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THE USE OF PC BASED SIMULATION SYSTEMS IN THE TRAINING OF ARMY
INFANTRY OFFICERS – AN EVALUATION OF THE RAPID DECISION TRAINER.

by

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A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Science
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in the College of Engineering and Computer Science
at the University of Central Florida
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ABSTRACT

This research considers two modes of training Army infantry officers in initial training to conduct a platoon live fire exercise. Leaders from groups that were training with the current classroom training methods were compared to leaders from groups whose training was augmented with a PC based training system known as the Rapid Decision Trainer (RDT). The RDT was developed by the US Army Research Development and Engineering Command for the purpose of aiding in the training of tactical decision making and troop leading procedures of officers in the initial levels of training to become rifle platoon leaders. The RDT allows the leader in training to run through platoon level operations prior to live execution in a simulated combat environment. The focus of the system is on leadership tasks and decision making in areas such as unit movement, internal unit communication and contingency planning, and other dismounted infantry operations. Over the past year, some Infantry Officer Basic Course platoons at Ft. Benning have used the RDT in an experimental manner. Anecdotal evidence suggests that the system is beneficial in training IOBC officers. The Army Research Institute (ARI) conducted a preliminary evaluation of the RDT in March 2005 (Beal 2005). However, no quantitative measures were used in the evaluation of the RDT, only subjective evaluations of the users. Additionally, there were no formal evaluations by the training cadre, only the users themselves. This experiment continues the work of ARI and uses qualitative and quantitative data from both users and the evaluating cadre. In this experiment, the effectiveness of the RDT was evaluated through measuring leader behaviors and personal preferences. Three measurement approaches were used; (1)

quantitative performance measures of leader actions, (2) qualitative situational awareness and evaluations of inclusion in the non leader players, and (3) a qualitative evaluation of the system's usability and effectiveness by system users. Analysis reveals statistically significant findings that challenge the current norms.

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TABLE OF CONTENTS

LIST OF FIGURES	ix
LIST OF TABLES	x
LIST OF ACRONYMS/ABBREVIATIONS	xi
CHAPTER ONE: BACKGROUND	1
1.1 Simulation Definitions:	1
1.2 Simulation in Military Training	2
Proliferation of Virtual Training in the Army	2
1.3 Research Gap	4
CHAPTER TWO: LITERATURE REVIEW	5
2.1 The Rapid Decision Trainer	5
Purpose of the RDT	5
Development of the RDT	6
Griswold Range Live Fire Exercise	7
Functionality of the RDT	9
2.2 ARI Study (2005)	13
2.3 The Use of PC games for Military Training	14
Current Ideology Regarding PC Games for Training	14
Fidelity Requirements in Dismounted Infantry Training	15
Techniques for Training with PC Games	17
CHAPTER THREE: METHODOLOGY FOR EVALUATING THE RDT	19
3.1 Participants	19

3.2 Task.....	19
3.3 RDT Training.....	20
System Training.....	20
Group Training and Discussion	21
Buddy Team RDT Training.....	22
3.4 Post RDT Training Questionnaire	22
3.5 Live Fire Exercise Training Event.....	23
Performance Evaluations	23
3.6 Post Live Fire Questionnaire	25
3.7 Experimental Design.....	26
Primary Learning Null Hypothesis: Non-Leader Inclusion.....	26
Secondary Learning Null Hypothesis: Leader Performance Measures	26
Equipment Hypothesis	26
CHAPTER FOUR: FINDINGS.....	28
4.1 Conduct of the Experiment.....	28
4.2 Summary of Results.....	28
The primary learning Null Hypothesis (Non-Leader Inclusion).....	30
Evaluations and Comparisons.....	30
Self Assessment Control Group vs. RDT, Post Training/ Prior to LFX -	
Evaluations and Comparisons:.....	30
Self Assessment Control Group vs. RDT, Post LFX - Evaluations and	
Comparisons	32
Secondary Learning Null Hypothesis: Leader Performance Measures	37

Peer Evaluations of Platoon Leaders in Live Fire Exercise.....	37
Cadre Evaluations of Platoon Leaders in Live Fire Exercise	37
Equipment Hypothesis	38
RDT System Evaluations.....	38
4.3 Discussion of Results.....	40
Primary Learning Null Hypothesis (Non-Leader Inclusion)	40
Post Training Evaluations and Comparisons	40
Post LFX Evaluations and Comparisons	43
Secondary Learning Null Hypothesis (Leader Performance).....	45
Performance Measure Comparisons	45
Equipment Hypothesis	45
CHAPTER FIVE: CONCLUSIONS	48
5.1 Result Summary.....	48
5.2 Limitations of Study	49
5.3 Lessons Learned.....	51
5.4 Future Research Areas	52
APPENDIX A: PRE- TRAINING QUESTIONNAIRE.....	54
APPENDIX B: RDT POST TRAINING QUESTIONNAIRE.....	56
APPENDIX C: CONTROL GROUP POST LFX QUESTIONNAIRE.....	65
APPENDIX D: POST LFX RDT QUESTIONNAIRE	68
APPENDIX E: POST TRAINING QUESTIONNAIRE (CONTROL GROUP).....	71
APPENDIX F: SCALED PERFORMANCE MEASURES FOR LEADERS	75
LIST OF REFERENCES.....	89

LIST OF FIGURES

Figure 1: Griswold Range Live Fire Concept Sketch.....	9
Figure 2: RDT Planning Phase Menu and Concept Sketch	10
Figure 3: Sample message to platoon leader from friendly SAF agents.....	11
Figure 4: Platoon leader orders to SAF depicted on a concept sketch map.....	11
Figure 5: RDT Assessment Phase Screen Shot.....	12
Figure 6: RDT Simulated Environment.....	16
Figure 7: Sequence of events and data collection points	27
Figure 8: RDT Classroom and Buddy Team Training.....	29
Figure 9: Control group platoon leader pauses to send orders to squads via radio in LFX.	36
Figure 10: RDT platoon leader issues orders after enemy contact in LFX.	36

LIST OF TABLES

Table 1: Griswold Range Live Fire Target Sequence.....	8
Table 2: Pre-study Questionnaire Summary	29
Table 3: Results Summary of Training Preparedness, Post Training, Pre-LFX: Control Group vs. RDT (Likert Scale).....	31
Table 4: Results Summary of Overall Opinion of Training, Pre-LFX: Control vs. RDT (Yes/ No).....	32
Table 5: Result Summary of Inclusion in LFX: Control Group vs. RDT (Post LFX)	33
Table 6: Result Summary of Overall Opinion of Training, Post LFX: Control Group vs. RDT (Averages).....	34
Table 7: Descriptive Statistics and Single Sample Wilcoxon Sign Test for RDT Group Overall Training Preparedness (Post LFX).....	35
Table 8: Result Summary of Peer Performance Evaluation of the Platoon Leader Post LFX: Control Group vs. RDT.....	37
Table 9: Result Summary of Cadre Performance Evaluations of the Platoon Leader Post LFX: Control Group vs. RDT.....	38
Table 10: Results Summary of RDT System Interaction Evaluation (7 pt Scale).....	39
Table 11: Results Summary of RDT System Realism (5 pt Scale)	40
Table 12: Overall Opinion of Training Post Training vs Post LFX (Percent Responding YES).....	42
Table 13: Fisher Exact Test for Overall Opinion of Training, Post Training Vs Post LFX (Results relative to Data from Table 12).....	43

LIST OF ACRONYMS/ABBREVIATIONS

AAR	After Action Review
ARI	Army Research Institute
COTS	Commercial Off The Shelf
DoD	Department of Defense
IOBC	Infantry Officer Basic Course
LFX	Live Fire Exercise
LT	Lieutenant
M&S	Modeling and Simulation
MTP	Mission Training Plan
NCO	Non-Commissioned Officer
PC	Personal Computer
PL	Platoon Leader
PLT	Platoon
PSG	Platoon Sergeant
RDECOM	Research Development and Engineering Command
RDT	Rapid Decision Trainer
ROTC	Reserve Officer Training Corps
RTO	Radio Telephone Operator (Radio Man)
SL	Squad Leader
TNG	Training
USAIS	United States Army Infantry School

CHAPTER ONE: BACKGROUND

1.1 Simulation Definitions:

For centuries, live training has been the cornerstone of military preparedness. Live training consists of real soldiers operating real vehicles in a tactical environment for the purpose of training a specific task or set of tasks. Most soldiers, leaders and analysts argue that live training is the best type of training to the direct correlation of training to real world tasks, and high transferability of training efforts. However, live training takes large amounts of time, people, money, land, and resources. Live training usually involves great long range planning efforts, detailed safety analysis, and high levels of over watch by leaders. For these reasons, the DoD must look for ways to simplify the training process.

At one end of the spectrum, live training prepares soldiers for battle by firing weapons as they move through a training course or facility. At the opposite end of the spectrum are two types of computer-based training: constructive and virtual training. “Constructive training uses computer programs to train military personnel in military tactics and situational response” (Welsh 2005). “It refers to a simulation involving simulated people operating in simulated systems. Real people stimulate such simulations but are not involved in determining the outcomes” (Page 1998).

Virtual training creates a replica of the weapon systems or command or operation center that looks, feels and operates like the actual equipment (Welsh 2005). “A simulation involving real people operating simulated systems. Virtual simulations inject human-in-the-loop in a central role by exercising motor control skills (e.g., flying an airplane), decision skills

(e.g., committing fire control resources to action), or communication skills (e.g., as members of a C4I team)” (DoD 1998).

“Virtual M&S provide understanding of human reactions and decision processes and human-machine interfaces. Output supports initial and early user evaluation. Virtual M&S provides a platform for crew training prior to live exercises and tests, or realistic mission rehearsal in preparation for actual combat operations” (Rodriguez 2003). In short, the military is not looking to eliminate nor reduce the use of live training. Instead, simulation and virtual training can be used to augment live training. Soldiers can use virtual training to become better prepared to execute their limited live training opportunities, thus making live training more effective. In addition, when live training is limited due to monetary, time or operational constraints, simulation systems can possibly fill the training gap.

1.2 Simulation in Military Training

Proliferation of Virtual Training in the Army

In order to improve the effectiveness and efficiency of training at all levels, the Army is looking to make use of simulations in training its units and leaders. One approach, emphasizing a low cost, low impact manner, is for the Army to leverage the use of PC based training system as well as gaming technology in many areas. “Because budgets for collective training are tight, one common objective is to maintain and raise performance by acquiring comparatively less expensive distributed-simulation training systems to lessen the need for more expensive field training” (Erwin 2000; Proctor 2000). As the US Army and other Department of Defense (DoD)

services continue to have less availability of time and money for training, they must continue to find ways to make the most effective and efficient use of the training resources that are available.

Due to decreased time in grade at each rank, (caused by a more rapid promotion system) leaders are spending less time in formal school houses and more time in their actual units learning from experience in the field. Additionally, specialty training units are constantly being faced with decreased funds, personnel and time. Therefore, any efficiencies that can be gained in school house training is desirable. Should the methodology of using PC based simulations prove to be beneficial in the training environment, it may then be pushed into the operational force for use in training for real world tactical operations in a near limitless number of scenarios.

Through the use of virtual simulation it becomes possible to focus smaller amounts of money, time and effort directly on lower level units for the purpose of training more specific tasks. Improvements in simulation technologies have enabled the development of networked simulations which seem to provide a reasonable substitute for collective training in the field (Boldovici 2002). These improvements over the past few years have made it increasingly possible for developers to create virtual environments with enough fidelity to simulate the required level to train individual tasks and small unit behaviors. Prior to these developments, computing limitations such as processors and graphics cards limited the scope of simulation to large scale constructive simulation using basic mathematical algorithms.

As computing power and graphic generations improve so do the perceived quality of simulated virtual environments. Simulations of live training environments (such as ranges and maneuver areas) can now be built/ generated in a simulation program that can be pushed down to be conducted at the unit level, reducing the need for large scale installation simulation centers for some training tasks. Currently the Army is conducting studies on the use of virtual training in

areas of medical evaluation, mission planning, intelligence gathering, vehicle gunnery, aviation training, vehicle systems, infantry tactics, the military decision making process, and communication systems (Green 2005). With this proliferation of technology, the question then becomes: For what tasks can we best use virtual training and how detailed must these simulations be in order to be effective?

1.3 Research Gap

While many military organizations are currently working to develop and field virtual training systems to units and training centers in the field, few do so with adequate evaluations of the training abilities of the individual systems. Many systems developed by Army research organizations are fielded for the purpose of proof of concept or to show off a specific capability. This study will evaluate one such system, The Rapid Decision Trainer (RDT), in order to determine how well this PC based virtual simulation can be used to prepare dismounted infantry platoon leaders for the conduct of a live fire training exercise. The results of this study will benefit the Army Research Development and Engineering Command, The US Army Infantry Training Center and possibly guide the development of future similar systems.

CHAPTER TWO: LITERATURE REVIEW

2.1 The Rapid Decision Trainer

Purpose of the RDT

The Rapid Decision Trainer was developed as a training tool for the cadre of the Infantry Officer Basic Course to assist in the development of tactical decision making and troop leading procedures at the infantry platoon level. “The IOBC-RDT is a low-cost, PC-based, virtual training simulation that was created to better train and prepare infantry second lieutenants to participate in the squad- and platoon-level, live-fire training exercises conducted during the 16-week, Infantry Officer Basic Course” (Pike 2005).

The decision making and troop leading procedures contained within the live fire exercise are a small microcosm of the types of scenarios that an infantry platoon leader will face in his future operational units in training or combat. While the RDT was designed specifically to prepare Lieutenants for the decisions and procedures in the live fire exercise, the types of decisions they train will carry over throughout their military career as an infantry officer.

Resource constraints, principally time, severely constrain the number of students who have the opportunity to assume key leadership roles and demonstrate their knowledge of key doctrinal principles during an IOBC live-fire exercise. Each platoon consists of twenty future platoon leaders. However, there is only a single iteration of the platoon live fire exercise per platoon per training cycle. While this is the capstone exercise for the course, (including the tactical procedures as well as leader training) only five students get to hold leadership positions.

Only one gets to practice the role of platoon leader (the purpose of the IOBC). The others play the roles of the led enlisted soldiers. The RDT “makes it possible for all IOBC students to play one of the key leadership roles (squad leader during a squad exercise and platoon leader in the platoon exercise) in the virtual environment and to do so during several iterations of the same scenario. This new capability provides each student with an opportunity to develop and demonstrate their knowledge of the key principles in a standard training environment”(Pike 2005).

Development of the RDT

The US Army Research, Development, and Engineering Command (RDECOM) Simulation and Training Technology Center (STTC) in Orlando, FL and the 11th Infantry Regiment cooperatively developed the RDT over a two year period from 2004 to 2005. The RDT was, and is, first and foremost an applied research effort. The STTC’s primary goal was to explore how a game engine-based simulation could assess student performance beyond the typical “shoot a bad guy, get a point” metric of entertainment games. The RDT’s assessment engine uses approved doctrine and TTPs. Furthermore, the STTC wanted to explore how student performance data could be presented in a useful format to both students and instructors. The primary software developer for the RDT was General Dynamics (formerly Veridian) Advanced Information Systems in Orlando, FL (Pike 2005).

The current version of the RDT contains training scenarios for the squad level live fire exercise as well as the platoon level exercise. These exercises focus on differing levels of coordination and decision making and take place during two different phases of the sixteen week

IOBC. The two scenarios within the RDT are independent of each other. Conduct of both exercises is not required. For the purpose of this evaluation only the platoon level exercise will be considered.

Griswold Range Live Fire Exercise

The live fire exercise is conducted by the 11th Infantry Regiment, Fort Benning, Georgia. This unit is responsible for the initial training of infantry Second Lieutenants in the Army. As discussed previously, each platoon performs one live iteration of the event after conducting one walkthrough. The live fire exercise is a simulated platoon attack on an enemy position with the use of live (real) ammunition.

The platoon attack is conducted in a constrained environment within the confines of the Griswold Range. The attack is broken down into a series of targets associated with various decision points and associated enemy actions. These phases (target sequence) are broken down in Table 1. An aerial photo of the range complex with corresponding diagrams of the platoon's planned actions is displayed in Figure 1. The photo in Figure 1 displays the tactical overlay containing the platoon's operational scheme of maneuver. For safety purposes the scheme of maneuver will be the same for all platoons conducting the live fire regardless of their interaction with the RDT.

Table 1: Griswold Range Live Fire Target Sequence

Event #	Description and Action
1	Targets Set A up, LPOP Single Kill
2	Target Set B1, B2 and D up for Support By Fire, Multiple kills and resets
3	Asslt 1 & 2 move to assault position event #2 targets stay up
4	Asslt 1 & 2 in assault position. (Begin moving forward Step C &F with pneumatic gun, event 2 targets stay up)
5	Asslt reaches shift fire trigger. PL initiates shift signal (step B1 & Bs down), (Step C,D,F up) SBF shifts fires and confirms.
6	Asslt 1&2 IMT forward to cease fire trigger. PL initiates cease fire signal. SBF ceases fire, Step C,D,F down; B2 and G up
7	Asslt 1 and 2 IMT forward and cross road. (Step E1,E2, D up & B2,G down)
8	LOA (all targets down)
9	Consolidation/ counter attack (step E1& E2 up)
10	Counter attack destroyed (step E1 & E2 down)
11	Move to shoot house and assault as required (no mechanical targets)

Students receive their orders the night prior to the engagement, just as they likely would in a real environment. The lieutenants will develop their plan for the attack on their own and will come prepared the next morning to issue orders and conduct the assault. After conducting a walkthrough and practice “blank fire” (blank ammunition), the platoon will conduct the exercise under the supervision of the cadre and trained range safety personnel.

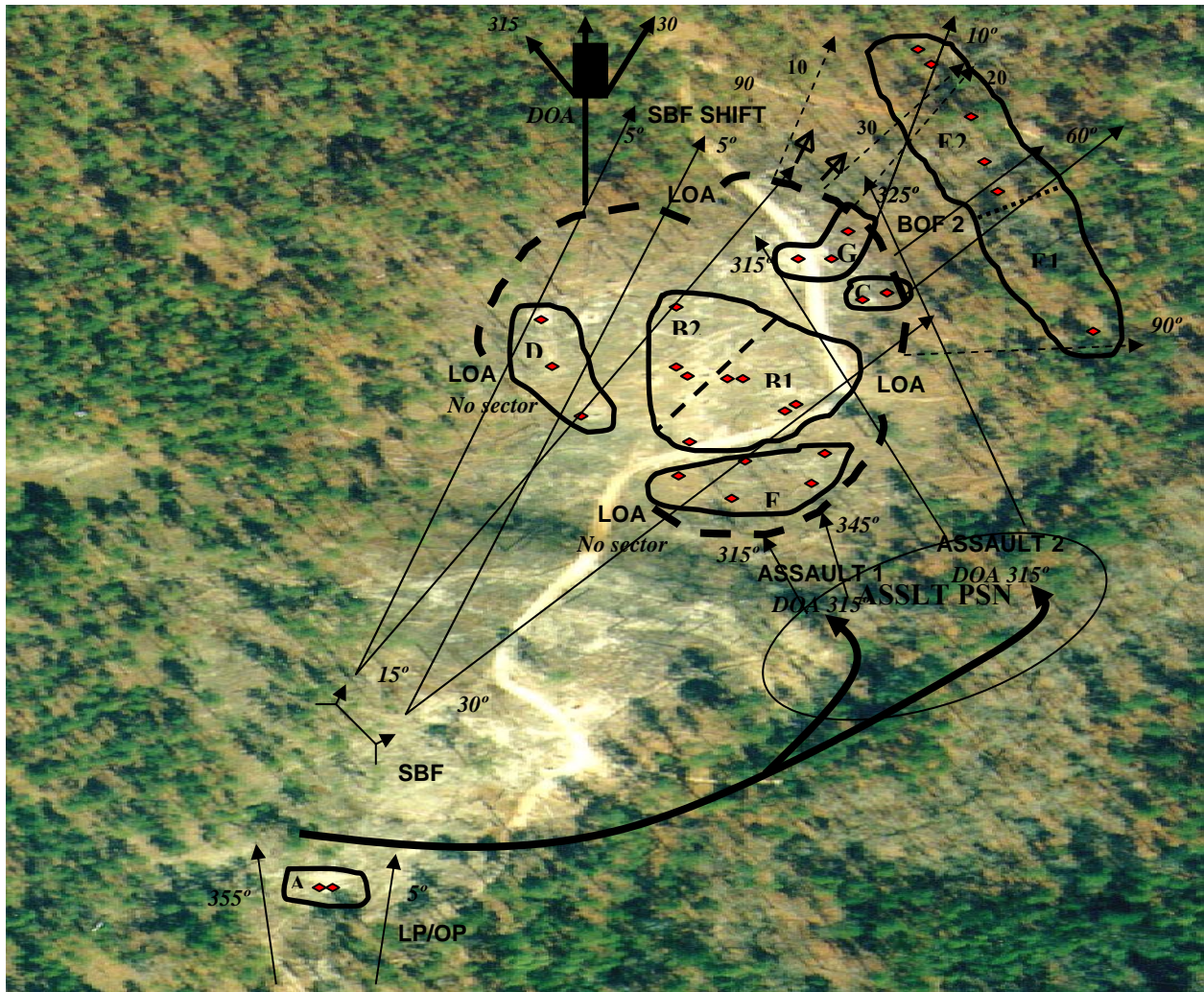


Figure 1: Griswold Range Live Fire Concept Sketch

Functionality of the RDT

The RDT contains functionality in three distinct phases of the operation. Phase One is the planning phase. During this phase, students are given the opportunity to read their orders and create orders for their subordinate units. These actions include determining the composition and location of units, signaling and reporting procedures, and creation of map overlays and indirect

fire support. During this phase students may select actions from various pull-down menus and enter their choices of actions. The main planning menu is depicted in Fig 2 below. From this menu students can go to submenus such as signal, fire support plan, and pre-combat inspections.

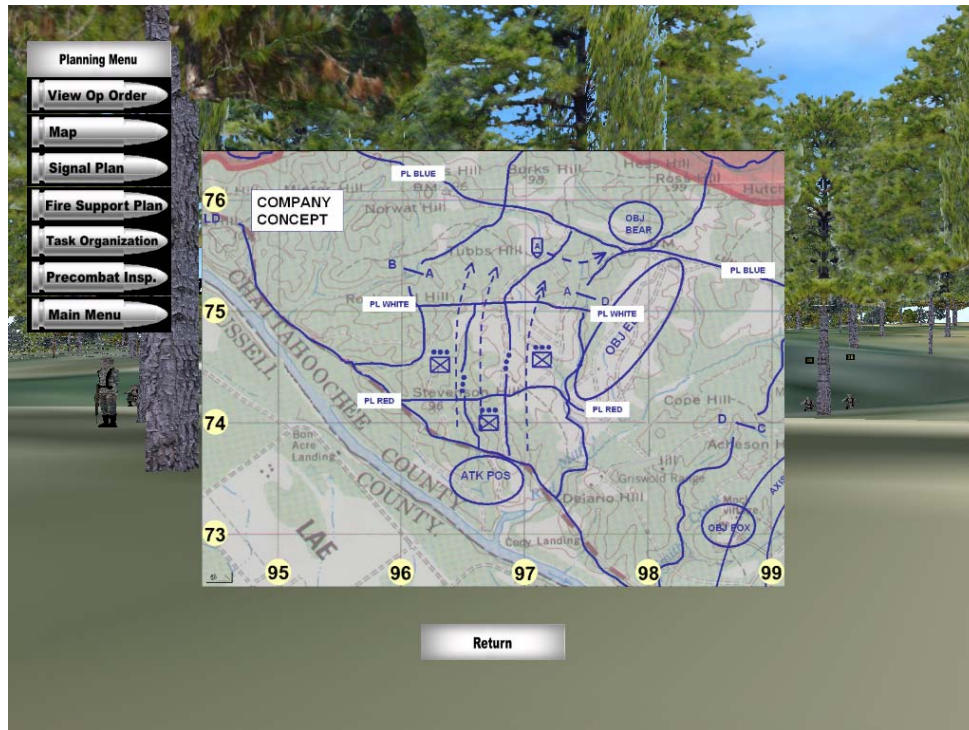


Figure 2: RDT Planning Phase Menu and Concept Sketch

While navigating the planning menu, students will be asked to type their orders in some blocks and make menu selections in others. All of these actions will be recorded and evaluated later in the assessment phase.

Phase Two is the execution phase. Students maneuver within the simulated environment and conduct their assault mission and react to enemy contact drills. While interfacing with the RDT, students can issue orders to subordinate units, send signals, review their maps, check position of self with simulated GPS, observe through binoculars, and other functions. When the semi-autonomous agents who compose the platoon encounter enemy activity, they will report

and provide the leader with the opportunity to make adjustments to the plan and issue new orders. A sample message from first squad is displayed below in Figure 3. Figure 4 then depicts the follow orders created by the platoon leader on a concept sketch.



Figure 3: Sample message to platoon leader from friendly SAF agents



Figure 4: Platoon leader orders to SAF depicted on a concept sketch map

Phase Three is the Assessment Phase. During this phase, students are evaluated on a series of GO/ NO-GO criteria by an automated assessment. This is simply a measurement of whether or not a task was performed. The students' written answers are solicited at several points during the exercise, for their review later. For example, when a student orders his squads to adjust their actions, the RDT will provide a text box for the student to enter his rationale for, and steps involved in, adjusting the scheme of maneuver. Through self-assessment the student can then compare his answers with those that are provided by the system as the "approved solution" or "textbook" answer (approved solution provided by actual IOBC platoon trainers).

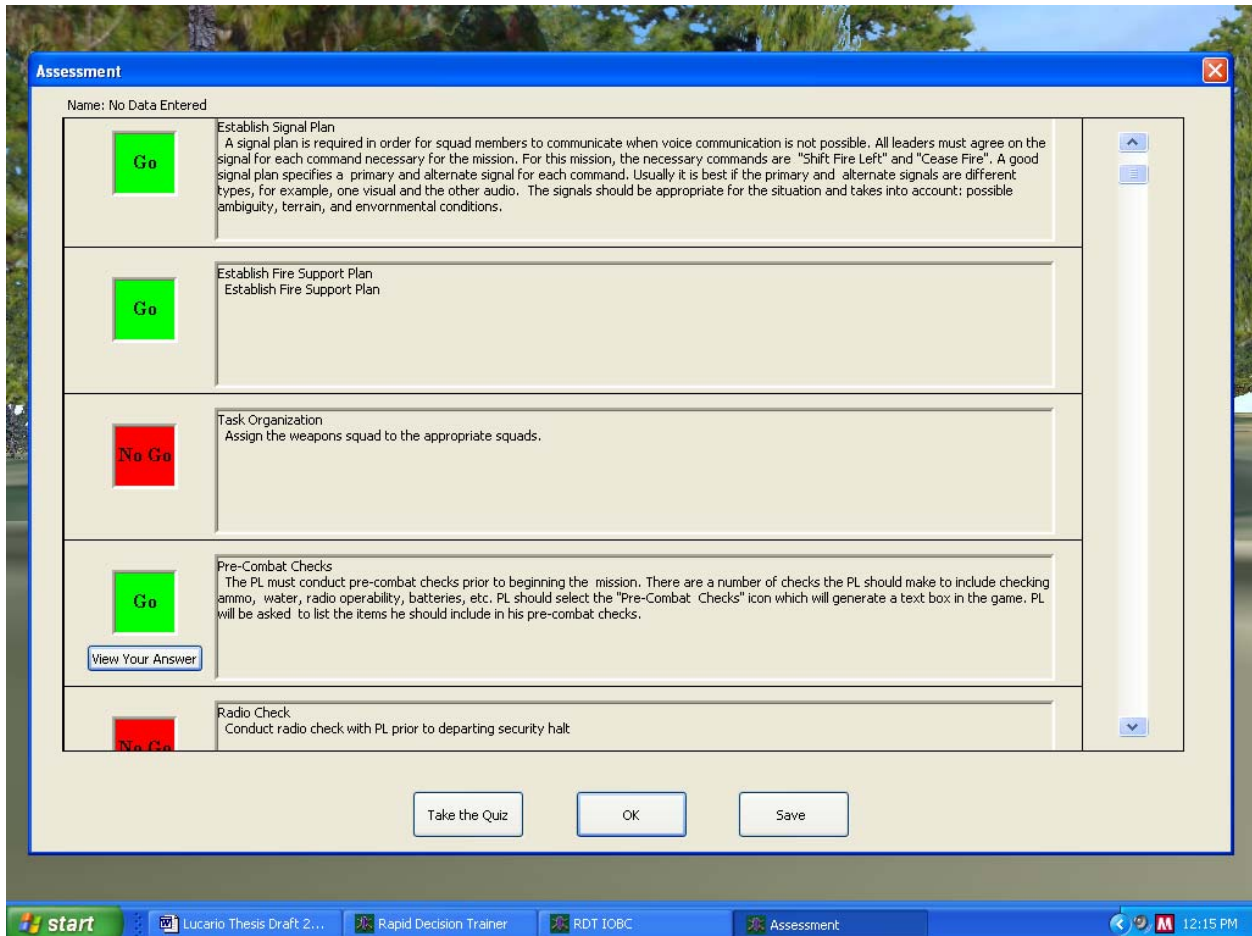


Figure 5: RDT Assessment Phase Screen Shot

2.2 ARI Study (2005)

The Army Research Institute at Ft. Benning, Georgia conducted a study on the perceptions of the Rapid Decision Trainer from September 2003 to October 2004 in conjunction with the IOBC. The primary purpose of the study was to help determine the effectiveness of PC based training systems for the US Army Infantry School. More specifically, the study focused on methods for the conduct of training with the RDT. While measures were taken on students perceptions of and motivations for training with the RDT, there was not a focus on performance increases due to the RDT (Beal 2005).

Nineteen Lieutenants were assigned to train in one large group, while twenty Lieutenants were assigned to train on the RDT in two man buddy teams. Following the RDT training, students conducted the live fire exercise. Students were given both pre and post live fire exercise questionnaires evaluating their perceptions.

The ARI study's primary findings were that students perceived training values in the RDT regardless of the training condition (group or buddy team). Most lieutenants reported that they were motivated to use the RDT, and that they believed their experience helped them to prepare to lead a platoon in their subsequent assignment (Beal 2005).

Additional findings concluded that there was a requirement for: a) a qualified instructor should be present while the RDT is used, b) high levels of fidelity between events and activities in the RDT simulated environment and those in the live exercise, c) entertainment or fun as a factor for students to train using the RDT, and d) individual trainees interface directly with the simulated RDT mission to achieve optimal training outcome.

2.3 The Use of PC games for Military Training

Current Ideology Regarding PC Games for Training

Military training organizations around the world have acknowledged the potential for gaming systems to assist in military training, experimentation, and decision support (Morrison 2004). A variety of experiments have found that COTS simulators, both individual PC based, and massive multiplayer games have proven to be beneficial (Morrison 2004; Hussain 2005; Eastman 2002) for a variety of military applications. Despite the success of these systems, many military leaders remain skeptical of the idea of replacing valuable live training with “playing a computer game”. As studies continue to show the value of augmenting live training with simulations we will continue to see a rise in their application.

An article in National Defense Magazine incorporates various views of industry leaders (military and commercial) regarding the use of PC based games for training. General James L. Jones, Commandant of the Marine Corps, said in a November 2000 interview that “Ideally there should be a balance between simulation based and live training both. I think simulation can do an awful lot for learning the basics. But there is nothing like getting out there and doing it in real life” (Erwin 2000). This idea is something that is shared by most military leaders and soldiers. While some tasks can be trained via simulation, others require live training, at least as a culminating exercise. While the “basics” can be learned in the simulation, the live experience will often tie the learning together in order to enhance transfer into the actual task when performed in a combat environment.

Over the last few years, the commercial gaming industry has invested millions of dollars in the realm of image generation and various functionalities. "PC-based video games have come so far in the quality of the imagery, that they rival multi-million dollar Defense Department simulators," Warrant Katz (CEO of Mak Technologies) said in an interview. Most games have splashy graphics and are fun to play, he noted, but "they don't [necessarily] exercise the training skills that you need." It still is financially a good deal for the Pentagon because it can benefit from the development work that commercial firms already have funded (Erwin 2000). There are many financial advantages to incorporating commercial systems and letting industry absorb the many R&D costs.

Fidelity Requirements in Dismounted Infantry Training

Those who oppose the use of video game technology for training are not necessarily proponents for 100% live training. Some believe that full fidelity simulators are the key to successful simulation training. Many believe that a PC based simulation can not produce the realism or replication of the real world in the simulation that is required to truly train military tasks. This opposition is based on the idea that maximum replication equals maximum effectiveness. "Video games are video games," said John Lenyo, vice president for business development at BAE Systems Flight Simulation and Training, in Tampa, Fla. "The reason you can do a game on a PC but you need a full-fledged simulator to do a simulator is the computer power isn't there, and there are shortcuts everywhere to make it fit on a PC. Huge shortcuts," he said in an interview. Video games are about eye-hand coordination, he noted. "There are benefits, but they are not a replacement" for real simulators. A \$29 game "will never be like a

\$29 million simulator," said Lenyo. "The reason it costs \$29 million is because it is much more sophisticated (Erwin 2000). While many soldiers perceive that full fidelity simulation is "needed" for quality training, studies have shown that more is not always better.



Figure 6: RDT Simulated Environment

While high fidelity simulations do have their place in the training of detailed motor skills, it appears that it is not required to have relevant training value. Morris et al. (2002) argue that "... while advanced simulations may "aid" in the process of human immersion, the variance associated with degree of immersion has repeatedly been shown to be predominantly a function of individual responsiveness to cues and characteristics of the environment, not associated with fidelity or replicated reality" Kantowitz (Morris 2002) specifies three main elements to an experimental situation as setting representation, subject, and variable representation. He demonstrated that the need for setting representation is over stated and that transfer of the

behavior from the virtual to the real world is dependent more on the connection of individual psychological processes than on the technical measures of the realism (Kalawsky 2001).

Recently the infantry community has acknowledged that computer advances and software have largely overcome the argument that dismounted infantry simulations are technically too hard to overcome (Rodriguez 2003). While light infantry tasks are terrain and detail intensive, many image generators can easily process quality simulated environments. Army Major Wilfred Rodriguez of the Infantry Training Center states that the detailed execution of individual tasks in the virtual environment for the training of the individual soldier is not where the real value lies. Quality simulation in the dismounted infantry community comes from the simulation of scenarios that require the practice of leader development and coordination on the battlefield. Rodriguez goes on to say that the importance of simulation training in the infantry community lies in its ability to serve as a “training gate to gain certain levels of proficiency before units execute costly, rare and dangerous live training” (Rodriguez 2003).

Techniques for Training with PC Games

Dr. Jessie Chen (Consortium of Universities of the Washington Metro Area, Consortium of Post-Doctoral Fellows) noted in 2003 that military training with PC games was on the rise due to the shortage of training time available. With that in mind, she wanted to find ways to maximize the use of PC system skill training (purpose of the system) time by limiting the amount of time required to learn the gaming techniques and interface of the system (how to play the game).

The focus of the research was the analysis of two common methods of instruction in Commercial- Off- The- Shelf (COTS) gaming systems; game tips and computer based tutorials. The study found that computer based tutorials appeared to be more beneficial for motor elements such as maneuvering actions. The study also concluded that game tips contributed to higher performance in cognitive segments of the game such as setting up game plans and familiarity with the game interface. (Chen 2003)

CHAPTER THREE: METHODOLOGY FOR EVALUATING THE RDT

3.1 Participants

Two test groups will be used for the RDT evaluation performed at Ft. Benning from 9 to 19 November 2005. The RDT condition group consists of two platoons of 40 Second Lieutenants in IOBC, with the non-RDT condition group consisting two platoons of 40 Second Lieutenants. The IOBC is the first Army school that lieutenants attend in order to prepare them to move into a regular Army unit and lead infantry soldiers as platoon leaders.

3.2 Task

This experiment will be conducted at the US Army Infantry School at Ft. Benning, GA. The participants will be two platoons of Second Lieutenants assigned to the Infantry Officer Basic Course (IOBC). During a normal training cycle, each platoon will contain approximately 40 Infantry Officers. The platoons will conduct various levels of training to prepare for their culminating event which is a unit live fire exercise. In a live fire exercise, students will lead their units on a tactical military operation with the use of live ammunition. These training events are considered to be the most critical due to the need for rapid decisions and intense coordination in the unit to ensure safety of all participants. During the LFX, participants will be firing live ammunition from their individual M16 rifles and M249 and M60 automatic weapons on simulated enemy targets. (enemy targets do not fire back)

All four platoons will be from the same training company to help ensure commonality of classroom instruction methods and curriculum. Two platoons will conduct all of their training

using the current classroom and field training methods to prepare for their unit live fire exercises. This includes use of graphics on overheads, sketches, rock drills and written practical exercises. The RDT condition platoons will replace four hours of their classroom training with the use of the PC based RDT system.

3.3 RDT Training

The RDT training will be conducted in a classroom environment on 9 November 2005, with the use of several desktop computers owned by the Infantry Training Center in Building 4, Classroom 1B using RDT Version 6.0. (Figure 5) During the training, a representative from General Dynamics and the Army Research Development and Engineering Command will be present to assist with any technical issues that may arise. This will ensure that all students receive the same level of training without confounding problems due to software problems. Additionally, two members of the Ft. Benning Technical support group will be present to deal with any hardware issues associated with the physical equipment located in classroom 1B. This team will be responsible for the installation of the RDT on all of the desktops prior to the conduct of training as well.

System Training

The RDT condition platoons will begin their training with a group user tutorial conducted by the platoon trainer. The RDT does not currently contain an embedded tutorial or help functions. Thus, it is difficult for students to immediately sit down and conduct a tactical mission on the RDT without instruction. Based on Chen's 2005 study of PC based gaming systems for

training discussed earlier, a user tutorial is important for rapid learning and system usability. Therefore, platoon trainers will conduct this session prior to usage by students. During this tutorial, students will receive instruction on the use of the RDT PC based system itself. Specific functionality and user interface issues will be discussed. Students will learn how to navigate through the menus, store and retrieve written responses, manipulate the simulated friendly forces, and conduct tactical operations in the simulation.

Group Training and Discussion

Army Research Institute (ARI) determined from their 2005 iteration of training and evaluation that students perceived to have better interaction with and higher levels immersion in the RDT when a qualified instructor/ trainer was present to help encourage critical thinking and provide immediate feedback (Beal 2005). The tasks trained in the RDT are highly cognitive leadership tasks that can result in many right outcomes. Learning for this type of activity is often best trained through some combination of instruction, discussion and exercises (Proctor 2000) with other students, as well as an instructor or facilitator. Therefore when discussing the optimal instruction method for the RDT, it was determined that a platoon trainer will be present during the RDT usage to help facilitate the learning and decision making process for the trained officers. In this instance, the platoon trainers present will be infantry captains who have previously served in platoon leader jobs at operational units during combat. The trainers have a consistent relationship with the trained lieutenants and are responsible for their entire course of initial instruction as infantry officers.

The initial block of RDT instruction will be conducted over a one hour period in the Infantry Training Center's computer classrooms. The platoon trainer will select one student to run through the training exercise while the remainder of the group watches the exercise on several large screen projection televisions. The students not directly interfacing with the system will have an opportunity to interact with the system through the instructor in an interactive question and answer method along with group discussion of the game player's actions.

Buddy Team RDT Training

The second block of training will be concluded with a one hour session in which students will have the opportunity to directly interact with the system in two man buddy teams. While one student acts as the platoon leader for a given exercise, the other student will observe and act as a coach for the iteration. Upon the completion of one iteration, the students will reverse roles. Each student will have the opportunity to run through the scenario at least twice during this period. Throughout this block of instruction, the platoon trainer and several assistant trainers will be present to answer questions and mentor the students as required.

3.4 Post RDT Training Questionnaire

Finally, each student will receive a questionnaire regarding their perceptions of the RDT training that just took place. (Appendix B, adapted from ARI Study, 2005) The questionnaire consists of a series of seven point scale questions measuring the students' perceptions on level of preparedness provided, quality of training, and perceived learning. The questionnaire consists of a total of 63 questions divided into five parts. In addition, this questionnaire covers a wide range

of questions on the user interface, likeability of the system, quality of the simulated environment, functionality, solicits feedback for improvement in several areas, and evaluates the overall experience. While portions of the questionnaire are newly developed, others are a continuation of the ARI study conducted in 2005. The control group also receives a questionnaire during this phase. A twenty five question survey will be distributed prior to LFX execution covering the students perceived level of preparation using their current training plan. Statistical analysis will be conducted on the differences and similarities in responses between the two methods and will be discussed in chapters four and five of this report.

3.5 Live Fire Exercise Training Event

Upon completion of the RDT training, the student officers will participate in their live fire exercise the following week. The LFX will be conducted at the Fort Benning, Griswold Range Complex under the supervision of the Infantry Officer Basic Course Cadre on 15-19 November 2005. The scheme of maneuver and procedures for the conduct of this exercise are included in section 2.1 of this study.

Performance Evaluations

In infantry tactics, there are many valid techniques and procedures available to successfully complete the same mission. It is the policy of the IOBC to conduct all training and evaluations based on doctrine alone, without the influence of individual tactics, techniques, and procedures (TTPs) (Wright 2005). Therefore, the platoon trainers for each platoon are the primary evaluators for the LFX. This helps eliminate the impartial grading of students based on

their use of individual techniques for mission accomplishment. For this study, the same platoon trainers will conduct evaluations on both platoons. They will consist of the two primary platoon trainers (Captains), the company commander (Major) and one senior NCO trainer.

Due to the restrictions placed on this experiment by the units command, availability of personnel, ranges, and restrictive training schedule on the US Army Infantry School, only one platoon will be evaluated in each condition. Unfortunately, this will create a situation where the evaluated groups for leader actions discussed in the following paragraphs will have a small number (n) of one platoon leader, who has only four evaluators. However, measures will be conducted in other areas to help accommodate for these statistical shortcomings. (see section 3.6)

Evaluations will be conducted on the acting platoon leaders as they execute these live fire missions. The trained professional army officers and non-commissioned officers discussed previously will evaluate the leaders on the accuracy, relevance and timeliness of their decisions in the live fire exercise (Appendix F). Leaders are currently not evaluated in a quantitative manner, so coordination must be conducted with the platoon trainers/ evaluators to determine quantifiable measures. (Wright 2005) By adjusting the current GO/ NO-GO criteria from the unit's current evaluation metric (Wright 2005) a 7 Point Likert Scale of proficiency is added for each performance measure. Since this is not the current method of evaluation, trainers and evaluators will receive a special period of instruction from the platoon trainer prior to conducting evaluations. Trainees from the RDT and Non-RDT trained groups will be evaluated on this 7 point scale.

3.6 Post Live Fire Questionnaire

Due to the restrictions placed on this experiment by the unit's command, availability of personnel, ranges, and restrictive training schedule, all personnel trained on the RDT can not be evaluated during the performance of leader tasks. Only the student performing the role of the platoon leader will be evaluated on performance measures. In the Post Live Fire Exercise Questionnaire (Appendix C&D) the platoon members were asked to evaluate the performance of their Platoon Leader using the 7 point Likert Scale. This adds a second measure of performance for the platoon leaders' actions. Additionally, a third measure was developed to measure the relative effectiveness of the RDT. Trainees in the non-leader roles will be given a post LFX questionnaire that will measure the relative levels of involvement in and understanding of the leader's actions within the LFX compared to non-leader trainees in the non-RDT trained condition. (Appendix D, adapted from ARI Study, 2005)

Finally, participants in the RDT condition platoons will be asked to evaluate the RDT system through a series of post LFX questionnaires. Pre/ post LFX evaluations will measure the trainees and trainers overall perceptions of the effectiveness of the RDT in relation to each of their personal experiences in the LFX, as well as their perceived level of training received and their perceived transferability of training to future operations as an infantry platoon leader. These questionnaires will also use the 7 point scale to measure the systems usability, likeability, and functionality for improvements and requirement generations for future Army PC based training systems. It is the system's ability to help prepare students in non-leader roles (during the LFX) to conduct platoon level operations that is the focus of this study.

3.7 Experimental Design

Primary Learning Null Hypothesis: Non-Leader Inclusion

The level of preparedness of non-leader combatants for the Live Fire Exercise is not different for those that receive RDT instruction from those that receive traditional instruction.

Secondary Learning Null Hypothesis: Leader Performance Measures

The performance of RDT trained combatants in leadership roles in the Live Fire Exercise is not different from those combatant leaders not trained with the RDT.

Equipment Hypothesis

Students who train with the RDT will perceive that the RDT system is an adequate system for the purpose of training the skills required for the conduct of the Platoon LFX and will have positive perceptions.

Statistical analysis will be performed on all qualitative and quantitative measures using several methodologies. As discussed previously, the primary means for evaluating performance measures of lieutenants performing leadership roles is through direct observation and evaluation by the platoon trainer. The students will be evaluated on designated tasks in accordance with ARTP 7-8, (Army 2002) using a seven point Likert Scale. The scores of the RDT condition leaders will be compared to the non-RDT condition using a series Mann-Whitney (Wilcoxon

Rank Sum) evaluations. Statistical analysis on all other non-performance measures associated with the Post-RDT and Post-LFX questionnaires/ surveys will be conducted using Wilcoxon Rank Sum Tests (Mann-Whitney). Estimated mean and median analysis will be used to determine perceived usability and effectiveness of the RDT through survey data. For the comparison of inclusion in the LFX, Mann-Whitney tests will also be performed on all questions which are common to the RDT and non-RDT conditions when applicable. Finally, Pre and Post LFX data for the RDT group was compared using Wilcoxon Sum Rank Test for matched pairs.

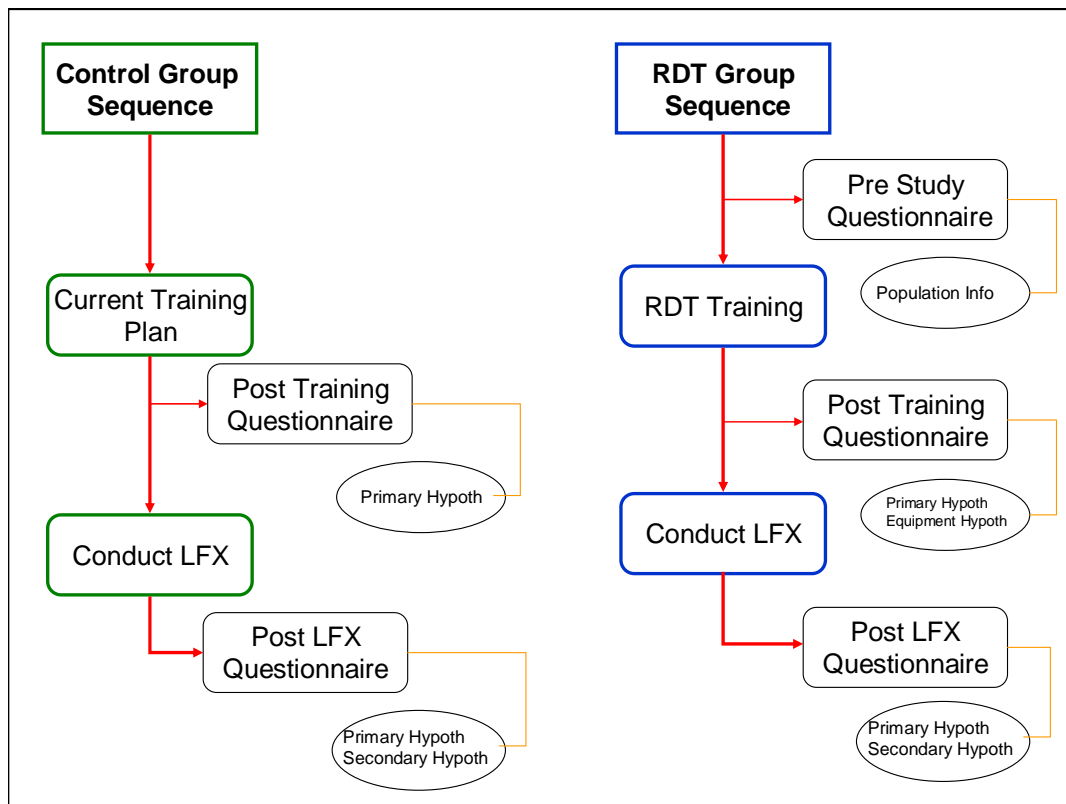


Figure 7: Sequence of events and data collection points

CHAPTER FOUR: FINDINGS

4.1 Conduct of the Experiment

The experiment was conducted as originally planned with the following changes: Due to last minute scheduling conflicts and other IOBC graduation requirements, only one platoon per condition was allotted to participate in this study. Additionally, the two platoons used had a total of 39 members rather than 40. All participants in this study were male ranging in age from 22 to 39. All students had at least 4 years of college experience. Two foreign service officers from allied countries were included in the RDT group as well as two in the control group. Control and experimental groups received the training treatments and data collection instruments identified in figure 7 above.

4.2 Summary of Results

Through the conduct of an initial pre-study survey, (Appendix A) it was determined that the participants had various levels of experience with video gaming or the use of military PC games. Most participants reported that they seldom played video games in their free time. Of those who did play video games in their free time it was reported that some of those games were first person shooter games (as is the RDT). In addition to gaming experience, the lieutenants had varying levels of experience in dismounted infantry operations. While thirty of the thirty-nine officers had no prior experience other than IOBC, four participants had less than two years of infantry experience, and five participants had greater than two years of experience in infantry

operations. None of the participants had any experience with the RDT in other classes at Ft Benning or any other training location.



Figure 8: RDT Classroom and Buddy Team Training

Table 2: Pre-study Questionnaire Summary

Question	Response Range	Mean	Median	Remarks
Age	22-39 years old	24	23	Only 2 over age 28 Both are foreign officers
College Ed.	4 years	-	-	100% reported at least 4 years
Infantry Experience	1-3	1.4	1.0	IOBC only = 30 participants < 2 years = 4 > 2 years = 5
Frequency of video gaming	1-4	2	2	Never = 14 participants Seldom = 14 Sometimes = 8 Often = 3
Amount of games that are 1 st person Shooter	1-3	1.7	2.0	None = 17 participants Some = 17 All = 5
RDT Experience	0	-	-	100% had no experience with the RDT

The primary learning Null Hypothesis (Non-Leader Inclusion)

Evaluations and Comparisons

Data was collected via self assessment questionnaires listed in Appendix B through F to test this null hypothesis subjectively. The first self assessment was collected post RDT/classroom training but prior to LFX. The second self assessment was collected post LFX. A summary of results follows.

Self Assessment Control Group vs. RDT, Post Training/ Prior to LFX - Evaluations and Comparisons:

As discussed in section 3.4 the RDT group provided data via the post RDT training questionnaire filled out at the completion of the day of RDT training. In comparison, the control group was asked to fill out the responses to their post training questionnaire (Appendix E) upon completion of their normal LFX preparation classroom training. The comparison of these results is shown below in Table 3.

Using the Mann-Whitney Test (Wilcoxon Rank Sum) for all questions, the null hypothesis of Control Group = RDT Group was rejected based on the self assessment questionnaires and an alternative hypothesis of Control \neq RDT was accepted at a .05 level of significance. Additionally, it was determined that the alternative hypothesis of Control $>$ RDT should be accepted. P values and results show below:

Table 3: Results Summary of Training Preparedness, Post Training, Pre-LFX: Control Group vs. RDT (Likert Scale)

Question	H ₀ / H ₁	P Value at $\alpha = .05$	Result
To what extent did the training provide you with an effective simulated training experience?	Control = RDT Control \neq RDT	.0009	Reject Ho
	Control = RDT Control > RDT	.0000	Reject Ho
To what extent did the training accurately cover the tasks and conditions specified in current platoon level battle drills?	Control = RDT Control \neq RDT	.0000	Reject Ho
	Control = RDT Control > RDT	.0000	Reject Ho
To what extent did the training permit you to train and rehears the types of decisions a platoon leader must make during a LFX?	Control = RDT Control \neq RDT	.0265	Reject Ho
	Control = RDT Control > RDT	.0132	Reject Ho
To what extent did your training provide meaningful practice for responding to enemy fires?	Control = RDT Control \neq RDT	.0116	Reject Ho
	Control = RDT Control > RDT	.0058	Reject Ho
To what extent did your training help you to better understand the key doctrinal principles for conducting platoon battle drills?	Control = RDT Control \neq RDT	.0002	Reject Ho
	Control = RDT Control > RDT	.0001	Reject Ho
In your opinion will your training have a valuable impact on preparing you to lead a platoon in a unit?	Control = RDT Control \neq RDT	.0036	Reject Ho
	Control = RDT Control > RDT	.0018	Reject Ho

Participants were asked to answer yes/ no questions on their overall opinion of their use of the RDT (RDT group) and their current training plan (control group). The total number of yes responses was summed for each question and averages taken out of the 39 participants in each group. In all cases, the control group returned higher averages as seen in Table 4 below.

Table 4: Results Summary of Overall Opinion of Training, Pre-LFX: Control vs. RDT (Yes/ No)

Question	Control Group % Yes	RDT Group % Yes	Result
Did your training teach you something new about how to be a PL during an LFX?	.8974	.6666	Control > RDT
Did your training teach you something new about how a platoon leader should respond to emerging conditions?	.7949	.6154	Control > RDT
Did your training help prepare you for the Platoon LFX	.8974	.7692	Control > RDT
Did your training help you to learn and practice the procedures associated w/ platoon battle drills?	1.00	.9231	Control > RDT

Self Assessment Control Group vs. RDT, Post LFX - Evaluations and Comparisons

Upon the completion of the Live Fire Exercise, the control group and the RDT group were each asked to fill out a questionnaire. The RDT group was asked to respond to a series of questions regarding their feelings of inclusion in the LFX as well as overall training value and overall opinion of the RDT Training (Appendix D). The RDT group responses were compared with the control group based on their answers provided via their post LFX questionnaire (Appendix C). With a .05 level of significance, the null hypothesis of Control = RDT could not

be rejected for four out of the five questions. The fifth question resulted in the acceptance of the alternative hypothesis of Control > RDT. Results are summarized below in Table 5.

Table 5: Result Summary of Inclusion in LFX: Control Group vs. RDT (Post LFX)

Question	H₀ / H₁	P Value at $\alpha = .05$	Result
How easily were you able to follow the tactical scenario of the LFX?	Control = RDT Control \neq RDT	.0022*	Reject Ho
“Same as Above”	Control = RDT Control > RDT	.0011*	Reject Ho
How easily were you able to follow the tactical decision making of the Platoon leader during the LFX	Control = RDT Control \neq RDT	.2529	Fail to Reject Ho
How easily were you able to terrain associate and navigate the range?	Control = RDT Control \neq RDT	.6237	Fail to Reject Ho
To what extent were you prepared to understand the key doctrinal principles for conducting platoon battle drills during LFX?	Control = RDT Control \neq RDT	.2154	Fail to Reject Ho
How adequate were your opportunities to learn/ practice the procedures associated with platoon battle drills prior to LFX?	Control = RDT Control \neq RDT	.5635	Fail to Reject Ho

Again, participants were asked to answer yes/ no questions on their overall opinion of their use of the RDT (RDT group) and their current training plan (control group). The total number of yes responses was summed for each question and averages taken out of the 39 participants in each group. However, this time the RDT group yielded higher averages in three of

the four questions and had an equal response for the fourth question. Results are summarized in Table 6 below:

Table 6: Result Summary of Overall Opinion of Training, Post LFX: Control Group vs. RDT (Averages)

Question	Control Group % Yes	RDT Group % Yes	Result
Did your training teach you something new about how to be a PL during an LFX?	.6410	.6923	Control < RDT
Did your training teach you something new about how a platoon leader should respond to emerging conditions?	.6154	.7949	Control < RDT
Did your training help prepare you for the Platoon LFX?	.7436	.9487	Control < RDT
Did training your training help you to learn and practice the procedures associated w/ platoon battle drills?	.9231	.9231	Control = RDT

The RDT group responses to questions regarding the overall training preparedness of the RDT were gathered using the 7 point Likert scale. Since only the RDT responded to these questions, descriptive statistics were taken. The descriptive statistics for the 39 participants are listed below in Table 7 for each question. All questions returned positive response means and medians, showing positive opinions of the system’s ability to prepare the lieutenants for the LFX. The medians were then compared to the mid point response of 4 using a Wilcoxon Sign Test testing the null hypothesis of $med = 4$ vs. $med \neq 4$. Wilcoxon estimated medians and P-values are shown in column five. Responses that are statistically significant at $\alpha = .05$ are highlighted with an *.

Table 7: Descriptive Statistics and Single Sample Wilcoxon Sign Test for RDT Group Overall
 Training Preparedness (Post LFX)

Question	Mean	Std Dev	Est. Med	P Value Med = 4 vs. Med ≠ 4
To what extent did the RDT add to your classroom instruction in learning to lead a platoon?	4.590	.818	4.5	.001*
To what extent did the RDT provide you with an effective virtual live fire?	4.795	1.105	5.0	.000*
To what extent did the RDT actually simulate the tasks and conditions specified in current platoon level battle drills?	5.154	1.204	5.0	.000*
To what extent did the RDT permit you to train and rehearse the types of decisions a platoon leader must make during a LFX?	5.077	1.133	5.0	.000*
To what extent did the RDT help you to better understand the key doctrinal principles for conducting platoon battle drills?	4.949	1.191	5.0	.000*
To what extent did your experience with the RDT help you to better understand the decisions of the acting platoon leader during the LFX?	5.179	1.023	5.0	.000*
To what extent did the RDT prepare you to make the decisions you would have made if you had been the platoon leader in the LFX?	4.821	1.211	5.0	.001*
To what extent did the RDT provide you opportunities to practice how you would react to enemy contact if you had been the PL during the LFX?	5.0	1.100	5.0	.000*
In your opinion, will using the RDT have a valuable impact on preparing you to lead a platoon in a unit?	4.995	1.080	5.0	.000*



Figure 9: Control group platoon leader pauses to send orders to squads via radio in LFX.



Figure 10: RDT platoon leader issues orders after enemy contact in LFX.

Secondary Learning Null Hypothesis: Leader Performance Measures

Peer Evaluations of Platoon Leaders in Live Fire Exercise

The Likert Scale results from 39 lieutenants were collected for both the control and RDT platoon leaders as awarded by their peers. An analysis of medians was then performed and is summarized in Table 8 below. When performing a Wilcoxon Rank Sum/ Mann-Whitney Test on the medians of the control vs. the RDT groups at a .05 level of significance, it was determined the groups were not equal. We reject the null hypothesis that the medians were equal and furthermore accept the alternative hypothesis that the control group was higher than the RDT group. Therefore, it can be concluded that the control group platoon leader had a higher level of overall performance based on an evaluation by their peers.

Table 8: Result Summary of Peer Performance Evaluation of the Platoon Leader Post LFX: Control Group vs. RDT

H ₀ / H ₁	P Value	Result
Median = / Median ≠	.0124	Reject H ₀
Median = / Median >	.0062	Reject H ₀ & accept H ₁

Cadre Evaluations of Platoon Leaders in Live Fire Exercise

Table 9 shows the Likert Scale results from 33 performance measures were collected for both the control and RDT platoon leaders as awarded by three evaluators. An analysis of medians was then performed on the full 102 measures. When performing a Wilcoxon Rank Sum/

Mann-Whitney Test on the medians of the control vs. the RDT groups at a .05 level of significance, it was determined that we could not reject the null hypothesis that the groups were equal.

Table 9: Result Summary of Cadre Performance Evaluations of the Platoon Leader Post LFX: Control Group vs. RDT

H ₀ / H ₁	P Value	Median	Result
Median = / Median ≠	.0000	4.0	Fail to Reject Ho

Equipment Hypothesis

RDT System Evaluations

RDT group participants were asked to answer a series of questions using a 7 point Likert Scale for system interaction (Table 10) as well as a five point scale for system realism (Table 11). Descriptive statistics were performed on the responses for each question. Medians for Table 10 were then tested against the midpoint of the Likert scale using a single sample Wilcoxon Sign Test with a null hypothesis of med = 4 vs. med ≠ 4. Medians for Table 11 were tested using the same method with a null hypothesis of med = 3 vs. med ≠ 3. Those responses that were statistically significant at .05 are highlighted with *.

Table 10: Results Summary of RDT System Interaction Evaluation (7 pt Scale)

Question	Mean	Std Dev	Median	Wilcoxon Est. Median	P Value Med = 4 vs. Med ≠ 4
How would you describe the amount of time you trained w/ others during the RDT experience?	4.359	1.328	4.0	4.0	.108
How important is fun and personal entertainment as a reason to want to train with the RDT?	4.231	1.385	4.0	4.5	.300
How realistically did the RDT portray physical objects in the mission environment?	4.231	1.327	5.0	4.0	.330
How realistically did the RDT portray actions made by members of the platoon?	4.513	1.144	5.0	4.5	.015*
How realistically did the RDT portray actions made by the enemy?	4.051	1.317	4.0	4.0	.715
How satisfied were you with the training opportunities provided by the RDT?	4.615	1.161	5.0	4.5	.004*
How real was the experience of being a platoon leader inside the RDT environment?	4.231	1.202	4.0	4.0	.242

Table 11: Results Summary of RDT System Realism (5 pt Scale)

Question	Mean	Std Dev	Median	Wilcoxon Est. Median	P Value Med = 3 Vs Med ≠ 3
How good was the ENVIRONMENTAL realism? (Do the trees, vehicles, terrain look real enough?)	3.462	.790	4.0	3.5	.005*
How good was the AUDIO realism? (Were the sounds realistic?)	3.667	.955	4.0	3.5	.001*
How good was the AGENTS APPEARANCE? (Do the soldiers look like real soldiers?)	3.538	.756	4.0	3.5	.001*
How real were the BLUE FORCE'S actions? (Does the blue force react according to doctrine?)	3.718	.999	4.0	4.0	.000*
How real were the ENEMY FORCES actions? (Does the enemy react as you would expect?)	3.256	.850	3.0	3.5	.103
How good was the PSYCHOLOGICAL realism? (Personal Involvement in the PL role)	4.051	.724	4.0	4.0	.000*

4.3 Discussion of Results

Primary Learning Null Hypothesis (Non-Leader Inclusion)

Post Training Evaluations and Comparisons

An evaluation of the data found in Tables 3 and 4 suggests that upon completion of the RDT training, RDT group participants were skeptical about the value of the training they received and lacked the confidence that the control group had. This was contributed to by several

factors. First, several cadre members from other platoons expressed their dislike for virtual training to train dismounted infantry tasks to the students. As role models, these views were likely picked up by some of the participants prior to the conduct of training. Secondly, some students had adverse feelings about the use of computer games in general regardless of whether they were used for training or for fun. Additionally, there were a large number of complaints about the instability of the RDT program itself and the number of crashes experienced during the conduct of the training. While students understood that this was a program in the early stages of development, there is no doubt that unexplainable crashes during the conduct of training would have an adverse effect on the quality of training as well as students' overall opinion of training.

Despite these issues, we find that when we compare the data from the Post Training Survey in Table 4 with Post LFX data in Table 6, we can see a distinct change of opinion. Averages for all question responses from the RDT group increased while averages from all question responses decreased for the control group. In both cases the numerical differences are quite large. The differences are displayed in Table 12 below. A detailed statistical analysis using the Fisher Exact Test is displayed in Table 13. The test was conducted comparing the post training results to the post LFX results for each group. The difference in proportions and their 2-tailed P-values are shown. These results suggest that, retrospectively, the RDT group found themselves to have been more prepared for the LFX than they had anticipated and had learned something from their training. Conversely, the control group felt that they were not as prepared as they anticipated and had not learned as much as they hoped.

Table 12: Overall Opinion of Training Post Training vs Post LFX (Percent Responding YES)

Question	Control Group Post Training	Control Group Post LFX	RDT Group Post Training	RDT Group Post LFX
Did your training teach you something new about how to be a PL during an LFX?	.8974	.6410	.6666	.6923
Did your training teach you something new about how a platoon leader should respond to emerging conditions?	.7949	.6154	.6154	.7949
Did your training help prepare you for the Platoon LFX?	.8974	.7436	.7692	.9487
Did your training help you to learn and practice the procedures associated w/ platoon battle drills?	1.00	.9231	.9231	.9231

Table 13: Fisher Exact Test for Overall Opinion of Training, Post Training Vs Post LFX (Results relative to Data from Table 12)

	Control Group Post Training Vs. Post LFX TNG=LFX Vs TNG ≠ LFX		RDT Group Post Training Vs. Post LFX TNG=LFX Vs TNG ≠ LFX	
Question	Difference in Proportions	P (2 Tail)	Difference in Proportions	P (2 Tail)
Did your training teach you something new about how to be a PL during an LFX?	0.256	.0141	-0.026	1.000
Did your training teach you something new about how a platoon leader should respond to emerging conditions?	0.179	.1354	-0.179	.1354
Did your training help prepare you for the Platoon LFX?	0.154	.1384	-0.179	.0427
Did training your training help you to learn and practice the procedures associated w/ platoon battle drills?	0.077	.2403	0.000	1.000

Post LFX Evaluations and Comparisons

Data collection for the Post LFX measures of inclusion were attained via the Post LFX surveys in Appendices C & D. Responses were given on the 7 point Likert Scale with 7 being the highest response. The primary purpose of the RDT is to train and allow all members of an IOBC class to make the decisions necessary for the conduct of platoon movement to contact live fire exercise. Since only one member per class actually gets to perform these duties in the LFX, the

38 other members are able to do this virtually via the RDT. Therefore, these inclusion measures are perhaps the most important in the survey data.

In four out of the five questions, the RDT group had higher responses with a .05 level of significance (Table 5). RDT participants stated they were more able to follow the tactical decision making of the acting Platoon Leader, more easily able to follow the terrain, more prepared to understand the key doctrinal principles of the LFX, and had greater opportunities to learn the procedures associated with the LFX. Conversely, the control group had higher responses for their ability to follow the tactical scenario of the LFX with a P value of .0011 (The highest level of significance in this test). This was surprising given that the RDT participants reported higher marks for understanding of doctrinal principles and ability to follow tactical decision making.

The results of Table 7 show the RDT groups opinions of the overall training preparedness achieved by use of the RDT. Data was collected using the Post LFX Survey with responses given using the 7 point Likert Scale. The RDT group returned high marks with all means above 4.5 and all but one median equal to 5. The responses were then compared to the midpoint for the Likert Scale using a single sample Wilcoxon Signed Test. The descriptive statistics were validated for all questions with high levels of statistical significance. This demonstrates that the RDT group felt that their RDT experience did have a positive value and added to their understanding of the decisions they would make as a platoon leader in the LFX. Additionally, they felt they had increased opportunities for practicing the tasks and decisions required for leading a platoon in their battle drills.

Secondary Learning Null Hypothesis (Leader Performance)

Performance Measure Comparisons

Based on peer evaluation of the acting platoon leader, it was concluded with statistical significance that the control group platoon leader had a higher level of performance. While there are many factors that could influence these subjective results, we can not be certain of any confounding factors and must accept the data at face value.

While the large sample size of the peer evaluation provides greater statistical significance in evaluating the platoon leaders' performance, the evaluations given by the cadre provide a greater quality of data. These cadre members are trained personnel who have conducted these evaluations class after class over a period of two to three years. When evaluating this data (Table 9), we find that the performance as graded by those who actually determine passing marks for a living find that the performance of the two groups are equal.

Equipment Hypothesis

The null equipment hypothesis of “students who train with the RDT will perceive that the RDT system is an adequate system for the purpose of training the skills required for the conduct of the Platoon LFX and will have positive perceptions” was validated in this study.

System Interaction data was collected using a 7 point Likert Scale. For this section, the responses ranged from 1 to 7 with 1= NOT AT ALL, 4 = SOMEWHAT and 7 = VERY MUCH. For all questions, the means and medians were no less than 4, which was an acceptable level. This proved to be true using basic descriptive statistics as well as through a comparison to the

midpoint of the Likert scale using the Single Sample Wilcoxon Sign Test. See Table 10.

Acceptable perceptions of the system were proven for all questions with better than “SOMEWHAT” responses in terms of the “How realistically ... the RDT portray actions made by members of the platoon” and “How satisfied were you with the training opportunities provided by the RDT”. Participants stated with a mean of 4.2 and a median of 4 that fun and personal entertainment was a SOMEWHAT important reason to want to train with the RDT (Table 10). Slightly better than ”SOMEWHAT” ratings also weakly support ARI’s original hypothesis that fun and personal entertainment is important for future systems (Beal 2005). Additionally, the study confirmed Beal’s assertion that a combination of individual and Buddy Team Training would be effective. Participants stated with a mean of 4.3 and a median of 4 that the amount of time they trained with others was the RIGHT AMOUNT OF TIME. In this case, the value of 4 was the optimal value rather than 7. The responses ranged from 1= TOO MUCH TIME, 4 = RIGHT AMOUNT OF TIME, 7 = NEED MORE TIME.

While there were positive perceptions of the RDT, only two questions showed statistical significance. The first being how well the RDT portrayed actions by the platoon members and the second being how satisfied participants were with the quality of training provided by the RDT. These questions also provided the highest mean and median response values. The corresponds with the results found in Table 11 as well regarding the ‘how real the Blue Forces actions’ were in the RDT.

When evaluating the realism of the RDT, the study used a five point scale. Where 1= Inadequate, 2=Poor, 3= Adequate, 4 = Good, and 5= Excellent. Participants returned positive opinions of all measures of realism, with all mean values above 3 and all but one median equal to 4 (Table 11). Again, this proved to be true using not only the descriptive statistics but through

the comparison to the midpoint using the single sample Wilcoxon Sign Test. All responses showed high levels of statistical significance except for the question regarding the realism of the actions of enemy forces. It is interesting to note that the lowest levels of realism were also attributed to the enemy actions which, as stated, were statistically no better than acceptable. Several participants stated that it was unrealistic to expect the enemy to react the same every time and to not do anything other than remain in place and wait to be killed. At this time the RDT does not have semi-autonomous/ intelligent enemy agents. Conversely, the highest markings for realism were gained by psychological realism. Despite their lower marking in other areas, participants felt high levels of GOOD personal involvement in the role of platoon leader. This suggests that while users may prefer to have high quality graphics and high levels of realism, they can still become immersed in the system and be highly involved with just the basic graphics used by the RDT.

CHAPTER FIVE: CONCLUSIONS

This study was conducted in order to attempt to validate the Rapid Decision Trainer's ability to adequately train infantry students to conduct platoon leader duties in the IOBC live fire exercise. The RDT was developed by the Army Research Development and Engineering Command in effort to assist the cadre of the Infantry Officer Basic Course to better prepare their lieutenants for the conduct of the Griswold platoon LFX and make the most efficient use of their LFX time. The study was conducted at the United States Army Infantry Center, at Ft. Benning Georgia in November of 2005. The survey responses, as well as performance evaluations of the RDT trained platoon, were compared to those of a platoon using the current method of instruction for LFX preparations. The results of this evaluation could effect the future development of this product as well as the use of other PC based simulations for use at the US Army Infantry Center and other Army schools.

5.1 Result Summary

Based on the data summarized in Tables 3 – 11, and discussions presented in section 4.2 above, the following statements concerning the hypothesis of this study are presented:

The primary learning Null Hypothesis (Non-Leader Inclusion) which stated that the preparedness of non-leader combatants for the Live Fire Exercise is not different for those that receive RDT instruction from those that receive traditional instruction can not be rejected.

The secondary learning Null Hypothesis (Leader Performance Measures) which stated that the performance of RDT trained combatants in leadership roles in the Live Fire Exercise is not different from those combatant leaders not trained with the RDT is rejected.

The secondary equipment hypothesis which stated that students who train with the RDT will perceive that the RDT system is an adequate system for the purpose of training the skills required for the conduct of the Platoon LFX and will have positive perceptions can not be rejected.

Outside of the statistical analysis, the overall assessment of the RDT training was positive. The students exhibited a positive response to the training. Additionally, anecdotal evidence provided by the IOBC platoon trainer indicated that students showed a better understanding of the decision making process during the platoon live fire. Their actions were more deliberate and well planned (although sometimes too deliberate). The platoon trainer (CPT Marcus Wright) did recommend that the IOBC continue to use the RDT in the future. Continued discussion suggests that the greatest benefit of this system is likely the ability to provide LTs with repeated exposure to the training event in effort to strengthen learning.

5.2 Limitations of Study

The study performed had many limitations to both how the experimented could be conducted as well as the composition of the participants. The Infantry Officer Basic Course operates on a very strict timeline due the limited amount of time and resources available as discussed in Chapter 2 of this study. There are very few days when a study such as this can be injected into the ongoing curriculum. As a result, only two platoons were able to participate in the study (one control/ one RDT). Had a larger number of platoons been available for both groups, it would have been possible to evaluate the secondary hypothesis regarding leader actions with much more statistical significance. It would be ideal to evaluate all the platoons over a period of one year in order to have large populations of leaders to evaluate. Additionally, this

time limitation limited the number of hours available for RDT training. Ideally, a two day training session would have provided a real opportunity for students to learn the system well before conducting missions in the RDT. Finally, the strict training curriculum allowed for few training sessions to be replaced by the RDT training.

The composition of the students available for the study was not completely random. The two platoons and their members were dictated by the IOBC cadre. There was no way to sort out those with greater gaming or dismounted infantry experience in each platoon, or to level them out comparatively. Additionally, the lieutenant chosen to perform the duties during the LFX was not chosen at random. In both cases, the cadre chose one of their best officers to perform these duties. This, however, is the standard procedure so it is representative of how actual classes perform.

In addition to time and personnel, the study also dealt with software and hardware limitations. Because RDECOM deals primarily in research efforts for the purpose of proof of concept, software development is not funded sufficiently to result in production level software. The RDT as developed by General Dynamics at the time of the study had many glitches and was unstable. Students experienced multiple crashes during their individual and buddy team training. Several participants noted this in their individual comments in the post training surveys. Participants stated that this did detract from the quality of the RDT experience and detracted from the quality of training provided. General Dynamics did continue to develop this software for several months after the experiment was conducted. The RDT product in place at the IOBC now is more stable and offers a few more options.

Finally, the study was limited by the quality of hardware provided by the Infantry Training Center at Building 4. While the Ft. Benning computer personnel tried very hard to

provide the highest quality training environment, they could not overcome some compatibility issues between the RDT and other training systems that were running on the desktops computers. This was also the cause of some of the crashes that occurred during the RDT training session.

5.3 Lessons Learned

Several lessons were learned during the conduct of this study which will help future studies in this area. Some of these lessons include conducting more thorough pilot tests, shorting the surveys, and better determination of performance standards for Platoon Leaders during the LFX. While I do not believe that these lessons would have changed the study's outcome, I do believe they could have made the data collection process much easier.

During the initial creation of the surveys, I had not yet participated in a Platoon Live Fire Exercise. As a result, I was unsure of what questions would truly be relevant to my study. To compensate for this, I adapted the original RDT study conducted by ARI to fit my purposes. The ARI study questionnaires were very long and attempted to draw information on a wide range of questions that were not necessarily relevant to me. In an attempt to minimize risk in this experiment I retained too many questions. Participants commented that the surveys were too long and they began to lose interest, especially on the RDT Group Post Training Questionnaire.

Better pilot studies could possibly have remedied some of the issues with survey length. By providing the questionnaires to more army officers who had conducted live fire events, I may have been able to better hone in on the key issues that needed to be addressed. Better questions may have been developed. This study's efforts may have relied too heavily on ARI's work as well as on the opinions of the single IOBC cadre member who assisted me in these efforts.

The platoon leader performance standards as presented in *Battle Drills for the Infantry Rifle Platoon and Squad: ARTEP 7-8* are very inclusive of all the things an infantry platoon must do in the conduct of a movement to contact. However, many of these conditions and standards are not relevant to the conduct of the LFX at Griswold Range. The evaluation sheets agreed upon by myself and the IOBC cadre ended up evaluating more tasks than necessary. There was much disagreement among the cadre about whether or not some tasks should be evaluated. Some cadre chose to evaluate some tasks, while others did not. A better wash of the evaluation sheets and a more complete briefing to the cadre by the senior evaluator or myself would have ensured that all evaluators were working to the same standards.

5.4 Future Research Areas

The conduct of this study as well as the precedent study conducted by ARI focused primarily on data obtained through subjective surveys. While this study attempted to gain quantitative data for the secondary hypothesis (leader performance), the limitations discussed in section 5.2 hindered the ability to gather large amounts of data. Future studies should focus on performance evaluations to truly determine whether or not an RDT trained platoon leader, as well as the entire platoon, can achieve increased performance levels.

In order to achieve these performance evaluations, future studies may also want to consider using the statistics based on the information collected in the imbedded assessment phase of the RDT. This study was unable to gather sufficient data using this method due to the number of system crashes that erased portions of the participants' results. Future studies can also use this data to validate the effectiveness of the assessment phase itself, in addition to extracting data for performance measures.

Evaluation of individual learning and increases in performance should also be considered. Future studies should attempt to evaluate individual lieutenants throughout the RDT training sequence to determine whether or not a participant shows evidence of learning over multiple iterations of the RDT. Improvement in performance can be measured using the imbedded assessment phase or other outside measures. These measures would help in determining the increase in training “preparedness” for the actual live fire. Finally, this should be compared to training transfer in the actual LFX environment, as was conducted by this study (This would effect only the LT chosen to be the platoon leader in each group.) This study did attempt to collect such data but again was unsuccessful due to the software and hardware limitations discussed previously. The large number of crashes in the system prevented the collection of complete sets of data that could be compared over multiple iterations.

In all cases, future studies should be conducted over a period of a year or more in order to gain a large number of groups to conduct comparisons between. Since there is only one LT chosen in each platoon to act as the platoon leader, it could take well over a year to gain enough acting platoon leaders in RDT and control groups to conduct a statistical analysis with a significant number of participants (N).

The Army Research Development and Engineering Command as well as other DoD agencies continue to develop PC based systems for the training of military tasks. The evaluation of these systems to determine effectiveness is critical to maintaining fiscal responsibility as well as ensuring that we provide soldiers with the best opportunities possible to attain new skills. Future studies in the area of PC based simulation systems will continue to be valuable not only to the DoD, but also to commercial industries who are using PC based simulations to train workers in many areas.

APPENDIX A: PRE- TRAINING QUESTIONNAIRE

Pre Training Questionnaire

Print Initials _____ (Not for ID purposes, only for questionnaire differentiation)

- 1) What is your age? _____

- 2) How many years of college have you completed?
 - a) 4 year degree
 - b) 2 year degree
 - c) 2 years of college course or less

- 3) How much experience have you had with conducting dismounted infantry tactical operations?
 - a) IOBC only
 - b) enlisted prior service < 2 years
 - c) enlisted prior service > 2 years

- 4) How often do play video games in your free time?
 - a) Never
 - b) Seldom
 - c) Sometimes
 - d) Often/ regularly

- 5) If you play video games, how many are military "first person shooter" games?
 - a) None
 - b) Some
 - c) All

- 6) Have you ever worked with the Rapid Decision Trainer prior to today?
 - a) Yes
 - b) No

APPENDIX B: RDT POST TRAINING QUESTIONNAIRE

RDT Post Training Questionnaire

Print Your Initials _____ (not for ID purposes, only to differentiate questionnaires)

Your responses to items in this questionnaire should be based on your experience training with the **Platoon Leader RDT** in preparation for the IOBC platoon live-fire exercise (LFX). Respond to the questions in Parts 1 and 2 of this questionnaire by **marking an "X"** in the appropriate box of the **7-point** scale. Respond to subsequent parts of the questionnaire as each directs.

Part 1. Overall Training Value of the Platoon Leader RDT

1. To what extent did your experience with the RDT add to your IOBC classroom instruction in learning to lead an Infantry platoon?

1			4		7
NOT AT ALL			SOMEWHAT		VERY MUCH

2. To what extent did your experience with the RDT teach you how to make the tactical decisions required when leading an Infantry platoon?

NOT AT ALL			SOMEWHAT		VERY MUCH

3. To what extent did your experience with the RDT teach you to better understand the influence of METT-TC factors when leading an Infantry platoon?

NOT AT ALL			SOMEWHAT		VERY MUCH

4. To what extent did the RDT provide you with an effective "virtual live-fire" training experience?

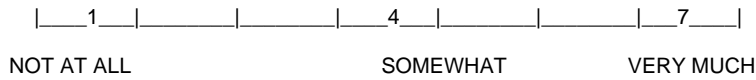
NOT AT ALL			SOMEWHAT		VERY MUCH

5. To what extent did the RDT accurately simulate the tasks and conditions specified in current platoon-level battle drills?

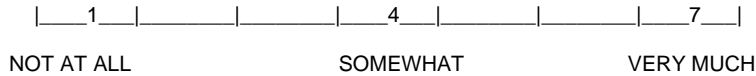
NOT AT ALL			SOMEWHAT		VERY MUCH

** Adapted from original U.S. Army Research Institute (ARI) March 2005*

6. To what extent did the RDT permit you to train and rehearse the types of decisions a platoon leader must make during a live-fire exercise?



7. To what extent did your experience with the RDT provide meaningful practice for planning a platoon mission?



8. To what extent did your experience with the RDT provide meaningful practice for exercising command and control of platoon operations?



9. To what extent did your experience with the RDT provide meaningful practice for planning appropriate platoon-level fire control measures?



10. To what extent did your experience with the RDT provide meaningful practice for designating movement routes according to the terrain?



11. To what extent did your experience with the RDT provide meaningful practice for controlling a platoon-level movement to contact?



12. To what extent did your experience with the RDT provide meaningful practice for responding to enemy fires?



** Adapted from original U.S. Army Research Institute (ARI) March 2005*

7. How fast did the RDT respond to the actions you initiated?

|_____|_____|_____|_____|_____|_____|_____|
NOT FAST MODERATELY FAST VERY FAST

8. How realistically did the RDT portray physical objects in the mission environment?

|__1__|_____|_____|_____|__4__|_____|_____|__7__|
NOT AT ALL SOMEWHAT COMPLETELY

9. How realistically did the RDT portray actions made by members of the platoon?

|__1__|_____|_____|_____|__4__|_____|_____|__7__|
NOT AT ALL SOMEWHAT COMPLETELY

10. How realistically did the RDT portray actions made by the enemy?

|_____|_____|_____|_____|_____|_____|_____|
NOT AT ALL SOMEWHAT COMPLETELY

11. How satisfied were you with the training opportunities provided by the RDT?

|_____|_____|_____|_____|_____|_____|_____|
NOT SATISFIED SOMEWHAT SATISFIED COMPLETELY SATISFIED

12. How completely were you able to search the RDT simulated environment?

|_____|_____|_____|_____|_____|_____|_____|
NOT AT ALL SOMEWHAT COMPLETELY

13. How much were experiences in the RDT environment consistent with your experiences during IOBC field exercises?

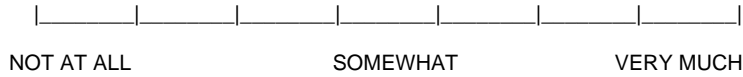
|_____|_____|_____|_____|_____|_____|_____|
NOT CONSISTENT MODERATELY CONSISTENT VERY CONSISTENT

14. How real was the experience of being a platoon leader inside the RDT environment?

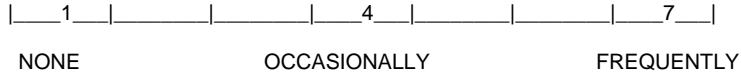
|_____|_____|_____|_____|_____|_____|_____|
NOT AT ALL REAL MODERATELY REAL VERY REAL

** Adapted from original U.S. Army Research Institute (ARI) March 2005*

15. Overall, how much could you focus on the platoon leader experiences created by the RDT rather than on the computer keyboard functions?



16. Were there moments during your experience with the RDT when you felt completely focused on the task of leading a platoon?



Part 3. Platoon Leader RDT Realism

In the table below, provide your assessment of the Platoon Leader RDT in terms of these types of realism by circling one of the alternatives in the right column.

Type of Realism	How good was this type of realism in the RDT?	Provide Comments For Improvement
Environment: <i>(Does the terrain look realistic enough for this training even? Do trees and vehicles, etc look real?)</i>	Excellent Good Adequate Poor Inadequate	
Audio: <i>(Were the sounds contained in the RDT realistic?)</i>	Excellent Good Adequate Poor Inadequate	
Agents Appearance: <i>(Do the Soldiers look like real Soldiers?)</i>	Excellent Good Adequate Poor Inadequate	
Tactical Blue Force: <i>(Does the Blue force react according to doctrine? Does it react in a timely manner?)</i>	Excellent Good Adequate Poor Inadequate	
Tactical Enemy Force: <i>(Does the Enemy force react as you would expect an enemy to react?)</i>	Excellent Good Adequate Poor Inadequate	
Psychological: <i>(Were you involved in your role as a Platoon Leader during mission execution?)</i>	Excellent Good Adequate Poor Inadequate	

Part 4. Factors Associated with Using the Platoon Leader RDT to Train

In Part 4 of the questionnaire draw a circle around the letter that best indicates the extent to which you agree or disagree with each statement. Write the letters NA to the left of the statement number to indicate that you have no basis for having an opinion about the statement because you did not did not perform or observe the action it describes.

			Strongly Disagree		
			Disagree		
Neither Agree or Disagree					
	Agree				
Strongly Agree					

Section I: Understanding and Planning the Mission

- | | | | | | |
|---|---|---|---|---|---|
| 1. The company OPORD allowed me to clearly understand my mission. | A | B | C | D | E |
| 2. The computer functions required for mission planning were easy to use. | A | B | C | D | E |
| 3. The means provided to develop signal plans were adequate. | A | B | C | D | E |
| 4. The planning map provided an appropriate amount of detail. | A | B | C | D | E |
| 5. An appropriate amount of information was provided to plan the mission. | A | B | C | D | E |

Section II. Execution the Mission Tasks and Steps

- | | | | | | |
|---|---|---|---|---|---|
| 6. It was easy to execute the plans for platoon operations. | A | B | C | D | E |
| 7. It was easy to request and obtain information while executing the mission. | A | B | C | D | E |
| 8. It was easy to issue commands while executing the mission. | A | B | C | D | E |
| 9. The reporting process was adequate to keep my CO informed. | A | B | C | D | E |
| 10. It was easy to control and coordinate the movement of maneuver elements. | A | B | C | D | E |
| 11. Methods provided to control and synchronize fires were adequate. | A | B | C | D | E |
| 12. It was easy to implement FRAGOs based on emerging battlefield conditions. | A | B | C | D | E |

Section III: Assessment

- | | | | | | |
|--|---|---|---|---|---|
| 13. The RDT adequately tracked and evaluated my performance. | A | B | C | D | E |
| 14. The RDT permitted me to conduct a meaningful self-assessment. | A | B | C | D | E |
| 15. The red-green ratings of my performance were useful for self-evaluation. | A | B | C | D | E |
| 16. The quiz at the end of the exercise was a useful tool for self-evaluation. | A | B | C | D | E |

** Adapted from original U.S. Army Research Institute (ARI) March 2005*

Part 5. Overall Opinion of the Platoon Leader RDT

1. Did training with the RDT teach you something new about how a platoon leader should plan an Infantry offense mission? Circle one: Yes No

2. Did training with the RDT teach you something new about how a platoon leader should respond appropriately to emerging battlefield conditions? Circle one: Yes No

3. Do you think the RDT made has prepared you for the upcoming Platoon LFX? Circle one: Yes No

4. Did training with the RDT help you to learn and practice the procedures associated with platoon level battle drills? Circle one: Yes No

Please make any other comments you wish to make about the Platoon Leader RDT and its training value.

APPENDIX C: CONTROL GROUP POST LFX QUESTIONNAIRE

6) To what extent did you were you prepared to understand the key doctrinal principles for conducting platoon battle drills (prior to conducting the LFX)?

| 1 | | | 4 | | | 7 |
NOT AT ALL SOMEWHAT VERY MUCH

7) To what extent did your platoon's current training plan permit you to train and rehearse the types of decisions a platoon leader must make during a live-fire exercise?

| 1 | | | 4 | | | 7 |
NOT AT ALL SOMEWHAT VERY MUCH

8) How adequate were your opportunities to learn/ practice the procedures associated with platoon level battle drills prior to conducting the LFX?

| 1 | | | 4 | | | 7 |
NOT ADEQUATE SOMEWHAT VERY ADEQUATE

Part 2. Overall Opinion of Training

1. Please rate the leadership performance of your acting platoon leader during the Live Fire Exercise using the 7 point scale below.

| 1 | | | 4 | | | 7 |
Horrible Average Flawless

2. Did your training (specific to LFX Preparation) teach you something new about how a platoon leader should plan an Infantry offense mission? Circle one: Yes No

3. Did your training teach you something new about how a platoon leader should respond appropriately to emerging battlefield conditions? Circle one: Yes No

4. Do you think these specific training events have prepared you for the upcoming Platoon LFX?
Circle one: Yes No

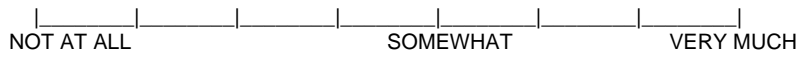
5. Did your training events help you to learn and practice the procedures associated with platoon level battle drills?
Circle one: Yes No

Please make any other comments you wish to make about the LFX and recommendations for rehearsals and preparations of future students.

** Adapted from original U.S. Army Research Institute (ARI) March 2005*

APPENDIX D: POST LFX RDT QUESTIONNAIRE

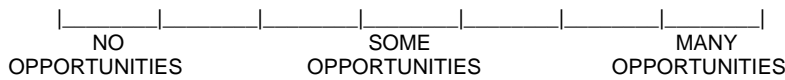
9. To what extent did the scenario and terrain used in the RDT accurately simulate what you experienced during the LFX at Griswold Range.



10. To what extent did training with the RDT prepare you to make the decisions you would have made if you had been the platoon leader during the IOBC LFX at Griswold Range?



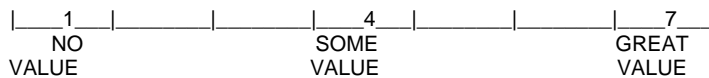
11. To what extent did training with the RDT provide you with opportunities to practice how you would react to enemy contact if you had been the platoon leader during the IOBC LFX?



12. In your opinion, how desirable is it to use a simulated training exercise such as the RDT to gain experience as the platoon leader during the IOBC LFX?



13. In your opinion, will using the RDT have a valuable impact on preparing you to lead a platoon in a unit?



Part 2. Overall Opinion of the Platoon Leader RDT

1. Did training with the RDT teach you something new about how a platoon leader should plan an Infantry offensive mission?
Circle one: Yes No

2. Did training with the RDT teach you something new about how a platoon leader should respond appropriately to emerging battlefield conditions? Circle one: Yes No

3. Did training with RDT help prepare you for the Platoon LFX at Griswold Range? Circle one: Yes No

4. Did training with the RDT help you to learn and practice the procedures associated with platoon level battle drills?
Circle one: Yes No

Please make any other comments you wish to make about the RDT and its training value.

** Adapted from original U.S. Army Research Institute (ARI) March 2005*

APPENDIX E: POST TRAINING QUESTIONNAIRE (CONTROL GROUP)

APPENDIX F: SCALED PERFORMANCE MEASURES FOR LEADERS

Synopsis Report for Collective Task
07-3-1101
Conduct Movement to Contact (Infantry Platoon)
Status: Active

Condition: The platoon is operating separately or as a part of a larger unit and is ordered to conduct a movement to contact. Contact with the enemy was broken. The enemy has withdrawn, is being reinforced, and is preparing to counterattack. (This can be an insurgency or counter-insurgency environment.) The enemy has indirect fire capabilities. The unit has guidance provided by the rules of engagement (ROE) and from mission instructions, such as the peace mandate terms of reference, Status of Forces Agreement (SOFA), and rules of interaction (ROI). Civilians, government agencies, nongovernmental organizations, private voluntary organizations, and local and international media may be in the area.

Some iterations of this task should be performed in MOPP4.

Standard: The platoon moves NLT the time specified in the order. The platoon makes contact with only one element and the main body is not surprised by the enemy. Once the platoon makes contact, it maintains contact to destroy squad and smaller sized elements and fix units larger than a squad. The platoon maintains a sufficient fighting force capable of conducting further combat operations. The unit complies with the ROE/ROI, mission instruction, higher headquarters and other special orders.

Grading Scale: GO: (1-3) NO/GO: (4-7)

1	2	3	4	5	6	7
Not Executed	Executed w/ adverse Effects	Poorly Executed	Executed To Standard	Executed Above Standard	Excellent Execution and Timing	Near Perfect Execution

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<p>* 1. The platoon leader plans the movement to contact.</p> <ul style="list-style-type: none"> a. Platoon leader conducts troop leading procedures. b. (If not directed by the company) Determines which technique to use for conducting the movement to contact. <ul style="list-style-type: none"> (1) Search-and-attack technique. (2) Approach march technique. c. Considers METT-TC when determining the method. d. Addresses PIR requirements. <p>* 2. The platoon leader supervises preparations for the mission.</p> <ul style="list-style-type: none"> a. Coordinates the plan with adjacent units. b. Platoon maintains security during preparations. c. Reconnoiters and posts guides along the route to the LD, if authorized in the OPORD. <p>3. The platoon crosses the LD on time and begins the movement to contact.</p> <ul style="list-style-type: none"> a. Initiates movement on the platoon leader's order. b. Moves in the formation designated in the order. 							
<p>* 4. The platoon leader directs the platoon to use the search-and-attack technique.</p> <ul style="list-style-type: none"> a. Uses multiple, coordinated, small-unit (squad/team) to find, fix, or finish the enemy. b. Determines the number and size of the units operating areas. <ul style="list-style-type: none"> (1) Assigns small areas of operation that keep the squads more concentrated and helps maintain control. (2) Divides the platoon area into zones and focuses on one zone at a time while conducting economy-of-force missions in other zones. c. Locates the enemy without being detected. d. Once engaged, fixes the enemy in position and maneuvers against the enemy. e. Maintains security throughout actions. <p>* 5. The platoon leader directs the platoon to use the approach-march technique.</p> <ul style="list-style-type: none"> a. Selects the movement technique and formation based on the likelihood of enemy contact. 							

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<ul style="list-style-type: none"> b. Maintains contact, once contact is made, until ordered to do otherwise. 							
<ul style="list-style-type: none"> 6. The platoon reacts to contact. <ul style="list-style-type: none"> a. Reacts to contact and takes the appropriate actions. b. Follows the directions of higher headquarters. 							
<ul style="list-style-type: none"> * 7. The platoon leader reorganizes the platoon as necessary. <ul style="list-style-type: none"> a. Conducts consolidation and reorganization. b. Reports the situation to the company. c. Continues the mission. 							

Synopsis Report for Collective Task

07-3-1001

Take Action on Contact (Infantry Platoon/Squad)

Status: Inactive

Condition: The platoon is conducting tactical operations as part of a larger unit. It makes contact through one of the eight forms of contact (receipt of direct fire, visual contact, receipt of indirect fires, contact with obstacles, contact from threat/unknown air elements, electronic warfare contact, contact in nuclear, biological, chemical (NBC) situations, or nonhostile contact). The unit has guidance provided by the rules of engagement (ROE) and from mission instructions, such as the peace mandate terms of reference, Status of Forces Agreement (SOFA), and rules of interaction (ROI). Civilians, government agencies, nongovernmental organizations, private voluntary organizations, and local and international media may be in the area. Some iterations of this task should be performed in MOPP4.

Standard: The platoon reacts to the contact, deploys as required, and reports the contact to higher headquarters. It develops the situation and recommends a course of action (COA) based on the commander's intent and/or current tactical situation. The platoon executes the chosen/directed COA and reports to higher headquarters. The platoon remains combat effective and is prepared for follow-on missions.

The unit complies with the ROE/ROI, mission instruction, higher headquarters and other special orders. No friendly unit suffers casualties or equipment damage as a result of fratricide. Collateral damage is minimized.

Grading Scale: GO: (1-3) NO/GO: (4-7)

1	2	3	4	5	6	7
Not Executed	Executed w/ adverse Effects	Poorly Executed	Executed To Standard	Executed Above Standard	Excellent Execution and Timing	Near Perfect Execution

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<p>1. Platoon deploys and reports.</p> <p>a. Conducts command and control of operations digitally:</p> <p>(1) Maintain digital situational awareness.</p> <p>(2) Submit digital reports and overlays.</p> <p>(3) Direct movement, positioning, and fires digitally.</p> <p>b. Ensures that rules of engagement (ROE) and rules of interaction (ROI) are disseminated to subordinate personnel.</p> <p>c. Reacts when contact entails direct fire contact .</p> <p>(1) Element in contact returns fire immediately to destroy or suppress the threat and sends contact report.</p> <p>OR</p> <p>(2) Deploys to covered and concealed positions, if available.</p> <p>(3) Utilizes indirect fire assets, as necessary.</p> <p>(4) Activates on-board self protection measures as appropriate.</p> <p>(5) Conducts battle drills, as necessary.</p> <p>(6) Maintains visual contact with the threat while continuing to develop the situation through reconnaissance or surveillance.</p> <p>(7) Maintains cross-talk with all platoon elements.</p>							

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
(8) Platoon leader/platoon sergeant (PSG) sends SPOTREP to higher headquarters.							
<p>d. Reacts when contact is visual.</p> <p>(1) If there is immediate danger from the threat, the element establishing visual contact initiates fires to destroy or suppress the threat, deploys to covered and concealed positions using appropriate battle drill(s), and reports to platoon leader.</p> <p>OR</p> <p>(2) If there is no immediate danger from the threat or the threat is out of direct fire range, the element deploys, maintains visual contact, and reports to platoon leader.</p> <p>(3) Remaining platoon elements deploy to supporting covered and concealed positions, as directed by platoon leader.</p> <p>(4) Platoon leader/PSG sends spot report (SPOTREP) to higher headquarters.</p> <p>e. Reacts when contact is indirect fires (observed or receiving).</p> <p>(1) Elements observing indirect fire use evasive actions to avoid impact area.</p> <p>(2) Elements under fire continue to move quickly to clear impact area.</p> <p>NOTE: Crews immediately close hatches, as necessary.</p> <p>(3) Platoon reacts to chemical/biological attack, if necessary, IAW OPOD/FRAGO and type of incoming rounds.</p> <p>NOTE: Platoon elements immediately conduct NBC reconnaissance.</p> <p>(4) Platoon leader/PSG sends SPOTREP to higher headquarters.</p> <p>(5) If NBC agents were detected, platoon leader/PSG sends follow-up NBC 1 report to higher headquarters.</p> <p>f. Reacts when contact is with an obstacle.</p>							

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<p>(1) Element establishing visual contact with the obstacle deploys to covered and concealed positions and reports to platoon leader.</p> <p>(2) Remaining platoon elements deploy to supporting covered and concealed positions, as directed by platoon leader.</p> <p>NOTE: Crews immediately close hatches, as necessary.</p> <p>(3) Platoon leader calls for immediate smoke on the far side of the obstacle to conceal deployment of the platoon, if required.</p> <p>(4) Platoon leader/PSG sends SPOTREP to higher headquarters.</p> <p>g. Reacts when contact is a threat/unknown air contact.</p> <p>(1) If there is immediate danger from the threat, the element establishing visual contact initiates fires to destroy or suppress the threat, deploys to covered and concealed positions using appropriate battle drill(s), and reports to platoon leader.</p> <p>OR</p> <p>(2) If there is no immediate danger from the threat or the threat is out of direct fire range, the element establishing visual contact, deploys, maintains visual contact, and reports to platoon leader.</p> <p>(3) Remaining platoon elements deploy to supporting covered and concealed positions, as directed by platoon leader.</p> <p>(4) Platoon leader/PSG sends SPOTREP to higher headquarters.</p> <p>h. Reacts when contact is electronic warfare contact (i.e., sensor or radio detection, interception, or direction finding).</p> <p>(1) Element in contact sends SPOTREP to platoon leader.</p>							

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<p>(2) If there is immediate danger from the threat, the element establishing electronic warfare contact deploys to covered and concealed positions using appropriate battle drill(s), and reports to platoon leader.</p> <p>OR</p> <p>(3) If there is no immediate danger from the threat or the threat is out of direct fire range, the element establishing electronic warfare contact maintains contact, and continues to report to the platoon leader.</p> <p>(4) Remaining platoon elements deploy to supporting covered and concealed positions, as directed by platoon leader.</p> <p>(5) Platoon leader/PSG sends SPOTREP to higher headquarters.</p>							
<p>i. Reacts when contact is NBC contact (i.e., physical or by alert with chemical agent alarms).</p> <p>(1) If chemical or biological contact, element in contact masks, sounds alarm, and sends SPOTREP to platoon leader.</p> <p>(2) Platoon takes protective measures against NBC attack/contamination.</p> <p>(3) Platoon elements conduct NBC reconnaissance to determine type and extent of contamination.</p> <p>(4) Platoon leader/PSG sends SPOTREP to higher headquarters.</p> <p>(5) Platoon leader/PSG sends follow-up NBC 1 report to higher headquarters.</p> <p>j. Reacts when contact is non-hostile contact (physical or visual).</p> <p>(1) Element in contact continues to observe.</p> <p>(2) Remaining platoon elements deploy to supporting covered and concealed positions, as directed by platoon leader.</p> <p>(3) Platoon leader/PSG sends SPOTREP to higher headquarters.</p>							

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<p>* 2. Platoon leader evaluates the situation.</p> <p>a. Element in contact evaluates the situation quickly.</p> <p>(1) Conduct reconnaissance of the area using a combination of mounted elements, dismounts, and reconnaissance by fire to fully develop the situation.</p> <p>(2) Determine enemy size, composition, activity, orientation, and location of weapon systems.</p> <p>(3) Search for antitank ditches, minefields, wire, or other obstacles that could define a fire sack.</p> <p>(4) Search for the flanks of the enemy and any elements that could mutually support enemy position(s).</p> <p>(5) Based on a fully developed situation, send updated SPOTREP (with possible COAs) to the platoon leader/PSG.</p> <p>b. Platoon leader/PSG analyzes SPOTREPs and other tactical information as required to make an assessment of the situation.</p> <p>c. Platoon leader/PSG directs the actions of elements not in contact in a manner that supports the elements in contact.</p> <p>AND/OR</p> <p>d. Platoon leader and/or PSG directs elements not in contact to continue the mission in accordance with (IAW) the operation order/fragmentary order (OPORD/FRAGO).</p> <p>* 3. Platoon leader develops the situation as required using a combination of techniques.</p> <p>a. Chooses fire and maneuver, indirect fire, reconnaissance by fire, or surveillance.</p> <p>b. Ensures platoon's actions allow for survivability and mission accomplishment.</p> <p>c. Sends updated SPOTREP to higher headquarters.</p>							

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<p>* 4. Platoon leader selects an appropriate course of action based on the commander's intent, METT-TC, his analysis of the situation, and input from elements in contact.</p> <p>a. Directs the platoon to execute the original course of action (as previously addressed in the OPORD) if it is consistent with the commander's intent/concept and is within the platoon's capability.</p> <p>OR</p> <p>b. Based on the situation, issues FRAGO to refine the plan, ensuring it supports the commander's intent.</p> <p>OR</p> <p>c. Directs the platoon to execute tactical movement (employing bounding over-watch and support by fire within the platoon) and reconnaissance by fire to further develop the situation.</p> <p>OR</p> <p>d. Directs the platoon to establish a hasty defense/support by fire (SBF) position and takes further guidance from commander.</p> <p>OR</p> <p>e. Chooses an alternative course of action (COA) based on evaluation and development of the situation.</p>							
<p>* 5. Platoon leader recommends alternative COA (if situation dictates a change to the original plan).</p> <p>a. Sends recommendation to the commander.</p> <p>b. Receives orders to execute the COA selected by the commander.</p> <p>c. Uses cross-talk with other platoons as necessary to obtain support (platoon leader/PSG).</p> <p>* 6. Platoon leader directs the platoon to execute the course of action based on the situation or commander's order.</p> <p>a. Directs the platoon to destroy an inferior force.</p> <p>OR</p>							

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<p>b. Directs platoon to conduct over-watch/support by fire.</p> <p>OR</p> <p>c. Directs platoon to conduct an attack by fire.</p> <p>OR</p> <p>d. Directs platoon to assault an enemy position.</p> <p>OR</p> <p>e. Directs platoon to break contact and conduct bypass operations.</p> <p>OR</p> <p>f. Directs platoon to conduct reconnaissance by fire.</p> <p>OR</p> <p>g. Directs platoon to conduct defense of a battle position.</p> <p>OR</p> <p>h. Directs platoon to breach an obstacle.</p> <p>* 7. Platoon leader directs operation to completion based on the situation and OPORD, FRAGO, and commander's intent.</p> <p>a. Continues to execute the selected or refined COA until platoon accomplishes the original mission, receives a FRAGO from the commander, or is ordered to execute consolidation and reorganization on the objective.</p> <p>b. Alters COA during execution as the situation dictates.</p> <p>* 8. Platoon leader/PSG keeps the commander informed throughout the operation.</p> <p>a. Sends updated SITREPs and/or SPOTREPs as necessary.</p> <p>b. Reports completion of the operation.</p>							

Synopsis Report for Collective Task

07-3-1100

Conduct Attack (Infantry/Mech Infantry Platoon)

Status: Active

Condition: The platoon is operating separately and has been ordered to attack to seize an objective. The enemy has been in position for 24 hours and has prepared positions with mines and wire. Both friendly and enemy forces have indirect fire capabilities. The platoon is given sufficient time to plan. ROE have been published. Some iterations of this task should be performed in MOPP4.

Standard: The platoon main body is not surprised or fixed by the enemy. The platoon accomplishes its assigned tasks according to the commander's intent. The platoon kills, captures, or forces the withdrawal of the enemy. The platoon accomplishes the mission NLT the time specified in the OPORD. The platoon maintains a sufficient fighting force capable of defeating an enemy counterattack and continuing further combat operations. The US forces comply with the ROE.

Grading Scale: GO: (1-3) NO/GO: (4-7)

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
Not Executed	Executed w/ adverse Effects	Poorly Executed	Executed To Standard	Executed Above Standard	Excellent Execution and Timing	Near Perfect Execution

TASK STEPS AND PERFORMANCE MEASURES	1	2	3	4	5	6	7
<p>* 1. The platoon leader receives, plans, and issues the OPOD IAW T&EO71-2-0065.07-3000 Conduct Troop Leading Procedures Infantry Platoon</p> <p>* 2. The platoon leader organizes the platoon to conduct the attack.</p> <p> a. Designates a base-of-fire element (IAW T&EO 07-3-2107.07-3000, Conduct Over-watch / Support by Fire Rifle Platoon</p> <p> b. Designates an assault element based on the enemy situation, consisting of one, two, or all squads (dependent on the platoon acting alone or as a part of a company attack).</p> <p> c. Designates a breach force if necessary.</p> <p> d. Designates movement and fire control measures.</p> <p>3. The platoon prepares for the attack.</p> <p> a. Conducts pre-combat checks.</p> <p> b. Conducts rehearsals.</p> <p>4. The platoon moves from the assembly area to the line of departure (LD).</p> <p> a. Moves without stopping in the attack position, if possible.</p> <p> b. Fixes bayonets, if directed.</p> <p> c. Deploys in attack formation.</p> <p> d. Crosses at the right place and on time.</p> <p>5. The platoon moves from the LD to the assault or support position.</p> <p> a. Moves using the appropriate techniques (IAW T&EO 07-3-1134.07-3000, Conduct Tactical Movement Infantry Platoon).</p> <p> b. Uses a covered and concealed route.</p> <p> c. Moves the assault and base-of-fire elements to their respective positions without being compromised.</p>							

<p>6. The platoon moves through the assault position and assaults</p> <ul style="list-style-type: none"> a. Deploys in the assault formation b. Breaches IAW T&EO 07-3-1403.07-3000, Conduct Initial Breach of a minded wire obstacle c. Assaults IAW T&EO 71-2-0220.07-3403, Assault an enemy position. <p>7. The platoon performs consolidation and reorganization IAW T&EO 7-3-4607, Conduct Consolidation and Reorganization Rifle Platoon Mounted</p> <p>8. The platoon reports to the company commander when the objective has been secured.</p> <p>9. The platoon repels the enemy counterattack.</p>							
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