described the strategic objectives and the reasoning behind the operation in a speech to the National Defense University. The President highlighted that “for generations, the United States of America has played a unique role as an anchor of global security

⁵¹ United Nations Security Council, "Resolution 1973: Libya," (S/RES/1973), Official Record (New York, 17 March 2011), 1.

⁵² Ibid., 3.

⁵³ Ibid.

and as an advocate for human freedom. Mindful of the risks and costs of military action, we are naturally reluctant to use force to solve the world's many challenges. But when our interests and values are at stake, we have a responsibility to act."⁵⁴ As the Libyan people began reclaiming their human rights, Colonel Qadhafi responded with force.⁵⁵ The United States joined other nations in enforcing United Nations Security Council Resolution 1970, which implemented sanctions and embargos. As the violence continued, the President was confronted with "this brutal repression and a looming humanitarian crisis."⁵⁶ As Colonel Qadhafi's forces continued to move east, "Benghazi, a city nearly the size of Charlotte, could suffer a massacre that would have reverberated across the region and stained the conscience of the world."⁵⁷ The President stated it was not in our national interest to let that happen.⁵⁸ The President summarized the actions: "the United States has worked with our international partners to mobilize a broad coalition, secure an international mandate to protect civilians, stop an advancing army, prevent a massacre, and establish a no-fly zone with our allies and partners."⁵⁹ These actions supported the strategic objectives of protecting innocent lives and supporting basic human rights while reinforcing regional and global security.⁶⁰

⁵⁴ Barack Obama, "Libya" (speech, National Defense University, Washington, DC, March 28, 2011), accessed April 29, 2014, <http://www.whitehouse.gov/photos-and-video/video/2011/03/28/president-obama-s-speech-libya#transcript>.

⁵⁵ The name of Muammar al Qadhafi is transcribed in many ways by various sources. This monograph refers to him as Colonel Qadhafi, or simply Qadhafi, except when quoting other documents, where his name is represented as it appears in the source.

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ Ibid.

⁶⁰ For more information regarding the right to protect in Libya reference the following School of Advanced Military Studies monographs: Joshua J. Major, "The Responsibility to Protect: Intervention is Not Enough" (Monograph, School of Advance Military Studies. Fort Leavenworth: US Army Command and General Staff College, 2013); and J.E. Landrum,

While the President did outline strategic objectives, two aspects were missing. First, what was the United States' relationship with the rebel forces? Was the United States supporting their effort and assisting them militarily, or were military actions focused solely on the protection of the civilians. The second aspect was the desired end state. What did the United States want Libya to "look like" when the military forces left? Were there exit criteria, for both success and failure, that would permit a withdrawal of military forces? These ambiguities added complexity into the operational planning process and made it difficult to measure successful achievement of strategic objectives.

No-fly zone

Marine Corps General James N. Mattis, then commander of United States Central Command, succinctly described the process of establishing a no-fly zone. He said friendly forces "would have to remove the air defense capability, in order to establish the no-fly zone. So it – no illusions here, it would be a military operation. It wouldn't simply be telling people not to fly airplanes."⁶¹ Examining Libya's air defense system before the conflict, it "was considered one of the most robust air defense networks in Africa, second only to Egypt's."⁶² As part of the air defense system, Libya had ten major air bases housing about 180 fighter and attack aircraft. Most

"Legitimacy: First Principles and Efficacy of R2P Operations" (Monograph, School of Advanced Military Studies. Fort Leavenworth: US Army Command and General Staff College, 2012).

⁶¹ John Vandiver and Geoff Ziezulewicz, "No-Fly Zone Over Libya: The Facts," *Stars and Stripes* (Washington, DC), March 1, 2011.

⁶² Florence Gaub, *The North Atlantic Treaty Organization and Libya: Reviewing Operation Unified Protector*, Letort Papers (Carlisle, PA: Strategic Studies Institute and US Army War College Press, 2013), 6, accessed April 1, 2014, <http://www.strategicstudiesinstitute.army.mil/pubs/download.cfm?q=1161>.

of the aircraft were believed to be non-operational.⁶³ The first step to establish the no-fly zone was to destroy the Libyan air defense system, including enemy aircraft and surface-to-air threats.

The Director of the Joint Staff, Vice Admiral Bill Gortney, gave a press conference on March 20, 2011, that described the events of the first two days of the operation. The initial actions to establish the no-fly zone began with 124 Tomahawk “missiles strikes on selected air defense systems and facilities ashore, as well as air defense command and control infrastructure.”⁶⁴ These initial strikes “significantly degraded the regime’s air defense capability to include their ability to launch many of their SA-5s which are the long-range surface-to-air missiles” as well as SA-2 and SA-3 surface-to-air systems.⁶⁵ Following the initial missile strikes, manned aircraft targeted “military facilities and aircraft from an airfield at Ghardabiya.”⁶⁶ They destroyed aircraft and additional air defense assets. In addition to the air defense targets, “coalition tactical fighters also began hitting the ground forces of Colonel Qadhafi on the outskirts of Benghazi.”⁶⁷ These targets included armor, mechanized infantry, and mobile surface-to-air batteries. After the first day of operations, coalition forces attacked air defense systems, command and control nodes, and enemy fielded forces. The success of these strikes led Admiral Mike Mullen, Chairman of the Joint Chiefs of Staff, to declare on March 20th, 2011, the “no-fly zone effectively in place.”⁶⁸

⁶³ Jeremiah Gertler, *Operation Odyssey Dawn (Libya): Background and Issues for Congress*, CRS Report R41725, (Washington, DC: Library of Congress, Congressional Research Service, March 30, 2011), 10.

⁶⁴ “DoD News Briefing with Vice Adm. Gortney from the Pentagon On Libya Operation Odyssey Dawn,” US Department of Defense, March 20, 2011, accessed April 1, 2014, <http://www.defense.gov/Transcripts/Transcript.aspx?TranscriptID=4787>.

⁶⁵ Ibid.

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ Michael J. Carden, “Mullen Says No-Fly Zone 'Effectively in Place',” US Department of Defense, accessed April 1, 2014, <http://www.defense.gov/news/newsarticle.aspx?id=63231>.

One problem in determining if the objective of a no-fly zone was complete is in the definition. Admiral Mullen said the no-fly zone was *effectively in place*, but there were still parts of the Libyan air defense system intact. On March 20, 2011, the same day as Admiral Mullen's statement, Vice Admiral Gortney stated the fixed surface-to-air missile systems (SA-2, 3, 5) were "taken down" but there are still "mobile surface-to-air missiles, SA-6, SA-8, and a particular large number of handheld what we called [MANPADS], SA-7 type, and there are quite a few of those out there."⁶⁹ Furthermore, there had been no attacks against "triple-A (anti-aircraft artillery) sites, whether they're fixed or they're mobile."⁷⁰

Is the establishment of a no-fly zone the same as air superiority? The standard answer applies: *it depends*. In this case, the no-fly zone was *effectively in place* after the first day depending on the definition. The definition of a no-fly zone falls under the Joint definition of an exclusion zone: "a zone established by a sanctioning body to prohibit specific activities in a specific geographic area in order to persuade nations or groups to modify their behavior to meet the desires of the sanctioning body or face continued imposition of sanctions, or the use or threat of force."⁷¹ A no-fly zone is an air exclusion zone. Important in this definition is the term *prohibit*. Prohibit does not mean prevent. Another definition shows that "a no-fly zone cannot prevent an actor from flying, but ensures that any activity will be dealt with according to the pre-set conditions decided for the zone."⁷² For this operation, United Nations Security Council Resolution 1973 as enforced by coalition aircraft prohibited all unauthorized flights, regardless of the intent or origin. The no-fly zone was tested on April 9, 2011, when a rebel MiG-23 took off from a base near Benghazi. Coalition fighter aircraft detected the prohibited aircraft and the MiG-

⁶⁹ "DoD News Briefing with Vice Adm. Gortney from the Pentagon On Libya Operation Odyssey Dawn," March 20, 2011.

⁷⁰ Ibid.

⁷¹ JP 3-0, GL-9.

⁷² Engelbrekt, *The NATO Intervention in Libya*, 107.

23 returned to base.⁷³ This event demonstrated the definition of a no-fly zone as prohibition, not prevention. The no-fly zone was maintained through the threat of force, the same threat of force that was in place after the first day. If the no-fly zone was effectively in place after the first day, did the coalition force also have air superiority?

Returning to the definitions of air superiority listed earlier, again the answer is: it depends. Air superiority can be qualified through time and space. It is reasonable that after the first day's strikes, coalition forces had local air superiority. In the days following the initial strikes, mobile surface-to-air missile sites and command and control locations were destroyed. On March 23, 2011, Vice Air Marshall Gregory Bagwell, Royal Air Force Commander of Air Operations over Libya, announced the Libyan "air force no longer exists as a fighting force, and its integrated air defence system and command and control networks are severely degraded to the point that we can operate over [Libyan] airspace with impunity."⁷⁴ With these conditions, air superiority had met the Air Force doctrine terms of *broad and enduring*. Again recalling the definitions of air superiority, this did not mean there was no opposition from enemy forces. Warden used the term *serious opposition* and Air Force doctrine uses *prohibitive interference*. On March 28, 2011, a pilot reported a launch of "maybe an SA-2 or an SA-3."⁷⁵ This single air defense measure did not invalidate air superiority, but did provide an example to highlight the importance of definitions in operations.

By the end of March 20, 2011, the first twenty-four hours of the operation, one of the primary operational objectives was complete, the establishment of a no-fly zone. Enforcement continued throughout the duration of the operation, but the no-fly zone permitted greater freedom

⁷³ Ibid., 118.

⁷⁴ "Libyan Air Force Neutralised," Ministry of Defence, accessed April 1, 2014, <https://www.gov.uk/government/news/libyan-air-force-neutralised>.

⁷⁵ "DoD News Briefing with Vice Adm. Gortney from the Pentagon On Libya Operation Odyssey Dawn," US Department of Defense, March 28, 2011, accessed April 1, 2014, <http://www.defense.gov/Transcripts/Transcript.aspx?TranscriptID=4803>.

in achieving the second objective of protecting civilians. The coalition did not delay protection of civilians until the no-fly zone was established; there were strikes against regime ground units threatening civilians during the first twenty-four hours. With the no-fly zone in place, coalition aircraft could focus more effort on protecting civilians. The final section of this monograph further analyzes the no-fly zone in relation to Warden's theory.

Protection of civilians

During the first twenty-four hours of the operations, the coalition targeted Libyan air defenses in order to establish the no-fly zone. Additionally, coalition aircraft targeted Libyan maneuver forces near Benghazi. In first hours of the conflict, "fifteen [United States] Air Force and Marine Corps aircraft participated in these attacks, as well as aircraft from France and Great Britain."⁷⁶ When questioned why these enemy units were attacked, Vice Admiral Gortney's response was clear, "they were mechanized positions and they were advancing on Benghazi. And so to protect the Libyan people we took them under attack."⁷⁷

The first step in protecting civilians was attacking Libyan maneuver units. Vice Admiral Gortney identified this objective in his March 20, 2011 press conference. He stated, "if [Qadhafi's ground forces] are moving and advancing on to the opposition forces into Libya, yes, we will take them under attack." Targeting the fielded forces played a primary role in protecting the Libyan people.

Coalition fighter aircraft targeted Libyan ground forces on the first day and nearly every day of the operation. North Atlantic Treaty Organization documents provide further detail on the strike results. The April 18, 2011 summary contained the following key engagements:

⁷⁶ "DoD News Briefing with Vice Adm. Gortney from the Pentagon On Libya Operation Odyssey Dawn," March 20, 2011.

⁷⁷ Ibid.

18 April: In the vicinity of Tripoli: 9 ammunition bunkers and 1 building (HQ of 32nd Brigade) were destroyed.
In the vicinity of Misrata: 6 surface to air missiles, 4 tanks, 3 air defence missile sites and 1 mobile rocket launcher were destroyed.
In the vicinity of Sirte: 3 ammunition storage bunkers destroyed.
In the vicinity of Zintan: 3 tanks, 1 anti-aircraft weapon system and 1 armoured vehicles were destroyed.
In the vicinity of Brega: 1 building was destroyed.⁷⁸

This battle damage assessment shows both the types of targets and their location. During this one day of operation, coalition fighter aircraft destroyed ground maneuver vehicles as well as air defense and supply depots. Strikes against ground maneuver units and logistic capacity continued throughout the operation. One of the most successful attacks occurred on October 20, 2011. The North Atlantic Treaty Operation media release provides a detailed account of the events:

At approximately 08h30 local time (GMT+2) on Thursday 20 October 2011, NATO aircraft struck 11 armed military vehicles which were part of a larger group of approximately 75 vehicles manoeuvring in the vicinity of Sirte. These vehicles were leaving Sirte at high speed and were attempting to force their way around the outskirts of the city. The vehicles had a substantial amount of mounted weapons and ammunition, posing a significant threat to the local civilian population.

The convoy was engaged by NATO aircraft to reduce the threat. Initially, only one vehicle was destroyed, which disrupted the convoy and resulted in many vehicles dispersing and changing direction.

After the disruption, a group of approximately 20 vehicles continued at great speed to proceed in a southerly direction, due west of Sirte, and continuing to pose a significant threat. NATO again engaged these vehicles with another air asset. The post strike assessment revealed that approximately 10 pro-Qadhafi vehicles were destroyed or damaged.

At the time of the strike, NATO did not know that Qadhafi was in the convoy. NATO's intervention was conducted solely to reduce the threat towards the civilian population, as required to do under our UN mandate. As a matter of policy, NATO does not target individuals.⁷⁹

⁷⁸ "NATO and Libya: Operational Media Update for 18 April," Allied Joint Force Command Naples, SHAPE, NATO HQ, April 19, 2011, accessed April 17, 2014, http://www.nato.int/nato_static/assets/pdf/pdf_2011_04/20110419_110419-oup-update.pdf.

⁷⁹ "NATO and Libya: Operational Media Update for 20 October," Allied Joint Force Command Naples, SHAPE, NATO HQ, October 21, 2011, accessed April 17, 2014, http://www.nato.int/nato_static/assets/pdf/pdf_2011_10/20111021_111021-oup-update.pdf.

These two reports show the variety of targets destroyed in an effort to protect the Libyan civilians. The reports also show the arrangement of the tactical actions for a typical day of the operation.

The North Atlantic Treaty Organization daily update stated policy does not permit targeting individuals, in this case Colonel Qadhafi. This point was also stressed during Vice Admiral Gortney's March 20, 2011 conference when he stated, "at this particular point I can guarantee that [Qadhafi is] not on a targeting list."⁸⁰ Although Colonel Qadhafi was not targeted, specific elements of his army were. Military intelligence identified the 32nd Brigade as "a premier force for Colonel Qadhafi."⁸¹ Intelligence assets monitored the units of the 32nd Brigade, and on April 18, 2011, fighter aircraft destroyed the Headquarters Building.⁸² Because this unit was the largest threat to the protection of civilians, it was critical to target.

Protecting civilians through airpower provided challenges not present if ground forces conducted the same operation. Airpower cannot set up blocking positions and keep opposing forces out. To protect the Libyan civilians, aircraft had to destroy Colonel Qadhafi's ground forces. The coalition targeted ground elements from the beginning of the operation until its completion. Intelligence identified the 32nd Brigade as the most capable and threatening ground force and thus fighter aircraft targeted it as a critical element of the Libyan regime. Although friendly forces did not individually target Colonel Qadhafi, he was injured when he was part of a ground maneuver element. Through the destruction of Libyan fielded forces, the coalition protected the Libyan civilians and the primary objective of the operation was complete. This

⁸⁰ "DoD News Briefing with Vice Adm. Gortney from the Pentagon On Libya Operation Odyssey Dawn," March 20, 2011.

⁸¹ "DoD News Briefing with Adm. Locklear via Telephone from USS Mount Whitney," US Department of Defense, March 22, 2011, accessed April 1, 2014, <http://www.defense.gov/Transcripts/Transcript.aspx?TranscriptID=4793>.

⁸² "NATO and Libya: Operational Media Update for 18 April," Allied Joint Force Command Naples, SHAPE, NATO HQ, April 19, 2011.

concludes detailing some of the tactical action of the two operations. This information is now evaluated using Warden's theory.

Analysis of Operation Odyssey Dawn and Unified Protector

The previous two sections of this monograph presented the basis of Warden's theory and an overview of the two operations. The analysis of the operations is divided into two parts corresponding with the two operational objectives. These are first, the establishment and enforcement of the no-fly zone, and second, the protection of civilians. The evaluation criteria are the elements of Warden's theory that were previously selected: the enemy as a system of five rings, each with a center of gravity, and the necessity of air superiority to enable interdiction and close air support to attack the enemy as a system. Through the analysis, these individual elements emerge as pieces that are linked with each other.

No-fly zone

The no-fly zone was one of the objectives of United Nations Security Council Resolution 1973. As an air exclusion zone, it provided the Libyan civilians freedom from air attack. It also provided coalition forces freedom to conduct air-to-ground attacks. Establishing a no-fly zone in accordance with the Security Council's objective, matches with Warden's theory of establishing air superiority first. The initial attacks of Operation Unified Protector were the destruction of the Libyan Air Force and many of its permanent strategic surface-to-air missile sites. There was no direct air-to-air opposition, but the configuration of the coalition assets, F-16 Fighting Falcons and F-15E Strike Eagles, were in position to eliminate any air threats.

With no air-to-air opposition, the next step in establishing air superiority was eliminating surface-to-air systems. Tomahawk missiles and B-2 Spirit stealth bombers attacked these systems on the first night of the operation. During the bombing missions, the coalition forces had localized, temporary air superiority as they were destroying targets in order to provide larger, permanent air superiority. Strike aircraft targeted mobile surface-to-air systems as they were

identified. Maintaining air superiority continued throughout the operation as evidenced by the April 18, 2011 key target engagements where coalition aircraft destroyed surface-to-air missiles, air defense missile sites, and an anti-aircraft weapon system. These tactical actions further increased the time and space of air superiority.

Operations Odyssey Dawn and Unified Protector follow Warden's offensive method of air superiority. For reference, the counter is air defense; Warden used the example of the British defense against the German air offensive in the summer and fall of 1940.⁸³ To gain air superiority through the offensive, "every aircraft capable of crossing the lines is sent out on missions designed to crush the enemy's offensive capability. (Suppression of air and ground-based defenses may be necessary before attacking systems supporting offensive air.)"⁸⁴ This is precisely what the coalition did on the night of March 19, 2011.

Warden listed five areas vulnerable to attack to achieve air superiority: equipment, logistics, geography, personnel, and command and control.⁸⁵ Operation Unified Protector targeted the equipment and geography, the aircraft and defense systems already in place. This was the most efficient way to initiate air superiority and highlights a strength of offensive air superiority. Warden asserted the advantage of offensive air superiority is that it "keeps the initiative and forces the enemy to react."⁸⁶ This is a meaningful phrase in that it also relates to current joint doctrine.

Joint doctrine outlines the six-phase model for operations. The phases are:

⁸³ Warden, *The Air Campaign*, 23. For more information on defensive air operations, reference Chapter Four, where Warden describes the worst situation, when the enemy can operate against one's own bases while his are immune.

⁸⁴ Ibid., 22.

⁸⁵ Ibid., 34.

⁸⁶ Ibid., 22

Shape (Phase 0)
Deter (Phase I)
Seize Initiative (Phase II)
Dominate (Phase III)
Stabilize (Phase IV)
Enable Civil Authority (Phase V)⁸⁷

The actions on March 19, 2011 to establish air superiority seized the initiative. The previous sanctions and embargos attempted to deter further Libyan aggression. When they were not successful, military action began, and the pursuit of air superiority, in agreement with Warden's theory, seized the initiative.

Achieving the first operational objective of a no-fly zone supported Warden's priority of establishing air superiority. As previously mentioned, the definitions of the terms are not identical, but in this instance, the manner in which they were achieved is the same. The final piece of emphasis is that of time, space, and purpose. Terms like no-fly zone and air superiority are often used without understanding their complete definition. Time and space are important stipulations to a no-fly zone and air superiority. Localized or enduring carry different requirements. Understanding the purpose may help determine what is needed. The operational purpose of these actions is usually easy to determine, to prevent aircraft from flying. The strategic purpose may not be as clear. For this case, the strategic purpose was to protect civilians from air attack and allow coalition forces freedom of air maneuver. Understanding the definitions of the terms, as well as the assumptions of the theory, allows a complete analysis of the no-fly zone. The next part for examination is the protection of civilians.

Protection of civilians

Protection of civilians is a difficult operational objective when only using airpower. Friendly ground forces, when placed in close proximity to civilians, offer a more direct means of protecting the populace. Airpower, on the other hand, must maintain a more offensive posture to defeat or destroy the enemy. Using air superiority to establish a no-fly zone achieved one

⁸⁷ JP 5-0, xxiii-xxiv.

operational objective and supported Warden's theory on the importance of air superiority. In order to achieve the second operational objective, protection of civilians, Warden's criteria of attacking the enemy as a system through interdiction and close air support requires closer examination. This analysis begins with the innermost ring, leadership.

Leadership is the center of the five rings and, according to Warden, offers the greatest benefit when targeted. The leader of Libya was Colonel Qadhafi. For both Operation Odyssey Dawn and Unified Protector, Qadhafi was not a target. This was clearly expressed in press conferences and daily reports. The United Nations Security Council did not name Colonel Qadhafi as a target or list regime change as the objective. Because of this, Qadhafi was not directly targeted, but his command and control elements were.

It was not necessary to kill every military leader in the Libyan Army in order to target leadership. The coalition forces destroyed command centers and early warning radars to "isolate the commanders."⁸⁸ This limited information available to the political and military leadership. One example of this type of strike was the destruction of the Libyan 32nd Brigade Headquarters. Eliminating the command and control functions at the headquarters reduced the combat capability of the 32nd Brigade. More information on this brigade is presented in the fielded forces analysis.

Warden specifically stated that "if a strong leader such as Attila, Napoleon, Bismarck, Hitler, or bin Laden is taking an opponent in a particular direction, the removal of that leader (and perhaps his close associates) will normally result either in a reversal of direction or significant deceleration."⁸⁹ Colonel Qadhafi was that strong leader who was commanding the attacks on the Libyan people, but he was not targeted individually. The center of gravity of leadership was Colonel Qadhafi. On October 20, 2011, rebel fighters killed Colonel Qadhafi and Operation Unified Protector ended eleven days later.

⁸⁸ Engelbrekt, *The NATO Intervention in Libya*, 121.

⁸⁹ Warden, "Strategy and Airpower," 68.

The coalition identified Qadhafi as the center of gravity for the leadership ring and the staff arranged tactical actions to isolate him and deny his ability to command. It is impossible to determine how long the Libyan ground forces would have continued their attack on the civilian people if Qadhafi was not killed. It is apparent that his death quickly ended the attacks and the coalition achieved the objective of protecting civilians.

The events of Operation Unified Protector were a successful application of Warden's leadership ring. Tactical actions isolated political and military leaders from their subordinates. Warden's theory on the return on investment for efforts to affect different rings was also validated. Warden wrote attacking the rings closer to the center provide more return than the outer rings. The removal of one individual permitted the completion of the operation.⁹⁰

Warden's second ring is processes. Processes are links that assist the enemy system in conducting operations. The coalition targeted multiple processes through the two operations. In the first few days of the conflict, while establishing the no-fly zone, early warning radar sites and communication nodes were destroyed. This was a primary objective in establishing the no-fly zone and establishing Warden's primary objective of air superiority, but was also part of his second ring (and the third – infrastructure, which will be covered in the next section). Eliminating information gathering and communication capabilities disrupted the processes of the enemy system.

Each of Warden's five rings can be targeted non-kinetically as well, and this ring provides an example. United Nations Security Council Resolution 1970 also mandated an arms embargo and asset freeze. These measures targeted the process of purchasing and equipping Libyan military forces. This disruption reduced Colonel Qadhafi's ability to sustain his military forces.

⁹⁰ For more information on coercion theory in this campaign reference the following School of Advanced Military Studies monograph: Richard Goodman, "Operations Odyssey Dawn and Unified Protector: A Coercive Failure?" (Monograph, School of Advance Military Studies. Fort Leavenworth: US Army Command and General Staff College, 2013).

Identifying a center of gravity for processes is typically more difficult than establishing the leadership center of gravity. There are many processes in the enemy system. The United Nations Security Council specifically stated two that were targeted. To establish air superiority, other processes were disrupted or destroyed. Additional military logistical processes were targeted in an effort to reduce Libyan ground maneuver capability. Although establishing the center of gravity is not as simple as naming the influential leader, in this case, that person helps identify the processes' center of gravity: command and control through communication.

Colonel Qadhafi's ability to lead his military forces is the center of gravity for this ring. As the political and military leader, his ability to communicate with the people and command the armed forces was critical. The targeting of communication towers and command and control bunkers disrupted this process.⁹¹

In Operations Odyssey Dawn and Unified Protector, the first two of Warden's rings are linked. The coalition isolated the leadership by disrupting the process of command, control, and communication. To disrupt this process, aircraft destroyed elements of the communication system. These elements are part of the infrastructure, the third ring in Warden's theory.

Warden asserted that every enemy needs infrastructure to function. This is clearly true for any conventional military force, such as the Libyan Armed Forces.⁹² North Atlantic Treaty Organization's Daily Reports show that a building, bunker, or depot was kinetically targeted nearly every day of the operation. The specific target types vary, but include vehicle storage facilities, command bunkers, and ammunition storage. Ammunition and missile storage facilities were the overwhelming majority of infrastructure targets destroyed.

⁹¹ "NATO and Libya: Operational Media Update for 20 April," Allied Joint Force Command Naples, SHAPE, NATO HQ, April 21, 2011. accessed May 06, 2014, http://www.nato.int/nato_static/assets/pdf/pdf_2011_04/20110421_110421-oup-update.pdf; and "NATO and Libya: Operational Media Update for 22 April," Allied Joint Force Command Naples, SHAPE, NATO HQ, April 23, 2011. accessed May 06, 2014, http://www.nato.int/nato_static/assets/pdf/pdf_2011_04/20110423_110423-oup-update.pdf.

⁹² Warden also discusses infrastructure in unconventional warfare in *The Air Campaign*, 68-9.

Based on the mission reports, the coalition clearly thought ammunition was the infrastructure center of gravity. As previously discussed, command and control and communication elements were also destroyed, but these were to support the previous two rings. Ammunition does not influence the previous rings as much as it affects the last, fielded forces. Ammunition is the center of gravity for this ring, as it provides the greatest impact without disrupting the operational and strategic objectives.

Other possible centers of gravity for this ring could be petroleum, oil, and lubricant locations or road networks. The problem with targeting these areas was the impact on the population. While they may provide greater impact to the Libyan military forces, they also significantly affect the civilian population. This inquiry introduces Warden's views on "reachable" centers of gravity.⁹³

"Reachable" means having the resources and authorization to attack. Recalling Warden's definition of a center of gravity: *the point where an attack will have the best chance of being decisive*. "In some cases, the commander must identify specific reachable centers of gravity, if he has neither the resources nor the authorization to act against the ultimate centers."⁹⁴ Targeting military-civilian processes supports Warden's claim. It is difficult to know if targeting petroleum, oil, and lubricants would have had a greater impact than targeting ammunition, but the former did not match with the strategic objectives whereas the latter did. Simply identifying a center of gravity does not mean it should be targeted. Understanding its role in the strategic level provides more clarity. For Operations Odyssey Dawn and Unified Protector, preserving infrastructure that was valuable to the population was more important than targeting a potential critical vulnerability of the enemy military.

⁹³ Warden, *The Air Campaign*, 7.

⁹⁴ Ibid.

Warden contended, “nation-states and groups need elements of the population (demographic groups) to be sympathetic and helpful in a variety of ways.”⁹⁵ For Operations Odyssey Dawn and Unified Protector, the objective was protecting the population from attack. Physical security was only one part of influence on the population. It was also necessary to build coalition support and the will of the people. Another key part of this ring is the population of the coalition countries. Their support influenced actions by the coalition military.

The United Kingdom identified strategic communication as essential to the campaign.⁹⁶ Colonel Qadhafi was using state-run media to deliver propaganda and instigate attacks on rebels.⁹⁷ The first part of the strategic communication plan was to stop, or at least reduce, Qadhafi’s message. This was challenging because of the ownership structures of the satellite broadcasters. Qadhafi was able to continue transmitting until rebel forces were able to take over the frequencies and broadcast coverage of the revolution.⁹⁸ The second part of the strategic communication plan was to broadcast information about the revolution and counter Qadhafi’s messages. North Atlantic Treaty Organization-sponsored YouTube channels, daily media briefings, and a 24-hour “media response service” accomplished this task.⁹⁹ Even with this structured, multi-pronged approach, the coalition was not as successful as the rebel forces. The rebels established their own television station, *Libya Ahrar* (Free Libya), which allowed them to provide information more quickly than the NATO-led instruments.¹⁰⁰ Both the coalition and rebel

⁹⁵ Warden, “Strategy and Airpower,” 69.

⁹⁶ Peter Ricketts, *Libya Crisis National Security Adviser’s Review of Central Co-ordination and Lessons Learned* (London: UK Cabinet Office, 2011), 18.

⁹⁷ *Ibid.*, 19.

⁹⁸ *Ibid.*

⁹⁹ Engelbrekt, *The NATO Intervention in Libya*, 177.

¹⁰⁰ *Ibid.*

communication efforts were successful in promoting the revolution and “weakening the regime’s intimidation of the population.”¹⁰¹

Another important part of the population ring was the support of the people of the coalition. The important message was how to legitimize another campaign of choice. The United States and United Kingdom were already involved in conflicts in Iraq and Afghanistan whose popular support was waning. The central message of the Libya campaign was the liberation of the people from a tyrant killing his own. Highlighting the positive features of the campaign supported this line of effort. Central to the liberation message was the fact that a United Nation’s Resolution authorized the action *by any means necessary*. The coalition had approval to use military means to achieve the objectives. This brought legitimacy to the operation. In addition to the resolution, the presence of a coalition further supported the message by showing multi-national support in the operation. This was not a single nation exacting a revenge mission. Regional and world allies united to protect innocent people. A final piece of the communication analysis for the United States was the message to consolidate the operation under North Atlantic Treaty Organization command. Vice Admiral Gortney stressed this point in his first couple of interviews. This would show a coalition led operation instead of a United States led one and further reinforced the coalition nature of the operation.

Population as the fourth ring provided many considerations at the operational level of war. For this situation, communication was influential on three sides. Sir Peter Ricketts, as the United Kingdom Prime Minister’s National Security Adviser in 2011, summed up the importance nicely: “good strategic communications must be an integral part of every campaign from the outset and planned for accordingly, both nationally and as an Alliance.”¹⁰²

¹⁰¹ Ricketts, *Libya Crisis National Security Adviser’s Review of Central Co-ordination and Lessons Learned*, 18.

¹⁰² *Ibid.*, 23.

The fielded forces are Warden's final ring. This does not mean that Warden thought attacking fielded forces is the least important aspect of war. He simply contended that attacking the other rings could provide a larger impact in achieving the objectives. For Operations Odyssey Dawn and Unified Protector, the coalition did not have time to wait until the other rings were targeted, or even until enduring air superiority was established. The first night of coalition military action had Libyan ground forces positioned outside of Benghazi. It was necessary to target fielded forces immediately, but that does not mean indiscriminately. Warden offered that when attacking fielded forces, it is necessary to "analyze the fielded force as a system and find the relevant centers of gravity" just like at the strategic level of enemy analysis.¹⁰³ In Libya, this meant identifying a center of gravity as well as any forces that were an immediate threat to civilians.

Coalition fighter aircraft attacked Libyan tanks in the first twenty-four hours of the conflict. Rebel forces took the city of Benghazi in February and were using it as the center of operations. On March 19, 2011, twelve Libyan T-72 tanks were attempting to recapture the city. The rebel forces were able to damage the lead tank and temporarily halted the attacking force. The remaining Libyan tanks were preparing for a counter-attack when French fighters engaged them.¹⁰⁴ The French Rafales engaged the tank formation and destroyed four.¹⁰⁵ This action stopped the Libyan attack and forced the tanks to withdraw.

This action, conducted as part of the first tactical action of the operation, displayed the importance of understanding the operational objectives. Warden's theory has fielded forces as the fifth ring, but the situation required protecting civilians, who were living in Benghazi. Allowing the loyalist forces to conduct the attack would have caused greater casualties. The coalition attack also provided a psychological effect to the people of Libya, showing them the coalition

¹⁰³ Warden, "Strategy and Airpower," 70.

¹⁰⁴ Engelbrekt, *The NATO Intervention in Libya*, 113.

¹⁰⁵ Ibid.

valued their safety from the beginning of the operation. The Libyan ground forces were also affected, realizing they no longer had freedom of maneuver. The destruction of four Libyan tanks was a small tactical success, but because it was done with respect to time (the opening hours of the operation) and space (in Benghazi, the rebel “capital”), it had a larger operational and even strategic impact. Colonel Qadhafi was made aware that his military was under attack.

Benghazi was a center of gravity for the rebel forces. Once the coalition neutralized the Libyan Air Force and Air Defense assets, they increased strike missions on the Qadhafi forces that were a threat to the Libyan population.¹⁰⁶ The Libyan loyalist fielded forces center of gravity was the 32nd Brigade, commonly known as the Khamis Brigade. Khamis Qadhafi, the youngest son of Colonel Qadhafi, commanded this brigade. Khamis received his military education in Russia and his brigade consisted mostly of mercenaries.¹⁰⁷ The brigade was fiercely loyal to the Qadhafi regime and was equipped and trained to a higher standard than the rest of the Libyan Army. The Khamis Brigade was involved in stopping riots throughout Libya in February and March. As the coalition operation began, Colonel Qadhafi recalled the Khamis Brigade to Tripoli. During the movement west, members of the brigade “committed several atrocities on the way, including the burning of a supermarket, killing of prisoners and harassing and killing civilians.”¹⁰⁸

The brigade was stationed outside of Tripoli to protect the capital. Coalition aircraft continued targeting the elements of the brigade, primarily the headquarters. On August 21, rebel forces were able to attack the remaining elements of the brigade and drive them away from the city. Initial news reports claimed Khamis was killed on August 29 during a coalition attack. He was not seen again until October 2012 where he was spotted with militia forces attacking rebel strongholds. The Libyan National Congress reported he was killed on October 21, 2012, during

¹⁰⁶ Ibid., 119.

¹⁰⁷ Ibid., 120.

¹⁰⁸ Ibid.

combat near Bani Walid.¹⁰⁹ Even though it appears Khamis survived after the August 29 attack, his brigade was barely combat effective. At this point, the fielded forces center of gravity was defeated.

There were two approaches in attacking fielded forces. First was the quick strike against units posing an immediate threat to the friendly center of gravity, Benghazi. Second was the more methodical targeting of specific ground forces once enduring air superiority was established. Both methods match Warden's theory. Fielded forces provide the least return of investment, and this is demonstrated since the destruction of the 32nd Brigade occurred in August and the operation did not end until October. Additionally, fielded forces should not be targeted initially unless it meets what Warden described as a "strategically important entity."¹¹⁰ For this operation, defending Benghazi met that criteria. Operations Odyssey Dawn and Unified Protector followed Warden's theory in the manner fielded forces were targeted.

An important part of Warden's theory is the ratio of interdiction to close air support missions when targeting the enemy as a system. It is necessary to recall that Warden's definitions of interdiction and close air support differ from current doctrinal definitions. This detail is relevant because doctrinally, the coalition did not conduct close air support in this campaign because there was no *detailed integration* with the friendly forces. Warden would argue the attacks on the T-72s outside Benghazi the first day of the operation was close air support. This mission was a strike against targets that friendly ground forces could engage if they had the capability. Although not doctrinally correct, close air support did occur during the operations. The more important analysis is the allocation of close air support versus interdiction.

¹⁰⁹ M. Cherif Bassiouni, ed., *Libya: from Repression to Revolution: a Record of Armed Conflict and International Law Violations, 2011-2013* (International Criminal Law) (Leiden: Martinus Nijhoff Publishers / Brill Academic, 2013), 373.

¹¹⁰ Warden, *The Air Campaign*, 13.

Examining the daily mission results provides a clear picture of the targeting priorities of the coalition. Many of the targets were infrastructure (ring three) that affected the other rings.¹¹¹ These targets ranged from command and control facilities to supply depots. All of these targets were struck through interdiction missions, limiting both information and warfighting supplies, ammunition and fuel. While it was necessary to target Libyan ground forces that were a threat to civilians thorough close air support, interdiction missions provided a larger impact to the enemy as a system.

Warden's contention on the priority of interdiction over close air support is a direct reflection from his experiences in Vietnam where the enemy fought unconventionally. In Libya, the rebels were more unconventional than the Libyan forces, but the emphasis on interdiction over close air support is still valid and was successful. Although not doctrinally precise, Operations Odyssey Dawn and Unified Protector targeted the five rings by focusing on interdiction and only relying on close air support when necessary to provide immediate protection to Libyan civilians.

Protecting Libyan civilians required the full application of Warden's theory. First, coalition aircraft and land attack missiles established air superiority. It was local and temporary at first, but eventually grew to an enduring theater-wide status. Next, the five rings were targeted, primarily through interdiction missions. These missions struck targets on all five levels and stopped the flow of information to the leadership and the flow of resources to the fielded forces. This enduring attack led to the end of the operation. During the operation, if civilians came under immediate threat, close air support provided instant protection. This combination of all elements of Warden's theory, in this specific environment, resulted in success for Operations Odyssey Dawn and Unified Protector.

¹¹¹ The ability to target infrastructure does not increase its priority above leadership or processes. The infrastructure was one way to affect the other rings, but not the only method. Rules of engagement and strategic limitations may influence the ways the rings can be targeted.

Conclusion

The primary purpose of this monograph was to determine if the execution of Operations Odyssey Dawn and Unified Protector, with the objectives of a no-fly zone and the protection of civilians, followed Colonel John Warden's theory of warfare. The evidence provided indicates that these operations did follow Warden's theory. Air superiority was necessary for all subsequent operations. For Operation Odyssey Dawn, this was necessary for both the protection of civilians, but also the establishment of the no-fly zone. Air superiority allowed freedom of maneuver for interdiction and close air support missions to complete the remaining objective. For these two operations, Warden's assertion of the importance of air superiority was correct.

The coalition targeted the five rings through a variety of methods. Considering the impact of the targeting efforts, Warden's order of the five rings was analyzed. Leadership as the first ring and Qadhafi as the center of gravity validated Warden's theory. Although Qadhafi was not a direct target, once he perished at the hands of rebel forces, the operation ended. That one small tactical action led to the end of the entire operation. Warden was very clear on the importance of a strong leader. He wrote the removal of that leader normally causes *reversal of direction or significant deceleration* of the current events. These operations demonstrated that assertion. Warden's analysis of the importance of leadership, specifically a strong leader, was correct in this case.

The United Nations Security Council named two processes that were to be targeted, the arms embargo and asset freeze. This reduced the ability of the Libyan regime to resupply nationally, but the coalition military forces were responsible for interdicting the resupply process in country. Additionally, coalition aircraft destroyed command and control elements degrading the command and control process of the Libyan military. In targeting the processes, leadership was isolated and resupply was delayed. Warden's second ring was invaluable in the operations.

Infrastructure was the next ring, but targeting was limited to military specific entities. Infrastructure can encompass a multitude of items, including civilian power stations and water

treatment facilities. For these operations, the coalition did not target any civilian or joint use facilities. Destroying the links that combined leadership and processes to the fielded forces displayed the infrastructure vulnerabilities. Ammunition storage facilities were the main focus of this part of the operation. Targets that could affect the Libyan regime, but also the civilian population, were not attacked and this links with the fourth ring.

Population was central to the entire operation. Protecting civilian life was a specified operational objective, so avoiding any targets that may impact civilian livelihood was crucial. The most important aspect of this ring was the communication plan. Providing information to the Libyan people that showed the truth and countered Qadhafi's message was important. This line of operation uncovered difficulties with respect to the ownership of the satellites that provided the information relay. The second part of population was the support of the coalition members' population. Conducting a communication campaign at home bolstered support for the military efforts. Warden's fourth ring was very influential in this campaign, both toward the Libyan and coalition people.

The final ring was fielded forces. Similar to the fourth ring, there were two lines of operation. First, coalition aircraft targeted any Libyan ground forces that were an immediate threat to the civilian population. The second focus was the 32nd or Khamis Brigade. Identifying the premier fighting force is common in many operational approaches. The coalition was able to target this elite unit and severely reduce the Libyan regime's combat capability. The methodology operational planners used matched Warden's priorities. Fielded forces are last in priority unless they threaten a strategic objective. The operational actions matched Warden in this ring.

The ratio of interdiction and close air support also followed Warden's methods. In the operations, the coalition used interdiction missions to strike the five rings, including the fielded forces. The coalition command and control reserved close air support for times when necessary, but even then, the employment did not match doctrine or the experiences in Operations Iraqi

Freedom and Enduring Freedom. Interdiction and close air support were effective because Warden's first priority and operational commander's priority, air superiority, was established.

The previous paragraphs detailed how the operations followed Warden's theory. Planners nested tactical actions with operational and strategic objectives that flowed logically through time and space. With any operation, it is necessary to evaluate missed opportunities. One possible change to the operation involved making Colonel Qadhafi a target. Warden explicitly indicated the removal of a strong leader typically changes the current behavior. The North Atlantic Treaty Organization operation ended shortly after Qadhafi's death. This relationship supported Warden's claim. Targeting Qadhafi does not mean he has to die. Coercion theory is one possible method to change unwanted behaviors. Lt Col Richard Goodman argued that if the coalition tried to coerce Qadhafi, it failed.¹¹² The coalition attempted isolation by reducing his command, control, and communication network. Again, the regime's behavior did not change throughout that line of effort. It was the removal of Qadhafi, through his death, that ultimately achieved the operational end state. This then enabled the strategic end state. This event presents the question, if in concert with the strategic end state and Warden's theory, would the earlier removal of Qadhafi have ended the operation sooner? The strategic end state is the key part of this question. Since the removal of Qadhafi was not part of the strategic plan, the coalition did not pursue this part of Warden's theory. This aspect of the operation is one departure from Warden's theory.

Operations Odyssey Dawn and Unified Protector validated the main principles of Warden's theory of warfare. In order to effectively evaluate his theory, it was necessary to know his definitions and it was helpful to understand his background on why he prioritized certain aspects. Reconstructing tactical actions displayed the lines of operation. This insight permitted evaluation of the operations using Warden's theory as framed by the two operational objectives. The evaluation showed that the execution of Operations Odyssey Dawn and Unified Protector,

¹¹² Richard Goodman, "Operations Odyssey Dawn and Unified Protector: A Coercive Failure?" (Monograph, School of Advance Military Studies. Fort Leavenworth: US Army Command and General Staff College, 2013).

with the objectives of a no-fly zone and protection of civilians, followed Warden's theory of warfare.

Warden's theory was previously tested in the conventional conflict, Operation Desert Storm, and it has now been shown to be valid for this asymmetrical conflict. A theory of warfare that was tested in both conventional and asymmetric conflict provides the planner with a framework for analyzing future conflict. Warden's theory is a solid theoretical foundation for the application of combat air forces.

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