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The Marine Corps has maintained a low level personnel parachute capability since 1927. This system is antiquated and the Marines have not used it operationally since the Second World War. The Marine Corps should withdraw funding and cease training forces for low-level static line operations due to the unlikely future requirement to use this insertional technique. The reasons the Marine Corps should no longer conduct low-level personnel parachute operations are: the risks associated with training and operational employment, the high financial burden and rigorous proficiency required, and the development and availability of better options. While this insertion method will likely never be used operationally in the future, the benefits parachute operations provide to partner nations may outweigh the financial costs and injury risks. Nevertheless, the Marine Corps should slowly eliminate low-level static line operations, reinforce alternate options, and turn to more advanced options of the future.

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DOES THE UNITED STATES MARINE CORPS NEED A LOW-LEVEL STATIC LINE OPTION? THE PAST, PRESENT, AND FUTURE OF PERSONNEL PARACHUTE OPERATIONS WITHIN THE MARINE CORPS

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Executive Summary

Title: Does the United States Marine Corps Need a Low-Level Static Line Option? The Past, Present, and Future of Personnel Parachute Operations Within the Marine Corps

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Thesis: The Marine Corps should withdraw funding and cease training forces for low-level static line operations due to the unlikely future requirement to use this insertional technique. The reasons the Marine Corps should no longer conduct low-level personnel parachute operations are: the risks associated with training and operational employment, the high financial burden and rigorous proficiency required, and the development and availability of better options.

Discussion: The United States Marine Corps has conducted parachute operations since 1927. Due to the uncertain nature of the Second World War, the Marines trained a large parachute force, although Marine parachute operations were sporadic and limited throughout the war. The Marine Corps continued to incorporate training involving low-level static line parachutes, but the mission of the Marine Corps varied significantly from the parachute-heavy United States Army. The Marine Corps still maintains the capability but has not been required to use it operationally since the Second World War. The training and equipping of the force come at a cost to other training. For the freefall mission, which suits the lightly equipped Marines and reconnaissance forces, low-level static line operations are just a training "stepping stone. In the 1950s air assault began to show a capability that matched or exceeded mass airborne forces, with less individual training, less risk, and is easily repeatable. The additional options replaced the operational necessity of low-level static line, specifically in the Marine Corps, where maneuver warfare was highly valued. The most significant remaining value of low-level static line is Theater Security Cooperation. The ability to train with foreign elite forces does provide avenues to strengthen partnerships.

Conclusion: Operationally there is little necessity for low-level static line operations, and other services have begun to drift away from the Army "Airborne" mentality. The Marine Corps is the most "Army-like" of the services and still conducts low-level static line as a prerequisite for freefall or as a standalone option. While this insertion method will likely never be used operationally in the future, the benefits parachute operations provide to partner nations may outweigh the financial costs and injury risks. Nevertheless, the Marine Corps should slowly eliminate low-level static line operations, reinforce alternate options, and turn to more advanced options of the future.

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE, UNITED STATES AIR FORCE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

Table of Contents

Page

Preface

Parachute operations have always been an interest of mine, and that grew when I received an assignment to 4th Air Naval Gunfire Liaison Company (ANGLICO), West Palm Beach, FL in 2013. I was then in the unique position of holding one of the few jump billets for aviators, and since 4th ANGLICO is a reserve unit, the active duty staff only had two officers. While stationed there I had many interesting and deep conversations about parachute operations with Lieutenant Colonels Todd Peery and Andrew Kelley. These discussions about the future of the capability led me to research and further evaluate if our observations were indicative of the true nature of low-level static line operations in the Marine Corps.

While researching this subject, I received an astonishing amount of support from Navy and Marine Corps experts. Master Gunnery Sergeant (Retired) Daniel Furiak, Master Gunnery Sergeant Steven Pope, and Gunnery Sergeant Bryan Kaufmann provided crucial support, current operating structure, and the future program direction. Lieutenant Commander James Clark, a US Navy SEAL and Marine Corps Command and Staff Student, and Mr. Steven Mischo from the Naval Parachute Course, provided relevant Navy programs that paralleled the possible future of the Marine Corps. The creation of this document would not be possible without their help and assistance.

I want to acknowledge my sincere appreciation for all the help Dr. Charles McKenna, Dean of Marine Corps Command and Staff College, provided during this process. His insight, reviews, and dedicated interest truly inspired me and brought forth a much better product than I would be capable of producing alone. Being one of his last mentees before retirement was an honor, and the college will significantly miss his commitment.

Introduction

Where is the prince who can afford so to cover his country with troops for its defense, so that ten thousand men descending from the clouds might not, in many places, do an infinite deal of mischief before a force could be brought together to repel them?

—Benjamin Franklin, 1784

The United States is unlike most other developed countries in the world due to its isolation from potential adversaries, being the first constitutional democracy, and being an innovator in adapting and cultivating various ethnicities and cultures into one "melting pot." While military innovation is nothing new to this 241-year-old country, global military prominence began in the late 19th and early 20th centuries. One of the critical factors producing military might was the increased ability to project forces world-wide while other countries were downsizing their armed forces. Before the early 20th century, the primary mobility method was via ocean vessel, but starting in the First World War, air power became a pivotal capability allowing multidimensional military projection. Through the advancement of air power came multiple avenues of operationally employing these air forces. One of the first methods used was the aerial delivery of parachute forces. This revolutionary approach benefited from reducing the reliance on functional landing strips and allowing operations into enemy held territories. Early pioneers of air delivery confirmed the operational benefits as well as the drawbacks, but initially, this was the only option to distribute troops to a location without an airfield. With the advent of air assault, more options were available for insertion, and as helicopters became more advanced and prolific, these alternate options assumed a more prominent role.

The United States Marine Corps has been the "tip of the spear" in America's battles at least since the passage of the Goldwater-Nichols Act in 1986. Being the preeminent "force in readiness" creates a need for expeditionary capabilities. Insertion techniques are therefore

crucial to the employment of these forces in accessibility-limited regions or hostile territories. The modern-day multi-domain battlefield produces requirements for enhanced capabilities to engage globally. Every insertion capability has a corresponding cost relative to its operational value. This price is inclusive of financial requirements as well as training and use of the limited manpower. This ratio must be analyzed to ensure that training is devoted to operational methods that are likely to be employed, worthwhile for the time committed, and proven to be effective. Evaluated against these parameters, the Marine Corps should withdraw funding and cease training forces for low-level static line operations due to the unlikely future requirement to use this insertional technique. The reasons the Marine Corps should no longer conduct low-level personnel parachute operations are: the risks associated with training and operational employment, the high financial burden and rigorous proficiency required, and the development and availability of better options.

History of Marine Corps Airborne Operations

The vision of parachutes pre-dated the advent of the hot air balloon, but after the Montgolfier brothers invented the hot-air balloon in 1783, the next 120 years involved initial but unsuccessful tests.[1] The concept behind modern day combat airborne operations originated from the First World War. The Wright brothers piloted the first powered aircraft in 1903, and only a little over a decade later were airplanes becoming large and powerful enough to be used to drop troops in combat reliably. Winston Churchill was one of the first to propose utilizing aircraft to parachute in forces behind enemy lines to influence critical objectives. While this never came to fruition, the United States and the Soviet Union began actively pursuing the feasibility of airborne operations.[2] Billy Mitchell, who is considered by many to be one of the founding

fathers of the United States Air Force, was an initial supporter of using paratroops during the First World War. He suggested the use of parachute troops to assault the city of Metz and support envelopment and capture of the fortress. While this plan was never carried out, its original designer Lewis H Brereton ended up being a Lieutenant General and commanding the First Allied Airborne Army during Operation MARKET-GARDEN in 1944.[3]

In 1927 the United States Marine Corps conducted a test demonstrating the ability to drop twelve lightly equipped personnel near Washington D.C. Although the United States Army did not perform its first analysis until 1928, no service or country exhibited much interest in airborne warfare. The United States Marine Corps did conduct one of the first "Aerial Delivery" operations during the Nicaraguan intervention between 1927-1933 dropping mail, food and water to combat troops.[4] The primary catalyst for the worldwide revolution in military affairs involving airborne operations was Germany's use of paratroopers during their expansion through northern Europe in 1940. Multiple airborne missions achieved success by the *Fallschirmjager* with relatively few forces employed. These lop-sided victories caught the attention of many of the world's major militaries. In fact, the United States Army and Marine Corps were forming airborne units and competing to be assigned the airborne mission.[5]

The United States Army started its parachute program just shortly after the Germans demonstrated the combat capability in 1940. In October 1940 the Marine Corps joined the Navy parachute training at Lakehurst, New Jersey. The Marines used the co-located lighter-than-air craft during training due to the non-availability of airplanes. The Commandant wanted to incorporate "air troops" into the entire Marine Corps, and the estimate of the requirement was a total of about 750 total Marines.[6] The Marine Corps continued to observe the German military as it conducted airborne operations and were very interested in the airborne assault on Crete in

May 1941 due to it being an island and the Marine Corps' expeditionary structure. The success of the mission in the eyes of the Corps allowed the newly created 1st and 2nd Marine Divisions to form their paratrooper units. It is interesting to note that while many Allied airborne units used the success in Crete to push their agenda forward, the German command considered Crete a failure due to the 25 percent casualty rate and they never again launched a major airborne operation.[7]

After the Japanese forced the involvement in World War Two by the United States, the Marine Corps formed Raider Battalions to conduct advanced base operations. The Raiders as well as the Marine paratrooper units, although formed and trained for different missions, ended up working together multiple times. Both organizations trained using swift insertions and overwhelming combat power in localized areas to penetrate enemy defenses rapidly. In 1942 the Marine Corps had its parachute courses on the east and the west coast and were responsible for over 33,000 jumps with no parachute related deaths.[8] There were ongoing debate and competition between the Raider units and the parachute battalions. Since each was specialized, each unit was competing for talented Marines to fill the ranks. Since the parachute units required a limited throughput training school, it was harder to maintain their numbers. There was also controversy around Marines retaining their "jump pay" while deployed because they were not conducting any airborne operations. In 1943, the Marine Corps considered four airborne operations, but because of the distance between islands and the lack of good terrain, transports, and staging areas, the Marine Corps did not execute any of the missions.[9]

The United States Army, as well as the British and Japanese militaries, all made combat jumps within the Pacific although the Marine Corps never conducted a large-scale airborne operation. A major reason for this was the geographic staging locations and the insertion

distances required by the operational plans. Most Marines paratroopers were being used in an infantry role and as a specially trained raid force. There was so little use of parachute operations that the Marine Commandant, through the Chief of Naval Operations, canceled the parachute program. This cessation allowed about 3,000 Marines to perform other duties and saved the government about $150,000 a month. Most of the remaining paratroop forces, which included riggers, either performed aerial delivery operations or worked in conjunction with the Office of Strategic Services with clandestine operations. [10]

Following the Second World War, there were Marines who advocated for paratrooper training but were initially unsuccessful. In 1947 Marines began training with helicopters and were developing the ability to incorporate the newest vertical envelopment into amphibious operations. While the Marine Corps maintained its parachute operations the major focus during the Korean War was aerial delivery. In fact, the United States Air Force aerially delivered critical bridges to the First Marine Division allowing them to conduct a tactical retreat.[11] Most airborne missions during the Korean War were conducted by army units, specifically the 187th Regimental Combat Team "Rakkasans." These jumps, under the command of General Douglas MacArthur, ranged from massive drops including over 100 aircraft to small drops of a battalion or less.[12] The Army used the Rakkasan airdrops as an extension of maneuver warfare and had no other combat capability that was as expeditious and concentrated at the time. The Marines were much more focused on amphibious operations during this period while incorporating rudimentary helicopters into casualty evacuation roles.

Between 1953 and 1965, the primary focus of the US government was the Cold War with the Soviet Union which propelled the Army to enhance readiness as it maintained the size, weaponeering, and capabilities required for any non-nuclear global conflict. The 82nd Airborne

Division served as the global response force. The Marine Corps maintained its airborne capability but focused more on enhancing the capabilities of the helicopter operations integrated within a task force. This enhancement proved to be extremely beneficial leading up to the Vietnam War, and the Army was much slower to adapt. The Army did attempt to incorporate capabilities that would be more expeditionary in the early 1960's and added the first Combat Aviation Battalion within the 101st Airborne Division in 1960.[13] In Vietnam, the airmobile concept, which had a heavy reliance on helicopters, was becoming the preferred method, and the Marine Corps' previous innovation in that area provided a framework that even the Army followed. The air assault capability limited the need for airborne insertions. There were multiple small airborne missions within Vietnam, but the only significant parachute assault was on February 22nd, 1967 by the 173rd Airborne Brigade during Operation JUNCTION CITY ALTERNATE. The combination of air assault and airborne operations proved to be an issue that did not occur in the past. Personnel parachutes covered the drop zone that was used as the same landing zones for helicopters due to the limited opening in jungle-covered terrain. The conflict of airborne and heliborne operations at the same location caused accidents and several near incidents during this operation.[14] Vietnam provided a formative experience for airborne units within the US military and drove both the Army and Marines to choose free-fall parachutes for small unit missions.

After Vietnam, airborne missions were used sporadically and integrated into the greater global insertion ability. From 1975-1991 the United States participated in several airborne operations, but parachute operations were used only as an insertion technique in coordination with other assaults.[15] The primary purpose of airborne insertions during Operations URGENT FURY (1983, Grenada) and JUST CAUSE (1989, Panama) were to add a multi-faceted attack,

thereby complicating the defense required by the enemy. In both of these operations, the US Army was successful, although elements of the 82nd Airborne Division prepared to jump into Grenada, the commander airlanded the division's forces instead. The 82nd Division commander, Major General Edward Trobaugh said,

> There is an advantage in control when you airland in that you get off the plane together, and you have a little more control initially, but the disadvantage was that the runway could handle only one C-141 at a time, so we took longer to assemble our combat power on the ground by airlanding than if we had jumped. Plus, we didn't get our gold star on our jump wings![16]

The previous quote suggests that mass airborne operations were becoming more of a tradition than an operational necessity. From 1991-2018 no additional large airborne operations were conducted, and most of the small operations were either military freefall missions or conducted more as a demonstration of capability than out of operational necessity.

Current Marine Corps Airborne Structure

While the Army has a significant paratrooper contingent, including multiple special operations units, several brigades, a variety of individual jumpers, and an entire division, the Marine Corps retains far fewer airborne personnel. The only units in the Marine Corps with jump billets are Reconnaissance Battalions, Force Reconnaissance Companies, Air Delivery Platoons, Radio Reconnaissance Platoons, Reserve Component Air Naval Gunfire Liaison Companies (ANGLICO), and Marine Forces Special Operations Command (MARSOC) with Training and Education Command and Marine Corps Systems Command maintaining airborne positions for advocates and program managers.[17] There are approximately 2,245 total active jumpers within the Marine Corps, including MARSOC. The Marine Expeditionary Force (MEF) units that maintain these capabilities use parachute insert for primarily small team insertions to

conduct reconnaissance or shaping actions leading to the central air, ground, or amphibious assault. The exception to this are the Reserve ANGLICOs who retain their airborne mission from their origination as a unit that primarily provided fires integration to the Army. The airborne mission allowed them to accompany Army airborne units into combat. The active component companies do not currently have an essential airborne task, although they are trying to reinstitute it.[18]

Military freefall (MFF) is the pinnacle of the Marine Corps' airborne insertion techniques and is the preferred method for covert infiltration of enemy contested areas. MFF is maintained and exercised by most special operators and reconnaissance Marines. Most organic, joint, or contracted platforms can conduct MFF. The capabilities are supported at all levels of the Marine Air Ground Task Force (MAGTF) and exercised in joint or multi-national training or operations. The Marine Expeditionary Force (MEF) retains direct control over the Force Reconnaissance units and the division within the MEF retains the reconnaissance battalion. Marine Corps MFF units train with organic aviation assets and increase this training before deployment.

Risks

In the United States Army, airborne is an identifier given to particular units. Many units within the Army maintain abilities to conduct parachute operations. However, even part of the famous XVIII Airborne Corps, the 101st Airborne Division (Air Assault) is no longer airborne in anything other than the name. The airborne units in the US Army received their status from major historical division and larger size operations in Europe during the Second World War. The operations, including MARKET GARDEN and NEPTUNE, set conditions for decades of maintaining the capabilities of mass airborne insertion. While the 82nd Airborne Division is the

only Army division to maintain airborne capabilities, the other services do not maintain or train to a mass insertion airborne force because of unnecessary risk.

Low-level Static Line (LLSL) operations were the zenith of capabilities in the 1940's, but today they are extremely antiquated and almost impossible to set the conditions necessary for practical application. The first and foremost reason is that low-level static line operations require a permissive environment to allow transit of sizeable high-performance aircraft to fly relatively low over a designated drop zone. A battalion-sized unit drop would need more than ten C-130s or seven C-17s. The signature of these aircraft over an enemy with even a primitive integrated air defense system proves exceptionally challenging. At drop altitudes of 1200 feet above ground level, aircraft are safe from radar-guided threats, but infrared-guided missiles and anti-aircraft artillery fire are a significant threat. For any air defense, these aircraft are easy to target due to their relatively slow speed, large size, and steady flight path. During the aerial delivery window, the plane must slow down and are limited in maneuverability, providing an even better target as well as exposing the intended drop zone to the enemy. These limitations require aerial delivery to accept a high loss of aircraft and airborne personnel, or have to have a permissive environment leading up to and during the insertion.

There is a reason airborne personnel in an active parachute duty status receive additional pay; it is dangerous. In addition to combat loss to enemy fire, low-level static line training and operational missions accept a higher risk than any other insertion technique. In a two-year study between 1994 and 1996 of the XVIII Airborne Corps, over 240,000 jumps were conducted resulting in 1,972 recorded injuries, a 0.81 percent injury rate.[19] This figure includes all jumps, including the many administrative jumps which will often have fewer injured personnel due to easier parameters, lack of carried weapons and packs, and no follow-on mission which required

much of the units preparation time before the jump. Fort Bragg, North Carolina, hosted Combined Joint Operational Access Exercise 15-01 in April 2015. An *Army Times* article described 50 paratroopers injured in the joint and combined airborne operation, including 82nd Airborne Division and United Kingdom's 16 Air Assault Brigade personnel. The exercise was the largest held at Fort Bragg in almost 20 years and included about 2,100 jumpers during the main effort insertion. The injury rate according to these figures is 2.3 percent.[20] The author of this paper was a participant in the exercise and a liaison with the command element of the brigade and recalls 151 injuries briefed after the jump which is 7.2 percent, but still under the Army's successful combat jump threshold of 10 percent. Regardless of which numbers are accurate, injuries are common in low-level airborne operations.

Another risk to executing parachute operations is weather requirements. For low-level static line operations winds are extremely important. Most types of parachutes the Army uses are non-steerable, such as the T-10 and the T-11; therefore, landing on the drop zone becomes harder to calculate and more variable for sustained winds and wind gusts. For the steerable parachutes that the Marine Corps uses (MC-7), there is still a limit of ten knots of correction due to the maximum forward travel speed of the parachutes. Winds aloft are essential for calculating the release point of the airborne personnel, but these forces must still land on the ground. Maximum surface winds for conducting safe landings on land are 13 knots for static line operations,[21] and 17 knots for water landings.[22] These speeds allow the parachutist the ability to make a safe parachute landing fall without excessive lateral movement, but in many parts of the world, these wind speeds are difficult to obtain, especially during certain parts of the day. Visibility is also a factor for both the jumpers and aircraft. For jumpmaster control operations, the jumpmaster must be able to identify ground references to conduct the drop. Although there

are systems on specific aircraft to allow parachute operations into limited visibility areas, these increase the risk and are often not used for training evolutions. Due to lack of training with these systems or scenarios, there would likely be an increased risk during an operational requirement to execute with reduced visibility.

The benefit of aerial delivery is that no airfield is required to insert the parachute force, which provides the insertion force with the advantage of surprise and flexibility. The issue with mass insertion is that for every jumper added to a drop there must either be a more prominent drop zone or more passes over the drop zone. Both of these requirements increase risk. The bigger the drop requirement is, the harder is it to find a suitable zone, and it also increases the likelihood that enemy can anticipate the drop zone selection. Adding more sticks to a drop increases risk because even though the first pass may have been a success, the enemy has a higher likelihood of redirecting defense systems after the initial waves to target follow-on forces. While using alternate run-in courses is an option, the final location of the flight will be over the same area. Using multiple drop zones is a technique to reduce drop zone size, but it increases the complexity of the link up after the insert and requires more support capacity in hostile territory.

In the modern political environment, it is imperative to mitigate risk. With the 24-hour news cycle and video and recording devices everywhere, the US military must anticipate and minimize risk due to technology in two ways. First, any mistake can now be spread globally via social media almost instantly. The speed at which information travels can create a much bigger problem than the original solution was to resolve and while problems cannot often be anticipated, reducing risk limits vulnerability to unforeseen circumstance. Second, widespread technologies allow adversaries an increased ability to predict the US military's actions. An adversary with a clearer picture of the United State military's intentions can negatively impact

the planned impact. The Marine Corps needs to be able to accomplish missions without any additional detractors.

Costs

All competencies within the military have an inherent cost associated with training and maintaining the operational capability. These costs come in a variety of forms, such as the obvious financial one, but also have an associated cost of providing personnel for training as well as training and paying for the aviation units. The overall price of an airborne capability is higher than most other insertion techniques due to its complexity. Air assault or amphibious operations can be disaggregated and trained to by the individual entities. For the insertion forces, basic air assault consists of nothing more than walking off a helicopter. The more advanced air assault procedures such as fast rope and Special Patrol Insertion / Extraction (SPIE) can be trained to on a tower and executed via helicopters. These other techniques also do not require a specialized school to attend and are taught to the units by mobile teams and internal unit instructors. Training for air assault techniques saves money versus training the equivalent airborne force.

In the current fiscal climate, the financial burden is a primary concern when evaluating military capabilities. In December 1943, in the midst of a world war, the Marine Commandant suspended parachute operations as primarily a cost savings initiative.[23] It is essential to measure the cost of maintaining a capability against the likelihood of its future use. The Marine Corps is in the midst of replacing its end of service life MC-7s with MC-6s at the cost of $6.2 million. The Multi-Mission Parachute System (MMPS) or the eventual replacement, the Enhanced Multi-Mission Parachute System (E-MMPS) costs between $14,000-$21,000 per set depending on quantity purchased. The estimate to replace the entire MFF capability is almost $22 million.

These costs are just for the parachute themselves. The contractor assistance, flight costs, civilian schools, additional equipment and replace parts create an even more significant operational cost.

All parachutists filling valid billets require proficiency and currency to maintain their qualifications and continue to receive "Jump Pay." The currency needed to retain the additional pay required a minimum of one jump per quarter and can carry forward or be retroactive meaning a parachutist requires at least four drops per year. To remain proficient and be able to execute non-administrative jumps, parachutists must have jumped within the previous six months. These requirements force parachute units to ensure they schedule aircraft and drop zones on a regular basis. Military free-fall jumps maintain currency for both types. Many units that have the two kinds of capabilities focus on MFF currency jumps and rarely utilize LLSL operations. Only 0451 Airborne and Aerial Delivery Specialists can pack and re-pack MC-7 parachutes and reserves. The reserve parachutes must also be repacked on a rotating basis to ensure consistency. Paraloft Marines, who are often the jumpmasters, are required to conduct packing procedures and are exceptionally busy during massive jump exercises where more jumps occur than the unit maintains parachutes.

The aviation element must train and retain the capability to support parachute operations to sustain a robust airborne capability within the MAGTF. The planning and execution templates for rotary wing aircraft are relatively simple due to their slower speeds, but the single high-performance aircraft in the Marine Corps inventory is the KC-130. The KC-130J accomplishes eight mission essential tasks; one of these is to conduct air delivery. [24] Within all the aerial delivery profiles, only low-level air delivery has a pilot re-fly requirement of 90 days.[25] The reason for this is the fact that extensive planning and inherent risk are present in these low-level missions. Pilots can refresh their currency in a simulator, but instructors typically use the

aircraft since it provides more realistic training. The extensive planning, training, and coordination required to conduct low-level aerial delivery is vastly different from high altitude aerial delivery in both planning and execution. At higher altitudes, the parachutists are capable of steering to the drop zone when dropped within a certain radius from the calculated high-altitude release point. At the low altitudes, a specific computed air release point must be briefed and agreed upon by the crew and the jumpmaster based on parachute ballistics, wind, and drop height. This complexity makes low-level aerial delivery one of the most dangerous missions a KC-130 flies and requires intense focus which can subtract from the ability of the squadron pilots to devote their training to other tasks.

Alternate Options

The United States military remains as the one global military power because it has a highly trained force, it can dominate in a majority of contested domains, and it can project effects quickly, anywhere in the world. Force projection involves transporting troops by aircraft or sea into the contested theater. From there the troops must execute entry into the combat environment. The entry can be forced or uncontested and can be via sea, air, or land. The overall situation must be evaluated on permissiveness, total force size, location, and enemy capabilities to ensure the use of the correct entry force. Often an advance force will enter by a different means than the main force. LLSL operations will not likely be the preferred method for entry, but air assault and high-altitude parachute operations could be employed.

Air assault is and will remain the primary means of vertical envelopment during aviation assault support operations. The definition of air assault is an “operation in which assault forces (combat, combat service, and combat service support), using the firepower, mobility, and total

integration of helicopter assets, maneuver on the battlefield under the control of the ground or air maneuver commander to engage and destroy enemy forces or to seize and hold key terrain."[26] The Marine Corps typically fights as a MAGTF, so its task organization will routinely include the Aviation Combat Element (ACE). Marine Airpower uses a rotary wing or tilt rotor capability that can function in support of Marine infantry. In a Marine Expeditionary Unit (MEU), the core of the ACE is a squadron of Ospreys. In a Marine Expeditionary Brigade (MEB), the ACE is a Marine Air Group (MAG) which is often rotary wing. Moving from either the sea or a forward operating base is often best accomplished by helicopter and tilt-rotor assets. Once in the hostile theater, the lack of runways does not necessarily require a low-level airborne insertion. The only reason to include an airborne insertion of an advance or specialized force is to be undetected by the enemy, and low-level static line operations do not meet that intent. Instead, using rotary wing aircraft is often the best option due to availability, ease of coordination, and flexibility. Air assault or assault support operations often replace a majority of possible low-level static line personnel operations.

In fact, one of the reasons the Marine Corps got more involved in helicopter insertion tactics is that the aviation units are a separate element under the same Marine Corps commander. Until 1983, the aviation portion of the United States Army was not its own branch. The use of helicopter assets was limited in Korea and Vietnam. The lack of focused training and organization enabled other branches to utilize aviation as a tool afforded to them like a radio or truck.[27] The resultant lack of innovation enabled airborne units to remain formidable because other branches were not exploiting technology. The Marine Corps retained its MAGTF and was much more capable of utilizing helicopters to support the entire Marine forces agenda.

While some operations used air assault, for many situations where low-level personnel insertion may have been desired in the past, in the modern-day battlefield with the current threat and capabilities array, high altitude parachute operations can replace most conceivable requirements. A "high altitude" parachute operation means any release at or above 4,500 feet above ground level. There are two types of MFF, high altitude / high opening, and high altitude / low opening (HAHO/HALO). In training, the typical "low opening" is at 4,500 feet and "high opening" is any height up to 25,000 feet. The primary parachute for these missions is the MMPS which is used by all Marine Corps and MARSOC qualified parachutists.

The acquisition and training using MMPS or any future similar parachute provide significant advantages. The chutes used are modified civilian "skydiving" parachutes which means it is easier to obtain new products or accessories for the small number of operators within the Marine Corps. The qualified parachutists can also use civilian "wind tunnels" for training as many freefall techniques are similar. The parachutists can train using contract, non-military aircraft, which saves a significant amount of money and training time. The cost to operate a smaller single or twin-engine airplane is approximately seven times cheaper than a four-engine turboprop KC-130J.[28]

The capabilities afforded with the MMPS over the MC-7 heavily outweigh the additional cost. The individual parachutist can repack the parachutes, which means fewer parachutes must be brought and maintained with the unit, and fewer parachute "riggers" are required to maintain the systems. Additionally, the repack ability allows smaller numbers of personnel to travel and train without the larger logistical footprint necessary for MC-7 operations. The glide ratio of the MMPS allows performing high opening to be a significant tactical advantage. With glide distances of over 50 kilometers, the aircraft used to drop the parachutists can be in international

airspace or outside the range of many air defense systems and the operation can be conducted covertly and safely for the jumpers. HAHO/HALO will be a primary means for reconnaissance or special operation forces missions in the future. Another benefit to military free-fall parachutes is the ability for qualified personnel to carry a passenger in tandem which can allow a non-parachutist required for a specialized mission to accompany the insertion force. Different methods can activate the MMPS during air delivery. In a typical high altitude / high opening configuration, the parachutists activate the parachute at a pre-determined altitude to ensure the glide ratio required from activation location to the drop zone. Human error or slight delays can cause minor deviations of activation altitudes that can inadvertently place some jumpers at different activation altitudes which will then cause different glide abilities and make same location touch down harder or impossible depending on the deviation. The best backstop against these unintended errors is Double-Bag Static Line (DBSL).[29]

DBSL allows military free-fall systems to use static line activation to ensure the same activation altitude for all jumpers. If activating at the same height, all jumpers can maintain the same glide profile to arrive at the same drop zone. The lack of freefall means less risk and is evident in the shorter training required than MFF school. Any military free-fall graduate is qualified to execute high altitude static line; mobile teams can train low-level static line jumpers in two weeks to use the MMPS in a static line configuration. Since this is the most anticipated use of small team parachute operations, these courses are in high demand. There are currently plans to increase the output of the MFF trainees from 240 to 420 per year.[30] These additional seats would eliminate the requirement for any high altitude static line training because the formal curriculum could meet the criteria for that requisite number of trained parachutists.

Another idea that can incorporate increased training capacity while reducing or eliminating low-level static line capability is to administer the Marine Corps' course in parachute training. The United States Navy Special Warfare community has already implemented is own five-week combined course that includes all the qualifications gained by two separate courses over seven weeks of US Army parachute training. There was initial pushback from the low-level static line proponent, the Army, but the United States Special Operations Command (SOCOM) and the Navy reached a consensus which entails the Navy paying for training.[31] The course included the same five jumps required at the Army Airborne Basic Course and 28 freefall jumps. SOCOM has validated the course, and it provides the same level of training required by special warfare operators before commencing unit-level training specific to mission responsibilities. The US Air Force is currently working with the same contractor, Tactical Air Operations, to run a parallel course. This course has not started yet but shows that other services are interested in what the Navy has accomplished. The Navy course is currently at maximum capacity, so the Navy would need to add additional periods of instruction if the Marine Corps was to join the Navy course. The Marine Corps could also take the curriculum and separately contract a course, but it would require additional organic representation and more contract aircraft.[32] There are also only so many locations in the United States with weather that supports the parachute operations year-round.

Issues with Removing Low-Level Airborne Capability

LLSL may no longer be a reasonable operational requirement, but that does not mean the Marine Corps as an entity will abandon it because several factors support its retention. The most important is Theater Security Cooperation (TSC). The United States conducts multiple

international exercises with partner nations, involving a wide array of cooperative capabilities. One of the significant combined activities, especially among the reconnaissance and special operations forces, is airborne operations. The foreign troops often do not have a robust freefall capability, so they conduct low-level static line jumps. North Atlantic Treaty Organization (NATO) countries have maintained a large contingent of airborne troops and continue to do TSC primarily with the US Army. The US military sold many of its older systems to partner nations to be able to keep training with them on at least an annual basis.[33] One of the military's primary responsibilities is to support political objectives, and often an essentially political objective is military cooperation. Another possible scenario is that portions of the Marine Corps may need to integrate with Army units for an exercise or operation. If a command is directed to integrate with an airborne unit, having a low-level static line ability enhances their synergistic efforts. Although, even within the Army, non-airborne units often train with airborne units, and air assault is often the best course. While the Marine Corps may never operationally conduct combined or joint missions, it is crucial to count TSC as an essential tool.

The likelihood of using low-level static line against an enemy seems remote, but that does not mean that a potential adversary does not need to counter that ability. Current Anti-Access / Area Denial defenses by potentially opposing nations have to counter the ability to use a large or small scale airborne force as a method of entry. At low levels the current weapon systems designed in an Integrated Air Defense System (IADS) are infrared and air defense artillery (ADA) / anti-air artillery systems (AAA). Often our threat of the ability to engage the enemy in a certain way is just as good as actually fighting the enemy. If the whole of the US military were to abandon low-level inserts, there is a possibility those countries may focus on improving a different area of their defensive systems that would be more detrimental than

maintaining the current capability. Retaining the airborne capability also provides excellent flexibility. The use of airborne forces in the last 30 years was by choice, not by necessity. Sometimes the opportunity to use this method may pay dividends in building an "Esprit de Corps." In the Second World War five of 81 Marines who received the Medal of Honor, were parachute Marines.[34]

Conclusion

The United States military continues to have an extremely advanced and capable force to use as necessary to promote interests globally. While Nazi Germany was the first to use airborne operations to conduct large-scale assaults on hostile territory, the US has remained as the most prominent advocate of airborne forces by retaining five brigades capable of expeditiously engaging the enemy worldwide. The Marine Corps has by necessity maintained a much smaller airborne capacity to use in support of the MAGTF or in a specialized role to support special operations requirements. No large-scale efforts have ever been attempted operationally by the Marines, but they remain capable of small unit insertions globally with the MEU, and regionally with any other size MAGTF. The legacy of the parachute Marines lives on in the traditions of all modern Marines going to US Army Airborne School although the combat environment, enemy capabilities, and risk acceptance limits have changed.

The Marine Corps will most likely not use a low-level personnel parachute option in a contested environment in the future. There is too much risk associated with placing aircraft within the parameters to have Marines jump from airplanes. The US Marine Corps and Air Force do not have the requisite number of aircraft, as they did in the past, to be able to support a large force insertion. The cost to train aircrew, jumpmasters, and parachutists continue to

increase, while the actual low-level ballistics and technology remain relatively similar to the 1940s. There is a high rate of injuries during parachute operations. During the invasion of Crete, the Germans lost about a quarter of their combat forces, and although it was a successful mission, they never again wanted to allow that same level of risk. The most critical factor for no longer utilizing LLSL insertion is that there are better options available to US military.

The Marine Corps was the first service to use helicopters in an assault support role and was revolutionary by integrating the aviation element into the command structure of the composite force. When the US Army was just experimenting with the helicopter as the primary vertical envelopment apparatus, the Marine Corps had already developed tactics and doctrine to establish rotary wing assault support as a cornerstone of maneuver warfare. For the missions that were unable to use helicopters or were covert, the Marines began to focus more on the MFF option. The flexibility it provided was significantly superior to LLSL, and it suited the number of participants who would engage in that type of insertion. Even with that focus, the Marine Corps retained a LLSL capability for three reasons. First, the US military had an airborne tradition, and tradition builds esprit de corps. Second, it is easier to maintain a skill as a "just in case" or a "break glass in time of war," than it is to lose the expertise and be required to regain that expertise while also purchasing new equipment. Finally, the main reason the Marine Corps has kept an airborne capable force is to engage our partner nations in Theater Security Cooperation. For many other countries, conducting combined airborne exercises with the US Marines breeds a specialized and motivated force. The units that participate are often their "best of the best." Does the benefit the US and the partner nations get from exercises outweigh the costs? If the Marines eliminate LLSL, would the combined exercises increase the conduct of air

assault or MFF? Is TSC valuable enough to be the primary reason to maintain this operational capability?

The Marine Corps should gradually eliminate training and exercising LLSL. The alternate options are more than enough to accomplish the combat requirements for rapid employment of troops or pre-planned insertion of a reconnaissance force behind enemy lines. The Marine Corps should spend the money saved on further investigating other capabilities that may replace the need for "boots on the ground," such as more advanced unmanned aerial vehicles (UAV) or more cutting-edge robots. The original paratrooper Marines do have a legendary past, but the entirety of the military is changing with additional contested domains. The Marines need to distance themselves from the turn of the 20th-century technology and look to the future.

Endnotes

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