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# Observations of Infantry Courses: Implications for Land Warrior (LW) Training

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The research examined the potential impact of the Land Warrior (LW) system on three Infantry courses: the Infantry Officer Basic Course (IOBC), Basic Noncommissioned Officer Course (BNCOC), and Infantry One-Station Unit Training (OSUT). The areas investigated within each course were weapons training including use of the target acquisition capabilities of the LW, communications training, land navigation, operational techniques and tactical operations, field exercises, and computer skill training. Formal observations were made of these blocks of instruction in each course. The report describes both major and minor impacts upon course content and training resources. In addition, different options are presented on how to integrate LW training into the courses. Because the LW system was evolving during the research period, the training impacts represent the best estimate at the time and could change as a result of LW system changes, institutional course changes, or both. The actual impacts will depend on decisions made regarding which LW tasks should be taught, the scope and depth of this training, and the performance standards required for these tasks.

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**OBSERVATIONS OF INFANTRY COURSES: IMPLICATIONS FOR LAND WARRIOR (LW) TRAINING**

**CONTENTS**

# Observations of Infantry Courses: Implications for Land Warrior (LW) Training

## Introduction

The Land Warrior (LW) system is an integrated system that will impact all a soldier does and how units operate in combat. It affects how every soldier and leader moves, shoots, and communicates. Not only does it change the way in which many individual tasks are currently performed, but because of new system capabilities it also expands the scope of tasks to be performed. The system will impact unit tactics, techniques, and procedures. Changes in communication and reporting procedures, transmission of intelligence information, weapon system employment, and navigation during the day and night are only a few areas that will be affected.

Quality training is critical to ensuring that soldiers, leaders and units use LW capabilities fully. Courses at the Infantry School will provide the fundamental training for soldiers and leaders. The potential impact of the LW system on three Infantry courses is the focus of the report.

The three courses selected for observation and analysis provide a spectrum of institutional training challenges, and train critical, distinct segments of the Infantry population. The courses selected were the Infantry Officer Basic Course (IOBC), the Infantry Basic Noncommissioned Officer Course (BNCOC), and Infantry One Station Unit Training (OSUT). The IOBC is where lieutenants (future platoon leaders) are given their basic instruction and training. The BNCOC is mandatory for progression to the position of squad leader within the Infantry. Infantry OSUT trains individuals just entering the Army on basic soldier skills and Infantry-specific skills. The analysis focused on which blocks of instruction within each course will be impacted by the LW system, as well as how the instruction itself will be affected by the LW. In addition, options for integrating LW training within each course were developed.

Several limitations and assumptions were established for the analysis. First, all observations and comments were based on what we thought the LW system would do and be — subject to change since the system is still being developed. For purposes of the report, the system was considered to be complete. The same assumptions applied to all supporting publications and doctrine as well. This was a considerable leap, in that almost all platoon-level LW publications (mission training plans [MTPs], drills, Military Qualification Standards [MQS] II, and field manuals) were clearly marked as "final draft for testing." Second, although some of the LW items are government-furnished equipment (GFE), all items were considered integral components of the LW system. Consequently, training of these GFE items is an essential part of the report. Third, training options could not be tempered with the use of training devices at this time as training devices for LW are yet to be completely determined. Finally, no specific estimates of time to train the various LW skills were made and no cost estimates were attempted.

At the time the observations were conducted, the design of the LW system, both hardware and software, was evolving (Goodman, 1999) and the LW Operational Requirements Document ("Operational Requirements Document," 1999) was being revised. It was not possible to observe soldiers using LW software nor the LW ensemble itself, but observations of training on weapon subsystem sights and devices had been made (Dyer, 1999). In addition, changes were being made to the marksmanship POI in Infantry OSUT. Thus is it important to understand that the training impacts cited in this report represent the best general estimate at the time and could change as a result of LW system changes, institutional course changes, or both.

## Method

### Purpose of Observations

As stated above the report provides information on LW institutional training implications for the IOBC, Infantry BNCOC, and Infantry OSUT. It also presents possible options for the integration of LW training for the lieutenants, noncommissioned officers (NCOs), and individual soldiers in these courses. As currently designed, the LW system calls for the infusion of five completely new subsystems: weapon subsystem (WS); integrated helmet assembly subsystem (IHAS); computer-radio subsystem (CRS); protective clothing and individual equipment (PCIE); and software subsystem (SW). See Appendix A for a detailed description of the LW equipment, as described in 1998 LW system documents. Given the evolution of the LW system, drawings of some of the LW equipment in this Appendix may not depict the final system.

### How Observations Were Conducted

#### IOBC

Under the current program of instruction (POI), IOBC comprises 1,091.5 academic hours taught over a 16-week period. No attempt was made to observe the entire IOBC. An initial review was conducted to determine current IOBC classes where infusion of LW instruction would be most beneficial. From this review, candidate classes were selected for observation. Twenty-eight training observations were made during the period July-October 1998. These observations reflected 413 hours of the total course. A summary of the classes and possible LW implications for IOBC is in Appendix B.

#### BNCOC

Under the current BNCOC POI, 348.5 academic hours are taught over an 8-week period. As with IOBC, no attempt was made to observe the entire BNCOC, and an initial review was conducted to determine the classes where LW instruction should be included. From this review, 20 candidate classes were selected for observation. Of these 20 classes, 18 were observed during the period March-April 1999, reflecting a total of 294 hours of course time. A synopsis of the observed classes and LW implications for BNCOC is in Appendix C.

OSUT

Under the current OSUT POI, 690 academic hours are taught over a 13-week period. As with IOBC and BNCOC, all of OSUT was not observed. Twenty six candidate classes were selected for observation (a total of 171.5 hours). Of these 26 classes, 20 were observed over the period July-August 1999. These training observations constituted 107 of the total 690 academic hours of planned training. A summary of the observed OSUT classes and possible LW implications for OSUT is in Appendix D.

Observation Procedures

A standardized observation form captured the same information for all instruction (see Appendix E). It identified critical information from the current instruction as well as future LW implications. Standard information included POI title and course number, POI hours and hours observed, observer name, class size and location, training aids used for the instruction, and training tasks and time spent on each. Of particular interest were the performance standards for the various tasks. The performance standards often impact the class length and the resources required when training the task. The observer then recorded key instructional items. These included a summary of the instruction, LW implications, training subjects (what were they, how were they covered), time for each task, required equipment, and ammunition required, if any. Factors that could lead to potential problems were recorded. This information included issues such as whether the POI and the visitor's folder information matched, where changes to the instruction were needed based on new doctrine or equipment, and if the required training tasks and performance standards matched what was trained.

## Results: Implications and Impacts of Including LW Training in IOBC, BNCOC, and OSUT

This section addresses the general level of proficiency that each lieutenant, NCO, or individual soldier is expected to achieve in selected areas based on his respective training (IOBC, BNCOC, or OSUT). Only LW implications are noted. For this section, the final draft of Special Text (ST) 7-11 II-MQS *Land Warrior MQS Qualification Standards II Infantry Branch (11) Company Grade Officer's Manual*, dated 26 August 1997 ("Land Warrior," 1997a), was assumed to be a final product. It is intended to supplement Soldier Training Publication (STP) 7-11 II-MQS *Infantry Branch (11), Company Grade Officer's Manual* (Department of the Army [DA], 1991a). The same applies to the final draft of ST Army Training and Evaluation Program (ARTEP) 7-8-1 MTP (LW) *Mission Training Plan For The Land Warrior Infantry Rifle Platoon and Squad* ("Mission training," 1998) and the review draft of Draft Equipment Publication (DEP) 11-5895-XXX-10 *Operator's Manual For Land Warrior System* ("Operator's Manual," 1998). In these draft publications, existing tasks were modified to reflect the capabilities of the LW system. This provides the entry-level consideration for LW-specific training. See the corresponding appendices for details on IOBC (Appendix B), BNCOC (Appendix C), and OSUT (Appendix D). Listed below are major implications caused by the integration of LW equipment into the current POIs.

## Overall Trends

Integration of LW into IOBC, BNCOC, and OSUT will eventually require an in-depth review of each course's POI to delineate what LW-specific equipment training will be conducted, what performance standards will be applied, where it will be integrated into existing instruction, and where LW capabilities need only be referenced. For example, use of the computer with software programs will require LW-specific instruction. Inclusion of the GFE, particularly weapons like the M4 modular weapon and the M240B machine gun, and the associated target acquisition systems can be integrated into existing instruction. This integration will be more demanding for IOBC and BNCOC than for OSUT. In OSUT, individual soldier training related to a particular system is usually substituted for an existing system by a given effective date. However, in IOBC and BNCOC, training for existing systems must continue while training for new systems is integrated or added.

A major LW innovation is the computer and the benefits it provides in mission planing, execution, and information flow. There are two basic issues regarding the computer. The first is whether individuals have the requisite basic computer skills to "maneuver" in the LW software. The second issue is the need to learn the LW software itself and all of its (or selective) capabilities. Sequencing this instruction to make it meaningful and to use it as a building block for other LW computer-based instruction will be a critical task for the Infantry School. Additionally, the Infantry School will need to consider the percentage of soldiers without a computer background. If the number is substantial, "remedial" or "special" training for these soldiers will have to be developed and provided prior to LW computer instruction per se. Computer training is addressed in detail later in the report.

Assuming that the lieutenant or NCO has been trained to use the LW computer hardware and software, much of the LW information can be integrated into existing classes by merely referencing LW capabilities. Use of the computer's hand-held display (HHD) and LW Planning Aid during the preparation for movement phase of the offense instruction is an excellent example. A reference can be made that one of the benefits for LW-equipped units is that the leader can use the HHD to create a digital overlay of the route on the digital map, incorporate maneuver graphics, use the LW Planning Aid to plan the way points along the route, time the segments, and digitally provide the information to the entire platoon, or in the case of an NCO, a patrol.

Mission preparation time for tactical exercises must be formalized and increased to meet LW-specific requirements. Leader tasks for NCOs and officers, particularly in the mission preparation phase, have increased dramatically. Example tasks include setting the computer parameters for global positioning system (GPS) reporting rates and keying all of the squad and soldier radios using a KYK-13 encryption box. Leaders must also include transferring mission data packages: ensure LW systems are powered on and initialized, power up the built-in test (BIT), log-on, complete mission data transfer; place the LW computer system into its combat mode. Leaders must also perform such tasks as alerting subordinates of laser detection warnings and zeroing LW systems of personnel who are missing in action (MIA) or captured. Communications checks have increased as well. Voice and digital communication checks are

required of all individuals on each of the two radio nets. All members of the platoon must now enter the radio nets.

Additional instructional cadre will be required to support most tactical operations. For example, during mission preparation, the platoon leader will review LW data for updated intelligence and information on enemy or mission, including operation orders (OPORDs), warning orders (WARNOs), and fragmentary orders (FRAGOs). This information must be entered into the computer by the cadre prior to each exercise to ensure realism. Text-based copies of mission OPORDs will no longer suffice.

Safety considerations will have to be changed to incorporate LW equipment. For example, all LW participants must wear ballistic laser eye protection system (BLEPS) or special protective eyewear cylindrical system (SPECS) with the day display component (DDC) when operating in a laser environment. Soldiers must also wear BLEPS or SPECS to protect their eyes from the DDC itself.

Determination must be made as to the amount of LW supply issues that will be incorporated into classroom time for both IOBC and BNCOC. Logistics instruction should include the appropriate LW authorization documents and supply publications. Since many of the LW components are parts of sets or kits, the classes could incorporate LW equipment as examples. For tactical exercises, LW supply requirements (e.g., batteries and replacement parts) will increase logistics problems for the cadre.

Improved survivability on the modern battlefield is a cornerstone of the LW program. Regardless of how the instruction is tailored, it should include, at a minimum, a description and tactical use of the body armor. The use of protective upgrade plates placed in body armor to improve survivability should also be discussed.

The impacts of operating LW equipment in a nuclear, biological, and chemical (NBC) environment will have to be addressed. The primary focus should be on communication and decontamination. The same applies to the use of individual LW equipment, for example, when the wearer must don a protective mask.

BNCOC has a unique problem. Unlike IOBC, BNCOC students teach almost all of their own classroom instruction. There is also very little hands-on training and absolutely no weapons firing. The crux of the issue is that BNCOC assumes that the NCO is fully trained in weapons operation and training, therefore BNCOC training focuses only on NCO supervisory skills and training, such as range operations and coordinating unit fires. This presents a real problem as most students, at least for the short term, will have no LW experience upon which to base their training. Without basic hands-on skills, such as placing a weapon into operation (including all optics and target acquisition systems) or first-hand knowledge of system-unique requirements such as proper bore sighting procedures, we can hardly expect the NCO to progress to conducting supervisory tasks without some loss as to "why" a task is conducted in a particular fashion. This violates the basic training philosophy of teaching the soldier to first "crawl" before

he learns to "walk." The BNCOC cadre provide assistance, however, they mirror the same problem in that the current instructors will also have no first-hand LW experience.

OSUT instruction, with the exception of some GFE (M240B machine gun, the M249 squad automatic weapon [SAW], and some familiarization with night vision goggles and aiming lights), lacks all LW "prerequisite" training needed to integrate the more advanced LW systems training. Additional training time will be required. The basic Infantry skills currently taught will also be required for LW and can not be omitted. For example, although the OSUT soldier receives two classes on basic map reading, he does not receive instruction on the use of a global positioning system (GPS), land navigation, or use of military symbols. As a result, the value of providing this soldier a map with a tactical overlay and asking him to report what he has seen (and where) is questionable at best, unless the POI is expanded to include additional map reading skills.

The current OSUT training on the M16A4 has been modified to include firing with night vision goggles and aiming lights. However it is only for familiarization, and the other LW GFE optics (M68 close combat optic [CCO] and the AN/PAS-13 thermal weapon sight [TWS]) are not taught. Current training on the M240B machine gun and the M249 SAW does not teach all that it could. The M249 SAW instruction includes operating and firing with the AN/PVS-4 night vision sight, but there is no such training with the M240B machine gun. No LW GFE optics or target acquisition systems (specifically the AN/PAS-13 TWS and night vision goggles with aiming lights) are taught in conjunction with either the M240B or the M249 SAW.

In another example, when the OSUT soldier receives LW instruction on the use of the LW computer/radio subsystem (CRS), he must also be taught proper radio procedures, tactical reporting, and handling message traffic. With the integration of LW, each soldier will be able to communicate on individual radios. He currently receives only rudimentary instruction on radio operating procedures. Instruction is limited to use of the phonetic alphabet and use of prowords and call signs, two of six tasks taught during one hour of instruction. Additionally, with the LW soldier radio there is the capability to send and receive text messages. Current OSUT instruction includes only use of the SALUTE (size, activity, location, unit, time, and equipment) format. As a result, additional instruction on radio procedures and preparing and handling various message formats must be added to the POI. Training on soldier radio operations must also include instruction on LW-unique graphics and the icons used as menus in the computer software.

## Weapons and Ammunition

### Summary of Findings

Weapon subsystem. Some of the components to the LW weapon subsystem are fielded or are in the process of being fielded. Other components will be fielded with the LW and thus present new capabilities to the LW-equipped soldier. Although the integration of these components is unique to the LW system, soldiers currently have the opportunity to gain skills with the individually-fielded components, and these skills will transfer directly to the LW system.

While the fielding timelines vary with each item of equipment, an overview of the fielding status is presented to help the reader understand the training impacts. Most Infantry soldiers already have some version of night vision goggles (NVGs); the AN/PVS-7B/D or AN/PVS-14. This image intensification device provides a night capability similar to that in the LW night sensor display component (NSDC). In addition, many Infantry soldiers and leaders have some form of aiming light (e.g., AN/PAC-4B/C or AN/PEQ-2A). The NVGs must be used in conjunction with the aiming light for firing and fire control purposes. The AN/PAQ-13 TWS and M68 CCO are not as prevalent in the force, as they are being fielded currently. Some units have prototype bore sight devices. The video camera and the laser range finder/digital compass assembly (LRF/DCA) will be fielded with the LW system. In the presentation that follows, there is mention of using the AN/PVS-4 night sight during institutional training. It has been in the field for many years, but is not a component of the LW system.

With regard to the weapons themselves, the LW soldier will have the M4 Modular Weapon System, the M249 squad automatic weapon (SAW), or the M240B machine gun. The SAW has been fielded for many years, while the M4 carbine is replacing the M16A2 rifle and the M240B machine gun is replacing the M60 machine gun. With regard to current institutional training, the M16A2 rifle or the M16A4 rifle with the rail adapter system is used, depending on the course.

In general, it is the additional target acquisition capabilities (those that are currently being fielded as well as those unique to the LW system) that will have the greatest impact on institutional training resources and time. Changes in the weapon systems per se will not require additional training.

IOBC. The current standard for the lieutenant in IOBC is to qualify with the M16 rifle during the day. Night firing using a variety of optics and artificial illumination is for familiarization. The M16 and M249 SAW are also part of military stakes (MILSTAKES) testing. However, this evaluation is limited to assembly/disassembly for both systems. All M249 SAW and M240B machine gun firing, both day and night, is for familiarization. Decisions must be made as to whether qualification will be required with the additional target acquisition devices (i.e., other than iron sights) inherent to the LW weapon subsystem.

BNCOC. There is no current weapons firing standard for BNCOC. No live firing or hands-on weapons training is conducted. Rifle marksmanship instruction is limited to range operations and is not evaluated. Machine gun training is limited to operational employment and range operations. Machine gun instruction is evaluated as part of career management field (CMF) 11 testing.

OSUT. The current standard for the OSUT soldier is to qualify with the M16 rifle during the day and night (unaided night fire). M16 night firing is conducted as part of advanced infantry marksmanship (AIM) training using the AN/PAQ-4C aiming light and the AN/PVS-7B/D or AN/PVS-14 night vision goggles (NVGs), but this firing is not for qualification. There is no integrated firing with the LW-based M68 CCO and TWS for either day or night firing. Firing of

the M249 SAW and M240B machine gun is for familiarization. No LW optics or target acquisition systems are taught in conjunction with the M240B machine gun or M249 SAW. While firing of the M249 SAW includes night firing instruction on the AN/PVS-4B/C night sight, no similar instruction is provided for the M240B machine gun. As with IOBC, decisions must be made as to whether qualification will be required with other LW target acquisition systems.

Discussion

IOBC and BNCOC. If the decision is made to train and fire in IOBC with the devices and sights associated with the LW weapon subsystem, additional training time will be required. These devices and sights include the AN/PAS-13 TWS, the laser range finder/digital compass assembly (LRF/DCA), the AN/PAQ-4C infrared aiming light (IAL), the AN/PEQ-2A target pointer illuminator/aiming light (TPIAL), the video camera (now called the daylight digital sight), and the M68 CCO. In addition, effective techniques of boresighting these system must be trained.

As indicated previously, for IOBC some night observation equipment (AN/PAQ-4B aiming light, AN/PVS-7B/D or AN/PVS-14 NVGs) was available to support night live with the M16 and M4. All firing with these image intensification systems was for familiarization only. Use of the AN/PEQ-2A TPIAL was not considered, nor was use of the other LW devices and sights.

With regard to other weapon systems, the M240B machine gun will be issued to LW-equipped units, yet IOBC students received only a cursory introduction to this system. Only two M240B machine guns were available on one particular range. Additional weapons are needed to support complete training on this system by all students. Firing with the M249 SAW included only familiarization firing. There was insufficient ammunition and time to allow all students to live-fire zero and qualify. In IOBC, training is currently provided for the M2 .50 Cal. machine gun. Light Infantry LW-equipped platoons will not use the M2. However, the M2 will remain a main support weapon in mechanized units. The trade off between M2 and LW equipment training must be made by the Infantry School.

The BNCOC course assumes that its NCOs are fully trained in weapons operation and training. This will not be the case, at least initially, for LW-specific weapons despite the fact the weapons are not LW unique. The only LW-related weapon mentioned was the M249 SAW. NCOs are not trained on the other modular weapon subsystems (M4E2 or M240B machine gun). In addition, initially, a decision will have to be made as to what LW weapon systems, if any, BNCOC students will fire, qualify with, or use in tactical exercises. This includes the target acquisition and night vision devices related to weapons firing. The only night optical device currently used in BNCOC is the AN/PVS-4 night sight. No LW-based optics or target acquisition systems are used currently.

As with IOBC, the weapon system field manuals (FMs) used in BNCOC, particularly the operator's manuals, will have to be completed and approved for training. Until then, information

on special range considerations or requirements and tactical employment procedures will not be taught to the very personnel tasked to supervise range firing and tactical employment, lieutenants and NCOs. For example, FM 23-14 *M249 Light Machine Gun in the Automatic Rifle Role* (DA, 1994a) will have to be rewritten to reflect LW employment requirements as well as some of the tactical employment and range operations information currently included in FM 23-67 *Machine Gun 7.62-mm, M60* (DA, 1984a). At that point, FM 23-14 should replace FM 23-67 as the primary reference for this training in BNCOC. Also, FM 23-9 *M16A1 and M16A2 Rifle Marksmanship* (DA, 1989) will have to be rewritten to include the M16A4, M4 carbine, and M4 modular weapon system.

In both leader courses, tactical and firing range operation instruction should include the use of the LW squad radio to enhance fire control and improve compliance to fire commands. Other techniques of fire command and control provided by the LW system such as employment of the AN/PEQ-2A target pointer illuminator should be incorporated as well.

OSUT. OSUT marksmanship training is currently undergoing major revision. It will be some time before the revised changes to the POI are finalized. Our review marked the first iteration of the transition period. As a result, our observations may not mirror subsequent revisions. Approximately three of the 13 weeks of OSUT are currently dedicated to marksmanship training. Most M16A2 OSUT firing is currently conducted with standard "iron" sights for day firing. It is the newly instituted advanced Infantry marksmanship (AIM) phase of OSUT that relates directly to the LW's aiming light and NVG capability. However, the AN/PAS-13 TWS and M68 CCO are not included in the newly instituted AIM training. As a result, more time will be required to fire with all LW optics.

For the first period in advanced Infantry marksmanship (called AIM 1), the OSUT unit conducted familiarization training (mounting and operation) on the AN/PVS-7B NVGs and AN/PAQ-4C aiming light and bore sighted the rifle prior to arriving at the range. The unit itself conducted training on the AN/PVS-7B and AN/PAQ-4C. The 29th Infantry Regiment cadre taught 13 OSUT soldiers to mount and bore sight the AN/PAQ-4C to the M16A4. Those 13 trainees then boresighted all 48 weapons for the company training. This initial block of instruction was followed by field fire exercises with the NVGs and aiming light, and then by practice qualification and qualification scenarios. However, soldiers were not required to meet the night fire qualification standard. Of the three courses observed, only OSUT currently provides extensive training with NVGs and aiming lights.

With respect to the M240B machine gun and M249 SAW, there is less marksmanship training. Currently for OSUT, no night vision or target acquisition devices are included in the M240B machine gun instruction. Instruction on mounting and using the AN/PVS-4C night sight was included in the M249 SAW class only, but no firing was conducted.

As with IOBC, limited LW-associated equipment is available to support OSUT training. There is also a finite amount of ammunition for marksmanship training. The inception of the new AIM instruction requires more ammunition. The inclusion of additional LW-specific instruction will require even more. While the cadre uses various techniques to conserve

ammunition expenditure, additional ammunition will be required if OSUT soldiers are to conduct live-fire and qualification training (both day and night) with the various LW optics.

All courses. Throughout IOBC, BNCOC, and OSUT, qualification standards should be uniform. All soldiers should qualify with the M16/M4-series weapon, both day and night, using the target acquisition systems and optics available for the weapon system in combat. The current range structure needs to be reviewed to ensure all necessary target systems and capabilities are available to support this requirement. The AN/PAS-13 TWS requires thermal blankets on targets which may require electrical upgrades to marksmanship ranges. The addition of a day/night rifle range, preferably using a MOUT setting, which would enable soldiers to engage pop-up targets at close range using the AN/PAQ-4C aiming light, the AN/PEQ-TPIAL, AN/PAS-13 TWS, video camera, and the M68 CCO would be extremely beneficial.

Familiarization firing for the M249 and M240B should include both day and night firing. It appears that there is currently adequate training time to support this requirement in OSUT. The POIs for IOBC and BNCOC should be reviewed to determine if adequate training time exists. This training must include the appropriate target acquisition and optic device training, to include mounting and bore sighting the devices.

Lastly, it appears that adequate weapon systems exist in the Weapons Pool to support both qualification and familiarization firing requirements. The increased firing, however, will require additional weapon maintenance contact team support given the age and use of the current systems, particularly the M249 SAW. This may result in an increased cost for weapon repair parts. There will also be a definite cost increase for batteries to support the target acquisition and optics. The availability of ammunition to support these requirements is unknown. Additionally, the availability of sufficient numbers of target acquisition devices and optics to support qualification requirements in all three courses is also unknown.

## Target Acquisition/Weapon Sights

### Summary of Findings

Background. Although the LW target acquisition/weapon sights were discussed under the Weapons/Ammunition section, these devices provide capabilities beyond firing per se. In addition, understanding the technologies underlying these devices will greatly help soldiers in employing them effectively. As such this section focuses on the need to train soldiers on equipment capabilities that go beyond the "hitting targets," the traditional weapons qualification task.

IOBC. The current standard for the lieutenant in IOBC is familiarization training on some equipment items, depending on what is available (e.g. AN/PVS-4 night sight, AN/PAQ-4 aiming light, bore light). There is no evaluation of knowledge or skills for these devices, nor is there training and evaluation of the M68 CCO, AN/PEQ-2A TPAIL, or AN/PAS-13 TWS.

BNCOC. The current standard for the BNCOC student is familiarization training on some equipment, depending on what is available (e.g. AN/PVS-4 night sight). There is no evaluation of knowledge or skills for this device, nor is there training and evaluation of the M68 CCO, the AN/PAQ-4C aiming light, AN/PEQ-TPAIL, any version of NVGs, or the AN/PAS-13 TWS.

OSUT. As stated previously, the current standard for OSUT is familiarization training with the AN/PAQ-4B/C aiming light and AN/PVS-7B/D or AN/PVS-14 NVGs. But there is no evaluation of knowledge or skills for these devices, nor training/evaluation of the M68 CCO and AN/PAS-13 TWS.

Discussion

IOBC and BNCOC. The recent decision (in 1999) to close the Night Fighting Experimentation Facility in the Infantry School will have a detrimental impact on night fighting training for both IOBC and BNCOC. The training in this facility, provided by the Dismounted Battlespace Battle Lab (DBBL), constituted the vast majority of IOBC and BNCOC formal instruction on night vision and target acquisition devices. The class provided an overview of selected devices including the AN/PVS-7D binocular and AN/PVS-14 monocular NVGs, and the holographic HNV-1 Belgium NVGs. Sight. Various aiming lights/pointers including the AN/PAQ-4B/C, AN/PEQ-2A, a laser pointer called the AIM-1, the LPL-30 laser pointer, and the GCP-18 ground commander pointer were presented. This facility also provided students a brief exposure to a computer-based program designed to train the thermal signatures of combat vehicles, an unaided night vision instructional program, and a series of NVG lanes that required soldiers to move with and employ NVGs in a variety of simulated night environments. A prototype boresighting system was also demonstrated and explained.

It is unknown at this point how this instruction and the integration of LW-based optics and target acquisition systems will be now be provided to IOBC and BNCOC. Nor is it known where students will be taught the fundamentals regarding the technologies underlying these devices, their capabilities, and how to adjust the controls to maximize equipment capabilities. The current instruction should be expanded to include the optical/target acquisition devices available to the LW-equipped units, notably the AN/PAS-13 TWS, M68 CCO, the night sensor display component (NSDC), the video camera/sight, and the LRF/DCA. The Infantry School will also have to decide whether to formally test IOBC and BNCOC student proficiency on some, if not all, LW optics given the criticality of these components.

Existing tactical instruction in IOBC and BNCOC should include the tactical capabilities provided by the TWS, NSDC, video camera/sight, and LRF/DCA. These devices can be used to scan for suspected enemy presence, enemy movement, enemy occupied areas, possible enemy approaches, and thermal images for freshly placed mines. The presence or absence of these situations can then be sent on the spot via digital reports. In addition, all soldiers equipped with TWS or video camera can use the equipment to peer around corners, to scan danger areas, and to examined an exit to detect any enemy movement before entering a bunker or building or moving over a trench.

OSUT. OSUT soldiers need thorough instruction on how to mount and operate all devices, followed by evaluation of their proficiency in these skills. Currently, familiarization training is provided only on NVGs and aiming lights. Although OSUT soldiers typically receive little instruction on the technologies they use, some consideration should be given to providing them a conceptual understanding of the technologies underlying the various LW target acquisition systems, e.g., they can distinguish between image intensification and thermal technologies and their related capabilities. The tactical instruction during OSUT should integrate the use of LW-based optics, which will cause some operational techniques to change. For example, OSUT exercises could include the use of the TWS or video camera in the indirect fire mode, using the TWS or video camera to peer around an obstruction or berm and engage targets without exposing the firer to danger.

## Communications

### Summary of Findings

IOBC. The current standard for the lieutenant in IOBC is to learn how to put into use and operate the AN/VRC-88A single-channel ground/airborne radio system (SINCGARS). This training is evaluated in a communications examination. No training is conducted on the AN/PRC-126 radio. All other communications training is for familiarization.

BNCOC. The BNCOC student receives only one communications class, an overview of the operation of the AN/VRC-88A SINCGARS. This class enables the BNCOC student to operate SINCGARS as a net member in the frequency hop mode. The instruction is evaluated by a 10-question communications section of the CMF 11 examination.

OSUT. Communications instruction includes the field telephones (TA-1 and TA-312) and the SINCGARS radio (AN/VRC-88A). The OSUT company cadre evaluate students on two communications skills (perform voice communications and install a TA-312/PT) as part of their Phase III evaluation. Both tasks are scored as GO/NO GO. Some limited experience with a SALUTE report occurs in the Individual Tactics part of OSUT.

### Discussion

Both BNCOC and IOBC students will still need the current training on the SINCGARS, as the LW CRS does not replace the SINCGARS radio and the squad radio must be functionally compatible with the SINCGARS radio. There is not enough time in the SINCGARS classes to instruct any of the LW-related communications equipment and their capabilities. With the increase in the number of radios available at the platoon and squad level for LW-equipped units, communications security (COMSEC) considerations will have to be stressed even more so than now. Because the LW CRS will replace the squad radio in LW-equipped units, for IOBC students, those personnel slotted for LW units can use the squad radio training time to begin training on the LW CRS.

The IOBC and BNCOC tactics classes should cover several critical LW capabilities. Reporting with the LW system is completed using the digital joint variable message format (JVMF). Use of the JVMF should improve both the speed and accuracy of reporting. Mission equipment and supplies (MES) reports are updated and submitted to higher headquarters more rapidly. An automated battle roster is completed as part of mission preparation. Leaders can use the LW Planning Aid to improve mission or situation change reporting. The voice command over soldier/squad radios ensures all elements are alerted. All soldiers use VOX (voice operated control switch) to talk in order to keep their hands free to fire and maneuver. Communications and tactics classes should include that the CRS has a muting capability for minimizing COMSEC problems where noise discipline is a requirement. All audio alerts and warnings can be set to "visual only" and the microphone set to "whisper" mode.

IOBC and BNCOC instruction should also address that more mission preparation time will be required for communications checks, both audio and digital. Voice and digital communication checks are required of all individuals on each of the two radio nets. All members of the unit must now enter the radio nets.

The IOBC and BNCOC instruction will have to discuss the effects of operating in a radiological battlefield environment with the LW radio equipment. This training will have to include issues such as radio frequency dampening effects that a radiological environment has on communications equipment and possible countermeasures such as temporarily burying the equipment if advance notice is provided.

The IOBC, BNCOC, and OSUT soldiers will still need to know the basic means of communications. It is assumed that LW-equipped units will still have telephones and wire for use in defensive or assembly area positions. Therefore, soldiers should continue to receive training on wire laying equipment and telephones.

OSUT soldiers will still need to know the basic means of communications with associated advantages and disadvantages. Because there is functional and operational commonality between the SINCGARS radio and the LW CRS, they will still need the current training on the SINCGARS. However, OSUT soldiers currently receive limited instruction on radio procedures and even less on handling different forms of message traffic. With the integration of LW, each soldier will be able to communicate on an individual radio. Additionally, included in the LW soldier radio is the capability to send and receive text messages. As a result, instruction and evaluation on radio procedures and preparing and handling various message formats must be increased in the POI. Soldier radio operations instruction must also include the LW CRS display and the icons used as menus in the computer software.

## Land Navigation

### Summary of Findings

IOBC. The current standard for the lieutenant in IOBC is to pass basic day and night

navigation training with a map and compass. During the advanced land navigation examination, students are allowed to use the precision lightweight global positioning system (PLGR) and AN/PVS-7B/D NVGs. However, student proficiency in the use of these two devices is not evaluated other than during this practical application.

BNCOC. The current standard for the BNCOC student is to pass basic day and night navigation training with a map and compass. Unlike IOBC, the BNCOC land navigation examination does not permit the use of the PLGR and AN/PVS-7B/D NVGs.

OSUT. Map reading for OSUT is limited to two classes on basic map reading, called MR1 and MR2. There is no associated land navigation instruction. MR1 enables the OSUT soldier to identify natural and man-made features on a map, and to determine grid coordinates and a magnetic azimuth between two points using a lensatic compass. MR2 reinforces much of MR1 plus enables the soldier to determine a magnetic azimuth and provides limited familiarity with the concept of terrain association. Both classes will be required regardless of the level of LW integration.

Discussion

IOBC and BNCOC. Projected classes will have to address the benefits of leaders being issued a GPS and whether or not the students will have access to this equipment when conducting the classes. Included in the decision is whether to continue or increase use of the PLGR versus LW GPS or not use either system for advanced land navigation training.

Classes will also have to address the impact of the LRF/DCA. Currently, no personal weapon is equipped with a laser range finder. Range is estimated. The LRF/DCA, projected to be issued to leaders and M203 gunners, can be used to determine ranges out to 2,500 meters and magnetic azimuths. Soldiers equipped with the LRF/DCA can also determine the range and azimuth to an enemy location or an objective. The overall impact will be determined based on the basis of issue for the LRF/DCA and a determination as to whether or not the students will have access to this equipment.

All LW leaders have the capacity to modify graphic control measures and digitally disseminate information to subordinates. The LW leader can also use the LW Planning Aid to aid in his terrain analysis and graphically plot the movement route. The LW computer will provide distance and movement times via a mission timer set to announce time distance factors at way points. At a minimum, both land navigation and tactics classes should address these LW capabilities.

The Infantry School will have to determine if the LW GPS, LRF/DCA, and the digital map and overlay will be used as part of land navigation training for all students. At a minimum, both land navigation and tactics classes should cover LW capability for improved positive location. Leaders must be trained on how position location information can be displayed and used to enhance their situation awareness and decision-making in all mission phases.

In current land navigation instruction, resection is taught to all IOBC and BNCOC students. Resection training for LW-equipped units should not be needed. The Infantry School will have to determine, as part of their overall LW training plan, how resection will be taught.

OSUT. The OSUT soldier currently receives no instruction on the GPS. LW integration of GPS and its application to the individual soldier will require additional training time. The use of LW navigation systems and insertion of land navigation training will need to be determined for tactical training as well. Since the OSUT soldier receives no instruction on military symbols, additional training time will also be required for instruction on operational graphics. Even with the LW system, all students will still need fundamental training on map reading skills. The content of the land navigation training might need to be changed based on the actual capabilities and displays of the LW system.

## Operational Techniques and Tactical Operations

### Summary of Findings

IOBC. The current standard for the lieutenant in IOBC is to pass the tactics block of instruction with an 80% or better examination score. Current IOBC classroom discussion and examinations must be expanded to incorporate critical LW tasks and capabilities.

BNCOC. The current standard for the BNCOC student is to pass the CMF 11 instruction examination with a 70% or better examination score. As with IOBC, BNCOC classroom instruction and examinations must be expanded to incorporate critical LW tasks and capabilities.

OSUT. There are no current standards for OSUT soldier knowledge of operational techniques or tactical operations. Soldier performance is evaluated informally as part of squad tactical training. The evaluation is conducted by drill sergeants and is solely performance-oriented.

### Discussion

IOBC and BNCOC. A decision must be made as to when to use the current doctrinal references or the LW versions. The doctrinal materials in question include FM 7-8 *Infantry Rifle Platoon and Squad* (DA, 1992a), ARTEP 7-8 MTP *Mission Training Plan for the Infantry Rifle Platoon and Squad* (DA, 1994b), and ARTEP 7-8-1 Drill *Battle Drills for the Infantry Rifle Platoon and Squad* (DA, 1993b).

Offensive tactics and air assault classes should include references to the LW CRS offering a computerized countdown timer capability for those tasks that require precise timing. Examples include events such as raid subtasks, movement routes, and landing zone (LZ) arrival and departure times. The timer can also be tied to both the indirect fire support as well as direct fire support from any support elements.

Defensive operations classes should include the use of the LRF/DCA to improve sector sketches, and other events such as laying a protective mine field. All tactics classes should include the use of the LRF/DCA and digital intelligence update reports to place enemy locations and positions on the digital overlay. The IOBC and BNCOC instruction focusing on reconnaissance and/or intelligence assets should point out that platoon or patrol leaders can use video images digitally transmitted by reconnaissance elements using their TWS or video camera to brief key personnel on a current or pending mission.

Both IOBC and BNCOC classes need to emphasize that the TWS and NSDC can also provide improved vision during periods of limited visibility. The TWS can also be used to see through smoke and dust. These facts warrant mention in all associated tactics classes.

Fire support classes should provide instruction and/or mention that the LW soldier computer interface (SCI) can be used to call for indirect fire. For IOBC, LW MQS II standards require the LW platoon leader to prepare a digital fire support plan for several missions. The LW CRS provides the capability to submit calls for fire in an automated fashion. Some of the information currently needed in a call for fire will be provided in an automated means so the person calling for or adjusting fires will be required to perform fewer functions or provide less information to the firing unit. With the LW system, the requestor either will be able to use his GPS to provide his exact location or the firing unit will know the caller's location through the automated tracking (situational awareness) capability. The classes should also include the use of the LRF/DCA to help adjust fires. Finally, all references ( *Observed Fire* [DA, 1991d]), graphic training aid (GTA) 7-1-32 *Observed Fire Reference Card* [DA, 1987], and GTA 17-2-15 *The Call For Fire* [DA, 1985]) must be changed to reflect the advantages of LW equipment to help adjust fire.

Tactics classes should mention that LW-equipped units can increase the distances between personnel crossing danger or large open areas up to 300 meters or use the two-man buddy system (as specified in ST 7-8-1 ("Mission training plan," 1998)). Flank security, using the two-man buddy system, can be doctrinally extended to 1.3 kilometers, the absolute range limit of the soldier radio. Additionally, voice communications or digital messages can be sent from the far side of a danger area, noting whether it is either safe or unsafe for the main body to cross.

Tactics classes should mention that command and control is improved based on individual availability of information. Rules of engagement (ROE) and standing operating procedures (SOP) can be downloaded into each individual's mission data module (MDM) as part of mission preparation.

Both IOBC and BNCOC tactics classes should mention that LW-equipped units provide their lieutenants (and all other leaders) the luxury of a Data Reference Library built into the computer system. Doctrinal sources (e.g. ST 7-8-1 ("Mission training," 1998)) are programmed into the computer and can be reviewed prior to executing a mission or conducting an ambush, for example. Checklists (including troop-leading procedure, consolidate and reorganize, preventive maintenance checks and services [PMCS]) are provided as guides and incorporated as pop-up

menus. The soldier can also generate his own tailored checklist. The computer will store up to 25 checklists with as many as 50 items each. Messages can be pre-written and saved. The leader simply selects the message and transmits it based on his assessment.

Tactics classes should explain that the LW can be used to disseminate information about the enemy and mission to each member of the platoon by voice or digital message via the soldier and squad radios. The digital map shown in the HHD used by leaders and the helmet mounted display (HMD) used by both the individual soldier and leader to enhance situational awareness by providing real-time images of events. Leaders will also use the HHD for entering and viewing information.

Tactics classes need to point out how the LW CRS can enhance all tactical operations. The computer is expected to be capable of providing rapid, digitized OPORDs, WARNOs, FRAGOs, jump manifests, reports, etc. Planned pre-programmed messages also include such reports as a digitized NBC 1, SALUTE, and spot reports.

Tactics classes should also specify how the LW-equipped platoon or patrol leader can use his digital map and LW Route Planning Aid to help his terrain analysis and select his route. The LW SCI will provide distances and projected movement times. The computer will store up to nine 1:50,000 scale digital maps (23 km by 22 km). Once operational, there will be five LW Planning Aid subfunctions. These subfunctions are orders, route planning, fire planning, minefields, and reconnaissance images. As currently planned, the computer can store five, 100 object range cards; five, 500 object unit fire plans; and five, 50 object hasty protective minefields. These considerations should be incorporated into any instruction.

Both IOBC and BNCOC instruction on defensive tactics will need to cover the use of the LW LRF/DCA: in sector sketch development, during periods of limited visibility, defining sector limits and establishing principal directions of fire, and engaging predetermined targets. The LRF can be used to determine range to a target reference point (TRP), provided it is within range, and the DCA can compute the azimuth to that TRP. The overlay function of the LW SCI can then be used to develop graphic overlays, including range cards, sector sketches, routes, and unit fire plans and forward them digitally. The planning goal is for the computer to be capable of managing 10 palettes specialized to a particular overlay type. These palettes are: observation points, fire support, friendly, enemy, route, tool, target, air space, traffic, sector identification, and obstacles.

The IOBC and BNCOC tactics classes should address the use of the AN/PAQ-4C, AN/PEQ-2A, and LRF/DCA lasers to provide an additional means for far recognition signals. The infrared (IR) beams can be seen by similar IR systems or devices capable of detecting these beams.

Fratricide prevention is a major issue covered in both offensive and defensive tactics classes in IOBC and BNCOC. These classes should explain how two approaching units or sub-elements can be readily identified by their LW systems to reduce the possibility of fratricide.

Both elements would set their LW CRS to automatically provide the other element with situational awareness information. The LW systems will then provide location data to each unit.

Both IOBC and BNCOC students must be informed on the use of the LW CRS to prepare and disseminate NBC 1 Reports. All of the NBC-related manuals (FM 3-3 *Chemical and Biological Contamination Avoidance* [DA, 1992c], FM 3-4 *NBC Protection* [DA, 1992b], FM 3-5 *NBC Decontamination* [DA, 1993c], FM 3-100 *Chemical Operations Principles and Fundamentals* [DA, 1996a], and GTA 3-6-8 *NBC Warning and Reporting System* [DA, 1996c]) must be upgraded to include LW equipment and procedures, particularly counteractions to any electromagnetic pulse (EMP) threat.

Individual soldier and team tactical movements should be improved through the use of the soldier radios coordinating the movement and the tracking of individual soldiers. Training must also emphasize that radio usage needs to be controlled to avoid unnecessary chatter that clutters nets and could compromise tactical operations.

With the introduction of LW equipment, the fundamentals of patrolling should be reviewed and redefined. For example, a current practice is to record information gathered in a reconnaissance mission or while reconnoitering an area or zone. The video link and computer interface could provide an automatic information feed to higher level organizations, precluding the requirement for soldiers on the ground, close to target positions, from needing to record information and make rough sketches. Additionally, some of the patrolling basics could be simplified or accomplished more easily. For example, the laser range finder and GPS could help more accurately locate a suspected enemy target. The increased communications capability should facilitate passing information between patrol members operating in the vicinity of the same target and in maintaining communication with observation posts (OPs). Thermal sights could help detect potential targets within a given target area.

The fundamentals of military operations on urbanized terrain (MOUT) will need to be reviewed and discussed. While a draft guide has been prepared, ST 90-10-1, *Land Warrior Infantryman's Guide to Combat in Built-up Areas* ("Land Warrior Infantryman's," 1998), the MOUT doctrinal manual will need to be updated to reflect revised LW capabilities. For example, the optics systems allow a soldier to observe and accurately engage targets around a corner (into a room) without exposing himself. This could reduce the reliance on using grenades as the first option for clearing a room before entering. MOUT classes should also stress that the increased communications capability should facilitate passing information between teams operating in the same building. Thermal sights could help detect potential targets within the target area.

OSUT. While OSUT tactical instruction is at a lower level than IOBC and BNCOC, many of the above fundamentals apply directly to OSUT as well. For example, individual infantryman are the ones who clear rooms in a MOUT environment, man unit OPs, and walk point during movement where chance encounters and fratricide are likely. As the operational doctrine is refined to accommodate LW capabilities and leader training is adjusted, so too must the training for OSUT soldiers be changed.

## Computer Skills

### Summary of Findings

Background. Of all of the LW subsystems, the computer-radio subsystem, or CRS, will prove to be the most challenging for integration. The subsystem is unique to LW and new to the force. The problem is two-fold, operational training on a technical system that is new to the force and a possible lack of basic computer skills.

IOBC and OSUT. Neither the IOBC nor OSUT soldier receive any training on computer skills.

BNCOC. There are no current computer skill training standards for BNCOC. The Infantry Advanced Non-commissioned Officer Course (ANCOC) and BNCOC have started to address the problem of lack of computer knowledge and experience by teaching a four-hour block of familiarization instruction. This instruction, however, is not rigorous. The class is on general computer use for those personnel who do not feel comfortable working with the computer, not training of skills.

### Discussion

There are two basic issues regarding the LW computer. The first is whether individuals have the requisite basic computer skills to "maneuver" in the LW software. The second issue is the need to learn the LW software itself and all of its (or selective) capabilities. Sequencing both blocks of instruction to make it meaningful and to use it as a building block for other LW computer-based application will be a critical task for the Infantry School. The leader and soldier cannot simply go to the field and perform well with the system if these basic and LW-specific skills do not exist.

The problem concerns individual knowledge of and skill with computer operations. This will require early identification and tailored additional instruction for select personnel. In a separate effort, the Army Research Institute (ARI) Infantry Forces Research Unit (IFRU) prepared a computer survey to examine the computer background of Infantrymen (Dyer & Martin, 1999). IOBC, BNCOC, and OSUT students were asked a series of questions concerning their basic computer knowledge, rated their performance level and understanding of computer operations, and identified a series of commonly-used icons. Individual self-ratings of computer expertise ranged from expert to novice, and corresponded to the icon test scores (graphics representing an application designed for a particular purpose) in *Windows*®-based software programs. IOBC students had the most computer background. However, with both BNCOC and OSUT almost half of the students had limited computer skills.

The computer background of soldiers must be considered as it impacts their ability to learn the LW system quickly and to employ it well. The better background a student has in computer operations, the easier he will understand the tactical, reporting, and graphic functions

of the LW computer. Understanding how a basic computer operating system works is a prerequisite to learning the software programs within any computer system. For example, most operating systems are based on *Windows*® technology. The LW software will also be based on *Windows*® technology, and therefore have a basic commonality with much commercial software, despite the use of some icons and functions that must be new and unique to the LW system. As a result of this commonality, the majority of soldiers will understand that the LW icons are used to gain access to various menus, even though they may not understand what a particular LW icon represents. The novice, on the other hand, will not have the benefit of this basic knowledge and of common terms like hidden and pop-up menus, control panel, cursor, display, title bars, scrolling, etc. He must "play catch-up" from the inception of the class. In extreme circumstances, this lack of basic knowledge can cause the student to "freeze up," negating the entire instruction.

Within each course, the Infantry School will need to consider the percentage of these soldiers without a computer background. As indicated in the Dyer and Martin (1999) report, limited basic computer skills are not expected to create serious problems in IOBC given the educational experiences of the lieutenants. If the number of soldiers with limited backgrounds is substantial, "remedial" or "special" training complete with standard for these soldiers will have to be developed and provided prior to LW computer instruction per se. Other options could be letting a student test out if he already has basic skills, or take an abbreviated block of instruction on a weak area.

The second issue is the need to learn the LW software itself and all of its (or selective) capabilities. The projected LW computer system is complex, providing an array of information and capabilities to all leaders and soldiers. There is no other system from which training can be drawn. All operational training on the system will require additional course time. Decisions must be made as to the length of the LW computer training, whether and how the knowledge and skills covered will vary with the soldier's duty position, how the CRS will be taught, the required performance standards, and whether the training will be concentrated in a single block of instruction or distributed throughout the course. Suffice to say, if no additional time is allocated, a follow-on decision must be made as to what current training will be curtailed. Also, given the complexity and vast number of tasks associated with the LW computer, remedial training should be planned for, whatever training option is selected.

## Training Options for How to Address LW in IOBC, BNCOC, and OSUT

### General

Regardless of the training option, the crawl-walk-run approach should be used. As envisioned, soldiers can be trained on individual tasks inherent to the LW system during formal classroom instruction. Once the soldier has learned to use LW functions, he can be introduced to situations that cause him to combine and integrate multiple functions. Lane training is one possibility. Selected critical soldier, leader, and mission essential task list (METL) and/or collective tasks are taught using specific terrain. Lane training uses multi-echelon techniques to maximize efficient use of limited terrain and control conditions in a field environment. Training

tasks could culminate with the use of situational training exercises (STXs). STXs are mission-related, limited exercises designed to train one collective task or a group of related tasks and drills. They usually include drills, leader tasks, and soldier tasks.

IOBC makes use of extensive STXs to reinforce earlier instruction. For LW-based STXs, scenarios and vignettes should focus on incorporating tactics appropriate for LW, stressing the integration of all subsystems to accomplish a given task. The use of LW-based scenarios, replacing the current ARTEP 7-8 MTP (DA, 1994b) with ST ARTEP 7-8-1 MTP (LW) ("Mission training," 1998), provides the doctrinal hands-on training with the integration of LW equipment. Appendix F provides a comparison of a current IOBC STX and the additional considerations and equipment required to make the STX LW-based.

Lane training is used extensively in BNCOC as part of field training. It is an excellent option for training combined skills. Lane training allows BNCOC to train several critical tasks, usually associated with specific missions, and to reinforce classroom instruction. This type of instruction is far less resource intensive than STXs.

The cornerstone of OSUT is hands-on instruction. Individual tasks are demonstrated to the OSUT soldier. The individual soldier immediately conducts practical exercises to acquire specific knowledge by physically "doing" the task. Reinforcement training is received either through additional formal instruction or informal instruction by the soldier's drill instructor (DI). Individual task training is followed by instruction on collective tasks, requiring the combined actions of several soldiers. Again, reinforcement training is completed either through formal instruction or through additional informal instruction conducted by the DI. OSUT also conducts lane training and culminates tactical instruction with field training exercises (FTXs).

Given the level of LW tasks for the individual soldier, additional training time will be required in OSUT. This is due in part because many basic skills related to more advanced LW tasks are currently not taught in OSUT (e.g. no radio operating procedures and reporting procedures as they relate to the communications capability of the CRS.) Basic skills will have to be taught in addition to related LW tasks. Existing instruction will still be needed and cannot be a "bill payer."

There is also the issue of LW training devices and their impact on the three courses. LW training devices remain to be resolved. The amount and type of devices will dramatically affect other training times. Developmental decisions will should be made before any additional POI reviews are undertaken by the Infantry School for LW integration. These decisions include both the degree of embedded training and the possible use and extent of virtual reality simulations for IOBC.

Finally, there is the corresponding issue of the level of LW instruction. Given the advanced (and complex) tasks associated with LW, some instruction may be too advanced for the current target audience. Some instruction that was given at one level may require elevation to another professional level. Correspondingly, basic skill training or related subtasks taught at one

level may be forced down to another lower professional level. In other words, what was given to ANCOC NCOs, may now be necessary in BNCOC, or similarly trickle down to OSUT soldiers.

## Training Options

This section presents several options for integrating LW into each of the courses. The current system training plan (STRAP, "System Training Plan," 1999) outlines the following strategy for the initial institutional training. A LW leader course that combines training for officers and NCOs would be offered. For OSUT, a LW course would be taught after the completion of the current OSUT. This strategy corresponds to Option II presented below for each course. However, our Option II does not specify combining officer and NCO training as stated in the STRAP.

We have presented several options because the appropriateness of any specific option may vary with the status of LW fielding. What works when LW is almost completely fielded may not be the best interim solution. In addition, there is value to documenting the perceived advantages and disadvantages of each option.

### IOBC

Four training options emerged as possible solutions for the integration of LW into IOBC. These were: integrating complete training in IOBC for all lieutenants; integrating an overview/introduction in IOBC with a detailed add-on for selected lieutenants; integrating complete training in IOBC as a separate track for selected lieutenants; and developing an exportable training package for unit implementation. A factor to consider when examining the IOBC training options is that, except for lieutenants with prior service, IOBC students are new to the operational Army.

Option I: Integrate complete training in IOBC for all lieutenants. Provided the final basis of issue plan (BOIP) indicates complete Army-wide fielding and enough equipment is issued to the Infantry School, the best choice would be to integrate complete training in IOBC for all lieutenants. Integration of the GFE systems, particularly weapons and corresponding optics systems, would be substituted for existing equipment. Outmoded equipment and tactics would be deleted from the POI, freeing instruction time for LW-specific training. All instruction could then be converted to LW-specific training. However, the likelihood that enough equipment would be made available to the Infantry School for complete conversion may not be realistic even though the Department of the Army may dictate Army-wide fielding. The M2 Bradley Fighting Vehicle (BFV), M249 SAW, and M9 9mm automatic pistol are demonstrated experiences of new equipment being issued without the Infantry School having enough initial equipment for complete training.

Option II: Integrate overview/introduction in IOBC with a detailed add-on for selected lieutenants. Another option is to integrate a LW overview or introduction in IOBC, providing a detailed add-on for selected lieutenants scheduled for LW assignments. In essence, this is a system where all officers receive a standard IOBC, followed by intensified training consisting of

LW-specific training. The first blocks of instruction in the add-on would include LW component-specific training, training on the LW capabilities that interface with more traditional instruction (fire support, call for fire, land navigation, communications, etc.), and leader training on providing LW instruction and troubleshooting. The instructional period would provide remedial training (as required) and adequate range firing, both day and night, emphasizing bore sighting, optics, and possibly a live-fire exercise (LFX) stressing communications and command and control problems. Tactics classes would stress the integration of LW capabilities in planning, preparing for, and executing missions, and would present increasingly challenging STXs that force maximal use of the LW system functions.

This option does not burden IOBC with conducting detailed instruction for all lieutenants, often forcing a choice between instructional subjects. One or two LW overview or introduction classes would be provided to all in the form of familiarization training. The LW tactics and general capabilities or enhancements would be limited to instructional comments and sprinkled throughout IOBC within the appropriate subjects. In this way, all lieutenants learn LW capabilities yet also receive the same overall instruction. Any GFE would be integrated into the appropriate systems classes. The detailed add-on training would be presented in the form of a LW-focused tracked training.

Option III: Integrate complete training in IOBC as a separate track for selected lieutenants. This option provides a demonstrated method of training individuals specifically earmarked to perform identified skills. The Infantry School has successfully "tracked" heavy versus light infantry training in the past (mid-1970s). The tracking was based on the initial assignment of each lieutenant. Common training (referred to as the IOBC Basic Course) was attended by all "tracks," regardless of initial assignment. After the basic course, those officers scheduled for assignment to light infantry units attended light infantry-intensive training. Lieutenants assigned to mechanized units received heavy infantry-intensive training. The cost in terms of supporting resources (e.g., ranges, equipment, range personnel, time, and instructors) and cadre is high, at times virtually duplicating initial requirements. Extending IOBC also increases school support costs for the weeks of additional training. There is also some "instructional loss" for corresponding groups of lieutenants. For example, LW lieutenants may receive instruction on LW-specific software functions and menus, then attend instruction on basic tactics and fundamental training focusing on general infantry tasks. Several weeks later, depending on the schedule, they may return to LW instruction and continue to a more complex LW task. This break in LW instruction may result in a loss in retention of the skills/background necessary for the more complex tasks.

Option IV: Develop an exportable training package for unit implementation. This option provides minimal impact to the existing IOBC. One or two LW overview or introduction classes are provided to all lieutenants in the form of familiarization training. The LW tactics and general capabilities or enhancements are limited to instructional comments and sprinkled throughout IOBC within the appropriate subjects. In this way, all lieutenants learn LW capabilities yet also receive the same instruction. The GFE equipment would be integrated into the appropriate systems classes. An exportable training package is developed where the lieutenant is trained at his unit. The cost to the Infantry School is minimized; however, there are major concerns with

this option. First, there is a risk that the limited LW training received in IOBC will be lost by the time the officer reaches his initial assignment (X number of weeks of IOBC followed by leave time). Second, the goal should be to prepare the lieutenant to be proficient with LW when he assumes a LW-platoon command. This option does not meet this goal. He comes in unprepared, whereas the platoon is proficient. With LW, the system is not an option for the lieutenant (as is the M240B machinegun or the M249 SAW). He must use the computer, communications, etc. Additionally, the potential for actual deployment is real. The lieutenant may not have the time to learn the system with an exportable training package. Finally, and the major consideration, once an exportable training package is delivered to the unit for implementation, all influence is lost by the Infantry School as to instructional standardization, completeness of training content, quality of the instruction, and performance assessment.

BNCOC

Five training options emerged as possible solutions for the integration of LW into BNCOC. Four paralleled those proposed for IOBC: integrating complete training in BNCOC for all NCOs; integrating overview/introduction in BNCOC with a detailed add-on for selected NCOs; integrating complete training as a separate track for selected NCOs; and developing an exportable training package for unit implementation. Unlike IOBC, a fifth option is to maintain the status quo.

Option I: Integrate complete training for all NCOs. Like IOBC, this option assumes that the final BOIP indicates complete Army-wide fielding and enough equipment is issued to the Infantry School to integrate complete training. Time for the integration of the GFE systems, particularly weapons and corresponding optics, would have to be added or found through a complete POI review.

Option II: Integrate overview/introduction with a detailed add-on for selected NCOs. Another option is to integrate a LW overview or introduction, providing a detailed add-on for selected NCOs scheduled for LW-equipped assignments. Like IOBC, this is a system where all NCOs receive a standard BNCOC, followed by intensified training consisting of LW-specific training. The intensified BNCOC detailed LW instruction add-on might be shorter than IOBC since leader tasks are generally limited to those of the squad and/or patrol structures. However, the increasing demand on junior leaders to perform at higher levels may require more training time. The first blocks of instruction in the add-on would include LW component-specific training, training on the LW capabilities that interface with more traditional instruction (fire support, call for fire, land navigation, communications, etc.), and leader training on providing LW instruction and trouble-shooting. The next blocks of instruction would provide remedial training (as required) and adequate weapons training to include related range firings. Tactics classes would force NCOs to integrate LW capabilities in their role as leaders.

Option III: Integrate complete training as a separate track for selected NCOs. Like IOBC, this option provides a demonstrated method of training individuals specifically earmarked to perform identified skills. Common training (the basic course) would be attended by all "tracks," regardless of initial assignment. Those NCOs scheduled for or returning to assignments to LW-

equipped infantry units attend LW-specific training while the remaining soldiers attend the more traditional instruction. With this option, the cost in terms of supporting resources (e.g., ranges, equipment, range personnel, time, and instructors) and cadre is high, at times duplicating initial requirements. Like IOBC, creating tracked instruction for BNCOC also increases school support costs for the additional training.

Option IV: Develop an exportable training package for unit implementation. Like IOBC, this option provides minimal impact to the existing instruction, and the concept is the same. Overview or introductory LW classes are provided to all NCOs for familiarization training. The LW tactics and general capabilities or enhancements are limited to instructional comments and sprinkled throughout the appropriate subjects. In this way, all NCOs learn LW capabilities yet also receive the same instruction. The GFE would be integrated into the appropriate systems classes. An exportable training package is developed where the NCO is trained at his unit. The cost to the Infantry School is minimized.

The major concerns with this option are the same as those identified in IOBC. Additionally, since BNCOC does not conduct live fire or hands-on weapons training on GFE weapon systems, a training shortfall will occur. Training on the weapon systems can be readily overcome through home station training and self-study. However, placing the associated LW target acquisition systems into operation and the procedures for bore sighting these systems are more complex. As a result, the NCO, in his capacity as a direct line supervisor, will be placed at a severe disadvantage until he can bring himself "up to speed" at his unit.

Option V: Maintain the status quo. An option available to BNCOC, but not to IOBC, is to maintain the current level of instruction. Unlike the IOBC lieutenant, the NCO at BNCOC has unit experience and undergone previous training both as an individual and as a member of the unit. This option assumes the NCO in BNCOC has received LW training in OSUT, in his unit, or in both locations. Integration of LW in BNCOC would be limited to overview/introductory material with specific comments and information reinforcing the current instruction. The infusion of LW could put some NCOs at an initial disadvantage. Any NCO shortfall in LW knowledge and capabilities at the unit would be reduced through the use of LW-trained peers, the LW-trained platoon leader, additional unit LW training, and/or self-study. As new NCOs progress through the ranks and the LW fielding is almost complete, this issue of an NCO shortfall in LW knowledge and skills will disappear.

OSUT

The four training options common to IOBC and BNCOC also emerged as possible solutions for integrating LW into OSUT. These were: integrating complete training in OSUT for all soldiers; integrating a LW overview/introduction in OSUT with a dedicated LW add-on course; integrating complete LW training as a separate track for selected soldiers; and developing an exportable training package for LW unit use. However, the details of some options vary somewhat from those proposed for IOBC and BNCOC, because of the uniqueness of the soldier population and the OSUT course of instruction. A key factor to consider when examining the training options is that OSUT students are new to the Army.

Option I: Integrate complete LW training in OSUT for all soldiers. As with IOBC, the best choice would be to integrate complete LW training in OSUT, provided the final BOIP indicates complete Army-wide fielding and enough equipment is issued to the Infantry School. Integration of the GFE systems, particularly weapons and corresponding target acquisition and optics systems, would be substituted for existing equipment. Outmoded equipment and tactics would be deleted from the POI, freeing instruction time for LW-specific training.

Option II: Integrate overview/introduction in OSUT with a dedicated LW add-on course. Another option involves a LW overview or introduction embedded within OSUT, with a detailed add-on for soldiers scheduled for LW assignments. In essence, all soldiers receive a standard OSUT, followed by an intensified LW training course of instruction. The strategy for this integration is the same as that presented for IOBC and BNCOC.

Soldiers scheduled for LW-units would then attend an add-on course offering LW component-specific training and training on the LW capabilities that interface with more traditional instruction (fire support, call for fire, land navigation, communications, etc.). The instructional periods would provide remedial training, as required. It should also provide adequate range firing, both day and night, emphasizing target acquisition systems, bore sighting, LW navigation functions, and LW communications and command and control capabilities. This option does not burden OSUT with conducting detailed LW instruction for all soldiers. Also, much of the OSUT instruction is presented by the DIs. Especially during the early phases of LW fielding, DIs will not have the first-hand experience and necessary knowledge to adequately present this training.

Option III: Integrate complete training in OSUT as a separate track for selected soldiers. Like IOBC and BNCOC, this option provides a demonstrated method of training individuals specifically earmarked for unique training. The rationale for its use is the same as for 11C versus 11B OSUT platoon training. The "tracking" is based on the initial assignment of the soldier. Common training is attended by all infantry "tracks," regardless of their initial assignment. Specific "blocks" of time are set aside for LW-specific training. LW-bound soldiers would attend additional LW-intensive training in lieu of more traditional infantry instruction. This option increases the administrative burden on the OSUT staff. Additionally, there is a high training investment associated with an initial entry soldier whose retention may ultimately be an issue. The cost in terms of supporting resources (e.g., ranges, equipment, range personnel, time, and instructors) and cadre is high, at times virtually duplicating initial requirements. It may also require extending OSUT. Extending OSUT will increase school support costs for the additional training.

Option IV: Develop an exportable training package for unit implementation. This option, the same as Option IV cited under IOBC and BNCOC, provides minimal impact to the existing OSUT POI, but is the least desirable. The soldier receives his LW training at his unit through an exportable training package, and the cost to the Infantry School is minimized. The major concerns with this option are as follows. First, OSUT currently teaches only a portion of the requisite skills for an 11B10. The preponderance of 11B10 tasks are taught at the unit. The

addition of even more tasks may prove a burden at the unit level. Second, the potential for actual deployment is quite real. The soldier may not have the time to learn the LW system before being sent into a potentially hostile situation. He will be armed with a system that improves both his survivability and lethality without understanding how to use it. This situation would increase the current demands placed on the unit's officers and NCOs. Third, use of an external training package may prove detrimental to individual soldier morale. The soldier comes into the unit unprepared, whereas the entire unit is LW proficient. Peer acceptance of this new team member may also be adversely affected by the soldier's inability to immediately "do his job." Finally, and a major consideration, once an exportable training package is delivered to the unit, all influence is lost by the Infantry School as to instructional standardization, completeness of training content, quality of the instruction, and performance assessment.

## Conclusions

The LW system offers some unique training challenges for the institution. First, the subsystems forming the LW ensemble system are comprised of both LW-specific and GFE. Secondly, the baseline training packages for both types of equipment are still being finalized. Specific training requirements at this point are subject to change. These issues include how individual tasks are accomplished; which tasks should be trained for different segments of the Infantry population; the most cost-effective means of training; the LW tactics, techniques and procedures, and performance measures and standards. Decisions in these areas will have a major impact on training resources — on requirements for equipment, training devices, training support material/aids, ammunition, ranges, instructors (number and train-up), and training time.

The CRS raises two training issues: training basic computer skills and training the LW software itself. Surveys have indicated a vast disparity in computer knowledge and use within the Infantry population. The major question to be resolved is how to integrate use of the LW computer into instruction on specific tasks. The instruction must be sequenced, identifying which computer skills are taught/tested up-front and which are then delayed and incorporated with specific task/area training – such as fire support, call for fire, and land navigation.

Finally, the LW-specific equipment itself is still evolving, although the GFE items are known and completed initial testing. The BOIP is firm; LW equipment will be issued to all five types of Infantry. When the fielding plans and fielding timelines for both GFE and LW-specific equipment are final, the Infantry School will be able to make specific decisions regarding the best way (or ways) to phase-in LW training for leaders and soldiers. The information in this front-end analysis is a foundation for making these decisions.

## References


*Battle drills for the Land Warrior infantry rifle platoon and squad* (Special Text ST ARTEP 7-8-1 Drill; Final draft for Land Warrior testing). (1998, March).

Department of the Army. (1984a, February). *Machinegun, 7.62mm, M60* (FM 23-67). Washington, DC: Author.

Department of the Army. (1984b, December). *Operator's manual for 40mm grenade launcher, M203* (TM 9-1010-221-10). Washington, DC: Author.

Department of the Army. (1985, October). *The call for fire* (GTA 17-2-15). Washington, DC: Author.

Department of the Army. (1987, June). *Observed fire reference card* (GTA 7-1-32). Washington, DC: Author.

Department of the Army. (1988, September). *Soldier's manual and trainer's guide, MOS 11B, 11C, 11H, and 11M Infantry, Skill levels 1/2/3/4* (STP 7-11BCHM14-SM-TG). Washington, DC: Author.

Department of the Army. (1989, July). *M16A1 rifle and M16A2 rifle marksmanship* (FM 23-9). Washington, DC: Author.

Department of the Army. (1990, September). *Training the force: Battle focused training* (FM 2-101). Washington, DC: Author.

Department of the Army. (1991a, July). *Infantry branch (11), company grade officer's manual* (STP 7-11 II-MQS). Washington, DC: Author.

Department of the Army. (1991b, July). *Operator's manual for machine gun, 5.56mm, M249 w/equipment* (TM 9-1005-201-10). Washington, DC: Author.

Department of the Army. (1991c, July). *Operator's manual for machine gun, 7.62mm, M240 and M240B, M240C, M240E1, M240G* (TM 9-1005-313-10). Washington, DC: Author.

Department of the Army. (1991d, July). *Tactics, techniques, and procedures for observed fire* (FM 6-30). Washington, DC: Author

Department of the Army. (1992a, April). *Infantry rifle platoon and squad* (FM 7-8). Washington, DC: Author

Department of the Army. (1992b, May). *NBC protection* (FM 3-4). Washington, DC: Author

Department of the Army. (1992c, November). *Chemical and biological contamination avoidance* (FM 3-3). Washington, DC: Author.

Department of the Army. (1993a, September). *Operator's and unit maintenance manual for light, aiming, infrared AN/PAQ-4B* (TM 11-5855-301-12&P). Washington, DC: Author.

Department of the Army. (1993b, November). *Battle drills for the infantry rifle platoon and squad* (ARTEP 7-8-1 Drill). Washington, DC: Author.

Department of the Army. (1993c, November). *NBC decontamination* (FM 3-5). Washington, DC: Author

Department of the Army. (1994a, January). *M249 light machinegun in the automatic rifle role* (FM 23-14). Washington, DC: Author.

Department of the Army. (1994b, September). *Mission training plan for the infantry rifle platoon and squad* (ARTEP 7-8 MTP). Washington, DC: Author.

Department of the Army. (1996a, May). *Chemical operations principles and fundamentals* (FM 3-100). Washington, DC: Author

Department of the Army. (1996b, July). *Operator's manual for machine gun, 7.62mm, M240 and M240B, M240C, M240E1, M240G* (TM 9-1005-313-10). Washington, DC: Author.

Department of the Army. (1996c, August). *NBC warning and reporting system* (GTA 3-6-8). Washington, DC: Author.

Department of the Army. (1997a, January). *Operator's and unit maintenance manual, sight, thermal, AN/PAS-13 (V)2 and AN/PVS-13 (V)3* (TM 11-5855-302-12&P). Washington, DC: Author.

Department of the Army. (1997b, May). *Staff organization and operations* (FM 101-5). Washington, DC: Author.

Department of the Army. (1997c, October). *Operator's and unit maintenance manual for target pointer illuminator/aiming light (TPIAL) AN/PEQ-2A* (TM 11-5855-308-12&P) (Draft). Washington, DC: Author.

Department of the Army. (1998a, October). *Operators and unit maintenance manual including repair parts and special tools list for M68 sight, reflex, w/quick release and mount* (TM 9-1240-413-12&P). Washington, DC: Author.

Department of the Army. (1998b, October). *Operator's manual for rifle, 5.56mm, M16A2 w/e, M16A3, M16A4, carbine M4 w/e* (TM 9-1005-319-10). Washington, DC: Author.

Dyer, J. L. (1999, November). *Training lessons learned on sights and devices in the Land Warrior (LW) weapon subsystem* (Research Report 1749). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Dyer, J. L., & Martin, G. H. (1999). *The computer background of Infantrymen: FY99* (Research Report). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. Manuscript submitted for publication.

Goodman, G. W. (1999, October). Revolutionary soldier. *Armed Forces Journal International*, 56-64.

*Land Warrior Infantryman's guide to combat in built-up areas* (ST 90-10-1; Final draft for Land Warrior testing). (1998, March).

*Land Warrior MQS qualification standards II infantry branch (11), company grade officer's manual* (ST 7-11 II-MQS; Final draft for Land Warrior testing. (1997a, August).

*Land Warrior MQS qualification standards II manual of common tasks for lieutenants and captains* (ST 21-II-MQS; Final draft for Land Warrior testing). (1997b, November).

*Mission training plan for the Land Warrior infantry rifle platoon and squad* (ST ARTEP 7-8-1 MTP (LW), Final draft for Land Warrior testing). (1998, March).

*Operational requirements document (revised) for Land Warrior (LW).* (1999, August).

*Operator's manual for Land Warrior system* (Draft Equipment Publication 11-5895-XXX-10; Draft prepared for review). (1998, March).

*System training plan for the Land Warrior system* (STRAP). (1999, November).

## Appendix A: Land Warrior Equipment

Land Warrior (LW) is the U.S. Army's first-generation, integrated soldier fighting system. It fully integrates weapons and communications systems. It has a modular design that is easily reconfigured to meet mission needs. It allows the distribution of battlefield information to the force in digital form. LW interfaces with other developmental Army systems to provide the Army-wide capability to conduct operations.

Listed below are the six major subsystems of the Land Warrior System. An asterisk (*) denotes those items that are government-furnished equipment (GFE).

| Major Subsystem | Component Part |
|---|---|
| Weapon Subsystem | M4 Modular Weapon System with Pistol Grip*<br>M249 Squad Automatic Weapon (SAW)*<br>M240B Machine Gun*<br>M203 Grenade Launcher*<br>M68 Close Combat Optic (CCO)*<br>AN/PAS-13 Thermal Weapon Sight (TWS)*<br>AN/PAQ-4C Infrared (IR) Laser Aiming Light*<br>AN/PEQ-2A Target Pointer Illuminator/Aiming Light (TPIAL)*<br>Daylight Sight/Video Camera<br>Laser Rangefinder/Digital Compass Assembly (LRF/DCA) |
| Integrated Helmet Assembly (IHAS) Subsystem | Advanced Ballistic Shell Helmet and Suspension/Retention System<br>Helmet-Mounted Monocular Day Display<br>Night Sensor with Integrated Flat Panel Display<br>Laser Detector Module<br>Integrated Microphone and Headset<br>Ballistic/Laser Eye Protection (BLEPS) or Special Protective Eyewear Cylindrical System (SPECS)*<br>M45 Chemical/Biological Protective Mask* |
| Computer-Radio Subsystem (CRS) | Scalable Pentium© Processor-Based Computer Assembly<br>Integral Global Positioning System (GPS)<br>Soldier Radio Assembly<br>Squad Radio Assembly<br>Handheld Flat Panel Display/Keyboard (Leader version)<br>System Control Module (SCM) |
| Protective Clothing and Individual Equipment (PCIE) Subsystem | Modular Body Armor with Ballistic Plates<br>Integrated Load-Carrying Frame with Electronic Component Housing<br>Chemical/Biological Protective Garments*<br>Integral Radio and Global Positioning System Antennas<br>Modular, Mission-Tailorable Rucksack System |
| Software Subsystem | Power Management Module<br>Tactical and Mission Data Support Modules<br>Joint Technical Architecture (JTA) Compliant Maps and Tactical Overlays Displayed, Transmitted Display/Capture Video Images<br>Intuitive, Easy-to-Learn Graphical Interface |
| System Interconnect and Controls Subsystem | System Control Module<br>Battery Box<br>Cables and Harnesses<br>2 Button Switch |

The following is a breakdown of the six major subsystems of the LW System. Although several sources were used, DEP 11-5895-XXX-10, a Draft Equipment Publication (*"Operator's Manual for Land Warrior System,"* 1998), was the preferred source.

## Weapon Subsystem (WS)

The WS provides integrated target acquisition, location, and marking capabilities. The WS has multiple configurations. It consists of a modular weapon with attached optical, infrared, and thermal sensors. It interfaces with the Computer/Radio Subsystem (CRS) and Integrated Helmet Assembly Subsystem (IHAS). The WS consists of the following components: Modular Weapon (M4E2); M249 Squad Automatic Weapon (SAW); M240B Machine Gun; M203 Grenade Launcher; Close Combat Optic (CCO); Thermal Weapon Sight (TWS); Infrared (IR) Laser Aiming Light; Target Pointer Illuminator/Aiming Light (TPIAL); Video Camera; and Laser Range Finder/Digital Compass Assembly (LRF/DCA).

### Modular Weapon

The modular weapon consists of an M4E2 carbine rifle with a Rail Adapter System (RAS) installed. The modular weapon increases the fighting capability of the rifleman. The modular weapon is a gas operated, shoulder fired, air-cooled, magazine fed, selective fire caliber 5.56mm rifle/carbine. The RAS provides the ability to quickly install and remove weapon sensors. All positions in the LW-equipped squad, except the M249 gunner, carry a modular weapon. For additional information on the M4E2 carbine, refer to TM 9-1005-319-10 (DA, 1998b). The modular weapon is GFE.

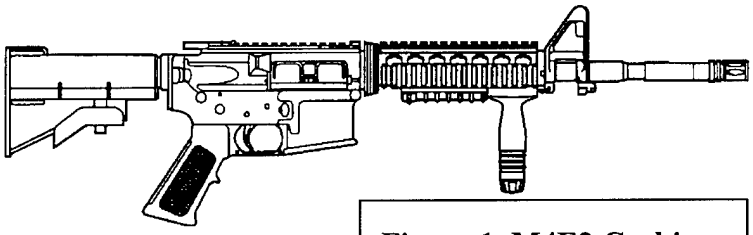


**Figure 1. M4E2 Carbine.**

### M249 Squad Automatic Weapon

The M249 SAW is a rapid fire machine gun. The M249 SAW is belt-fed, gas-operated, air-cooled and fires from the open bolt position. The authorized round for the M249 SAW is the 5.56mm. It can be fired from the shoulder or hand-held position, bipod-steadied position, or from the tripod-mounted machine gun position. The automatic rifleman is the only position that carries the M249 SAW. The TWS or TPIAL is mounted on the M249 feed tray rail. The M249 is GFE for LW. For additional information on the M249, refer to TM 9-1005-201-10 (DA, 1991b).

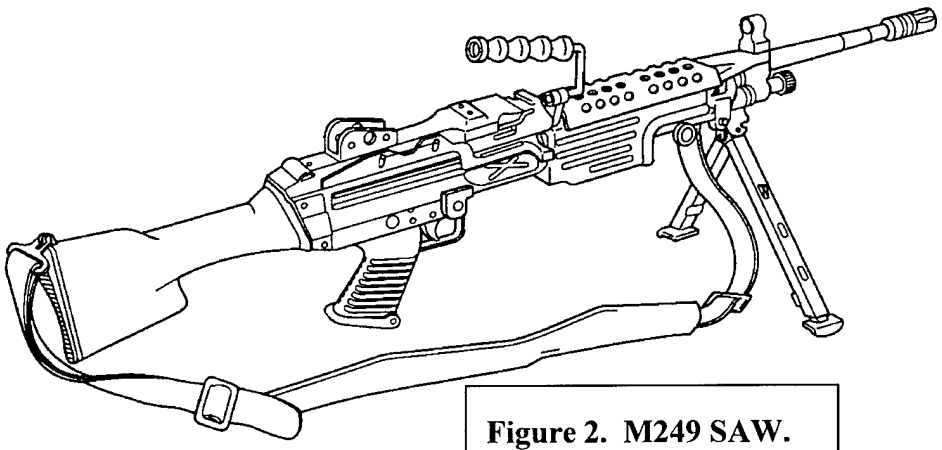


**Figure 2. M249 SAW.**

M240B Machine Gun

The M240B machine gun is gas-operated, mounted on a coaxial mount, and fires from the open bolt position. The 7.62mm is the authorized round for the M240B machine gun. The M240B machine gun has a buttstock and can be ground-mounted on the M122A1 Tripod Mount or integral bipod. The TWS or TPIAL are mounted on the M240B feed tray rail. The M240B replaces the M60 machine gun and is GFE for LW. For additional information on the M240B, refer to TM 9-1005-313-10 (DA, 1996b).

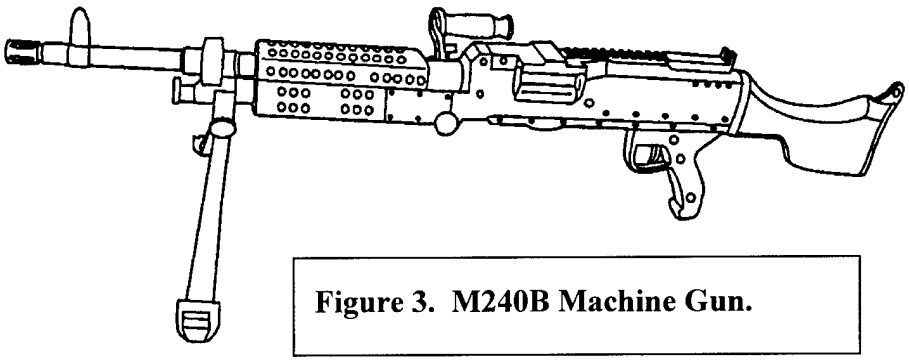


**Figure 3. M240B Machine Gun.**

M203 Grenade Launcher

The M203 Grenade Launcher is attached to the bottom of the modular weapon replacing the bottom rail of the RAS. The grenadier is the only position to carry the M203 Grenade launcher. The M203 grenade launcher is GFE for LW. For additional information on the M203 grenade launcher, refer to TM 9-1010-221-10 (DA, 1984b).

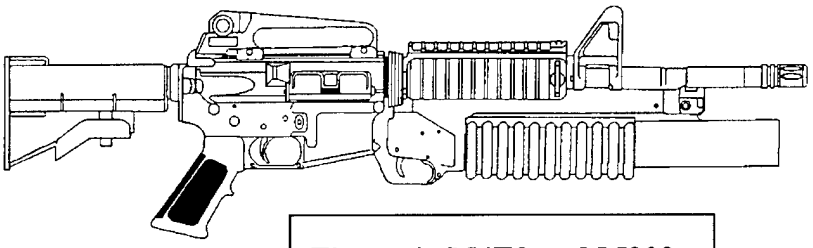


**Figure 4. M4E2 and M203.**

M68 Close Combat Optic (CCO)

The M68 CCO mounts to the modular weapon top rail in place of the TWS. The CCO is used primarily for daylight operations when there are unobstructed conditions, in the short to medium range. The CCO uses a red aiming reference (collimated dot) and is designed for "two eyes open" method of sighting and firing. The dot follows the horizontal and vertical movement of the gunner's eye while remaining fixed on the target. No centering or focus is required. A replaceable battery provides power to the CCO. Every position except the automatic rifleman carries a close combat optic. The CCO does not have an interface with the CRS or IHAS. It is GFE for LW.

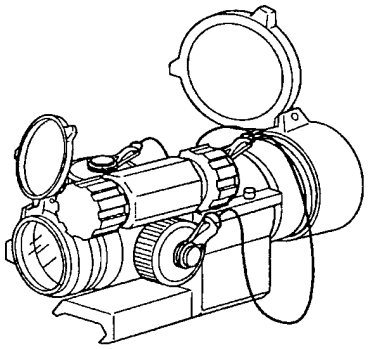


**Figure 5. Close Combat Optic.**

AN/PAS-13 Thermal Weapon Sight (TWS)

The TWS (medium thermal weapon sight) mounts to the modular weapon top rail. The TWS interfaces with the CRS and IHAS via the sensor harness (W23) and weapon/display harness (W6). The TWS provides improved target acquisition capabilities under reduced visibility conditions. It is effective at locating targets in conditions of darkness, smoke, dust and haze. It also operates effectively during day light operations. The operator can use the TWS for surveillance and fire control, or to scan, detect, select, and engage targets. The TWS is GFE. For more information on the TWS, refer to TM 11-5855-302-12&P (DA, 1997a).

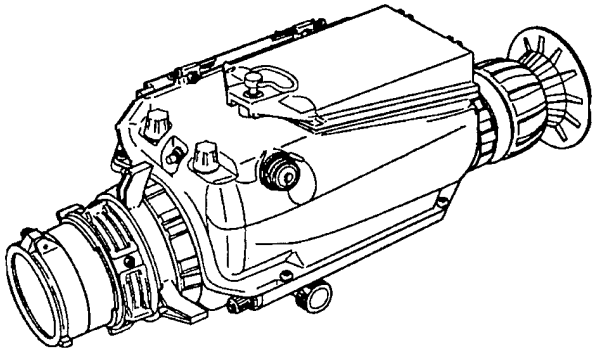


**Figure 6. Medium TWS.**

AN/PAQ-4C Infrared (IR) Aiming Light (IAL)

The AN/PAQ-4C IR aiming light mounts vertically to left side rail of the modular weapon RAS or vertically to a mounting bracket on the right side of the M249 SAW. The aiming light works in conjunction with the Night Sensor Display Component (NSDC) to direct weapon fire at night. It projects an infrared beam along the weapon's line of firing designating the point of impact on the target. It provides a means for coordinating fire at targets marked by the leader. A replaceable internal battery provides power to the IAL. Positions carrying the M4E2/M16A4 weapon will carry the IAL. It is GFE for LW. For additional information, refer to TM 11-5855-301-12&P (DA, 1993a).

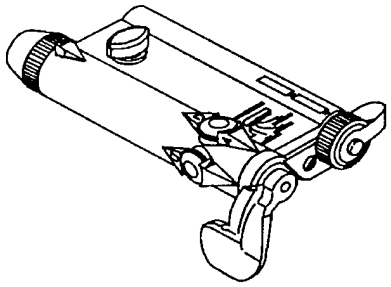


**Figure 7. IAL.**

AN/PEQ-2A Target Pointer Illuminator/Aiming Light (TPIAL)

The TPIAL mounts vertically to the left side of the modular weapon RAS and horizontally to the top of the feed tray on the M249 SAW or M240B machine gun. The TPIAL works in conjunction with the NSDC on the integrated helmet assembly to direct weapon fire at night. It also provides a means for coordinating fire at targets marked by the leader. The TPIAL projects an infrared beam along the weapon line of fire designating a point of impact on the target. Positions carrying the M4E2/M16A4 modular weapon, M249 SAW, and M240B MG will carry the TPIAL. It is GFE for LW. For additional information, refer to TM 11-5855-308-12&P (DA, 1997c).

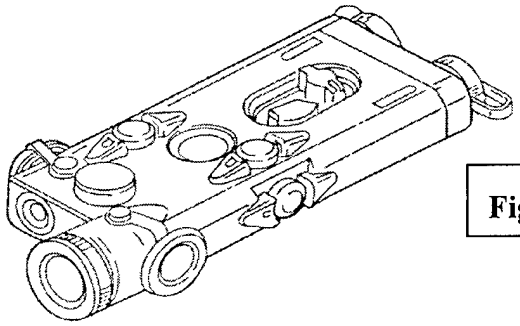


**Figure 8. TPIAL.**

Video Sight/Camera

The LW prototype ensemble incorporates a video sight/camera for daylight use. It mounts to the left side rail on the RAS, replacing the IAL. It connects to the CRS and IHAS via the sensor harness (W23) and the weapon/display harness (W6). The camera outputs a video signal to the CRS and IHAS. It receives power and control signals from the CRS. It has a 3X magnification. There is no zoom capability. All positions except the SAW gunners and M240B machine gunners carry the video sight/camera.

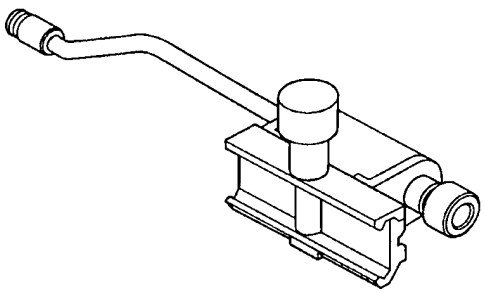


**Figure 9. Video Sight/Camera w Cable.**

Laser Rangefinder/Digital Compass Assembly (LRF/DCA)

The LRF/DCA is a single add-on unit with a laser range finder and digital magnetic compass. It mounts to the right side rail of the RAS. It interfaces with the CRS via the sensor harness (W23) and the weapon/display harness (W6). Control of the LRF/DCA is accomplished through the Soldier Computer Interface (SCI) and buttons on the LRF/DCA. The platoon leader, platoon sergeant, squad leader, grenadier, and team leaders carry an LRF/DCA. During ranging operations, the LRF/DCA outputs a laser pulse. When the pulse returns, the LRF/DCA determines the target range and sends the information to the CRS. The LRF/DCA can determine range of targets, from 25 to 2500 meters. It can discriminate between two targets in the same line of sight that have at least 50 meters of separation. The DCA is a digital magnetic compass. It determines the target azimuth and angle. It sends the azimuth and vertical angle data to the CRS. The DCA has a compensation mode, which provides for the magnetic effects of the soldier's equipment, munitions, and body. A DCA declination adjustment mode enables the operator to enter a declination offset constant.

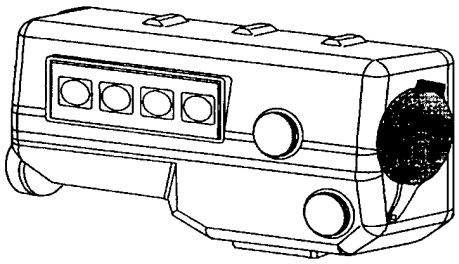


**Figure 10. LRF/DCA.**

Computer/Radio Subsystem

The Computer/Radio Subsystem (CRS) is the primary electronics unit of the LW system. The CRS performs computation, control, and communications capabilities. This improves information collection, processing, and distribution capabilities. It consists of the following components: Computer Module; Global Positioning System (GPS); Soldier Radio; Squad Radio; Remote Input Pointing Device (RIPD); and Hand Held Display (HHD) and keyboard.

Computer Assembly

The Computer Assembly is a microprocessor-based computer that provides processing capabilities for the LW system. It provides processing for sensor integration, communications, planning, messages, and warnings. It has the capability to process data from multiple sources at the same time and is integrated into the Load Carrying Equipment (LCE) frame.

Global Positioning System (GPS)

The GPS provides positioning and navigation data for use by the LW software applications. It is integrated into the computer assembly.

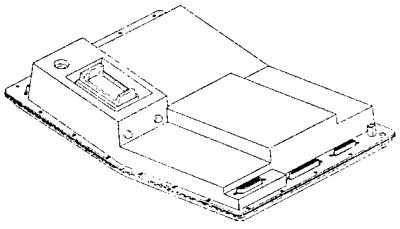


**Figure 11. Computer.**

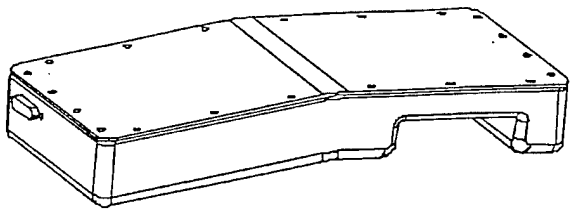


**Figure 12. Global Positioning System.**

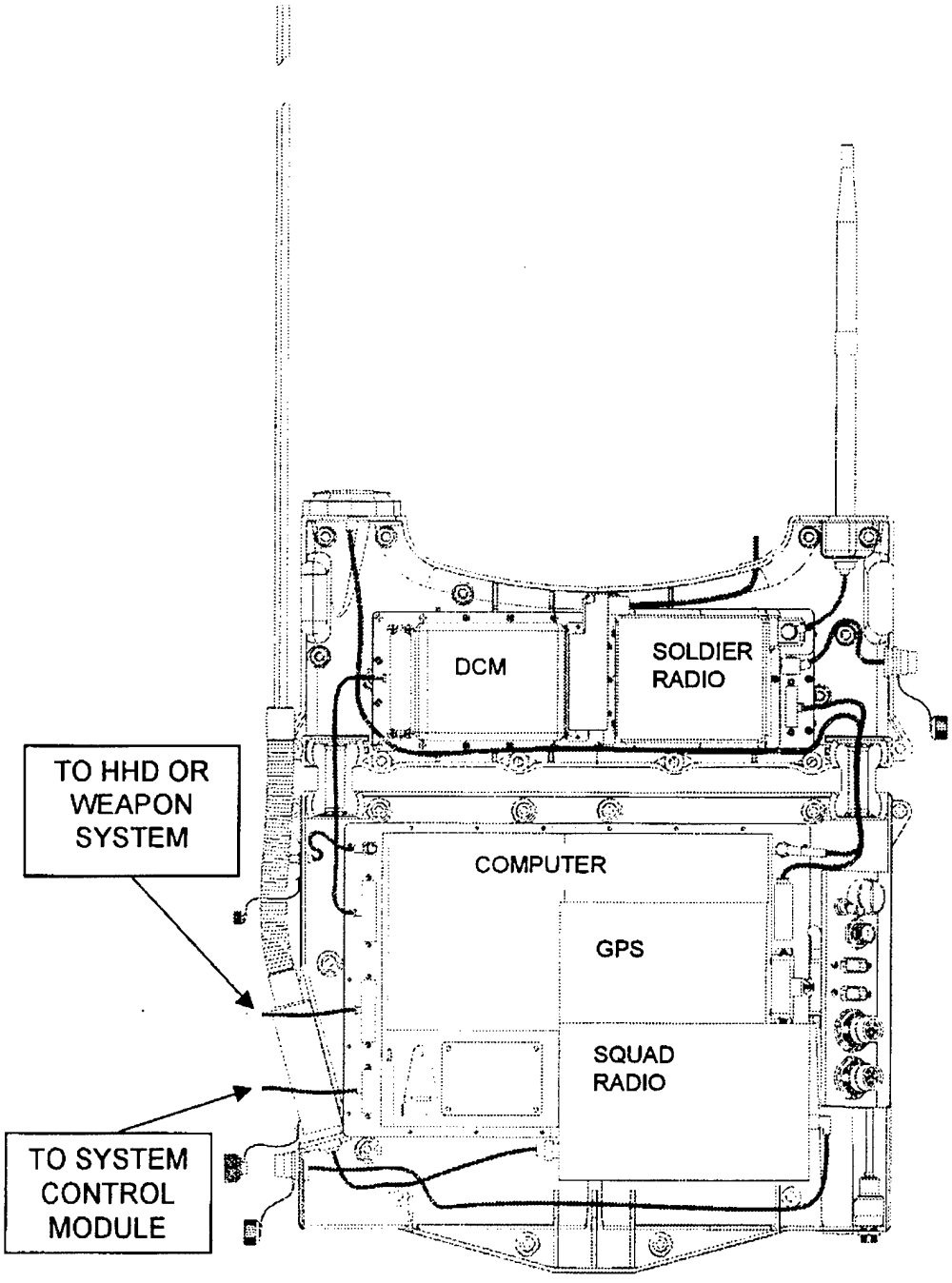



**Figure 13. Computer Radio Assembly.**

Soldier Radio

The soldier radio provides communication between squad members. The operator uses a SCI dialog card and System Control Module (SCM) controls to maintain soldier radio operations. The soldier radio is integrated into the upper electronic component housing (ECH).

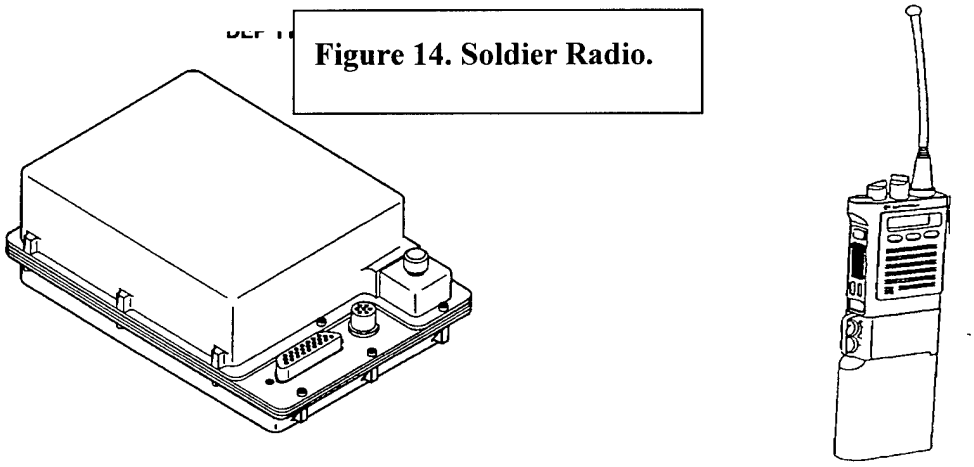


**Figure 14. Soldier Radio.**

Squad Radio

The squad radio provides communications on Combat Net Radio Networks such as the platoon and company command nets. The squad radio provides full SINCGARS-SIP (Single-Channel Ground/Airborne Radio System Improvement Program) compatibility including data modes, frequency hopping, etc. The operator uses the Soldier Computer Interface (SCI) software and SCM controls to maintain squad radio operations. A connector on the squad radio attaches to the computer assembly and is held in place with a clip for easy removal and replacement.

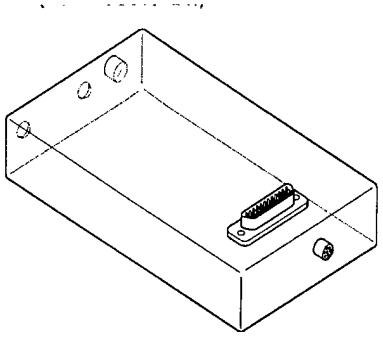


**Figure 15. Squad Radio Assembly.**

System Control Module (SCM)

The SCM is the primary control for moving the cursor on the SCI and HHD. The soldier wears the SCM on the shoulder strap of the LCE. Cable W4 connects the SCM to the computer assembly. The SCM is used to select menu options, to activate controls, and to draw overlays and graphics. It is also used to select radio volume and push-to-talk. The Soldier Access

Module (SAM) is applied to the SCM by the soldier when logging onto the LW system. The SAM contains the password, soldier access data, and soldier/mission profile data.

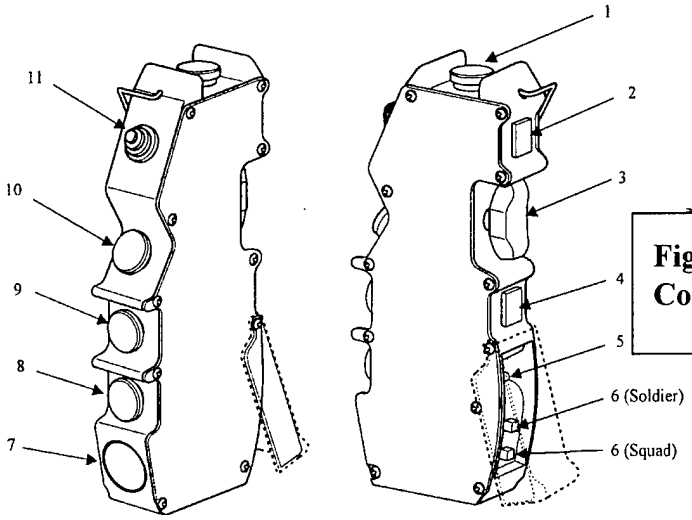



**Figure 16. System Control Module.**

| Item # | Function | Item # | Function |
|---|---|---|---|
| 1 | System On/Off/Volume | 7 | Initial Log-On Button |
| 2 | Momentary On-Push Button | 8 | Video |
| 3 | Momentary Push-Button Toggle Control | 9 | Brightness/Contrast Button |
| 4 | Escape Function Key | 10 | Display Selection Mode |
| 5 | Zero Button | 11 | Cursor Control Button |
| 6 | Secure/Nonsecure SQD/Soldier Radio | | |

Hand Held Display (HHD) and Keyboard

The HHD with keyboard provides remote input and display of information. The HHD consists of a display/touch screen (#1 in Figure 17), connected via cable to the keyboard (#2 in Figure 17). The HHD is provided with a padded case for stowage when not in use. The keyboard provides a standard layout with 12 function keys across the top. The keyboard has a cable with a captive connector cover that connects to the weapon/display cable for interface with the CRS.

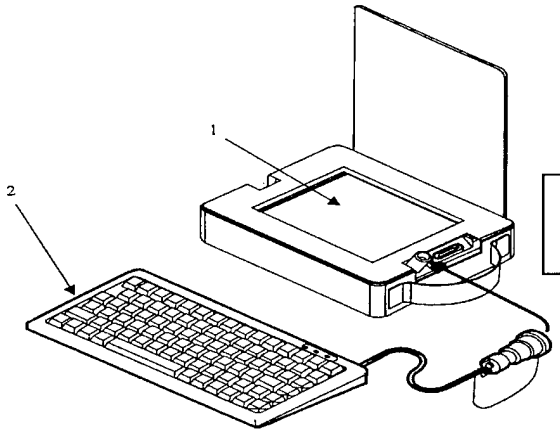



**Figure 17. HHD and Keyboard.**

## Integrated Helmet Assembly Subsystem (IHAS)

The IHAS displays critical battlefield information to the soldier. It consists of the following items: Integrated Helmet Assembly (IHA); Day Display Component (DDC); Night Sensor Display Component (NSDC); Display Control Module (DCM); M45 nuclear, biological, and chemical (NBC) Mask; and the Ballistic Laser Eye Protection System (BLEPS) or Special Protective Eyewear Cylindrical System (SPECS). The BLEPS or SPECS and the M45 NBC mask are provided as GFE to LW. The BLEPS/SPECS must be worn while using the DDC and are not worn with the NSDC. The IHAS interfaces with the CRS to obtain video and audio output from the computer, voice transmit and receive capability for multiple radios, and real-time video directly from soldier-carried weapon subsystem sensors.

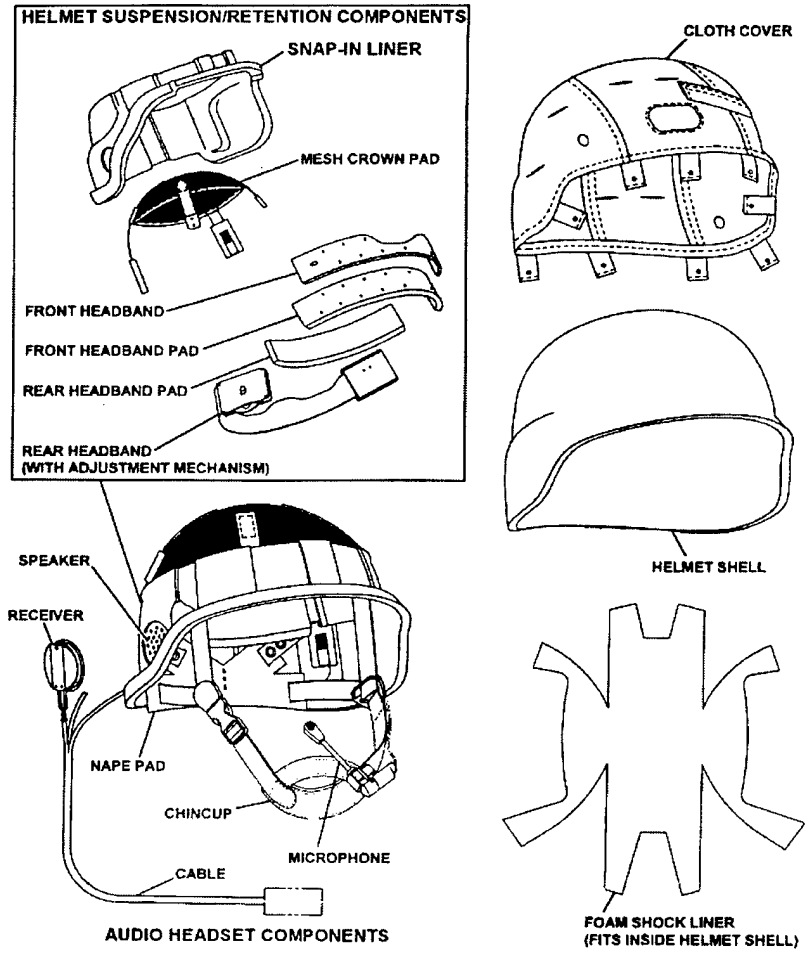



**Figure 18. Integrated Helmet Assembly.**

Integrated Helmet Assembly (IHA)

The integrated helmet assembly (IHA) consists of the following components: Helmet Shell; Helmet Suspension/Retention System; Audio Headset; and Laser Detectors.

Helmet shell. The helmet shell is an outer protective cover with the standard current Personal Armor for Ground Troops (PASGT) helmet shape. The helmet shell is available in sizes corresponding roughly to the PASGT medium (LW Size 2), large (LW Size 3), and extra large (LW Size 4).

Helmet suspension/retention system. The helmet suspension/retention system is an assembly that snaps inside the helmet shell to provide energy absorbing impact protection as well as improved helmet stability. Improved helmet stability is required for keeping the helmet-mounted sensors and displays in front of the eye during normal soldier activity. The system consists of a snap-in liner with edge band; a suspension assembly incorpor-ating an impact liner, a crown support, and a headband assembly; and a retention assembly with adjustable chin and neck nape straps. Adjustments are provided for headband circumference, crown pad height, and chin strap length. The adjustments make it possible to fit the 5$^{th}$ through 95$^{th}$ percentile soldier using only two inner stabilizer liners with three suspension/retention system sizes.

Audio headset. The audio headset consists of a standard earphone speaker and an electronic noise-canceling microphone. The microphone is mounted on the chin strap with a clip for convenient placement near the mouth. An audio cable embedded inside the helmet liner connects the speaker and microphone to the IHAS cable at the rear of the helmet. The cable has a common microphone connector on the bottom of the helmet liner at the left rear of the helmet for connecting either the chin strap microphone or the M45 NBC Protective Mask microphone.

Laser detectors. The laser detector sensor assembly consists of four pairs of sensors that fit between the helmet cover and the ballistic helmet shell. The output of each sensor is routed through the DCM to the CRS where the detection is processed to provide an auditory alert to the soldier and to provide via the SCI, a visual display identifying the quadrant of origin of the incoming laser.

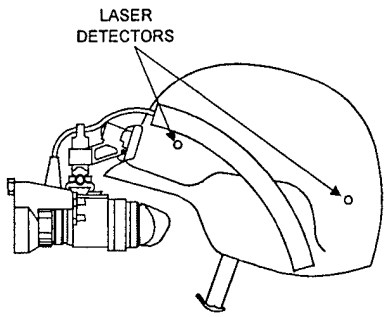
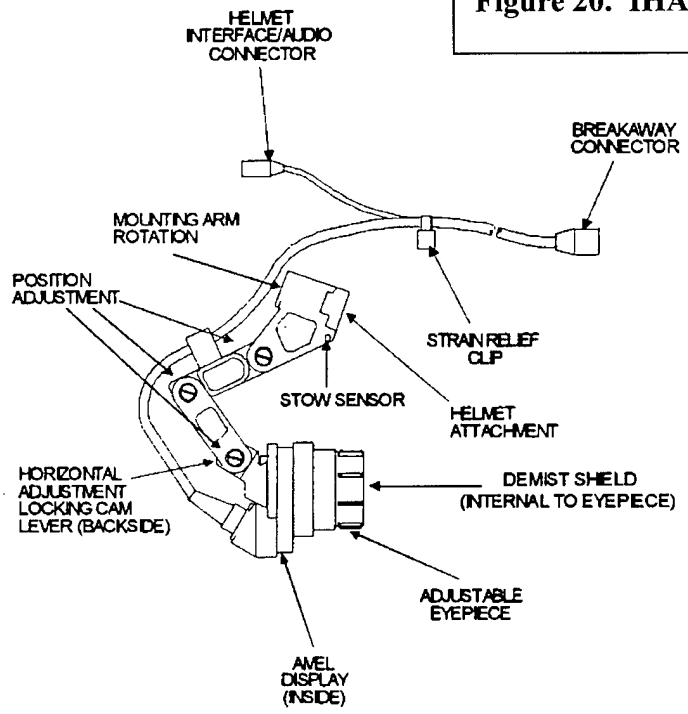



**Figure 19. IHAS Laser Detectors.**

Day Display Component (DDC)

The DDC is a detachable monocular display device for viewing the output of the SCI and video images during day operations. It contains a helmet attachment, position adjustment, active matrix electro-luminescence (AMEL) image source and optics. It also has an adjustable focus eyepiece. The DDC attaches to the helmet audio cable. The DDC has a non-see-through display. It has an adjustable eyepiece to correct for variations in user readability. It is compatible with protective eyewear and NBC gear such as the BLEPS or SPECS and the M45 NBC mask. The operator can use the DDC as a backup for the NSDC. However, if used as an NSDC backup, DDC will not provide the night mobility imagery capability of the NSDC. At night, the DDC displays graphics or sensor display.

**Figure 20. IHAS DDC.**

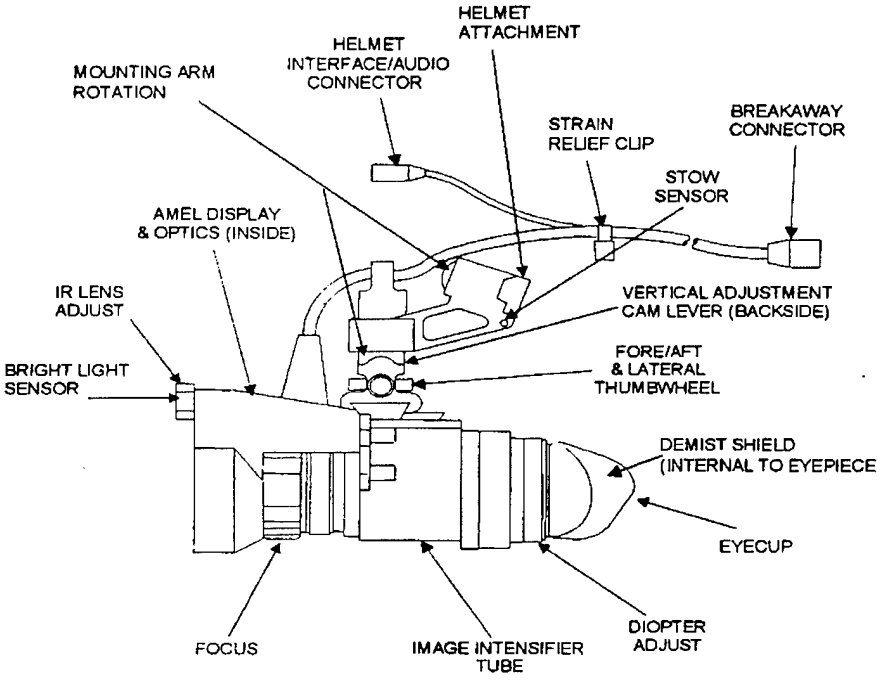



Night Sensor Display Component (NSDC)

The night sensor/display component is an attachable module providing sixty degrees field of view night vision with capability for viewing the output of the SCI and video images during night operations. It consists of a helmet attachment, position adjustment, AMEL image source and optics, adjustable eyepiece, and Image Intensifier ($I^2$) tube. It attaches to the mount on the front of the helmet. It has an electrical cable that connects to the DCM and the helmet audio cable. The cable is secured inside a flap on the helmet cover. A flexible water-tight outer sheath provides protection from moisture. The NSDC has the following modes: (1) $I^2$ sensor and IR illuminator, (2) OFF, (3) $I^2$ only, (4) $I^2$ and AMEL (5) same as position 4. A display only mode

for viewing TWS imagery with no $I^2$ sensor input is possible by selecting position 4 while blocking the external scene with a lens cap. The NSDC has an $I^2$ sensor brightness control located on the NSDC. A removable eyecup is also provided.

**Figure 21. IHAS Night Sensor Display Component (NSDC).**




Display Control Module (DCM)

The DCM is the interface between IHAS and the other components of LW. It processes the Video Graphics Adapter (VGA) input from the CRS computer and real time video from the TWS or video sight/camera. The AMEL display brightness and contrast controls are located on the DCM. Eight levels of contrast and brightness are supported. The DCM is integrated into the upper ECH.

M45 NBC Protective Mask.

The M45 NBC mask is provided as GFE to LW. The M45 NBC mask can be worn along with the IHAS subsystem. The IHAS can be doffed quickly enough to allow the user to don the M45 NBC mask within 9 seconds. IHAS allows viewing of the DDC and NSDC through the mask. IHAS allows the use of the standard M45 mask microphone by connecting it to the same plug-in connector as the microphone in the IHAS audio headset.

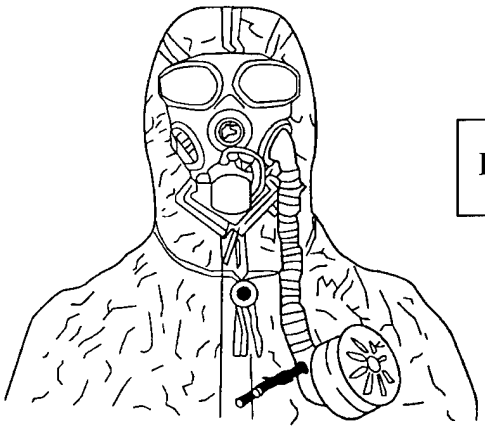


**Figure 22. M45 NBC Mask.**

Protective Eyewear

The LW system incorporates protective eyewear as part of the IHAS. Two candidate technologies have been selected for wear, SPECS or BLEPS. SPECS can be worn while using the DDC or NSDC. BLEPS must worn while using the DDC. For those with eye prescription requirements, the nosepiece of BLEPS is specially designed for mounting a BLEPS prescription lens carrier. BLEPS and SPECS are provided as GFE to LW.

Protective Clothing and Individual Equipment Subsystem (PCIES)

PCIES is a system that protects the soldier from fragmentation and allows the soldier to carry all essential equipment on ground missions. The system consists of a pack system, body armor, LCE, Load Bearing Ballistic Belt, and load panel assemblies for storing ammunition.

Pack System

The pack system consists of the following components: Approach March Pack Assembly, Assault Pack Assembly, and Patrol Pack Assembly. The approach march pack assembly consists of the pack and frame. The approach march pack frame serves as the main attachment point for all pack options. The frame has a foot for attaching to the lower ECH for load transfer to the load bearing Ballistic Belt Assembly. Internal straps hold the SINCGARS radio used by radio/telephone operator (RTO) soldiers. External webbing and pouches hold various GFE items. Worn below the approach march pack, the assault pack assembly can be attached either to the approach march pack frame or to the LCE. When attached to the LCE frame, the assault pack stays with the soldier and cannot be quick-released. The patrol pack assembly is used to carry food and other items necessary for survival. This pack is normally worn on top of the approach march pack.

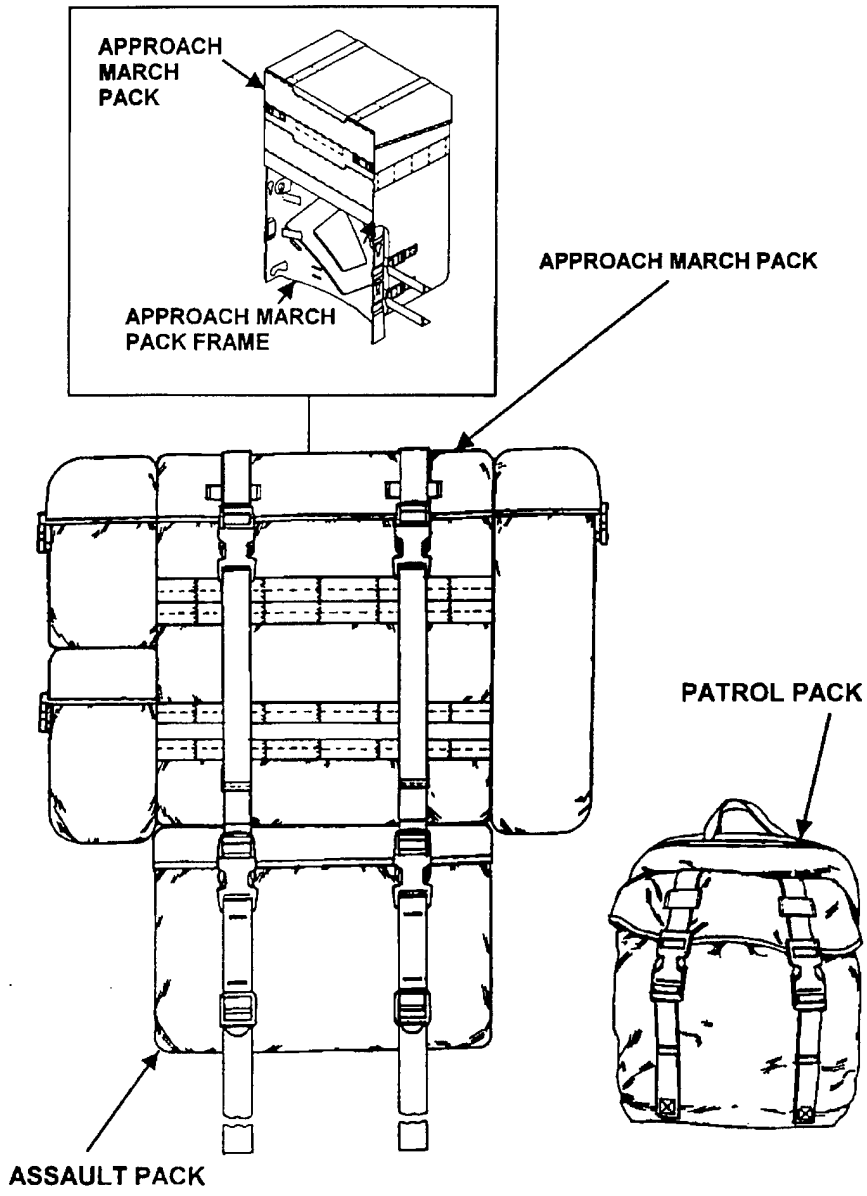



**Figure 23. Pack System.**

Body Armor

Body armor provides protective covering of the soldier's upper torso to reduce the number of serious and lethal wounds to neck, chest, upper abdomen, shoulders, and back. Multiple layers of aramid material form a strong, pliable barrier. The body armor consists of the ballistic vest with insert (soft armor), ballistic belt, hard plate and plate carrier. The vest does not

protect against small arms fire. However, it may decrease the severity of wounds from rifles and machine guns.

Load Carrying Equipment (LCE).

The LCE houses the CRS and provides attachment points for the modular packs. The LCE consists of the following items: ECH; Quick Release Assembly; Articulation Joint Assembly; and Load Carrying Harness Assembly.

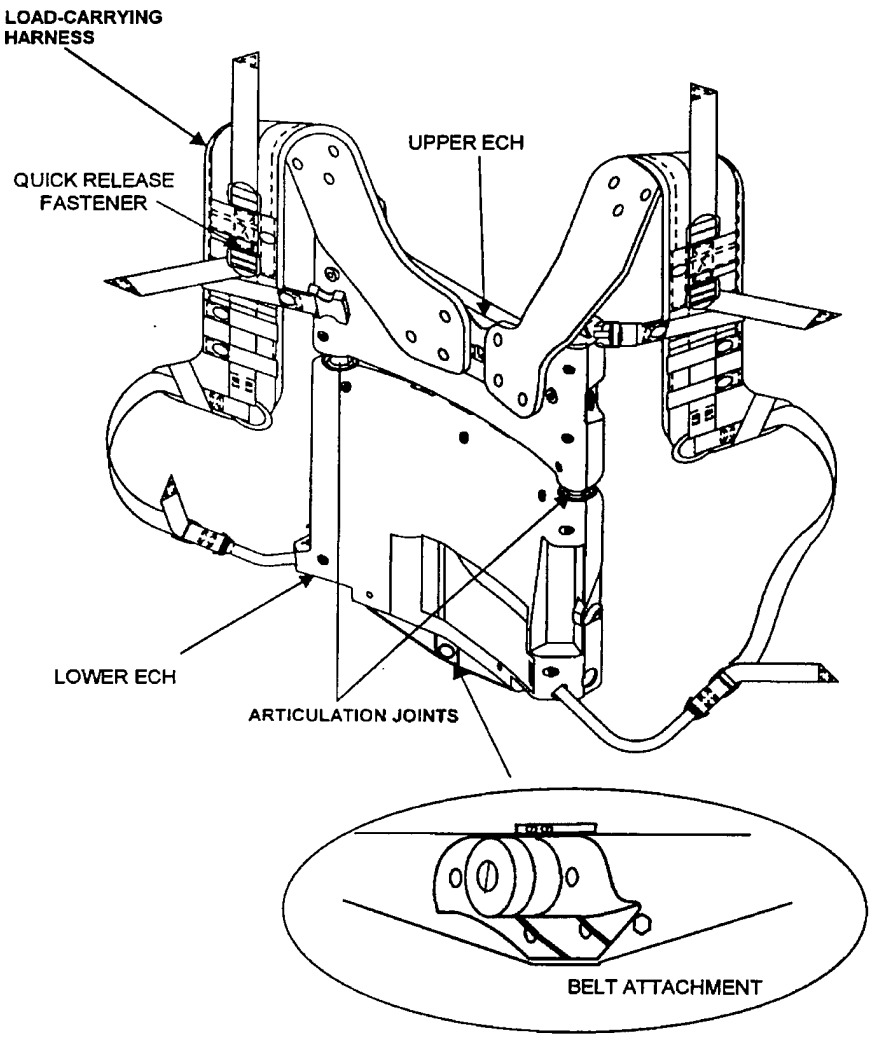



**Figure 24. Load Carrying Equipment.**

Load Bearing Ballistic Belt

The load bearing ballistic belt assembly serves two main purposes: to support the load on the hips and to protect against ballistic fragments. The belt has a fabric cover with ballistic inserts. Webbing on the outside of the belt allows for attachment of GFE items such as canteens, bayonet, and the battery box.

Load Panel Assembly

Load panel assembly consists of externally mounted pouches attached to a right and left panel. Each panel attaches to the corresponding side of the LCE harness (right or left). The panels buckle together in front and lace together in back for added stability. The load panel assembly is available in three configurations: rifleman, grenadier, and SAW/machine gunner.

## System Interconnects and Controls Subsystem

The system interconnects and controls consist of the following major components: system control module, battery box, cables and harnesses, Two-Button Switch, and other cables/harnesses providing internal cabling between subsystems.

## Software Subsystem

The software subsystem controls LW communications, processing sensor data and images, displays maps and overlays, automates location reporting, and processes digital message traffic and reports. The LW software provides the control logic that enables dismounted soldiers and units to interface with the Tactical Internet using Joint Variable Message Format (JVMF) messages and other components of the Army Common Operating Environment (ACOE). It also automates a wide range of unique infantry tasks, including range cards, direct fire planning, indirect fire planning, and hasty minefield reporting.

## Appendix B. IOBC Training Observed

This appendix summarizes the 28 blocks of observed IOBC instruction. Each synopsis includes a short narration covering the scope of training (what was trained and how training was conducted), and any Land Warrior (LW) implications.

The following table lists the classes that were observed. The listing is sequential. Although no specific estimates were made of time to train the various LW skills, in many cases it was obvious where LW integration could occur without requiring additional time. Most of these implications center on merely providing information or simple comments. Others will require extensive revisions to the current instruction. The following table indicates where LW could be introduced in the training that was observed, based on available time and related subjects already in the class. This chart reflects only observed training and does not include other unobserved associated classes where LW-related material may be introduced. Thus it does not reflect total integration of LW training into IOBC. The "No" column reflects where LW is not applicable.

| Classes Observed | Applicable to LW? | | Classes Observed | Applicable to LW? | |
|---|---|---|---|---|---|
| **POI # Class Title** | **Yes** | **No** | **POI # Class Title** | **Yes** | **No** |
| WJ9B02 Applied Map Reading | √ | | TB9B56 Dismounted Battlespace Battle Lab | √ | |
| WJ9B03 Terrain Association and Orienteering | √ | | CR9B08 Defensive Fire Support Planning | √ | |
| TB9B43 Land Navigation STX | √ | | CR9B09 Offensive Fire Support Planning | √ | |
| TA9B53 Machine Gunnery | √ | | TC9B82 Defensive Operations | | √ |
| TB9B75 Army Operations | | √ | TC9B83 Defensive Operations | √ | |
| CT9B04 Communications Equipment | √ | | TC9B85 JANUS Exercise | | √ |
| CR9B14 Call for Fire | √ | | CN9B04 Nuclear Weapons Effects | √ | |
| WB9B76 Antitank I | √ | | CG9B33 Supply Procedures | √ | |
| TH9B77 Develop a Squad STX | √ | | CG9B32 Small Unit Logistics | √ | |
| CU9B03 Battle Focused Training I | | √ | TB9B76 Introduction to Combat Operations | √ | |
| TC9B80 Platoon Operations | | √ | TA9B86 Introduction to the Offense | | √ |
| TH9B45 Advanced Land Navigation Exam | √ | | TA9B87 Fundamentals of Offensive Operations | √ | |
| TC9B50 M16A2 Rifle Marksmanship | √ | | TA9B89 Platoon Attack STX | √ | |
| TC9B81 Platoon Drill STX | √ | | CL9B31 Tactical Cohesion | | √ |

A description of the classes by POI number (alphanumeric order) follows.

**CG9B32 Small Unit Logistics.** 2 POI Hours. Observed: 2 of 2 hours. The training was conducted as a company-level class. The purpose of the class is to provide an instructional overview of logistics operations at the company team and battalion levels. The first hour of instruction covered sustainment controls, personnel responsibilities, unit trains, and personnel and unit trains locations. The second hour of instruction was dedicated to resupply operations.

This included resupply techniques, soldier load management, and elements of paragraph 4, logistics, of the operation order.

*LAND WARRIOR IMPLICATIONS*:
1. Including LW supply issues, e.g. batteries and replacement parts, could focus the class more towards LW unit logistics problems.
2. LW-equipped units' ability to provide digitized and status reports should be addressed.

**CG9B33 Supply Procedures.** 3 POI Hours. Observed: 3 of 3 hours. The training was conducted as a company-level class. The purpose of the class is to ensure that the IOBC student will be able to accomplish his obligation for supply responsibility at the platoon and company level. The first hour of instruction covered means of identifying authorized on-hand items in Modification Table of Organization and Equipment (MTOE) or Table of Distribution and Allowance (TDA) units, methods to request those items, property accountability, and manual and automated hand receipts. The second hour of instruction included supply accountability terms, direct responsibility and property accountability, relief from property responsibility, procedures for proof of pecuniary liability, and procedures for conducting a report of survey. The third and final hour of instruction was a practical exercise on developing a hand receipt.

*LAND WARRIOR IMPLICATIONS:*
1. Once the LW equipment is fully fielded, the appropriate authorization documents and supply publications will have to be updated. Since many of the LW components are parts of sets or kits, the class could incorporate LW equipment as examples.
2. No other LW implications were noted.

**CL9B31 Tactical Cohesion:** 2 POI Hours. Observed: 2 of 2 hours. The training was conducted as a company-level class. The intent of the class is to familiarize the student with group dynamics, how group dynamics may be affected by combat conditions, the importance of tactical cohesion, how to recognize tactical cohesion, and how to build it. A 17-minute exert from a documentary entitled "Charlie Company" was shown. The CBS documentary was produced in 1971. It focused on the life of the men of Company C, 1-7th Cavalry in Vietnam. The segment covered a company change of command and a situation faced by the new commander when his unit was directed to travel 300 meters down a road to be evacuated by helicopter. The lead squad refused to travel down the road, causing the whole company to ultimately fail in establishing a timely pick-up zone (PZ). This situation established a scenario that was discussed by the class for the remaining 1.5 hours.

*LAND WARRIOR IMPLICATIONS*: No specific LW implications were noted.

**CN9B04 Nuclear Weapons Effects**. 2 POI Hours. Observed: 2 of 2 hours. This class is the fourth period of NBC instruction. The training was conducted as a company-level class. The intent of the instruction is to provide information on effects and actions taken as a platoon leader or battalion staff officer in a radiological battlefield environment.

*LAND WARRIOR IMPLICATIONS*:
1. The class did not discuss the radio frequency dampening effects that a radiological environment has on communications equipment.
2. The class will have to discuss the effects of a radiological battlefield environment on the LW radio equipment.
3. Setting up decontamination sites was barely discussed. Decontamination of LW equipment in a radiological environment will have to be addressed. The same applies to the use of individual LW equipment when the wearer must don a protective mask.

**CR9B08 Defensive Fire Support Planning**. 4 POI Hours. Observed: 4 of 4 hours. Half the class attended field training and half attended this instruction. The students then rotated to and from the field. This instruction is one in a series of fire support classes. Defensive fire support planning is taught one day, and offensive fire support planning, the next day. The basis for the class is SH 7-17 *Fire Support.* The first two blocks of instruction included identifying the key personnel, equipment, and organizations that provide fire support for a maneuver company and platoon. The next block of instruction addressed the four standard tactical missions assigned to the field artillery. These included direct support, general support, reinforcing, and general support reinforcing. The next portion of the class discussed the top-down fire planning process. It covered the organizations and key personnel responsibilities in supporting a maneuver company. The main portion of the instruction centered on the doctrinal task for defensive fire planning. The class was instructed on the employment, positioning, environmental restrictions, and the considerations for defensive fire planning. Additionally, the instruction included how to determine the trigger point to engage a moving target.

*LAND WARRIOR IMPLICATIONS*: The basic skills of fire support planning will still need to be taught to LW-equipped personnel. An unresolved question remains. How much fire support planning can be accomplished/transmitted using LW equipment.

**CR9B09 Offensive Fire Support Planning**. 3 POI Hours. Observed: 2.5 of 3 hours. Half the class attended field training and half attended this instruction. The students then rotated to and from the field. This instruction is one of a series of fire support classes. Defensive fire support planning is taught one day, and offensive fire support planning, the next. The basis for the class is SH 7-17 *Fire Support.* The first two blocks of instruction centered on permissive and restrictive fire control measures. Each of the four major types of permissive (boundaries, coordinated fire line, fire support coordination line, and free fire area) and restrictive (restricted fire line, restricted fire area, no fire area, and airspace coordination area) fire control measures were discussed. The next portion of the class focuses on the fire support plan. It included a discussion of fire support employment and the contents of the fire support paragraphs of the operation order (OPORD), paragraphs 3a(2) Fires; and 3c Tasks to combat support units (3c(1) [air support, chemical, field artillery, nuclear, and offensive electronic warfare] and 3c(2) [mortars] through 3c(3) [coordinating instructions]). Based on the content of the operation order, the class was then instructed on the nuances of developing a fire support execution matrix (FSEM). The final portion of this instruction was a practical exercise on developing a FSEM.

*LAND WARRIOR IMPLICATIONS*: The basic skills of fire support planning will still need to be taught to LW-equipped personnel. Two unresolved questions remain. First, how much fire support planning can be accomplished/transmitted using LW equipment? Second, will the use of LW equipment to plan fire support be taught here or in a comparable block of instruction on the LW computer?

**CR9B14 Call for Fire.** 4 POI Hours. Observed: 4 of 4 hours. Call for fire training consisted of two separate 4-hour sessions. During the first session, CR9B14, students received training on how to prepare a call for indirect fire followed by how to adjust indirect fire. The second session, CR9B53 Call for Fire Certification (not observed), was an extensive practical exercise where students actually practiced preparing calls for fire and adjusting fires using the audiovisual equipment available in the Training Set Fire Observation (TSFO) facility. Using the TSFO facility, students were presented a variety of targets. They must write the appropriate call for fire for each type target, observe the initial indirect rounds, then write the appropriate adjustment they would need to bring the rounds onto the target. The written information was then graded. The first hour of observed training presented the six elements of the call for fire: identification, warning order, target location, target description, method of engagement, and method of control. The instructor asked questions and had different students practice submitting a call for fire based on various situations. Students also learned the five rules of direction. During the second hour, students learned how to locate a target using three different methods: polar, grid, and shift from a known point. Again, the instructor explained each method, then provided various samples that allowed students to practice and ask questions. The third hour outlined the information that the observer would receive from the firing unit after submitting a call for fire. Each of the items was explained and the benefit to the observer noted. The final hour of the initial training session explained how the observer would adjust fires onto the target. Various means of estimating range and deviation changes were presented. The exercise used the TSFO to simulate a variety of targets under different conditions. Students were required to submit calls for fire. After initial rounds were fired, students submitted calls to adjust the fire onto the target. All methods for locating targets and adjusting fires were included.

*LAND WARRIOR IMPLICATIONS*:

1. Students going to LW-equipped units should use their LW Computer/Radio Subsystem and Software Subsystems during this training to learn and practice the way they will actually be calling for fire. Testing standards will have to be developed to reflect the LW equipment, if it is used.
2. Training currently emphasizes that the person calling for and adjusting fire must provide his location to the element providing indirect fires. With the LW system, either the person will be able to use his GPS to determine exact location relatively easy or through the automated tracking (situational awareness capability) the firing unit will know the caller's location.
3. When the LW software system is fully developed, some of the information currently needed in a call for fire might be provided in an automated means so the person calling for and adjusting fires will be required to perform fewer functions or provide less information to the firing unit.

**CT9B04 Communications Equipment.** 8 POI Hours. Observed: 8 of 8 hours. The purpose of this block of training was to provide information about the typical communications systems that

are used at company- and platoon-level. The systems and equipment covered during the training included the field telephone (TA-1 and TA-312), associated wire laying devices, squad radio (AN/PRC-126), and the SINCGARS radio (AN/VRC-88A). The various radio systems and power sources (other than batteries) were available for training. Following an explanation of each major topic and appropriate demonstration, the students were required to conduct a hands-on PE for most of the tasks. The training session lasted eight hours. The first portion of the training identified the five means of communication along with their advantages and disadvantages. The second session presented information on the basic wire laying equipment and phones available at company and platoon level. This training lasted about 30 minutes. The instructor then explained how to operate the squad radio. Students then had an opportunity to put the radio into operation and program frequencies. This lasted about 30 minutes. The next seven hours of the training addressed operations of the SINCGARS radio. Topics included several skills from an overview of the function switches and maintenance to operating the radio in both the single channel and frequency hopping modes.

*LAND WARRIOR IMPLICATIONS*:
1. Students will still need to know the basic means of communications with associated advantages and disadvantages. It is assumed that LW-equipped units will still have telephones and wire for use in defensive or assembly area positions. Therefore, students should still receive training on wire laying equipment and telephones.
2. The LW Computer/Radio Subsystem (CRS) will replace the squad radio in LW-equipped units. Personnel slotted for LW units can use the squad radio training time to begin training on the LW CRS.
3. At this point, the LW CRS is not replacing the SINCGARS radio. It is possible that some functional and operational commonality will exist between the SINCGARS radio and the LW CRS, but that is unknown now. Students will still likely need the current training on the SINCGARS.
4. With the increase in the number of radios available at the platoon and squad level for LW-equipped units, communications security (COMSEC) considerations will have to be stressed even more so than now.

**CU9B03 Battle Focused Training I.** 2 POI Hours. Observed: 2 of 2 hours. The training was conducted as a company-level class. The intent of the class was to introduce the IOBC student to the tools needed to properly manage training in his platoon. It is the second in a series of three classes in training management. The first hour focused on an introduction to FM 25-101 *Battle Focused Training*, Chapter 3: Planning (DA, 1990). Topics included the planning process, time management systems, and types of training plans. Differences between the active component and reserve force were also discussed. The second hour covered leader responsibilities associated with training management, the conduct of company and platoon training meetings, preparation for training, and Training and Audio/Visual Support Center (TASC) capabilities.

*LAND WARRIOR IMPLICATIONS*: No specific LW implications were noted.

**TA9B53 Machine Gunnery:** 31 POI Hours. Observed: 16 of 31 hours. Training began with the company conducting a road march to a machine gun range (Wagner Range). Following

breakfast, all students received a safety briefing and an orientation to the training activities for the two-day period. The company then broke into platoons and proceeded through a series of round robin stations:

- Disassembly/assembly of M60 (10 weapons; 2 instructors)
- Disassembly/assembly of M249 (16 weapons; 3 instructors)
- Load and reduce stoppage/operate M60 (10 weapons; 2 instructors)
- Load and reduce stoppage/operate M249 (10 weapons; 2 instructors)
- Construct range cards (12 weapons with T&E, tripod; 2 instructors)

In the process of rotating between the various stations, each student also conducted day familiarization firing with both the M60 and M249. Students conducted night familiarization firing and remained on the range overnight. Training continued the next day with the students being evaluated on selected Military Stakes (MILSTAKES) events. They also received training on the M2 .50 Cal heavy MG. Depending on the particular station, the instructor to student ratio varied from 1:18 to 1:10. All training was conducted on the same range and included an overnight bivouac.

*LAND WARRIOR IMPLICATIONS*:

1. The optic devices available to the LW-equipped unit (PEQ-2A and AN/PAS-13 TWS) were not included in this training. Training was primarily with the AN/PVS-4 night sight; although some soldiers wore the AN/PVS-7 NVGs when firing. In some cases, illumination star clusters were used and the soldiers fired unaided. While prior training introduced the borelight device, there was no practice boresighting any optics or aiming lights for the machine gun.
2. It is anticipated that the M240B will be used by LW-equipped units, yet students received only a cursory introduction to the system (only 2 weapons were available on the range.) With only two (2) M240B machine guns on the range, additional weapons are needed to support complete training on this system by all students.
3. Firing included only familiarization with the M60 and M249. There was insufficient ammunition and time to allow all students to live fire zero and qualify with the M249 even though the M249, like the M240B, will be used by LW units.
4. Training is currently provided for the M2 .50 Cal. Machine Gun. LW-equipped units will not use the M2.
5. Night observation equipment was available to support night firing with the PVS-4 night sight. (20 PVS-4s with M16/M249 reticle; 10 PVS-4s with M60 reticle). Although 20 PVS-7 NVGs were available without any type of aiming light, night firing cannot be conducted with NVGs alone. It is important to note that PAQ-4 aiming lightss were requested, but the company was notified that they were not available.
6. Additional equipment will be needed even if only to familiarize IOBC students. For example, night firing with the TWS will require thermal blankets on the targets.

**TA9B86 Introduction to the Offense.** 1 POI Hour. Observed: 1 of 1 hours. The intent of the instruction is to introduce offensive operations. The class is normally taught as a company-level class presented by a guest speaker.

*LAND WARRIOR IMPLICATIONS*: No specific LW implications were noted.

**TA9B87 Fundamentals of Offensive Operations**. 5 POI Hours. Observed: 4 of 5 hours. This platoon-level class is the second block of instruction on offensive operations. The intent of the instruction is to provide the student with the fundamentals of offensive operations and offensive mission planning. The class is a mixture of new offensive training and previous instruction on the military decision-making process (MDMP). The first two hours of instruction focus on offensive doctrine. The remaining instruction provides the student with information on mission planning. The original MDMP class was taught prior to defensive operations training. The blending of the two serves the student well in conducting mission planning for offensive operations.

*LAND WARRIOR IMPLICATIONS*:
1. Planned MQS II standards require the LW-equipped leader to use his digital map and LW Route Planning Aid to help his terrain analysis and select his route. The LW computer will provide distances and projected movement times. These considerations should be incorporated into the instruction.
2. No other LW implications were noted.

**TA9B89 Platoon Attack Situational Training Exercise (STX)**. 104 POI Hours. Observed: 16 of 104. The intent of this instruction is to provide a practical application reinforcing the doctrinal methods and techniques for conducting individual movement, squad and platoon movement collective tasks, and executing a platoon movement to contact live fire exercise. The scope of the training was two-fold. First, the STX was developed to conduct a series of platoon movements to contact, culminating in a live fire exercise (LFX) for each platoon. Secondly, the training was to reinforce earlier classroom instruction with the company conducting company-level deliberate attacks. All selected tasks were scheduled for training. Night missions were conducted on three of the four nights spent in the field bivouac site. Two platoon-level night raids were conducted as well as one company attack on a trenchline. None of this night training was observed.

*LAND WARRIOR IMPLICATIONS*:
1. The subtasks and standards for ARTEP 7-8 MTP (Mission Training Plan) will have to be rewritten to include the changes and enhanced capabilities of LW equipment.
2. Equipment, particularly weapons and communications equipment, used in the field training exercise (FTX) will need to be identified. The specific capabilities and equipment changes will depend on the tasks selected to be included in the STX.

**TB9B43 Land Navigation STX.** 67.5 POI Hours. Observed: 28 of 67.5 hours. Training was conducted over a three-day period at two land navigation sites (Furman Road and Yankee Road). The instruction covered both day and night land navigation training and evaluation.

*LAND WARRIOR IMPLICATIONS*:
1. Projected classes will have to address the benefits of leaders being issued global positioning systems (GPS) and whether or not the students will have access to this equipment when conducting the classes, whether GPS should be included in the examination, or should the GPS be saved for use only in advanced land navigation.

2. The impact of the Laser Range Finder/Digital Compass Assembly (LRF/DCA) will have to be assessed and integrated, requiring a move from a text-based map and lensatic compass to the digital LRF/DCA. Current military qualification standard (MQS II) standards require individual leader knowledge on using this system to identify map symbols of man-made objects, locate a point on the map, measure the distance, measure and plot an azimuth, and locate an unknown point on the ground.

**TB9B56 Dismounted Battlespace Battle Lab**. 2 POI Hours. Observed 2 of 2 hours. The class is a platoon-level class. The intent of the instruction is to provide the IOBC student with an introduction to the AN/PVS-7B, bore sighting of the AN/PAQ-4C to the M16 rifle, and individual completion of the night vision lanes located in Ft. Benning's Night Fighting Experimentation Facility. Additionally, familiarization instruction was provided on the AN/TVS-5, AN/PEQ-2, holographic Belgium goggles, hand-held laser pointer, bike light, and Phoenix. Other training features in the facility, an unaided night vision instructional program, boresighting devices/techniques, and a computer-based thermal combat vehicle signature training program, were not used.

*LAND WARRIOR IMPLICATIONS*:
1. The AN/PVS-7B is necessary for LW instruction. Additional LW night vision devices and optics that must be taught for LW-unit bound officers includes the AN/PVS-7D, AN/PVS-14, and the AN/PEQ-2. Instruction should include the use of a thermal sight source for day and night live firing and observation.
2. Time will have to be increased to change the class from a demonstration of boresighting the AN/PAQ-4C to the M4E2 to a practical exercise (PE), allowing all students hands-on experience.
4. Time should be increased to include instruction (preferably a PE) stressing adjusting the optical lenses on all devices (thermal sights, image intensification devices).

**TB9B75 Army Operations.** 1 POI Hour. Observed: 1 of 1 hour. The block of training began with a guest speaker providing his overview and perspective of Army Operations. The intent is to expose the students to Army doctrine, stressing the principles of war and tenets of Army operations. An overview of combat operations (principles of war, tenets of Army operations, etc.) is necessary even with the fielding of LW. Students must learn the characteristics of various types of operations, troop leading procedures, how to analyze terrain for military operations, what goes into an operations order, etc.

*LAND WARRIOR IMPLICATIONS*:
1. Execution of operation orders will vary with the fielding of LW, but the doctrinal principles should not change.
2. No other specific LW implications were noted.

**TB9B76 Introduction to Combat Operations**. 21 POI Hours. Observed: 18 of 21 hours. The students received an in-depth presentation on various aspects of Army operations. The training began with specific examples and explanation of the material covered in the overview. Next, the training centered on the characteristics of offensive and defensive operations. Following this doctrinal background, troop-leading procedures (TLP) were introduced as the basis for planning

operations. This includes conducting METT-TC, terrain analysis, and making an estimate of the situation. The final portion of the classroom training explained the format of an operation order and operational graphics. An afternoon was then spent conducting a training exercise without troops (TEWT) to relate doctrinal discussions to actual terrain and a proposed mission. Students were required to prepare a platoon operation order (OPORD) as part of the class.

*LAND WARRIOR IMPLICATIONS*:
1. The basic doctrinal training will still need to be presented.
2. Both offensive and defensive operations will be enhanced by the LW Computer/Radio Subsystem, which will provide digitized OPORDs.
3. Thermal weapon sights (TWS) and the Night Sensor Display Component (NSDC) provide improved vision during periods of limited visibility.
4. Additional leader tasks will also have to be addressed with LW-equipped units, for example, zeroizing LW systems of personnel who are MIA or captured.
5. Route selection using the LW computer is an MQS II task.
6. Specific tactics, techniques, and procedures (TTP) for employment of the LW-equipped units can be introduced when they are developed. Can the LW system be used to prepare and disseminate OPORDs? If so, can the students use the LW system to prepare their OPORD as part of this class? If the students use the LW system for this purpose, how will the instructor access their work to conduct his evaluation?

**TC9B50 M16A2 Rifle Marksmanship.** 28 POI Hours. Observed: 28 of 28 hours. This training is conducted over a three-day period. The first day consists of a series of stations where the students participate in what is called PMI (Primary Marksmanship Instruction), not BRM (Basic Rifle Marksmanship). The students received training by platoons. Each platoon spent approximately one hour per training station, rotating between 5 stations. Station 1 was the Weaponeer. Students were shown how to operate the system and then allowed to practice firing. Station 2 was the Multi-Purpose Arcade Combat Simulator (MACS). Four MACS systems were available for the students to practice the field firing techniques of identifying and engaging pop-up targets. Station 3 was the disassembly/assembly/maintenance/load/unload/immediate action of the M4/M16. Half of the students were issued an M16 and the other half received an M4. This was the first IOBC class to receive the M4. Station 4 was the shadow box/washer drill. Students practiced the fundamentals of basic rifle marksmanship. Station 5 was donning an NBC protective mask and firing a rifle while wearing the mask. On the second and third days, all students zeroed and qualified with the M16 or M4. The following table shows the number of rounds fired to obtain a zero.

| Number of Rounds to Obtain a Zero | 6 | 9 | 12 | 15 | 18 | 21 | 27 | 30 | 33 |
|---|---|---|---|---|---|---|---|---|---|
| Number of Firers | 2 | 7 | 21 | 32 | 42 | 29 | 15 | 4 | 3 |

| Number of Rounds to Obtain a Zero | 36 | 39 | 42 | 45 | 48 | 51 | 60 | 75 | >75 |
|---|---|---|---|---|---|---|---|---|---|
| Number of Firers | 5 | 3 | 1 | 3 | 2 | 1 | 1 | 2 | 7 |

Once a student zeroed his weapon, he moved to the qualification range. All ten firing points were used on the qualification range. Of the first 4 firing groups, 11 of 45 firers qualified. By midday on the second day of qualification firing, less than 50 of the 206 students had qualified. At the end of Day 2 firing, 191 firers had qualified and all ammunition had been expended.

*LAND WARRIOR IMPLICATIONS*:
1. Each student fired 20 rounds at night, using the AN/PAQ-4 Aiming Light and AN/PVS-7 Night Vision Goggles. This class did not receive training from the Dismounted Battlespace Battle Lab (DBBL) on night equipment prior to range firing so this was their first exposure to night optics. Training (TB9B56) should be conducted prior to this range firing or else should be presented as concurrent training while at the range.
2. There were only 20 PAQ-4s and 20 PVS-7s. There was only one borelight device at the range. Therefore, the only training presented to the students was a demonstration by platoon trainers. With the limited amount of equipment, providing individual students an opportunity to practice boresighting would have required extensive time.
3. If the intent is to qualify with the basic rifle (M16/M4), then sufficient time and ammunition musts be made available. The cadre still needs to provide remedial and concurrent training for those students who have difficulty with marksmanship. If the students lack basic marksmanship skills, accurate firing with the LW system will still be difficult.
4. The LW platoon leader has an AN/PEQ-2A on his M4. If he fires for qualification, he should be afforded the opportunity to use the AN/PEQ-2A.
5. LW familiarization/qualification should also include the AN/PAS-13 Thermal Weapon Sight and M68 Close Combat Optic (CCO)
6. If the intent is to introduce LW optics, then time is available through concurrent training stations, provided the equipment and the properly trained cadre are available. If familiarization firing is also desired with selected optics, additional ammunition is required. It seems that this firing could be integrated into the current time and range facilities, but would require some detailed organization and coordination by the cadre. It could also mean using students in rotating positions as safety and support personnel to augment the cadre operating the range.
7. Any firing beyond familiarization with selected optics would most likely not be executable within the available time. More ammunition is also required.

**TC9B80 Platoon Operations.** 12.5 POI Hours. Observed: 3.5 of 12.5. The training was conducted in a series of platoon-level classes over a two-day period. Nine tasks were to be covered within the context of offensive platoon-level operations. The first day, 3.5 hours, is lecture. The second day is scheduled to be a lecture on mission analysis of an operation order and conducting platoon-level battle drills. The intent of the instruction is to introduce offensive operations. The students are introduced to critical tasks and teaching points as they are taken through the various aspects of a movement to contact. This situation continues through the second day with additional critical aspects being introduced, to include completing the mission analysis and how to conduct selected battle drills.

*LAND WARRIOR IMPLICATIONS*: No specific LW implications were noted.

**TC9B81 Platoon Drill Situational Training Exercise (STX).** 108 POI Hours. Observed 16 of 108. The training was scheduled over a five-day period at Griswold Range. The intent of this instruction is to provide a practical application reinforcing the doctrinal methods and techniques for planning and conducting movement and security operations at the platoon level. This instruction reinforced the initial training, TD9B67 Platoon Operations. On the first day, the platoons familiarized themselves with the terrain. On the second day, the platoons continued their training while rotating through the blank fire iteration of the range. On the third day, the platoons continued training while each platoon rotated through the live-fire iteration of the range. The instruction was round-robin training, rotating each of the four platoons through training on selected tasks and drills, force-on-force training against an opposing force (OPFOR) squad, and a live-fire exercise. The training was basically lane training with each platoon given a lane to occupy. Each platoon conducted walk-through, rehearsals, and finally force-on-force training against a four-man OPFOR on that lane. Each platoon rotated through a live-fire exercise on the third day.

*LAND WARRIOR IMPLICATIONS*:
1. The subtasks and standards for ARTEP 7-8 MTP (DA, 1994b) will have to be rewritten to include the changes and enhanced capabilities of LW equipment. All comparable LW publications (e.g. ST ARTEP 7-8-1 MTP [LW]) have been developed for LW testing only. A complete review of each publication will be required by USAIS.
2. Equipment, particularly weapons and communications equipment to be used in the STX, will need to be redefined. The specific capabilities and equipment changes will depend on the tasks selected to be included in the STX.

**TC9B82 Defensive Operations (Guest Speaker).** 1 POI Hour. Observed: 1 of 1 hours. The training was conducted as a company-level class. It serves as the introduction class for defensive operations for IOBC. FM 7-8 (DA, 1992a) was used as a reference source. Three major tasks are covered in company-level defensive operations. All are doctrinal issues. These are listed below:

| Tasks | Subtasks |
|---|---|
| Task 1: Identify the Characteristics of the Defense | - preparation<br>- mass and concentration<br>- disruption<br>- flexibility<br>- security |
| Task 2: Identify Alternate Defensive Patterns | - mobile defense<br>- area defense |
| Task 3: Identify Defensive Techniques | - battle positions<br>- strongpoint defense<br>- defense in sector<br>- perimeter defense<br>- reverse slope defense |

*LAND WARRIOR IMPLICATIONS*: No LW implications were noted.

**TC9B83 Defensive Operations.** 6 POI Hours. Observed: 6 of 6 hours. The training was conducted as a platoon-level class. This classroom instruction addresses the basics of the defense. The second day is a five-hour TEWT. This class serves to prepare the student for a

follow-on field practical exercise, the 75 hour, TC9B84 Defensive STX. The following tasks were covered:

| Task # | Task |
|---|---|
| 1. | Purpose of the Defense |
| 2. | Characteristics of the Defense |
| 3. | Alternate Defensive Patterns |
| 4. | Defensive Techniques and defensive framework (battle positions, strongpoint defense, defense in sector, perimeter defense, reverse slope defense) |
| 5. | Explain priorities of work in the defense |
| 6. | Explain how to integrate obstacles and indirect fire with the defense |
| 7. | Explain the techniques of fire for the platoon's weapon systems |
| 8. | Explain limited visibility techniques |
| 9. | Explain combat service support (CSS) considerations for the defense |
| 10. | Explain the process of constructing a defensive sector sketch |
| 11. | Describe basic characteristics of the BFV |
| 12. | Describe the organization of a BFV squad and platoon |
| 13. | Describe the procedures for operating in an NBC environment |
| 14. | Describe the methods of employment, positions, and methods for defending a BFV platoon |

*LAND WARRIOR IMPLICATIONS*:
1. The LW Soldier Computer Interface (SCI) will enhance defensive operations. It will provide rapid, digitized defensive operation orders, including digitized NBC 1 Reports.
2. Use of the LRF/DCA will improve development of the sector sketches.
3. TWS and NSDC will provide improved vision during periods of limited visibility.
4. Additional leader tasks will have to be addressed with LW-equipped units, for example, zeroing LW systems of personnel who are MIA or captured.
5. The LW SCI provides improved CSS status reporting and expedites the requesting of supplies for both offensive and defensive operations.

**TC9B85 JANUS Exercise.** 4 POI Hours. Observed: 4 of 4 hours. The training was conducted in conjunction with the platoon defensive STX, TC9B84. JANUS simulation is a suite of computers that generates an integrated battlefield, combining students, portraying friendly force leadership positions, operating against a real opposing force. The JANUS simulation provides the capability for up to six sides (different combatants) to conduct a scenario-driven battle. The battles cannot be linked, but can be sequentially arranged after a short set-up period for each battle. For example, the platoon can conduct a movement to contact. After a short setup, the platoon can then conduct a deliberate defense of the site. The simulation is used to teach leader training with a focus on the battlefield operating system (BOS) (intelligence, maneuver, fire support, mobility/counter-mobility/survivability, air defense, combat service support, and command and control). JANUS is capable of conducting scenarios on all five defensive missions, all five offensive missions, and 14 special missions (raid, rear operations, etc.). Students are selected to fill leadership positions from squad leader through company commander and critical BOS positions. Some students are also selected to be exercise integrators. There is also an exercise control element that ensures that both sets of players stay within the parameters of the established scenario.

*LAND WARRIOR IMPLICATIONS*:
1. One area to explore is the possibility and value of linking automated LW output to the JANUS simulation.

**TH9B45 Advanced Land Navigation Examination.** 20 POI Hours. Observed: 4 of 20 hours. The purpose of this examination is to evaluate the students' ability to negotiate/conduct the advanced land navigation course. The students are organized as two-person buddy teams. Each team is assigned five points that it must locate using various land navigation techniques and skills. There are approximately three to four kilometers between points. To pass this examination, the students must obtain 70 out of 100 possible points. If the student correctly plots his start point, he receives 10 bonus points. The team receives 20 points for each "point" they correctly locate. (*Note*: The maximum total is 110 points.) The students are not authorized to navigate on the trails and roads. OPFOR are in the area to detect students on the trails and roads. If students are caught, they are penalized 10 points for each occurrence.

*LAND WARRIOR IMPLICATIONS*:
1. Just as with other land navigation training, the student could use the DCA and the LRF/GPS. The students are currently scheduled to receive GPS orientation training as part of Advanced Land Navigation II instruction and resulting examination.
2. Several decisions will have to be made. First, will the GPS be used only in Advanced Land Navigation Training II? Second, will LW students use the LW DCA? Finally, with the use of navigational aids, should the Advanced Land Navigation II instruction and scoring be made more difficult, a new land navigation site needed, or both?

**TH9B77 Develop a Squad Situational Training Exercise (STX).** 6 POI Hours. Observed: 2 of 6 hours. The training was a combination lecture and practical exercise. The first two hours were lectures on the development of an STX. The final four hours centered on a practical exercise of physically building a squad-level STX. The company was broken down into six groups to complete the PE. The following tasks were taught:

| Task # | Task |
|---|---|
| 1. | Conduct an assessment of training |
| 2. | Prepare a near-term training plan |
| 3. | Develop a squad situational training exercise |
| 4. | Determine individual and leader tasks |
| 5. | Write a training objective |
| 6. | Prepare a risk assessment as part of an STX |
| 7. | Conduct an after-action review (AAR) |

*LAND WARRIOR IMPLICATIONS:*
1. The subtasks and standards for ARTEP 7-8 MTP (DA, 1994b) will have to be rewritten to include the changes and enhanced capabilities of LW equipment. All comparable LW publications have been developed for LW testing only. A complete review of each publication will be required by USAIS.

2. Specific LW capabilities addressed in the STX will depend on the tasks selected to include in the STX developed by the student.

**WB9B76 Antitank 1.** 4 POI Hours. Observed: 3 of 4 hours. The training consisted of a combination lecture and practical exercise. The POI called for a four-hour class on various aspects of the M47 Dragon Medium Antitank Weapon and the M220E4 TOW 2 Antitank Weapon. The class had been modified to include the Javelin Antitank Weapon. The MK19 Mod 3 40mm Grenade Launcher and the Improved TOW Acquisition System (ITAS) were discussed in passing. The instruction included 2.5 hours of lectures on the Javelin, Dragon, and TOW 2 systems, followed by a round robin practical exercise. The practical exercise consisted of three stations one each on the Javelin, Dragon, and TOW 2. Each station led the students through assembly and disassembly, preparation for firing, hands-on familiarization, and a chance to ask additional questions.

*LAND WARRIOR IMPLICATIONS*:
1. Classes will have to address the impact of the LRF. None of the current antitank weapons is equipped with a laser range finder. Range is estimated. The LRF, projected to be issued to leaders and M203 gunners, can be used to determine ranges out to 2,500 meters and magnetic azimuths. Leaders and M203 gunners can acquire targets and determine their ranges. This information can be relayed to the antitank gunners. The overall impact will be determined based on the basis of issue for the LRF.
2. Classes will also have to address the benefits of additional communications capabilities under the LW Program. The antiarmor company currently requires two radio nets, one for the command link and the other to communicate between all of the systems operating on the platoon net. The individual and squad radios (with ranges of 1.3 and 5 miles, respectively) will free one of the current radios as well as offer a communications capability between paired antiarmor systems without tying up the platoon net.
3. The classes will also have to address firing positions for the antitank systems. At a minimum, the classes will have to address firing both the Dragon and Javelin with the load carrying equipment (LCE), modular body armor, and integrated helmet assembly (IHA), particularly the night sensor/display component (NSDC). For example, the NSDC will have to be placed in the stowed position in order to acquire a good sight picture, both day and night.
4. Finally, since all three antiarmor systems have excellent night thermal capabilities, use of the thermal weapons sight (TWS) on individual weapons will cause no instructional impact.

**WJ9B02 Applied Map Reading.** 2 POI Hours. Observed: 2 of 2 hours. This training is the student's initial introduction to map reading and the practical application of land navigation. It is during this session that the student learns the basic fundamentals of map reading (map symbols, grid coordinates, terrain features, measuring distance, plotting an azimuth, resection, intersection, marginal data, etc.). Following this classroom introduction to map reading, the students have a series of other training sessions where they learn how to do terrain association, as well as conduct both day and night land navigation to locate points on the ground.

*LAND WARRIOR IMPLICATIONS*:

1. Even with the LW system, students will still need fundamental training on map reading skills. The actual content of the training might need to be changed based on the actual capabilities and displays of the LW system. Until the LW software system is fully developed, the actual training can not be finalized. There are numerous factors that must be known:

- Will colors in the LW display match the colors shown on maps for different features (green, black, red, brown, and blue)?
- How does the map appear in the NSDC?
- Which maps are digitized for use in LW? Will the instructors need to use different map sheets for training?
- Will LW display contour lines for determining elevation?
- Will LW use the same symbols as current maps (ticks for depressions, cuts, and fills)?
- Are grid lines included in LW and how accurately can coordinates be plotted?
- How will GPS be used in plotting points?
- In the LW display, is north always to the top or can the orientation be altered?
- Will LW adjust for magnetic versus grid directions?
- How can a person measure road or straight-line distance in LW?
- How does an operator plot an azimuth in LW? Thus, how does a person conduct intersection to locate a point?

2. With the GPS capability, resection training should not be needed.
3. While most of the map reading fundamentals will be necessary, the LW-equipped students may require separate or additional training to learn how to physically operate their system, learn the icons inherent to operating the system, and unit symbols for individuals and elements larger than squads.

**WJ9B03 Terrain Association and Orienteering.** 3 POI Hours. Observed: 3 of 3 hours. Training was conducted at a land navigation site (Furman Road). The training consisted of two segments, a 30-minute lecture and a 2.5-hour practical exercise on terrain association. This instruction is a prerequisite for both day and night land navigation training. Specific topics addressed in the instruction included:

| Task # | Description |
|---|---|
| 1 | Plot an 8-digit grid |
| 2 | Determine a magnetic and grid azimuth |
| 3 | Use a lensatic compass |
| 4 | Use a protractor |
| 5 | Identify terrain features on the ground |
| 6 | Orient a map with a compass |
| 7 | Orient a map using terrain association |
| 8 | Determine a location on the ground by terrain association |
| 9 | Navigate using a military map and lensatic compass |
| 10 | Establish and verify a pace (walking and running) |

*LAND WARRIOR IMPLICATIONS*:

1. Classes will have to address the benefits of leaders being issued GPS and whether or not the students will have access to this equipment when conducting the classes.
2. Classes will also have to address the impact of the LRF/DCA. Currently, no personal weapons are equipped with a laser range finder. Range is estimated. The LRF, projected to be issued to leaders and M203 gunners, can be used to determine ranges out to 2,500 meters and magnetic azimuths. The overall impact will be determined based on the basis of issue for the LRF and a determination as to whether or not the students will have access to this equipment.
3. Planned MQS II standards require the LW-equipped leader to use his digital map and LW Route Planning Aid to help his terrain analysis and select his route. The LW computer will provide distances and movement times. These considerations should be incorporated into the instruction.

## Appendix C. BNCOC Training Observed

This appendix provides a synopsis of the 18 blocks of observed BNCOC instruction. Each synopsis includes a short narration covering the scope of training (what was trained and how training was conducted), and any Land Warrior (LW) implications.

With few exceptions, all BNCOC classroom instruction is student-taught with supervision by a small group instructor. This forms a combination of lecture and group discussion training. The BNCOC cadre is available to supervise and guide the student-led discussion, if necessary. Most BNCOC instruction culminates with a training review.

The following table lists the classes that were observed. The listing is in sequential order. Although no specific estimates of training time were made to train the various LW skills, in many cases it was obvious where LW integration could occur without requiring additional time. Most of these implications center on merely providing information or simple comments. Others will require extensive revisions to the current instruction. The following table indicates observed training where LW could be introduced. The analysis is based on available time and related subjects already in the class. This chart reflects only observed training and does not include other unobserved associated classes where LW-related material may be introduced. Consequently, as with IOBC, it does not reflect total integration of LW training into BNCOC. The "No" column reflects where LW is not applicable.

| Classes Observed | Applicable to LW? | | Classes Observed | Applicable to LW? | |
|---|---|---|---|---|---|
| **POI # Class Title** | **Yes** | **No** | **POI # Class Title** | **Yes** | **No** |
| M307 NBC Defense | √ | | BNCO04 Land Navigation | √ | |
| P302 Rifle Marksmanship Training | √ | | BNCO06 Logistics | | √ |
| BNCO02 Forward Observer Procedures | √ | | M306 Battle Drills | √ | |
| BNCO10 Computer Overview | √ | | BNCO07 Planning a STX | √ | |
| BNCO11 Night Fighting Facility | √ | | BNCB03 PLGR | √ | |
| BNCO01 JANUS Exercise | | √ | BNCB02 Patrolling | √ | |
| M305 Squad Tactical Operations | √ | | BNCB01 Squad Tactical Operations | √ | |
| CTCO01 SINCGARS | | √ | BNCB08 MOUT | √ | |
| BNCO09 Tactical Employment of Machine Guns | √ | | BNCB07 Situational Training Exercise | √ | |

A description of the classes by POI number (alphanumeric order) follows.

**CTCO01 SINCGARS.** 4 POI hours. Observed: 4 of 4 hours. The purpose of this class is to provide an overview of the operation of the AN/VRC-88A Single Channel Ground and Airborne Radio System (SINCGARS). This class should enable the student to operate SINCGARS as a net member in the frequency hop mode. Only SINCGARS-related systems were addressed in this class. No other communications systems were discussed. Aside from introductory instruction of several SINCGARS-related systems, training focused on the AN/VRC-88A SINCGARS and AN/CYZ-10 ANCD. The first hour served as an introduction to the AN/VRC-88A SINCGARS including step-by-step assembly, programming single channel frequencies, offsetting frequencies, and frequency scanning. The second hour served as the introduction for the AN/CYZ-10 ANCD. The third hour discussed frequency hop, and step-by-step loading

communications security (COMSEC) data into the SINCGARS, followed by a practical exercise. The fourth and final hour discussed clearing information from the radio using the CUE Channel, late net entry techniques, and a review of the instruction.

*LAND WARRIOR IMPLICATIONS:*
1. Since the AN/VRC-88A SINCGARS will remain in service, this class will still be required.
2. Due to the length and technical nature of this instruction, there is not adequate time to include LW SINCGARS-compatible communications equipment.

**BNCB01 Squad Tactical Operations (Tactics).** 48 POI hours. Observed: 6 of 48 hours. Squad Tactical Operations, referred to as Tactics in the training schedule, consists of two phases. Students first conduct a 4-hour lecture/group discussion, followed by a field training exercise (FTX). The FTX is a three-day training exercise included in the BNCB07 Situational Training Exercise (STX). Students are grouped into platoon/patrol size organizations and conduct a variety of missions to experience a hands-on walk-through of tactical operations. Each student carried his individual TA-50 and was equipped with multiple integrated laser equipment system (MILES). The platoons were armed with M16s and squad automatic weapons (SAWs). No night vision equipment was provided. The soldiers practiced the doctrinal procedures discussed in the classroom.

*LAND WARRIOR IMPLICATIONS:*
1. The training currently includes six different actions/tasks involved in tactical operations. These fundamentals and basics will still need to be reviewed and discussed. However, the increased LW capabilities should be integrated into the training. The same terrain and basic missions could still be used as the basis for the training, but would require some modification to adequately incorporate LW systems.
2. With the introduction of LW equipment, the fundamentals of tactical operations should be reviewed and redefined. For example, two topics addressed were link-up operations and passage of lines as part of an infiltration or exfiltration. The discussion centered on the difficulty in locating exact points/locations on the ground, especially at night. The LW system capabilities should obviate most of these difficulties through increased accuracy in navigation, position location, situational awareness, and increased communication capability.
3. Some of the tactical operations basics could be simplified or accomplished more easily. For example, one topic discussed was clearing a trench line and how to mark friendly locations within the trench area. The LW computer system should track individual soldier locations and the heads-up display should facilitate keeping everyone aware of friendly locations.
4. The increased communications capability of LW equipped units should also be addressed.

**BNCB02 Patrolling.** 16 POI hours. Observed: 8 of 16 hours. Patrolling instruction consists of two phases. Students first conduct a 4-hour conference/group discussion, followed by a field training exercise (FTX). The classroom instruction is a student-led discussion in a classroom environment. The majority of the students in the 11B track are light infantry soldiers with a variety of prior training and personal experience in patrolling operations. This conference consists mainly of readings from FM 7-8 (DA, 1992a), ARTEP 7-8 MTP (DA, 1994b), and STP 7-11 BCH&M 14-SM-TG (DA, 1988), combined with discussion where the different students have an opportunity to express how patrolling operations are conducted within their parent unit.

FM 25-101 *Battle Focused Training* (DA, 1990) was referenced but not used. Various techniques for the different facets of patrolling operations were presented. The FTX is a three-day field training exercise. Students are grouped into platoon/patrol size organizations and conduct a variety of missions to experience a hands-on walk-through of patrolling operations. The students practice the doctrinal procedures that were discussed in the classroom environment. Throughout the FTX, the patrol organizations executed five different missions involving both patrolling and other tactical operations.

*LAND WARRIOR IMPLICATIONS*:
1. The discussion currently addresses the terminology used in patrolling operations and discusses the fundamentals of patrolling. These fundamentals and basics will still need to be reviewed and discussed. However, the FTXs should be modified to incorporate the use of the LW system. The same terrain and patrolling missions could be used, but the conduct of the exercise should accommodate LW capabilities.
2. With the introduction of LW equipment, the fundamentals of patrolling should be reviewed and redefined. For example, a current practice is to record information gathered in a reconnaissance mission or while reconnoitering an area or zone. The video link and computer interface could provide an automatic information feed to higher level organizations, precluding the requirement for soldiers on the ground, close to target positions, from needing to record information and make rough sketches.
3. Some of the patrolling basics could be simplified or accomplished more easily. For example, the laser range finder and GPS could help more accurately locate a suspected enemy target. Also, the increased communications capability should facilitate passing information between patrol members operating in the vicinity of the same target and in maintaining communication with observation posts (OPs). Thermal sights could help detect potential targets within the target area.

**BNCB03 Precision Lightweight Global Positioning System (PLGR).** 7 POI hours. Observed: 6 of 7 hours. The training was conducted as small group instruction. The purpose of the instruction is to identify the basic characteristics, operational requirements, and use of the AN/PSN-11 Precision Lightweight Global Positioning System (PLGR) to navigate from one point to another. The PLGR class has two distinct phases. First, the BNCOC students are taken through the technical aspects of the component parts and placing the AN/PSN-11 PLGR into operation. This segment of the class is a combined lecture/group discussion. The preponderance of the class was used for a practical exercise where the students used the PLGR to navigate from one point to another on the drill field adjacent to the classroom.

*LAND WARRIOR IMPLICATIONS*:
1. The AN/PSN-11 PLGR class should remain as a part of the overall BNCOC instruction, however, a decision will have to be made when and where to implement LW-comparable instruction on the laser range finder/digital compass assembly (LRF/DCA) for LW-equipped soldiers.
2. Although the PLGR is taught to BNCOC students, it is not included as part of the night land navigation examination.
3. A decision will have to be made as to the use of the PLGR in lieu of the LRF/DCA for LW soldiers or if LW-equipped soldiers will receive separate instruction.

**BNCB07 Situational Training Exercise (STX).** 96 POI hours. Observed: 4 of 96 hours. This is the practical exercise (PE) follow-on instruction to BNCO07 Planning a Situational Training Exercise (STX) (4 hours). It is a 70-hour practical exercise listed on the training schedule that includes both day and night periods. This activity is spread over a four-day period. The students are grouped into five platoon/patrol size organizations and rotate through a series of STX lanes. The specific lanes vary between courses, but are conducted in the same general vicinity. The exercises are only conducted during daylight; nights are spent in a minimum security patrol base. The PE consists of establishing five STX lanes and then having each platoon/patrol plan for and execute each lane. The lanes include the basic missions of point ambush, movement to contact, route reconnaissance, attack to destroy a bunker, and conduct a hasty defense. As stated above, the missions for the lanes can vary.

*LAND WARRIOR IMPLICATIONS:*
1. This block of training currently includes five different STX lanes that exercise a small unit in the conduct of tactical operations. These fundamental missions and the same terrain could still be used as the basis for the training, but would require some modification to adequately incorporate LW systems.
2. As addressed in other blocks of training, with the introduction of LW equipment the fundamentals of tactical operations should be reviewed and redefined. The revised tactics and operations should be practiced as part of these STX lanes.

**BNCB08 Military Operations on Urbanized Terrain (MOUT).** 12 POI hours. Observed: 6 of 12 hours. The classroom instruction was conducted as small group instruction. The purpose of the instruction is to provide the BNCOC student the fundamentals of MOUT. The class culminates with a practical exercise (PE) that includes both day and night periods. The POI lists the classroom instruction at 4 hours and a PE for 8 hours. Actually, the classroom instruction was scheduled for 12 hours and the PE was scheduled for 22 hours. The training for this PE is scheduled at Ft. Benning's MOUT site (McKenna) and is intended to be a walk-through of the doctrinal topics addressed during the classroom conference.

*LAND WARRIOR IMPLICATIONS:*
1. The fundamentals of MOUT operations will still need to be reviewed and discussed. However, with the introduction of LW, the fundamentals of MOUT operations will need to be reviewed and refined.
2. The increased communications capability should facilitate passing information between teams operating in the same building. Thermal sights could help detect potential targets within the target area.

**BNCO01 JANUS Exercise**. 4 POI hours. Observed: 4 of 4 hours. JANUS Simulation is a suite of computers that generates an integrated battlefield, combining students, portraying friendly force leadership positions, operating against a real opposing force (OPFOR). JANUS is capable of conducting scenarios on all five defensive missions, all five offensive missions, and 14 special missions (raid, rear operations, etc.). The class consists of three segments: a formal introduction, the training exercise, and an after-action review (AAR). The introduction provides the history of the simulation, explains how the platoon will be organized to conduct the training, and the

intricacies of the work stations and components. The times vary for the practical exercise, as does the amount of time devoted to the AAR. The JANUS Simulation provides the capability for up to six sides (different combatants) to conduct a scenario-driven battle. The battles cannot be linked but can be sequentially arranged after a short set-up period for each battle. For example, the platoon can conduct a movement to contact. After a short setup, the platoon can then conduct a deliberate defense of the site. The simulation is used to teach leader training with a focus on the battlefield operating systems (BOS) (intelligence, maneuver, fire support, mobility/counter-mobility/survivability, air defense, combat service support, and command and control). Students are selected to fill leadership positions from squad leader through company commander and critical BOS positions. Some students are also selected to be exercise integrators. There is also an exercise control element that ensures that players stay within the parameters of the established scenario. The simulation is capable of training a platoon at a time. The training focus of JANUS is leader training within the framework of the BOS.

*LAND WARRIOR IMPLICATIONS.*
1. One area to explore is the possibility and value of linking automated LW output to the JANUS simulation.
2. No additional specific LW implications were noted.

**BNCO02 Forward Observer Procedures.** 6 POI hours. Observed: 4 of 6 hours. The purpose of this class is to provide an overview of the various means of calling for and adjusting observed indirect fires. The class is divided into three sections. First, the class is instructed on the components and procedures for calling indirect fires. The second portion of the class discusses the three types of calls for fire (locate a target by grid coordinates, shift from a known point, and polar plot). Due to the complicated process of calling for fire by shifting from a known point, this period includes several practical exercises. The third portion of the class focuses on calling for fires using the three techniques for calling indirect fires. One student portrays the fire direction center (FDC), while another student uses one of the techniques to call for fire. The times vary for the practical exercise and student knowledge. The class is scheduled for a 6 hour block, but is usually completed before that time. This particular class was completed in 4 hours.

*LAND WARRIOR IMPLICATIONS:*
1. The class should include the use of the LRF/DCA to help adjust fires. This could easily be incorporated into a practical exercise to call for fire using LW equipment. Use of the LW messaging capability should also be integrated into the instruction.
2. All references (FM 6-30 *Observed Fire* [DA, 1991d], GTA 7-1-32 *Observed Fire Reference Card* [DA, 1987], and GTA 17-2-15 *Call For Fire* [DA, 1985]) will have to be changed/updated to reflect the advantages of LW equipment to help adjust fire.

**BNCO04 Land Navigation.** 20 POI hours. Observed: 13 of 20 hours. The classroom instruction was conducted as small group instruction. The practical exercise (both day and night) was conducted at a land navigation training site (Furman Road). The instruction provides an overview of land navigation training, culminating in a practical exercise. At the completion of the classroom portion of the instruction, the BNCOC student is expected to use the fundamentals of map reading to: navigate using a military map and the techniques of terrain association; apply the fundamentals of land navigation to determine elevation, distance while moving and a

magnetic azimuth while moving using a compass; orient a map to the ground using a lensatic compass; bypass an obstacle while moving from one point to another point during hours of darkness; and identify an objective within 60 minutes. The training has three phases: 4 hours of classroom instruction; 6 hours of day terrain association; and 3 hours of night land navigation. The students were broken down into three-man teams for both the day and night land navigation practice sessions. Two of the required classroom tasks, Select a Movement Route Using a Map and Identify the Fundamentals of Land Navigation at Night, received no instruction. The land navigation examinations were not observed.

*LAND WARRIOR IMPLICATIONS*:
1. Unlike the IOBC land navigation examination, the AN/PSN-11 PLGR is not used by the BNCOC student as part of his land navigation training and examination.
2. A decision will have to be made as to the use of the PLGR in lieu of the LRF/DCA for LW-equipped soldiers, and when and where to implement LW-comparable instruction on LRF/DCA for LW soldiers.

**BNCO06 Logistics**. 2 POI hours. Observed: 2 of 2 hours. This student-led instruction provides the BNCOC student an introduction to manual procedures for the Army supply and logistical system. The focus of the class is on unit supply and resupply procedures. Unlike the Infantry Officer Basic Course (IOBC), this class contains no instruction on supply accountability or documentation.

*LAND WARRIOR IMPLICATIONS*: No LW implications were noted.

**BNCO07 Planning a Situational Training Exercise (STX).** 4 POI hours. Observed: 4 of 4 hours. This student-led instruction is designed to assist the BNCOC student in planning an STX, and in learning how to use the Combat Drills (Attack and Defend) and STX lanes. The intent of this instruction is to provide a practical application reinforcing the doctrinal methods and techniques for conducting squad movement collective tasks. The class is broken into two segments. The first hour is a building block lecture on how to develop an STX. The BNCOC Class #M306 Battle Drills (2 hrs) is a prerequisite for this class. Based on what was learned on the use of battle drills, the students are taught to include collective tasks from ARTEP 7-8-MTP (DA, 1994b) in a logical sequence to produce an STX. The remaining portion of the class was a series of practical exercises on developing squad and section STXs and a review of the entire process.

*LAND WARRIOR IMPLICATIONS*:
1. The subtasks and standards for ARTEP 7-8 MTP *Mission Training Plan for the Infantry Rifle Platoon and Squad* are currently in draft. ARTEP 7-8 MTP will have to be finalized prior to implementing changes to BNCOC.
2. LW equipment, particularly weapons and communications equipment, will have to be integrated. The specific capabilities and changes will depend on the tasks selected to be included in the STX.

**BNCO09 Tactical Employment of Machine Guns.** 4 POI hours. Observed: 4 of 4 hours. The purpose of this student-led instruction is to train the BNCOC student in how to employ a

machine gun. The class concentrates on fundamental instruction on machine gun employment. It was quite apparent that the class was structured around the M60 manual, FM 23-67 *Machine Gun 7.62-MM, M60* (DA, 1984a). The class was using FM 23-14 *M249 Light Machine Gun in the Automatic Role* (DA 1994a). It contained most of the same information, but in a different sequence. This caused the students to jump back and forth between chapters 5 and 6 of FM 23-14.

*LAND WARRIOR IMPLICATIONS*:
1. The instruction should include the use of the LW squad radio to enhance fire control and improve compliance to *fire* commands.
2. The instruction should also include the use of the LW LRF/DCA in sector sketch development, during periods of limited visibility, in defining sector limits and establishing principal directions of fire, and in engaging predetermined targets.
3. FM 23-14 *M249 Light Machine Gun in the Automatic Role* (DA 1994a) will have to be rewritten to reflect some of the information included in FM 23-67 *Machine Gun 7.62-MM, M60* (DA, 1984a). This is particularly true for range operations and weapon employment. Once that is accomplished, FM 23-14 should be the only reference used in the class.
4. None of the LW target acquisition equipment was addressed in the instruction.

**BNCO10 Computer Overview**. 4 POI hours. Observed: 3 of 4 hours. This informal class is designed to provide 11-Series MOS soldiers information on a limited number of basic computer operations. The intent is for soldiers with more experience to assist those with limited experience. A classroom (#32) in the Infantry School is specifically designed to provide each student with an Internet-capable computer. Each station has a Gateway 266M Computer. Although the instruction was designed for more experienced soldiers to assist those with less experience, the more experienced soldiers became a hindrance to the instructor. Several more experienced soldiers stayed ahead of the instructor or went off on their own to view the Internet. In several instances, less experienced soldiers observed the instruction without actively participating. It is recommended that the students be screened and the class limited to those individuals who portray themselves as "novices" with little or no experience. Three or four more experienced soldiers can roam the classroom, available to assist the instructor, if requested by a student. The class is scheduled for a four-hour block, but is usually completed before that time. This situation is true for Advanced Noncommissioned Officer Course (ANCOC) as well. This particular class was completed in three hours. The class can best be described as familiarization, and is not intended to give soldiers computer skills per se.

*LAND WARRIOR IMPLICATIONS*:
1. For those personnel considered computer "novices" (those with little or no computer experience), there is a tendency to avoid using any computer. Through training, much of this hesitancy can be overcome.
2. Basic computer skills, such as use of menus, a mouse, icon identification, sending messages, manipulating files, etc. will be required to operate the LW computer. Soldiers should be competent with basic computer skills and, in particular, operating procedures, before they proceed to the LW computer. Through the application of *Windows©*, icon identification and basic operation of the LW computer can be enhanced, shortening training time.

**BNCO11 Night Fighting Facility.** 4 POI hours. Observed: 3 of 4 hours. The class was conducted in the Night Fighting Experimentation Facility of the Infantry School. The facility is specifically designed to conduct night vision device training. The instruction is provided by the Dismounted Battlespace Battle Lab (DBBL). The class provides an overview of night vision devices. The class is a combination lecture and practical exercise capability in the form of lane training. The lane comprises an obstacle course (built within the classroom) that each student must navigate under darkness conditions. Different environments (wood line, desert cave, jungle and MOUT) are depicted within the lane. Since the students use the ANPVS-7B night vision goggles to negotiate the lane training, the class focuses heavily on NVG operation. Other devices receiving familiarization training include the AN/PVS-7D and AN/PVS-14 Monocular night vision devices; AN/PAQ-4B; AN/PEQ-2A; AIM-1; LPL-30 Laser Pointer; and GCP-18 Ground Commander Pointer. The students were also shown the HNV-1 Belgium Night Sight. Unlike the US technology, the HNV-1 uses a heads-up display. It was noted that the HNV-1 is scheduled to undergo testing shortly. The class consists of three segments, a formal introduction, a lane training exercise, and an after-action review (AAR). The times vary for the practical exercise, as does the amount of time devoted to the AAR. The class is scheduled for a four-hour block, but is usually completed before that time. This particular class was completed in three hours. Other training features in the facility, unaided night vision training, boresighting devices/techniques, and a computer-based thermal combat vehicle signature training program, were not used.

*LAND WARRIOR IMPLICATIONS:*
1. Besides the night vision goggles, the only LW optics device discussed was the AN/PEQ-2A Target Pointer Illuminator/Aiming Light (TPAIL).
2. The AN/PAQ-4B was shown in lieu of the AN/PAQ-4C Infrared (IR) Aiming Light (IAL).
3. The AN/PAS-13 Thermal Weapon Sight (TWS) and the M68 Close Combat Optic (CCO) were not included in any of the discussion. The CCO should be included to show the students the day sight. No thermal training was conducted, although a computer-based thermal signature training program is available. More time would be required for soldiers to attain thermal signature skills.
4. All LW devices should be incorporated into this training.

**M305 Squad Tactical Operations.** 48 POI hours. Observed: 4 of 48 hours. This class has two parts, a classroom discussion and a follow-on FTX. The four-hour class serves as the introduction to squad tactical operations, specifically to introduce the squad leader to the planning considerations for conducting tactical road marches, both foot and vehicular, actions in the defense, and the effects of continuous operations on personnel. A student instructor taught each of the tasks with group discussion by the class. All key points outlined in the POI were discussed. The appropriate field manual and corresponding page numbers that supported each task were identified. The POI lists the classroom presentation at 8 hours and the FTX at 40 hours. The class was actually scheduled for 4 hours. The 40-hour PE is included in the BNCB07 STX FTX.

*LAND WARRIOR IMPLICATIONS:*
1. When finalized, FM 7-8 (LW) *Infantry Rifle Platoon and Squad* should be used as a reference in lieu of the current version.

2. Comparable LW-specific tasks should replace the current tasks, as indicated in the table below.

| Current Tasks | Comparable Land Warrior Tasks |
|---|---|
| Conduct Tactical Road March | 7-3-1123 LW Perform Tactical Road March |
| Conduct a Defense by Squad | 7-3/4-1115 Execute Defense |
| Consolidate a Squad following Enemy Contact While in the Defense | 7-3/4-1607 LW Perform Consolidation and Reorganization |
| Reorganize a Squad following Enemy Contact While in the Defense | 7-3/4-1607 LW Perform Consolidation and Reorganization |
| Direct Unit Air Defense | 7-3/4-1301 LW Defend Against Air Attack |
| Perform Duties as Serial/March Unit CDR | Same IAW FM 7-8 (LW) |
| Conduct troop Leading Procedures | Same IAW FM 7-8 (LW) |
| Conduct Military Decision-Making Process | Same IAW FM 7-8 (LW) and FM 101-5 |

**M306 Battle Drills**. 2 POI hours. Observed: 2 of 2 hours. This student-led instruction is designed to provide the student with the knowledge of how to use battle drills as a means of training common leader combat skills. The class is broken into two segments. The first hour was a building block lecture on crawl-walk-run methodology, how to use battle drills, key definitions, and the flow of how battle drills operate. For the second hour, the class was divided into three small groups to conduct practical exercises on Battle Drills 1, 4, and 5 from ARTEP 7-8-1 Drill *Battle Drills for the Infantry Rifle Platoon and Squad* (DA, 1993b). The remaining portion of the instruction contained a review. This class is a prerequisite for BNCO07 Planning a Situational Training Exercise (STX).

*LAND WARRIOR IMPLICATIONS*:
1. ARTEP 7-8-1 Drill has been rewritten in draft and will need to be finalized to include the changes and enhanced capabilities of LW equipment.
2. All LW leader tasks should be addressed. Equipment, particularly weapons and communications equipment, will have to be integrated. The specific capabilities and changes will depend on the tasks selected to be included in STX.

**M307 NBC Defense.** 5 POI hours. Observed: 5 of 5 hours. The training was conducted as small group instruction. The purpose of the instruction is to identify the basic characteristics, effects, and actions necessary to function on an NBC battlefield. All key points in the POI were discussed. The appropriate field manual and corresponding page numbers that supported each task were identified.

*LAND WARRIOR IMPLICATIONS*:
1. The sensitivity of LW equipment will require additional protection. Given notice of a nuclear detonation, LW computers, communications equipment and sights should be buried to protect them from any electro-magmetic pulse (EMP).
2. Procedures for decontaminating LW equipment from chemical and biological contamination must be developed and provided to the field.
3. Students must be informed on the use of the LW computer to prepare and disseminate NBC 1 Reports.
4. All of the NBC-related documents (FM 3-3 *Chemical and Biological Contamination Avoidance* [DA, 1992c], FM 3-4 *NBC Protection* [DA, 1992b], *FM 3-5 NBC Decontamination*

[DA, 1993c], FM 3-100 *Chemical Operations Principles and Fundamentals* [DA, 1996a], and GTA 3-6-8 *NBC Warning and Reporting System* [DA, 1996c]) must be upgraded to include LW equipment and procedures, particularly counteractions to any electromagnetic pulse (EMP) threat.

**P302 Rifle Marksmanship Training**. 8 POI hours. Observed: 8 of 8 hours. The training was conducted as small group instruction. The purpose of the instruction is to understand squad marksmanship training requirements as stated in FM 23-9 *M16A1 and M16A2 Rifle Marksmanship* (DA, 1989). The instruction is student-taught with supervision by the small group instructor. The student instructor offered a unique introduction to the class. He presented movie excerpts to demonstrate both good and bad rifle marksmanship techniques. For bad marksmanship techniques he ran a clip from the film *Platoon*, a Vietnam era film. The scene showed an infantry platoon that was surprised while in a night defensive position. In the ensuing chaos, only one enemy soldier was wounded and ultimately killed after a hellish firefight. For good marksmanship, the movie *Sergeant York* was selected. The excerpt, from the World War I docudrama starring Gary Cooper, focused on the scene where SGT York received the Congressional Medal of Honor by destroying four machine-gun nests, killing 24 enemy soldiers, and capturing over 100 more. As a result of the introduction, the soldiers in the audience were "fired up" and eagerly participated in the class.

*LAND WARRIOR IMPLICATIONS*:
1. This instruction deals with the fundamentals of rifle marksmanship training. These fundamentals are limited to the four steady hold factors, identifying shot groups and taking corrective action to zero the M16 rifle, correcting individual soldier deficiencies, and daylight range operations and considerations. No mechanical training was conducted. These fundamentals will not change with the inclusion of LW weapon systems. However, with the additional GFE and other equipment in the LW weapon subsystem, additional diagnostic techniques and fundamentals of firing these equipment (Dyer, 1999) must be added to the POI.
2. FM 23-9 *M16A1 and M16A2 Rifle Marksmanship* (DA, 1989) will have to be rewritten to include the M16A4 Rifle and M4E2 Carbine.

## Appendix D. OSUT Training Observed

This appendix summarizes the 20 blocks of observed OSUT instruction. Each synopsis includes a short narration covering the scope of training (what was trained and how training was conducted), and any Land Warrior (LW) implications. The following table cites the classes that were observed, and whether there will be a LW impact. The listing is sequential. As with IOBC and BNCOC, the descriptions provided below do not necessarily reflect total integration of the LW system in OSUT, as there could be other impacts not identified by this analysis.

| POI # | Class Title | LW Impact ? | POI # | Class Title | LW Impact ? |
|---|---|---|---|---|---|
| CM1 | Basic Military Communications | Yes | BR9 | Practice Record Fire II | Yes |
| MR1 | Basic Map Reading I | Yes | BR10 | Record Fire | Yes |
| MR2 | Basic Map Reading II | Yes | BR11 | Automatic/Burst Firing (M16A2) | Yes |
| BR2 | Fundamentals of Rifle Marksmanship | Yes | BR12 | Protective Mask Firing (M16A2) | Yes |
| BR3 | Shot Grouping and Zero | Yes | BR13 | Night Firing (M16A2) | Yes |
| BR4 | Downrange Feedback Firing | Yes | MG3 | M240B Machine Gun | Yes |
| BR5 | Confirm Zero | Yes | AIM1* | Advanced Infantry Marksmanship | Yes |
| BR6 | Field Fire I and Target Detection | Yes | AIM2* | Advanced Infantry Marksmanship | Yes |
| BR7 | Field Fire II | Yes | AIM3* | Advanced Infantry Marksmanship | Yes |
| BR8 | Practice Record Fire I | Yes | AIM4* | Advanced Infantry Marksmanship | Yes |

**Note:* Advanced Infantry Marksmanship (AIM) is a series of four newly implemented lessons replacing Advanced Rifle Marksmanship (ARM) classes. The first iteration was conducted in August 1999. It is expected to undergo some modification for content and standards until finalized.

A total of 26 blocks of instruction was identified as likely candidates for the inclusion of LW instruction. Five classes of these classes were not observed. However, based on descriptions provided in the POI (and if LW equipment were available), these classes could have critical LW implications. These classes are:

| POI # | Lesson Title* | POI HRS | LW IMPACT |
|---|---|---|---|
| IN8 | Pre-Combat Inspection | 4 | Yes |
| IT3 | Conduct Night Offensive Operations | 2 | Yes |
| MG1 | M249 Machine Gun | 20 | Yes |
| MO1 | Military Operations on Urban Terrain (MOUT) | 8 | Yes |
| ST1 | Perform as a Member of a Dismounted Infantry Squad | 22.5 | Yes |

*NOTE: For additional details on the unobserved classes see paragraph 5, below.

OSUT marksmanship training is currently undergoing major revision. The final impact on basic rifle marksmanship (BRM) is still unknown. All advanced rifle marksmanship (ARM) classes are being replaced by the newly implemented advanced infantry marksmanship (AIM)

training. The changes are not a one-for-one swap. Changes include reallocating training times, revamping standards, and combining tasks and scenarios. It will be some time before the changes to the POI are finalized. Our review marked the first iteration of the transition period. As a result, our observations reflect only the first iteration, and may not mirror subsequent revisions.

As a result of the POI revisions, tasks normally associated with concurrent training stations on the range are now expected to be taught by the drill instructors (DIs) at their company areas prior to arriving at the firing range. This transition phase was in progress during our OSUT observations. For example, during AIM 1, the unit was expected to conduct familiarization training (mounting and operation) on the AN/PVS-7B and AN/PAQ-4C, and bore sight the weapons prior to arriving at the range. The OSUT unit conducted familiarization training on the AN/PVS-7B and AN/PAQ-4C, but was unaware of the requirement to bore sight individual weapons. Consequently, 29th Infantry cadre taught 13 OSUT soldiers to mount and bore sight the AN/PAQ-4C to the M16A4. Those 13 trainees then bore sighted all 48 weapons for the company training. For the remaining AIM classes, the unit conducted the training on mounting night vision goggles (NVGs) and bore sighting the weapons.

The current OSUT standard is for the soldier to qualify with the M16 rifle during the day and night. Therefore, given the LW target acquisition systems, a decision must be made how and what to qualify with and associated LW standards. Currently, M16 night firing is conducted as part of AIM training using the AN/PAQ-4C and AN/PVS-7B/D NVGs. Mounting and operation of the AN/PVS-4 night sight is taught, but it was not used for firing. There is no integrated firing with the LW-based M68 Close Combat Optic (CCO) and Thermal Weapon Sight (TWS) for either day or night firing. LW live-fire training should include using the TWS for both day and night firing. Additionally, firing should include the use of the TWS or video camera in the indirect fire mode, using the TWS or video camera to peer around an obstruction or berm and engage targets without exposing the firer to danger. If the LW system uses a bore light, then soldiers should be taught how to boresight the optics and target acquisition systems.
be introduced.

A description of the classes by POI number (alphanumeric order) follows.

**AIM 1 Advanced Infantry Marksmanship.** 8 POI Hours. Observed: 2 1/2 of 8 hours. AIM 1 is the first of four newly implemented Advanced Infantry Marksmanship (AIM) lessons. The OSUT soldier is to engage targets during hours of limited visibility while wearing NVGs. Given an AN/PVS-7B/D or AN/PVS-14, bore light, an M16/M4 series weapon with ammunition, and an AN/PAQ-4C aiming light, the OSUT soldier must mount the NVGs and acquire targets unaided and with the AN/PAQ-4C. He must hit 3 out of 10 50-meter targets unaided and 12 of 25 50-meter targets aided with NVGs. To conduct the range firing, the OSUT soldier fires three tables. Table I requires the student to fire a 10-round magazine and engage 50-meter targets without aided vision. The student then lowers and adjusts his NVGs and makes final adjustments. Table II requires the student to fire a 10-round magazine and engage 50- to 150-meter targets from the foxhole supported firing position with aided vision. Table III requires the

student to fire a 3d magazine with 15 rounds of ball ammunition and engage targets using both the prone unsupported and prone aided positions at ranges from 50 to 150 meters.

*LAND WARRIOR IMPLICATIONS:*
1. This revised instruction is critical for LW application of night vision devices.
2. It is also critical for LW application of zeroing and bore sighting the AN/PAC-4C to the M16/M4.
3. Currently night fire during AIM includes only NVGs and aiming lights. For LW, night fire qualification with the TWS must be executed as well.

**AIM 2 Advanced Infantry Marksmanship.** 8 POI Hours. Observed: 2 of 8 hours. AIM 2 is the second of four AIM lessons. AIM 2 is both a day practice and qualification. The OSUT soldier is to demonstrate the ability to detect and engage moving and stationary targets during daylight hours. On a remote target system (RETS) range, given an M16A2 rifle, 34 moving target exposures at ranges from 35 to 185 meters, 16 stationary target exposures at ranges from 50 to 300 meters, each OSUT soldier must achieve a minimum of 18 hits out of 50 target exposures to qualify. The chart listed below provides a breakdown of the practice and qualification results.

| Achieved Standard On 1st Firing | Achieved Standard On 2d Firing | Failed to Achieve Standard | Did Not Fire* |
|---|---|---|---|
| N=68 | N=27 (195 total) | N=1 | N=2 |

*Included range detail and profiles.

*LAND WARRIOR IMPLICATIONS:* Firing was conducted with standard M16A2 "iron" sights. LW will require either additional training on or integrated firing with the M68 CCO, the TWS, and/or the PAQ-4C aiming light against moving targets.

**AIM 3 Advanced Infantry Marksmanship (AIM).** 4 POI Hours. Observed: 3 of 4 hours. The OSUT soldier is to demonstrate the ability to engage targets during hours of limited visibility with the AN/PAQ-4C aiming light. During darkness, given an AN/PVS-7B/D or AN/PVS-14 NVG with two batteries, bore light with battery, an M16/M4 series weapon with 36 rounds of 5.56mm ammunition, an AN/PAQ-4C with batteries, and a range with foxhole firing positions and 75-, 175- and 300-meter pop-up targets, the OSUT soldier must mount the NVGs and engage targets using the AN/PAQ-4C. He must concurrently load, reduce stoppage, and clear an M16/M4 series weapon without assistance during hours of darkness while engaging pop-up targets from the foxhole supported and prone unsupported firing positions. This firing is considered familiarization firing.

*LAND WARRIOR IMPLICATIONS:* When the unit arrived at the range, the unit cadre stated that all devices were mounted and bore sighted in the company area. No details were provided as to whom, and specifically how, bore sighting was conducted. This instruction is critical for LW application. To be effective with NVGs and aiming lights, all soldiers must know how to boresight the aiming light. Assuming the TWS is added to the POI, soldiers must also learn to boresight it as well.

**AIM 4 Advanced Infantry Marksmanship (AIM).** 4 POI Hours. Observed: 3 of 4 hours. AIM 4 is the final AIM lesson. The OSUT soldier engages targets during hours of limited visibility with the AN/PAQ-4C aiming light. During darkness, given AN/PVS-7B/D or AN/PVS-14 NVGs with two batteries, bore light with battery, an M16/M4 series weapon with 80 rounds of 5.56mm ammunition, an AN/PAQ-4C with batteries, and a range with foxhole firing positions and 50- to 300-meter pop-up targets, the OSUT soldier must mount the NVGs and engage targets with the AN/PAQ-4C. He must concurrently load, reduce stoppage, and clear an M16/M4 series weapon without assistance during hours of darkness while engaging the targets. The following chart provides a breakdown of the firing results. Although soldiers fired qualification tables, qualification with NVGs and aiming lights is not required for OSUT graduation.

| Achieved Standard During Practice | Achieved Standard During Qualification | Failed to Achieve Standard | Did Not Fire* |
|---|---|---|---|
| N=74 | N=62 (136 total) | N=59 | N=1 |

*Profile.

*LAND WARRIOR IMPLICATIONS:* It is critical for the LW application that all soldiers receive training on aiming lights, NVGs, and zeroing and bore sighting the various optics to the M16/M4 series weapon, including the CCO and TWS. At the time this report was written, the qualification standards for NVGs and aiming lights were under review. Night standards for the TWS must also be established.

**BR2 Fundamentals of Rifle Marksmanship (Dry Fire and Diagnostic).** 15 POI Hours. Observed: 9 of 15 hours. The purpose of this basic rifle marksmanship (BRM) training is to teach the OSUT soldier the basic fundamentals of rifle marksmanship and allow him to conduct different "dry fire" exercises to practice these fundamentals. The 15 hours of training is conducted over a two-day period. The OSUT company cadre has much flexibility in how this training is executed. The 29th Infantry Regiment provides a portion of the training, while most of the time is spent under DI supervision. During the two days, trainees participate in a repetitive round robin of firing exercises, usually by platoon-size element. The amount of time each trainee spends in each training event, and the sequence of events varies. At the end of BR2, trainees are expected to have learned the fundamentals of firing a rifle and be prepared to begin live fire on a range.

*LAND WARRIOR IMPLICATIONS:*

1. According to comments from the DIs, it is unlikely that very many OSUT soldiers have received any formal training in proper marksmanship skills prior to their enlistment in the Army. This period of fundamental training will still be necessary.
2. While the objective of preparing trainees to conduct live fire "grouping" will still be valid with LW, some of the training events could be restructured to better use the available time. For instance, proper trigger squeeze is important, but perhaps less time could be devoted to the dime-washer exercise and other optics/aiming devices could be introduced. This would require that the equipment be available for training and that the company cadre/instructors be proficient in training these systems.

**BR3 Shot Grouping and Zeroing**. 12 POI Hours. Observed: 6 of 12 hours. The main objective of this training session is to have all OSUT soldiers zero their individual weapons and be prepared to start downrange firing. The 12 hours of training are conducted over a two-day period. In the observed unit, the first day was devoted to having all soldiers meet the required standard for grouping. Day 2 was used to have all soldiers zero their weapons. According to the range cadre, some units will have soldiers begin confirming their weapon's zero immediately after achieving the grouping requirement on Day 1.

*LAND WARRIOR IMPLICATIONS:*
1. According to comments from the DIs, most soldiers had not previously fired a weapon. Since this is the first opportunity for these soldiers to fire a live round, this period of training will still be necessary. The amount of time used for grouping could be reduced provided another device/technique is used to verify that OSUT soldiers are properly following the firing fundamentals.
2. The objective of having all soldiers zero their individual weapon will still be valid with LW. Some training events could be restructured to better use the available time. For instance, soldiers could zero weapons immediately after grouping rather than waiting until the next day. Also, the bore light could be used to boresight and then use live-fire to confirm the zero. Training on other optics/aiming lights could be introduced to soldiers while they are waiting to fire. This would require that the equipment be available for training and that the company cadre/instructors be proficient in training these systems.
3. All BRM training is currently conducted using the M16A2 rifle. With the fielding of LW, the issue of the M4s will need to be resolved. Also, if other optics will be used (CCO, TWS, etc.), additional firing time and rounds will be required, as well as the appropriate targets and heat sources.

**BR4 Downrange Feedback Firing.** 6 POI Hours. Observed: 3.5 of 6 hours. The OSUT soldier is to demonstrate consistent application of the four fundamentals of marksmanship in the integrated act of shooting and obtain 27 hits out of 36 shots at prescribed ranges (75, 175, and 300 meters) within a 3-centimenter scaled circle. During daylight, given an M16A2 rifle, a helmet, and LCE on a known distance (KD) or modified field fire (MFF) range with F- and E-type silhouette feedback targets, soldiers must engage the 75-, 175- and 300- meter targets from the prone unsupported position and from the supported fighting position. Six rounds are allocated for each position and target range combination, for a total of 36 rounds. The OSUT soldier must hit 10 out of 12 shots on the 75-meter target; 9 out of 12 shots on the 175-meter target; and 8 out of 12 shots on the 300 meter target. An additional four rounds of ammunition are allocated to each soldier for remedial training.

*LAND WARRIOR IMPLICATIONS:* See BR10.

**BR5 Confirm Zero**. 2 POI Hours. Observed: 2 of 2 hours. The OSUT soldier is to demonstrate consistent application of the four fundamentals of marksmanship in the integrated act of shooting and confirm zero at 300-meter on a KD or a MFF range with the M16A2 rifle. During daylight, given an M16A2 rifle, a helmet and LCE; on a KD range with E-type silhouette targets, the soldier must engage a 300-meter target with 6 rounds from the prone supported

position or foxhole supported firing position on an MFF range. The soldier must obtain a shot group with 4 of 6 hits within a 3-centimeter scaled circle on an E-type silhouette down range feedback target. One additional round of ammunition is allocated to each soldier for remedial training.

*LAND WARRIOR IMPLICATIONS:* See BR10.

**BR6 Field Fire I (Single Timed Targets and Target Detection).** 3 POI Hours. Observed: 2 of 3 hours. The OSUT soldier is to detect and engage single, timed targets with the M16A2 rifle. During daylight on a field fire range with timed single target exposures presented at 75, 175, and 300 meters and given 36 rounds of ammunition, the OSUT soldier must detect and achieve at least 22 hits out of 36 target exposures. The following chart provides a breakdown of the firing results.

| Achieved Standard | Failed to Achieve Standard | Did Not Fire* |
|---|---|---|
| N=99 | N=26 | N=8 |

* 8 personnel were either on range detail or profile

*LAND WARRIOR IMPLICATIONS:* See BR10.

**BR7 Field Fire II (Single and Multiple Timed Targets).** 3 POI Hours. Observed: 2 of 3 hours. The OSUT soldier is to detect and engage single and multiple timed targets with the M16A2 rifle. During daylight on a field fire range with timed single and multiple target exposures presented at 75, 175, and 300 meters, given 10 rounds of 5.56mm ammunition for an introduction to field fire single and multiple targets, and 44 rounds of ammunition, the OSUT soldier will hit 27 out of 44 timed target exposures. The following chart provides a breakdown of the firing results.

| Achieved Standard | Failed to Achieve Standard | Did Not Fire* |
|---|---|---|
| N=111 | N=63 | N=1 |

* Profile

*LAND WARRIOR IMPLICATIONS:* See BR10.

**BR8 Practice Record Fire I.** 2 POI Hours. Observed: 2 of 4 hours. The OSUT soldier is to detect and engage timed targets with the M16A2 rifle. During daylight on a record fire range with timed target exposures presented at ranges from 50 to 300 meters, given 20 rounds of 5.56mm ammunition fired from the foxhole supported fighting position and 20 rounds from the prone unsupported position, the OSUT soldier will hit 23 out of 40 timed target exposures. The first two firing orders fired both BR8 and 9 from the same foxhole. The remaining firing orders fired BR8, then BR9. For BR8, only 61 soldiers received first time "GOs". Ultimately, 76 soldiers achieved the standard. Details for BR9 are listed separately. The following chart provides a breakdown of the firing during practice record fire.

| Achieved Standard | Failed to Achieve Standard | Did Not Fire* |
|---|---|---|
| N=76 | N=109 | N=7 |

*Included range detail and profiles.

*LAND WARRIOR IMPLICATIONS:* See BR10.

**BR9 Practice Record Fire II.** 4 POI Hours. Observed: 3 of 4 hours. The OSUT soldier is to detect and engage timed targets with the M16A2 rifle. During daylight on a record fire range with timed target exposures presented at ranges from 50 to 300 meters, given 20 rounds of 5.56mm ammunition fired from the supported fighting position and 20 rounds from the prone unsupported position, the OSUT soldier will hit 23 out of 40 timed target exposures. BR8 (Practice Qualification I) and BR9 (Practice and Qualification II) were conducted together. Unlike BR8, in BR9 no trainee coach was used to assist in locating targets and assisting firing. The first two firing orders fired both BR8 and 9 from the same foxhole. The remaining firing orders fired BR8, then BR9. The following chart provides a breakdown of the firing for BR9.

| Achieved Standard on 1st Firing | Achieved Standard on 2d Firing | Failed to Achieve Standard | Did Not Fire* |
|---|---|---|---|
| N=49 | N=12 (61 total) | N=124 | N=7 |

*Included range detail and profiles.

*LAND WARRIOR IMPLICATIONS:* See BR10.

**BR10 Record Fire.** 4 POI Hours. Observed: 2 of 4 hours. The OSUT soldier is to detect and engage timed targets with the M16A2 rifle for qualification. During daylight on a record fire range with 40 timed target exposures presented at ranges from 50 to 300 meters, given an M16A2, and 20 rounds of 5.56mm ammunition fired from the foxhole supported fighting position and 20 rounds from the prone unsupported position, achieve at least 23 hits out of 40 timed target exposures. 184 OSUT soldiers attempted to qualify. 17 OSUT soldiers failed to qualify after the 3$^{d}$ firing. No additional training was offered.

| Achieved Standard 1st Firing | Achieved Standard 2d Firing | Achieved Standard 3d Firing | Failed to Achieve Standard |
|---|---|---|---|
| N=135 (73%) | N=26 (161 total, 87%) | N=6 (167 total, 91%) | N=17 |

*LAND WARRIOR IMPLICATIONS for BR4, BR5, BR6, BR7, BR8, BR9 and BR10:* Firing was conducted with standard M16A2 "iron" sights. LW will require either additional training on or integrated firing with the M68 CCO and TWS for day qualification. A decision must be made regarding on which systems the OSUT soldier must qualify during the day (iron sight, M68 CCO, video sight/camera, and/or TWS).

**BR11 Automatic Firing/Burst Firing (M16A2).** 2 POI Hours. Observed: 2 of 2 hours. BR11 is designed to demonstrate OSUT soldier proficiency in automatic weapon firing. During daylight, on a field fire range, and given an M16A2 rifle with 21 rounds of ammunition, the OSUT soldier is to correctly fire the weapon in three-round bursts and obtain target hits at 75, 175, and 300 meters while demonstrating control of the weapon in the automatic/burst mode.

Targets are to be engaged from the prone supported fighting position. The class is considered familiarization firing. No statistics were maintained.

*LAND WARRIOR IMPLICATIONS:* LW target acquisition/aiming devices (notably the TWS and M68 CCO) would be included in the range fire.

**BR12 Protective Mask Firing (M16A2).** 3 POI Hours. Observed: 3 of 3 hours. BR12 is designed to demonstrate OSUT soldier proficiency in firing the M16A2 rifle while operating in a nuclear, biological, and chemical (NBC) environment. On a field fire range, given an M16A2 rifle and 20 rounds of ammunition, the OSUT soldier is to engage E-type silhouette targets at 75 and 175 meters while wearing a protective mask, using semi-automatic fire from the prone supported fighting position. The standard is to obtain a total of 11 target hits out of 20 target exposures. The class is considered familiarization firing. No statistics are maintained.

*LAND WARRIOR IMPLICATIONS:* Again, LW target acquisition/aiming devices (notably the TWS and M68 CCO) should be included in the range fire.

**BR13 Night Firing (M16A2).** 3 POI Hours. Observed: 3 of 3 hours. BR13 is being replaced by AIM1. BR13 is designed to demonstrate OSUT soldier proficiency in applying night firing techniques with the M16A2 rifle. During daylight with 5 rounds and at night (EENT) with 30 rounds of mixed ball and tracer ammunition, given an M16A2 rifle with AN/PVS-4 night sight, the OSUT soldier is to engage F-type silhouette targets at 50 meters using semi-automatic fire from the supported fighting position. The standard is to obtain a total of 3 target hits out of 10 target exposures without the night sight and 9 target hits out of 18 target exposures with the night sight. Of 190 soldiers, 184 attempted to achieve the standard. The following chart provides a breakdown of the firing.

| Achieved Standard on 1st Firing | Achieved Standard on 2d Firing | Failed to Achieve Standard | Did Not Fire* |
|---|---|---|---|
| N=55 | N=60 (115 total) | N=69 | N=6 |

*Included range detail and profiles.

*LAND WARRIOR IMPLICATIONS:* The LW implications for night fire were covered previously under AIM 1, 3, and 4.

**CM1 Basic Military Communications.** 7 POI Hours. Observed: 3 of 7 hours. The purpose of this training is to teach the OSUT soldier the minimum skills necessary to operate basic communications equipment and transmit and receive a message by wire and radio. The systems and equipment included field telephone (TA-1 and TA-312) and the SINCGARS radio (AN/VRC-88A). Mock-ups of the systems were displayed and power sources (other than batteries) were available. The company was separated into platoon-size groups of approximately 50 soldiers. Throughout the training day, the groups rotated between various training stations where they received instruction and hands-on practical experience. A different instructor (29th Inf cadre) presented the training to each group using mock-ups of the systems, actual radios, and slides. DIs periodically assisted, but were not responsible for presenting any of this training.

Following an explanation of each major topic and appropriate demonstration, the soldiers were required to conduct a hands-on PE for most tasks.

*LAND WARRIOR IMPLICATIONS:*
1. OSUT soldiers will still need to know the basic means of communications with associated advantages and disadvantages.
2. It is assumed that LW-equipped units will still have telephones and wire for use in defensive or assembly area positions. Therefore, soldiers should still receive training on wire laying and telephones.
3. Since the LW CRS is compatible with the SINCGARS radio, not replacing it, soldiers will still need the current training on the SINCGARS.
4. OSUT soldiers currently receive no instruction on radio procedures or handling message traffic. With the integration of LW, each soldier will be able to communicate on individual radios. Additionally, included in the LW soldier radio is the capability to send and receive text messages. As a result, new instruction on radio procedures and preparing and handling various message formats must be added to the POI. Discussion on soldier radio operations must also include instruction on LW-unique graphics and the icons used as menus in the computer software.

**MG3 M240B Machine Gun.** 8 POI Hours. Observed: 6 of 8 hours. The OSUT soldier is to demonstrate proficiency in engaging targets with the M240B machine gun. During daylight on a machine gun transition range, given a bipod-mounted M240B with 100 rounds of ammunition, the OSUT soldier is to zero the M240B and engage targets. Twenty rounds are used to zero the M240B so that the center of the beaten zone hits the target area, engaging targets between 300 and 700 meters. The soldier then uses the zeroed M240B with 80 rounds of ammunition to engage targets. The training is for familiarization only. Targets ranged from 50 to 300 meters. Maintaining the M240B was taught in conjunction with cleaning the weapons for turn-in.

*LAND WARRIOR IMPLICATIONS*: No night vision sights or optics were included in this instruction. Instruction on mounting and using the night vision sight AN/PVS-4 night sight was included only in MG1 M249 SAW, which was not observed.

**MR1 Basic Map Reading I.** 5 POI Hours. Observed: 5 of 5 hours. MR1 and MR2 are the two basic map-reading classes for the OSUT soldier. MR1 is the basic map reading lesson. It provides the basic skills necessary for the OSUT soldier to identify natural and man-made features on a map, determine grid coordinates, and determine a magnetic azimuth between two points using a lensatic compass. This was the first iteration of the class taught by drill sergeants. The class was formerly presented by the 29th Infantry and included MR1, MR2, and MR3. MR3 is no longer taught. MR3 consisted of a culminating practical exercise where the OSUT soldier determined distance while navigating between two points dismounted. MR3 was conducted on a 600-meter pace range.

*LAND WARRIOR IMPLICATIONS*: This basic map-reading class will be required regardless of the level of LW integration. LW integration of global positioning system (GPS) and its application to the individual soldier will require additional training time.

**MR2 Basic Map Reading II.** 3 POI Hours. Observed: 2.5 of 3 hours. MR2 is the second and final block of instruction on basic map reading skills. This instruction enables the OSUT soldier to demonstrate an ability to conduct the following: identify terrain features, determine grid coordinates, determine distance on a map, and determine a magnetic azimuth. It reinforces much of the content in MR1. MR2, like MR1, was formerly taught by the 29th Infantry Regiment as platoon-level instruction. OSUT now teaches the instruction internally using drill sergeants as instructors. Additionally, it is now taught as company-level instruction.

*LAND WARRIOR IMPLICATIONS*: This second basic map-reading class will be required regardless of the level of LW integration. LW integration of GPS and its application to the individual soldier will require additional training time. Also learning the symbols and icons within the LW software subsystem will be required.

Listed below is a summary of the five classes that were deemed to have potentially critical LW implications, but were not observed. The synopsis is based on the descriptions provided in the POI.

**IN8 Pre-Combat Inspection**. 4 POI hours. IN8 is a series of eight periods that instruct the OSUT soldier on how to conduct different types of inspections. Period 8 focuses on conducting a soldier and equipment pre-combat inspection.

*LAND WARRIOR IMPLICATIONS*:
1. OSUT soldiers will require additional instruction on donning and doffing the equipment, and conducting operational checks on it.
2. Instruction should also include the training and combat configurations of the body armor and tailoring the load carrying equipment for different missions.

**IT2 Individual Tactical Movements/Employ Camouflage, Cover, and Concealment.** Part of the training covers reporting. Within the context of a movement task the OSUT soldier must report information of potential intelligence value, in SALUTE format.

*LAND WARRIOR IMPLICATIONS*. OSUT soldiers will require more systematic training and evaluation on common reports within the LW system.

**IT3 Conduct Night Offensive Operations.** 2 POI hours. IT3 teaches the OSUT soldier to conduct night operations by using proper challenge and password, reaction to flares, procedures to report information while practicing the correct noise, light and litter discipline, thus avoiding enemy contact.

*LAND WARRIOR IMPLICATIONS*:
1. LW instruction should include radio operating and reporting procedures used with the soldier radio.

2. Instruction should also include the tactical capabilities provided by the TWS, night sensor display component (NSDC), and video sight/camera. These devices can be used to scan for suspected enemy presence, enemy movement, enemy occupied areas, possible enemy approaches, and thermal images for freshly placed mines. The presence or absence of these situations can then be sent on the spot via digital reports.
3. All soldiers equipped with a TWS or video sight/camera must be taught to use the equipment to peer around corners, scan danger areas, or into an exit to detect any enemy movement before entering a bunker or building, or moving over a trench without exposing themselves to danger.

**MG1 M249 Squad Automatic Weapon**. 20 POI hours. MG1 instructs the OSUT soldier to operate the M249 squad automatic weapon (SAW) to include identifying characteristics, performing maintenance, performing a function check, loading and unloading, correcting a malfunction, zeroing, demonstrating marksmanship fundamentals, and engaging targets with and without the AN/PVS-4 night sight. Firing is for familiarization, not qualification.

*LAND WARRIOR IMPLICATIONS*:
1. The instruction currently includes the AN/PVS-4 night sight. No LW optics or target acquisition systems are taught in conjunction with the M249 SAW.
2. Integrated day/night firing must include the LW-based optics to include the TWS and the NVG/aiming light combination.

**MO1 Military Operations on Urban Terrain (MOUT).** 8 POI hours. MO1 instructs the OSUT soldier on performing movement techniques, entering a building, clearing a room, selecting a hasty firing position, and preparing individual and crew-served weapon positions all while operating in a MOUT environment.

*LAND WARRIOR IMPLICATIONS*:
1. The LW optics systems will allow a soldier to observe and accurately engage targets around a corner (into a room) without exposing himself. This could reduce the reliance on using grenades as the first option for clearing a room before entering. Use of the indirect view and firing capabilities of the video sight/camera and the TWS should be integrated in MOUT training.
2. MOUT classes should also stress that the increased communications capability should facilitate passing information between teams operating in the same building. Thermal sights could help detect potential targets.

**ST1 Perform as a Member of a Dismounted Infantry Squad.** 22.5 POI hours. ST1 is a squad tactical training exercise that instructs the OSUT soldier on how to perform as a member of a dismounted infantry squad. It focuses on performing Battle Drills 1A, 3, and 4 (conduct squad attack, break contact, and react to ambush), moving as a member of a fire team, and performing the slide for life.

*LAND WARRIOR IMPLICATIONS*:
1. Instruction should mention that LW-equipped units can increase the distances between personnel crossing danger or large open areas up to 300 meters or use the two-man buddy

system. Flank security, using the two-man buddy system, can be doctrinally extended to 1.3 kilometers, the absolute range limit of the soldier radio.
2. Voice communications or digital messages can be sent from the far side of a danger area, noting whether it is either safe or unsafe for the main body to cross.
3. Use of the LW's enhanced communication capabilities should be incorporated in this field exercise. Command and control and situational awareness are improved based on individual availability of information. LW can be used to disseminate information about the enemy and mission to each individual by voice or digital message via the soldier and squad radios. The helmet mounted display (HMD) enhances situational awareness by providing the individual soldier images of current information, in real time. Additionally, items like rules of engagement (ROE) and standing operating procedures (SOP) can be downloaded into each individual's mission data module (MDM) as part of mission preparation.
4. When NVGs are used, the AN/PAQ-4C, AN/PEQ-2A, and LRF/DCA lasers can be incorporated in the exercises to provide an additional means for far recognition signals.
5. Individual soldier and team tactical movements should be improved through the use of the soldier radios to coordinate their movement and track individual soldiers.

## Appendix E. Sample Observation Form

Shown below is a sample observation form format. On the following pages is an actual observation form.

POI Number POI Name:

POI Hours Observed: _____ of _____

| POI HRS | TYPE OF INSTRUCTION | TRAINING TIMES |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

Date: _____

Observer : _____

# of Instructors: PRI: _____ ASST _____

Equipment currently used: _____

_____

_____

Class size (Circle):

SGI 200-man Classroom

Other (Explain): _____

Location:

Classroom Training site

Field site

Other (Explain): _____

Instructional Materials (Circle):

Slides Handouts

GTAs Samples

Other (Explain): _____

Current ammunition required:

_____

_____

_____

_____

Land Warrior equipment needed:

_____

_____

_____

_____

_____

| | Task | Time: X to X | Instruction* |
|---|---|---|---|
| | | | |
| | | | |

Use abbreviation: Lecture (L), Demonstration (D), Practical Exercise (PE)
Group Discussion (GD), Multimedia Instruction (MI)

Written summary of lesson. Major points made in instruction; Student questions; Strengths/Weaknesses by task; Range changes needed (e.g. thermal targets):

POI NUMBER POI NAME (Narrative)

Written Summary:
Land Warrior Implications:
Training Subjects:
Time:
Equipment:
Ammunition:

**TC9B82 Defensive Operations (Guest Speaker):**

POI Hours Observed: 1 of 1 hours

| POI HRS | TYPE OF INSTRUCTION | TRAINING TIMES |
|---|---|---|
| 1.0 | GS | 1100-1200 |
| | | |
| | | |
| | | |

Date: 16 Sept 98
Observer : Centrie
# of Instructors: PRI: 1 ASST ____
Equipment currently used: See comment sheet

Class size (Circle):
SGI (200-man Classroom)
Other (Explain): ____
Location:
(Classroom) Training site
Field site
Other (Explain): ____
Instructional Materials (Circle):
(Slides) Handouts Video
GTAs Samples
Other (Explain): ____

Current ammunition required: See comment sheet

Land Warrior equipment needed: See comment sheet

| | Task | Time: X to X | Instruction* |
|---|---|---|---|
| 1. | Defensive operations (guest speaker) | 1100-1200 | L |

* Use abbreviation: Lecture (L), Demonstration (D), Practical Exercise (PE)

## TC9B82 Defensive Operations (Guest Speaker)

### SUMMARY:

The training was conducted as a company-level class in BLDG 4. It serves as the introduction class for defensive operations for IOBC. Four major tasks are covered within the context of company-level defensive operations.

### LAND WARRIOR IMPLICATIONS:

No Land Warrior (LW) implications were noted. Regardless of whether the class was conventional or Land Warrior-based, the content (characteristics of the defense, the two types of alternate defensive patterns, and defensive techniques) would not change.

### TRAINING SUBJECTS:

1. The POI lists the class as TC9B82 Defensive Operations. The Visitor's folder and all supporting documentation list the class as TE9B26 Defensive Operations. On closer analysis, both classes were identical.

2. The purpose of the class is to present the introduction to defensive operations through the use of a guest speaker. The presentation is designed to provide a sense of validity to the material, conveying a sense that the guest speaker actually used the information during his career. Critical teaching points were identified on viewgraphs as they were presented.

**TIME**

1. Commander, 29th Infantry Regiment was the guest speaker.

2. The slides are a standard presentation, offering the students an introduction to defensive operations without allowing the (any) guest speaker to deviate too far from the class material. FM 7-8 was used as a reference source.

3. The following material was covered.

| Task # | Task | Teaching Points |
|---|---|---|
| 1. | Purpose of the Defense | definition |
| 2. | Characteristics of the Defense | - preparation<br>- mass and concentration<br>- disruption<br>- flexibility<br>- security |
| 3. | Alternate Defensive Patterns | - mobile defense<br>- area defense |
| 4. | Defensive Techniques | - battle positions<br>- strongpoint defense<br>- defense in sector<br>- perimeter defense<br>- reverse slope defense |

**EQUIPMENT:** The following training equipment was required: 1 overhead projector with selected viewgraphs

**AMMUNITION**

No ammunition was required

## Appendix F. Developing a Land Warrior Situational Training Exercise (STX)

General

A situational training exercise (STX) is a short, scenario-driven, mission-oriented tactical exercise that trains a single collective task (training and evaluation outline [T&EO]) or a group of related battle drills and collective tasks (T&EOs). The drills and T&EOs are modified based on METT-TC and arranged in a logical sequence to train a portion of an operation.

The current IOBC Program of Instruction (POI) makes extensive use of STXs. For example, TA9B89 *Platoon Attack STX* comprises 104 hours of instruction and is the culminating exercise for offensive operations. The intent of this instruction is to provide a practical application reinforcing the doctrinal methods and techniques for conducting individual movement, squad and platoon movement collective tasks, and executing a platoon movement to contact live-fire exercise (LFX). TC9B81 *Platoon Drill STX* (108 hours) is another example. There are similar STXs for defensive operation instruction.

Land Warrior Comparison

As with the rest of the POI, STXs will have to be reviewed to ensure LW enhancements are integrated into the instruction. For example, all platoon tasks and the process of how to develop an STX are found in the current ARTEP 7-8 MTP (DA, 1994b). Battle drills and collective tasks for ARTEP 7-8 MTP have been tentatively rewritten to include the changes and enhanced capabilities of LW equipment in Final Draft Special Text (ST) ARTEP 7-8-1 MTP (LW) *Mission Training Plan for the Land Warrior Infantry Rifle Platoon and Squad (*1998). For this comparison, the special text of ARTEP 7-8-1 MTP (LW) was deemed a final product.

Listed below is a task comparison between the current TA9B89 *Platoon Attack STX* and its LW counterpart:

| Related Battle Drills and Collective Tasks for TA9B89 Platoon Attack Situational Training Exercise (STX) | Current Task# IAW ARTEP 7-8 | Corresponding Land Warrior Task# IAW ST ARTEP 7-8-1 MTP |
|---|---|---|
| Prepare for combat | 7-3/4-1046 | 7-3/4-1606LW |
| ASLT a strongly defended position | 7-3/4-1011 | 7-3/4-1103LW |
| Overwatch/support by fire | 7-3/4-1007 | 7-3/4-1108LW |
| Occupy an assembly area | 7-3/4-1022 | 7-3/4-1136LW |
| Conduct a tactical movement | 7-3/4-1025 | 7-3/4-1134LW |
| Employ fire support | 7-3/4-1046 | 7-3/4-1200LW |
| Reconnoiter the area | 7-3/4-1042 | 7-3/4-1003LW |
| Consolidate and reorganize | 7-3/4-1047 | 7-3/4-1607LW |
| Breach an obstacle | 7-3/4-1014 | 7-3/4-1402LW |
| Clear a trenchline | 7-3/4-1015 | 7-3/4-1114LW |
| Perform movement to contact | 7-3/4-1101 | 7-3/4-1101LW |
| Execute a platoon attack | 7-3/4-1100 | 7-3/4-1100LW |
| Execute a company attack | FM 71-10 | FM 71-10 |
| Knock out a bunker | 7-3/4-1113 | 7-3/4-1113LW |

Scope of Training

The scope of the training would remain unchanged. First, the STX should contain the existing series of platoon movements to contact, culminating in a live fire exercise (LFX) for each platoon. Night missions should remain as part of the four nights spent in the field bivouac site, including the existing platoon-level night raids and the company attack on a trenchline.

Ware Range (GL093970) remains an excellent training site for blank and LFX. The company should continue to be broken down into two sections with the 1st, 2d, and 3d platoons placed on one schedule (Section 1) and the 4th and 5th platoons on another (Section 2). For Day 1, all platoons should continue to occupy separate sectors to conduct movement techniques, troop leading procedures, and conduct raids. From their occupied sectors, the platoons can then be rotated through dry fire rehearsals for the platoon LFX and the company deliberate attack, using the actual terrain, as is the current training.

All scenarios for the dry fire exercises, force-on-force training, and LFX should remain identical. Each platoon is to conduct a movement to contact to a known objective. Short of the objective, the lead elements encounter an enemy OP, which they must defeat with a minimum amount of casualties. Once the OP is destroyed, the platoon continues movement to the objective where they encounter an enemy squad that must be destroyed. The LFX uses pop-up targets that appear to be counterattacking the objective once the platoon has initially secured the objective.

On Day 2, each platoon continues working on collective tasks associated with a movement to contact and the deliberate attack. Starting in the morning, the platoons would continue to conduct blank fire and MILES rehearsals on the actual terrain against the OPFOR squad. Each platoon then rotates through a live-fire exercise of the platoon movement to contact starting that afternoon.

The enhancements provided by LW offers an opportunity to conduct a night movement to contact and/or deliberate attack LFX. This training will provide the lieutenants an opportunity to experience the difficulties of conducting night operations. There is currently adequate time to conduct this training. Time must be reallocated to identify and coordinate safety measures and command and control issues. Additionally, time must be allocated to bore sight night vision devices to their corresponding weapons. Thermal blankets must be used to clearly identify targets. The number of thermal blankets will depend on the number of targets portrayed in the scenario. The thermal blankets will require a power source.

Training time in Days 3 and 4 should continue to be set aside for completing platoon training either at the platoon LFX or the movement to a company deliberate attack. A make-up LFX should continue to be scheduled for the last day.

Current Equipment

The following is a listing of equipment currently required to conduct this STX. The amounts are based on a current IOBC class size of 180 personnel.

| Category | Item | Amount |
|---|---|---|
| General | lister bags | 4 |
| Class VII | Binoculars | 20 |
| | M60 MG complete[1] | 12[1] |
| | M249 complete | 36 |
| | M203 complete | 36 |
| | M16/M4 rifles | 180 |
| | AN/PVS-7[1] | 52[1] |
| | AN/PVS-4[1] | 12[1] |
| | Cleaning rods | 1 per PLT Trainer |
| | Combat lifesaver bag | 1 per PLT |
| Communications | OE-254 antenna | 2 |
| | PRC-119 | 18[1] (?[3]) |
| | PRC-126[1] | 35[1] |
| | TA-312 | 6 |
| | TA-1 | 16 |
| | DR-8 | 7 |
| | Speaker box | 2 |
| | GE radios | 15 |
| | Quick recharger (for GE) | 1 |
| MILES | M16/M4 | 180 |
| | M60[1] | 12[1] |
| | M240B[2] | 12[2] |
| | M249 | 36 |
| | MILES Control guns | 10 |
| | Small arm alignment fixture (SAAF) | 5 |
| Vehicle support | 1/4 ton TMP vehicle | 1 |
| | 2 1/2 ton TMP vehicle | 1 |
| | HMMWV | 4 |
| | 2 1/2 ton truck w/water trailer | 2 |
| | buses (to and from range) | 5 |

NOTES: 1. Not required for LW training.
2. In lieu of M60 for LW-equipped units
3. Reduced number (TBD) required for range operations and troop safety.

Land Warrior-Specific Equipment Requirement

Listed below is the additional equipment required to convert the instruction to LW-specific. The requirements are listed as a per platoon requirement. The listing assumes that all personnel are LW-equipped including computers, all optics, and communications capability.

| Item | Basic Load |
|---|---|
| LW ensemble, complete | 1 per individual |
| Battery, BA 3090 (9 volt) | 1 per individual |
| Battery, BB2847/U (TWS) | 1 per 4 hr period for ea. TWS |
| Battery, BB2847/U (CRS) | 2 per 2.6 hr period for ea. CRS |
| Battery, DL 1/3N (CCO) | 1 per 30 hr period for ea. CCO |
| Battery, BA 5567/U (IR Aiming Light) | 1 per 30 hr period for ea. IAL |
| Battery, BA 5/23/U (LRF/DCA) | 2 per 30 hr period for ea. LRF/DCA |
| Battery, BA 5123/4 (CRS Memory Backup) | 2 per 7 day period for ea. CRS |
| Battery, BA 123/U (Zeroizing Battery) | 1 per 30 hr period for ea. CCO |
| Battery Charger PP8444/U | 2 per LW system |
| BB 2847/U Battery Adapter, Type J-6554/P | 1 per charger |
| Thermal blankets for targets | TBD based on number of targets |
| Thermal blanket power source | TBD |
| LW line replacement units | TBD |

Ammunition

Listed below is the current ammunition requirement for STX TA9B89 *Platoon Attack STX*. The current ammunition requirement does not require revision.

| System | Ammunition | DODAC | Amount |
|---|---|---|---|
| M16A2 | 5.56mm, ball | A071 | 19,920 |
| M16A2 | 5.56mm, blank | A068 | 39,860 |
| M249 | 5.56mm, link, ball | A059 | 9,440 |
| M249 | 5.56mm, link, blank | A062 | 35,700 |
| M60 | 7.62mm, link, ball | A131 | 3,000 |
| M60 | 7.62mm, link, blank | A111 | 28,000 |
| M203 | 40mm TPT | B519 | 400 |
| M18 | Claymore mine | K143 | 0* |
| Pyrotechnic | C4/TNT 1 1/4 or 1 lb blocks | M023 | 0* |
| Pyrotechnic | Demolition cord | M | 0* |
| Pyrotechnic | Grenade, hand, smk, RD | G950 | 3 |
| Pyrotechnic | Grenade, hand, smk, HC | G930 | 300 |
| Pyrotechnic | Grenade, hand, smk, GRN | G940 | 120 |
| Pyrotechnic | Grenade, hand, smk, YLW | G950 | 120 |
| Pyrotechnic | Grenade, hand, smk, VLT | G955 | 50 |
| Pyrotechnic | Illum, 40mm, WS | L311 | 240 |
| Pyrotechnic | Smoke pot, 30 lb | K867 | 2 |
| Pyrotechnic | Simulator, proj., ground burst | L594 | 400 |
| Pyrotechnic | Simulator, proj., hand grenade | L601 | 150 |
| Pyrotechnic | Simulator, boobytrap | L495 | 20 |
| Signal | Illum, WSC | L312 | 75 |
| Signal | Illum, GSC | L314 | 27 |
| Signal | Illum, RS | L311 | 12 |
| Signal | Illum, parachute, WHT | L313 | 20 |

* Indicates required but not issued

Land Warrior-Specific Impact on IOBC

IOBC cadre training. The IOBC cadre will require time for "retooling" for LW equipment and capabilities. In some instances, this may require establishing formal LW instruction for the cadre (e.g. operation of the computer/radio subsystem). The level of training for other subsystems, notably the modular weapon subsystem, will depend on the assignments and experience-level of the individual cadre member. Digital warning, fragmentary, and operations orders as well as accompanying SPOT, logistics, and situation reports will have to be developed to support the tactical exercises.

Training evaluation. Doctrinally, the cadre will have extensive changes to both capture for themselves and in turn, instruct their IOBC charges. For example, listed below are LW-specific tasks found in both LW battle drills and collective tasks that are not found in the current IOBC training. The preponderance of these tasks are collective, individual, or leader tasks required to conduct a specific task or drill. These include LW-specific tasks associated with mission planning, preparation, conduct, and post-mission actions. Others are safety considerations that must be adhered to maintain safe operations. For example, the platoon or patrol leader must ensure that all personnel wear protective laser-safe eyewear (Special Protective Eyewear Cylindrical System [SPECS] or Ballistic Laser Eye Protection System [BLEPS]) due to laser hazards. This listing is not all inclusive and should be considered a composite sampling.

1. Participants must wear BLEPS or SPECS with the day/night display component when operating in a laser environment.
2. Rules of engagement (ROE)/standing operating procedures (SOP) are downloaded into the mission data module (DDM) as part of mission preparation.
3. Movement and fire control measures are depicted on digital overlay and sent to each soldier. Hand held display (HHD) digital map display enhances soldier situational awareness.
4. Leader uses global positioning system (GPS) and digital map and overlay to ensure positive location. Mission timer set to announce time distance factors at waypoints.
5. Protective upgrade plates are placed in body armor to improve survivability.
6. Leader uses LRF/DCA and digital SPOT reports to place enemy locations and positions on digital overlay. Leader modifies graphic control measures and digitally disseminates to subordinates.
7. Those equipped with thermal weapon sight (TWS) capability, night sensor display component (NSDC) and video sight/camera (and LRF/DCA) can scan suspected enemy presence/movement/area/ approach/freshly emplaced mines for thermal images and send digital reports.
8. Leader uses both mission data module (MDM) and radio subsystem to enhance command and control.
9. Leader uses computer/radio subsystem (CRS) to provide more accurate and timely requests for indirect fire support.
10. Leader uses mission equipment and supplies (MES) and submits report to higher headquarters.

11. Leader uses of joint variable message format (JVMF) to speed reporting. All Casualty/evacuation/SALUTE/SITREP/Call for Fire/SPOT reports are reported using JVMF digital message format.

12. Leader uses LW Planning Aid to improve mission/situation change reporting.

13. Leader uses voice command over soldier/squad radios to ensure all elements are alerted.

14. All soldiers use VOX (voice activated control switch) to talk in order to keep their hands free to fire and maneuver.

15. All soldiers use TWS or video camera (with 3X magnification) to peer around the corner/exit to detect any enemy movement before entering the bunker/over the trench.

16. Selected soldiers use TWS or video camera (with 3X magnification) to transmit intelligence/reconnaissance data for use in mission preparation.

17. During mission preparation, platoon leader reviews LW data for updated intelligence and information on enemy/mission. Disseminates information to subordinates.

18. Leaders ensure squad members mute their audio alerts and turn off infrared (IR) emitters during critical radio silence periods.

19. Voice and digital communication checks are completed by the leader. All members of unit enter the radio nets.

20. Unit bore sights all TWS, LRF/DCA, AN/PAQ-4C, AN/PEQ-2, video sight/camera, and close combat optic (CCO) for personal modular weapons.

21. Automated battle roster is completed as part of mission preparation.

22. Leader sets individual soldier profiles.

23. Leader sets computer parameters such as GPS reporting rates.

24. Leader keys all of the squad and soldier radios using KYK-13.

25. Leaders must prepare digital sector sketch and forward it digitally.

26. Security elements increase the distances specified in ST 7-8-1 *Land Warrior Infantry Platoon and Squad* as a result of improved situational awareness (Task: Move Tactically).

27. Element leader relays by voice communications or digital message that far side of a danger area is either safe or unsafe.

28. Soldiers equipped with LRF/DCA determine range and azimuth to enemy location.

29. Leader plans for transfer of mission data packages.

30. LW systems are powered on and initialized; power up built-in test (BIT), log-on process, and mission data transfer completed; and placed in combat mode as part of mission preparation.

31. Leader warns subordinates of laser detection warnings and zeroing procedures if capture is imminent.

After action reviews (AARs). LW affords the IOBC cadre the capability to enhance the quality of AARs if a data log is built into the computer software. Correcting performance errors is easy to do with LW as log data generated by each LW soldier during an operation can be downloaded and retrieved using the mission data support equipment (MDSE). Information stored in the mission memory, particularly the mission, equipment, and supplies (MES) functions (particularly messages and reports), can be downloaded by the cadre, analyzed, and presented back to the IOBC student in the form of an AAR. The information can be presented sequentially using the three primary storage modes (planning [events/actions in the assembly area to plan the

mission], movement [functions/actions required between the assembly area and the objective rally point], and combat [functions/actions required to fight]) of the soldier computer interface (SCI). For example, during the planning phase of the operation, information can be accessed (after the fact) from the LW Planning Aids. Information from the five Planning Aids subfunctions (orders [includes OPORDS, WO, and FRAGOs], route planning, fire planning [including range cards/sector sketches and unit fire plans], hasty minefields, and reconnaissance images) can be reviewed for critical errors, improper procedures, or omissions. When coupled with video capture images, this information can support the mission event and serve as the basis for the AAR.

## Appendix G. Acronyms

The following acronyms were used in preparing this report. In the event of conflicting information, DEP 11-5895-XXX-10 (Working Document) *Draft Equipment Publication Operator's Manual for Land Warrior System*, 9 March 1998, was used as the preferred source. For tactical terms, FM 101-5 *Staff Organization and Operations* (DA, 1997b) was used as the preferred source.

| | |
|---|---|
| AAR | After-action review |
| ACOE | Army common operating environment |
| AIM | Advanced Infantry Marksmanship |
| AMEL | Active matrix electro-luminescence image |
| ANCOC | Advanced Noncommissioned Officer Course |
| ARI | Army Research Institute |
| ARTEP | Army training and evaluation program |
| BIT | Built-in test |
| BLDG | Building |
| BLEPS | Ballistic laser eye protection system |
| BNCOC | Basic Noncommissioned Officer Course |
| BOIP | Basis of issue plan |
| BOS | Battlefield operating system |
| BRM | Basic rifle marksmanship |
| BFV | M2 Bradley Fighting Vehicle |
| CCO | Close combat optic |
| CMF | Career management field |
| COMSEC | Communications security |
| COTS | Commercial off-the-shelf |
| CRS | Computer/radio subsystem |
| CSCI | Computer software configuration items |
| DBBL | Dismounted Battlespace Battle Lab |
| DCA | Digital compass assembly |
| DCM | Digital control module |
| DDC | Day display components |
| DEP | Draft equipment publication |
| ECH | Electronic component housing |
| EMI | Electromagnetic interference |
| EMP | Electromagnetic pulse |
| FDC | Fire direction center |
| FH | Frequency hopping |
| FM | Field manual |
| FOV | Field of view |
| FRAGO | Fragmentary order |
| FSEM | Fire support execution matrix |
| FTX | Field training exercise |
| GFE | Government furnished equipment |
| GPS | Global positioning system |

| | |
|---|---|
| GTA | Graphic training aid |
| HHD | Hand held display |
| HMD | Helmet mounted display |
| $I^2$ | Image intensifier |
| IAL | Infrared aiming light |
| IAW | In accordance with |
| IHA | Integrated helmet assembly |
| IHAS | Integrated helmet assembly subsystem |
| IOBC | Infantry Officer Basic Course |
| IR | Infrared |
| ITAS | Improved TOW acquisition system |
| IWS | Individual weapon system |
| JTA | Joint technical architecture |
| JVMF | Joint variable message format |
| LCD | Liquid crystal display |
| LCE | Load carrying equipment |
| LFX | Live fire exercise |
| LRF | Laser range finder |
| LRF/DCA | Laser range finder/digital compass assembly |
| LRU | Line replacement unit |
| LW | Land Warrior |
| LW Ensemble | Land Warrior (hardware and software) |
| LW System | Land Warrior (ensemble and soldier) |
| LZ | Landing zone |
| MACS | Multi-purpose arcade combat simulator |
| MDM | Mission data module |
| MDMP | Military decision-making process |
| MDS | Mission data support |
| MDSE | Mission data support equipment |
| MES | Mission equipment and supplies |
| METL | Mission essential task list |
| METT-TC | Factors of mission, enemy, terrain, troops, time available and civilian concerns |
| MGRS | Military grid reference system |
| MIA | Missing in action |
| MILES | Multiple integrated laser engagement system |
| MILSTAKES | Military stakes |
| MOPP | Military-oriented protective posture |
| MOS | Military occupational skill |
| MOUT | Military operations in urban terrain |
| MQS | Military qualification standard |
| MTOE | Modified table of organization and equipment |
| MTP | Mission training plan |
| NBC | Nuclear, biological and chemical |
| NCO | Noncommissioned officer |
| NCS | Network control station |

| | |
|---|---|
| NOD | Night observation device |
| NSDC | Night sensor display component |
| NVG | Night vision goggle |
| OP | Observation post |
| OPFOR | Opposing force |
| OPORD | Operation order |
| OSUT | One station unit training |
| PASGT | Personal armor system for ground troops |
| PCIES | Protective clothing and individual equipment subsystem |
| PE | Practical exercise |
| PLGR | Precision lightweight global positioning system |
| PMCS | Preventive maintenance checks and services |
| PMI | Primary marksmanship instruction |
| POI | Program of instruction |
| PZ | Pick-up zone |
| RAM | Random access memory |
| RAS | Rail adapter system |
| RF | Radio frequency |
| RFI | Radio frequency interference |
| RIPD | Remote input pointing device |
| RIS | Rail interface system |
| ROE | Rules of engagement |
| RTO | Radio/telephone operator |
| SAAF | Small arm alignment fixture |
| SALUTE | Size, activity, location, uniform, time, and equipment |
| SAM | Soldier access module |
| SAT | Small arms transmitter |
| SAW | Squad automatic weapon |
| SC | Single channel |
| SCI | Soldier computer interface |
| SCM | System control module |
| SIC | Systems interconnect and controls |
| SINCGARS | Single-channel ground/airborne radio system |
| SIP | SINCGARS Improvement Program |
| SOI | Signal operating instructions |
| SOP | Standing operating procedures |
| SPECS | Special protective eyewear cylindrical system |
| ST | Special text |
| STX | Situational training exercise |
| SQR | Squad radio |
| SR | Soldier radio |
| SS | Soldier system |
| SW | Software subsystem |
| T&EO | Training and evaluation outline |
| TASC | Training and audio/visual support center |
| TBD | To be determined |

| | |
|---|---|
| TDA | Table of distribution and allowances |
| TEWT | Tactical exercise without troops |
| TLP | Troop-leading procedures |
| TPIAL | Target pointer illuminator/aiming light |
| TRP | Target reference point |
| TSFO | Training set fire observation |
| TTP | Tactics, techniques, and procedures |
| TWS | Thermal weapon sight |
| UGS | Unified grid system |
| USAIS | United States Army Infantry School |
| VGA | Video graphics adapter |
| VOX | Voice operated control switch |
| WARNO | Warning order |
| WS | Weapon subsystem |