Why the Army Needs an Ultra Light Combat Vehicle

JOHN FULLER

For five millennia, the Infantryman has been a vital component of land armies, and land armies have been the dominant form of military power. Land forces are the most important form of military power because land is where people live, work, govern, establish markets, and build civilizations. Land is the domain of humans, and it is the land force that engages with populations. The U.S. Army is America's primary land force to build strategically important relationships and sustain peace.

The decisive combat organization of the Army is the maneuver brigade combat team (BCT). At the end of 2015, the Army currently projects that only 32 BCTs will remain in the active force (this number could be significantly less), and of those slightly less than half will be Infantry BCTs (IBCTs).[1]

The foot-mobile capability of Infantrymen remains an essential capability when confronted with complex terrain. But, the limitations of foot mobility can also be a detriment to mission accomplishment and survivability. In the current operational environment, most potential adversaries an IBCT would face are mobile. Their capabilities range from conventional motorized armies to irregular civilian vehicle fleets. In order to seize and maintain the initiative against these potential adversaries, IBCTs must have a lightweight transport that is strategically and operationally deployable, and that provides Infantrymen with improved tactical mobility, agility, and speed.

Description and Background

In a recent press release, the Army's Maneuver Center of Excellence (MCoE) at Fort Benning, Ga., described the ultra light combat vehicle (ULCV) as: "providing ground combat movement and maneuver capabilities for scouts and Infantry squads and can be inserted using penetrating vertical lift platforms (UH-60 and CH-47) in high-altitude and high-temperature environments as well as by parachute. ULCVs encompass a range of options, from single Soldier mobility such as exoskeletons and individual all-terrain vehicles through team and squad level options such as multi-person all terrain vehicles. The defining parameter to qualify as 'ultra light' is the ULCV must weigh less than 4,500 pounds in full combat configuration to support sling-load vertical delivery by UH-60 aircraft.[2]"

Recently, the Army hosted a ULCV platform performance demonstration at Fort Bragg, N.C., to determine if current industry technology is capable of producing a vehicle that can meet Army requirements. Six candidate systems participated in the demonstration, and the results validated that industry is capable of producing a vehicle that can meet or exceed draft threshold requirements; however, there is no commercial-off-the-shelf (COTS) vehicle that meets all ULCV threshold requirements. Regardless, the demonstration results are encouraging in that industry has proven it can build a ULCV that meets Army requirements and do so at a reasonable price. But, this does not address why the Army needs the ULCV.

The intent of this article is to make the case for why the Army needs a ULCV, not to offer a specific solution. A lengthy and ultimately expensive development process is not needed; rather, selecting and adapting a COTS system that is affordable and immediately available is viewed as the most reasonable and cost-effective approach.[3] This article offers nine significant and compelling reasons for fielding ULCVs to the IBCT; however, the fiscal austerity that continues to pervade Washington suggests limiting funding to equip only airborne IBCTs with ULCVs. This recognizes the airborne role in initial stages of forcible entry operations and supports current airborne doctrine characterized by multiple dispersed drop zones.

Reasons

#1. Retaining the Strategic Deployability Edge. The IBCT is and must remain the Army's most strategically deployable formation. Its strategic deployability advantage stems from its ease of transportability by airlift rather than sealift. Speed in deploying a BCT formation is important, but getting anywhere in the world quickly is of little value if

the force lacks tactical mobility once on the ground. Unlike the Stryker BCT (SBCT) and Armor BCT (ABCT) which are encumbered by the large combat vehicles that make up those formations, the IBCT has no such encumbrance; its primary weapon is the Infantry Soldier. As stated in the U.S. Army Operating Concept, "To seize, retain, and exploit the initiative under conditions of uncertainty and complexity, Army forces must act and respond faster than the enemy."[4]

At the strategic level, rapid deployability is critical to seizing the initiative. At the tactical level, mobility on the battlefield allows IBCTs to retain and exploit the initiative through rapid maneuver. The strategic lift needed to support the delivery of squad ULCVs is negligible from either a weight or volume standpoint, but the tactical mobility they provide the Infantry force once on the ground is substantial. Retaining the IBCT's strategic deployability advantage is essential; adding the ULCV retains this capability and provides a matching tactical mobility capability needed to fight our future enemies.

The ULCV must be capable of deploying by C-130 aircraft, to include airdrop, with no change required to the physical configuration of the vehicle prior to loading on the aircraft or when rigged for airdrop. Additional deployability requirements include airdrop from C-17 aircraft using a Dual Row Airdrop System (DRAS) in combat configuration to maintain the ability to fight immediately upon arrival onto the drop zone or when driven off the ramp of the aircraft. The ULCV also provides a rapid option to drive on and off a CH-47 and is sling-load transportable by UH-60 in combat configuration.

#2. The Global Response Force (GRF) and Joint Forcible Entry Operations. The joint GRF is the nation's premier option for rapid crisis response with an operationally significant force. The airborne IBCT is the cornerstone of this force, capable of conducting airborne joint forcible entry to secure strategic access anywhere on the globe. When conducting joint forcible entry, an airborne IBCT seizes the initiative by conducting an airborne insertion at a time and place where the enemy is least prepared. The ULCV will allow the airborne IBCT to retain and exploit the initiative by enabling rapid, extended maneuver on the ground, without significantly diminishing the strategically important rapid deployability and small logistic footprint of the force. The small size of the ULCV allows it to be airlifted for extended distances and to the high elevations that characterize much of the terrain in regions where Army forces expect to engage future enemies. It is also capable of being loaded in a C-130, which is critical to the GRF. As the GRF may be constrained by Air Force assets for insertion (and is likely to be inserted via C-130 due to the prevalence of that platform in the Air Force fleet), any solution for tactical mobility must be C-130 loadable to be useful to the GRF. The ULCV supports the future maneuver concept of widely distributed, mutually supporting small unit operations; the employment of infiltration tactics to gain positional advantage over our enemies; the ability to rapidly mass forces and fires from widely dispersed locations; and the ability to rapidly disperse afterward.[5]

Other joint forcible entry requirements necessitate tactical

Figure 1 — The Six Candidate Systems that participated in the ULCV Demonstration at Fort Bragg

mobility for the airborne IBCT as well. To insert at a time and place for which the enemy is unprepared, it may be necessary to conduct the airborne insertion some distance from a militarily desirable objective, such as an airfield needed to introduce follow-on forces, additional non-air-droppable systems, and logistic assets. With ULCVs, the airborne force can insert far from the objective and maneuver quickly to seize the objective before its defenders can react. Compared to the capability of a force constrained to walking, the ULCV offers tremendously enhanced mobility to achieve this requirement.

Almost all joint forcible entry missions will entail the establishment of a security zone around the airhead. As additional forces, systems, and logistic assets arrive at an airhead, they will be vulnerable to enemy attack unless a security zone is established. The tactical mobility granted by the ULCV will enable this security zone to be much larger, greatly enhancing the protection afforded friendly forces and the airhead, especially from long-range fires.

#3. The Future Operating Environment. Our future enemies are myriad. The Army is operating in a globally connected world. The Internet and social media provide a free worldwide network that is accessible to the law abiding and the lawless alike; these new communication capabilities have become the preferred means used by criminals, terrorists, or even nation-states for fomenting political unrest, civil disorder, and radical behavior directed at any and all who may be susceptible.

The Army and IBCTs must be prepared to fight across the range of military operations, from unconventional to conventional, from insurgencies to conflicts involving the use of weapons of mass destruction. Enemies may consist of convergent elements including transnational criminals, rogue nations, militant theologies, and forces equipped with modern weapons and financed by trillions of dollars in revenues annually generated from illicit markets and trade that proliferate worldwide.[6] We must have the ability to adapt rapidly to a hybrid environment that is extremely dynamic and complex.

There will be periods during future conflicts when our Infantry forces will require protected road mobility, and there will be periods during which that same Infantry will require enhanced cross-country mobility offered by a ULCV. There will also be times the Infantry will be required to fight in complex terrain that requires squads to operate on foot and have access to multiple enablers. This suggests that our conventional forces must begin to operate and think like our special operations forces (SOF) by adopting an arms room concept both in terms of weapons carried and vehicle transportation used. The ULCV is one of the vehicles that must be an IBCT capability.

#4. Increase Tactical Speed. Speed, although not itself a principle of war, contributes to four areas that are principles of war: surprise, the offense, maneuver, and security.[7] Speed is a quality needed in all tactical operations from offensive to defensive. Speed is essential because warfare is by its nature dynamic and ever changing. At best, the consequence of not acting with speed is a lost opportunity, and at worst it is a decisive loss.

From the viewpoint of movement and maneuver, speed is important in reducing risk and maintaining the initiative. The ULCV increases the average cross-country movement speed of the Infantry from 4 miles per hour to 20. Increased speed allows formations to rapidly move through danger areas and around obstacles. Speed can be used to avoid enemy strong points, quickly reinforce battlefield success, speed infantry forces to augment threatened positions, rapidly deploy a reserve Infantry element to positions of advantage from which to launch a counterattack, or relocate forces to block a flanking movement by the enemy. When viewed from the perspective of multiple scenarios that would normally put our dismounted Infantry at risk, the increased cross-country speed provided by the ULCV allows us to reverse

A vehicle parachutes to the ground as a C-17 Globemaster III aircraft prepares to drop additional vehicles during an airborne training exercise conducted by the 82nd Airborne Division on 8 September 2011 at Fort Bragg, N.C.

Photo by SGT Michael J. MacLeod

that dynamic. Speed reduces the enemy's time to react to our initiatives; it therefore increases our ability to maintain the initiative and likewise increases the commander's ability to exploit success. Speed is a capability of the ULCV that in certain terrain makes it superior to foot mobility.

#5. IBCTs Need More Mobility to Effectively Maneuver. Maneuver is mobility and direct firepower. Mobility simply means the force can move, but maneuver entails moving the friendly force to a position or positions of advantage relative to the enemy to enable the most effective use of direct fires in support of the Infantry's assault to seize and secure the objective by attacking the enemy's flanks or rear.

The essential purpose of the ULCV is to provide greater battlefield mobility than foot mobility offers. Greater battlefield mobility increases the maneuver options of IBCT commanders in terms of time and distance. The increased tactical mobility of the ULCV increases the span of influence a ULCV-equipped Infantry force can achieve. Each of the mobility capabilities of the ULCV enhances the maneuver footprint of the IBCT; this is significant and critical for the IBCT.

#6. Facilitates Dispersed Operations for IBCTs. The central idea of future maneuver forces is to conduct combined arms, air-ground operations, and operate dispersed over wide areas.[8] Complex terrain, which will characterize future wars, largely precludes the employment of large formations and will result in our reliance on dispersed but mutually supporting units that execute aggressive actions unified through commander's intent.[9] Similarly, the ULCV provides airborne IBCTs the capability to employ dispersed offset drop zones during forcible entry operations, especially those operations in which an anti-access/area denial (A2/AD) environment is anticipated.[10] The ULCV allows the Infantry force to operate longer, in dispersed locations, and over greater distances to meet the envisioned doctrinal concepts driven by the future operational environment. For IBCTs, the ULCV enables us to realize those doctrinal concepts.

#7. Mission Command. The ULCV equipped with a more capable mounted antenna and charging station will substantially increase operational range of the squad radio and enhance situational awareness (SA) while providing improved mission command on-the-move capability. The squad radio can interface with aerial and ground sensors which provide video streaming feeds from their respective source systems, a substantial improvement over current SA capabilities for dismounted Infantry.[11] This mission command enhancement will aid in preventing fratricide, providing on-the-move and dismounted command and control, and improving SA, which will enable the squad to be more survivable and lethal.

#8. Reduce the Infantryman's Burden. In 1902, an article appeared in *The New York Times* decrying the burden of Infantrymen and saying that military authorities were trying to reduce the weight now carried, which at that time was 76 pounds per Infantryman. S.L.A. Marshall's well-known treatise, *The Soldier's Load and the Mobility of a Nation*, also recounted the negative effect of the Soldier's load on his performance in combat.[12] But perhaps nothing better captures the real dilemma of the increasing weight carried by our Infantry than an excerpt from a McClatchy newspaper in 2009 that recorded an Army Infantry platoon in pursuit of a Taliban unit:

> *In Afghanistan a lieutenant led his patrol in hot pursuit of a Taliban band mounted in stolen pickup trucks. His six-ton, up-armored vehicles bucked and swerved through the cross-country chase. The more agile (Taliban) pickups easily pulled away and enabled the insurgents to escape on foot up a mountain. When the officer dismounted his troops and sent them after their quarry, they fell even further behind, for each man had to clamber upward encumbered with 60 pounds of [additional weight including] body armor... weapon, ammunition, communications and survival pack. The officer aborted the mission.*[13]

We have unintentionally reduced the Infantryman to a pack mule, requiring him to carry a rucksack, personal protection, his weapon, ammunition, grenades of varying types, food, water, and other sundry items to include some type of enabler that may weigh in excess of 50 pounds.[14]

In every war we continue to increase the personal protection afforded our Soldiers. In Vietnam, American Soldiers wore a bullet-proof vest made of ballistic nylon that weighed less than eight pounds.[15] The current protective ensemble now provided to our Soldiers weighs 21.8 pounds.[16] This ensemble protects more of the Soldier's torso and limbs, but the additional weight reduces Soldier agility making him vulnerable for longer periods and inducing fatigue more rapidly. The ULCV offers relief from the physical and mental exhaustion of dismounted movement, reserving the Infantryman's strength for the critical close fight.

The capabilities of the Infantry force continue to grow aided by continuing emphasis and funding for the "Squad: Foundation of the Decisive Force" initiative that began in 2010.[17] Many of these initiatives include new enablers to provide the Infantry squad with needed capabilities. While many enablers cannot be carried due to weight and size limitations, the ULCV is capable of accommodating some when the mission dictates.

Currently, there are limited recharging solutions available to the IBCT. However, extended duration operations require Infantrymen to carry a large number of spare batteries, thereby exacerbating the load problem. While not the only solution, power generation for the Infantry squad would significantly mitigate the risk of inadequate power at critical times and simultaneously reduce the need to carry additional batteries. The ULCV can provide the recharging capability so urgently needed by the IBCT.

#9. Medical Evacuation. In every war involving American Soldiers since the beginning of the 20th century, the percentage of Soldiers saved after being wounded on the battlefield has consistently increased.[18] Although some of this is due to increasing medical capability, most of the increase is due to the application of immediate battlefield triage provided the Soldier and the speed with which the Soldier is evacuated to a field medical facility. The ULCV provides the Infantry squad with a capability to rapidly move battlefield casualties to a safe pick-up zone where a medical evacuation helicopter can speed the Soldier to a field hospital.

Considerations

The previous assessment of the Infantry's need for a ULCV does not offer a specific solution. However, the Army should consider the following as it considers a ULCV solution:

1. Developing the ULCV as a new system would be both a long and overly expensive process; the Army should seek an affordable, commercially available, but adaptable solution.[19]

2. The solution should be simple and not attempt to solve everyone's requirements with a 100-percent solution; the 80-percent solution is better than none.

3. The ULCV is first a personnel transport system and second an equipment transport; to the extent the ULCV can carry the Soldier's load in whole or in part, it should be used for this purpose.

4. A squad multipurpose equipment transporter (SMET) may be needed in addition to the ULCV.[20]

5. Consider requesting the manufacturers of the COTS products include a hybrid engine that would provide a silent-run capability as an option.

6. Protection standards that add weight and negate the ULCV's agility and cross-country capability should be avoided. Its cross-country mobility, agility, and potential silent-run capabilities are its inherent protection.

7. Provide the ULCV with an enhanced antenna and power-generation station to increase its capabilities.

Considerations 5 and 7 are enhancements the Army should consider when evaluating ULCV candidates.

Conclusions

The Infantry can no longer rely on foot mobility alone on today's up-tempo, dynamic, and changing battlefield. Foot mobility will always remain an essential Infantry capability, but the future reality is that we must have greater mobility as an option. The ULCV adds a needed capability to Infantry maneuver in several ways: mobility to support dispersed wide area security; increased speed; extended reach; burden reduction; carrying enablers; battery charging; mission command enhancement; and offering the commander new maneuver options. Most importantly, the ULCV saves the Infantryman's strength and mental alertness for the critical close battle and permits the Infantry force to operate longer and over greater distances with less fatigue.

Providing IBCTs with squad mobility is overdue, and the ULCV is one answer to this long-standing need.

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Notes

[1] Matthew Cox, "Army Must Shed 6 BCTs to Meet Proposed Budget Cuts," online article appearing on Military.com on 28 February 2014 at http://www.military.com/daily-news/2014/02/28/army-must-shed-6-bcts-to-meet-proposed-budget-cuts.html.

[2] Press release prepared by COL Rocky Kmiecik, director of the Mounted Requirements Division, Capabilities Development and Integration Directorate, MCoE, 22 January 2014.

[3] MCoE, "What Is a Combat Vehicle Modernization Strategy and Why Is It Important (Final Draft)," Fort Benning, 4 March 2014, 4-5.

[4] TRADOC Pamphlet 525-3-1, *The Army Operating Concept* (Fort Eustis, VA: TRADOC, August 2010) 11-12.

[5] MCoE, "The U.S. Army Functional Concept for Movement and Maneuver, 2018-2030 (Draft)," 23 June 2014, 10.

[6] Admiral James G. Stavridis, foreward to *Convergence: Illicit Networks and National Security in the Age of Globalization*, edited by Michael Miklaucic and Jacqueline Brewer, (Washington, D.C.: Center for Complex Operations, National Defense University Press, April 2013), vii – xxi.

[7] John A. English, *A Perspective on Infantry* (NY: Praeger Publishers Inc, 1981), 48.

[8] TRADOC Pamphlet 525-3-6, *The United States Army Concept for Movement and Maneuver 2018-2030 Version 2.2 (DRAFT)* (Fort Eustis: TRADOC, 2014), 10-11

[9] Ibid.

[10] Field Manual (FM) 90-26, *Airborne Operations* (Washington, D.C.: Department of the Army, 1990).

[11] PEO Mission Command.

[12] S.L.A. Marshall, *The Soldier's Load and the Mobility of a Nation*, 1950.

[13] Online article prepared by GEN (Retired) Paul Gorman, http://usacac.army.mil/cac2/CSI/docs/Gorman/06_Retired/03_Retired_2000_11/22_09_SoldierFuture_Jun.pdf, 2.

[14] Online PowerPoint presentation on operational loads from the 2nd Battalion, 504th Parachute Infantry Regiment (PIR) during Operation Iraqi Freedom III at http://thedonovan.com/archives/modern warriorload/ModernWarriorsCombatLoadReport.pdf.

[15] Ibid.

[16] GEN Ray Odierno, Lightening the Load Update (prepared by PEO Soldier), 30 January 2012, 4.

[17] MG Robert B. Brown, "Infantry Squad: Decisive Force Now and in the Future," *Military Review*, Nov-Dec 2011, 2-9.

[18] Scott S. Gartner, "Iraq and Afghanistan through the Lens of American Military Casualties," *Small Wars Journal*, 3 April 2013, Figure 1.

[19] Maneuver Center of Excellence, Combat Vehicle Modernization Strategy (DRAFT), 26 February 2014, 9.

[20] U.S. Army Capabilities and Integration Center, Unmanned Ground Systems: Robots in the Fight (PowerPoint presentation to NDIA). Located online at https://www.google.com/#q=squad+mobile+equipment+transport+smet. Slides 4/7.

John Fuller is a contract SAIC employee serving as the information officer for the Capabilities Development and Integration Directorate at the Maneuver Center of Excellence, Fort Benning, Ga. As the information officer, he is responsible for assisting leadership and action officers with developing articles and papers to inform stakeholders on emerging operational concepts and combat development activities. Mr. Fuller graduated from the College of William and Mary in Williamsburg, Va., in 1965. He holds a master's degree in business administration from Texas Christian University in Fort Worth, Texas, and graduated from the U.S. Army War College in 1985. He completed more than 26 years of active duty service and retired in 1992 after serving as the chief of staff of Fort Benning. He was also chief of staff for the 7th Infantry Division (Light) during Operation Just Cause and served for two and a half years with the Military Assistance Command, Vietnam (MACV) and the 1st Cavalry Division (Airmobile) in Vietnam. He has commanded at all levels from platoon through brigade.