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The Relevance of Technology in Afghanistan

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*Afghanistan, in many ways poses an even more complex and difficult long term challenge than Iraq—one that, despite a large international effort, will require a significant U.S. military and economic commitment for some time.*¹

--Robert M. Gates, Secretary of Defense

*It will be a long campaign, a campaign of knives at night, rather than cruise missiles during the day.*²

-- MG (Ret) Lewis MacKenzie, Canadian Army

With the US Army's renewed focus on Afghanistan, it looks at creating conditions to more effectively bring stability to a country that historically has had little stability. Conventional wisdom posits that to have any chance of success, a "surge" similar to the one in Iraq is needed in Afghanistan. After all, quantity has a certain innate quality all its own, particularly when numbers are essential to securing vast areas under insurgent control. To its credit, quantity can also be accompanied by innovative technological advances that enhance the existing quality of the deployed force. But, can technologically lethal advancements profoundly influence success? As the US Army fields new and more advanced technologies in the application of lethal force in Afghanistan, this question is at the center of much debate. But perhaps, the answer is staring directly at us in the form of previous lessons and the cold, stark reality of the Afghan strategic landscape. Success may hinge on the ability to learn from the past and to properly address the effects of this landscape.

First and foremost, it is prudent to define the US strategy for Afghanistan. After all, technology is a means to enhance success, not an end to itself. But, as all military professionals know, defining success is arguably one of the more challenging endeavors for a national command authority, particularly the task of matching national security interests with the ends, ways, and means of applying military force. On 2 December 2009, President Obama announced his strategy for Afghanistan. Basically, this strategy (or plan) is threefold. First, the US and allies will maintain pressure on Al Qaeda along the Afghan-Pakistan border. Secondly, the Taliban

¹ Defense Secretary Robert Gates, speech delivered at National Defense University, Ft. McNair, Washington, DC, September 29, 2008.

² Linda Diebel, "Order of Battle," *Toronto Star*, September 23, 2001.

effort will be countered by sending 30,000 additional American troops to Afghanistan. And third, the goal of training and growing the size of the Afghan military and police forces, along with respective civilian institutions, will be maintained. Nine years later, disrupting, dismantling, or even defeating al Qaeda in Pakistan has been a largely unfinished task. Doing the same to the Taliban in Afghanistan or preventing their return has been equally challenging.³ Bringing stability and security to this country by expanding, training, and equipping Afghan military and police forces is also time consuming and labor intensive in itself. Bringing democratic political, social, and economic reform to Afghanistan by developing good governance and rule of law, while creating a sustainable market economy, remains a formidable objective. Unfortunately, the war in Afghanistan continues to challenge the US Army with a wide array of issues unique to Afghanistan and having no precedence nor equal in Iraq. Even with an articulated strategy, the work would still be challenging and difficult, in light of the differences between the two countries. Applying critical variables of the contemporary operational environment assists in identifying these differences.

Strategic Comparison

*Afghanistan presents a unique set of problems: a rural-based insurgency, an enemy sanctuary in neighboring Pakistan, the chronic weakness of the Afghan government, a thriving narcotics trade, poorly developed infrastructure, and forbidding terrain.*⁴

-- Michael R. Gordon, *NY Times Staff Writer*

From the standpoint of the nature and stability of the state, Iraq had (and still has) an established centralized rule, law, and statutes to govern, while Afghanistan relies on decentralized government, no centralized rule of law, and predominantly tribal and religious cleric rule. This impacts the ability of the occupying force and the host government to govern effectively from a centralized location in the capital or to represent the interests of all its citizens. Additionally, Iraq relies on a national taxation system, while Afghanistan has no federal system of taxation. While Iraq has a strong national identity (the notion of an Iraqi), Afghans have regional and complex tribal and ethnic identities. A strong historic warrior figure dominates its culture with seasoned and highly motivated fighters who dislike foreigners. Again, the notion of Afghanistan as a nation or nation-state may have no relevance in the minds of the tribes and ethnic groups and affects the success of counterinsurgency programs or the creation of national campaign plans.

Regarding sociological demographics and with one exception (Kurds), Iraq possesses an overwhelming Arab culture with one primary language of its majority, the Arabic language with dialects within it. Afghanistan has no common language or unifying culture, but a series of languages that primarily include Pashtu, Dari, and Balochi. Again in this case the various languages create language barriers for effective communication across the nation. Adding to the challenges of communications, Iraq has a functioning educational system, while Afghanistan has a high illiteracy rate reaching 100% in rural areas. This marginal literacy rate affects the ability

³ Afghanistan-Pakistan white Paper, http://www.whitehouse.gov/assets/documents/Afghanistan-Pakistan_White_Paper.pdf.

⁴ Michael R. Gordon, "Afghan Strategy Poses Stiff Challenge for Obama," *New York Times*, 1 December 2008

of the government to effectively communicate via normal communications media or means, particularly in the written language.

In regards to economics, Iraq has significant oil revenues to jump start its economy, while Afghanistan has a limited source of national income. Iraq's low to moderate standard of living far outweighs the very primitive standard of Afghan living where no electricity or running water is the norm. This austere patchwork reflects itself on the Afghan life expectancy of 44 years versus the 69 years of an Iraqi. Along with this, Iraq has only a limited problem with illegal narcotics production, while Afghanistan is the world's largest producer of opium. This poses a problem to nation building because this underground economy feeds and provides a livelihood for countless members of the population. Attempts at poppy eradication stress the sociological demographics and economics of a people that rely on subsistence agriculture for their livelihood. This issue further complicates any attempts at improving governance and law. It is a criminal problem, perhaps even larger or more potentially destabilizing than the insurgency itself, unless, of course, it is simply left alone, momentarily. This presents tough choices for any government or occupying force.

From the standpoint of military capabilities, while Iraq's military and police forces are becoming better trained and organized, the Afghanistan security equivalent is still in its infancy. Unfortunately, the Afghan insurgents appear to be growing in numbers and effectiveness. Unlike Iraq where the insurgents were primarily urban based, the Afghan insurgents operate predominantly out of the rural areas, making them more difficult to track, isolate, or engage. They operate from sanctuaries and base camps along the Afghan-Pakistani border and deep inside Pakistan. From these base camps they are able to infiltrate with relative impunity, thereby providing them with a sustainment capability difficult to neutralize. Overall, the terrain favors the insurgent, as it has for countless centuries.

Perhaps, from an overall strategic perspective, the physical environment may have the most impact on the success and failure of US and coalition military operations. With a land size of 437,072 square kilometers, Iraq is about the size of the state of Idaho. With 647,500 square kilometers, Afghanistan is about the size of the state of Texas. Bottom line, Afghanistan is 200,000 square kilometers or 50% larger than Iraq. For historical comparison, it is also five times larger than Vietnam. While Iraq has very hot summers and relatively mild winters, Afghanistan has dry hot summers and brutally cold winters. These temperature extremes not only affect the health and welfare of US Army personnel, but also have an impact on maintenance of vehicles and aircraft. Iraq's terrain is generally flat or with rolling plains, while Afghanistan's is mountainous, rugged, and arid. The high mountainous elevations greatly limit the performance of rotary wing aircraft, as well as slowing down the movement of dismounted infantrymen. Compounding its extreme elevations and dry arid environment, Afghanistan's road system is tenuous at best and very limited in carrying capacity, quite a contrast to Iraq's more robust and dependable national road network and infrastructure. This also creates challenges for logistics and the movement of critical supplies. Although Iraq supports the movement of supplies from ports and over roads and rail networks, Afghanistan is basically landlocked with no railroads, few airfields, and roads.

Finally, regarding national will and time, time does not favor an occupying force. And in the case of Afghanistan, a national will of sorts, although decentralized, has withstood the test of time over the centuries. Like the Vietminh who fought against the French and the Viet Cong against US forces, the Mujahedeen, fought the Soviet Union and now the Taliban fights the US and its coalition partners. Unfortunately, they appear to be ready to continue their struggle against a foreign invasion force however long this may take. The strength and will of an adversary is certainly a combat multiplier to be reckoned with.

So, a comparison of the critical variables of the contemporary operational environment reveals that Afghanistan is larger, higher, colder, more austere, more ethnically diverse, more socially isolated, more illiterate, less developed, more infrastructure challenged, more rural based, more economically deprived, and has a less organized, but more difficult to impact insurgent mix. Each factor in itself has a bearing and direct impact on nation building through the conduct of military operations. Significant factors like this cannot be dismissed or waved off because they are ever present and will not go away. That is the reality of the Afghan strategic landscape.

The Soviet Perspective

What lessons were learned in Afghanistan and how does technology impact on these? In an effort to glean from the past, the US Army compiled lessons from the Soviet Army experience in Afghanistan. One of the most complete assessments of this experience was the book, *The Other Side of the Mountain*, by Lester W. Grau. The following summary from this book focuses on the one aspect of the importance of lines of communications and the use of ambushes:

The strategic struggle in Afghanistan was a fight to eliminate the other's logistics. The *Mujahedeen* targeted the Soviet lines of communication – the crucial road network over which the Soviet supplies had to travel.⁵ The Soviet lines of communication (LOC) were a double lane highway network which wound through the Hindu Kush Mountains – some of the most inhospitable terrain on earth. Soviet military effectiveness depended on its ability to keep the roads open. Control of the road network became a main effort of Soviet combat. In that effort the Soviets lost over 11,000 trucks. The Democratic Republic of Afghanistan (DRA) truck losses were reportedly higher. The Mujahedeen effectiveness in interdicting LOCs was of utmost concern to the Soviets and effectively prevented them from maintaining a larger occupation force in Afghanistan.⁶

Additionally, security of the LOCs was a constant challenge facing the Soviet forces in Afghanistan. Security of the LOCs determined the amount of forces which the Soviet could deploy in Afghanistan and also determined the scale and frequency of offensive combat directed against the Afghan resistance forces.⁷ The Afghan terrain was not ideal for a mechanized force dependent on fire power, secure LOCs and high-technology. It is terrain where the mountain

⁵ Lester W. Grau, *The Other Side of the Mountain, Mujahedeen Tactics in the Soviet-Afghan War*, Foreign Military Studies Office (Ft. Leavenworth, KS: Military Press, 2001), xix.

⁶ Ibid, 148.

⁷ Ibid, 37.

warrior, using ambush sites inherited from his ancestors, could inflict “death from a thousand cuts”.⁸

Although the popular image of a *Mujahedeen* combatant is a hardened warrior clutching a Kalashnikov assault rifle, the most important *Mujahedeen* weapon in the conflict was the RPG-7 anti-tank grenade launcher. The Soviet manufactured, short-range weapon allowed the *Mujahedeen* to damage tanks, trucks and, occasionally, helicopters. The RPG was a powerful and effective weapon in an ambush. Since the *Mujahedeen* were light infantry, heavier crew served weapons gave them more staying power in a fight. Mortars, rocket, recoilless rifles and heavy machine guns were essential to the force that intended to hold its ground for a time against mechanized Soviet and DRA forces.⁹ *Mujahedeen* did vary ambush positions in the same ambush site. Their primary concern was to hit the column where it was the weakest - usually in the middle or rear - unless the purpose was to bottle up the column. In most ambushes, a small number of highly-mobile *Mujahedeen* were able to move and attack with little logistic support, but were unable to conduct a sustained fight. To reiterate, the RPG-7 was probably the most effective weapon of the *Mujahedeen*. When used at close quarters, and with the element of surprise, it was devastating.¹⁰

Mujahedeen success in inflicting heavy losses on the enemy was the result of elaborate planning, secrecy in movement, and coordinated action. This became possible through detailed information about the enemy including the size, direction of movement, and estimated time of arrival of the enemy convoy to ambush site. The *Mujahedeen* were quick to key on Soviet and DRA tactical patterns and procedures and actively exploited them. Unfortunately, the Soviets surrendered the initiative in movement control to the *Mujahedeen* and never regained it. Consequently, most of the Soviet actions in the area were reactive. In a guerrilla war, the loss of the initiative becomes decisive in the outcome of the tactical combat. *Mujahedeen* decisions to ambush a long convoy were usually driven by geography, intent and escape routes. If the terrain at the ambush site was very constricted, the guerrilla would want to attack the head of the convoy and block the route with a combination of a road block and burning vehicles. The Soviets had a set a pattern of behavior which enabled the *Mujahedeen* to effectively ambush them. They used the same roads and paths regularly. Soviet combat troop behavior toward the villagers made the villagers willing accomplices in setting the ambushes and hiding the *Mujahedeen* and their weapons. The DRA had traveling propaganda/civil affairs teams which provided entertainment, medical treatment and pro-regime propaganda throughout Afghanistan. Their actions, however, did not offset the effects of insensitive behavior by Soviet combat forces.¹¹

The *Mujahedeen* conducted ambushes for harassment or for spoils. Often, these were small-scale ambushes which would only fire a few rounds into the convoy to destroy or damage some vehicles. Then the ambushers would withdraw without attempting to loot the column before the convoy commander could react. Ambushes conducted for spoils (weapons, ammunition, food, clothing and other military supplies) were normally conducted by larger forces who could

⁸ Ibid, xx.

⁹ Ibid, 66.

¹⁰ Ibid, 12.

¹¹ Ibid, 57.

maintain their positions for up to an hour. Still, the ambush was a short-term action designed to capitalize on surprise and terrain.¹²

Like their vehicular ambush protocol, the *Mujahedeen* learned to counter air assaults thorough planning, immediate action drills, an early warning system, and air defense ambushes. They learned to mine LZs, employ massed RPG fires against hovering or landing helicopters, and to try and overrun a LZ before the air assault forces had an opportunity to get organized and oriented. They also learned to “hug” Soviet forces so that helicopter gunships could not fire at them.

One of the more successful *Mujahedeen* air defense ambushes involved digging in heavy machine guns into caves in canyon walls. When the Soviet/DRA helicopters flew down a canyon, the machine guns would fire across the canyon filling the air with rounds. The helicopters could not attack the machine guns and were hard pressed to avoid the air defense fires.¹³

To continue this discussion, Les Grau’s other insightful book, *The Bear Went over the Mountain*, reveals additional lessons from the Soviet experience in Afghanistan. Some of these are also worth noting:

Modern, mechanized forces are at a disadvantage against committed guerrillas in the middle of a civil war and in rugged terrain. The Soviet-Afghanistan war demonstrated that:

A guerrilla war is not a war of technology against a poor and unsophisticated adversary. Rather, it is a contest of endurance and national will. The side with the greatest moral commitment (ideological, religious or patriotic) will most likely win the conflict. Battlefield victory can be almost irrelevant, since victory is often determined by morale, obstinacy and survival.

Secure logistics and secure LOCs are essential for the both the guerrilla and non-guerrilla force. Security missions, however, can tie up most of a conventional force.

Weapons systems, field gear, communications equipment and transportation which are designed for conventional wars most often work less effectively or fail totally in rugged terrain.

Tactics for conventional war will not work against guerrillas. Forces need to be reequipped, restructured, and retrained for fighting guerrillas or for fighting as guerrillas. The most effective combatants are light infantry.

¹² Lester W. Grau, *The Bear Went over the Mountain: Soviet Combat Tactics in Afghanistan*, Foreign Military Studies Office, (Ft. Leavenworth, KS: Diane Publishing Co., 2d printing 1996), 10. In most cases, page contents extracted in their entirety.

¹³ Ibid, 287.

Tanks are of limited utility for the counter-guerrilla force, but can serve as an effective reserve on more ideal terrain. Infantry fighting vehicles and helicopters can also play an important role in mobility and fire support. Mechanized forces usually fight effectively only when dismounted and when using their carriers for support or as a maneuver reserve. Ample engineer troops are essential for both sides.

Journalists and television cameramen are key players in guerrilla warfare. The successful struggle can be effectively aided when championed by a significant portion of the world's press.

Domination of the air is irrelevant unless airpower can be precisely targeted. Seizure of terrain can be advantageous, but is usually only of temporary value. Control of the cities can be a plus, but can also prove a detriment. Support of the population is essential for the winning side.¹⁴

What does this all mean to the US Army effort in Afghanistan today? At the heart of the Soviet experience is the central question: Why did the Soviets fail to achieve military victory in Afghanistan?

First, they were unable to seal the border with Pakistan and Iran to prevent the *mujahedeen* resupply of their forces. Second, they were unable to bring enough force into the country due to public opinion (particularly in the third world) and their inability to provide the logistics support necessary with a larger force. Third, Afghanistan is a country of strong beliefs and traditions and the population opposed the Soviets and the hostile Communist ideology of the government of Afghanistan. The Communist ideology directly attacked the ethnic structure, community structure, and religious beliefs of the people and the people violently rejected this ideology. Fourth, the Soviets had little respect for the people of Afghanistan. They used the Afghan People's Army, Sarandoy, the Khad and the local militias ("Defenders of the Revolution") as cannon fodder. These demoralized and inefficient forces regained some of their lost respectability only when the Soviets left. Further, the Soviets conducted indiscriminate air and artillery attacks against the rural population in order to force them out of the countryside and to dry up the *mujahedeen* supply lines.

The Role of Technology in Afghanistan

*Yet, technological superiority is not in and of itself a guarantee of success. Insight into our adversary's capabilities, tactics and motivation will provide the decisive edge.*¹⁵

-- Lester W. Grau, LTC, USA (ret)

Despite the severity and challenges of the task at hand, experiences in both Iraq and Afghanistan indicate that advanced technology can enhance the combat effectiveness of Soldiers in four

¹⁴ Lester W. Grau, *The Bear Went over the Mountain: Soviet Combat Tactics in Afghanistan*, Foreign Military Studies Office, (Ft. Leavenworth, KS: Diane Publishing Co., 2d printing 1996), 10. In most cases, page contents extracted in their entirety.

¹⁵ Grau, *The Other Side of the Mountain*, vii.

major areas. These are lethality, survivability, situational awareness, and mission command.¹⁶ It is important to note, though, that these enhancements assist Soldiers to more lethally engage the insurgent through improved military capabilities in a physical environment and do not necessarily improve nation building by helping counter other critical variables, such as the nature and stability of the state, sociological demographics, or the economics of Afghanistan. In other words, technological enhancements generally provide only a means to temporarily secure a country, but not necessarily permanently stabilize it. To begin the discussion, improving the lethality of the combat Soldier figures prominently in the following way:

Lethality: The ability to effectively and precisely destroy or close with the enemy by fire and maneuver and fire and movement is vital to a land power. New technologies focus on enhancing the Soldier's ability to deliver precise fires on moving and stationary targets; better laser designation for targeting; and the ability to detect, track, designate, and engage enemy targets. Both man-portable and vertical take-off UAS provide greater visibility, surveillance, and target detection of the battlefield and would give Soldiers an edge in situational awareness, precision targeting, and engagement. Robotics enhance the agility and mobility of infantry units.

Precision munitions are needed in mountainous terrain and at a firing rate that makes them more lethal and effective. In Afghanistan the insurgents fight just below the ridge lines and jump over the ridge when attacked with direct or indirect fires. A miss of greater than 50 meters would either go over the ridge and explode many hundreds of meters over, or explode under the ridge line—with the potential for killing or wounding non-combatants or US forces and allies.

The abundance of poor and unusable roads, if they exist at all, and the rugged terrain of Afghanistan, hamper and limit the use of heavy combat vehicles. Light weight systems are vital for mountain operations. The heavy towed 155 mm artillery is limited in its ability to support and is generally restricted to forward operating bases. This limitation makes the 81 and 120 mm mortars the direct support artillery weapons of choice for infantry in contact, despite their smaller explosive yield. Dispersed units that have a greater range than the range of supporting fires have to be able to protect themselves. However, it is important to note that even lightweight systems may still be affected by the same constraints heavy combat vehicles face, meaning the need to depend on roads, particularly along steep, narrow, and treacherous mountain roads and passes and the vulnerability to more lethal anti-armor weapons and IED's. Robotics are not road bound and will allow for pressing home the attacks on guerrilla forces.

Survivability: As important to delivering precise firepower is the ability for the Soldier to survive on the Afghan battlefield. Modular armor will allow upgrade platforms as armor technologies mature; and an active armor protection system that provides Soldiers additional survivability on a lighter platform against specific threats. Survivability systems are a difficult match. For one they must provide higher levels of protection to Soldier and vehicle, but they must be light enough to not adversely constrain mobility. Undeniably, any improvements to existing systems through the use of advanced technologies will greatly enhance the mission and the force protection of Soldiers. Additionally, robots and UAS will expose Soldiers to less risk, thereby

¹⁶ ARCIC briefing, "Capabilities Provided by Key FCS Technologies," Ft. Monroe, VA, 15 Jan 2008; Victor M. Rosello, "The Impact of FCS Technologies on Small Unit Performance," *Small Wars Journal*, 11 February 2009, <http://smallwarsjournal.com/>.

enhancing their survivability. Networks and robotics will provide the dismounted infantry the ability to identify and destroy antitank ambushes and IEDs.

Situational Awareness: The conceptual framework of the “Quality of Firsts” are qualities intended to address the ability of future Soldiers to operate inside the enemy’s cycle of adaptation and to deny the enemy opportunities to take action to quickly regain the initiative. To “see first”, Soldiers must see the battle space in all dimensions. More importantly, they must understand what is important to see. Seeing first involves the exploitation and integration of a wide variety of organic and external information capabilities, the conduct of intelligence activities required to develop the situation in sufficient detail to support planning and decision-making. Improved thermal and optical imagery; layering of sensors for better target coverage; more accurate sensing, breaching, clearing of building and tunnels; remote and rapid alerts with images for small units to assist in clearing buildings; remote reconnaissance, detection, and neutralization of booby-traps, landmines, WMD, and other explosive threats; and the ability to monitor greater areas with fewer Soldiers. Successes in combat will deflate the high insurgent morale, win back the civilian support and negate the increasing military expertise of the insurgents. Supporting “conflict among the people” and enhancing US ability to maintain persistent surveillance to determine patterns of life or behavior will take the Army from awareness to understanding.

Of the four major areas of improvement, situational awareness or more accurately, “situational understanding” plays the most critical role of any battlefield system. In Afghanistan, brigade combat teams are covering wide fronts and will be required to do a better job of dispersion and coverage. Achieving information superiority or dominance is a worthy goal, but it is not a realistic one. Good reconnaissance units fight for information because they often do not fight with information. Soldiers will need to monitor greater areas with fewer personnel. Because of the sheer size of Afghanistan, the magnitude of the problem, and the nature of rural insurgencies, situational awareness must provide more precise, accurate, and increased coverage. It is an essential element of the intelligence, surveillance, and reconnaissance process and the backbone of the intelligence collection effort. Man portable and vertical take-off UAS are just one component of this intelligence effort, as are unattended ground sensors, more robust intelligence interactive networks, and intelligence sharing systems.

Mission Command: Effective communications over longer distances has always been the mainstay of quick reacting and quick responding modern armies. Improvements in Battle Command can be made through the following: The ability to command on the move inside the Joint Network; combat identification to help prevent fratricide; target identification and discrimination to reduce collateral damage; links to more sensors and shooters; and communications relays to extend ranges for operations over more complex terrain. The greater the decentralized nature of deployed combat units, their physical dispersion, and the more complex the terrain, the more it is that units must rely on solid, dependable, and reliable communications. This is certainly a key factor in Afghanistan. One of the most important technological necessities for the Soldier is advanced communications systems capable of delivering digital voice and images over larger communications links. Multiple feeds from intelligence sensors also empower Soldiers and give them access to the common operating picture. Advanced networks will overcome poor intelligence and C2 limitations of the current

force, and will support stability operations with networks that access NGO and other government entities.

Conclusions

Will technology provide an important tipping point for success? As a parting note, Les Grau provides a snapshot of one way to address this question:

The Soviets combat-tested a lot of their new technology in Afghanistan. Traditionally, the new stuff first showed up in the Far East against China--the real threat. Then it went to NATO. They used Afghanistan to check a lot of their chemical weapons, new artillery systems, new sensors, new radios, new small arms and new aircraft. They introduced their AK-74 with its M-16 like bullet and found it was the wrong bullet for mountain combat. The RPO flame projector, fuel-air explosives, the SU-27 FROGFOOT close air support aircraft, the 2S4 and 2S9 artillery systems were all big winners in the combat test. They stuck with the old tanks, since the new tanks were improved for the tank-versus-tank role, not what they were up against. Afghanistan has anti-technology geography. GPS has a 500 meter CEP in the mountains, vapor-clouds FAE don't form correctly... and radio comms are horrible without satellite. The dust is like powdered emery. We are not willing to get the right technology to theater to make a difference. We still treat the Hummer as a combat vehicle--which it is not. French, Chinese and Russian helicopters fly higher than ours. We have real armored vehicles, but they stay at home. We rely on overhead imagery and predator when we need trained, well-equipped scouts on the ground. Our infantry carries 85 pounds of light-weight gear. The Roman Legion carried less. So did the American doughboy of World War I--and he was not in the mountains. The American doughboy could also engage the enemy with rifle fire out to 1,200 yards. The M-4 reaches out to 300 meters, but is barely lethal at that range. The average fire fights in Afghanistan are at 20 meters or 800 meters. We rely on our crew-served weapons to respond. Remember the old "don't give away the location of your crew-served weapons" that we grew up with. We now do it when the first round is fired. We say we "own the night" with our night vision devices, but we don't go out at night. We hunker down in forts and wait for the dawn. We travel the same roads where the IEDs are waiting and we do not take measures to obscure the gunner's vision (smoke, travel at night, and get off road). We are a "one-size fits all" army. We need artillery forward for direct fire in the mountains. That isn't a 155mm. It should be son of the Pack 75mm.¹⁷

Regarding lethality, the authors of this paper agree with Les Grau. Afghanistan's austere landscape presents a challenge to modern technology. From the high mountain elevations to the absence of viable road networks, all of these limit the ability of a modern army to maximize and exploit its technological advantages, particularly its mobility. This may be more pronounced in the use of armored vehicles on poor roads or narrow and winding mountainous passes. Similarly, rotary wing aircraft are limited on their transport loads or how effectively they can provide close air support at extremely high mountain elevations. Granted that field artillery

¹⁷ Lester W. "Thanks," Grau, e-mail message to authors, 8 April 2010.

plays a decisive role in offensive operations, self-propelled artillery is also affected by the same mobility limitations of armored vehicles. However, these limitations are offset by the advantages of precision targeting and firepower of combat vehicles. Consequently, military planners may have to weigh the advantages and disadvantages of using combat vehicles under certain terrain conditions in their operations.

New technologies do provide significant advantages in the areas of survivability, situational understanding, and mission command. The greater use of robotics and drones affords a greater stand-off capability and allows unmanned systems to take on more dangerous tasks, thereby contributing to the survivability of Soldiers. The predominance of ISR drones provides a tremendous combat multiplier and expanded coverage areas. This is particularly important to the wide territorial expanses present in Afghanistan. The ability to cover greater areas with sensors having greater target coverage, resolution, and that are network capable expands and improves situational understanding, one of the many areas necessary for combat units to achieve information superiority and dominance. Modern digital communication systems provide more responsive communications channels, having higher baud rates, and enhanced battlefield visualization down to platoon and in some cases, Soldier level. Designing a flat communication system which is capable of operating over longer distances is particularly effective in the decentralized nature of military operations in Afghanistan.

But will these technological advancements off set the many other challenges that the Afghan landscape presents? Using logic to address these questions, the most likely answer is probably not to the degree that will have a significant impact...for one simple reason. Unless the effects of the nature and stability of the state, national will, sociological demographics, the economy, the physical environment, and the factor of time are effectively countered, the application of advanced lethal technologies to establish security may not suffice. This may present the military with the same obstacles that prevented previous invading forces from achieving military victory in Afghanistan. If history is any indicator, then the advent of advanced technology may contribute to tactical battlefield gains, but may not be sufficient to achieve strategic or ultimate victory in Afghanistan.

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