Research Report 1322

HUMAN FACTORS EVALUATION OF THE MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM IN AN OPERATIONAL ENVIRONMENT

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This report documents results of the human factors evaluation of the Multiple Integrated Laser Engagement System (MILES) during OT II. The research was designed to assess the man-machine interface and user acceptance of MILES.

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FOREWORD

The Fort Hood Field Unit of the Army Research Institute for the Behavioral and Social Sciences (ARI) provides support to Headquarters, TCATA (TRADOC Combined Arms Test Activity). One aspect of this support concerns the field evaluation of new training systems, especially with regard to Human Factors.

From August 1978 to October 1978, the Army conducted MILES OT II at Fort Carson, Colorado. Primary emphasis of the test was to collect data on the MILES equipment in the hands of an operational unit. ARI assisted TCATA in MILES OT II by providing technical advisory services and by performing the human factors evaluation. This report presents the results of that human factors evaluation.

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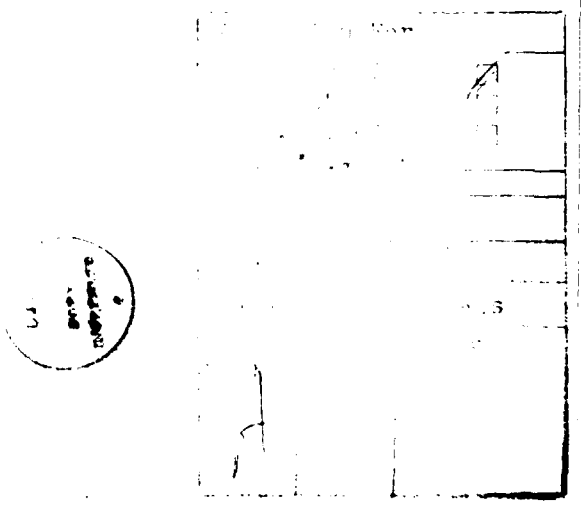

HUMAN FACTORS EVALUATION OF THE MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM (MILES) IN AN OPERATIONAL ENVIRONMENT

BRIEF

REQUIREMENT:

To evaluate the human factors aspects of the MILES training system.

PROCEDURE:

Human factors data on user acceptance and the man-machine interface of the MILES equipment were gathered through use of two questionnaires which were administered to all participants in MILES OT II at the end of each training phase (n=210). Additionally, all training managers rated the acceptability of MILES as a training system. Supplemental data on safety and motivation were collected throughout the test.

FINDINGS:

There was a high degree of individual user acceptance of MILES as a training system. Troops liked to train with MILES and felt that the training was very beneficial.

Training managers reported that MILES provided diagnostic feedback and was acceptable as a training system, provided that the equipment could be hardened to prevent frequent breakage.

In addition, based on the man-machine interface evaluation, it was found that:

1. MILES equipment is easy to install and remove.

2. Operator maintenance checkout procedures are adequate except for the DRAGON and VIPER which are too complex.

3. Design of the MWLD requires further human factors engineering.

4. Design of the TOW system requires further human factors engineering.

5. THE MILES TOW system is a major safety hazard, due to unintentional discharges of the ATWESS.

UTILIZATION OF FINDINGS:

The TRADOC Combined Arms Test Activity (TCATA) has utilized the findings of this report in TCATA test report OT 210, "Multiple Integrated Laser Engagement System (MILES) Operational Test OT II (MILES OT II)." In addition, findings of this report were used in equipment modifications which have led to a current MILES product with enhanced survivability.

HUMAN FACTORS EVALUATION OF THE MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM IN AN OPERATIONAL ENVIRONMENT

CONTENTS

INTRODUCTION

This report documents the human factors evaluation performed during operational testing (OT) II of the Multiple Integrated Laser Engagement System (MILES).* Information was gathered to answer two broad questions:

(1) What, if any, are the man-machine interface problems of MILES?

(2) What is the user acceptance of MILES?

BACKGROUND

There has long existed a need for training exercises to provide objective, valid measures of combat effectiveness. A necessary part of these measures would be a means of objectively inflicting and assessing casualties on a realtime or near realtime basis. Traditionally umpires have been used to assess casualties during combat exercises. However, because of the large element of subjective judgments inherent in the umpire's evaluations, the use of umpires has typically been characterized by low soldier acceptance. In recent years the Army Research Institue for the Behavioral and Social Sciences (ARI) has supported TRADOC in developing methods of tactical engagement simulation training. Although the term engagement simulation can take many meanings, for purposes of this report we will speak of engagement simulation as consisting of a variety of unit training techniques characterized by two-sided free play combat encounters with objective means for providing prompt and realistic casualty feedback and assessment. Early versions of engagement simulation, Squad Combat Operators Exercise (SCOPES) and REALTRAIN, included procedures for training units of company size or smaller. These engagement simulation techniques stressed (1) rapid kill/miss feedback through a system of identifying markers and controllers, (2) specified rules of engagement for assessing casualties and (3) accurate post exercise critiques through the use of After Action Reviews (AARs). The prompt feedback and accurate performance review procedures led to improved tactical performance as measured by various criteria (e.g., loss exchange ratios, rate and depth of advance, etc.). In addition initial user acceptance of these early engagement simulation systems was high (Root et. al., 1976) and resulted in improved morale (e.g. Bleda & Hayes, 1978; Sulzen and Bleda, 1979; and Bleda, 1979).

SCOPES and REALTRAIN achieved benefits of increased soldier motivation and training effectiveness. However, support requirements for large numbers of controllers and communication equipment have limited the usefulness of SCOPES and REALTRAIN to training exercises no larger than company level. MILES was developed to enable units through battalion level to hold engagement simulation training.

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*A copy of the MILES OT II test report may be obtained by writing Chief, Training Directorate (ATCAT-TD), HQ TCATA, Ft. Hood, TX 76544

As part of the Research and Development process the TRADOC Combined Arms Test Activity was tasked to conduct Operational Test II (OT II). OT II consisted of a test of the MILES equipment, in the hands of a unit operating as they would with normal issue equipment. In other words, OT II was designed to determine how well the MILES would operate under normal field operating conditions. The Ft. Hood Field Unit of ARI assisted TCATA on MILES OT II and performed the human factors evaluation to determine (1) what, if any, man-machine interface problems existed with the MILES equipment, and (2) user acceptance of MILES.

Research Issues. The human factors evaluation of MILES sought to answer two broad questions. First, what man machine interface problems, if any, existed with the equipment? For example, how easily could the MILES equipment be installed, removed and operated? How comfortable was it to use, how safe, and so on? The user acceptance question was addressed to individual soldiers and training managers. If training managers did not perceive MILES as a useful and cost effective training system, it would not be used. If the individual soldier did not accept MILES, then it is quite probable that sale and training would suffer.

METHOD

Subjects. Four distinct groups were utilized during MILES OT II. Two companies were supplied from the 1st of the 22nd Battalion, 4th Infantry Division, Ft. Carson, CO., and were trained using the MILES system. In addition, an opposing force was used during the pre- and post-test proficiency assessments of the two trained companies. Finally a fourth group, called the aggressor force, was used during pre-test activities to train the OPFOR. While human factors data was gathered from all groups (e.g., error reports and other safety data) most of the results reported here pertain to the two trained companies and the OPFOR (n=approximately 210).

Equipment. The MILES equipment consists of various sets of laser transmitter/detectors, with attendant signaling mechanisms to indicate near misses and kills. During OT II, MILES transmitters were used to simulate firing effects for the following weapons (1) M16A1 rifle, (2) M2 and M60 machine guns, (3) VIPER (LAW), Dragon, TOW and SHILLELAGH missiles, and (4) the main guns for the M60A1 main battle tank and M551 Sheridan. In addition to the laser transmitter equipment mentioned above, laser detectors were attached to harnesses for M113s, M551s, M60A1s, as well as infantrymen and designated armor crewmen.*

Collective Training System (CTS). The collective training system refers primarily to how training exercises were conducted and critiqued. The CTS included all support requirements to enforce the rules of engagement, and the after action reviews. Indirectly questions asked about the collective

*For a fuller discussion of MILES equipment utilized during OT II see TCATA's MILES test report OT 210 (1979).

training system were designed to determine if users perceived differences between the acceptability of the MILES equipment and the training support package being recommended for use with the equipment. This was an especially important question in view of comments previously made about REALTRAIN. While many commanders felt that REALTRAIN was a very good training technique, some commanders said they would not use it due to the requirements for large numbers of controllers and radios (ARI-Commanders Overview, comments section).

Data Collection Instruments. Information for the MILES human factors evaluation was gathered through four questionnaires and two data collection forms. (See Appendix A.) Two questionnaires "Human Factors-Infantry" and "Human Factors-Vehicles" addressed the MILES man-machine interface. Questions were asked referring to the ease of installation, removal, operation and maintenance of key components of the MILES equipment. In addition to these questionnaires a "Human Factors Error Report" form was available to all personnel as needed to report incidents where human factors problems were observed, and a data collection form was used to record subjective observations of unusually high/low motivation. Two additional questionnaires were used to assess user acceptance. One questionnaire was used to assess training manager acceptance (i.e., the battalion commander, the S-3, and the company commanders of the OPFOR and the companies being trained). The second user acceptance questionnaire was administered to all soldier participants. Interviews were used to supplement the above questionnaires and data collection forms.

Procedure. The training manager questionnaire was administered individually at the end of the MILES test. All other questionnaires were group administered at the end of the MILES training period. In addition to the questionnaires, equipment safety and motivation data were recorded as they occurred.

RESULTS

Results and conclusions will be discussed in terms of the two major areas of inquiry, i.e., man-machine interface and user acceptance.

Man-Machine Interface

Man-machine interface questions were asked concerning installation/removal, maintenance and operation of the MILES equipment.

Installation/Removal. Soldiers found the MILES equipment easy to install and remove. For example, when asked to rate the ease of installation, 80% (n=345) indicated that the MILES laser transmitters were easy or very easy to mount on the weapon. Similar data on ease of installation were obtained for the Combat Vehicle Laser Detector (CVLD), the Combat Vehicle Kill Indicator (CVKI) and the Man Worn Laser Detector (MWLD). Ease of equipment removal was also indicated with better than 80% of the soldiers rating the MILES equipment as easy or very easy to remove.

Maintenance. For most pieces of MILES equipment, operator maintenance was very limited and consisted of checking for obvious deficiencies. For example, a soldier would check a laser detector belt for cracked or broken detectors. If a device did not work or was damaged, it was turned in to the unit Direct Exchange facility. In other words, unit level maintenance consisted of inspect and replace. There was no actual troubleshooting or repair performed at unit level. Therefore unit operational maintenance problems, for the most part, were minimal.

The one place where major maintenance problems occurred was with the VIPER and DRAGON missile systems. For these systems, multiple operational checks were performed using a technical manual. Personnel reported that this procedure was cumbersome and inadequate and asked for a simpler means of troubleshooting the equipment. On many occasions equipment was turned in for repair which was functioning perfectly, indicating problems in the checkout procedure. The reason for this recurring maintenance error may not have resided with the VIPER and DRAGON manuals, but rather in the failure of the troops to use them. One controller observed that gunners repeatedly failed to follow correct procedures (e.g., failure to depress the sight before closing the missile tube), and felt that this might contribute to maintenance problems. Efforts to eliminate these costly erroneous turn-ins should probably center around the maintenance training program and/or simpler, more readable manuals.

Operations. Several components of the MILES system exhibited Human Factors problems during their operational use. Most notable were the TOW and MWLD systems.

(1) TOW. The MILES TOW system had HF problems both in the sight and the relative balance of the TOW tube. In addition, a major safety problem occurred in the firing of the MILES TOW.

Problems with the TOW sight were centered on the sight reticle. Several TOW gunners indicated that the reticle for the MILES TOW sight was thinner than on the regular missile sight. Perhaps this thinness lead to reports that the MILES TOW reticle had a tendency to fade or disappear during tracking operations. This disappearance was most often noted while tracking against a wooded background.

In addition to the sight problem, the MILES configured TOW tube was imbalanced. Without the weight of an actual, or dummy, missile in the tube, and perhaps due to the weight of the Anti-Tank Weapon Engagement Signature Simulation (ATWESS) at the rear of the MILEs tube, the launch tube was "rear heavy". To overcome this imbalance problem TOW gunners had to continually apply pressure on the adjustment knobs to keep the launch tube on a level plane. As the exercise progressed, this need for continual manual pressure resulted in operator fatigue.

Of more serious concern than the two human factors problems noted above, was the major human factors safety problem associated with the MILES TOW system. On numerous occasions TOWs were reported as misfiring (i.e., the ATWESS would not fire when the trigger was pulled). On a regular TOW the

procedure following a misfire would be to trip a disarm level before clearing the tube. This switch would electrically disarm the TOW. Unfortunately, on the MILES TOW the disarm signal would, on some occasions, trigger the MILES ATWESS. In one instance a soldier received second and third degree burns when the TOW accidentally fired while he was attempting to clear the ATWESS. Contractor personnel and the TCATA test team in a staged experiment were later able to duplicate accidental firing of the ATWESS via the disarm switch. During MILES OT II, the contractor developer of MILES provided three different "fixes" attempting to solve the unintentional firing safety hazard. After the third "fix" was applied, two incidents of unintentional firing occurred, and were duplicated. At the end of OT II this problem of accidental firing was still unresolved.

An apparent means of preventing accidental firings should be through the use of additional mechanical safety provided for the ATWESS. In the event of a misfire, gunners were instructed to first place the ATWESS mechanical safety on "SAFE", then to follow TOW misfire procedures. Following this, the loader could open the ATWESS device at the rear of the TOW tube and then remove the unfired cartridge. No misfirings were recorded when the mechanical safety had been used; it was argued by some that the safety problems encountered were a training rather than an equipment problem. Unfortunately the above represents a classic human factors problem where the original overlearned response will tend to be used in cases of stress or excitement. TOW crews had no prior experience with the mechanical safety and had been trained to use the TOW disarm switch. Under battlefield conditions (i.e., engagement simulation), the overlearned response of hitting the disarm switch would prevail, while the new response (setting the mechanical safety) could easily be forgotten. Therefore, the add-on mechanical safety was insufficient from a human factors standpoint as well as contributing to training under reduced battlefield operational fidelity. From a human factors view, a training program on the mechanical safety would have to be extensive and should only be used as a last resort; future modifications should center around prior learned responses (i.e., when the disarm switch is engaged, the MILES ATWESS should not fire).

(2) MWLD. The MWLD had several human factors problems associated with its use. Among these were several wearing problems for the battery pack/logic boxes, a problem with reflectivity of the MWLD detectors, and problems with the fit and adjustment of the harnesses. Taking these in order:

(a) The battery pack/logic box for the helmet assembly created HF problems. Soldiers repeatedly reported that the weight of the battery pack would pull the helmet backward. In addition to discomfort and the need to continually adjust the helmet, this HF problem could reduce training fidelity. For example, with the helmet tipped backwards, the person may be "shot" in the face but laser detectors would not be positioned to record the hit.

(b) The battery pack for the MWLD torso harness suffers from the same problem; i.e., the weight of the battery pack/logic box pulls the harness backward. This, coupled with the tendency of the harness adjustment clasps to slip, results in the harness pulling far enough back for the chest strap to ride up on the throat, inducing a choking effect on some soldiers.

(c) Another complaint expressed about the battery pack/logic box concerned mounted operations. During the MILES exercises, APC's operated cross country (i.e., off the road) at high speed. Personnel riding in armored vehicles were often jostled or even bounced against the interior walls of the vehicle. Under ordinary circumstances this would cause discomfort, but at an acceptable level. However, during cross country operations, several individuals complained that the battery pack/logic box (located in the center of the wearer's back) led to painful experiences because it was jammed between their spine and the wall of the vehicle.

(d) Reflectivity of the MWLD detectors created a tactical survival problem. Often the reflection from the detector lenses gave away the wearer's position. Detections at 1500 meters and more due to reflections were reported.

(e) Human factors problems for the MWLD were also observed in terms of fit of the devices. While most individuals indicated that the MWLD was easy to put on and remove, a few soldiers indicated that the MWLD was too small. Some larger size MWLDs for the more broad chested individuals were needed. Additionally, there was a fit problem due to the harness adjustment devices, which tended to slip. One company commander demonstrated that simply bending over would cause his harness to become loose and out of adjustment.

User Acceptance

The second major area of inquiry sought to determine the user acceptance of MILES. User acceptance was measured both for training managers and at the individual soldier level.

Training Managers. Training manager acceptance often determines whether a fielded system will be used at all. Therefore, the Battalion commander, S-3 and the three company commanders involved in MILES OT II were queried regarding perceived strengths and weaknesses of both the MILES equipment and the control system associated with its use. The following was found.

(1) Four of the five training managers felt that MILES was satisfactory for training.

(2) All of the training managers felt that the MILES equipment diagnosed weaknesses in the areas of movement, use of terrain, use of organic weapons, and gunnery marksmanship (Table 1).

TABLE 1. Perceived Extent to Which MILES Equipment Diagnosed Weaknesses

Area	Number responding				
	Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Movement	4	1	-	-	-
Use of terrain	4	1	-	-	-
Use of organic weapons	4	1	-	-	-
Gunnery/ marksmanship	2	3	-	-	-

(3) All of the training managers felt that the MILES equipment provided diagnostic information on strengths for movement, use of terrain, use of organic weapons, command and control, and gunnery marksmanship (Table 2).

TABLE 2. Perceived Extent that MILES Equipment Diagnosed Strengths

Area	Number responding				
	Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Movement	2	3	-	-	-
Use of terrain	3	2	-	-	-
Use of organic weapons	3	2	-	-	-
Command and control	1	4	-	-	-
Gunnery/ marksmanship	1	4	-	-	-

(4) All of the training managers felt that the MILES collective training system provided diagnostic information on weaknesses in certain areas of movement, use of terrain, use of organic weapons and gunnery marksmanship (Table 3).

TABLE 3. Extent Which the Collective Training System Diagnosed Weaknesses

Area	Number responding				
	Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Movement	2	3	-	-	-
Use of terrain	2	3	-	-	-
Use of organic weapons	2	3	-	-	-
Supporting fire usage	1	4	-	-	-

(5) All of the training managers felt that the MILES collective training system provided diagnostic information on strengths in the areas of movement, use of terrain, use of organic weapons, and supporting fire usage (Table 4).

TABLE 4. Extent Which the Collective Training System Diagnosed Strengths

Area	Number responding				
	Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Movement	1	4	-	-	-
Use of terrain	2	3	-	-	-
Use of organic weapons	1	4	-	-	-
Supporting fire usage	2	3	-	-	-

(6) Table 5 shows how much positive training training managers perceived that the MILES equipment provided at various levels of command. The most salient findings follow:

(a) Training managers perceived company commanders, platoon leaders, squad leaders and individuals as receiving positive training in movement, use of terrain, organic weapon usage and gunnery marksmanship.

(b) Four of the five training managers perceived the MILES equipment as providing positive training to company commanders and platoon leaders in command and control.

(7) Table 6 shows training managers' perceptions of the amount of negative training received from the MILES equipment. For the most part, perceived negative effect was very low.

(8) Table 7 shows training managers' perceptions of the positive training provided by the collective training system. It appears that training managers perceived the collective training system to provide the most positive training in the areas of movement, use of terrain, organic weapons usage, and guunery and marksmanship.

(9) Table 8 shows training managers' perceptions of the negative training provided by the MILES collective training system. For the most part, the percieved negative effect is very low.

TABLE 5. Training Managers' Ratings of Positive Training Provided by the MILES Equipment at Various Command Levels

Area of positive training	Level of cmd	Number of training managers responding: Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Reconnaissance	Co		3	1		1
	Pltn		3	1		1
	Sqd		2	2		1
	*Ind		1	2	1	1
Planning	Co		3	1		1
	Pltn		3		1	1
	Sqd		2	2	1	
	*Ind		1	1	2	1
Issuance of orders	Co	1	1		1	2
	Pltn	1	2			2
	Sqd		1	2	1	1
	*Ind	-	-	-	-	-
Movement	Co	4				1
	Pltn	4			1	
	Sqd	2	3			
	*Ind	4	1			
Use of terrain	Co	-	-	-	-	-
	Pltn	4	1			
	Sqd	2	3			
	*Ind	4	1			
Use of organic weapons	Co	4	1			
	Pltn	4	1			
	Sqd	2	2	1		
	*Ind	3	2			
Supporting fire usage	Co	2	2	1		
	Pltn	2	2	1		
	Sqd	1	2	2		
	*Ind			3	2	
Command & control	Co	2	2			1
	Pltn	2	2			1
	Sqd	1	2	1		1
	*Ind	-	-	-	-	-
Gunnery & marksmanship	Co	3	1			1
	Pltn	3	1			1
	Sqd	3		1	1	
	*Ind	3	2			

*Ind includes Individual and Crew Level.

TABLE 6. Training Managers' Ratings of Negative or Improper Training Provided by the MILES Equipment at Various Command Levels

Area of positive training	Level of cmd	Number of training managers responding: Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Reconnaissance	Co				4	1
	Pltn				4	1
	Sqd				3	2
	*Ind				4	1
Planning	Co				3	2
	Pltn				3	2
	Sqd				2	3
	*Ind				3	2
Issuance of orders	Co				2	3
	Pltn				1	3
	Sqd			1	1	3
	*Ind	-	-	-	-	-
Movement	Co			1	3	1
	Pltn			1	2	2
	Sqd		1	1	1	2
	*Ind		1	1	1	2
Use of organic weapons	Co				3	2
	Pltn				2	3
	Sqd				2	3
	*Ind				2	3
Use of terrain	Co		1		3	1
	Pltn		1		2	2
	Sqd		1		2	1
	*Ind		1	1	1	2
Supporting fire usage	Co			1	2	2
	Pltn				3	2
	Sqd			1	2	2
	*Ind			1	2	2
Command & control	Co				2	3
	Pltn				3	2
	Sqd				2	3
	*Ind	-	-	-	-	-
Gunnery & marksmanship	Co				2	3
	Pltn				2	3
	Sqd				2	3
	*Ind				2	3

*Ind includes Individual and Crew Level.

TABLE 7. Training Managers' Ratings of Positive Training Provided by the Collective Training System

Area of positive training	Level of cmd	Number of training managers responding: Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Reconnaissance	Co		2	2		1
	Pltn		3	1		1
	Sqd	1	2	1	1	
	*Ind		2		2	1
Planning	Co		2	2		1
	Pltn		4			1
	Sqd	1	2	1	1	
	*Ind		2	1	1	1
Issuance of orders	Co		2	1	1	1
	Pltn		3		1	1
	Sqd		2	1	2	
	*Ind	-	-	-	-	-
Movement	Co	2	1	2		
	Pltn	2	2	1		
	Sqd	2	2	1		
	*Ind	2	2			1
Use of terrain	Co	2	1	2		
	Pltn	2	2	1		
	Sqd	2	2	1		
	*Ind	2	2			1
Use of organic weapons	Co	1	2	2		
	Pltn	1	3	1		
	Sqd	2	2	1		
	*Ind	2	2			1
Supporting fire usage	Co	1	1	3		
	Pltn	1	2	2		
	Sqd	1	2	2		
	*Ind		3		1	1
Command & control	Co	1	2	1		
	Pltn	1	3			1
	Sqd	2	2			1
	*Ind	-	-	-	-	-
Gunnery & marksmanship	Co	1	2	1		1
	Pltn	1	3			1
	Sqd	2	2	1		
	*Ind	2	2			1

*Ind includes Individual and Crew Level.

TABLE 8. Training Managers' Ratings of Negative or Improper Training Provided by the Collective Training System

Area of positive training	Level of cmd	Number of training managers responding: Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Reconnaissance	Co		1		2	2
	Pltn		1		3	1
	Sqd		1		2	2
	*Ind				3	2
Planning	Co		1		2	2
	Pltn		1		2	2
	Sqd		1		2	2
	*Ind				3	2
Issuance of orders	Co		1		1	2
	Pltn		1		2	2
	Sqd		1		3	1
	*Ind	-	-	-	-	-
Movement	Co			1	1	3
	Pltn			1	1	3
	Sqd			1	1	3
	*Ind			1	1	3
Use of terrain	Co			1	1	3
	Pltn			1	1	3
	Sqd			1	1	3
	*Ind			1	1	3
Use of organic weapons	Co				2	3
	Pltn				3	2
	Sqd				2	3
	*Ind				2	3
Supporting fire usage	Co			1	2	2
	Pltn			1	2	2
	Sqd			1	2	1
	*Ind			1	2	1
Command & control	Co				3	2
	Pltn				2	3
	Sqd				2	2
	*Ind	-	-	-	-	-
Gunnery & marksmanship	Co				2	3
	Pltn				2	3
	Sqd				2	2
	*Ind				2	3

*Ind includes Individual and Crew Level.

(10) The perceived costs of the MILES equipment as seen by training managers is shown in Table 9.

TABLE 9. Perceived Costs of MILES Equipment

Response	Number of responses								
	Installation/removal			Maintenance			Operational use		
	pers	time	equip/ matl	pers	time	equip/ matl	pers	time	equip/ matl
Very expensive		1				2			
Expensive	1		3	3	3	3	1		2
Borderline			1	1	1				1
Inexpensive	3	3	1	1	1		4	2	1
Very inexpensive	1	1						3	1
Summary (E = expensive; I = inexpensive)	I	I	E	E	E	E	I	I	I/E

DISCUSSION

Training Manager Acceptance

Training managers felt that the MILES equipment was satisfactory for training. Several comments indicated that this response was contingent upon "hardening" the equipment to reduce breakage and improve reliability. The brigade commander and battalion commander of the test support unit strongly endorsed the MILES concept, but only if the equipment was hardened to provide durability in the hands of troops.

Training managers were also asked to rate the effectiveness of the MILES equipment in diagnosing strengths and weaknesses in reconnaissance, planning, issuance of operations orders, movement, use of terrain, organic weapon usage, supporting fire usage, command and control, and gunnery/marksmanship. In addition, the perceived degree of positive and negative training for the above areas were queried. Several training areas emerged from the training managers' responses as consensus choices for positive training and diagnostic evaluation. Eighty to one hundred percent of the training managers felt that the MILES equipment was effective in diagnosing strengths and weaknesses for movement, use of terrain, use of organic weapons, and gunnery/ marksmanship. The MILES equipment was seen as providing positive training in the same areas. In addition, all of the training managers felt that MILES equipment provided diagnostic information on strengths in command and control. Also training managers indicated that the collective training system provided diagnostic information on movement, use of terrain and organic weapons, gunnery/marksmanship, and supporting fire usage. Finally, training managers perceived negative training associated with MILES as minimal, both for the equipment and the collective training system.

In addition to questions regarding the training effectiveness of the MILES equipment, nine questions were asked training managers regarding their perceived costs of training with MILES. Costs in equipment, personnel and time for installation/removal, maintenance, and operational use were shown in Table 9. It appeared from this table that training managers regarded MILES to be expensive in terms of equipment and materiel. It was not clear whether they felt MILES to be expensive in terms of the use of unit equipment/materiel needed to support engagement simulation activities (e.g., extra jeeps and radios), or because of the perceived costs of the MILES equipment itself.

Another area which may be in need of future illumination was maintenance. In comparing the perceived costs of installation/removal, operation and maintenance, the only activity that training managers regarded as expensive in all three categories (i.e.,personnel, time and equipment) was maintenance. Since maintenance, under the MILES concept, was to be performed at depot level, training managers may have reacted to the large amount of equipment breakage during the test and the need for continual turn-in and resupply. Resupply may well have a large cost, with actual maintenance costs being small. At any rate, training managers' perceptions of high maintenance costs would tend to support their desires for hardening the equipment.

User Acceptance by Troops

As mentioned previously, user acceptance by troops was felt to be necessary to the successful use of MILES. If soldiers did not perceive MILES to be a system worth using, they would be unlikely to play the engagement simulation game and training effects would presumably be minimized. Therefore questions on perceived degree of positive and negative training were asked to assess the user acceptance of MILES at the individual soldier level.

The user perceived realism of the MILES system is shown in Table 10.

TABLE 10. Player Ratings of Realism Provided by MILES

	Percent responding				
Element of realism	Very realistic	Realistic	Borderline	Unrealistic	Very unrealistic
Kill capabilities of direct fire weapons	25	41	22	10	3
Kill capabilities of support weapons	22	37	29	9	4
Vulnerability to direct fire weapons	27	45	18	7	3
Vulnerability to indirect fire	13	33	28	20	7
Pace (speed of movement)	25	48	19	4	4

The user perceived positive training by area is shown in Table 11.

TABLE 11. Player Ratings of Positive Training by Area Using Miles

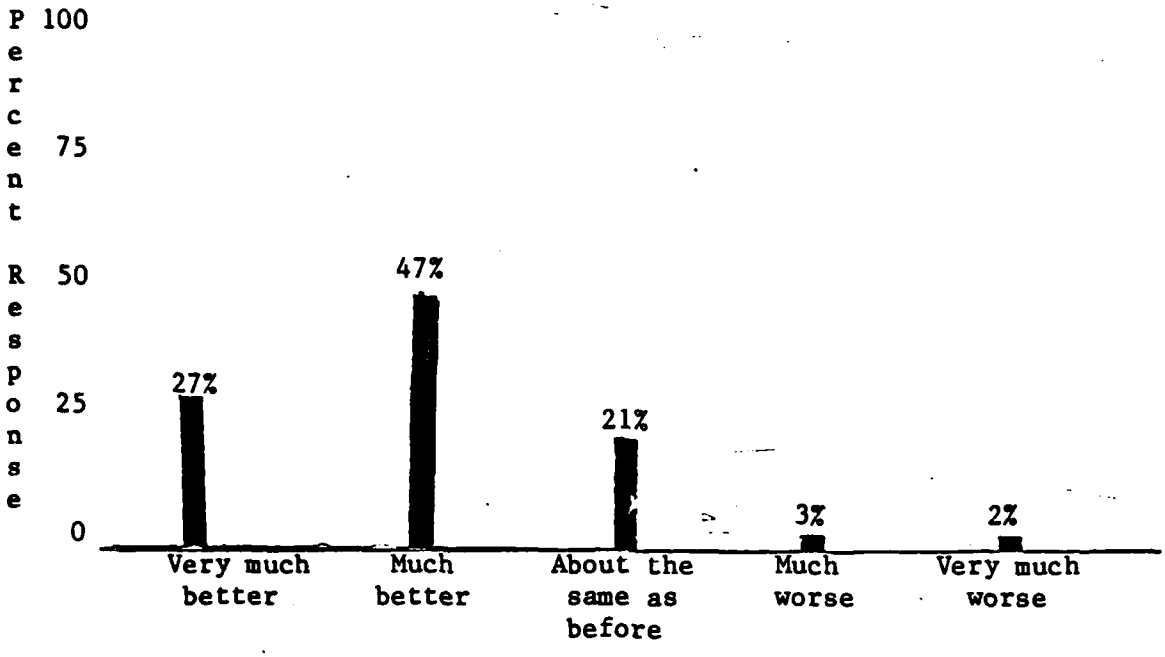
Area of training	Percent Response				
	Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Reconnaissance	21	34	29	9	7
Planning	15	35	34	10	5
Movement	38	39	16	4	3
Use of terrain	42	38	12	6	2
Use of organic weapons	32	40	20	7	1
Use of support weapons	33	35	17	12	3

Perceived improper training by area is shown in Table 12.

TABLE 12. Player Ratings of Improper Training by Area Using Miles

Area of training	Percent Response				
	Very great extent	Great extent	Only somewhat	Very little	Practically not at all
Reconnaissance	13	25	20	20	23
Planning	15	26	19	18	22
Movement	18	30	18	14	20
Use of terrain	20	25	15	13	27
Use of organic weapons	19	28	14	15	24
Use of support weapons	25	17	16	15	26

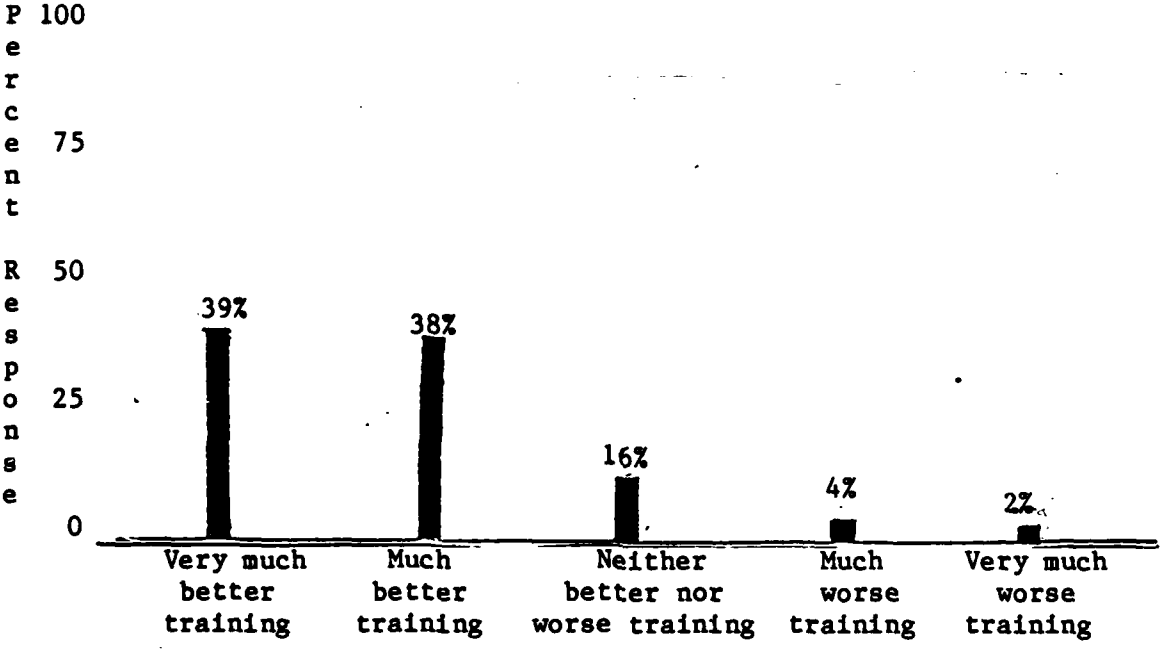
Individual soldiers were also asked to rate their ability to perform an attack. Seventy-four percent of the soldiers said that they were much better or very much better able to perform an attack following MILES training (Figure 1).



n=209

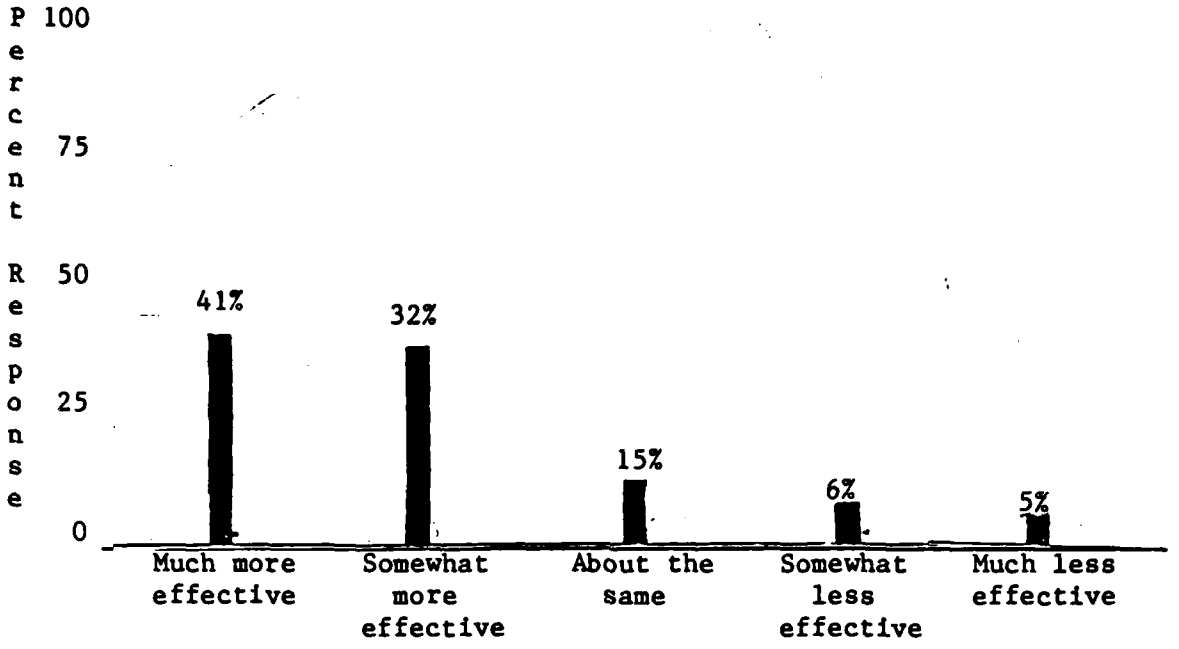
Figure 1. How would you rate your ability to conduct an attack following MILES training?

Soldiers were also asked two questions in which they compared the effectiveness of training with MILES to regular FTXs and normal unit training (Figures 2 & 3).



n=204

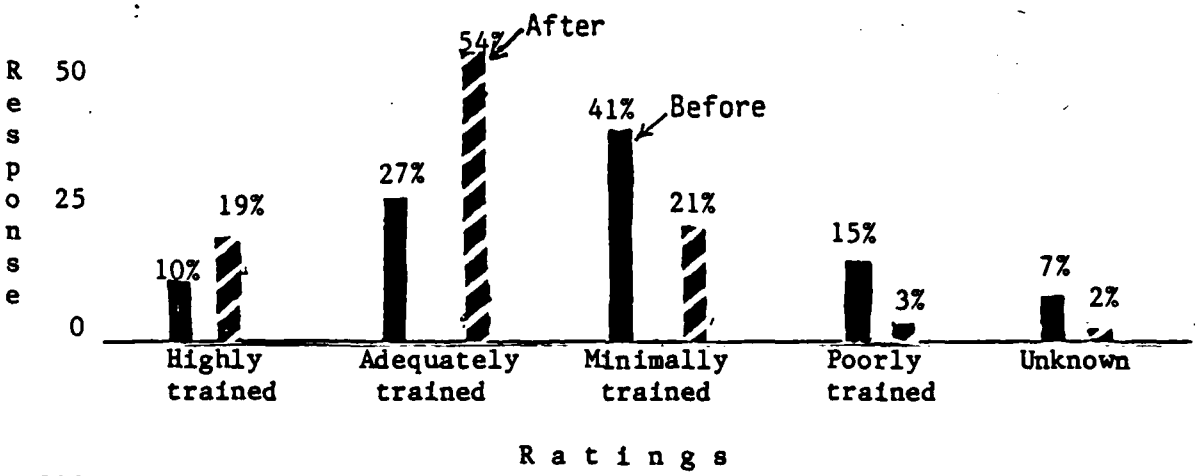
Figure 2. Compared to a regular FTX, a MILES exercise is?



n=206

Figure 3. Compared to the normal unit training your unit conducts, do you feel that MILES is?

Soldiers also rated their units as more highly trained following the MILES exercises. Figure 4 shows individual ratings of their unit's state of training for combat before and after the MILES exercises.



n=206

Figure 4. Comparison of state of training perceived by soldiers before and after MILES training

*Note both questions were asked after training with MILES.

Discussion of User Acceptance by Troops

As can be seen from the above results, there appears to be a high level of user acceptance at the individual soldier level. Most soldiers perceived MILES as providing realistic or very realistic training, and a majority said that MILES provided training to a great or very great extent in every area queried.

Some soldiers did see a potential for learning improper procedures and practices with MILES. However, this opinion was not expressed by a majority for any of the training areas (e.g., reconnaissance, planning, movement, use of terrain, use of organic weapons, or use of support weapons). In fact, the same areas where improper training was at times perceived to occur (e.g., use of terrain, 45% rated negatively) were also rated as providing positive training (e.g., 80%). In every case where soldiers rated an area as providing improper training, there were more soldiers who gave those same areas credit for providing positive training.

Seven questions were asked to determine soldiers' perceptions of the training effectiveness of MILES in general.

One was a straightforward question which asked the individual soldier to rate his ability to perform an attack following MILES training. As noted in Figure 1, 74% of the soldiers felt that MILES had improved their ability to perform an attack.

Four questions were used to determine if individual soldiers felt that their proficiency had improved during the MILES exercise. These questions were used to compare perceived states of training and readiness before and after training. They gave an indication of the perceived training value of MILES. However, they did not completely answer the question of how effective soldiers felt MILES to be. Even though the percentage responding "highly trained" and "adequately trained" increased dramatically after the exercises (Figure 4), it could be argued that any concentrated unit training program would yield these results.

To clarify the picture, two questions were asked which had the user specifically compare MILES to current training programs. As was seen in Figures 2 and 3, MILES was perceived by users to be a very effective training system when compared to current training programs.

In addition to the questionnaire results discussed above several incidents of unusually high motivation were observed. Perhaps the most startling incident was displayed by the aggressor unit used to train the opposing force company. After two weeks in the field, the aggressor force complained heavily about being sent back to garrison. They wished to continue training with MILES. Two other incidents appear worthy of special mention. During a MILES exercise, all but one member of an infantry squad were killed. This lone survivor took the squad's DRAGON missile, maneuvered into position and

"killed" a tank. In other cases, it was repeatedly observed that infantry troops were pushing attacks home with enthusiasm following dismounted attacks of 4-6 kilometers. Maintenance of enthusiasm for that long an assault was regarded as highly unusual by the post-provided observers.

CONCLUSIONS

Man-Machine Interface

1. MILES equipment is easy to install and remove.

2. Operator maintenance/checkout procedures are adequate except for the DRAGON and VIPER which are too complex.

3. Design of the MWLD requires further human factors engineering.

4. Design of the TOW system requires further human factors engineering.

5. The MILES TOW system is a major safety hazard due to unintentional discharges of the ATWESS.

User Acceptance

1. MILES is acceptable to training managers as a training system in the conduct of unit tactical training, provided that MILES hardware can be hardened to avoid breakage problems and safety problems can be rectified.

2. MILES provides adequate diagnostic feedback to training managers.

3. There is a high degree of individual user acceptance of MILES as a training system.

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Appendix

DATA COLLECTION INSTRUMENTS

HUMAN FACTORS - INFANTRY

DATE: _____

POSITION NO.: _____

NAME: _____ RANK: _____
(Last) (First) (MI)

DUTY POSITION/TITLE: _____

SECTION/ELEMENT: _____

INSTRUCTIONS

This questionnaire will be completed by all infantry player personnel at the end of Phase 2. Answer all questions by checking one answer per question. In addition, feel free to add comments at the end of the questionnaire as appropriate. The completed questionnaire will be returned to the unit evaluator.

1. How would you rate the comfort of the MWLD harness under the following conditions?

Walking	Running	Lying down	Crawling	Sitting	
_____	_____	_____	_____	_____	Very comfortable
_____	_____	_____	_____	_____	Comfortable
_____	_____	_____	_____	_____	Borderline
_____	_____	_____	_____	_____	Uncomfortable
_____	_____	_____	_____	_____	Very uncomfortable

2. How easy could you breathe while wearing the harness during normal activities?

_____ Very easy

_____ Easy

_____ Neither difficult nor easy

_____ Difficult

_____ Very difficult

OT 210 Questionnaire #515

3. How comfortable would you rate the harness and helmet assemblies?

_____ Very comfortable

_____ Comfortable

_____ Borderline

_____ Uncomfortable

_____ Very uncomfortable

4. How would you rate the ease of putting on the MWLD harness assembly?

_____ Extremely easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

5. How would you rate the ease of adjusting the harness?

_____ Extremely easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

6. How would you rate the ease of putting on the MWLD helmet assembly?

_____ Extremely easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

OT 210 Questionnaire #515

7. How would you rate the ease of adjusting the MWLD helmet assembly?

_____ Extremely easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

8. How would you rate the ease of removing the MWLD harness assembly?

_____ Extremely easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

9. How would you rate the ease of removing the MWLD helmet assembly?

_____ Extremely easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

10. How well would you rate the overall fit of the harness and helmet assemblies?

_____ Extremely easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

OT 210 Questionnaire #515

11. As a result of wearing the MWLD how would you rate your ability to obtain any of the following firing positions?

Standing	Kneeling	Prone	
_____	_____	_____	Very easy
_____	_____	_____	Easy
_____	_____	_____	Borderline
_____	_____	_____	Difficult
_____	_____	_____	Very difficult

12. How would you rate the safety of the MWLD harness and helmet for soldier use?

Harness	Helmet	
_____	_____	Very safe
_____	_____	Safe
_____	_____	Borderline
_____	_____	Unsafe
_____	_____	Very unsafe

13. How would you rate the loudness of the horn with respect to hearing comfort?

_____ Very comfortable

_____ Comfortable

_____ Neither comfortable or uncomfortable

_____ Uncomfortable

_____ Very uncomfortable

14. How would you rate mounting the training device to the weapon?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

15. How would you rate boresighting the laser training device to the weapon?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

16. How would you rate handling the weapon with the laser training device mounted?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

17. How easy was it to fire the weapon with the laser training device installed?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

HUMAN FACTORS - VEHICLES

DATE: _____

POSITION NO.: _____

NAME: _____ RANK: _____
(Last) (First) (MI)

DUTY POSITION/TITLE: _____

SECTION/ELEMENT: _____

INSTRUCTIONS

This questionnaire will be completed by all vehicle crewmen (i.e., tank crews, TOW crews) at the end of Phase 2. Answer all questions by checking one answer for each question or subquestion. In addition, feel free to add comments at the end of the questionnaire as appropriate. Return the completed questionnaire to the unit evaluator.

Laser Transmitter (The Shooter)

1. How would you rate mounting the training device to the weapon?

_____	Very easy	_____	Difficult
_____	Easy	_____	Very difficult
_____	Borderline	_____	Unk/NA

2. How would you rate boresighting the laser training device to the weapon?

_____	Very easy	_____	Difficult
_____	Easy	_____	Very difficult
_____	Borderline	_____	Unk/NA

OT 210 Questionnaire #516

3. How would you rate handling the weapon with the laser training device mounted?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

4. How easy was it to fire the weapon with the laser training device installed?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

Vehicle/CIA

5. How would you rate the ease of mounting the control and indicator assembly (CIA) in the vehicle?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

6. How would you rate the ease of body movements inside the vehicle with the CIA installed?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

7. How would you rate the safety of the CIA?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

8. How would you rate the accessibility and operation of the CIA controls?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

9. How would you rate the convenience of the CIA controls?

_____ Very convenient _____ Unk/NA

_____ Convenient

_____ Borderline

_____ Inconvenient

_____ Very inconvenient

10. How would you rate your ability to read the CIA controls under the following conditions?

	Dark	Daylight	Bright sunlight
a. Very adequate	_____	_____	_____
b. Adequate	_____	_____	_____
c. Borderline	_____	_____	_____
d. Inadequate	_____	_____	_____
e. Very adequate	_____	_____	_____

Vehicle/LCA

11. How would you rate the ease of mounting the loader's control assembly in the vehicle?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

12. How would you rate the ease of body movement inside the vehicle with the loaders control assembly installed?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

13. How would you rate the safety of the loaders control assembly?

_____ Very safe

_____ Safe

_____ Borderline

_____ Unsafe

_____ Very unsafe

_____ Unk/NA

14. How would you rate the ease of movement within the vehicle with the transmitter installed?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

15. How would you rate the ease of installing the CVKI on the vehicle?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

16. How would you rate removal of the CVKI from the vehicle?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

17. How would you rate the safety of the CVKI with respect to installation?

_____ Very safe

_____ Safe

_____ Borderline

_____ Unsafe

_____ Very unsafe

_____ Unk/NA

18. How would you rate the ease of installing the laser detector harness on the vehicle?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

19. How would you rate the ease of removing the laser detector harness from the vehicle?

_____ Very easy

_____ Easy

_____ Borderline

_____ Difficult

_____ Very difficult

_____ Unk/NA

20. How would you rate the safety of the laser detector with respect to installation and use?

_____ Very safe

_____ Safe

_____ Borderline

_____ Unsafe

_____ Very unsafe

_____ Unk/NA

OT 210 Questionnaire #516

21. How would you rate the comfort of the man worn laser device (MWLD) harness under the following conditions?

Walking	Running	Lying down	Crawling	Sitting	
_____	_____	_____	_____	_____	Very comfortable
_____	_____	_____	_____	_____	Comfortable
_____	_____	_____	_____	_____	Borderline
_____	_____	_____	_____	_____	Uncomfortable
_____	_____	_____	_____	_____	Very uncomfortable

22. How easy could you breathe while wearing the harness during normal activities?

_____ Very easy
_____ Easy
_____ Neither difficult nor easy
_____ Difficult
_____ Very difficult
_____ Unk/NA

23. How comfortable would you rate the harness and helmet assemblies?

_____ Very comfortable
_____ Comfortable
_____ Borderline
_____ Uncomfortable
_____ Very uncomfortable
_____ Unk/NA

24. How would you rate the ease of putting on the MWLD harness assembly?

_____ Extremely easy
_____ Easy
_____ Borderline
_____ Difficult
_____ Very difficult
_____ Unk/NA

25. How would you rate the ease of adjusting the harness?

_____ Extremely easy
_____ Easy
_____ Borderline
_____ Difficult
_____ Very difficult
_____ Unk/NA

OT 210 Questionnaire #516

26. How would you rate the ease of putting ont he MWLD helmet assembly?

_____ Extremely easy	_____ Difficult
_____ Easy	_____ Very difficult
_____ Borderline	_____ Unk/NA

27. How would you rate the ease of adjusting the MWLD helmet assembly?

_____ Extremely easy	_____ Difficult
_____ Easy	_____ Very difficult
_____ Borderline	_____ Unk/NA

28. How would you rate the ease of removing the MWLD harness assembly?

_____ Extremely easy	_____ Difficult
_____ Easy	_____ Very difficult
_____ Borderline	_____ Unk/NA

29. How would you rate the ease of removing the MWLD helmet assembly?

_____ Extremely easy	_____ Difficult
_____ Easy	_____ Very difficult
_____ Borderline	_____ Unk/NA

30. How well would you rate the overall fit of the harness and helmet assemblies?

_____ Very easy	_____ Difficult
_____ Easy	_____ Very difficult
_____ Borderline	_____ Unk/NA

31. How would you rate the safety of the MWLD harness and helmet for soldier use?

	Very safe	Safe	Borderline	Unsafe	Very unsafe	Unk/NA
Harness	_____	___	_____	_____	_____	_____
Helmet	_____	___	_____	_____	_____	_____

OT 210 Questionnaire #516

32. How would you rate the loudness of the horn with respect to hearing comfort?

_____ Very comfortable

_____ Comfortable

_____ Neither comfortable nor uncomfortable

_____ Uncomfortable

_____ Very uncomfortable

33. How satisfactory was the MWLD during normal operations while you were in the vehicle?

_____ Very satisfactory

_____ Satisfactory

_____ Borderline

_____ Unsatisfactory

_____ Very unsatisfactory

_____ Unk/NA

34. How satisfactory was the MWLD during normal operations while you were dismounted?

_____ Very satisfactory

_____ Satisfactory

_____ Borderline

_____ Unsatisfactory

_____ Very unsatisfactory

_____ Unk/NA

HUMAN FACTORS ERROR REPORT

DATE: _____

POSITION NO.: _____

NAME: _____ RANK: _____
(Last) (First) (MI)

DUTY POSITION/TITLE: _____

SECTION/ELEMENT _____

INSTRUCTIONS

Human factors is largely concerned with the efficient interface of man and machine. Human factors includes many factors such as ease of use, comfort, safety, and compatibility with the user's prior knowledge and skills. This form is designed for those times when you have seen a problem in using the MILES equipment.

1. When was the problem observed?

   a. _____ Installation

   b. _____ Removal

   c. _____ Operation

   d. _____ Maintenance

2. Did the problem create a safety hazard?

   a. _____ Yes b. _____ No

3. On what subsystem was the problem observed?

a. ___ MWLD	e. ___ M85 MG	i. ___ TOW	m. ___ Control gun
b. ___ M16	f. ___ COAX	j. ___ M113	
c. ___ M/MG	g. ___ VIPER	k. ___ M60A1	n. ___ Test set
d. ___ M60MG	h. ___ DRAGON	l. ___ M551	

4. Briefly describe the problem. _____

_____

_____

_____

_____

OT 210 Form #401

MOTIVATION INCIDENT
DATA COLLECTION FORM

DATE: _____

POSITION NO.: _____

NAME: _____ RANK: _____
(Last) (First) (MI)

DUTY POSITION/TITLE: _____

SECTION/ELEMENT _____

INSTRUCTIONS

We are interested in recording exceptional indicators of high/low motivation: times when morale, work level or simply "playing the game" was markedly different than you typically see in field exercises.

1. During what part of the training cycle was this observed?

_____ a. Pretest _____ c. Post-test

_____ b. Training phase _____ d. Other (explain) _____

2. When observed?

_____ a. During preparation for the exercises

_____ b. During conduct of the exercises

_____ c. During the after action review

_____ d. Other (explain) _____

3. Briefly describe the event. _____

OT 210 Form #435

TRAINING MANAGER ACCEPTANCE

DATE: _____

POSITION NO.: _____

NAME: _____ RANK: _____
(Last) (First) (MI)

DUTY POSITION/TITLE: _____

SECTION/ELEMENT: _____

INSTRUCTIONS

This questionnaire will be completed at the end of Phase 2 by the battalion commander, battalion XO, battalion S3 and company commanders. In addition, selected training managers at brigade will be asked to complete this questionnaire. We are interested in obtaining the views of training managers regarding the MILES system. The following questions are to be completed by company commanders at the end of each nine day training period and by the battalion commander and S3 at the end of the third nine day training period. Questions will be asked concerning:

a. The diagnostic/evaluative capability of MILES.
b. The perceived costs of using the MILES training equipment.
c. The perceived costs of the MILES Collective Training System.
d. The degree of positive training transfer.
e. The degree of negative training transfer.

The completed questionnaire will be returned to a unit evaluator or turned in to Data Collection.

OT 210 Questionnaire #517

1. To what extent do you perceive the MILES equipment as diagnosing weaknesses in the following areas? (Check one per item)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Issuance of order					
d. Movement					
e. Use of terrain					
f. Organic weapon usage					
g. Supporting fire usage					
h. Command & control					
i. Gunnery/ marksmanship					

2. To what extent do you perceive the MILES Collective Training System* as diagnosing weaknesses in the following areas. (Check one per item)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Issuance of order					
d. Movement					
e. Use of terrain					
f. Organic weapon usage					
g. Supporting fire usage					
h. Command & control					
i. Gunnery/ marksmanship					

*NOTE: The collective Training System consists of the controllers and information gathering network necessary to conduct the After Action Review.

OT 210 Questionnaire #517

3. To what extent do you perceive MILES equipment as providing diagnostic information on strengths (i.e., less need to train in these areas)? (Check one per item)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

4. To what extent do you perceive the MILES Collective Training System diagnosing strengths (i.e., less need to train in the following areas)? (Check one per item)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

The following questions pertain to "out of your hide" costs of using the MILES equipment. In other words, if your unit were to receive MILES equipment in the future, how expensive/inexpensive would you regard it in the following areas?

---

5. What are the perceived installation/removal costs in personnel?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

6. What are the perceived installation/removal costs in time?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

7. What are the perceived installation/removal costs in equipment/material?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

8. What are the perceived maintenance costs of the MILES equipment in terms of personnel?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

9. What are the perceived maintenance costs of the MILES equipment in terms of time?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

OT 210 Questionnaire #517

10. What are the perceived maintenance costs of the MILES equipment in terms of equipment?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

11. What are the perceived operating costs of the MILEs equipment in terms of personnel?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

12. What are the perceived operating costs in terms of time (i.e., how long does it take to learn something with MILES)?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

13. What are the perceived operating costs in terms of equipment (i.e., support vehicles, etc.)?

_____ Very expensive
_____ Expensive
_____ Borderline
_____ Inexpensive
_____ Very inexpensive

14. How much positive training does the MILES equipment provide company commanders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

15. How much positive training does the MILES equipment provide platoon leaders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

OT 210 Questionnaire #517

16. How much positive training does the MILES equipment provide squad leaders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

17. How much positive training does the MILES equipment provide individuals/crews? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Movement	____	____	____	____	____
d. Use of terrain	____	____	____	____	____
e. Organic weapon usage	____	____	____	____	____
f. Supporting fire usage	____	____	____	____	____
g. Gunnery/ marksmanship	____	____	____	____	____

18. How much negative training does the MILES equipment provide Company Commanders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Issuance of order					
d. Movement					
e. Use of terrain					
f. Organic weapon usage					
g. Supporting fire usage					
h. Command & control					
i. Gunnery/ marksmanship					

19. How much negative training does the MILES equipment provide platoon leaders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Issuance of order					
d. Movement					
e. Use of terrain					
f. Organic weapon usage					
g. Supporting fire usage					
h. Command & control					
i. Gunnery/ marksmanship					

OT 210 Questionnaire #517

20. How much negative training does the MILES equipment provide squad leaders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Issuance of order					
d. Movement					
e. Use of terrain					
f. Organic weapon usage					
g. Supporting fire usage					
h. Command & control					
i. Gunnery/ marksmanship					

21. How much negative training does the MILES equipment provide individuals/crews? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Movement					
d. Use of terrain					
e. Organic weapon usage					
f. Supporting fire usage					
g. Gunnery/ marksmanship					

OT 210 Questionnaire #517

22. How much positive training does the Collective Training System provide Company Commanders? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

23. How much positive training does the Collective Training System provide platoon leaders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

24. How much positive training does the Collective Training System provide squad leaders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Issuance of order					
d. Movement					
e. Use of terrain					
f. Organic weapon usage					
g. Supporting fire usage					
h. Command & control					
i. Gunnery/ marksmanship					

25. How much positive training does the Collective Training System provide individuals/crews in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Issuance of order					
d. Movement					
e. Use of terrain					
f. Organic weapon usage					
g. Supporting fire usage					
h. Command & control					
i. Gunnery/ marksmanship					

OT 210 Questionnaire #517

26. How much negative training does the Collective Training System provide Company Commanders? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

27. How much negative training does the Collective Training System provide platoon leaders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Issuance of order	____	____	____	____	____
d. Movement	____	____	____	____	____
e. Use of terrain	____	____	____	____	____
f. Organic weapon usage	____	____	____	____	____
g. Supporting fire usage	____	____	____	____	____
h. Command & control	____	____	____	____	____
i. Gunnery/ marksmanship	____	____	____	____	____

OT 210 Questionnaire #517

28. How much negative training does the Collective Training System provide squad leaders in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Issuance of order					
d. Movement					
e. Use of terrain					
f. Organic weapon usage					
g. Supporting fire usage					
h. Command & control					
i. Gunnery/ marksmanship					

29. How much negative training does the Collective Training System provide individuals/crews in the following? (Check one per area)

	Very great extent	Great extent	Only Somewhat	Very little	Practically not at all
a. Reconnaissance					
b. Planning					
c. Movement					
d. Use of terrain					
e. Organic weapon usage					
f. Supporting fire usage					
g. Gunnery/ marksmanship					

30. How satisfactory is the MILES equipment for training?

_____ a. very satisfactory
_____ b. satisfactory
_____ c. borderline
_____ d. unsatisfactory
_____ e. very unsatisfactory

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31. How satisfactory is the MILEs Collective Training System for training?

_____ a. very satisfactory
_____ b. satisfactory
_____ c. borderline
_____ d. unsatisfactory
_____ e. very unsatisfactory

---

32. If MILES were put in your battalion, how many days of MILES field training would you predict each company to get during a training cycle.

_____ a. very satisfactory
_____ b. satisfactory
_____ c. borderline
_____ d. unsatisfactory
_____ e. very unsatisfactory

USER ACCEPTANCE

DATE: _____

POSITION NO.: _____

NAME: _____ RANK: _____
(Last) (First) (MI)

DUTY POSITION/TITLE: _____

SECTION/ELEMENT _____

INSTRUCTIONS

This questionnaire will be filled out after completion of each phase. We are interested in obtaining your views of the training you have just received. Check one item for each question. If you have additional comments feel free to write in the margins or on the comments page provided at the end of the questionnaire.

1. How realistic were the kill capabilities of your direct fire weapons?

   _____ a. Very realistic

   _____ b. Realistic

   _____ c. Borderline

   _____ d. Unrealistic

   _____ e. Very unrealistic

2. How realistic were the kill capabilities of your support weapon?

   _____ a. Very realistic

   _____ b. Realistic

   _____ c. Borderline

   _____ d. Unrealistic

   _____ e. Very unrealistic

OT 210 Questionnaire #514

3. Rate how realistically you could be killed by MILES direct fire weapons.

_____ a. Very realistic

_____ b. Realistic

_____ c. Borderline

_____ d. Unrealistic

_____ e. Very unrealistic

4. Rate how realistically you could be killed by MILES indirect fire.

_____ a. Very realistic

_____ b. Realistic

_____ c. Borderline

_____ d. Unrealistic

_____ e. Very unrealistic

5. How realistic is the pace (speed of movement) during the battle?

_____ a. Very realistic

_____ b. Realistic

_____ c. Borderline

_____ d. Unrealistic

_____ e. Very unrealistic

6. To what extent did the MILES system provide training/learning in the following areas (check one per item)

	Very great extent	Great extent	Only somewhat	Very little	Practically not at all
a. Reconnaissance	_____	_____	_____	_____	_____
b. Planning	_____	_____	_____	_____	_____
c. Movement	_____	_____	_____	_____	_____
d. Use of terrain	_____	_____	_____	_____	_____
e. Use of organic weapon	_____	_____	_____	_____	_____
f. Use of support weapon	_____	_____	_____	_____	_____

7. To what extent did the MILES system permit or encourage <u>improper</u> procedures and practices in the following areas (check one per item).

	Very great extent	Great extent	Only somewhat	Very little	Practically not at all
a. Reconnaissance	____	____	____	____	____
b. Planning	____	____	____	____	____
c. Movement	____	____	____	____	____
d. Use of terrain	____	____	____	____	____
e. Use of organic weapon	____	____	____	____	____
f. Use of support weapon	____	____	____	____	____

8. How would you rate your ability to perform an attack following MILES training?

____ a. Very much better

____ b. Much better

____ c. About the same as before

____ d. Much worse

____ e. Very much worse

9. Compared to the normal unit training your unit conducts, do you feel that MILES is

____ a. Much less effective

____ b. Somewhat less effective

____ c. About the same in training effectiveness

____ d. Some more effective

____ e. Much more effective

OT 210 Questionnaire #514

10. How would you rate your units' state of training for combat before the MILES exercises?

_____ a. Highly trained

_____ b. Adequately trained

_____ c. Minimally trained

_____ d. Poorly trained

_____ e. Untrained

11. How would you rate your units' state of training after the MILES exercises?

_____ a. Highly trained

_____ b. Adequately trained

_____ c. Minimally trained

_____ d. Poorly trained

_____ e. Untrained

12. How would you rate your units' ability to conduct a deliberate attack before the MILES exercises?

_____ a. Highly trained

_____ b. Adequately trained

_____ c. Minimally trained

_____ d. Poorly trained

_____ e. Untrained

13. How would you rate your units' ability to conduct a deliberate attack after the MILES exercises?

_____ a. Highly trained

_____ b. Adequately trained

_____ c. Minimally trained

_____ d. Poorly trained

_____ e. Untrained

OT 210 Questionnaire #514

14. To what extent has the training exercise improved your ability to perform your combat duties well?

_____ a. To a very great degree

_____ b. To a great degree

_____ c. To some degree

_____ d. To a slight degree

_____ e. To a very slight degree

15. How important is the job you are doing in the Army?

_____ a. Very unimportant

_____ b. Unimportant

_____ c. Neither unimportant or important

_____ d. Important

_____ e. Very important

16. All in all how satisfied are you with the job you are doing in the Army?

_____ a. Very satisfied

_____ b. Satisfied

_____ c. Neither satisfied or dissatisfied

_____ d. Dissatisfied

_____ e. Very dissatisfied

17. Compared to a regular FTX, a MILES exercise is

_____ a. Very much better training

_____ b. Much better training

_____ c. Neither better or worse

_____ d. Worse training

_____ e. Very much worse

OT 210 Questionnaire #514

COMMENTS

Use this sheet to clarify any question or to express your views on any part of the MILES equipment or the training program you have just completed.