STRATEGY RESEARCH PROJECT

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AN EXAMINATION OF LAND WARRIOR'S CONTRIBUTION TO COMBAT POWER ON THE BATTLEFIELD

BY

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ABSRACT

AUTHOR: Glenn L. Burch, U.S. Army

TITLE: An Examination of Land Warriors Contribution to Combat Power on the Battlefield.

FORMAT: Strategy Research Project

DATE: 10 April 2001 PAGES: 25 CLASSIFICATION: Unclassified

Will Land Warrior improve the Infantry's combat power on the modern battlefield? Would this increased combat power change tactics, techniques and procedures, or yield a benefit that changes the ratio required for a successful attack or defense? At first the answer to this question appears self evident, however, a closer look reveals several key issues. Combat power is created by combining the elements of maneuver, firepower, protection, and leadership. The dynamics of these elements combined to create combat power- the ability to fight. The elements of combat power are doctrinal, time tested tenants that provide a framework for evaluating a change in overall combat power. For the purpose of studying Land Warrior the first three elements of combat power: maneuver, (including mobility) firepower, and protection are most relevant to the discussion. Leadership does not directly apply because of its personal intangible nature. However, command and control, a subset of leadership, is affected and requires examination. This overall examination results in an evaluation of Land Warrior's contribution to the combat power of the Infantry on the modern battlefield.

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> It would always come down to a few men in muddy boots and smelly uniforms who knew how to use the land and the night as their allies to visit death on their enemies.
>
> —Tom Clancy

The Infantry must be able to fight outnumbered and win and be capable of fighting again. A war of attrition is unacceptable. Battlefield victory will only be achieved by application of overwhelming combat power.

Whether L/W improves the combat power of the infantryman on the modern battlefield can only be determined by a critical examination of what it brings to the battlefield in terms of mobility, firepower, and protection and command and control. Inherent within these elements is the dependability, durability, simplicity, and versatility of L/W on the future battlefield.

There are several other factors to consider when examining the overall impact of L/W on combat power. One must consider operations across the full spectrum of conflict under all possible weather and terrain conditions. Consideration must also be given to equipment maintenance requirements at the soldier and organizational level. What is the mean time between failures in component parts? At issue is the L/W systems ability to remain functional and combat ready under tough conditions that infantrymen often find themselves in, ranging from the swamps to the desert and extreme heat, to snow and extreme cold. These are key issues at a time when the Army is consolidating maintenance activities, reducing the size and density of unit prescribed load list (PLL)).

What level and frequency of training is required to maintain combat proficiency with the L/W system? At a busy time in history for the Army, will L/W training requirements increase soldier OPTEMPO? Will new soldiers, some of whom are not high school graduates, possess the skills to become effective with the system under realistic condition? All these question merit some examination when studying overall impact on the battlefield.

JRTC EXPERIMENT

The most recent experiment with L/W occurred in September of 2000 at the Joint Readiness Training Center (JRTC.) The 2nd Platoon, C Company, 3d BN 325th ABN INF Reg deployed to JRTC L/W equipped (see figure 1).[1] The L/W platoon conducted a night assault and a search and attack mission. This phase of the experiment lasted approximately 72 hrs. The platoon then transitioned to live-fire missions, conducting an attack on urban terrain, and an ambush. The L/W platoon conducted its operations as part of a company. Conditions were consistent with a routine JRTC rotation. Weather conditions during the period varied. Temperatures ranged from the low 70's at night into the 80's during the day. It rained each day, with one night of heavy rain.[2]

There were contractors available to assist with the maintenance and other system problems. Battery resupply was almost always conducted administratively; to ensure the experiment continued on track.

In general the experiment was conducted under the normal realistic conditions created at JRTC. Administrative activities were few and generally confined to enhancing the execution of the L/W experiment and the gathering of data, not the outcome of any engagement.

MANEUVER

Maneuver is defined as "the movement of combat forces to gain positional advantage. Maneuver is the means of positioning forces at decisive points to achieve surprise psychological shock, physical momentum, massed effects and moral dominance."[3]

There are several aspects of maneuver by the L/W platoon that warrant close examination to determine if overall combat power is improved by L/W.

The L/W platoon conducted a night airborne assault. For the execution of the jump all equipment was contained in an "airpack" with the exception of the soldier's weapon. The airpack was attached to the soldier and lowered in the same way the rucksack is normally lowered. Only one L/W system was damaged as a result of impact on the drop zone, showing a good level of durability. Once on the DZ the L/W platoon was able to assemble in 40-45 minutes, this is up to 50% faster then a normal platoon

Organization for Combat

Platoon

- **2D Plt. C co (35)** (Platoon was full strength at 39 for training; 4 soldiers did not deploy to JRTC)
- **Medic (1)**
- **FO (1)**

Total of 45 Land Warrior systems (Version 0.6 in the box at JRTC

Company

- **Co Cdr (1)**
- **RTOs (2)**
- **XO (1)**
- **1SG (1)**
- **FIST (1)**
- **Mortar Section Ldr (1)**
- **Sapper Squad Ldr (1)**

FIGURE 1

conducting a night drop.[4] This improved assembly time is a result of the L/W, GPS, and digital map capability. Once everyone had L/W on and operating, they were capable of seeing the terrain and the members of the platoon using the L/W heads up display (HUD). This capability improves the platoon's ability to form quickly, get off the DZ and begin execution of its combat mission. This capability would also enhance execution by an AASLT unit or a dismounted mechanized infantry unit operating at night.

Once assembled, the L/W platoon had the mission to secure an objective of the leading edge of the DZ. The L/W platoon was able to move quickly and efficiently at night. The digital map display allows the platoon to "see" the terrain and pick the best route as they move cross-country. The platoon and it's squads and fire teams can move quickly as a result of the heads up display showing the terrain and other soldiers. The heads up display is used for one eye and the monocular PBS-14 Night Vision device is used for the other. In conjunction with each other, situation awareness is improved and speed of cross-country navigation is increased.

The platoon was able to move well dispersed at night and still maintain a suitable level of command and control. As figure 2[5] shows, the lead Fire team was 350m in front of the squad leader. This is well beyond the normal distance where hand and arm signals are the norm. Communication reliability somewhat restricted dispersion, however, the GPS and the HUD showed the location of other members. Although to this point situational awareness, movement control and navigation had all been good, enemy contact presented a challenge. Figure 3[6] shows the result of the L/W platoon's first enemy contact, a sniper team inflicts 2 KIA and 1 WIA on the L/W lead fire team. The sniper team is subsequently destroyed by the two remaining fire team members. It should be noted that the enemy sniper is destroyed with the aid of a thermal sight. The result of this engagement is, the platoon traded three casualties for two OPFOR casualties, not the best of outcomes. However this outcome is far better then the norm at the JRTC, where the sniper usually inflicts 25-65 casualties.[7] This was also the first time the sniper team had been killed.[8] The situational awareness capability of L/W assisted in prevention of a possible fratricide. The L/W platoon was unable to acquire

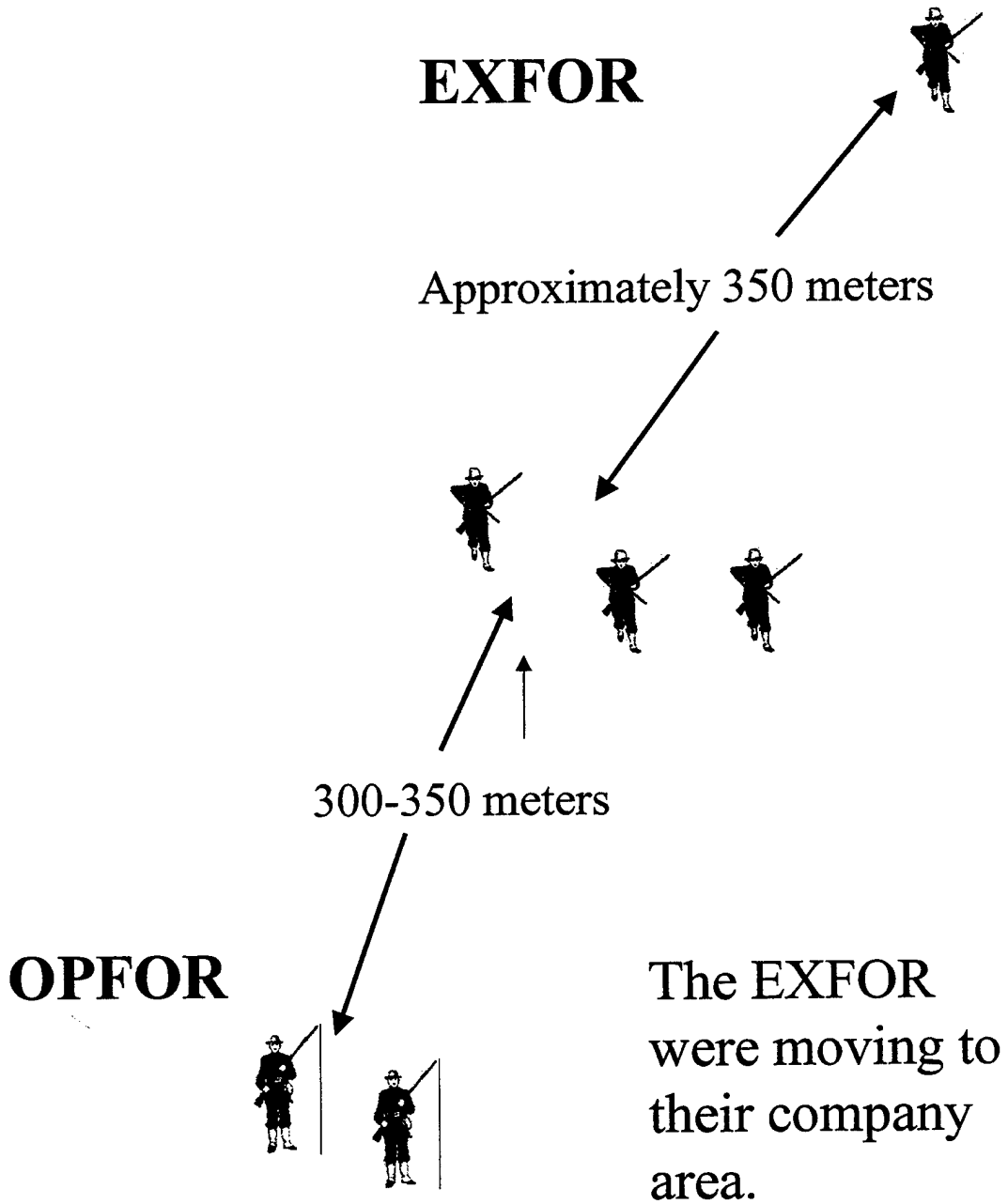

EXFOR
Approximately 350 meters
300-350 meters
OPFOR
The EXFOR were moving to their company area.

FIGURE 2

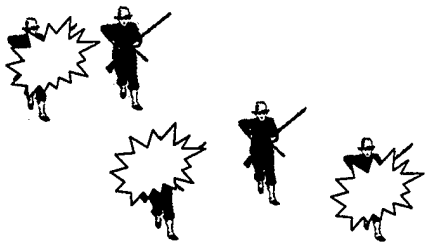
•5 Lw react to contact from Sniper team

•Sniper team inflicted 2 KIA, 1 WIA

•2 remaining LW continue to react to contact against Sniper team

•LW rifleman engages sniper with aid of thermal sight. Sniper KIA

•LW M203 gunner maneuvers and engages spotter with 5.56mm. Spotter KIA



•Lws coordinated actions through internal communication and HMD

•Squad leader was aware of the contact and that some of his soldiers were involved

•Moved in that direction

•Saw movement he initially percieved as enemy (actually his soldiers)

•Held his fire and contacted his soldiers by voice

•Used his HMD to verify the location and number of his soldiers

LW capabilities assisted in the prevention of fratricide

FIGURE 3

the enemy until fired upon, once again proving that if you can be seen, you can be hit, and if you're hit you'll be killed.

A follow on mission tasked the L/W platoon to move on the flank of a wheeled convoy in restrictive terrain. The L/W platoon was to secure the movement of the wheeled vehicles by clearing the wood line on the flank of the wheeled platoon. The L/W platoon moved very well during this mission. It was able to move almost as quickly as the wheeled vehicle along the trail. The L/W platoon was able to execute this movement because of the digital mapping display, and the GPS once again showing the location of all soldiers. The platoon was able to select the best route of movement and avoiding the old practice of navigating by dead reckoning at night.

This mission is similar to the mission conducted to secure the DZ. L/W platoons movement and friendly situation awareness is greatly enhanced compared to a conventional platoon. During this mission the platoon went to ground because of contact in an adjacent platoons zone. The L/W platoon sent out R&S teams as a security measure. One of the teams (3 soldiers) made contact with a two man OPFOR R&S team. The L/W element destroyed the OPFOR R&S team. The L/W element destroyed the OPFOR using the thermal night Sight and sustained no casualties.

During this 72-hour period the L/W platoon had a total of two engagements, with two OPFOR soldiers opposing them in each contact. The combined result of these contacts was three L/W casualties and four OPFOR casualties. Although this doesn't reflect high intensity combat there are several observations that can be made, and conversely there are several conclusions that cannot be made due to the lack of a high intensity environment for the test.

FIRE TEAMS AND MUTUAL SUPPORT. All indications from the experiment show that the L/W platoon moved very well at night as a result of the digital map display and the GPS image location in the HUD. Soldiers and leaders knew where they were and where other members in their team /squad were during movement. However, this is only two of three critical pieces of information needed during an attack or assault. To be successful, soldiers must know where they are, where fellow soldiers are and where the enemy is located. This third element is key to providing suppressive fire and mutual support.

During the engagement, the L/W element experienced on the drop zone, the fire team was 350 m in front of the squad leader. This distance is well beyond the normal distance within a squad for mutual support. In fact, this distance is just at the max effective range of the M-16 under ideal conditions, and beyond the range of the current FM radio being used. Additionally there is a movement time factor involved with this scenario. It may well require 10-15 minutes to negotiate the 350-m, while receiving direct fire, depending on terrain and vegetation. The L/W element in this engagement suffered three casualties and did not identify the sniper team until they were fired upon. Had the L/W element been engaged by a larger element, or one with more firepower the outcome could have been much different. To provide effective mutually supporting fires soldiers must be positioned to not only see each other but beyond so that enemy positions and sources of direct fire can be quickly identified and suppressed. Over-dispersion and lack of line of sight between soldiers results in a soldier being engaged and others not being able to identify the source of enemy fire. This is the recipe for the classic piece-meal action.

LW's increased navigation and situational awareness provides a capability allowing greater dispersion and speed of movement. This enhanced capability does not negate the need for elements to quickly mass, placing a high density of suppressive fires on the enemy when contact is made. During interviews with participants in the experiment, the point was made that fire teams could now be dispersed over as much as 500 meters and a squad over as much as 1000 meters. This dispersion puts members of the squad out of direct line of sight with each other, (terrain dependent) leaving areas unobserved by the human eye as the squad moves over the terrain. This dispersion affects not only the detection of possible enemy locations, but the ability of squad members to immediately engage with accurate direct fire. As previously mentioned, the time required for other dispersed elements to close the distance and be in position in a timely manner to provide supporting fires, must remain a concern. Additionally, the need for scouts was questioned; the logic being with this increased dispersion fewer or no scouts would be needed. Based on four plus years of personal observations at two different CTC's I view this as a dangerous path of logic. Scouts will always be a valued asset on the battlefield. The early warning and security they provide

allow commanders to preserve valuable combat power to be committed at the critical time and place. Scouts are capable of covering a large area and reporting the location of massed enemy formation and terrain data, or focusing on a specific objective from several sides and providing detailed information for a deliberate attack. They provide for both security (early warning) as well as reconnaissance (detailed information). In either role, scouts allow the commander to focus combat power at the critical time and location. They are an economy of force element that provides the commander time and space to react to contact with the main body of his force. L/W equipped scout elements will no doubt have an enhanced effectiveness on the battlefield, making the scout that much more valuable to the commander. Equipping every infantryman with L/W will not fulfill the same function that the current scout elements provide the commanders. Without scouts, the unit main body will gain contact quicker with less warning, violating the principle of making contact with the smallest force, and making it more difficult to mass quickly (once contact is made the ability to maneuver to mass is restricted) and achieve overwhelming combat power at the critical point.

L/W and other similar technology simply enhance the scouts' execution and provide improved scout employment and more accurate and timely reporting. BLUEFOR often fail to seize the objective at CTC's because of a lack of mass at the critical time and place on the battlefield. Mass being the overwhelming combat power in terms of maneuver elements, direct and indirect fires required to defeat the enemy. The scope of the JRTC experiment did not include a deliberate breech of enemy obstacles or the assault of a defending enemy. No doubt L/W would be very valuable to friendly situational awareness in smoke at the breech, or the night assault, however there is no evidence to indicate that L/W technology would reduce the requirement for both massed fire and maneuver to seize and clear an enemy position. Once in direct fire contact, it is the density of massed direct fires by the attacker that overwhelms the enemy, suppresses the enemy fire, allowing close quarter fire and movement. It is this fire and movement that allows the attacker to gain a foothold in the trench or building. Gaining this foothold is a critical task for the fire team squad/platoon and it is not possible without the high density of direct fires to suppress the enemy.

ASSAULT. The scope of the L/W experiment at JRTC greatly limits the conclusions that can be drawn from it. Because of the Low Intensity Conflict nature of the experiment the platoon did not conduct the more traditional and difficult missions of attack, assault or defend. Without the data and results from a L/W platoon assault on a defending enemy it is difficult to access overall impact on the Infantry mission. To get this assessment L/W will need to be tested under much tougher realistic conditions. To truly enhance the Infantry's execution in combat, L/W must not only address getting the warrior to the edge of battle but the follow through of the assault, seizure and holding of ground.

SOLDIER MOBILITY AND ENDURANCE. There is much discussion on the subject of the additional weight. In its current configuration, L/W weighs in at 13 pounds.[9] This is then increased by carrying additional batteries to between 20-25 lbs. Rucksacks and equipment carried by members of the L/W platoon varied between 75-105 lbs., depending on duty position. These figures indicate that L/W increases soldier load by approximately 20-30 percent. This is not a war stopper by any means, but it is an issue when outfitting an already overloaded soldier. Movements by the L/W platoon during the experiment normally were between 3-4 km, this being the distance the platoon could move and sustain operations. As previously mentioned, effects on the soldier during intense operations, such as the assault, were beyond the scope of this experiment. The company commander made it very clear that he believed the additional weight is an issue and it is one of the three top things needing improvement in his judgement. He also indicated that increased water consumption resulted from the additional weight and equipment.

During night operations eye fatigue and/or mental fatigue was a limiting factor. Participants in the experiment reported that soldiers operating with the HUD and NVG averaged 2-4 hours of continuous operation before requiring rest. This is similar to the fatigue that pilots suffer while flying under goggles. This again is not a major factor, but one which requires planning for, to maintain the tempo of the operation.

HUMAN ELEMENT. There is a portion of human nature, which will come into play under combat conditions. In short, fear of isolation. At night, in combat and under fire, being able to "see" your buddy in the HUD on the digital map will not meet the psychological need, in my judgement. For generations, Fire Team leaders have told their soldiers "follow me and do as I do": This was done not because of any lack of radios or technology but rather because soldiers under fire need the physical presence of leadership to overcome the fear of combat. This is no small task and history has proven time and again that the physical presence of leadership on the battlefield has made the critical difference and turned the tide of battle. Joshua Chamberlain at Little Round Top is an excellent example of leader presence. Soldiers are more likely to follow leaders not an ICON in their HUD when under fire. In the life-threatening environment of combat, the human dimension of leadership is paramount. Subordinates, seeing leaders share the danger of the moment by leading, not directing action, is what inspires subordinates to seize the initiative and attack into a kill or be killed situation. The camaraderie of shared hardship and danger has historically inspired small units, such as the 20th Main, to accomplish great tasks throughout the history of warfare. Chamberlain endured the hardship and shared the danger by leading, not directing his soldiers, and they responded against all odds to that leadership. Weapons and technology change, but to date, there is no evidence the human dimensions has changed.

L/W also provides the soldier with the capability to send spot reports by selecting from a pre-determined menu and then sending the message digitally via "e-mail". This enhancement received mixed reviews from participants in the experiment. This obviously cuts down on radio traffic, hand written notes, and the need to re-transmit spot reports to the next echelon causing more radio traffic. However voice transmissions have some valuable benefits, everyone on the net hears the report simultaneously and in critical situations, leaders can immediately question for clarity on essential details. Possibly the most critical issue is leaders and subordinates hearing each other's voices. Sensing for fear, indecision, frustration, and etc., is important when dealing with a subordinate who is beyond the line of sight in a life and death situation.

Conversely the leaders voice can have a calming, reassurance to subordinates or the snap that inspires motivation and sense of purpose.

The digital capability is a great enhancement for routine reports such as admin-log and sit reps. But when to or when not to use it is a key decision for any leader, for we do not want to undercut the critical human dimension of the infantryman.

FIRE POWER

An examination of firepower requires comparing the accuracy range and lethality of the infantryman's weapon now to that of L/W. The experiment and interviews indicate there is no increase in firepower provided by L/W, at least in the traditional sense. The Infantryman still carries the same basic weapon, the squad is equipped with the same automatic weapons, ammunition remains the same and the number of weapons remains the same. There is, however, one critical difference with L/W, the Individual Thermal Sight (ITS). This gives the individual Infantryman the same target acquisition and engagement capability that tanks and Bradleys have had for years. Interviews with participants of the JRTC experiment reflect that the ITS was key to both engagements the L/W platoon had with the OPFOR. Everyone interviewed indicated that the ITS provided the greatest increase in combat power of any of the other L/W component items. To be truly effective the sight needs to be used in conjunction with the GPS and digital map. As tankers and mechanized infantrymen know thermal image target identification can be very challenging. The added friendly force situational awareness provided by the digital map increases the infantryman's lethality. It should be clearly understood that the ITS is a component of the weapon, it does not allow the infantryman to have thermal images while moving unless he is looking through his weapon sight. In any case, the ITS gives the Infantryman a significant advantage in night combat.

Lethality is further enhanced by the soldiers improved ability to bring accurate indirect fires on the target in reduced time. The combination of the digital map, GPS and a laser range finder enables the soldier to quickly identify where the enemy is located and process the call for fire with greatly improved first round accuracy.

Both of these improvements were highlighted by the experiment participants and they obviously increased individual firepower and lethality. Collectively, these two improvements give the infantryman the firepower overmatch at the point of attack, even during limited visibility conditions, ensuring fire superiority and the suppression or destruction of enemy forces. The ITS, in particular, may well be the break-through that allows the infantryman to truly "own the night." What remains un-tested is how these capabilities improve the Infantryman's ability to attack and defend in a more conventional mid to high- intensity environment. There is obviously some benefit, but the rigors of assaulting an enemy position with L/W need to be explored and additional data gathered. Currently there is no available data from the most recent experiment to indicate that this improvement in firepower and lethality improves the combat power of the Infantry in the conduct of the assault.

PROTECTION

Protection and soldier survivability on the modern battlefield is a critical aspect of any future system. L/W brings improvements in the form of ballistic protection, improved ability to maximize cover and concealment, and fratricide avoidance through situational awareness. Interceptor body armor gives the soldier a substantial improvement over the old flak- jacket or Ranger Body Armor. Although the interceptor Body Armor (IBA) is lighter and more comfortable, during the experiment soldiers only wore it during the MOUT live fire phase. In spite of its improvements it is still added weight, restrictive to wear, and increases water consumption. This is more than likely an area where there is no pleasing the soldier. There is an increased level of protection from the vest that may impact combat power. This is difficult to access from the experiment but there are some general observations that can be made. The IBA covers only vital body parts and protects the soldiers from mortal wounds to the torso from most infantry type weapons on the battlefield. It doesn't however protect him from becoming a lesser casualty by injuries to his extremities, and if hit in the vest area it remains questionable whether a soldier could immediately continue to fight. The conclusion from this observation is that we have done an excellent job of protecting the soldier from a mortal wound, but the combat power of the fire team, squad, platoon, etc. is not increased because casualties

will still occur, and require treatment and evacuation. Research is still ongoing because the current IBA will not stop penetration from some high performance ammunition like Teflon. This type of ammunition will be available to future adversaries, and would neutralize the current L/W protection advantage.

L/W provides the soldier with the technology to maximize cover and concealment by engaging targets with the daylight video sight while the soldier remains behind cover. Based on participant interviews this is a good idea but the system is unreliable. During the training and preparation for the mission the video sights experienced numerous problems which hampered training. There is a training issue; it takes time and practice to be able to effectively engage targets using the video sight. The ideal time and place to use this system was during the MOUT live fire attack, but it was not used do to its current unreliability and the lack of adequate training prior to the mission. It is obvious however that the concept behind this idea will provide an increased level protection by reducing soldier exposure to enemy fire.

The GPS and digital map display also provide a new level of protection for soldiers. This friendly situational awareness greatly reduces the chance of fratricide. This capability was demonstrated by the L/W platoon, during the actions on contact at the Drop Zone. When the squad leader moved forward, and the lead fire team engaged the snipers he was able to quickly identify where the members of the fire team where located using the digital map and the GPS. This is a capability that can play a major role in reducing the fog of war and subsequently the incidents of fratricide.

Overall L/W makes a significant impact on soldier protection and survivability, it provides for additional ballistic protection, better use of cover and some level of fratricide avoidance. However results of the test are inconclusive to show that there is a level of protection provided that increases combat power to a level that reduces the number of infantrymen required for a successful attack of a defending enemy.

COMMAND AND CONTROL

Command and control (C2), a subset of leadership has several key issues within the L/W program. There are several C2 enhancements and improvements that L/ W brings to the battlefield. Several of the sub components already mentioned are C2

enhancements, digital map display, GPS and the common tactical picture of friendly forces, and voice and digital communications all give an added benefit to C2 on the battlefield. Additionally, the system has the capability for leaders and commanders to e-mail orders and graphics, selected from menus to subordinates. Although this is an innovation and a technological advance, I question the true and long-term value it brings to the force, particularly at the company level and below. This capability may speed the process but there is a value to looking subordinates in the eye when issuing orders, resolving all possibility of confusion and misunderstanding. There are conformation briefs, back briefs, and rehearsals to conduct. Additionally there is a professional development benefit for leaders at all levels going through the estimate process and the military decision making process. Briefing the order is not only an issue of clarity but it also touches on the human dimension when an intangible benefit is gained from leader, subordinate contact. This advancement should not be a full time replacement for the planning process, as we currently know it.

Land navigation has challenged the infantryman since the beginning of time. The GPS component of L/W virtually eliminates this problem. The HUD shows the soldier a digital map and his location on the ground, as well as those of other members of the unit. This also allows the soldier to move on the terrain along the best route, reducing soldier fatigue and increasing speed of movement. As already mentioned the GPS and digital map also increase indirect fire effectiveness. These are all positive moves for enhancing C2. The caution which accompanies these advances is dependence on technology. Current technology with GPS, PLUGGER, SLUGGER, and etc. have raised a generation of leaders that are largely techno-dependant. Equipped with a map, compass, and odometer, or a pace count many young leaders find themselves significantly challenged and mission accomplishment in question. Technology advancement is great, and gives us an advantage over adversaries, but we must ensure we continue to maintain our basic skills.

COMMUNICATIONS. In spite of satellite technology and down link for GPS and a digital capability the soldier is often challenged by voice communication. A major shortcoming highlighted during all interviews was the lack of adequate voice

communication. The L/W platoon found that voice communications was unreliable at ranges greater than 100-150 meters terrain dependant. Soldiers participating stressed that with all the enhancements L/W brings, little if any are more valuable than reliable voice communications. Based on personal experience I strongly support this point. Beyond the human dimension, the value of voice communications in combat is difficult to put a price on. The Infantry continues to need a truly man portable, reliable, secure radio, and L/W does not solve the problem.

Conditions on the battlefield and the available database have a significant impact on the value of L/W. The digital mapping is only as accurate as the data base. This is especially true during Military Operation on urban terrain (MOUT). During the MOUT portion of the experiment the digital map was of little value. It continued to show the locations of squad members, but it did not show walls, floors, ceilings, and etc. To have this capability the floor plans of the building would need to be in the mapping database. This is also true if the unit is clearing a trench. The display will not show walls, bunkers, turns and curves unless it is in the database. Participants interviewed believed that having the accurate location of other team/squad members displayed would give them a significant situational advantage. I see little evidence that would refute this belief. The capability to input the data exists. The central issue is data availability on a large scale, i.e. an Infantry brigade attacking a mid-size village/town. One can obviously see a benefit for surgical type special operations missions.

Reviewing all the comments and results of the JRTC experiment, it is clear that the greatest value L/W brings is C2. Navigation, situational awareness, digital capability, communications, and future communications potential, planning and reporting capability are all C2 functions and L/W enhances all the functions to some degree.

ADDITIONAL CONSIDERATIONS

There are several other issues that warrant discussion when closely examining the total impact of L/W on future Infantry training and operations. Issues such as training time, maintenance and dependability, weight and size, and the impact of the technology on C2 and leadership, all have a varying impact on overall combat power.

TRAINING. At a time when OPTEMPO and PERSTEMPO are concerns, L/W, although beneficial, comes with additional training issues and requirements. The platoon that participated in the October experiment at JRTC began its training in April. There were three weeks of classroom training with the optical system. The platoon also spent two weeks at Ft. Benning training for the live fire MOUT mission. The platoon spent an additional 30-35 training days conducting a variety of training scenarios in a field environment. In all, the platoon spent approximately seventy-five days of training in preparation for the JRTC mission. The company commander's assessment is that the platoon arrives at JRTC at the "P", practiced level of proficiency. Soldier's grasp of the training tasks was generally achieved quickly. He attributed this to the age of the soldiers. Most of the soldiers, being part of the video games and computer generation, quickly grasped the automation tasks. This base line knowledge allowed training to progress smoothly with little lost time. Some tasks were not trained or required increased time due to system or component failures. The commander assessed the platoon's execution at JRTC as satisfactory, and they built on their "P" level of training. The commander believes to maintain a "P" level of proficiency with L/W equipment, a platoon will require ten days of range time and thirty days of "field" training per quarter.. This forty-day investment is significant in light of approximately sixty training days available for the entire quarter. One can argue that once the entire force is L/W equipped, the time needed for required proficiency training will be reduced, based on prior repetitive training. Even in light of some reduction, there is still an increased training time requirement for proficiency with several sub-systems that must compete for the precious resource of time.

The training requirements for L/W are feasible, but like all other training requirements, the chain of command must make the commitment and prioritize time and events if the soldier is going to truly capitalize on the capabilities that L/W brings to the battlefield. A L/W unit that is not highly trained will forfeit any advantage to a better-trained enemy.

MAINTENANCE AND RELIABILITY. There are several maintenance aspects that the JRTC experiment brought to light. During the train up period, unreliability of some

components had a negative impact. Participants identified communications equipment and the daylight video as being unreliable during the training. The voice communications equipment often failed and in general was not reliable beyond 150 meters, terrain dependant. This shortcoming identified, it is being addressed and improvement is promised prior to the next L/W experiment.

The daylight video failed for a series of technical reasons. Improvement is also promised. The impact for the experiment was a lack of soldier proficiency. This system that would allow soldiers to shoot around corner without exposing themselves was not used during the MOUT live fire. This training opportunity was lost because of the maintenance failure during both the trains up and mission execution.

Throughout the 72-hour experiment the platoon experienced eight main computer malfunctions and six to eight communication related problems. This is a little over 25% failure rate for a 72-hour period. While not shocking for an experiment, it is a clear indicator that there is work to be done. It is important to note the experiment did not include an attack of a defending enemy, breaching, or an assault with trench clearing. All of these activities would clearly increase the stress wear and tear on L/W and its components. Participants identified cable connections as an important issue. Cables between L/W components were broken or torn loose by brush etc., resulting in down time. The company commander recommended reinforcing the connections or constructing them to "break-away" without damage. He believes either fix will work, but a modification is required, and is currently under consideration by contractors.

The experiment also highlighted the need for battery improvement. The disposable batteries were unreliable, the external case was subject to cracking and causing a soldier hazard. The rechargeable battery was reliable, but is an obvious additional logistical strain for the unit. This too is under further development following the experiment. Battery reliability, life span and weight are all under review and work toward improvement is currently ongoing.

During the train-up period the platoon selected six soldiers for additional maintenance training. These soldiers underwent a two-week course and became proficient at troubleshooting the system and replacing component parts as needed. These soldiers were also equipped with a limited PLL so that the most commonly

identified faults could be fixed on the spot. This idea was generated by the company and platoon during the initial training and resulted in reduced down time for soldiers during mission execution.

WEIGHT AND SIZE. Weight will always be an issue for the infantryman. The weight of L/W electronics, batteries and spare batteries is approximately 25lbs combined. This is an increase of 25% or more to what the infantryman currently carries. Technology advances will no doubt ultimately reduce this weight but currently, it remains a primary issue. Directly tied to weight is size. There is no current evidence to show that we are working to make L/W compatible with the M-2 Bradley or the Future Combat System (FCS) for infantry. The current infantry squad of nine men is a tight fit in an M-2. The increased bulk that L/W puts around the soldier makes it virtually impossible to safely put a nine man squad with L/W in a Bradley without soldier injury or equipment damage. Currently there is no evidence that L/W equipped soldiers are part of the equation for developing the FCS for the infantry.

MICROMANAGEMENT. The digital map and GPS provide a unique and valuable capability to aid in friendly situational awareness and land navigation. However all participants interviewed expressed some concern over the additional capability that this provides to all levels of leadership. Leaders, given the 100% correct visual lay down of friendly positions on a digital map, combined with the posting of the most updated enemy situation, will be tempted by the technological capabilities to micromanage right down to the individual soldier level. This brings to mind the stories of brigade commanders in Vietnam directing squads and fireteams from the hovering chopper. The technology and information, which it brings, are valuable and possibly life saving tools on the battlefield. Leaders must ensure that this good thing is not used to stifle junior leader initiative and development. This may require a high level of discipline, particularly in training, to not get involved and ultimately micromanage subordinate units solely because technology has made it possible.

CONCLUSION

L/W technology clearly enhances the mission execution of Infantry forces on the battlefield. These enhancements are primarily in the area of C2. The digital map and GPS improve both navigation and friendly situational awareness. Digital reporting and the ability to receive and transmit orders is also beneficial to C2. The individual communications system, although still requiring some improvement, does aid C2 and certainly will improve C2 in the future. The ITS is a large step closer to truly enabling the Infantry to "own the night". Body armor is lighter and provides greater protection than ever before. However, there is no evidence from the JRTC experiment or other ongoing L/W development that demonstrates an increase in combat power that will reduce the 3:1 ratio required for offensive operations. L/W remains largely untested during the execution of the offensive tasks of assault or breach. These are the tough missions that will test durability, reliability, and demonstrate L/W's contribution to improving Infantry combat power. This experiment provides only a single data point in the development of L/W. Based on my analysis, there is no evidence that warrants a reduction or change in the current structure of the Infantry organization or their basic doctrine. Such a move is unwise based on a single experiment. My analysis indicates that success of offensive actions still rests on the attacker's ability to gain fire superiority by the density of suppressive fires at the point of attack.

Participants in the JRTC experiment were unanimous in their recommendations for future L/W development. Weight and size need to be reduced wherever possible. The power-source primarily the non-rechargeable batteries need improvement. The voice communications equipment needs a greater range and reliability. Component parts especially cables need improvement in durability. Participants believed the GPS, digital mapping, and ITS provided the largest increase in capability and currently require the least work or improvement.

L/W brings new tools and enhanced capabilities to the Infantryman. The JRTC experiment will result in further improvements and additional capabilities for the L/W system. However, several more tests must be conducted, focusing particularly on the offensive capabilities of L/W in the mid to high intensity conventional conflict. Currently,

there is no definable increase to combat power that will change TTP's or the numbers of Infantrymen required for successful offensive operations.

Word Count: 6,786

ENDNOTES

[1]William F. Harris, "Initial Results Joint Contingency Force Advanced Warfighting Experiment September 2000." Briefing slides, Fort Benning, U.S. Army Infantry Center, 4 January 2001.

[2]All references to the L/W experiment at JRTC and comments/suggestions by participants are credited to comments from phone interviews conducted by the author with LTC Michael Garrett, CPT Russell Switzer and Sgt. John Petree.

[3]Department of the Army Field Manual 100-5, Operations, (Washington, D.C.: U.S. Department of the Army, 14 June 1993), 2-10.

[4]Bruce Jette, "Land Warrior," lecture, Carlisle Barracks, PA: U.S. Army War College, 10 January 2001, cited with permission of Col Bruce Jette.

[5]William F. Harris, "Initial Results Joint Contingency Force Advanced Warfighting Experiment September 2000," Briefing slides, Fort Benning, GA: U.S. Army Infantry Center, 4 January 2001.

[6]Ibid.

[7]Bruce Jette, "Land Warrior," lecture, Carlisle Barracks, PA: U.S. Army War College, 10 January 2001, cited with permission of Col. Jette.

[8]Ibid.

[9]Ibid.

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