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THESIS

**AIRBORNE NEXT: RETHINKING AIRBORNE
ORGANIZATION AND APPLYING NEW CONCEPTS**

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June 2015

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ABSTRACT

The airborne concept has had a lasting impact on military force structures since its employment on a large scale during World War II. It is puzzling to consider how little airborne organizational structures and employment concepts have changed in the intervening seven decades, considering the great amount of change occurring in warfare. This thesis examines the future potential of airborne concepts by rethinking traditional airborne organizational structures and employment concepts. Using a holistic approach in the areas of organization, doctrine, technology, and strategy as guiding frames of reference, this thesis recommends updating the organizational structures of airborne forces to model a “small and many” approach over a “large and few” approach, while incorporating a “swarming” concept. Utilizing historical and contemporary vignettes to demonstrate airborne utility, this research reveals how a parachute capability displays the unique attributes to complement a swarming concept. Under an updated organizational structure and new employment concept, airborne forces can offer renewed relevancy to the U.S. Department of Defense against modern adversaries in crises and conflict.

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LIST OF ACRONYMS AND ABBREVIATIONS

APOD	airports of debarkation
AQAP	Al-Qaeda in the Arabian Peninsula
AQIM	Al-Qaeda in the Islamic Maghreb
BCT	Brigade Combat Teams
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
CA	civil affairs
CIA	Central Intelligence Agency
DIP	designated impact points
DOD	Department of Defense
DZ	drop zone
FARC	Revolutionary Armed Forces of Colombia
GCC	geographic combatant commander
GPS	global positioning system
HA/DR	humanitarian assistance and disaster relief
HARP	high altitude release point
ISIS	Islamic State of Iraq and Syria
ISR	intelligence, surveillance and reconnaissance
LGOP	little group of parachutists
MACVSOG	Military Assistance Command-Vietnam Studies and Observations Group
MFF	military free-fall
MNLA	National Movement of the Liberation of the Azawad
NSS	National Security Strategy
ODA	Operational Detachment-Alpha
OIF	Operation Iraqi Freedom
OSS	Office of Strategic Services
Paranav	parachute navigational
PIR	Parachute Infantry Regiment
POW	prisoner of war

PSYOPS	psychological operations
QRF	quick reaction force
RSTB	ranger special troops battalion
SAM	surface-to-air missile
SF	Special Forces
SOCOM	Special Operations Command
SOE	Special Operations Executive
SOF	Special Operations Forces
SPOD	sea ports of debarkation
USSOCOM	United States Special Operations Command
USSOF	United States Special Operations Forces
WMD	weapons of mass destruction

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I. INTRODUCTION

In September 1944, over 20,000 Allied airborne troops were utilized in the Netherlands as part of Operation Market Garden.¹ The sky would have been thick with parachutes as two entire U.S. Army divisions—the 82nd and 101st—were dropped behind German lines, along with equipment and an additional 15,000 glider troops.² This combined arms operation resulted in heavy losses for the Allies, particularly the airborne forces, which were prevented from linking up with the relief columns as planned. It is difficult to conceive of another such spectacle on today’s battlefields: the sun literally blotted out by thousands of U.S. paratroopers drifting slowly into harm’s way. Yet, U.S. airborne forces’ structure has remained largely unchanged since World War II, 70 years ago. The 82nd and the 101st remain two of only eight active duty infantry divisions, and such mass drops still regularly assault the fields of Forts Campbell and Bragg.³

It is puzzling, therefore, to consider how airborne force structure has endured into the current operating environment, given the reduction of U.S. military forces, the proliferation of new area-denial technologies, and the outdating of traditional strategies used to infiltrate territory. How is it that the organizational structure of an airborne unit and the employment concept have remained the same, despite the monumental changes to the types of conflicts the United States confronts? The airborne division continues to be the U.S. Department of Defense’s (DOD) structural formula for airborne force organization along with a traditionalist view of “few and large” over “many and small.”⁴ This formula needs to be reconsidered. It is time for a fresh perspective on airborne

¹ John C. Warren, *Airborne Operations in WWII European Theater*, USAF Historical Studies, no. 97 (September 1956): 226–227, <http://www.afhra.af.mil/shared/media/document/AFD-090602-016.pdf>. Some 28,000 troops dropped on D-Day and shortly thereafter.

² Ibid.

³ The 101st restructured to an air assault division; however, some specialty units still stay proficient in airborne operations at Fort Campbell.

⁴ John Arquilla, “The New Rules of War,” *Foreign Policy*, February 11, 2010, <http://foreignpolicy.com/2010/02/11/the-new-rules-of-war/>. Dr. Arquilla argues that the military needs a new mindset for combating modern warfare with an organizational structure of “many and small” over “few and large.”

organization and new employment concepts to optimize current capabilities, force structure, and future employment.

The organization and employment of all military forces is rooted in government strategies set forth by decision makers. The National Security Strategy (NSS) serves as the United States' guiding security document. The NSS places special emphasis on preserving the military's ability to access the globe and defeat anti-access capabilities that would restrict power projection.⁵ Trickleing down from national policy, the DOD provides the military instrument of policy for maintaining access by declaring "operational access" as a critical strategic imperative.⁶ Military access can be achieved through a multitude of sea, air, land, space, and cyber means;⁷ however, the parachute capability of an airborne force offers a unique entry method used to gain access to an area of operation in contested and permissive land environments. The airborne option continues to be the DOD's premier forced-entry technique to gain access when a threat is complex and uncertain, and yet it needs to be updated to instantiate the capabilities effectively called for by national strategy.⁸ The following section discusses the ODTS (organization, doctrine, technology, and strategy) methodology in the thesis.

A. ODTS METHODOLOGY

The organizational structure of military forces does not simply exist for its own sake, but rather serves, ideally, to optimally achieve the military objectives desired by the force employers and decision makers. As such, the structure of military forces requires a careful consideration of not only organization, but also a well-informed understanding of strategy, doctrine, and technology. For example, the rise of the German panzer divisions

⁵ White House, *National Security Strategy (NSS)* (Washington, DC: White House, 2010), 14. Of particular note, the Joint Operational Access Concept (JOAC), January 17, 2012, ii, declares the essential access challenge for future joint forces is to be able to "project military force into an operational area" and "sustain it in the face of armed opposition."

⁶ Department of Defense, *Joint Operational Access Concept (JOAC)* (Washington, DC: Department of Defense, 2012); Secretary of Defense, *Quadrennial Defense Review (QDR)* (Washington, DC: Department of Defense, 2014).

⁷ Department of Defense, *Joint Operational Access Concept (JOAC)*, 1.

⁸ Charles Flynn and Josua Richardson, "Joint Operational Access and the Global Response Force," *Military Review*, July–August 2013.

in the 1930s required a holistic understanding of all areas in strategy, doctrine, and technology to justify that organizational change.⁹ Heinz Wilhelm Guderian could not have made an attractive case for reorganizing the armored tank forces into a relative few divisions without an accurate technological frame of reference that displayed understanding in improved attack aircraft, mobile artillery, tank mobility, and advances in the radio. From a doctrinal point of view, the panzer division could only be successful if used for decisive penetration maneuvers and not for the protracted attritional battles of World War I. In a strategic context, these changes enabled visions of quick and decisive campaigns, which meant the Germans could achieve victory with fewer forces employed by re-organizing their armor into panzer divisions. As this example illustrates, organization, doctrine, technology, and strategy are closely linked and reliant upon each other; understanding these concepts allowed the Germans to make well-informed organizational changes to optimize their fighting force. For this reason, the authors' method considers each of these areas.¹⁰

Based on the research conducted in this thesis, the authors have derived the following recommendations. A new swarming strategy should be considered for airborne forces incorporating many dispersed, internetworked maneuver units. These units must be capable of mixing and matching, conducting standoff operations and obtaining close-in capabilities, while having integrated surveillance, sensors, and command, control communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) for "top-sight." This new employment concept must be linked with organizational redesign for airborne forces incorporating a "small and many" over a "large and few" concept. The DOD should increase investment in small-scale airborne forces while large-scale airborne units must downsize from division and brigade units to battalion and smaller. This organization and doctrine will espouse the current technology environment with small-scale airborne units continuing to implement advanced technology in parachute systems, transport aircraft, navigation aids, and stealth enhancements. Large-scale units will

⁹ Kenneth Macksey, *Guderian: Panzer General-revised EDITION* (South Yorkshire, England: Greenhill Books, 2003), 1–20.

¹⁰ Dr. John Arquilla provided the guidance and information on the Guderian methodology example for the link between strategy, doctrine, organization, and technology.

change their current doctrine to heavy armored capabilities that combat the modern anti-access/area-denial (A2AD) threat employed by U.S. adversaries. Finally, U.S. policy makers and senior leaders must be willing to accept change and risk in the current security environment. A reorganized airborne force and new employment concept for both small and large units are necessary for today's U.S. airborne forces.

B. THESIS ORGANIZATION

Using strategy, doctrine, and technology as guiding influences for organizing the modern airborne force, this project identifies the pertinent components of each for the DOD to make an informed consideration of future airborne organization. Instead of making a narrow judgment on the tactical utility of airborne operations for the DOD, it holistically addresses the ways airborne forces have been, are, or could be organized for modern and future operations. This review is accomplished in four sections that address organization and doctrine, technology, strategy, and recommendations. These sections proceed as follows.

First, the issues of organization and doctrine are addressed. This section categorizes the taxonomy of airborne units to include both small and large-scale forces. The contemporary operating environment suggests that small wars and conflicts occurring in hybrid form are increasingly more common. The small-scale, Special Forces (SOF) airborne roles display greater relevancy in this trend for their speed, precision, and stealth capabilities. Yet, the expansion and proliferation of A2AD systems offer renewed possibilities for conventional, large-scale airborne employment. Recognizing that the large-scale airborne roles are much less likely to recur, an increased investment in small-scale airborne capability is recommended.

The next section links technology and force structures and delineates the broad and narrow technology frames of reference to provide context to the reader on the broader implications of technology trends and the specific changes occurring within airborne technology. For airborne concepts, it means greater mobility is granted to smaller formations and larger formations are imperiled.

The third section of the body discusses the incorporation of airborne operations into a swarming concept. Swarming characteristics incorporate autonomous, integrated, coordinated, and dispersed small-units designed to operate in standoff or close-in distances while sustainably pulsing with force or fire. This section applies the re-organized airborne force structure and doctrine with a proposed swarming strategy.

The concluding section offers the necessary tools to implement the new employment concept. Areas of future research are offered to advance this concept by using SOF as a test bed for the swarming concept. Further attention should be allotted to the DOD force structure design, doctrinal rewrites, and swarming applications with U.S. parachute forces.

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II. IDENTIFYING THE ROLES OF AIRBORNE FORCES: ORGANIZATION AND DOCTRINE

Airborne forces continue to enjoy a prominence in U.S. force structure. Nearly three quarters of a century later, most historians would consider Airborne's greatest utility to have occurred during World War II with the division-sized drops that were undertaken across the European theater. It is noteworthy and somewhat puzzling that the organizational structure of an airborne unit of action has remained largely intact since its inception. The airborne division continues to be the U.S. DOD's structural formula for airborne force organization. It adds to the growing debate on force structure and organization within all the DOD for optimizing the modern force. Many traditionalists long to maintain the larger force structures, while progressive thinkers seek to replace the "few and large" with the "many and small."¹¹ While attempts to scale down the U.S. Army's unit of action resulted in the creation of the brigade combat teams (BCT), the airborne division maintains ultimate authority. Yet, utility in airborne extends far beyond the capabilities of the airborne division.

The aim of this chapter is to redefine the role of airborne forces to relate the employment of airborne forces to the growing debates on military force structure and the concept of swarming in modern operations. First, the taxonomy of airborne forces is addressed to include both the conventional and SOF. Second, airborne operational roles, to include those involving both small- and large-scale forces, with historical vignettes are critically examined. Third, the current operating environment is discussed, to include the threats generated by both state and non-state actors. In conclusion, this chapter summarizes the roles of small and large-scale airborne utility and the contributions to the new operational concept of swarming.

¹¹ Arquilla, "The New Rules of War." Dr. Arquilla argues that the military needs a new perspective for combating modern warfare with an organizational structure of "many and small" over "few and large."

A. TAXONOMY OF AIRBORNE ROLES

Small-scale airborne forces are organized under SOF and large-scale airborne forces come under conventional forces. For this analysis, small-scale airborne forces are defined as any element smaller than a battalion. Small-scale airborne forces typically utilize high-performance parachutes in military free-fall operations with the latest in training and equipment fielding. These units operate independently in austere environments with a decentralized chain of command, offering a low signature for specialty-type operations. For this analysis, large-scale airborne forces are defined as a battalion element and larger. Large-scale operations utilize static-line operations with non-steerable parachutes to seize terrain. The units are capable of deploying up to a division-sized element with a large amount of coordination and logistics. The following sections define each camp (conventional and SOF) to further develop the argument about small- or large-scale airborne operations.

1. Conventional Airborne Forces

The U.S. Army maintains a conventional airborne capability with one active division in Fort Bragg, North Carolina and three active brigades: one in Italy, one in Alaska, and one in Hawaii. The mission of these conventional airborne units is to “strategically deploy, conduct forcible entry parachute assault and secure key objectives for follow-on military operations in support of U.S. national interests.”¹² Additionally, three ranger battalions and one ranger special troops battalion (RSTB) conduct airfield seizure operations as one of their legacy tasks. The roles associated with maintaining an

¹² The 82nd Airborne Division has three Airborne Brigade combat teams (1st, 2nd, and 3rd BCT) located at Fort Bragg, North Carolina. The division also has a headquarters and headquarters battalion, combat aviation brigade, and division artillery. “Welcome to the Home of America’s Guard of Honor,” accessed April 1, 2015, <http://www.bragg.army.mil/82nd/Pages/default.aspx>. The 173rd Airborne Brigade consists of the 1/503rd and 2/503rd infantry battalions, a brigade special troops battalion, a cavalry squadron, a field artillery battalion and a support battalion, located in Vicenza, Italy). “SkySoldiers,” accessed April 1, 2015, <http://www.eur.army.mil/173abct/>. The 4th Brigade 25th Infantry ID consists of four airborne battalions located in Hawaii. The 25th infantry division also has one airborne brigade located in Alaska. “4th Brigade Combat Team (Airborne),” accessed April 2015, <http://www.usarak.army.mil/4bde25th/>.

airborne capability for these units are for seizing, shows of force, and reinforcing operations.¹³

2. Special Operations Forces

The U.S. Army maintains a SOF airborne capability that extends throughout five active Special Forces (SF) groups, two active civil affairs (CA) brigades and two active psychological operations (PSYOPS) groups.¹⁴ Additionally, a number of Air Force, Marine and Naval Special Operations maintain special purpose airborne forces. The United States Special Operations Command (USSOCOM) mission is “to provide trained, equipped, ready, and regionally aligned Special Operations Forces (SOF) in support of Geographic Combatant Commanders (GCCs), and through unified action, conduct sustained special operations to eliminate threats to U.S. interests and protect the American people.”¹⁵ The roles associated with maintaining an airborne capability for these units are for raids, reconnaissance, and special warfare missions.

3. Roles for Airborne Forces

A variety of roles for U.S. airborne forces are accepted within the DOD. These roles are specified in U.S. doctrine, joint doctrine, and rooted in national policy.¹⁶ These sources offer vague guidance for airborne forces with an unclear distinction of roles. Based on these various sources, Figure 1 offers three clearly defined roles for the

¹³ The authors consolidated the major airborne roles from FM 90–26 Airborne Operations and identified the most important roles for small- and large-scale airborne forces. Headquarters, *Airborne Operations: Field Manual 90–26*, 1–5.

¹⁴ The 1st Special Forces Regiment has five active Special Forces Groups (1st, 3rd, 5th, 7th, 10th SFG(A)) and two National Guard Groups (19th and 20th Group). “The United States Army Special Operations Command,” accessed April 1, 2015, <http://www.soc.mil>. The 75th Ranger Regiment has three Ranger Battalions and a Ranger Training Support Battalion (RTSB). The Navy has SEAL teams located on the East and West Coast and the Marines have the Marine Special Operations Command (MARSOC) with specialized airborne units in each command. “The United States Army Special Operations Command.”

¹⁵ William H. McRaven, *2014 USSOCOM Posture Statement Before the Senate Armed Services Committee Emerging Threats and Capabilities Subcommittee*, 113th Cong., 1 (2013) (statement of Admiral William J. McRaven, USN, Commander, United States Special Operations Command).

¹⁶ Headquarters, *Airborne Operations: Field Manual 90–26* (Washington, DC: Department of the Army, 1990); Joint Chiefs of Staff, *Joint Forcible Entry Operations JP 3–18* (Washington, DC: Joint Chiefs of Staff, 2012), 1–5; The National Security Strategy (NSS), Quadrennial Defense Review, and Joint Operational Access Concept (JOAC) discuss the importance of operational access for strategic utility.

implementation of both small- and large-scale airborne forces. The three roles for small-scale airborne assaults are for their use in reconnaissance, raiding, and special warfare. The three roles for large-scale airborne assaults are seizures, shows of force and reinforcement. These roles are explained in further detail in the following sections.

<u>Small-scale Airborne Roles</u>	<u>Large-scale Airborne Roles</u>
<ul style="list-style-type: none"> • Reconnaissance • Raids • Special Warfare 	<ul style="list-style-type: none"> • Seize • Show of Force • Reinforce

Figure 1. Small- and Large-scale Airborne Roles¹⁷

B. THE UTILITY OF SMALL-SCALE AIRBORNE FORCES

Small-scale airborne forces are advantageous for gaining operational access by using stealth, standoff, speed, and precision. Historical and contemporary evidence reinforces the utility of small-scale airborne operations in modern warfare. U.S. doctrine describes the capabilities of small-scale airborne operations to include “providing intelligence, surveillance, and reconnaissance capabilities and may conduct direct action operations.”¹⁸ Figure 2 illustrates the primary roles for small-scale airborne utilization and key attributes for each role. This section argues the value of maintaining small airborne units and later discusses the benefits these units have in modern warfare.

¹⁷ The authors consolidated the major airborne roles from FM 90-26 Airborne Operations and identified the most important roles for small and large-scale airborne forces. Headquarters, *Airborne Operations: Field Manual 90-26*, 1–5.

¹⁸ Headquarters, *Airborne Operations: Field Manual 90-26*, 1–5.

<u>Small-scale Utilization</u>	
Reconnaissance	<ul style="list-style-type: none"> • Stealthy and speedy infiltration • Provide intelligence
Raids	<ul style="list-style-type: none"> • Render key targets operationally ineffective • Surprise entry, swift execution, rapid exit • POW and Hostage Rescues, NEOs
Special Warfare	<ul style="list-style-type: none"> • Clandestine link-up with indigenous forces • Stealthy and speedy infiltration

Figure 2. Small-scale Utilization of Airborne Forces

1. Reconnaissance

Reconnaissance is a primary mission for small-scale units because it provides a stealthy and expeditious means of gathering intelligence and in forming the planning considerations of military commanders.¹⁹ Recon is conducted in one of two ways. First, as part of the military planning process, prior to the mission; or second, as the primary mission itself. An example of the former includes recon on a target prior to calling in air strikes. An example of the latter is recon for intelligence purposes. Conducting airborne as an infiltration platform for recon provides the planner improved operational access for deep infiltration, unreachable terrain, low signature, and in a contested environment. Recon has been used in airborne operations since its inception and has many historical case studies that highlight its importance.

During the Vietnam War, the Military Assistance Command-Vietnam Studies and Observations Group (MACVSOG) trained and assisted commandos for special warfare and reconnaissance missions into North Vietnam. Airborne infiltration was a critical capability for this special force of 4-to-6-man teams. Displaying great airborne utility in these stealthy operations, the MACVSOG conducted covert operations with U.S. SF,

¹⁹ Joint Publication 2-0 defines reconnaissance as a mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. Joint Chiefs of Staff, *Joint Intelligence, Joint Publication 2-0* (Washington, DC: Joint Chiefs of Staff, 2013), I-11.

South Vietnamese military personnel, and Central Intelligence Agency (CIA) operatives across a span of nearly 20 years.²⁰ The specialized U.S. units recruited North Vietnamese enemy prisoners of war (POWs) and trained them in reconnaissance, resistance force training, and sabotage operations.²¹ The North Vietnamese government was extremely concerned about “spy rangers” dropping from above.²² Military units were relocated and quick reaction force parties were designated to respond to the threat imposed by the MACVSOG. The overall deception that the small force created was instrumental in the larger U.S. campaign.

The MACVSOG example shows the importance of using a small-scale airborne operation for combat and to gather intelligence. The “smaller is better” approach was effective because of its ability to infiltrate behind enemy lines and identify adversary locations. These reconnaissance missions laid the groundwork for many operations today. Units, such as the U.S. 75th Ranger Regiment, various SOF, and other surgical strike units, have reaped the benefits of using military free-fall insertions for reconnaissance missions.

2. Raids

Raids offer an important role for small-scale airborne operations because of the aggressor’s ability to conduct surprise entry with swift execution and rapid exit.²³ Raids render key targets operationally ineffective with the use of force. Raids are intended, among other things, to temporarily seize an objective, to conduct hostage rescue, and

²⁰ Many of these teams were infiltrated by airborne; however, the Viet Minh were experts in tracking and running down commando teams. Once on the ground, most teams were captured, some executed, others imprisoned. Despite the questionable tactical success of the team’s output, the parachute infiltration served as the most viable employment mechanism for that situation. Robert M. Gillespie, *Black Ops, Vietnam: The Operational History of MACVSOG* (Annapolis, MD: Naval Institute Press, 2011), 5.

²¹ Ibid.

²² Richard H. Shultz, *The Secret War Against Hanoi: The Untold Story of Spies, Saboteurs, and Covert Warriors in North Vietnam* (New York: Perennial, 2000), 111.

²³ JP 1–02 defines a raid as an operation to seize an area temporarily to secure information, confuse an adversary, capture personnel or equipment, or to destroy a capability. It ends with a planned withdrawal upon completion of the assigned mission. Department of Defense, *Department of Defense Dictionary of Military and Associated Terms (Joint Publication 1-02)* (Washington, DC: Department of Defense, November 2010 as amended through August 15, 2014), 302.

non-combatant evacuation operations (NEOs). History is full of examples that date back to the Germans at Eben Emael and the United States at Los Banos in the World War II.

The Germans effectively utilized airborne raiding in their earlier conquests in Europe. The raid and capture of the Eben Emael fortress was made famous for utilizing an airborne force to overtake what was considered to be a nearly impregnable fortress.²⁴ German gliders skillfully landed paratroopers directly onto the objective and swiftly overtook the Belgium stronghold. No longer was the raiding force limited to strictly a ground attack and withdrawal; airborne raiding expanded the options.

The daring operation to liberate the prisoners at Los Banos in the Pacific Theater during World War II exemplified a textbook airborne raid. General MacArthur ordered the 11th airborne division commander to liberate the approximately 2,200 prisoners held by the Japanese at Los Banos prison.²⁵ Minimal casualties and mission success were attributed to good intelligence, good planning, and faultless execution. The Los Banos prison raid is considered by some to be the most successful small-scale airborne operation.²⁶

The Los Banos raid showed strategists and military commanders the value of using airborne infiltration to surprise the enemy with swift, expedient strikes. Contemporary examples of airborne raids include the Navy SEAL team military free-fall (MFF) operation into Somalia to rescue two aid workers from a terrorist organization.²⁷ Another raid example was the U.S. Army SF in Operation Iraqi Freedom (OIF) who conducted a raid on a target known to have an extensive early warning network in an

²⁴ William H. McRaven, *Spec Ops: Case Studies in Special Operations Warfare: Theory and Practice* (New York: Presidio Press, 1996), 29–67.

²⁵ During the conduct of the operation, the raiding airborne force completely surprised the prison guards. In swift execution, the operation took no more than 20 minutes; the entire 243-man prison guard detachment was dead. In a combined effort, trucks, amphibious tracks, and air transport were coordinated to facilitate the withdrawal and evacuation of prisoners. Gerard M. Devlin, *Paratrooper!: The Saga of U.S. Army and Marine Parachute and Glider Combat Troops During World War II* (New York: St. Martin's Press, 1979), 598.

²⁶ *Ibid.*, 610.

²⁷ Jeffrey Gettleman, Eric Schmitt, and Thom Shanker, "U.S. Swoops in to Free 2 from Pirates in Somali Raid," *The New York Times*, accessed March 12, 2015, <http://www.nytimes.com/2012/01/26/world/africa/us-raid-frees-2-hostages-from-somali-pirates.html>.

austere environment. The operational detachment used MFF airborne infiltration to seal the objective without alerting the presence of an incoming raid.²⁸ The relevancy of the raid is ever-present, as modern warfare demands specially trained units to strike an adversary at a moment's notice.

3. Special Warfare

Airborne infiltration in special warfare relies heavily on speed and stealth to avoid detection. Special warfare typically includes clandestine infiltration, which makes airborne infiltration a good fit for these types of missions.²⁹ Airborne offers this spectrum set of missions a speedy and stealthy method of linking up with indigenous forces. Airborne utility in special warfare dates back to the World War II Office of Strategic Services (OSS)/Jedburgh teams.³⁰

Infiltrating by parachute behind enemy lines into France allowed the Jedburghs to gain access for linkup with the French resistance. The Jedburghs relayed intelligence gathered from civilians in close proximity of targets to reduce collateral damage. The three man-teams conducted resistance operations initially and shifted to guerilla warfare once the lodgment area was secure. The guerrilla operations included “sabotaging communications, attacking enemy supply depots, command posts, and road and rail traffic, and, where necessary, preventing enemy demolition or bridges or other structures that were needed by the allies.”³¹ Airborne served as the method to get these teams into areas they needed to be to fulfill their mission.

²⁸ ODA 074 conducted a combat standoff MFF insertion into Iraq in support of OIF on May 30, 2007.

²⁹ Special warfare as the execution of activities that involve a combination of lethal and nonlethal actions taken by a specially trained and educated force that has a deep understanding of cultures and foreign language, proficiency in small-unit tactics, and the ability to build and fight alongside indigenous combat formations in a permissive, uncertain, or hostile environment. Department of Defense, *Department of Defense Dictionary of Military and Associated Terms (Joint Publication 1-02)*, 343.

³⁰ Operation Jedburgh was a part of the larger operational plan devised for Operation Overlord. In doing so, the Jedburghs and OSS could organize, train, and equip the resistance forces to cut off rail lines and obstruct roads using ambush and sabotage methods. Andrew L. Hargreaves, *Special Operations in World War II: British and American Irregular Warfare*, vol. 39 (Norman, OK: University of Oklahoma Press, 2013), 1–9.

³¹ Hargreaves, *Special Operations in World War II: British and American Irregular Warfare*, 1–9.

The Jedburghs example shows the importance of investing in human capital with specialized training for elite soldiers. The amount of time and resources invested in the Jedburghs was a small fraction of the overall war budget and the payoff was tremendous for the Allies. Currently, the Special Operations Command (SOCOM) recognizes the utility of airborne in special warfare and is currently making changes to instill a “collective military free-fall capability throughout the Army’s Special Forces Regiment [that will] ensure the U.S. Army’s unconventional-warfare force can effectively enter and perform within the operational areas of today and tomorrow.”³² The true test for utilizing this force will be the political acceptance for the amount of risk these elite soldiers face in special warfare missions.

4. Summary of Small-scale Airborne Operations

Evaluating the effectiveness of small-scale airborne operations may not be as simple as examining the track record of successful vs. non-successful missions. Recons, raids, and special warfare have a high degree of success throughout history. Finding the relevancy in modern warfare is a more beneficial way to evaluate the small-scale roles. A common tool in the military for discussing applicable doctrine is called C4ISR. This evaluation tool is useful in highlighting how the U.S. military is fighting air, land, and sea battles against future opponents. The same evaluation criteria are used for small and large-scale airborne operations.

Small-scale airborne operations are most successful when units implement a decentralized command and control structure. These units work independently behind enemy lines in small teams emphasizing a simple, effective command and control structure. Using this flattened command structure is beneficial when operating in denied territories with minimal resources. Newer technologies in communications and computers are ever evolving. SOF operators now communicate under canopy with advanced technologies in radio. MFF jumpmasters are now using computers for calculating global positioning system (GPS) high altitude release points (HARP) and designated impact

³² Charles Cleveland, *ARSOF 2022 Document* (Ft. Bragg, NC: U.S. Army Special Operations Command, 2014), 20.

points (DIP) for a more reliable and successful landing. These types of equipment fielding also streamline the communications process for relaying intelligence, calling in air strikes, or requesting resupply. SOF missions will continue to require advanced training and equipment fielding.

C. THE UTILITY OF LARGE-SCALE AIRBORNE OPERATIONS

Large-scale airborne utility is often used when a military force aims to seize terrain with a large amount of personnel. These operations are used as a forced entry technique to gain access to an area of operation. Figure 3 illustrates the primary roles of large-scale airborne roles—seize, show of force, and reinforce.³³ This section argues the validity of large-scale roles with a scaled-down degree in size and strength.

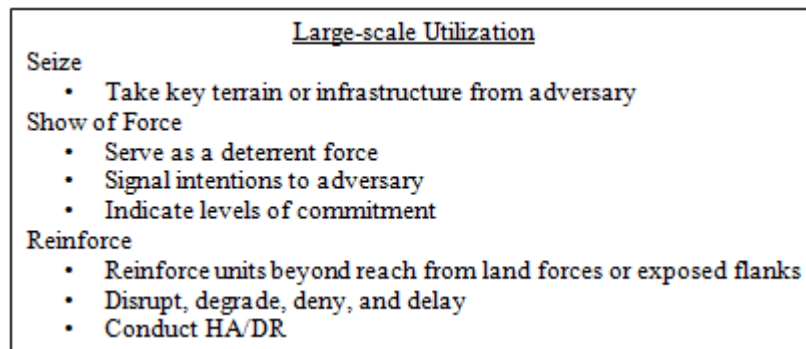


Figure 3. Large-scale Utilization³⁴

³³ Department of the Army, *Airborne Operations: Field Manual 90-26*, 1–5.

³⁴ This figure provides insight of the key components to the primary small-scale airborne roles.

1. Seize

Seizing serves as a primary role for large-scale airborne operations with airfield seizure as the most prominent form.³⁵ The securing of a lodgment, such as an airfield, allows the airborne force to facilitate the air landing of follow-on forces. This role was frequently employed in World War II, such as the U.S. seizure at Nadzab Airfield.³⁶

The seizure of the Nadzab airfield in the Pacific theater during World War II offers a historical example of a well-planned and executed airborne operation. This operation was a part of General MacArthur's great counter-offensive north towards the heart of Japan.³⁷ The airborne troops were tasked to seize the Nadzab Airfield and facilitate the air-landing forces; ultimately fighting towards the amphibious attacking forces at the city of Lae, New Guinea. Ensuring adequate air protection for the airborne forces, the Air Force commander supporting the raid provided no less than 100 fighter aircraft to provide protection for the air transport planes in route to the drop zone (DZ).³⁸ Bombers prepared the DZ with machine gun fire, bombs, and finally smoke, to conceal the parachute drops and landings. At execution, all three airborne battalions from the 1/503RD Parachute Infantry Regiment (PIR) were dropped with pinpoint accuracy in less than five minutes.³⁹ The seizure of the airfield was the first massed accurate delivery of a large-scale airborne force.⁴⁰

This account demonstrates the massive amount of logistics involved in conducting a joint, combined airborne operation. When a division is deployed, one airborne brigade provides logistics, one is on reserve, and one conducts the jump. Massive amounts of

³⁵ JP 1-02 defines seizure as employing combat forces to occupy physically and to control a designated area. Department of Defense, *Department of Defense Dictionary of Military and Associated Terms (Joint Publication 1-02)*, 327.

³⁶ The German seizure of Maleme Airfield in WWII was another example of a large-scale raid; however, the success was marginal due to weather and bad intelligence.

³⁷ MacArthur wanted to seize and occupy the city of Lae and nearby Nadzab Airfield to use as a stepping stone northward. The operation involved using an intricate combination of airborne, amphibious, and air-landing troops. Devlin, *Paratrooper!: The Saga of U.S. Army and Marine Parachute and Glider Combat Troops During World War II*, 255.

³⁸ *Ibid.*, 261.

³⁹ *Ibid.*, 262.

⁴⁰ *Ibid.*

time, preparation, planning, and personnel are required to make this operation successful. The debate arises when a more capable opponent in the defense has advanced technology in A2AD to combat massing airborne infiltration. This debate is further explored in the technology section of this thesis.

2. Show of Force

A fully activated airborne unit may serve as a show of force to an adversary on the verge of committing troops.⁴¹ The activated airborne unit is placed on alert as an escalating military step during a potential global conflict or crisis. Although show of force is not an actual mission-set for airborne forces, it showcases a nation's strength in military might and can signal a level of commitment to partner forces. The Yom Kippur War and a more recent NATO training exercise are both examples of using a show of force.⁴²

The 82nd Airborne Division demonstrated a show of force during the Yom Kippur War in 1973. The entire 82nd Airborne Division with 15,000 personnel was alerted to prepare for deployment as a quick reaction force in response to the Yom Kippur War.⁴³ The Soviets responded by activating three airborne divisions consisting of nearly 50,000 airborne troops on high alert.⁴⁴ Fortunately, a cease-fire led to the de-escalation of airborne troops on both sides. Without a ceasefire, little would have stopped the Soviets from moving into Egypt with airborne forces.⁴⁵ The airborne show of force

⁴¹ JP 1-02 defines show of force as an operation, designed to demonstrate U.S. resolve, which involves increased visibility of U.S. deployed forces in an attempt to defuse a specific situation that if allowed to continue, may be detrimental to United States interests or national objectives. Department of Defense, *Department of Defense Dictionary of Military and Associated Terms (Joint Publication 1-02)*, 332.

⁴² Paratroopers from the 173rd Airborne Brigade conducted a training rotation with the Lithuanian Mechanized Infantry Brigade. The mission was intended to provide a show of force to Russia that the European allies and the United States were committed to protect the borders of sovereign countries in Eastern Europe. A. M. Lavey, "173rd Paratroopers Land in Lithuania," U.S. Army, accessed March 12, 2015, <http://www.army.mil/article/124808/>.

⁴³ John L. Scherer, "Soviet and American Behavior During the Yom Kippur War," *World Affairs* 141, no. 1 (Summer 1978): 4.

⁴⁴ *Ibid.*, 14.

⁴⁵ *Ibid.*, 18.

option escalated on both sides and quickly signaled the level of commitment that both the United States and the Soviets had toward their respective allies.⁴⁶

Show of force and deterrence was a common tool used during the Cold War between the United States and USSR. The benefits far outweighed the cost of going to war. Today, the threat of military force weighs heavily on the adversary, which oftentimes chooses to seek other options in the face of the overwhelming opponent. With current state actors, such as China, North Korea and Iran, the United States would be wise to keep a large response force as a deterrent threat for future conflicts.⁴⁷

3. Reinforce

The reinforce role for airborne utilization encompasses a wide breadth to include support to units beyond reach from land forces, exposed flanks, disrupt, degrade, deny, and delay.⁴⁸ Famous large-scale airborne operations in World War II, by the French later in Indo-China,⁴⁹ and more recently, the French in Mali are all examples of reinforcing troops by airborne insertion.⁵⁰

Operation OVERLORD combined the roles of both seizing and reinforcement operations for airborne infiltration into denied territory in Europe. The plan called for four infantry divisions onto the Normandy beaches with two airborne divisions inland

⁴⁶ Both the United States and USSR conducted a show of force; however, the Soviets may have “showed the U.S.” more in troop strength and commitment.

⁴⁷ While there is little evidence that show of force deters, the lack of conflict may be an indicator that show of force was sufficient.

⁴⁸ JP 1-02 defines reinforcing as a support mission in which the supporting unit assists the supported unit to accomplish the supported unit’s mission. Only like units (e.g., artillery to artillery, intelligence to intelligence, armor to armor, etc) can be given a reinforcing/reinforced mission. Department of Defense, *Department of Defense Dictionary of Military and Associated Terms (Joint Publication 1-02)*, 309.

⁴⁹ The French in Indo-China further developed the lessons learned in World War II and used them in their fight against the Viet Minh in the First Indo-China War (1946–1954). Similar to a modern day QRF, (quick reaction force), the French radioed in to their headquarters in Hanoi when bases were attacked. The Foreign Legion were loaded up onto German Junkers and dropped into the enemy vicinity for reinforcement. The Legion was dropped behind enemy lines to fix the enemy, disrupt, and provide centers of resistance. John Weeks, *Assault from the Sky: A History of Airborne Warfare* (Kirkwood, NY: Putnam Publishing Group, 1978), 125–131.

⁵⁰ In comparison to traditional airborne operations, the French airborne assaults in Mali would be considered small-scale by historical standards; however, the French airborne operations in Mali most appropriately reflect the airborne role of “reinforcing” and are categorized as such.

from the 82nd and 101st Airborne Divisions. The United States blocked German reinforcements and seized the bridges north of the town of Caene.⁵¹ Little groups of parachutists (LGOPs) confused the Germans due to scatter drops across the countryside. The two divisions were not able to seal off the beach completely, but did allow the Allied landing at Utah beach to proceed without much opposition.⁵² This operation was effective because of the Allies' ability to surprise the enemy and strike deep into denied territory.

The French in Mali displayed the most modern example of airborne serving in a seize and reinforce role.⁵³ The main objectives for Operation Serval relied on the use of airborne troops to maintain an "aggressive tempo."⁵⁴ The French leadership credited airborne for its audacity and speed that kept the enemy from organizing defenses.⁵⁵ The first airborne operation consisted of 40 SOF forces and engineer equipment tasked to seize the airport of Tessalit and clear the dirt airstrip to allow follow-on forces to land reinforcements.⁵⁶ The larger airborne operation included nearly 250 French paratroopers. This group of paratroopers conducted a static-line airborne infiltration into the northern part of Timbuktu to prevent AQIM from escaping into the northern deserts.⁵⁷ The reinforcing airborne force effectively denied AQIM insurgents from using any of the established avenues of escape. In a display of both seizing and reinforcing, the French

⁵¹ Weeks, *Assault from the Sky: A History of Airborne Warfare*, 86.

⁵² Weeks, *Assault from the Sky: A History of Airborne Warfare*, 90–91.

⁵³ In January 2012, the situation in Mali had deteriorated quickly. The disenfranchised Tuareg group in the northern regions of Mali initiated a movement called the National Movement of the Liberation of the Azawad (MNLA) combined with support from Islamic extremists group Al-Qaeda in the Islamic Maghreb (AQIM) to lay claim and control of regions in northern Mali. The Government of Mali could do nothing but helplessly watch AQIM spread across the region. The deterioration of Mali occurred on the heels of the Libyan Civil War, which allowed an influx of weapons and military equipment to cross the borders and arm the Tuaregs and AQIM. Michael Shurkin, *France's War in Mali: Lessons for an Expeditionary Army* (Santa Monica, CA: RAND Corporation 2014, http://www.rand.org/content/dam/rand/pubs/research_reports/RR700/RR770/RAND_RR770.pdf).

⁵⁴ *Ibid.*, 10.

⁵⁵ *Ibid.*

⁵⁶ Shurkin, *France's War in Mali: Lessons for an Expeditionary Army*, 21.

⁵⁷ NATO Defense College Conference, "The Future of Airborne Forces in NATO," NDC Conference Report, Rome, Italy, April 2013, 2.

airborne operations in Mali during Operation Serval illustrated modern utility in an airborne force.

These examples show the importance of inserting troops into areas that land forces are incapable of reaching. A large force is necessary to infiltrate the area, secure it, and conduct follow on operations when necessary. Combining both small and large-scale airborne units is an important lesson from this vignette. Sending in SOF first to recon and prepare for a larger force is a common tactics, techniques, and procedure (TTP) in U.S. DOD doctrine and airfield seizure TTPs.

4. Summary of Large-scale Airborne Operations

Specifically for airborne, the antiquated ways of organizing an inherently rapid infiltration technique with multiple layers of oversight stalls the real strengths of an airborne capability. Additionally, the large numbers of airborne paratroopers maintained for readiness, but rarely used, adds to another point of contention. Some military experts agree that an entire airborne division of parachutists does not make sense in modern warfare.⁵⁸ The division, the brigade, the battalion, and even the company, all add an echelon of control that detracts from the lower tactical element's rapid reaction capability. With a redesigned outlook on airborne organization and employment, a flattened command and control structure would allow an airborne force the flexibility to remain highly mobile, autonomous, and self-contained in response to the modern range of military operations.

Large-scale airborne operations require a massive amount of support elements (brigade size) when deploying a divisional airborne element, which comes with the territory of training, equipping, funding, and transporting a large amount of soldiers. The command and control hierarchy is very top driven with detailed planning at the General level for coordinated execution all the way down to the squad. Newer technologies in communications and computers are not as necessary for basic level airborne operations. Soldiers require only five static line jumps prior to performing this mission with their

⁵⁸ John Arquilla, *Worst Enemy: The Reluctant Transformation of the American Military* (Chicago, IL: Ivan R. Dee, 2008), 48.

unit. Massing a large amount of troops is troublesome in an age in which high-tech equipment is accessible on the black market. Intelligence, surveillance and reconnaissance are crucial aspects prior to conducting a large-scale operation. The combination of using small units to infill for intelligence, surveillance and reconnaissance (ISR) is necessary prior to deploying any type of large force. Large-scale airborne operations are questionable in today's operating environment in which technology trumps massing of forces. The next section discusses the current operating environment in more detail to further explain how airborne forces fit into modern warfare.

D. CURRENT OPERATING ENVIRONMENT

With over 35 small wars in existence and minimal conventional wars, the current operational landscape for warfare continues to evolve. Israeli military historian Martin van Creveld describes the environment as “large-scale, conventional war-war as understood by today's principal military powers-may indeed be at its last gasp; however, war itself, war as such, is alive and kicking and about to enter a new epoch.”⁵⁹ Across the spectrum of conflict, combatants organize as both state and non-state actors, employ conventional and irregular tactics, and blur the lines of warfare. Defining these types of conflict is complicated, as scholars and military professionals alike have attempted an array of terms including asymmetric warfare,⁶⁰ fourth generation warfare,⁶¹ hybrid warfare,⁶² irregular warfare,⁶³ and gray area warfare.⁶⁴ Although not all these terms are

⁵⁹ Martin van Creveld. *Transformation of War* (New York: Simon and Schuster, 2009), 2.

⁶⁰ Asymmetric warfare: In military operations the application of dissimilar strategies, tactics, capabilities, and methods to circumvent or negate an opponent's strengths while exploiting his weaknesses. Department of Defense, *Department of Defense Dictionary of Military and Associated Terms (Joint Publication 1-02)*, 19.

⁶¹ Fourth-generation warfare: “The fourth generation has evolved in ways that take advantage of the political, social, economic, and technical changes since World War II. It makes use of the advantages those changes offer an unconventional enemy.” Thomas X. Hammes, *Insurgency: Modern Warfare Evolves into a Fourth Generation* (Washington, DC: National Defense University, Institute for National Strategic Studies, 2005), 2.

⁶² Hybrid warfare: “In hybrid warfare, the adversary most likely presents unique combinational threats specifically designed to target U.S. vulnerabilities. Instead of separate challengers with fundamentally different approaches (conventional, irregular, or terrorist), we can expect to face competitors who will employ all forms of war, including criminal behavior, perhaps simultaneously.” Frank G. Hoffman, *Hybrid Threats: Reconceptualizing the Evolving Character of Modern Conflict* (Washington, DC: National Defense University, Institute for National Strategic Studies, 2009), 5.

considered military doctrine, they all represent a category along a spectrum of warfare that is ever-evolving and adapting.⁶⁵

Not only are the types of warfare difficult to define, but also so are the types of existing threats to the United States. The two threats that airborne forces continue to combat are state and non-state actors. State actors aim to control territory, which is the main theme in large-scale airborne roles (seize, show of force, and reinforce). Non-state actors do not control territory; however, they often operate amongst the population in irregular conflicts. This section defines both state and non-state actors in modern warfare to show how airborne units maintain relevancy in the fight.

1. State Actor Threats

Traditionalists view that the future of conflict will likely remain conventional and reflect state-on-state warfare. The United States and its allies are facing state threats that include rogue regimes, such as North Korea and Iran who continue to challenge the safety of global security.⁶⁶ North Korea threatens American diplomacy with “provocation and tensions in East and South China Sea,” which create increased risk for allied partners.⁶⁷ Iran threatens the goal of nonproliferation for nuclear weapons with ambitions of attaining capabilities within three months.⁶⁸ Both regimes continue to disregard global security efforts for establishing international cooperation.

⁶³ Irregular warfare: A violent struggle among state and non-state actors for legitimacy and influence over the relevant population(s). Irregular warfare favors indirect and asymmetric approaches, though it may employ the full range of military and other capacities, in order to erode an adversary’s power, influence, and will. Also called IW. Department of Defense, *Department of Defense Dictionary of Military and Associated Terms (Joint Publication 1–02)*.

⁶⁴ Gray area warfare: Gray area phenomena combine elements of traditional warfighting with those of organized crime. Steven Metz, *Armed Conflict in the 21st Century: The Information Revolution and Post-modern Warfare* (Washington, DC: National Defense University, Institute for National Strategic Studies, 2000), XII.

⁶⁵ Hoffman, *Hybrid Threats: Reconceptualizing the Evolving Character of Modern Conflict*, 1–7.

⁶⁶ Secretary of Defense, *Quadrennial Defense Review (QDR)*, 1.

⁶⁷ White House, *2015 National Security Strategy* (Washington, DC: White House, 2015), 10.

⁶⁸ Micah Zenko. “Putting Iran’s Nuclear Program in Context.” March 31, 2015, http://blogs.cfr.org/zenko/2015/03/31/putting-iran-nuclear-program-in-context/#cid=soc-email-at-blogs-putting_iran8217s_nuclear_prog-033115.

Other external threats to the United States and its allies arise from global powers, such as China and Russia, which strive to modernize their militaries for future conflict. Increasing tensions throughout Southeast Asia and the Pacific indicate expansionist efforts by the Chinese that shake the regional balance.⁶⁹ One of the largest trading partners with the United States, China “will continue seeking to counter U.S. strengths using anti-access and area-denial (A2/AD) approaches and by employing other new cyber and space control technologies.”⁷⁰ Russia, which provides large amounts of natural gas to many European states, has violated Ukraine’s territorial integrity and national sovereignty, while endangering international norms with other neighboring countries.⁷¹ Of course, other states threaten the United States and other territories; however, this sample summary illustrates the dynamically evolving security environment. Large-scale units are a necessary component against an adversary that holds terrain.

2. Non-state Actors

Following the attacks on 9/11, the United States experienced a new threat from non-state actors and terrorist organizations. Like the attackers of the World Trade Center, these adversaries will now utilize custom-designed irregular capabilities to attack American vulnerabilities. Foreign fighters and terrorist threats continue to increase because of the porous borders, lack of security, and sectarian violence in fragile states across the Middle East and Africa. Countries, such as Tunisia, Libya, Yemen, and Egypt, harbor terrorists who “seek to exploit transitional governments and expand their influence.”⁷² These non-state actors range from Daesh or Islamic State of Iraq and Syria (ISIS), to Boko Haram in Nigeria, to Al-Qaeda in the Arabian Peninsula (AQAP), to Al Shabaab in Somalia. These “terrorists remain willing and able to threaten the United States, our citizens, and our interests—from conducting major and well-coordinated

⁶⁹ Roberts Sutter, “Asia’s Importance, China’s Expansion, and U.S. Strategy: What Should be Done?,” *Asia Pacific Bulletin*, no. 283 (October 28, 2014), <http://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/34255/apb%20no.283.pdf?sequence=1>.

⁷⁰ Secretary of Defense, *Quadrennial Defense Review (QDR)*, 6.

⁷¹ White House, *2015 National Security Strategy*, 10.

⁷² Secretary of Defense, *Quadrennial Defense Review (QDR)*, 5.

attacks to executing attacks that are smaller and less complex.”⁷³ Terrorist aspirations for weapons of mass destruction (WMD) are a constant threat to U.S. national strategy. Foreign terrorist groups affiliated with al Qa’ida, as well as individual terrorist leaders, may seek to recruit or inspire Westerners to carry out attacks against the U.S. homeland with little or no warning.⁷⁴ Small-scale units are a perfect fit against these expeditionary transnational actors that do not hold terrain.

3. Summary of Current Operating Environment

One certainty about warfare is the difficulty in predicting what the future of conflict will be. Given both categories of warfare, it seems that a conservative position on this debate is that conflict will consist in some hybrid form between conventional and irregular. However, conventional and SOF camps agree that irregular aspects of fighting will continue into the foreseeable future. In tallying the recent types of conflicts, the overwhelming amount of irregular conflict that occurs between state and non-state actors cannot be discounted, as well as the much fewer that occur between states. Given this overall increase in irregular conflict, military and strategic decision makers must prepare forces to deal with the myriad of changes in warfare for the near future.

E. SUMMARY OF AIRBORNE ROLES

Using U.S. doctrine as a guide, this section has categorized airborne roles into small and large-scale. Small-scale airborne roles consist of reconnaissance, raid, and special warfare, while large-scale airborne roles consist of seize, show of force, and reinforce. Each role displayed utility in historical and modern scenarios that lend credit to the continued relevancy of airborne. While not all roles are utilized equally, or even frequently in modern crises and conflict, a comprehensive look at airborne roles and utility may offer decision makers new perspectives for military force organization.

As the debate over force structure continues, the manner in which units are organized will increasingly be called into question. Budget constraints, risk, political

⁷³ Ibid., 8.

⁷⁴ Secretary of Defense, *Quadrennial Defense Review (QDR)*, 8.

implications, evolving threat, and emerging technology are only a few of the long list of force structure considerations. For these reasons, the DOD continually reassesses the military force structure and organization to optimize the fighting force for modern warfare. Many traditionalists seek to maintain larger hierarchal force structures, while progressives seek to reorganize into smaller de-centralized force structures. Whether a traditionalist, progressive, or moderate approach is taken, this research urges the DOD to closely consider the roles and utility of airborne when re-thinking the military force structure and future operational concepts.

III. THE TECHNOLOGICAL FRAME OF REFERENCE

Technological understanding and the effects of major innovations date back to the beginning of warfare.⁷⁵ William McNeill, for example, in his seminal book, *The Pursuit of Power*, addresses the broad focus of technology in armed conflict by hearkening back to numerous historical cases of innovations that altered warfare.⁷⁶ These innovations had profound effects on military force structures. For example, detailed mapping, skilled staff officers, written orders, and a re-organized force structured into divisions allowed French commanders of the 18th century to increase the size of their armies while maintaining effective command and control on the battlefield.⁷⁷ Additionally, railroads, steamships, and the electronic telegraph of the 19th century afforded the mass mobilization of Moltke's armies and supplies that allowed for extended fighting campaigns across great distances.⁷⁸ The theme that emerges from these cases is that military force structures and fighting doctrine were adjusted to account for these changes. An informed technological frame of reference is required to make appropriate airborne organizational changes.

Drawing back on the Guderian example pre-World War II, the German technological frame of reference came from both broad and narrow advances. The broad frame stemmed from advances in communications and radio capabilities that afforded maneuver units greater mobility across larger distances. The narrow frame of reference

⁷⁵ Daniel R. Headrick, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (Oxford, England: Oxford University Press, 1981). Headrick, in his book, describes the interplay between technology and imperialism. For the purposes of this research, Headerick's book provides context as to the importance of technology on force development; Bernard Brodie and Fawn McKay Brodie, *From Crossbow to H-bomb* (Bloomington, IN: Indiana University Press, 1973). Brodie draws relationships between science, technology, and the military by providing historical examples that illustrate how military research advances technological pursuits; Andrew F. Krepinevich, "Cavalry to Computer: The Pattern of Military Revolutions," *The National Interest*, no. 37 (Fall 1994): 30–42. Krepinevich writes that military revolutions consist of technological change, systems development, operational innovation and organizational adaptation. This work provides supporting evidence of technology influences on military forces and the steering of force structures.

⁷⁶ William Hardy McNeill, *The Pursuit of Power: Technology, Armed Force, and Society Since A.D. 1000* (Chicago, IL: University of Chicago Press, 1982). See McNeill's book for numerous examples on the introduction of technologies and their profound effects on military force structures. McNeill explores three distinct themes throughout his book; economic, social, and technological aspects of warfare. Of these themes, McNeill's work on the technological aspect of warfare relates more aptly this research.

⁷⁷ McNeill, *The Pursuit of Power: Technology, Armed Force, and Society Since A.D. 1000*, 163.

⁷⁸ *Ibid.*, 248–249.

specifically considered advances in mobile artillery, tank mobility, and attack aircraft. These technological advances, when properly combined, organized and employed, overcame the vulnerabilities of attritional warfare from World War I and paved the way for early German success in World War II. The developers of new technologies for that era pursued new “tools” to overcome vulnerabilities with capabilities. What led to success, however, were not the technological tools themselves, but the reorganization and application of the tools. By addressing the modern technological frame of reference, it becomes clearer to see that airborne force structures and new operational concepts are needed to operate more effectively in times of a rapidly changing technological environment.

This section examines technology from a broad and narrow frame of reference to justify rethinking the airborne organization and adopting new military operational concepts that fit this era. The broad frame provides the overall global context, while the narrow frame addresses airborne specific technological vulnerabilities and capabilities. As Figure 4 indicates, the broad frame of reference argues that new technologies are transferring power from large hierarchal structures to smaller formations, which displays the linkages between technology and the potential influences on how militaries can organize based on technological advancements. Therefore, airborne utility is indirectly affected by broader technological changes. The narrow frame of reference addresses the tools of technology that directly influence airborne utility. Modern airborne vulnerabilities include advancing and proliferating A2AD systems, armored enemy ground forces, and non-stealthy deployment aircraft. Modern airborne capabilities consist of improved parachute systems and high-tech airborne equipment. The resulting analysis from the frames of reference concludes that SOF airborne units will greatly benefit from organizing into smaller-scale units of action to maintain speed and stealth; additionally, conventional forces can benefit from organizing into smaller, but more protected—with armor—to survive the modern A2AD threat network. The outcomes from each of these broad and narrow technology frames of reference provide the context for the argument to reorganize airborne forces with a vision of swarming.

<u>Broad Tech Frame of Reference</u>	<u>Narrow Tech Frame of Reference</u>
<ul style="list-style-type: none"> • New technologies devolve power • Mobility to smaller formations • Larger formations are imperiled • “Small and Many” over “Large and Few” 	<ul style="list-style-type: none"> • New technologies create airborne vulnerabilities <ul style="list-style-type: none"> • SAMs, non-stealthy A/C, lack of ground mobility • New technologies enhance airborne capabilities <ul style="list-style-type: none"> • Parachute and equipment advances, armor and mobility

Figure 4. Technological Frame of Reference: Broad and Narrow⁷⁹

A. BROAD TECHNOLOGICAL FRAME OF REFERENCE

The rise of the information age is characterized by a shift in traditional industry to one based on information, computerization, and networking. As many scholars suggest, the information age is greatly impacting military affairs, which in many ways, affects how modern institutions are organized. This “information revolution” is primarily based on the technological abilities to collect and receive massive amounts of data and smartly process it into useful and manageable packets of information.⁸⁰ Examples of these enabling technologies include computers, satellites, GPS, and worldwide communications. Military specific examples include C4ISR, such as drones and other advanced aircraft sensors for gathering and processing data. These systems challenge how organizations traditionally function. Hierarchical, top-down, organizational structures work much less efficiently due to the massive increase in the flow of information. New technologies, rather, have transferred power to lower levels. “The information revolution empowers the network form,” writes Arquilla, “undermining most hierarchies.”⁸¹ Lower-level efficiency rewards institutions that organize into smaller groups. A smaller formation has the ability to react much faster to information than a

⁷⁹ “Broad” from John Arquilla and David Ronfeldt, *Swarming and the Future of Conflict* (Santa Monica, CA: RAND National Defense Research Institute, 2000). The broad frame of reference bullet points echo the insights from *In Athena’s Camp* by Dr. John Arquilla and David Ronfeldt. These insights lend credit to understanding the broader technology picture at a global level. The overall point emphasized from *In Athena’s Camp* is that “organization and doctrine are just as important as technology.”

⁸⁰ Norman C. Davis, “An Information-based Revolution in Military Affairs,” excerpted from John Arquilla and David F. Ronfeldt, United States Department of Defense, Office of the Secretary of Defense, and National Defense Research Institute (U.S.), *In Athena’s Camp: Preparing for Conflict in the Information Age* (Santa Monica, CA: RAND, 1997), 83.

⁸¹ Arquilla and Ronfeldt, *Swarming and the Future of Conflict*,” iii.

larger formation that has several hierarchal levels to move through. In essence, largely organized institutions are falling behind to the more flattened, smaller institutions, which greatly impacts military organizations.

Modern military organizations serve as a model of large hierarchical institutions plagued by inefficiencies. An institution of this size also places great value in large platforms. Today, large platforms, such as tanks, ships, and planes dominate the battlefield. Martin Libicki argues that the days of platform dominance are coming to an end.⁸² The large military platforms so dominant today will yield to many systems composed of sensors, emitters, microbots, and miniprojectiles able to detect, track, target, and destroy.⁸³ Advancing technologies resulting from the information age will continue to reward smaller units. In this way, Libicki believes that the “small and many” will replace the “large and few.”

The broad technological concepts of the information age provide context to military organizations about how to structure forces and adopt operational concepts for future conflict and crises. While traditional mindsets display resistance to such changes, it cannot be denied that networks are replacing hierarchies as the more effective organizational structure. Holistically, “small and many” over “large and few” evokes a new mindset, especially in military affairs. Certainly, all military services and their respective branches can benefit from updated thinking in organizational structures. As the previous section suggests, airborne concepts stand out as an adaptable infiltration capability with a wide breadth of utility from small to large-scale. The technologies that specifically relate to the evolution of the airborne capability directly influence the airborne impact on future operational concepts.

⁸² Martin Libicki, “The Small and Many,” excerpted from John Arquilla and David F. Ronfeldt, United States Department of Defense, Office of the Secretary of Defense, and National Defense Research Institute (U.S.), *In Athena’s Camp: Preparing for Conflict in the Information Age* (Santa Monica, CA: RAND, 1997).

⁸³ *Ibid.*, 191.

B. NARROW TECHNOLOGICAL FRAME OF REFERENCE

1. Airborne Technological Vulnerabilities

Modern vulnerabilities to airborne forces are a direct result of technological improvements to counter-measures. These counter-measures are A2AD systems and armored ground forces. The specific areas of concern for airborne forces are surface-to-air missiles (SAMs), advanced artillery, non-stealthy deployment aircraft, mobility, and armored protection on the ground. These challenges can be summarized as “getting to the fight, getting into the fight, and staying in the fight.”⁸⁴ In addressing these airborne vulnerabilities, the DOD must consider the premiums placed on the capabilities of the adversary’s defense; in the A2AD environment, defense seems to prevail as the dominant form. An adversary can much easier offset the costs of defending as opposed to an offensive maneuver, which closely relates to Robert Jervis’ concepts developed in “Cooperation Under the Security Dilemma.” Jervis refers to a security dilemma of this type as the puzzle of offense/defense balance and the ability to distinguish between an offense or defense posture.⁸⁵ Jervis would classify the airborne dilemma as a defensive dominant scenario in which the defender, with A2AD capabilities, can easily inflict a serious amount of damage on the employment of a traditional large-scale offensive airborne force.⁸⁶

A2AD⁸⁷ threats pose a significant challenge to airborne forces and create critical vulnerabilities to airborne employment.⁸⁸ The key adversary capabilities to pose the

⁸⁴ Vincent Alcazar and Thomas M. Lafleur, “A Role for Land Warfare Forces in Overcoming A2/AD,” *Military Review*, November–December 2013.

⁸⁵ Robert Jervis, “Cooperation Under the Security Dilemma,” *World Politics* 30, no. 2 (January 1978): 167–214.

⁸⁶ *Ibid.*

⁸⁷ Joint Operational Access Concept (JOAC), January 17, 2012 forward by Martin E. Dempsey. Distinction between anti-access and area-denial: Anti-access refers to those actions and capabilities, usually long-range, designed to prevent an opposing force from entering an operational area. Area-denial refers to those actions and capabilities, usually of shorter range, designed not to keep an opposing force out, but to limit its freedom of action within the operational area.

⁸⁸ Alcazar and Lafleur, “A Role for Land Warfare Forces in Overcoming A2/AD,” 87. It is important to note that A2AD threats pose challenges across a wide spectrum of military forces that cross a multitude of domains not restricted to airborne. The domains are air, sea, land, space, and cyberspace. Airborne forces are a slice of the land warfare component in the new integrated joint: cross domain operations.

greatest threat to joint forces in future operations are high quality air defense and long-range artillery rocket systems.⁸⁹ In the 1970s, the best adversary mobile air defense system was the SA-6 SAM with a range of approximately 25 km. Today, the state of the art air defense systems have a maximum effective range against non-stealthy aircraft of approximately 400 km.⁹⁰ Additionally, the ability to employ and operate mobile artillery and rocket launchers on possible friendly lodgment sites at airfields and seaports pose great security threats. Modern mobile rocket launchers can reach ranges of more than 50 km.⁹¹ The A2AD threats directly implicate the Army's premier forcible entry capability of airborne assault.⁹²

Airborne transport aircraft presents challenges that manifest themselves into vulnerabilities for airborne forces due to the exposure to A2AD threats. The nature of transport aircraft used for airborne operations is that it cannot fly stealthily, which leaves the aircraft and airborne occupants exposed to SAM threats in their attempts to get to the fight. The U.S. Air Force supports the majority of airborne operations utilizing C-130s or C-17s. C-17s fulfill the strategic reach option and C-130s satisfy intra-theater requirements. Both types of aircraft are non-stealthy. Similarly, the U.S. Army's rotary wing assets do not have a stealth capable helicopter to deploy airborne forces. Critics point to many other shortcomings with the military's transport aircraft in modern A2AD environments to include the number of aircraft available, reach and weight limitations, and austere airfield landing/takeoff capabilities.⁹³ For all the technological vulnerabilities mentioned, airborne transport aircraft limits what airborne forces can accomplish.

The fear is that A2AD systems and technologies will not be limited to a few state actors, but will proliferate to other states further complicating the ability to achieve access and operate in contested areas of the world.⁹⁴ Reports indicate that nearly 100,000

⁸⁹ Gordon and Matsumuru, *The Army's Role in Overcoming A2/AD Challenges*.

⁹⁰ Ibid.

⁹¹ Ibid.

⁹² Ibid., 27.

⁹³ Andrew Krepinevich, Barry Watts and Robert Work, *Meeting the Anti-Access and Area Denial Challenge* (Washington, DC: Center for Strategic and Budgetary Assessments, 2003), 78–79.

⁹⁴ Ibid., 13–14.

such systems exist in the arsenals of over 100 states and at least 13 non-state groups, such as Hezbollah, the Revolutionary Armed Forces of Colombia (FARC), and the Tamil Tigers.⁹⁵ Sub-states and non-state actors actively seek to gain and employ SAMs. A2AD systems thwart the efforts of airborne forces to “get to the fight, get into the fight, and stay in the fight.”

2. Airborne Technological Capabilities

Advances in airborne technological capabilities attempt to mitigate the vulnerabilities just surveyed. Technological developments in improved parachutes, advanced airborne equipment, and new concept aircraft are examples of such attempts. This sub-section addresses the technological capabilities from both SOF and conventional forces; modern airborne forces reflect a dichotomy in capabilities optimized for specific purposes. Currently, SOF focuses on extending airborne capabilities to infiltrate with more stealth, speed, and precision in special warfare environments. Conventional forces, arguably, should seek to include more armored protection for survivability and mobility in the modern A2AD environment.

New parachute systems offer improved capabilities of airborne infiltration. The U.S. Army updated the static-line parachute system used for dropping airborne soldiers at low altitudes. The T-11 replaced the T-10D, which afforded the paratrooper a greater degree of maneuverability under canopy and greater parachute reliability, which ultimately, reduced the risk of injury. For United States Special Operations Forces (USSOF) forces, the U.S. Army updated the MFF parachute system used for dropping airborne soldiers at high altitudes. The RA-1 replaced the MC-4 that allowed the operator to carry more weight, travel farther distances under canopy, and give a higher degree of precision on the DZ. The MFF parachute continues to offer the military a stealth capable parachute for the purposes of clandestine infiltration.

⁹⁵ Max Boot, “The Paradox of Military Technology,” *The New Atlantis*, 20, Fall 2006, <http://www.thenewatlantis.com/publications/the-paradox-of-military-technology>.

Future concepts of airborne parachute development include the use of modified wing suits to propel operators at even greater distances than standard parachutes.⁹⁶ The operator would glide with a fixed set of short wings across distances up to 40 miles to infiltrate into an area. Continued development in parachute capability and new troop delivery concepts push the boundaries of modern airborne thought. Future concepts can greatly enhance the ability of the U.S. military to mitigate the increasing A2AD threat.

In the interim, incremental advances in airborne supporting equipment provide paratroopers and operators with greater capability. Rarely publicized due to the classified nature of most USSOF operations, MFF airborne infiltrations are becoming increasingly more relevant.⁹⁷ The leading attribute of infiltrating USSOF with MFF is stealth. Advanced technological equipment—night vision, parachute navigational (Paranav) aids, and landing assist applications—enhances the stealth capability. Stealthy infiltration allows USSOF to enter contested or denied areas of operations discreetly. The development of technology in MFF equipment compliments the Army SOF mid-term vision of increased airborne clandestine capability to overcome operational access vulnerabilities.⁹⁸

Unlike the stealth strengths of MFF infiltration, conventional equipment capability enhancements need to provide the airborne force with mobility and protection once on the battlefield. Non-stealthy transport planes used by airborne forces are highly vulnerable in a more advanced A2AD environment. Advocates of airborne forcible entry recommend further developments in light armored vehicles to give increased mobility and protection.⁹⁹ Airborne conventional units could be dropped further behind enemy lines/areas and away from air defense threats to maneuver in armored vehicles onto the enemy. The Russians originally developed the concepts and vehicles designed to improve mobility and protection for airborne forces. To reduce scatter and dispersion of airborne

⁹⁶ David Hambling, “Look Out Below! Wingsuits pushed for Airborne Assaults,” *Wired Magazine*, 2009, <http://www.wired.com/2009/12/look-out-below-wingsuits-pushed-for-airbone-assaults/>.

⁹⁷ Cleveland, *ARSOF 2022 Document*, 20.

⁹⁸ *Ibid.*

⁹⁹ Gordon and Matsumuru, “The Army’s Role in Overcoming A2/AD Challenges,” 28–29.

forces on the DZ, the Russians packed all equipment and personnel inside lightly armored vehicles and dropped them by parachute.¹⁰⁰ Once landed, the equipped vehicles could immediately begin movement to the objective.

The U.S. military has yet to adopt a lightly armored airborne vehicle capable of accomplishing the requirements necessary to operate effectively in an A2AD environment. The U.S. military solution was thought to be the Stryker combat vehicles; however, fully equipped weight of the vehicle became a restriction for airborne use. A mounted, armored vehicle capability for airborne forces offers a viable solution to overcoming the distance challenge for airborne forces once on the ground.

C. CONCLUSION

This chapter has offered a brief summary of the broad and narrow technologies that must be considered for rethinking airborne organization. Broadly, the information age is ushering in new technologies that alters how institutions should organize. Narrowly, the technology race will continue to produce airborne capabilities to overcome vulnerabilities. Arguably, it is represented by a defensive-dominant era by placing heavy costs and risk on the airborne employer.¹⁰¹ An adversary can easily offset the airborne employer by exploiting the vulnerabilities. Airborne vulnerabilities, such as proliferating A2AD systems, non-stealthy transport aircraft, and ground mobility, create issues for airborne forces “getting to the fight, getting into the fight, and staying in the fight.” While the capabilities certainly do not eliminate the concerns of airborne vulnerabilities, they greatly compliment the mitigating efforts.

Advancements in technology will continue to improve upon parachute systems and airborne equipment. Even yet, future technological developments may very well eliminate the need or outweigh the cost of employing an airborne force altogether. However, the foreseeable future seems to indicate incremental advancements of airborne

¹⁰⁰ Denis Kungrov, “Russian Army Receives New BMD-4M ‘Airborne’ Assault Vehicles,” August 14, 2014, http://rbth.com/defence/2014/08/14/russian_army_receives_new_bmd-4m_airborne_assault_vehicles_39027.html.

¹⁰¹ This defensive-dominant strategy does not always benefit against a small-scale, covert, airborne operation.

capabilities designed to overcome their vulnerabilities. To summarize the findings, SOF airborne units will greatly benefit from organizing into smaller-scale units of action to maintain speed and stealth. Additionally, conventional forces require organizing into smaller, but more protected units of action—with armor—to survive the modern A2AD threat network. In application of these two concepts, the former can be done at a fraction of the price to maintain SOF proficiency in airborne. Rather, the conventional force requires additional funding to build and outfit armored protective vehicles capable of operating in the modern A2AD environment.

More importantly, technology is not a replacement for effective organization, doctrine, and strategy. All the technological tools mentioned in this section require careful consideration of military commanders and decision makers to employ and organize airborne forces effectively. As Max Boot indicates, the paradox of today’s age is that modern technology is both “the great separator and the great equalizer in military affairs.”¹⁰² In understanding this paradox, technology alone cannot be wholly relied upon as the solution, but rather serves as a frame of reference to consider other areas of change. The following chapter serves to introduce the concept of swarming and how airborne forces can use the technological capabilities of the modern era to thrive under a new doctrine of fighting.

¹⁰² Boot, “The Paradox of Military Technology,” 14.

IV. AIRBORNE DESIGN AND THE SWARMING CONCEPT

Given the preceding discussions of airborne history, along with emerging technological and threat environments, this section addresses a force developmental strategy and doctrine in rethinking airborne organization. More specifically, the authors argue that the DOD should consider restructuring the airborne force by organizing into smaller, decentralized, integration-focused airborne units of action while deliberately implementing a swarming concept to attain greater utility in modern and future warfare.

Swarming offers airborne forces an updated way of fighting in the information age. Swarming is “seemingly amorphous, but it is a deliberately structured, coordinated, strategic way to strike from all directions, by means of a sustainable pulsing of force and/or fire, close-in as well as from stand-off positions.”¹⁰³ The swarming concept relies on each one of the defined characteristics to operate effectively. The capabilities of an airborne force, detailed in previous sections, inherently satisfies many of the fighting characteristics of the swarming concept. As sweeping military structural change lingers at the decision-maker level, an airborne swarming concept can serve as an integral preview of the possibilities in implementing such an operational and force developmental strategy. Using the basic characteristics of swarming, this section applies swarming design elements to the modern airborne force.

Figure 5 displays the six basic characteristics of swarming.

¹⁰³ Arquilla and Ronfeldt, *Swarming and the Future of Conflict*, vii.

Swarming Characteristics

- Autonomous or semi-autonomous units engaging in convergent assault on a common target
- Amorphous but coordinated way to strike from all directions—“sustainable pulsing” of force or fire
- Many small, dispersed, internettted maneuver units
- Integrated surveillance, sensors, C4I for “topsight”
- Stand-off and close-in capabilities
- Attacks designed to disrupt cohesion of adversary

Figure 5. Basic Characteristics of Swarming¹⁰⁴

Military thinkers have adopted their own concepts of reorganizing the military based on changing technology trends to optimize the force for the modern era. Douglas MacGregor, author of *Breaking the Phalanx*, advocates forming the military into smaller, more reactive Army groups. He illustrates how today’s military organizations look very similar to those of the past and alludes to the DOD’s resistance to change, which leads to an inefficient ability to wage modern warfare with outdated organizational structures. While technology has changed the tools used by military organizations, the organizations remain the same, hierarchal, top-down-driven units of action. In similar fashion, Bevin Alexander acknowledges that large concentrations of troops and weapons serve as targets for destruction, and in the future, will no longer exist.¹⁰⁵ He builds the case that military units must be small, highly mobile, self-contained, and autonomous to survive.¹⁰⁶ Bevin

¹⁰⁴ Arquilla and Ronfeldt, *Swarming and the Future of Conflict*, 21.

¹⁰⁵ *Terrorism and the New Age of Irregular Warfare*, April 2, 2009, *Before the House Armed Services Subcommittee on Terrorism, Unconventional Threats and Capability Winning Future Wars: How Weapons That Never Miss Have Eliminated Conventional Warfare*, 111th Cong., 1 (2009) (Statement of Bevin Alexander).

¹⁰⁶ *Terrorism and the New Age of Irregular Warfare*, April 2, 2009, *Before the House Armed Services Subcommittee on Terrorism, Unconventional Threats and Capability Winning Future Wars: How Weapons That Never Miss Have Eliminated Conventional Warfare*. Alexander succinctly summarizes his observations of today’s traditional military structure in a statement made to the House of Armed Services Subcommittee—traditional military formations—the armies, corps, divisions, brigades, regiments, battalions, and companies of the 20th century—are obsolete. Massed armies are now targets ripe for destruction, not marks of strength. As computer networks provide instant global communication, the traditional military hierarchy of command is no longer needed. Since actions can be carried out much faster and over far greater distances than in the past, command decisions can be made quickly. They often must be made quickly because targets are normally fleeting, which eliminates the possibility of maintaining traditional military formations and hierarchies.

contends that the key to winning future wars is knowing when to move from one form of military organization to another.¹⁰⁷ Other experts agree that organizational change in militaries can produce significant change in warfare.¹⁰⁸

Airborne forces can benefit from this line of thinking. Small-scale airborne roles would greatly benefit from a force reorganized into small, decentralized, and self-contained units of action. The airborne roles in the small-scale category rely on stealth, speed, discreetness, and precision. These characteristics effectively fulfill the small-scale airborne roles, reconnaissance, raid, and special warfare. Similarly, large-scale airborne roles could still be accomplished from a force reorganized into a smaller form. Such a vision would entail small, dispersed airborne units of action infiltrating together to achieve relative superiority for the large-scale roles of airborne, seize, show of force, and reinforce. The concepts that Bevin and MacGregor propose for military structures and reorganization offer arguments that strengthen the utility of an airborne capability in the modern era. These concepts echo those of Arquilla and Ronfeldt under their predictions on future conflict and the diffusion of the “swarming” concept. Coupled with the previous section’s technological frame of reference on airborne capabilities and development, swarming can serve as an area of future growth for airborne concepts.

A. AIRBORNE ROLES AND SWARMING

Using swarming characteristics as a guide, Arquilla and Ronfeldt applied design elements that envision the military organizational structure for a swarming force capable of fighting in future conflict scenarios. The defined airborne roles—small- and large-scale—identified in the previous sections, compliment the characteristics of swarming and can directly fulfill the design elements intended to create a fighting force for future conflict. The following design elements of swarming are used to assess the viability of an

¹⁰⁷ *Terrorism and the New Age of Irregular Warfare*, April 2, 2009, *Before the House Armed Services Subcommittee on Terrorism, Unconventional Threats and Capability Winning Future Wars: How Weapons That Never Miss Have Eliminated Conventional Warfare*. Alexander uses the example of the premature decision to change to the flawed Pentomic structure in the 1950s despite fighting irregular protracted conflict in Vietnam. During this period of change, the military underwent an organizational change that left it unprepared to fight the wars effectively that actually occurred.

¹⁰⁸ Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell University Press, 1991).

airborne capability systematically in the swarming concept. An airborne force organized and employed with these design elements exhibit how parachute capable forces can effectively fight in future environments under new doctrine. Figure 6 displays the four design elements for a swarming concept.

- | |
|---|
| <p><u>Swarming Design Elements:</u></p> <ul style="list-style-type: none">• Many small, dispersed, internettted maneuver units• All-service coordination for mixing and matching• Both stand-off and close-in capabilities• Integrated surveillance, sensors, Command, Control, Communications, Computers, and Intelligence (C4I) for “topsight” |
|---|

Figure 6. Swarming Design Elements¹⁰⁹

B. MANY SMALL, DISPERSED, INTERNETTED MANEUVER UNITS

A swarming force must be small, dispersed, and internettted to be decisive. Under the swarming concept, those characteristics can be exhibited by a restructured airborne force. First, airborne forces can easily be organized into “many and small” maneuver units. A “many and small” structure allows the swarming concept to work effectively. As previously argued, the age of platform dominance and other large military structures may be coming to an end. Large platforms only make larger targets; smaller elements are much more maneuverable, flexible, and make themselves much more difficult to be located and hit by modern weapons. In today’s environment, it is most likely that airborne forces will be called upon to secure lodgments—airports of debarkation (APOD) and sea ports of debarkation (SPOD)—rather than support large-scale ground force operations. The seizure of such lodgments can be especially challenging given the proliferation of A2AD capabilities to include SAMs employed by both state and non-state actors. Smaller elements of airborne units will prove much more effective in neutralizing such A2AD threats and suppressing enemy air defenses prior to the securing of lodgments to facilitate the advancement of follow-on forces.

¹⁰⁹ Arquilla and Ronfeldt, *Swarming and the Future of Conflict*, 45.

Second, airborne forces must be able to operate in dispersed fashion, often autonomously or with little guidance. Autonomy and the ability to act independently or loosely guided is a critical component of the swarming concept. A decentralized structure is critical to achieving autonomy. An accidental form of decentralized airborne structure occurred during the Allied World War II large-scale drops at Normandy when paratroopers coined the term LGOP. This term is affiliated with the small bands of determined paratroopers that came together to fight in autonomous fashion, despite being scattered all over the battlefield on unplanned DZs. Understanding the overall operational objectives and mission intent, the resilient LGOPs could effectively carry out the issued orders without additional guidance. Although the hierarchical division structure was utilized in the Normandy operations, it was the on-the-ground modifications made by the tactical elements that displayed the power of small, dispersed groups.

A modern version of the World War II LGOP, under the swarming concept, would incorporate the strengths of reliable internetted communication between units of maneuver. LGOP mission intent would come from a flattened command structure that purposefully allowed the LGOP to accomplish mission intent autonomously. LGOPs could effectively swarm targets with overwhelming localized force to achieve relative superiority and re-disperse immediately following the completion of objectives.

Third, swarming airborne forces must be closely internetted to allow maximum information dissemination. Early airborne forces could not accomplish it optimally without the information and internetted components of the modern information era. Modern radios, blue force trackers, and other reliable sources of communication technology allow military units to stay internetted for close coordination.

C. ALL-SERVICE COORDINATION FOR MIXING AND MATCHING

Using a doctrine of swarming, all-service coordination requires joint and combined arms efforts by all branches and services. Many small maneuver units cannot maintain an “all-purpose” approach to forces and equipment that existing military structures tend to maintain today. In this regard, a swarming force requires the support of other services to provide the logistical, medical, or fire support to make up for the loss in

capability. Logistically, and in combat, airborne forces continue to advance in this regard. The air transport support provided by the Air Force and Army Aviation assets demonstrate the all-service efforts to deliver and re-supply an airborne force. The heavy lift delivery capabilities of the C-17 and C-130 afford airborne units great reach across large distances and rapid delivery of logistical requirements. Modern GPS-guided bundles allow for precise resupply that does not require ground transport or additional support assets for delivery.

In other displays of all-service coordination in a combat scenario, several Operational Detachment-Alphas (ODAs) demonstrated the power of well-coordinated fire during the beginning stages of Operation Enduring Freedom in Afghanistan.¹¹⁰ These ODAs relied on close air support and naval fire support to employ precision guided munitions onto desired enemy targets. The ODAs directed the swarms of munitions onto their objectives, which effectively neutralized their targets. Mission success was achieved with a few ODAs, close air support, and the fighting support of host nations forces. Future scenarios of this type could easily utilize airborne infiltration to emplace small units of action quickly to reign down well-coordinated precision fire onto key objectives.

D. BOTH STAND-OFF OR CLOSE-IN CAPABILITIES

In this context, airborne forces are increasingly appropriate; the capabilities of modern parachutes offer both reliable stand-off and close-in employment for swarming by force. As noted in the technology section, modern SOF utilize MFF techniques to infiltrate clandestinely from great distances under parachute canopy to avoid detection. The SOF can achieve stand-off distances of up to 40 kilometers using the latest parachute systems. Programs are currently being implemented to expand the MFF capability to all Army SF operators.¹¹¹ This program will build a clandestine stand-off infiltration capability to a specialized force already organized into small autonomous units of maneuver.

¹¹⁰ Arquilla, *Worst Enemy: The Reluctant Transformation of the American Military*, 46.

¹¹¹ Cleveland, *ARSOF 2022 Document*.

Stand-off not only refers to the parachute capability of an airborne force, but also the airborne operational ability to deploy quickly across great distances to troubled regions of the globe. Currently, the U.S. Army maintains the 82nd Airborne Division as a Global Response Force capable of reaching anywhere in the world within 96 hours of notification.¹¹² While the 82nd Airborne Division maintains the traditional division structure, the parachute capability and air transport reach affords the unit strategic mobility to conduct contingency operations. Arguably, an entire airborne division is not required to accomplish the global response task. A re-organized airborne structure of “small and many” airborne groups would continue to allow strategic mobility and stand-off reach with a greater degree of flexibility at a decentralized tactical level.

Advances in static-line parachutes for close-in capabilities continue to be refined. For example, static-line parachute advancements have reduced the rates of injury on jumping to less than (.005) percent.¹¹³ Parachute capabilities in stand-off and close-in instances will continue to progress based on technological advancements in parachute systems to give enhanced, reliable mobility to swarming forces.

Beyond the combat application of close-in capabilities, swarming with airborne forces can be used for the roles humanitarian assistance and disaster relief (HA/DR). For example, close-in swarming effects of the U.S. forces in Haiti during the American intervention known as Operation Uphold Democracy demonstrates swarming for the roles of HA/DR. The 82nd airborne was prepared to enter Haiti forcibly by seizing airfields in preparation for follow-on forces, but negotiations by a political delegation allowed the forces to enter permissively. Air-landing thousands of paratroopers onto the Haitian airfields, the 82nd Airborne Division quickly converged into the area to provide critical aid to the Haitian people. Swarming in force for other peacekeeping and stability operations perhaps has greater utility in future crises opportunities.

¹¹² Flynn and Richardson, “Joint Operational Access and the Global Response Force,” 38.

¹¹³ Chanel Weaver, “Injury Experts Evaluate Safety of New Army Parachutes,” February 24, 2014, http://www.army.mil/article/120614/Injury_experts_evaluate_safety_of_new_Army_parachutes/.

E. INTEGRATED SURVEILLANCE

Integrated surveillance refers to dispersed sensors and emitters with the operational ability to communicate and report between each other for the purposes of “top-sight,” to provide the “big picture” view of what is occurring.¹¹⁴ The vision of turning the military into a “sensory organization” is a critical necessity of a swarming force.¹¹⁵ While small groups of paratroopers can certainly act as sensors for reconnaissance purposes, this job will likely go to much smaller and computerized sensors and emitters. As Libicki envisioned in his article, “The Small and Many,” miniaturized sensors and emitters will foreseeably be able to provide the necessary information for “finding.”¹¹⁶

The integration of technology that enhances “finding” will empower the maneuver elements to react; it is within this scenario that small groups of airborne forces will likely benefit. The modern roles of airborne forces can be greatly enhanced by a well-integrated network of sensors.

Historically, swarming forces were unable to achieve an internetted level of integration without the technology of the modern era. Yet, the power of small groups prevailed even without it. Demonstrating a successful effort of what a small, dispersed, autonomous group can accomplish despite the technology shortcomings is the British Special Operations Executive (SOE) during World War II.¹¹⁷ Airborne infiltration was among many of the insertion techniques exercised by the sabotage and subversion experts. The SOE employed low-level airborne insertions from 300 feet at night as a rapid infiltration technique to insert operatives deep into German territory.¹¹⁸ These discreet airborne insertions allowed the SOE commandos to gain access to austere areas throughout Europe and create havoc on the Nazis from all directions. Winston

¹¹⁴ Arquilla and Ronfeldt, *Swarming and the Future of Conflict*, 46.

¹¹⁵ Ibid.

¹¹⁶ Libicki, “The Small and Many,” 195.

¹¹⁷ Arquilla and Ronfeldt, *Swarming and the Future of Conflict*, 41.

¹¹⁸ Ron Clarke, “Red Stocking,” January 12, 2015, <http://www.harringtonmuseum.org.uk/RedStocking.htm>.

Churchill's direction to the SOE was to "set Europe ablaze."¹¹⁹ Using this scenario in a contemporary context, imagine the possibilities of an integrated network of sensors and emitters to illuminate critical targets better for the SOE to create havoc.

F. CONCLUSION

Within in the realm of parachute capable forces, airborne units—when organized into small, decentralized units of maneuver—can offer renewed possibilities of increased relevance in modern conflict scenarios by adopting a swarming concept. In lieu of continuing to orient the airborne force towards large-scale action, the DOD should accept that it is highly unlikely to occur in the future. The DOD should instruct the Army to downsize the sheer numbers of airborne forces to match the modern and future likelihood of airborne implementation by organizing around small-scale operations. While large-scale airborne implementation may occur, the re-organized airborne force into smaller units of action can "ramp-up" to accomplish the unforecasted large-scale requirements.

The methods or techniques of airborne must be tailored to existing challenges; warfare itself has followed these very same maxims. While the roles of modern airborne forces has changed very little, the scale and utility in which it is used requires an update in organizational mindset, small and many over large and few.

A byproduct of military reorganization efforts evokes new visions of fighting doctrine. The swarming concept may hold great utility for an airborne force. Instant communications, mobility, and flexibility from small maneuver units allow for effective swarming to occur. Arguably, the age of technology will have arrived when a parachute capable force armed with modern equipment has the necessary components to fulfill a swarming concept. Using Arquilla and Ronfeldt's design elements for a swarming force, a reorganized airborne force operating under this concept can increase the relevancy of airborne forces in future conflict scenarios.

¹¹⁹ Michael Richard Daniell Foot, *SOE in France: An Account of the Work of the British Special Operations Executive in France, 1940–1944* (London, UK: Her Majesty's Stationery Office, 1966), 11.

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V. CONCLUSIONS

The primary purpose of airborne forces remains largely unchanged; infiltrating personnel and equipment utilizing a parachute capability. However, military organization, doctrine, technology, and strategy under the purview of the rapidly changing and complex contemporary operating environment suggests rethinking the future organization of airborne forces and the application of new employment concepts. As a series of airborne specific vignettes were considered, modern airborne concepts continue to remain relevant, as evidenced by their utility across a spectrum of small and large-scale employment. Small airborne forces fulfill the roles of reconnaissance, raids, and special warfare; large airborne forces are aptly suited for seizure, show of force, and reinforcement. Categorizing the taxonomy of airborne roles into small and large-scale appropriately links airborne roles to the modern contemporary operating environment and more closely aligns the SOF with small and conventional with large, which considers that these roles are not exclusive to each.

This thesis took a very holistic approach to considering the future possibilities of airborne employment. The value of this research is the ability to connect themes with practice across airborne organization, doctrine, technology, and strategy. Throughout the analysis, several themes occurred in considering future airborne employment.

First, the contemporary operating environment suggests that small wars and conflicts occurring in hybrid form are increasingly more common. The small-scale, SOF airborne roles display greater relevancy in this trend for their speed, precision, and stealth capabilities. Yet, the expansion and proliferation of A2AD systems offer renewed possibilities for conventional, large-scale airborne employment. Recognizing that the large-scale airborne roles are much less likely to occur, an increased investment in small-scale airborne capability is recommended.

Second, the “small and many” over “large and few” concept proposed by Libicki, and echoed by many others, urges military thinkers to form new concepts of organizing to stay on pace with the changing technological trends. This research displays the linkage

between technology and force structures, and delineates the broad/narrow technology frames of reference to provide context to the reader on the broader implications of technology trends and the specific changes occurring within airborne technology. For airborne concepts, it means greater mobility is granted to smaller formations and larger formations are imperiled. Airborne concepts should seek new ways of accomplishing the large-scale airborne roles without further compromising airborne forces to the known vulnerabilities, large, slow-moving transport aircraft, proliferating surface-to-air missile defense systems, and the lack of armored protection on landing and subsequent follow-on movement. Airborne forces organized into much smaller units of action can mitigate these advancing and expanding airborne vulnerabilities. A battalion size or less of airborne forces would arguably offer the most flexible response in modern employment. Any more forces required would likely include an air-landing element to supplement the parachute capability of the forces on the ground. Additionally, further developments in small-scale airborne technologies—such as advanced parachute systems, transport aircraft, navigation aids, and stealth enhancements—will contribute to the “small and many” school of thought.

Third, new doctrinal concepts, such as swarming, closely consider the changing technology trends, and offer new ways of optimizing the airborne force for future employment. Airborne forces are uniquely well-suited to operate under a swarming concept. Swarming characteristics incorporate autonomous, integrated, coordinated, and dispersed small-units designed to operate in stand-off or close-in distances while sustainably pulsing with force or fire. Despite the proposed benefits of restructuring an airborne force around such doctrine, several factors inhibit any immediate change. Allowing small units of action complete autonomy ranks among the highest of these factors. For this to change of occur, the DOD needs to accept the likelihood of increased risk to mission and to force, especially in an increasingly complex and uncertain threat environment. Risk aversion largely derives from a traditionalist mindset and a vision to continue fighting the “American Way of War.”¹²⁰ Rothstein cites the United States in El

¹²⁰ Rothstein, “Less is More: The Problematic Future of Irregular Warfare in an Era of Collapsing States,” 277–279. Rothstein defines the “American Way of War” as the application of a quantity of force using superior mass and firepower towards important strategic-level objectives.

Salvador in the early 1980s, and the Philippines post-9/11 as examples where the concept of “less is more” prevailed and agreeing to greater degrees of risk was accepted. Both outcomes display marked success by using small autonomous units of action to achieve desired objectives. Additionally, Mulhern’s research reveals that autonomy among military units is difficult to achieve without a higher degree of risk tolerance.¹²¹ Analysis in this area of research indicates that risk aversion is induced by exogenous political factors, organizational considerations, and organizational culture.¹²² Recognizing these implications to units restructured into smaller, autonomous units of action, the DOD consideration for the swarming concept for airborne forces will continue to remain stagnated as these issues persist.

With these themes in mind for the future of airborne concepts, the SOF serves as an excellent test bed to integrate the “small and many” approach to airborne employment. Airborne reorganization under a “small and many” structure, combined with an implementation of a swarming concept, offer renewed relevancy to an infiltration technique that has seemed to have lost some modern utility. Further attention and detail is required to organize airborne forces optimally for small- and large-scale airborne utility under new employment concepts, and to turn new airborne employment visions into working concepts and practical application. Regardless of any change to airborne structures, airborne maintains a lasting impact that pervades numerous modern military capabilities. If given the right amount of attention, even now, airborne has excellent potential well into the next era of conflict.

¹²¹ Mulhern, “Risky Business: Risk Tolerance in U.S. Army Special Forces.”

¹²² Ibid.

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