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14. ABSTRACT
During WWII a special operations group known as the Chindits conducted Operation Longcloth deep behind Japanese lines in Burma. The operation was a psychological victory, but came at a huge cost in men and material. This report uses this example to examine how technology can offset the costs of men and material in deep penetration operations. Analysis demonstrates that the most effective method to offset costs is combining animals and new technology in manned-unmanned-animal teaming.

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DEEP PENETRATION OPERATIONS PAST AND FUTURE

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MASTER OF MILITARY STUDIES

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Executive Summary

Title: Deep Penetration Operations, Past and Future.

Author: MAJ Glenn Baker, USMC, AY2016-2017

Thesis: A force can create a chaotic and uncertain environment for the enemy by infiltrating into rear areas and attacking vulnerable support and control areas. Currently US forces capable of conducting these infiltrations are expensive, difficult to train and equip, by utilizing manned and unmanned teaming the US military can increase capacity and capability of these forces to create dilemmas for future adversaries.

Discussion: The purpose of this project was to examine the role of (MUM-T) in Special Operations in a future operating environment. In this case, the British role in Operation Longcloth served as a historical example of small groups of men hastily drawn together to conduct operations against Japanese rear areas in Burma, where they were most vulnerable. During Operation Longcloth the terrain and lack of training for British forces was more dangerous to the mission than the Japanese forces. Lack of training and coordination from logistics resulted in the loss of one third of the total British force. The initial concept of this study was how to use unmanned systems to generate tempo against the enemy, and increase the survivability and lethality of similar special forces in the future. The tools examined were a distributed intelligence, surveillance and reconnaissance cameras on stationary and mobile platforms combined with organic power generation to increase the duration and command and control of the infiltrating forces.

Conclusion: This ISR system would be most effective in very restrictive terrain; which can be found in both jungle and heavy urban environments. The best platforms in these complex environments is using indigenous or imported animals to provide locomotion to the sensor and communications suites. This technology is especially effective when combined with systems capable of harvesting energy from the movement of the animals, which allows for significant endurance, yielding greater effect on the enemy for each system which is fielded. These systems can augment and support some of our highly-trained forces when operating behind enemy lines and because of their low-cost to employ can be viewed as expendable, greatly expanding

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The conclusions reached in this project only exist thanks to the decision game feedback provided by my fellow ASP students and instructors, my conference group instructor (LTC Janczyk USA), and my beautiful wife.

Introduction

It is important to understand which aspects of war are likely to change and which are not.

--MCDP 1, Warfighting

In 1941, Great Britain and the United States declared war against the Japanese. As the allied powers attempted to assume a war footing, the Japanese, who had already been fighting in China for a decade, launched a series of well-orchestrated, lightning fast attacks that devastated both nations military capabilities. After a humiliating defeat in Singapore, British forces viewed the Japanese as "indestructible jungle fighters."[1] A combination of psychological dominance, preparation, and aggression allowed the Japanese to rapidly route the British forces in Burma, gaining control of the country. The British realized they needed a new method of thinking and fighting to regain the initiative and restore their soldiers' confidence. The solution they found was an eccentric officer with an outlandish theory, Orde Wingate's Deep Penetration Theory.

In contemporary times, western governments have a very similar military disposition to the British disposition at the start of WWII. The United States has evolved into an occupation force with large bases, heavy logistics and a reliance on air dominance. This system has succeeded in reducing the casualties suffered in Counter-insurgency campaigns, but will be insufficient when facing a near-peer competitor in the future. The only way the United States will succeed is to find where enemy gaps exist and exploit them.

The United States Special Operations Command, (USSOCOM) is manned, trained and equipped to conduct operations that exploit enemy gaps. Unfortunately, USSOCOM's support infrastructure has become bloated and reliant on vulnerable aircraft to transport and sustain its

warfighting forces. Therefore, USSOCOM must look at new, low-signature, ground based methods to inform and resupply its operators. Operation Longcloth serves as a historic example of how similar forces, with similar problems found solutions. This study use Operation Longcloth to find potential solutions from the past, match them with contemporary technology to describe potential solutions to future problems.

Manned and Unmanned and Animal Teaming

"When war comes, people get into a habit of mind, accepting things they wouldn't otherwise."

--Anton Myrer, Once An Eagle

Warfare has evolved, continuously for all recorded history. As technology changes, the character of war keeps and sometimes drives the pace. In recent years, the militaries of the world have begun to look for machines to augment and replace the number of people who must enter the violent and uncertain battlefield. Current systems have allowed operators to get further away from the battlefield, and have greatly increased in sophistication and capability over the last twenty years.

In the US, most advances in unmanned systems have been with remotely piloted aerial systems. These systems have greatly increased the survivability of pilots, improved the time these systems can remain in flight, developed new methods for delivering ordnance and provided greater situational awareness for troops on the ground. Although airborne systems have improved, ground based systems in the US inventory are still rudimentary, unsophisticated and limited in number.

The cluttered environment on the ground requires more sophisticated sensors and processors to provide similar capabilities to the US air armada. The United States Marine Corps

is based around support for infantry formations,[1] and therefore advances in ground based systems will be required for the Marine Corps to "capture the full potential inherent in automation."[2] The Army Operating concept suggests that the battlefield will be "cluttered complicated… and increasingly urbanized."[3] Urban and jungle environments contain obstacles that are too difficult for current unmanned systems to navigate. Although technology will continue to advance, making these systems more capable, the cost associated with these systems will make them high value assets and difficult to replace.

A short-term solution to this problem is to match systems with animals to transport sensors, weapons, and sustainment to high risk areas of the battlefield. This would reduce the cost, complexity, and signature of several of these systems, and this would allow commanders to take greater risks to achieve advantages over the enemy that could be capitalized against the enemy.

Operation Longcloth demonstrates a military operation where the British Army conducted one of these high-risk operations. The operation provided a psychological victory that changed the tempo of the war, however it came at a high price of men and material. The cost made many historians assess this as a necessary failure; however, it is the perfect venue to examine the concepts of manned-unmanned-animal teaming.

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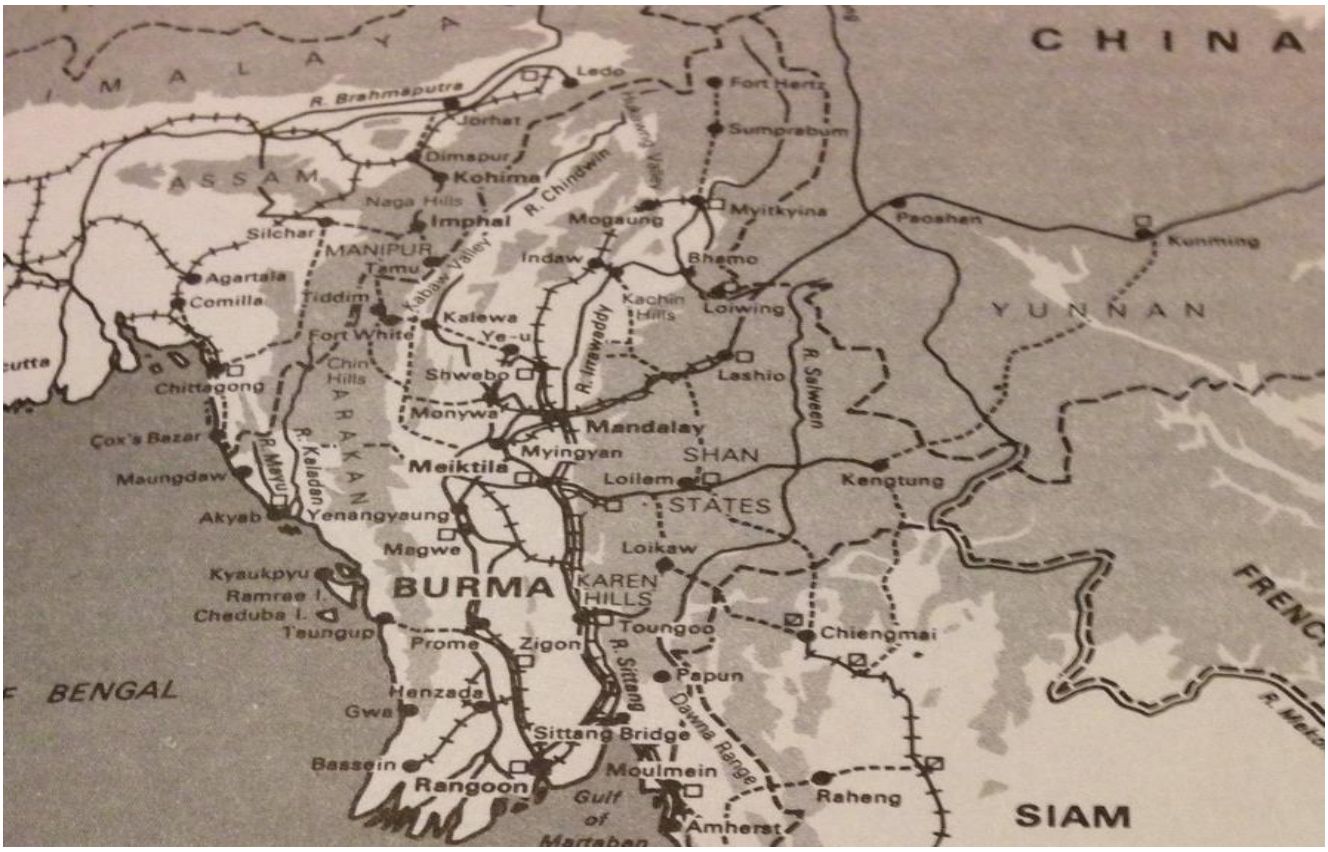
[1] Headquarters US Marine Corps, *Marine Corps Warfighting Publication 3-11.2* (Washington, DC: Headquarters US Marine Corps, November 2002), 3-4.
[2] Headquarters US Marine Corps, *Marine Corps Operating Concept: How an Expeditionary Force Operates in the 21st Century*, (Washington, DC: Headquarters US Marine Corps, September 2016), 19-21.
[3] Headquarters US Army, *The U.S. Army Operating Concept: Win in a Complex Word, 2020-2040*, TRADOC Pamphlet 525-3-1, (Washington, DC: Headquarters US Army, October 31, 2014), 21-24

Operation Longcloth; The First Chindit Expedition:

In early 1942 the Imperial Japanese Army infiltrated troops into southern Burma intending to dislodge the British government and open a new front against the Chinese. As the British colonial government fled from Rangoon, Winston Churchill watched as his nation ceded more and more territory and tens of thousands of British soldiers rotted in prisoner of war camps. As Japanese forces enveloped the exhausted British defenders, their reputation as invincible jungle fighters grew. In the beleaguered ranks of the British Army a young Colonel, Orde Wingate, presented an audacious proposal to reverse the defeat by implementing his theory of deep penetration attacks. Wingate developed this theory during years of conducting small unit operations in British Palestine. Wingate adapted his concept and then formed, trained, and employed a deep penetration brigade from the forces that were available in Burma executing the first deep penetration operation in Burma, Operation Longcloth. Although Wingate's theory gave the British forces significant advantages in maneuver and morale, the lack of sustainment and command and control resulted in numerous casualties because of starvation. Operation Longcloth illustrates methods necessary to eliminate the tempo gained by a near-peer competitor in major combat operations; these methods have atrophied in doctrine and training by most western militaries.



Japanese Operations:

The Japanese established a dominant tempo in the late 1930s by rapidly seizing territory throughout East Asia. The Japanese Fifteenth Army, which was composed of the 33rd and 55th Divisions, invaded Burma in an operation that consisted of four phases. The first phase was the infiltration of operatives to lead insurgent groups, the second was seizure of airfields, the third was the seizure of the Burmese Capital, Rangoon, and the fourth was an attack from Rangoon North to Border of British India, which was delineated by the Chindwin River.

The first phase of the Japanese operations in Burma was an early example of hybrid warfare.[4] Japanese agents infiltrated the countryside and the local societies, aided by the Burma

[4] In this paper, the term 'Hybrid Warfare' is derived from Timothy McCulloh and Richard Johnson's Paper, Hybrid Warfare published by Joint Special Operations University. In this publication "Hybrid Warfare" refers to operations which "employ a combination of conventional and unconventional organizations, equipment and techniques in a

Independence Army; an insurgent group trained and equipped by Japan since 1940 to cause uprisings and sabotage attacks against British infrastructure and garrisons.[2] These insurgent forces concentrated their operations against communications nodes throughout the countryside and provided intelligence and reconnaissance for the Japanese in advance of their attacks.

During the second phase of the Japanese operation, soldiers seized airfields and bombarded the Capital, Rangoon. Between 20-23 January 1942 The Japanese 112 Infantry Regiment from the 55th Infantry Division conducted a regimental infiltration seizing the airfields at Tavoy and Mergui, while the 143rd Regiment seized the airfield at Victoria Point. Seizing these three airfields allowed Japanese fighters to escort bombers in attacks against the Capital and British Army headquarters in Rangoon.[3]

On 22 January 1942, Japanese forces initiated the third phase and attacked over the border of Thailand with the main body of their 55th Division and the 33rd Division. The Japanese 18th and 56th Divisions landed in Rangoon and began to pursue British forces toward the Indian border. Japanese forces continued moving North, enveloping the Allied forces they encountered, rapidly expanding their control until they stopped at the Chindwin River, forcing the British back to India and the Chinese forces back to their homeland.[4]

Japanese forces used the jungle as maneuver space, which allowed them to encircle larger British formations which destroyed their lines of supply, and pushed British formations to either surrender or disintegrate because the soldiers' morale and leadership failed. General Wavell reflected on this failure, saying: "Japanese advances should not have [been as successful as they

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unique environment to achieve synergistic strategic effects." In this case, the Japanese forces inserted agents into the Burmese communities several years in advance, in many cases marrying locals and being placed into town governments. These agents served as advanced forces to provide logistics, staging areas and local guides to conventional Japanese forces during their attack.

were] British troops were withdrawn rather hastily for fear that they might be cut off."[5] Following the rout, the British leadership realized that the tactics they had trained their forces to conduct could not overcome Japanese maneuvering power and their image as invincible jungle fighters. As a result, British staff began looking for different methods to stall Japanese momentum, and reverse the loss of Burma.

British Preparation

Burma was the lifeline between the British and the Free Chinese, who were tying down 27 Japanese Infantry Divisions, which would have given the Japanese enough combat power to overrun all of Britain's Asian territories.[6] The 'Burma Road,' was a railroad line that linked the port of Rangoon to the Chinese province of Yunnan serving as the main supply route between the Allied powers and the Free Chinese forces of Chaing Kia-Shek. The senior Western Officer with the Chinese army, General 'Vinegar' Joe Stilwell, claimed that without the British forces providing relief the Chinese forces were; "In imminent danger of disintegration and collapse."[7]

Following the disastrous British defeat in Burma, General Archibald Wavell, the Commander-in-Chief of forces in India, began looking for methods to delay the Japanese and to relieve pressure on the Chinese. He served with Orde Wingate in Palestine during the interwar years and in Eretria in 1941 with the Gideon Forces. In 1936, Wingate served in Palestine organizing 'night squads' of Jewish settlers who operated against the Arab rebellion with great success.[8] He received the Distinguished Order Medal (DSO), but his advocacy for a Jewish state in Palestine overshadowed his military achievements giving rise to his reputation as a contentious character. In 1940, Wingate was brought to Sudan to organize the Gideon Force to fight the Italian invasion of Northern Africa. The Gideon Force was a group of "2000 Sudanese and Abyssinian regulars and guerrillas and a sprinkling of British Officers and NCOs."[9]

Wingate led this force to defeat "36,000 Italians with armored cars, field guns, bombers, and fighter planes,"[10] reinstating Addis Abada, the Emperor of Eritrea. During these operations, Wingate developed techniques for small units working behind enemy lines to infiltrate enemy lines and attack their vulnerable rear-echelon forces. The attacking troops' effectiveness was limited because they could only operate for a few days with what they could carry before coming back to their bases of supply.[11] General Wavell had overseen Wingate's success in Africa and believed that Wingate's alternative war techniques would be useful in Burma.[12]

Wingate arrived at the British Army headquarters and advocated his ideas for Deep Penetration Operations. Deep Penetration Operations would allow a small group of well-trained men to infiltrate through the Burmese jungle and attack the Japanese rear disrupting their supply chains and command and control. General Wavell claimed that these forces would be, "snipping at (the Japanese army's) heels like a Pekingese dog, to keep them busy so I can get (the British troops) ready."[13] The duration and depth were the principle differences between Deep Penetration Operations and Wingate's long-range operation from the Sudan and Palestine. The expansion of Wingate's technique was made possible using parachute-delivered supplies and wireless radio communications. As British troops ventured into the jungle, they would coordinate for resupply or fire support through radio communication to Royal Air Force and United States aircraft operating out of western India and Southern Chinese territory. General Wavell promoted Wingate to Brigadier General and directed him to organize a Deep Penetration force and implement his theories in Operation Longcloth.

Brigadier General Wingate organized his deep penetrations brigade into two groups with seven columns. Lieutenant Colonel L.A. Alexander commanded Northern Group, which consisted of columns: 3,4,5,7, 8 and the Brigade Headquarters with approximately 850 mules

and 2,000 men. Lieutenant Colonel S.A. Cooke Commanded Southern group, which was composed of number 1 and 2 columns and a group headquarters this organization was approximately 1,000 men and 250 mules.[14] The Deep Penetration Brigade adopted the organizational name of 'Chindits.'

Each column had around 300 men, although there were slight differences in each column. Three Column, commanded by Major Michael Calvert was similar in size and composition to the other six columns. Three Column was organized with: a Royal Air Force liaison section of five men, a medical section of five men, six signal (radio) men, a sabotage (demolitions) platoon of 45 men, a Burma Rifle Platoon (for Reconnaissance) of 45 men, a Support Group (logistics) of 31 men and an Infantry Company of 115 men for a total of 306 personnel in 3 Column.[15] This organization allowed each column to operate independently, and maneuver through the jungle to bypass enemy defenses. Bypassing vehicles and roads made these formations difficult to detect. Their supplies would be foraged or delivered by parachute from Royal Air Force and American aircraft in India and southern China. The plan called for the Chindits to leave their wounded behind and consume the mules if columns could not be resupplied. Each column had a "wireless" high-frequency radio that would serve as their link to the other columns and supporting aircraft.[16] The air-delivered supplies allowed Chindits to operate far enough behind the Japanese lines that Japanese commanders would be unable to maintain momentum and secure their lines of communication.

Operation Longcloth was originally intended to support a free Chinese offensive into Burma, but Chinese forces were unable to overcome the weather and internal organization problems and canceled their offensive. Despite these problems:

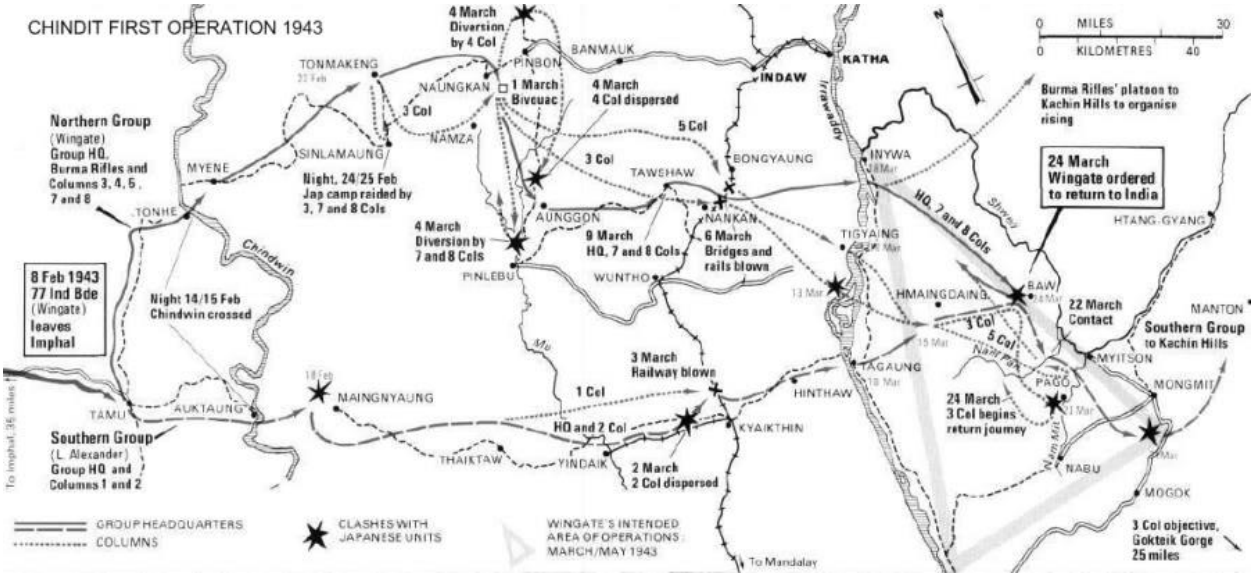
> "Wingate pressed to be allowed to continue with his part. He gave six reasons: first, his theories needed to be tested, second any delay might be bad for morale in his brigade; third, he could test whether the Burmese would co-operate in the liberation of their country; fourth, his operations would prevent a Japanese offensive on Fort Hertz, fifth, Japanese infiltration across the Chindwin would be stopped; and sixth, he could interrupt any Japanese plan for an offensive against Assam."[17]

Several staff officers believed this operation would not be successful on its own and would waste personnel and equipment. General Wavell agreed with Wingate's argument and decided the risk to personnel was worth the potential positive effects on morale, approving Longcloth as an independent operation.

After forming the columns, the organizations were trained to survive long enough to operate effectively against the Japanese forces. In most historical cases, a small force attempting long range infiltrations behind enemy lines would be screened and selected to ensure that all personnel had proper physical and mental attributes to maximize their chances of success. The Chindits did not enjoy this luxury. According to Mike Calvert, "More men and better equipment were the requirements, and at this stage, they were just not available."[18] The lack of pre-screened personnel forced Wingate to concentrate his training regimen largely on jungle survival and basic principles of light infantry insisting that any unit could be indoctrinated to meet the physical demands necessary. Multi-day patrol training, combined with the harsh jungle environment caused his unit to suffer loss of efficiency due to sickness and injury. At one point during the training, 70% of the Chindit's personnel were non-combat ready due to sickness and injury.[19] This attrition forced the Brigade to focus on moving under a load, physical conditioning and basic patrolling in the limited time they had available. The political pressure

for a psychological victory and Orde Wingate's desire to test his theories made the idea of waiting to conduct operations unpalatable. As a result, the Chindits never conducted full mission rehearsals that involved their support organization before beginning operations.[20] According to the Brigade Chief of Staff "(The Chindits) were badly trained, badly led and the plans were over optimistic."[21]

The Operation Begins:



On 8 February 1943, Brigadier Orde Wingate and his Chindits, departed from Imphal to begin their trek into Japanese territory. During the operation's initial phases, the Japanese impact on Chindit maneuvers was minimal. The force found that the terrain, vegetation, and efforts to sustain these forces presented a difficult enough challenge on their own. The deep penetration operations began in the Irrawaddy River Basin, between the Irrawaddy and Chindwin rivers. The area's dense vegetation made it impassable to animals and combat formations of personnel without devoting significant time to cut through vegetation. Rapid changes in

elevation contributed to injuries and increased caloric expenditure by the soldiers, taxing their supplies. The rivers were each over a kilometer in width and had sections where currents exceeded 3 knots. Although the terrain was advantageous for achieving surprise, when combined with limited support, it could be more lethal than the enemy.

Operation Longcloth placed the a huge logistics burden on the soldier within the column. The plan to resupply by air did not have enough ground-based support personnel at the airports to respond to unplanned requirements. Even if there were adequate personnel at the airports, poor communications with aircraft and rear elements made it impossible to change the support they received. Lack of supply capability constituted the principle limitating factor on the duration and damage to the enemy force. At the beginning of the operation, the average soldier carried 50% of his weight, and each mule carried the communications equipment and heavy weapons, making most mules carry 60% of their body weight,[22] which exceeded the recommended limits established in current doctrine.[23] Overloading these animals increases their caloric consumption and the likelihood of injury.

One day before the Northern Group set off, Southern Group crossed the Chindwin River at the town of Auktaung intending to cut the railway at Kyaikthin and continue to draw Japanese forces toward Mongmit. Northern Group crossed the Chindwin River planning to traverse the Zibyu Taughan range and cut the Shwebo-Myitkyina railway between the villages of Bongyaung and Nankan, then cross the Chindwin River at the town of Tohnhe.[24] Both groups infiltrated 20 miles into enemy territory and received their initial supply drops without encountering any Japanese forces.

The initial parachute drops were partially successful. Although they succeeded in delivering some supplies without being detected by the Japanese, many of the supplies were improperly

rigged for delivery, resulting in significant loss of supplies, including over ninety percent of the feed for the mules.[25] Moreover, Southern Group subsequently had significant trouble during their initial river crossing, taking an extra two days to get all their supplies across the Chindwin River. These failures can largely be attributed to the fact: "none of these operations had been practiced at this scale prior to (beginning Operation Longcloth)."[26] This initial failure was largely overcome as the forces learned how to do these complex tasks by doing them throughout the remainder of Longcloth, however the failure to rehearse the methods of resupply caused a cascading effect of damage to the mules from which the brigade never fully recovered.

On 18 February, Southern Group accidently made the first sizable enemy contact of the operation. This was technically successful since Southern Group's mission was to divert enemy forces. The contact resulted in the loss of some mules and equipment, but, more significantly, caused the column commander to lose control of his formation forcing him to detour south to locate members of the column and regain control of its movement. Despite British disarray following the contact, Japanese leaders remained unclear about how British forces had arrived and what they were trying to accomplish. The absence of traditional supply trains and lack of effort to secure ground lines of communication created a new problem for the enemy. This nontraditional method created total surprise that upended the Japanese understanding how British forces traditionally operated; however, the lack of command and control demonstrated that this concept was fragile and could not continue to operate once the Japanese began to understand how the Chindits were moving.

On 1 March, Northern Group dispersed into three elements, Three and Five Column continued to attack the railway, while 4 Column moved South to conduct an ambush along a Japanese line of communication. Seven and Eight Column conducted a demonstration against

the village of Pinlebu to draw Japanese attention away from the attack on the railway. After conducting a successful ambush Four Column was redirected to rejoin Seven and Eight Columns. Japanese forces ambushed Four column as they were moving to rejoin the other elements. During the fighting Four Column lost its radio as well as several mules and men. Without a radio and these supplies, Major Bromhead, the Column Commander, determined he "was low on ammunition… and could not influence the war, so he decided to turn back."[27] Four Column's retreat left the remaining Chindit forces undermanned and demonstrated the fragility of the of Wingate's technique.

On 6 March, Five Column demolished a large portion of the railway bridge at Bongyaung "a 100-foot span rested in the river, and the central 40-foot span fell completely apart."[28] Nearly simultaneously Three Column "had destroyed three bridges and cut the line in 70 places and left numerous booby traps."[29] These attacks accomplished many of the tactical objectives Wingate had originally proposed, by striking the enemy and disrupting their ability to attack British forces in India. He recognized, however, that he still enjoyed a decisive element of surprise, which would allow him to continue to disrupt the Japanese. These attacks accomplished all Longcloth's original aims with minimal British casualties, and an impromptu raid on the Japanese occupied village of Sinlamaung resulted in the acquisition of an elephant, solving several of Three Column's logistics problems. This success emboldened Wingate to continue his operations beyond their original scope; he began to plan to continue his attack East of the Irrawaddy River.

In contrast to the success of the Northern Group's forays, forty kilometers down the Rail-line Southern Group did not fare as well in their engagements with their Japanese foes. Two Column bivouacked near the rail line and were attacked by a Japanese Company. The attack dispersed

Two column, and Major A. Emmett, (the Column Commander) had to try to reconstitute his forces, but did not have sufficient communications to find his men in the jungle. Two Column retrograded back to British lines, trying to collect separated soldiers as they retreated. Southern Group's failure probably made calculations about the odds success in continuing the operations more complicated; however, Wingate may have already decided what he was going to do.

Prior to Three and Five Columns' strikes, Wingate sent Captain Herring and a platoon to conduct reconnaissance and determine if the locals would be willing and able to stage an insurrection. Captain Herring determined that the indigenous forces would be able to conduct these operations "at a much larger scale than previously anticipated as long as they could be armed and supplied."[30] Captain Herring was ultimately unable to reach Brigadier General Wingate by radio to give his report, and so this possibility was not factored into the decisions for continuing the Operation, but demonstrates that Wingate was already trying to extend Longcloth before achieving the original intent.

Three and Five Columns' attacks accomplished the initial goals of the operation, and Orde Wingate saw he had achieved nearly total surprise and seized the initiative against the Japanese who seemed unable to counter his Long-Range Penetrations. He balanced his momentum against the health and morale of his Chindits, which was fraying. Due to improper packing and foraging, most of the mules had developed galls (sores from rubbing) on their withers and haunches which made moving difficult and caused many of the muleteers to offload supplies to mitigate the effects. The men were also in poor shape because their rations were for emergency use and not intended to be a sole source of nutrition, unfortunately they were the only subsistence able to be acquired and air-delivered at the time. These rations provided 3,000 calories per day, which resulted in a calorie deficit of 1,000 per man per day. The lack of food

meant that the average man lost about 25 pounds of body weight by this point in the operation.[31] Wingate decided that his odds of success were too great to forego and ordered the remainder of his Brigade to extend their original operations.

On the 10th of March, Southern Group and Five Column crossed the Irrawaddy River unopposed. On the 13th of March, Three Column crossed and met heavy resistance from the far bank. In reaction to Three Column's contact the rest of Northern Group scouted more advantageous locations for traversing the river and crossed unopposed on the 18th of March. Southern Group was simultaneously receiving supplies by airdrop south of the village of Tamshaw when a Japanese patrol attacked. The attack on the air-drop made it clear the Japanese now understood the methods of operation, and throughout Burma, they deployed three regiments to hunt the Chindits. Wingate began to realize that the element of surprise had waned and the Chindits would not have the luxury of picking the time and place of their engagements from now on.

To further complicate the situation the far side of the Irrawaddy River didn't have sufficient ground water to sustain the force, and the lack of water made columns more reliant on resupply. To compound the difficulty the aircraft now had to fly further, stretching the limits of their escorts and making them operate closer to the Japanese airstrips. In this area the Japanese fighters would have time to locate and engage the resupply aircraft and RAF and US escorts didn't have fuel to dogfight. The dangers posed by Japanese aircraft and inability to forage for water made the likelihood of successfully resupplying the Chindits virtually non-existent. The loss of surprise and challenges of resupply caused Wingate to call his higher headquarters to discuss the situation. On 26 March 1943 Wingate was ordered to withdraw his forces to withdraw back to British-held territory.

The Operation Ends:

The Irrawaddy and Chindwin rivers stood as major obstacles between the Chindits and the safety of British lines. River crossings were difficult and the larger the element that crossed, the longer the process took. The Japanese began using boats on the rivers and parallel road networks as areas to intercept the retreating British formations. To increase the operational tempo his force enjoyed against the Japanese and reduce their vulnerability while crossing the rivers Wingate ordered Three and Five column to destroy an aqueduct while the remainder of his troops dispersed and infiltrated back to British lines by column. Shortly after the main body began its egress, Wingate determined that the chaos the destruction of the aqueduct would cause for the Japanese would not be worth the cost to the Burmese population and rescinded his order, forcing the entire Brigade to move back along multiple routes.

The Chindit retrograde was responsible for 70% of the casualties from the campaign.[32] The majority of casualties were the result of the environment and malnutrition instead of enemy action.[33] During the retrograde, most of the radios were "discarded or no longer effective"[34] which made communications with their air resupply completely reliant on line of sight communications, and therefore largely ineffective. The inability to communicate and the lack of ground-based supply trains caused nearly all the subsistence to come from: "The occasional piece of python, chunks of buffalo meat and endless rice."[35] These periods of caloric deficit made the soldiers "much more susceptible to disease and exhaustion,"[36] exacerbating the effects of the natural obstacles. The strain caused most columns to break apart leaving men as they retreated who would trickle in over the next several months, the columns that remained together as they came back across the Chindwin lost significant men to drowning with Five Column suffering "forty-six men (of 120) drowned or left."[37] As they trekked back to India, most

columns lacked the control to account for their men. Several narratives tell similar stories of men who were overcome by the terrain and disease as they attempted to return to friendly lines.

Analysis:

By June 1943 of the 3,000 men who began Operation Longcloth 2,182 had returned to British India. Viscount Slim, the Commander of all British forces in Burma claimed that: "As a military operation (Operation Longcloth) had been an expensive failure… (however) there was a dramatic quality about this raid. Skillfully handled, the press of the allied world took up the tale to show we had beaten the Japanese at their own game… For this reason, alone, Wingate's raid was worth all the hardship."[38]

The Marine Corps Operating Concept (MOC), calls for the Marine Corps to use a form of distributed maneuver with limited bases of support in the air and ground domains to have greater reverberating effects in the information domain.[39] The MOC's vision of employment of US forces is like what Wingate accomplished in 1943 with his Deep Penetration Theory. The cost of this operation might be considered too high in a contemporary setting, however, with the benefit of hindsight, we can see that slight modifications in the training, sustainment and command and control could have achieved similar results with a smaller cost.

Brigadier Wingate's deep penetration operations achieved all that they set out to do but, shortcomings in his use of logistics created the conditions that made Longcloth so costly. The first shortcoming was an over-reliance on sustaining the force by local forage. Although foraging can be an effective means of sustainment, large formations require significant time to gather enough supplies. The significant weight loss many of the Chindits experienced throughout the operation demonstrates that the shortfalls in scavenging based supply, especially

while conducting long movements. The other logistical shortcoming of Operation Longcloth was most of the local sources of food were incompatible with systems brought in from outside of the area; in this case, the mules' gastrointestinal distress and resulting injuries from eating bamboo. The distributed and "just in time logistics" gave the Chindits the ability to operate in terrain that was considered impassable, but it also limited the duration that these operations could endure.

Operation Longcloth also demonstrated to need for tighter coupling between air and ground units to air delivered sustainment without ground lines of communication. The Chindits' haphazard retreat to India after 24 March 1943 clearly demonstrated this lack of cohesion. Wingate's use of a distributed formation denied the Japanese the ability to mass against the Chindits to decisively defeat them. Although this scheme saved British forces from the enemy, it made them vulnerable to the elements, and harder to resupply. The air component had sufficient sorties to provide the nourishment but was unable to locate the columns to deliver supplies or provide close air support because most of the Column's radios no longer functioned. The radios failed to function because the headquarters element never planned to resupply parts for the radios nor provide replacement radios to the columns. This need for redundancy of mission essential equipment is equally applicable to any other critical classes of supply. The headquarters element was prepared to provide food and ammunition to the columns, but did not identify nor were they prepared to respond to other shortfalls.

Lack of adequate Command and Control was another major obstacle to the Chindit forces. Although Orde Wingate did an admirable job of providing Command with his intent, training, and presence on the battlefield for his brigade, during Operation Longcloth, his limited span of control didn't allow him to influence his entire unit. The limited span was due to the technology

of the day, a lack of redundant communications, and insufficient training. These problems were exacerbated because several Gurkhas in Wingate's brigade did not speak any English. These factors made internal control of the columns naturally difficult. Moreover, Wingate trained and equipped his forces so he could only reach his Column commanders, however the tactics the columns employed were based on small elements disappearing into the jungle on contact.[40] In these examples the ability of the Commander to control his forces did not extend to the level required by their tactical employment nor did it account for the chaotic nature of war. The Column commanders partially mitigated these obstacles by providing rally points, link up points and signal plans to their men. This was not enough, however, to effectively direct their troops in the face of the fluid nature of their decentralized operations. Most elements disintegrated or retrograded once they were separated from their Columns, taking months to regroup. The technology of the time limited commander's ability to talk to distributed units, and Wingate did not adequately address the shortcoming basing his plans for command and control on a battlefield without friction. Tactics and procedures must plan for worst case scenarios. The optimistic planning contributed to the high cost of the operation.

Maneuver was the most successful warfighting function of Operation Longcloth. Wingate's new operational design gave the Chindits advantages of surprise, speed, and offensive principles of war. The Japanese commanders' inability to develop an effective solution for Chindit warfare during Operation Longcloth demonstrated effective maneuvering. The first aspect of this was the organization of these elements; each element was organized to enable the demolitions section. The use of demolitions as the element's primary offensive arm allowed the columns to remain light. By limiting their need to transport large weapons and ordinance, the Chindits could use the jungle as a haven and allowed them to be resupplied entirely by air. The applied use of

demolitions "proved to be much more effective than the air force dropping bombs all willy-nilly."[41] By precisely demolishing targets on the ground, the number of sorties dedicated to striking targets could be limited allowing the RAF and US aircraft to provide sustainment and close air support to the columns. These tactics may seem outdated currently with precision guided munitions on most western aircraft, however in a GPS-denied or contested air environment the need for ground-based destruction of enemy targets may re-emerge.

The second factor that led to the Chindit's ability to move successfully against the Japanese was the use of pack animals within their columns. The use of mules allowed each column to operate without resupply for periods of three weeks. Although local forage caused health problems for several of the mules they could continue to operate without resupply, making the operations much more flexible than motor vehicles when resupply is unable to reach the supported units. Three Column's use of an elephant for carrying supplies and clearing paths was the most effective use of pack animals in Operation Longcloth, (regarding equipment carried for each pound of resupply received).[42] This success demonstrates that this tactic can be even more effective when using local animals which are accustomed to surviving in the local area where forces will conduct operations. The Chindit's organization and use of pack animals for supply enabled the operational maneuver that made the Chindits hard to detect and impossible to envelop.

Orde Wingate's after-action report mentions that several of his men were unable to swim across rivers,[43] because they never learned to swim before joining the Chindits. Mike Calvert also comments that many of the men had not conducted jungle operations or training before joining the Chindits. In a contemporary view, the leadership should have screened applicants for skills or disposition that would allow them to conduct these operations. "More men and better

equipment were the requirements (however) at this stage they were just not available."[44] All of the Column Commanders whose recollections were available indicated that this lack of screening was one of the primary obstacles during the operation. The majority of Operation Longcloth's casualties demonstrate that although new methods of maneuver provide advantages, employing technically complicated methods of fighting engender significant risk if the personnel conducting them do not possess requisite skills to accomplish them.

Operation Longcloth resulted in disproportionate effects, both psychologically and physically for the small numbers of troops involved. Some scholars argue that this operation disrupted the Japanese campaign plan and led to Lieutenant General Mutaguchi, (the Japanese Commander in Burma), to rethink his entire campaign, eventually leading to his defeat.[45] This assertion is highly disputable because the Japanese quickly repaired the damage from the raid and the Japanese decisions to change operational posture can't be directly tied to Longcloth. Wingate's innovative approach, however, did overcome the western perception of the Japanese army as "invincible jungle fighters."[46] Longcloth also established the doctrine, training, and cadre for Operation Thursday, the subsequent Chindit Operation in 1944, which was "Instrumental in (the British offensive which retook Burma)."[47] This examination showed that by adjusting methods of command and control and refining procedures for sustainment Wingate could have reduced the cost to friendly forces. Operation Longcloth's most resonant lesson is that new approaches will confuse and disorient the enemy, mitigating much of their strength. However, the units conducting these new approaches will be more likely to suffer non-battle injuries while using these methods. Therefore, new tactics and Operational designs should be developed during peacetime to ensure that leaders can screen and train their personnel before hostilities and therefore take advantage of the surprise and tempo that new techniques achieve against the

enemy. The lessons of Longcloth are especially relevant as the United States attempts to develop forces that will operate against near-peer competitors in a similar manner to Orde Wingate's Deep Penetration Theory which began with Operation Longcloth.

Operational Decision Game

> *Special Operations Forces… are generally unable to sustain operations for a long period of time.*
>
> *-Admiral William McRaven, Spec Ops*

The purpose of the case study was to provide a framework for how MUMA-T could provide an advantage to a combined Special Operations and conventional force. This scenario was set in Northern Burma, the same geographic area where Operation Longcloth occurred. The scenario used a Combined, Joint, Special Operations Task Force (CJSOTF). This CJSOTF was conducting shaping operations for a follow-on attack by a larger conventional force in an area where the enemy enjoys air superiority.

This project explored methods that a special operations force would employ to offset superior enemy mass and firepower while continuing to sustain itself in a denied air environment. This environment has not been encountered in recent US history, and therefore would require new approaches in sustainment, intelligence, and command and control (C2).

With this concept defined, the author developed a decision game set in the year 2025, fighting against a potential peer competitor. This scenario used the same setting as Operation

Longcloth, however examined fighting against a sophisticated enemy and managing a coalition force with the logistics requirements which have emerged in the early 2000s to equip US forces.

Design

The Operational Decision Game (ODG) was designed with the intended complexities of aligning and supporting SOF in a denied environment. In this game, the author presented each of the respondents with a scenario where the Chinese People's Liberation Army (PLA) has invaded the nation of Myanmar, with coalition forces staged in India. The nation of Myanmar is the seam between the PLA Southern Area Command and the Eastern Area Command, which is not a principle effort, resulting in a lack of resources for the CJSOTF.

This scenario combined several obstacles that were encountered in Operation Longcloth: Highly restrictive jungle terrain, a force that is quickly assembled and speaks multiple languages, and a denied aerial environment. These are in line with the most likely roles United States Special Operations Command will encounter in major contingency operations against a peer or near peer competitor.[5]

With Operation Longcloth in mind, the author assessed that the initial concept's capabilities would allow the defenders to move through highly restrictive terrain, to conduct unconventional warfare, or choose to conduct limited strikes. The author initially believed that electric power generation would enable combined formations within the CJSOTF to reach positions of advantage in conducting Unconventional Warfare or direct action against enemy

[5] USSOCOM *Global SOF Network 2025* pp4-7.

forces. This model was the principle factor for building an enemy with fiber-optic based C2 structure that enabled reinforcement from significant ground forces and integrated air defense.

Responses to the wargame

The author distributed the decision game, "Burma Penetration," during the month of February 2017, and received all responses by 30 March 2017. In total, the author received 31 completed games from 31 different respondents. Responses varied in depth from text-only answers to a portion of the questions, to complete responses with a graphic COA.

The level of pertinent experience varied across the pool of respondents. Ten of the respondents were Special Operations Officers assigned to Operational USSOCOM commands (2 NAVSPECWAR, 2 USASOC and 6 MARSOC). Twenty-one respondents were students assigned to the Marine Corps Command and Staff College, and five were Faculty at the Marine Corps Expeditionary Warfare School. The experience level varied from E-8 to O-6, and had two civilian respondents.

After receiving all responses, the author compiled the results in a spreadsheet for ease of longitudinal analysis to capture background of respondents, the functions they felt was most beneficial for the CJSOTF and what technology or system improvements would increase the likelihood of mission success in the scenario.

Solution to the scenario were divided into four main categories: Unconventional Warfare (UW), Direct Action (DA), Information Warfare, and conventional assault. The most common solution was to utilize Unconventional Warfare, fifteen respondents believed this was the best solution to the military problem in the ODG. Nine of these respondents were SOF officers, one was an Air Force Acquisitions Officer, three were military pilots and two were Logistics Officers.

These solutions all sought to spark? an insurrection by the disenfranchised Burmese population to create another front during the assault from friendly conventional forces. This would be enabled by utilizing the manned animal systems to bring supplies for the special operators and then use unmanned animal systems to bring supplies for indigenous fighters.

Direct action raids and ambushes were the next most common solution, with twelve respondents indicating this would be the most effective method to set conditions for follow on action. These responses all targeted communications, support infrastructure and isolated enemy forces. The occupation specialties of these respondents were: one Aviation Command and Control Officer, Three Artillery Officers, four Communications officers, two Infantry Officers, and two intelligence officers. In this scenario, manned/unmanned/animal teaming (MUMA-T) systems were used to surveille targets prior to assault, and were also employed in a suicide attack role by being fitted with explosives and detonating as a supporting attack during raids.

Three participants indicated that direct assaults would be the most effective method to employ the CJSOTF. Two of these respondents were Supply Officers and one was an Intelligence Officer. The MUMA-T concept would be employed in a direct attack mode, primarily using suicide bombers.

One participant utilized information operations as his primary method for employment of the CJSOTF. In his model, the force would conduct some UW, and utilize their electronic signatures to cause the enemy to believe they were a conventional attack, thereby drawing the enemy into terrain that where they would suffer from environmental casualties.

All respondents indicated MUMA-T systems would be beneficial to accomplishing their operational design against the enemy. Ten respondents indicated that an explosive module, (suicide vest) would be a worthwhile addition to the systems originally proposed in the ODG.

Effectiveness of the Initial Concept

The solutions presented to the Burma Penetration ODG suggest that most participants believed remote-controlled animal transported systems would effectively provide support for the CJSOTF. The concept had to be adapted depending on the method that the respondent decided, specifically if they felt that UW, DA or ISR would yield the greatest effects in support of follow on forces.

The initial warfighting functions considered in this ODG were sustainment, maneuver, C2 and intelligence. For sustainment, mules could carry gear, be directed remotely, and generate sufficient electricity for their own command and control systems, as well as provide power support for special operations forward operating bases. These mule systems can also act semi-autonomously to increase the rate of resupply and material available for continued operations.

Intelligence gathering from both an enemy and terrain perspective was most effective by using indigenous animals to employ electro-optical or data recording devices. Due to their natural camouflage and proficiency at transiting terrain that is highly restrictive for personnel and most military equipment, indigenous animals can utilize multiple avenues of approach to collect information on the enemy and can provide scouting functions to both SOF and conventional forces, especially in jungle terrain.

In the ODG, topography and vegetation made traditional radio communications very difficult. The use of a distributed internet protocol (IP) based communication were examined as a method to establish and maintain C2. The use of mobile and stationary small repeaters placed in the jungle canopy provided a link between air and ground forces, even with substantial jungle foliage and undulating topography.

The final warfighting function that was examined in the ODG was maneuver. This is achieved by utilizing the animal/ unmanned systems. In this case, small remotely piloted (or autonomous systems with proper advances in artificial intelligence) vehicles can be deployed to assist in crossing horizontal obstacles, and scaling vertical obstacles.

Overall, all participants indicated confidence in MUMA-T by employing forces using aggressive tactics without concern for securing lines of communication. This gave advantages in surprise and maneuver over enemy forces, but incurred greater risk from terrain and lack of supplies.

Refined Concept

By the end of this century the non-biological portion of our intelligence will be trillions of times more powerful than the unaided human intelligenc."

--Ray Kurzweil, The Singularity Is Near

Deep Penetration Operations are a valid concept in the 21st Century. Utilizing manned, unmanned, animal systems, commanders can reduce the number of friendly forces on the battlefield, and therefore reduce the attrition which was present in Operation Longcloth. The systems envisioned here can provide an advantage in: maneuver, intelligence, C2 and sustainment.

Systems

The concepts of MUMA-T in this scenario are two-fold: a dispersed array of small radio repeaters and sensors, which can be emplaced by indigenous animals. The second system is a self-contained two-way communications platform powered by kinetic energy and carried by animals, which can also deploy small UAS systems in support of local surveillance or mobility. These systems will provide more robust and resilient infrastructure for future operations in early stages of future operations, especially where enemy forces can contest US air supremacy.

The two-way communications platform with distributed ISR,[6] relies on a 4K DKI resolution camera, and KA band, SHF radio transmitter. This system also has a radio receiver capable of operating between 30mhz and 500mhz voice receiver. This module is the command unit, transmitting real-time video and relaying voice commands to the animals. This system is tied in with a scalable power generation and storage system, composed of 21700 lithium ion batteries, on a plastic/copper power generation sled, which can be scaled to each animal employed with these systems.

These systems can be employed with a variety of animals depending on terrain and mission analysis. The first animal platform to examine is the mule. The US Army and Marine Corps both have mule programs in which the animals are already familiar with voice commands, and can operate from commands given by radio, although these systems are currently only employed within line of sight. Employment of these systems with the current mule systems has the capability to deliver unmanned logistics capability to resupply and sustain SOF units in a denied air environment.

[6] See Enclosure 3

The second system is a stationary multi-band IP based transceiver with an internal power source. This piece of equipment has a body of two metal and plastic parts that are connected by wire. This element can be placed in trees, on top of buildings or employed on the move by personnel and animals. A group of these transceivers will form a large IP based "cloud" of RF energy. The "cloud" of RF energy allows the SOF operators, logistics elements and supporting units to remain in contact and track other elements movements while simultaneously making it more difficult for the enemy to use direction finding technology to locate friendly elements operating on the system. These systems also have the capability to serve as electronic beacons for aircraft; assisting aircrews and pilots in navigation in a GPS denied environment.

The final piece of equipment is a rope system utilized by small UAS. In this system, a small quad-copter or other device can carry a lightweight rope across horizontal obstacles or to the top of tall obstacles. After looping the lightweight rope around an anchor point the UAS can return to the formation. This eliminates the most technically challenging part of traversing rivers, canyons and climbing buildings. This increases mobility for light units in difficult terrain without the difficult and long training associated with advanced rope suspension techniques.[7]

Tactical Employment

The distributed animal systems can be used across the warfighting functions in difficult terrain. All USSOCOM units have a military Canine program at the Battalion or Task Group level. These dogs already have all the necessary training to employ these sensor systems. On a military working dog these systems could be used to increase the operational range of the animal, and could be incorporated for scouting, communications and Reconnaissance and surveillance of area targets.

[7] In the Marine Corps, these techniques are taught at the 10-week long Summer Mountain Leader's Course and the four week Urban Climber's course.

These systems should be incorporated at the Team, Platoon and Operational Detachment Alpha (ODA) level.

Mules provide the main platform for resupply, the diffused ISR system that can be used on canines can be employed with mules and reduce the number of people who need to be with a mule train, or the train can operate autonomously for distances up to 35 miles.[8] A mule train of three animals can transport 580 kilograms, which is a one month supply requirement for a special operations team. Additional animals can be added to increase carrying capacity. Locally acquired animals can also be added to the train. In Burma, the Chindits utilized an elephant from a local village while moving through the jungle. A lack of training, will require these additional animals to be guided, making them unable to operate autonomously, but they can augment capacity of manned units. The kinetic electricity generation can be scaled by wiring the generation modules in series to put out greater wattage and voltage to match requirements, making these formations energy independent.

Small UAS with rope systems attached can be employed with SOF or supporting formations in river crossing or military climbing operations. These small systems can be used to reduce the risk of drowning in river crossing, or non-combat related injuries from falls during military climbing operations. This equipment will reduce the number high-demand, low-density personnel required for these operations.

Character of Future Combat

[8] This is based on the Special Forces Animal Packing Manual; this restriction is the time that can be reached with local forage and no supplemental food in an inhospitable environment.

The battlefield during the mid-21st century will be in "complex terrain" where there will be a "battle of signatures,"[48] where military forces will attempt to evade electronic and visual detection from their adversaries. This will require elements that can avoid human intelligence networks while creating a more dispersed force with survivable support elements. These complex environments make hardware, sensor, and software requirements robust. Robotics have the potential to decrease the loss of life, and increase the tempo of joint forces; however, these systems are expensive and rely on fuel that must be brought in at great cost, which continually increases the requirement for vulnerable supply bases.

The future of conflict will also involve enemy forces who can either dispute or exhaust US airpower. The United States has significant capability to leverage superior technology on the battlefield, the slow acquisition process has made it difficult for the US Department of Defense to keep pace with emerging threats, in the future battlefield the US will face enemies with localized technological advantages in software and integration of commercial off the shelf products. The US budget does not support outspending every opponent at the high end of the technology spectrum, instead a combination of high tech and low tech solutions will be what provides success to US forces in the future.

Counterarguments and Concerns

The greatest hurdle to manned-unmanned animal teaming is the diverse support mechanisms required for implementing and sustaining these systems. Animals require food and although supplies can be supplemented by local forage, there is frequently greater waste associated with animals than with machines. Although requirements for food and water can be burdensome,

indigenous animals adapted to living off readily available food sources are already available throughout the battlefield. Moreover, the power requirements of the sensor and communications packages outlined in this paper can be sustained by the movement of the animals which yields lower energy requirements particularly when compared with those for a fully robotic system, and due to the expendable nature of the animals, much cheaper than utilizing additional military personnel.

The next criticism of MUMA-T is that animals can't be controlled with the same precision that a machine can, and without the aid of humans these animals/machine systems will not improve warfighting capability. Although robots are more adaptable than animals when used independently, they are less adaptable than a combined system. War is a chaotic and uncertain environment where fluidity and adaptability are more important than precision, and therefore the combined system is more suited to a battlefield than many strictly robotic systems.

Despite the numerous requirements and potential deviations, MUMA-T systems are a low-cost way to complete complex functions in complicated environments.

Conclusions

Humans are More Important than Hardware
--SOF Truths, SOF Global Vision 2025

In Operation Longcloth, Orde Wingate was able to achieve strategic effects with very few resources. Deep Penetration Theory was a success because according to Mike Calvert, "Most of the troops you encounter in rear areas aren't very good."[49] This is because these forces have limited time to train for combat and their technical functions. This phenomenon has been

demonstrated throughout history and in contemporary combat and there is no reason to believe this will change. The rear-element gaps in enemy strength will continue to provide an advantage to forces that can access them.

Getting to positions of advantage has traditionally required highly trained troops capable of exploiting enemy gaps. Enemy forces try to limit their vulnerabilities, and therefore troops need to maneuver in areas the enemy believes are impassable; these areas are inherently dangerous, making the risk associated with pursuing these courses of action prohibitive to many commanders. The losses of human life in Operation Longcloth would make it an unacceptable political risk in the contemporary environment; however, the use of MUMA-T will limit the number of people who must risk their lives and increase their lethality when they conduct these operations.

People will continue to be the most important factor in future battlefields regardless of technologies and strategies employed and audacity will be the most important attribute of those people. To achieve success against emerging threats the US military will need to find divergent thinkers like Orde Wingate.

Appendix A – Burma Penetration Operation Decision Game

Burma Penetration

ASP Decision Game

(US future / China current)

Penetrate Chinese defenses to offset mass in airpower.

Road to Crisis 2025

- After continual escalations in the South-China Sea the Chinese People's Liberation Army Navy (PLAN) under the Eastern Theater Command launches amphibious operations against the nation of Japan.
- Simultaneously the People's Liberation Army under the Southern Theater Command invades the nation of Vietnam.
- Two divisions of PLA with a brigade from the People's Armed Police (PAP) have occupied and are conducting security operations with a puppet government in the nation of Myanmar.
- US PACOM J-2 assesses the PLA Western Command is planning an Army sized invasion of the Nation of India.
- US PACOM lists re-establishing sovereignty to the nation of Japan as top priority, followed by preventing assault on the nation of India.

PAP operatives in Rangoon Myanmar

PLAN sailors enter Port of Osaka

Road to Crisis 2025

- US PACOM J-2 assesses the nation of Myanmar is a seam between Southern and Western command, which will cause significant internal friction within the PLA if exploited. There are also OGA teams embedded with Myanmar free forces in the state of Shan.
- SPMAGTF-PAC (1/1 Marines with aviation support) changes operational posture becoming TACON to SOCPAC.
- SPMAGTF-PAC, 1 and B Co. 1st Marine Raider BN, and 1 Co Indian light infantry form SOJTF Chindit in Imphal, India.
- SOJTF Chindit is tasked with attacking forces in Myanmar IOT disrupt PLA offensive operations in India.
- Diplomatic channels between all nations remain open throughout the mobilization and deployment process. Prior to the commencement of hostilities, all nations sign a non-nuclear agreement should fighting commence.

Nation of Myanmar

PLA Force Posture (air)

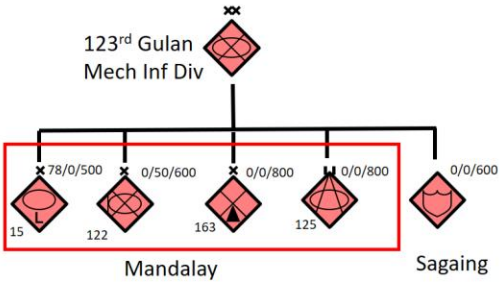
- Intelligence reports that PLA Div HQ is located in Mandalay with:

  -2 x JY-14 high/ medium altitude radar
- 23rd Fighter Sqdn (-) (10 x J-20)
- 3-5 JLP -40 High/ Medium altitude mobile scan radars are located throughout the country of Myanmar. The HQ-64 SAM systems will be tethered to the radars. At least 2 HQ-64s are defending the airfield in Kachin. Currently all other systems are unlocated.

JY-14 JLP-40

J-20

HQ-64 SAM



The 123rd Gulan Mech Infantry Div is located in Mandalay. The 163 Anti-Tank Bde (HJ 8 and trucks) and 122 Mech Infantry Bde (WZ-551) can respond within 24 hours from notification from People's Armed Police who are Headquartered in Hainjing.

NOTE:
- Organic UAS (Class 1, 2)
- Organic EW

ZTQ-105
105mm with 2x ATGM
12.7mm/ 7.62
Passive laser ATGM protection

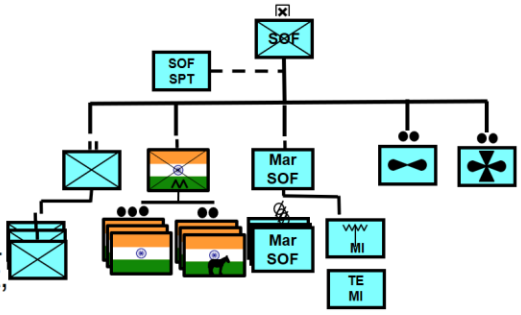
WZ-551 Type 92
25mm autocannon, 12.7mm/ 7.62
9 dismounts/ 3 crew

HongJian 8 ATGM
4,000 m wire guided

HongJian 12 ATGM
4,000 m fire and forget

American Force Posture

- 1/1 Marine Rifle Bn is T/O with no additional capabilities,
- Indian infantry is mountain strike with 200 pax and 100 mules.
- B, 1st MRB, 4 x Marine Special Operation Teams (14 pax each), 4 X Sigint, 4 X humint, 6 X MWD, 6 X JTAC, 87 pax.
- FW section is 2X F-35
- RW section is 4X MV-22



1/325 PIR

American Force Posture

- 1/1 Marine Rifle Bn is T/O with no additional capabilities,
- Indian infantry is mountain strike with 200 pax and 100 mules.
- B, 1st MRB, 4 x Marine Special Operation Teams (14 pax each), 4 X Sigint, 4 X humint, 6 X MWD, 6 X JTAC, 87 pax.
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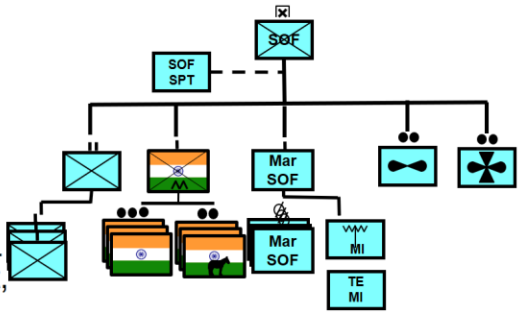
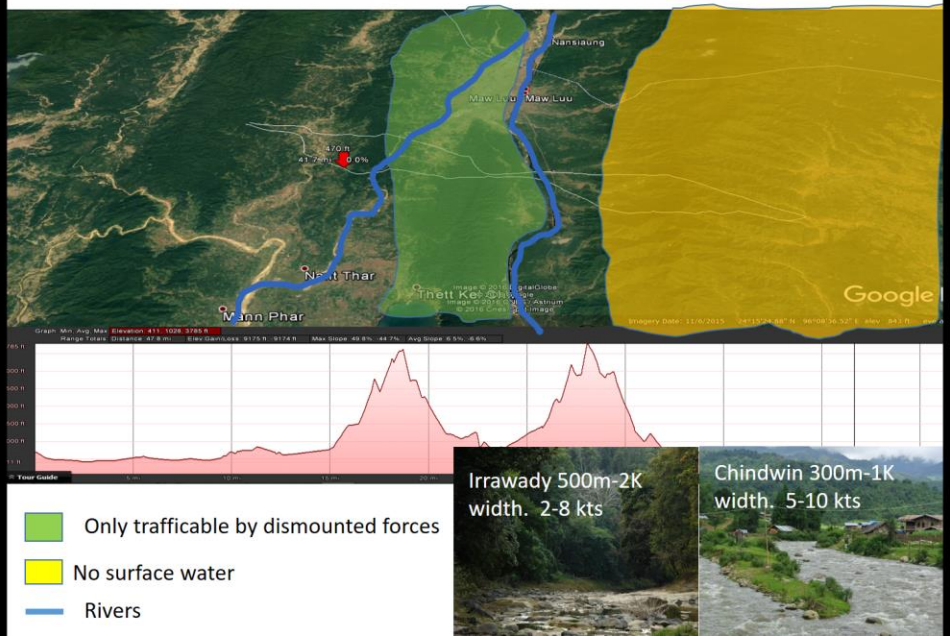


1/325 PIR

Terrain and weather



Only trafficable by dismounted forces

No surface water

Rivers

Remote animal command/ dispersed power generation Capabilities

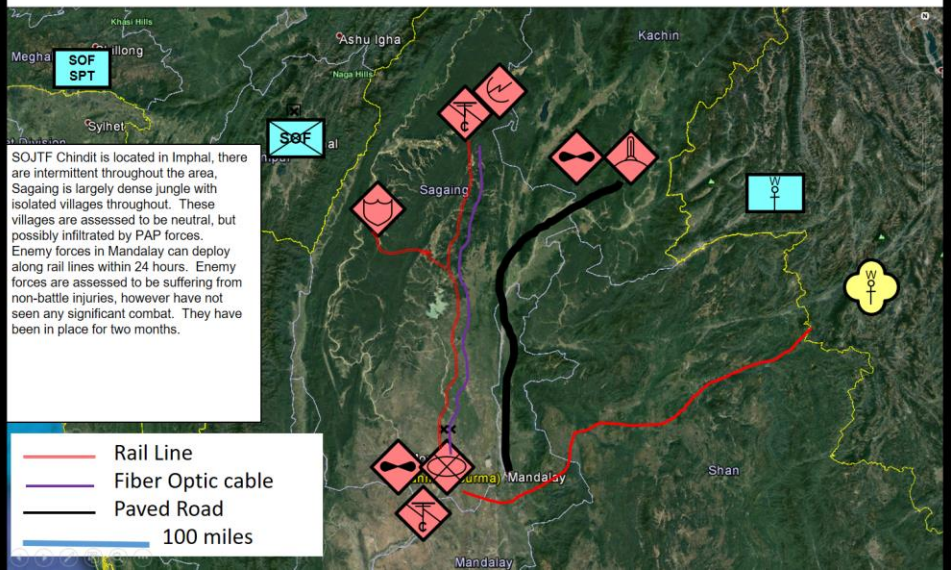
Remote tracking and command system. Uses self healing IP based LOS communications.

IP network cloud hub.

Lightning Pack kinetic power generation

- Systems can give commands to animals, track locations and match to programmed targets. Mule systems can be outfitted with explosive charges. Systems can be used without animal systems as a distributed E/O and IR camera.
- The IP network cloud hub is a 3' by 8" 2 pound system that can create a self healing "cloud" line of sight RF or hardwired network.
- Lightning packs generate electrical energy from kinetic energy created in walking, multiple systems can be employed on an animal and provide larger amperage and voltage. Each man portable system will charge 1 x BA5591 battery in 4 hours, (while moving).

Situation



Solution Set

Fill in the problem framing, COA Graphic/narrative, and theory of victory slides

References on key terms are provided

Theory of Victory

Synopsis of your Central Idea

Necessary Capabilities

Application & Integration of Military Functions

Spatial & Temporal Dimensions

Problem Framing

Problem Statement (incl. list of key facts and assumptions):
Tensions Between Current Conditions and Desired Conditions:
Elements that Must Change to Achieve the Desired Conditions:
Opportunities and Threats to Achieving the Desired Conditions:
Limitations:

JP 5-0, Figure III-6

COA Graphic and Narrative

	MISSION:
	INTENT (purpose, method, desired condition)
	CONCEPT (incl. key tasks by phase)

Remote animal command/ dispersed power generation Capabilities

Which of the capabilities described on the Animal systems slide were useful in this scenario?
Which of the capabilities described on the Animal systems slide were not useful in this scenario?
What additional capabilities would make the Animal systems concept more effective in offsetting an enemy's advantage in numbers or armor?
Additional comments:

Appendix B – Burma Penetration ODG results

Response Number	Background/ Experience	Principle functions	Concept Use
1	MARSOC/ E-8	UW/ ISR	
2	MARSOC/ E-8	UW	Resupply and ISR in support of DA. Resupply for UW.
3	Navy SEAL/ O-4	UW/DA	Resupply and ISR in support of DA. Resupply for UW.
4	Navy SEAL/ O-6	UW/ISR/DA/Sust.	Equip indigenous animals/ people with ISR/ C2 systems. Utilize electronic signature to match Division sized element.
5	MARSOC/ O-4	UW/DA	Resupply and ISR in support of DA. Resupply for UW.
6	MARSOC/ O-4	UW/ISR/courier	Conduct communication with indigenous forces with unmanned systems acting as couriers
7	MARSOC/ O-4	UW/ISR	Resupply and ISR in support of DA. Resupply for UW.
8	MARSOC/ O-4	UW/ISR/DA	Resupply and ISR in support of DA. Resupply for UW. Deep ISR during shaping
9	MARSOC/ O-4	UW/ISR	ISR in support of Bona Fides, security, (roving OP)
10	MARSOC/ O-4	UW/ISR	Resupply and ISR in support of DA. Resupply for UW.
11	Pilot/ USMC O-4	DA	Resupply, suicide bombing attack during raids.
12	Pilot/ USMC O-4	DA	Resupply, suicide bombing attack during raids.
13	Pilot/ USMC O-4	DA	Resupply, suicide bombing attack during raids.
14	Aviation C2/ USMC O-4	DA	Resupply, suicide bombing attack during raids.
15	Communications/ USMC O-3	Assault	Signature masking, independent suicide bombing attack.
16	Communications/ USMC O-4	Assault/ UW	Resupply, suicide bombing attack during raids.
17	Pilot/ USN O-4	DA	ISR in support of DA.
18	Pilot/ USAF O-4	DA	ISR in support of DA.
19	Infantry USMC O-4	DA	ISR in support of DA.
20	Artillery USMC O-4	Assault	Suicide bombing during attack, supply train during recovery.
21	Artillery USMC O-4	Assault	Suicide bombing during attack, supply train during recovery.
22	Artillery USMC O-4	DA	Signature masking, resupply after attacks, floating AXP.
23	Supply USMC O-4	Assault	Suicide bombing during attack, supply train during recovery.

24	Supply USMC O-4	Assault	Suicide bombing during attack, supply train during recovery.
25	Logistics USMC O-4	UW/DA	trade to indigenous forces/ ISR prior to raids.
26	Logistics USMC O-4	DA	Resupply, suicide bombing attack during raids.
27	Logistics USMC O-4	DA	Resupply, suicide bombing attack during raids.
28	Infantry USMC O-4	UW	Independent resupply of Indigenous Forces, ISR for CJSOTF.
29	Infantry USMC O-4	Assault	Resupply, suicide bombing attack during raids.
30	Infantry USMC O-4	DA	Resupply, suicide bombing attack during raids.
31	PHD civilian	UW/ISR	Resupply and ISR in support of DA. Resupply for UW.

Appendix C – Canine Remote Animal Command Prototype

This system is a weave type fabric with transciever on the rear of the apparatus. Video and audio is transmitted on KA band, which is digitally encrypted and transmitted through the transciever on VHF or HF spectrum.

Notes

[1] Redding, Tony *War in the Wilderness* p 12
[2] Allen, Louis *Burma, The Longest War 1941-45* pp 16-25
[3] Ibid p 28
[4] Warren, Allen *Burma 1942 The Road from Rangoon to Mandalay* pp 14-29
[5] Wavell, Archibald in Connell, John, *Wavell; Supreme Commander* pp 116-118
[6] Hsuing, James *China's Bitter Victory: The War With Japan, 1937-1945* pp 117-119
[7] Stillwell, Joseph in Berrnstein, Marc *Stillwell's Escape from Burma in WWII* p 19
[8] Allen, Louis *Burma, The Longest War 1941-45* p 118
[9] Ibid p120
[10] Ibid 119
[11] Ibid 123-127
[12] Fergusson, Bernard, *Beyond the Chindwin: An Account of Number Five Column of the Wingate Expedition into Burma* pp30-35
[13] Wavell, Archibald recalled by Mike Calvert, Calvert, Michael Oral History from http://www.iwm.org.uk/collections/item/object/ 80009725
[14] Thompson, Julian. 2001. *War Behind Enemy Lines*
[15] Calvert, Michael *Fighting Mad* p 69
[16] Redding, Tony *War in the Wilderness* p 28
[17] Redding, Tony *War in the Wilderness* p 147
[18] Calvert, Michael *Fighting Mad* p 69
[19] Redding, Tony *War in the Wilderness* p 33
[20]Ibid pp 35-37
[21] Major T.B.G. Bromhead from, Thompson, Julian. 2001. *War Behind Enemy Lines* pg. 140
[22] Fergusson, Bernard, *Beyond the Chindwin: An Account of Number Five Column of the Wingate Expedition into Burma*
[23] US Army Doctrine Command *FM 3-05.213 Special Forces Use of Pack Animals* pp 3-16 -3-18
[24] Ferguson, Bernard *Beyond The Chindwin* pp 54-58
[25] Dominic Neil from Thompson, Julian *War Behind Enemy Lines* p 150.
[26] Calvert, Michael Oral History from http://www.iwm.org.uk/collections/item/object/ 80009725
[27] R.B.G. Bromhead from Philip Chinnery *Wingate's Lost Brigade* pp. 68,69
[28] Ferguson, Bernard *Beyond The Chindwin p 138.*
[29] Calvert, Mike *Fighting Mad* p 141
[30] Capt Herring, from Thompson, Julian. 2001. *War Behind Enemy Line* p 154
[31] Allen, Louis. 1984. *Burma; The Longest War 1941-45. PP 50-52*
[32] Redding, Tony *War in the Wilderness* p 74
[33] Ibid p 76
[34] Ferguson, Bernard *Beyond The Chindwin* p 165
[35] Calvert, Mike *Fighting Mad* p 129
[36] Ibid p 142
[37] Ferguson, Bernard *Beyond The Chindwin pp 174-175*
[38] Slim, William *Defeat Into Victory* pp 162-163.
[39] Marine Corps Combat Development Command *The Marine Corps Operating Concept* pp 11-12
[40] Aves, Charles from, Thompson, Julian. 2001. *War Behind Enemy Lines* pp *156-158.*
[41] Calvert, Michael Oral History from http://www.iwm.org.uk/collections/item/object/ 80009725
[42] Calvert, Mike *Fighting Mad* p 121-123
[43] Wingate, Orde Report of Operation Longcloth from http://www.iwm.org.uk/collections/item/object/80013036
[44] Calvert, Mike *Fighting Mad* p 67
[45] Redding, Tony *War in the Wilderness* p 84
[46] Slim, William *Defeat Into Victory* pp 162-163.
[47] Ibid pp 220-223

[48] Marine Corps Combat Development Command *The Marine Corps Operating Concept* p 5.
[49] Calvert, Michael Oral History from http://www.iwm.org.uk/collections/item/object/ 80009725

Bibliography:

Adamsky, Dima. 2010. *The Culture of Military Innovation.* Stanford: Stanford University Press.

Allen, Louis. 1984. *Burma; The Longest War 1941-45.* New York: Phoenix Press.

Calvert, James Michael 'Mad Mike'. 1987. "Imperial War Museum Electronic Collection." *http://www.iwm.org.uk/.* 10 28. Accessed 11 14, 2016. http://www.iwm.org.uk/collections/item/object/80009725.

Calvert, Mike. 1964. *Fighting Mad; One Man's Guerilla War.* Shrewsbury, UK: Jarrolds Publishing.

Chinnery, Philip. 2010. *Wingate's Lost Brigade.* South Yorkshire: Pen and Sword Publishing.

Fergusson, Bernard. 2009. *Beyond the Chindwin: An Account of Number Five COlumn of the Wingate Expedition into Burma 1943.* London: Pen and Sword Publishing.

Redding, Tony. 2011. *War in the Wilderness.* Gloustershire, UK: Spellmount Press.

Scott, Walter Purcell. 1991. "Imperial War Museum Electronic Archives." *http://www.iwm.org.uk.* 11 27. Accessed Jan 01, 2017. http://www.iwm.org.uk/collections/item/object/80012086.

Slim, Viscount William. 1956. *Defeat Into Victory; Battling Japan in Burma and India 1942-1945.* New York: Cooper Square Press.

Thompson, Julian. 2001. *War Behind Enemy Lines.* Washington. D.C.: Brassey's Inc.

US Army Doctrine Command. 2004. *FM 3-05.213.* Washington DC: US Army Doctrine Command.

Adamsky, D. (2010). *The Culture of Military Innovation.* Stanford: Stanford University Press.

Alexander, J. (1993). *Across the Reef: The Marine Assault of Tarawa.* Washington DC: Marine Corps History Center.

Allen, L. (1984). *Burma; The Longest War 1941-45.* New York: Phoenix Press.

Ball, D. B. (1991). *Financial Failure and the Confederate Defeat.* Chicago: University of Illinois Press.

Bernstein, M. D. (2004, November 1). Joseph Stilwell’s Escape from Burma During World War II. *World War II*, pp. 16-22.

Boot, M. (2013). *Invisible Armies.* New York, NY: Liverright Publishing Corporation.

Calvert, J. M. (1987, 10 28). *Imperial War Museum Electronic Collection.* Retrieved 11 14, 2016, from http://www.iwm.org.uk/: http://www.iwm.org.uk/collections/item/object/80009725

Calvert, M. (1964). *Fighting Mad; One Man's Guerilla War.* Shrewsbury, UK: Jarrolds Publishing.

Chinnery, P. (2010). *Wingate's Lost Brigade.* South Yorkshire: Pen and Sword Publishing.

Connell, J. (1969). *Wavell, Supreme Commander.* London: Collins.

Fergusson, B. (2009). *Beyond the Chindwin: An Account of Number Five COlumn of the Wingate Expedition into Burma 1943.* London: Pen and Sword Publishing.

Johnson, T. M. (2013). *Hybrid Warfare.* Macdill Air Force Base, Florida: Joint Special Operations University Press.

Kistler, J. (2011). *Animals in the Military.* Santa Barbara: ABC-CLIO, LLC.

Matheny, M. R. (2011). *Carrying the War to the Enemy: American Operational Art to 1945.* Oklahoma City: University of Oklahoma Press.

Murray, W. a. (1996). *Military Innovation in the Interwar Period.* Cambridge: Cambridge University Press.

Redding, T. (2011). *War in the Wilderness.* Gloustershire, UK: Spellmount Press.

Scott, W. P. (1991, 11 27). *Imperial War Museum Electronic Archives.* Retrieved Jan 01, 2017, from http://www.iwm.org.uk: http://www.iwm.org.uk/collections/item/object/80012086

Slim, V. W. (1956). *Defeat Into Victory; Battling Japan in Burma and India 1942-1945.* New York: Cooper Square Press.

Thompson, J. (2001). *War Behind Enemy Lines.* Washington. D.C.: Brassey's Inc.

US Army Doctrine Command. (2004). *FM 3-05.213.* Washington DC: US Army Doctrine Command.

Warren, A. (2011). *Burma 1942 The Road from Rangoon to Mandalay.* London: Continuum International Publishing.