



Virtual Environment Study of Mission-Based Critical Information Requirements

Elizabeth S. Redden

ARL-TR-2636

MARCH 2002

The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

Citation of manufacturer's or trade names does not constitute an official endorsement or approval of the use thereof.

Destroy this report when it is no longer needed. Do not return it to the originator.

Army Research Laboratory

Aberdeen Proving Ground, MD 21005-5425

ARL-TR-2636

March 2002

Virtual Environment Study of Mission- Based Critical Information Requirements

Elizabeth S. Redden

Human Research & Engineering Directorate, ARL

Approved for public release; distribution is unlimited.

Abstract

The Human Research and Engineering Directorate of the U.S. Army Research Laboratory conducted an experiment to determine the critical information required by soldiers in four echelons (squad member, fire team leader, squad leader, and platoon leader). This information is intended for use in the development of the design requirements for information systems such as the Smart Sensor Web. The experiment was conducted in the Dismounted Battlespace Battle Lab's Squad Synthetic Environment (SSE), a virtual environment that allows the squad to participate in force-on-force exercises. A validation study of the SSE was conducted before the start of the experiment to ensure that information gathered in the virtual environment would be comparable to that gathered in a live experiment. The eight squads that participated in the experiment conducted infantry operations using scripted vignettes that were prepared to include as many situations as possible that are typically encountered during infantry operations. After participation in each vignette, soldiers rated the criticality of each of the situational awareness (SA) items on a questionnaire. This questionnaire was developed after a literature search and a subject matter expert conference that were conducted to gather potential SA critical information items.

ACKNOWLEDGMENTS

The authors wish to thank the several individuals from the U.S. Army Infantry School and the U.S. Army Research Laboratory (ARL) for their contribution to the study. First, we would like to thank Dan Turner. Without his assistance, this study would not have been possible. He led in the development of the scripts for the vignettes, and his extensive combat experience was crucial to the validity of the scripts and questionnaires used. In addition, his leadership skills were instrumental in the smooth running of the experiment. Bill Youngblood's assistance in the preparation of the scripts and in running the Platoon Headquarters and White Cell was very valuable. We also wish to thank SFC John Corderro-Torres and Jeffrey Everette for assisting in performing the literature search. Cindy Holloway was instrumental in the data reduction, questionnaire administration, and editing of the final report.

The authors further thank Nancy Nicholas of ARL for technically editing this document.

INTENTIONALLY LEFT BLANK

Contents

Executive Summary	1
1. Introduction	3
1.1 Background	3
1.2 Purpose	4
2. Method	4
2.1 Apparatus	4
2.2 Methodology Background	4
2.3 Current Methodology	5
2.4 Subjects	6
2.5 Instruments	7
3. Results	8
3.1 Validation Study	8
3.2 Critical Information Requirements	10
4. Conclusions	17
References	19
Appendices	
A. CIR Questionnaire Results	21
B. Literature Search Results	37
C. Smart Sensor Web Demographic Questionnaire Results	65
Distribution List	73
Report Documentation Page	79
Figure	
1. McKenna MOUT Site Layout	1
Tables	
1. Description of Vignette Tactics and Scripts	6
2. Squad Matrix	7
3. Priority Ratings of Information Requirements	9
4. Comparison of Live and Simulation Ratings	11
5. Summation of CIR Questionnaire Results	12

INTENTIONALLY LEFT BLANK

Executive Summary

The Human Research and Engineering Directorate of the U.S. Army Research Laboratory (ARL) conducted an experiment to investigate the critical information requirements (CIRs) for four echelons of the infantry platoon operating in and around urban areas during attack, defend, and reconnaissance missions in a virtual environment. The virtual environment used for the study was the Dismounted Battlespace Battle Lab's Squad Synthetic Environment (SSE). We validated the use of the SSE by conducting a "clear a room" vignette in the McKenna military operations on urbanized terrain (MOUT) site (see Figure 1), Fort Benning, Georgia, and by conducting the same vignette in the SSE. The results from both exercises were compared, and similar results were found in both environments.

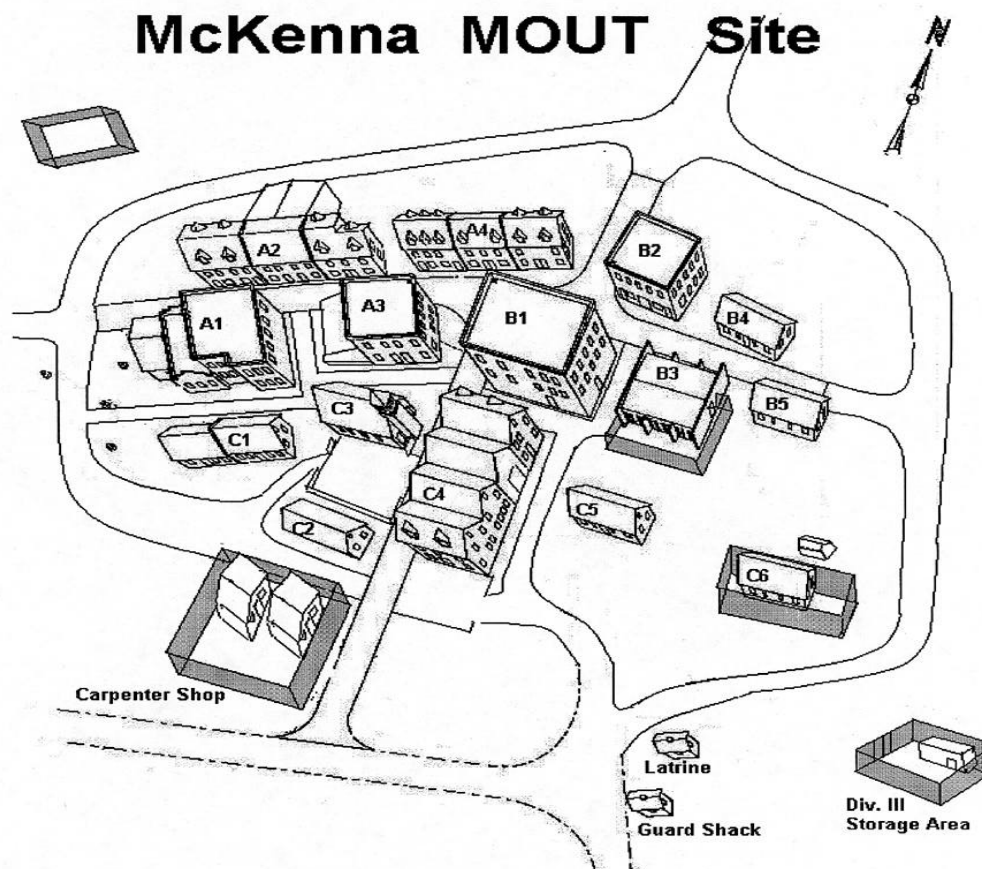


Figure 1. McKenna MOUT Site Layout.

A thorough literature search was conducted to document hypothesized CIRs for attack, defend, and reconnaissance missions. Next, a subject matter expert (SME)

panel comprised of current and former infantrymen was convened to generate CIRs that were specific to the scenarios used in the study and that were tailored by echelon. The literature search and the SME panel provided a large quantity of possible CIRs to be evaluated. To focus the study, an additional panel of SMEs convened with the purpose of reviewing the CIR literature search results and selecting CIRs to evaluate in the vignettes. The panel based CIR selection on criticality and relevancy to proposed vignettes. At the completion of the SME review, CIR questionnaires were constructed. These questionnaires were administered after the soldiers conducted each of the vignettes in the SSE so that the soldiers could rate the criticality of the proposed information requirements to the conduct of the vignette.

Findings indicate that information that should be rushed to the platoon members should be limited to only the critical information that affects their decisions or actions. This would result in less cluttered displays that are easily read and understood. Soldiers should be allowed to “pull” information that is less critical or that is only needed occasionally. Since squad members make very few decisions, they need less information than the higher echelons do. The information provided to squad members should only concern items that they have the ability to impact and items that cause them to take a particular course of action.

Criticality of the knowledge of the opposing forces’ (OpFor) location beyond 50 meters from the objective increases as the level of leadership increases. Squad members are interested in their objective and are somewhat interested in the OpFor location within 50 meters of their objective. The leaders are interested in the location of the OpFor all the way to 1 kilometer because this knowledge is important in their planning.

VIRTUAL ENVIRONMENT STUDY OF MISSION-BASED CRITICAL INFORMATION REQUIREMENTS

1. Introduction

1.1 Background

The primary design driver for information technology (IT) systems often appears to be expedience rather than human strengths and limitations. Many systems have been designed to provide the soldier with the information that can easily be obtained rather than first determining the type of information that is most needed. The Project Manager (PM) of the Deputy Under Secretary of Defense (Science and Technology) (DUSD[S&T]) Smart Sensor Web (SSW) initiative recognized this potential problem and addressed it by commissioning the U.S. Army Infantry Center (USAIC) and the U.S. Army Research Laboratory's (ARL) Human Research and Engineering Directorate to perform a study in support of the program. The purpose of the study was to investigate the critical information requirements (CIRs) for members of an infantry platoon operating in urban terrain. The results from this study will be used to document information requirements that should influence the design of the SSW. Two studies preceded the current study and acted as pilot tests for the methodology used.

1.1.1 Situational Awareness and Communication Experiment for Military Operations in Urban Terrain – Experiment I (SA-CE I)

The SA-CE I was conducted by ARL in support of the military operations in urban terrain (MOUT) advanced concept technology demonstration (ACTD) (Redden & Blackwell, 2000). This experiment successfully demonstrated the utility of the situational awareness (SA) assessment center methodology. It also piloted the concept of using an assessment center to determine CIRs for specific missions. The assessment center methodology placed squad-sized elements in vignettes at the McKenna MOUT facility in Fort Benning, Georgia. The vignettes required them to fight against a live opposing force (OpFor) whose movements and actions were scripted. At the completion of the short vignettes, the soldiers were given an assessment of knowledge questionnaire to determine the level of SA they achieved during the vignette. They also gave a subjective rating of the importance of the SA elements to the conduct of the mission.

1.1.2 Smart Sensor Web Pilot Test

This test was also conducted at the McKenna MOUT facility and used live OpFor in scripted vignettes. The assessment center methodology was able to discriminate between baseline and technology-enhanced conditions, demonstrating the potential of the SSW to increase the SA of the infantry squad. At the pauses in the vignettes, soldiers were administered a subjective

questionnaire that required them to evaluate the importance of the SA information elements to the conduct of the vignettes. This study also demonstrated the usefulness of placing soldiers in vignettes to evaluate the importance of CIRs to specific missions.

1.2 Purpose

The purpose of this study was to investigate the CIRs for four echelons of the infantry platoon (squad member, team leader, squad leader, and platoon leader) operating in urban areas during attack, defend, and reconnaissance missions.

2. Method

2.1 Apparatus

2.1.1 Squad Synthetic Environment

The CIR study was performed with the squad synthetic environment (SSE) simulator housed at Fort Benning. The study was executed by ARL, with the support of the Simulations and Modeling Division of the Dismounted Battlespace Battle Lab. The simulator configuration used for this study consisted of a command center (two control personal computers [PCs]), nine interactive soldier visualization stations (SVS), a maximum of eight PC OpFor and civilian on the battlefield (COB) interactive stations. Pleban, Eakin, Salter, and Matthews (2001) provided additional information about the configuration of the SSE simulator.

2.1.2 Validation Study

A validation study was conducted to ensure that the data obtained with the simulator would be consistent with data obtained during live operations. During the validation study, the soldiers used in this study conducted a vignette that had previously been conducted in a live exercise at McKenna MOUT site by three Ranger platoons. At the conclusion of the vignettes (both live and simulation), soldiers were administered a CIR questionnaire that asked them to rate the importance of specific information requirements in the vignettes. The results from the ratings from both exercises are given in Appendix A. The importance ratings of the information to the soldiers in the simulation vignette were then compared to the importance ratings of the soldiers who conducted the live vignette to determine whether the information requirements in the simulator were similar to the cognitive requirements in the live exercises.

2.2 Methodology Background

A literature search was conducted to evaluate methodologies that had been used in the past to determine or document CIRs. Payne, Bettman, and Johnson (1993)

placed subjects in a static simulator in which they selected items for consideration with mouse clicks. The CIRs were determined to be those that were most frequently chosen with mouse clicks. Endsley (1993) surveyed SA requirements in air-to-air combat fighters. She used unstructured interviews with subject matter experts (SMEs) and a goal-directed task analysis to develop structured information requirement questionnaires. Additional SMEs then performed criticality ratings of the potential CIRs contained in the structured questionnaires. In both the SA-CE I and SSW Pilot Test, ARL used SMEs to develop critical SA requirements, which were then given criticality ratings by the participants after they completed the assessment center vignettes.

2.3 Current Methodology

2.3.1 Literature Search

An extensive literature search was performed to find CIRs for the following mission-based scenarios: clearing a building, defending a MOUT objective, and reconnoitering a MOUT objective. Although no previous experiments or studies were found that were conducted solely to address infantry CIRs, several references hypothesized CIRs for different echelons of infantry soldiers. The four echelons of infantry soldiers considered in the literature search were squad member, team leader, squad leader, and platoon leader. The results of the literature search are a compilation of CIRs for each aforementioned echelon, as well as for the three mission-based scenarios and are given in Appendix B. Information sources and references cited include Army training and evaluation plans; U.S. Army field manuals; the U.S. Army Ranger Handbook (SH 21-76); Army Research Institute technical reports; data from two joint experiments conducted by the MOUT ACTD at the U.S. Army Dismounted Battlespace Battle Lab and the U.S. Marine Corps Warfighting Lab (JE1 and JE2); and data collected during SA-CE I. A SME panel comprised of current and former infantrymen was convened to generate CIRs that were specific to the scenarios used in the study and that were tailored by echelon.

The literature search and the SME panel provided a large quantity of possible CIRs to be evaluated. To focus the study, an additional panel of SMEs convened with the purpose of reviewing the CIR literature search results and selecting CIRs to evaluate in the vignettes. The panel based CIR selection on criticality and relevancy to proposed vignettes. At the completion of the SME review, CIR questionnaires were constructed.

2.3.2 Vignette Development

Vignettes were developed for the three mission-based scenarios selected for this study (clearing a building, defending a MOUT objective, and reconnoitering a MOUT objective). The vignettes were tailored to meet virtual environment requirements. Scripts were written for each vignette, which controlled the movement and action of the OpFor and COBs. An attempt was made to vary the scripts and the vignettes so that the soldiers would be confronted with as many

conditions as possible during the conduct of the experiment. Table 1 provides a description of the vignette tactics and scripts used for the CIR study.

Table 1. Description of Vignette Tactics and Scripts

Vignette	Tactics	Script 1	Script 2	Script 3
A	Squad attacks and clears a freestanding building that consists of four rooms. Squad attacks across an open danger area.	Three OpFor located on the objective. Three COBs co-located with OpFor.	Three COBs dead on the objective. Six OpFor mount counterattack.	Four OpFor located on the objective. Three COBs co-located with OpFor.
B	Squad defends and prepares for counter attack. Squad occupies the second floor of a building and observes OpFor activity on the eastern half of McKenna MOUT site.	Six OpFor in two different buildings; all move to attack squad. Four total COBs: two in a building and two in vicinity of the cemetery.	Seven OpFor in two different buildings; three move to attack squad, four fire from one building (two OpFor KIA in the building). Three COBs; all KIA in an open area.	Eight OpFor in two different buildings; four move to attack fire team A and (squad and) four attack fire team B (fire from one building).
C	Squad conducts a reconnaissance from the wood line, observing OpFor activity on the southern half of McKenna MOUT site.	Four OpFor preparing defensive positions in four different buildings. Three COBs move in an open area. Obstacle and vehicle (moving) in an open area.	Four OpFor preparing defensive positions in two different buildings. Two COBs move in an open area. Obstacles and vehicle (stationary) in an open area.	Four OpFor preparing defensive positions in four different buildings. Three COBs under heavy guard by OpFor; one killed by OpFor in an open area.

KIA = killed in action

2.3.3 Experimental Design

Eight squads participated in the study; each squad completed one of the three scripts for each vignette, as shown in Table 2.

2.4 Subjects

Eight squad-sized elements of soldiers and their platoon leaders were used for this study. The first six squads were comprised of soldiers from the 1/167 INF Alabama National Guard. The seventh squad was from Bravo Company, 1/30 INF 3ID (M) (Fort Benning), and the remaining squad was from Bravo Company, 1/29 INF (Fort Benning). Complete results of the demographics are given in Appendix C.

Table 2. Squad Matrix

Squad	Vignette A			Vignette B			Vignette C		
	Script 1	Script 2	Script 3	Script 1	Script 2	Script 3	Script 1	Script 2	Script 3
1	X			X			X		
2	X			X			X		
3	X			X			X		
4		X			X			X	
5		X			X			X	
6		X			X			X	
7			X			X			X
8			X			X			X

The six National Guard squads were close to full strength (a total of 48 soldiers) and had an average age of 31 years. They had an average of 13 years of education and 115 months of military service, with 61 months in their current positions. Most (88%) of the soldiers were infantry (qualified as 11M), with (an additional) 6% qualified 11B. Average military training and instruction received in light infantry operations (including classroom training and field exercises) was 16 months. Their self-evaluation of individual knowledge, skills, and abilities was average.

The 3ID (M) squad and the 1/29 squad were nearly full strength (a total of 17 soldiers) and had an average age of 24 years. They had an average of 13.6 years of education and averaged 47 months of military service with 43 months in their current positions. All the soldiers were infantry, with 12% qualified 11B. Average amount of military training and instruction received in light infantry operations (including classroom training and field exercises) was 10 months. Their self-evaluation of individual knowledge, skills, and abilities was average.

The subjects from the live validation exercise were nine Ranger squads from A and C Companies, 3rd Battalion, 75th Ranger Regiment, Fort Benning. The squads were at full strength (a total of 84 soldiers) and the soldiers' average age was 22 years. The Rangers had an average of 12.7 years of education with a mean general technical score of 118. They averaged 24 months of military service and 11 months in their current positions. Their self-evaluation of individual knowledge, skills, and abilities was slightly above average.

2.5 Instruments

2.5.1 Demographic Questionnaire

The demographic questionnaire was used to collect soldier military service, training, and experience data. The demographic questionnaire also included a

self-rating of knowledge, skills, and abilities related to infantry duties. The questionnaire was administered to the soldiers upon their arrival at the SSE simulator. (Detailed results are given in Appendix C.)

2.5.2 CIR Questionnaires

The CIR questionnaires were administered during pre-planned pauses in the vignettes. They required the participant to give a subjective rating on a 7-point scale (importance to the completion of the mission) of each of the information requirements contained in the CIR questionnaire. Items rated 5 to 7 were rated as being necessary for mission performance. Thus, the soldiers were able to place themselves into an actual scenario to determine how important the CIRs were to their positions in the platoon. See Appendix A for the CIR questionnaires.

3. Results

3.1 Validation Study

Forty-seven of the soldiers from the simulation exercise and 72 of the soldiers from the live exercise were used in the validation study. The mean ratings of criticality and standard deviations for the live and the simulation iterations of the validation study are given in Table 3. The questions from the live and the simulation exercises are listed in order of ratings from highest criticality to lowest criticality.

Independent sample t-tests were conducted to determine whether the criticality ratings during the simulation exercise were similar to the ratings given during the live exercise. Eight of the eleven t-tests were significant. However, examination of the order of the criticality ratings (see Table 3) revealed that the ordering of the criticality of the information requirements was very consistent between the live and simulated exercises. There was a 0.55 mean difference among the 11 ratings from the live and simulation exercises. In all cases, the soldiers from the simulation exercises rated the criticality of the information requirements higher than did the soldiers from the live exercises. This makes intuitive sense because the soldiers in the live exercises were receiving information from all five of their senses and had better peripheral vision. The soldiers in the simulation only had information from a two-dimensional visual display and from the “open microphone radio” that was used in the simulator so that the squad members could talk to each other and so that the squad leader and platoon leader could maintain communications. Information from outside sources would thus seem to be more critical to soldiers in the simulator than to soldiers in a live exercise. When the mean difference (0.55) was subtracted as a constant from the simulation ratings and independent sample t-tests were run, there were no

Table 3. Priority Ratings of Information Requirements

Priority	Information Requirements				Information Requirements			
	Live	Mean	SD	N	Simulation	Mean	SD	N
1	Q09 OpFor location on objective	5.28	1.35	72	Q09 OpFor location on objective	6.04	1.30	46
2	Q02 Counterattack threats and location	5.08	1.17	72	Q02 Counterattack threats and location	5.62	1.42	47
3	Q05 Type of hostile fire expected from Southeast	4.99	1.32	72	Q11 Platoon sergeant location	5.52	1.46	46
4	Q03 OpFor location outside McKenna	4.92	1.19	72	Q05 Type of hostile fire expected from Southeast	5.50	1.43	46
5	Q08 Company CCP location	4.83	1.16	72	Q03 OpFor location outside McKenna	5.36	1.29	47
6	Q06 OpFor activity reported by A Co.	4.69	.94	72	Q07 Disposition of 2nd Squad	5.34	1.27	47
7	Q11 Platoon sergeant location	4.66	1.30	68	Q06 OpFor activity reported by A Co.	5.32	1.46	47
8	Q04 OpFor element rate of movement	4.64	1.26	72	Q01 Anticipated time OpFor will reach McKenna	5.13	1.50	47
9	Q01 Anticipated time OpFor will reach McKenna	4.62	1.20	71	Q04 OpFor element rate of movement	5.09	1.43	46
10	Q10 Disposition of A CO	4.40	1.29	72	Q08 Company CCP location	4.98	1.65	47
11	Q07 Disposition of 2nd Squad	4.39	1.11	71	Q10 Disposition of A Co.	4.79	1.40	47

significant differences between the ratings from the live and the simulation exercises (see Table 4).

3.2 Critical Information Requirements

The detailed results from the CIR questionnaire are given in Appendix A. Table 5 displays a compilation of the results from all the questionnaires (i.e., the attack, defense, and reconnaissance questionnaires for planning, occupying an attack position, and executing the vignettes). It combines the information requirements on the soldiers' questionnaires into information requirement categories (i.e., all questions concerning the number of OpFor are grouped into an information requirement category). It also displays the mean of the question means in that category by echelon. Items rated 5.5 and higher were considered to be critical. We chose this mean rating cutoff by adding 0.55 (the mean difference between the live and simulator ratings that was considered to be simulator inflation) to the 5.0 (necessary for performance) scaled item.

Table 5 also presents the level of SA for each of the information requirements. Endsley (1987, 1988, 1995) defined SA as “the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future.” Endsley's definition of SA discussed three levels: perception, comprehension, and projection. Perception (Level 1 SA) is the lowest level of SA because it involves only the conscious knowledge that something is present in the environment. Level 2 SA or comprehension is the synthesis of disjointed perceptions so that understanding of the significance of the perceptions is present. Projection (Level 3) SA is the ability to project future courses of action, based on the understanding gained from Level 2 SA.

3.2.1 Location of OpFor on the Objective

Knowledge of the location of the OpFor on the “objective¹” was critical to all echelons before the attack. This knowledge was critical for planning the execution of the attack.

3.2.2 Size of the OpFor on the Objective

The number of OpFor on the objective was critical during the planning and execution of the attack to all echelons. It was also critical to all echelons during the planning and execution of the reconnaissance mission.

¹ A key piece of terrain identified by the commander to be seized or held.

Table 4. Comparison of Live and Simulation Ratings

Information Requirements	Simulation Adjusted Mean	Live Mean	t-value	df	2-tail Significance
Q01. When do you anticipate that the platoon-size OpFor element will reach McKenna Village?	4.58	4.62	-.17	116	.87
Q02. Do you have any OpFor counterattack threats? If so, from where?	5.07	5.08	-.07	117	.95
Q03. Are there any reports of OpFor platoon-sized units outside McKenna Village? If so, where are they?	4.81	4.92	-.48	117	.63
Q04. If yes, what is the rate of movement?	4.54	4.64	-.41	116	.69
Q05. What type of hostile fire do you expect to receive from the OpFor southeast of McKenna?	4.95	4.99	-.14	116	.89
Q06. What OpFor activity was reported by A Co.?	4.77	4.69	.34	117	.74
Q07. What is the disposition of the 2nd Squad?	4.79	4.39	1.78	116	.08
Q08. Where is the Company CCP?	4.43	4.83	-1.57	117	.12
Q09. Where are the OpFor on your objective?	5.49	5.28	.86	116	.39
Q10. What is the disposition of A Co.?	4.24	4.40	-.66	117	.51
Q11. Where is your platoon sergeant?	4.97	4.66	1.19	112	.24

Table 5. Summation of CIR Questionnaire Results

Ref No.	Information Requirement Category	SA Level	Question Number	PL	SL	FTL	SM
OffFor							
1	Location of OpFor on objective	Per	AO7	6.67	6.06	6.12	6.15
2	Size of OpFor on objectives	Per	AP1, AO6, AA1, BP1, CP1, CR1	6.17	6.37	6.36	5.95
3	Type of OpFor activity	Per	AA4, BD2, CP18	5.79	5.80	5.81	5.32
4	Location of OpFor outside of objective but within 50 meters of objective	Per	AO8, AA 2, BD3, CP17, CR9	5.71	6.22	5.79	5.61
5	Location of OpFor greater than 50 meters but less than 1 km away from objective	Per	AA5, BP4, CR3, CR8	5.93	5.97	5.83	5.38
6	Existence of OpFor special direct fire weapons	Per	AP2, AP3, AO17, BP2, CP2, CP3, CP4, CP5	6.22	6.06	6.28	5.83
7	Existence of OpFor indirect fire weapons	Per	AP9, BP5, CP9	5.56	6.08	6.11	5.36
8	OpFor special equipment such as night vision and long range optics	Per	AO20, CP16, CR11, CR12	6.06	6.09	5.79	5.67
9	Existence of OpFor air support	Per	AP10, CP10	5.34	5.97*	5.77	5.31
10	OpFor NBC capability	Per	AP7, CP11	5.67	6.45	6.10	5.66
11	OpFor reinforcement capability	Per	AP6, AO12, AA3, AA7, BP4, BD1, BD5, CP8, CR2	5.82	6.02	5.91	5.42
12	Direction of OpFor movement	Per	AA6, BD4	5.83	6.17	5.80	5.20
13	OpFor ammunition status	Per	BP18	5.00	5.72	5.57	5.18
14	Number of dead OpFor	Per	A01, AO3	4.20	4.61	5.36	4.43
15	OpFor physical and mental status	Comp	AO18, AO21	5.42	5.42	5.37	5.17
16	Strongest OpFor location	Comp	AP21	6.67	6.28	5.98	5.52
17	Weakest OpFor location	Comp	AP20	6.50	5.94	5.57	5.28
18	OpFor knowledge of your activities	Proj	BP12	5.33	6.78	6.18	6.07
19	OpFor intent and projection of enemy activity	Proj	AP5, AO10, AO11, AO22, AA8, BP3, BP10, BP17, BP20, BD6, CP7, CP 31, CR4, CR15 CR20	5.70	5.87	5.86	5.50

Table 5 (continued)

		Civilians on the Battlefield (COBs)					
20	Presence of COBs	Per	AP11	5.67	5.61	5.47	4.98
21	Location of COBs on objective	Per	CP14	4.83	5.39	5.41	4.97
22	Number of COBs on objective	Per	CP12, CR5	5.17	5.31	5.49	4.88
23	Temperament or status of COBs on objective	Comp	AP13, AO13, CR6	4.80	5.31	5.50	4.94
24	Temperament or status of COBs around objective	Comp	AO2, AO4, BP6, CP13	4.35	5.06	5.20	4.69
25	COB KIAs	Per	AA9	5.06	5.11	4.92	4.92
26	Differentiate between COBs and OpFor	Comp	AP12	5.00	5.50	6.02	5.15
		Friendly Troops					
27	a. Friendly location	Per	AO16, AA10, BD7,	5.80	5.58	5.85	5.76
	b. Friendly identification	Per	AO14, AO15, BP9, CP15	4.89	5.31	5.09	5.35
28	Friendly physical and mental stats	Comp	AO19, AA16, CP30	5.48	5.92	6.07	5.72
29	Attachments or detachments to the squad	Per	AP19, BP11	4.50	4.94	5.86	4.92
30	Knowledge of other friendly unit activity	Comp	AP16, AA14, BP15, CR13	5.32	5.57	5.73	5.36
31	Friendly wounded in action/killed in action (WIA /KIA)	Per	AO5, AA11	6.33	5.59	5.81	5.50
32	Strongest Friendly location	Comp	BP14	5.50	6.17	5.65	5.88
33	Weakest Friendly location	Comp	BP13, BD12	6.17	6.00	5.95	5.66
		Mission Information					
34	Information concerning buildings on the objective	Comp	AP8, AO23, CR16, CR17, CR18, CR19	5.98	6.11	6.00	5.40
35	Knowledge of terrain	Per	BP19, CP19, CP20, CP22, CP25, CP26	5.94	6.00	5.93	5.76
36	Obstacles or hazards on potential routes or objective	Per	AP4, AO9, CP6, CP24	6.00	6.07	6.02	5.44
37	Knowledge of mission parameters and command and control	Per	AP14, AP15, AP17, AA13, BP7, BP8, BP21, BP22, BD9, CR14	5.52	5.78	6.11	5.43
38	a. Friendly ammunition status	Per	AA15, BD11	6.17	6.56	6.19	6.45
	b. When Friendly resupply expected	Per	BD10	4.00	6.22	4.97	5.64
39	Secondary missions	Per	AP18, AA12, BD8, CR7	5.03	5.70	5.68	5.04
40	Conditions affecting mission (i.e., weather, light level)	Proj	AP22, CP2, CP23, CP27	5.63	5.63	6.00	5.56
41	Squad projected routes and movement rates	Comp	CP21, CP28, CP29, CR10	5.83	5.77	5.96	5.76

*because of reconnaissance

3.2.3 Type of OpFor Activity

The type of activity in which the OpFor is engaged is important to all echelons during a reconnaissance mission; it is one of the primary purposes of the mission. During the attack, attention is diverted from interest in OpFor activity outside the objective and is focused on areas of immediate concern. During the defense, the squad leadership found information about OpFor activity in the area to be of critical concern. This information helps the squad leadership to know what defensive tactics to employ and when to employ them.

3.2.4 Location of OpFor Outside the Objective but Within 50 Meters of the Objective

During the reconnaissance mission planning and execution, all echelons rated knowledge of the location of the OpFor within 50 meters of the objective as being critical. When the platoon was in the attack position and preparing to attack, their focus narrowed to the immediate objective. Once the attack was over, the squad became concerned with the location to which the OpFor escaped. During the defense, the squad leadership found information concerning OpFor location within 50 meters to be of critical concern. This information helped the squad leadership to know when and where to shift soldiers and where to direct fires.

3.2.5 Location of OpFor >50 Meters From the Objective but <1 km Away From the Objective and Reinforcement Capability

All three levels of leaders (fire team leader, squad leader, and platoon leader) were concerned with activity beyond 50 meters during the reconnaissance and the defense. During the attack, the fire team leaders were not interested in activity beyond their immediate objective. Squad members were not interested in the location of the OpFor at these distances, nor were they interested in knowledge of the OpFor reinforcement capability and the direction of OpFor movement. Knowledge concerning OpFor reinforcement during the planning of all types of missions is critical. During and immediately after the execution, it is critical to the leadership but not to the squad members.

3.2.6 Existence of OpFor Special Weapons

All four echelons believed that the knowledge of the location and the existence of special OpFor weapons (such as direct fire weapons and nuclear, biological, chemical capability) and special equipment (such as night vision and long range optics) was critical. This knowledge has a direct impact on the actions of all four echelons. In planning for attack and reconnaissance missions, the leadership needs to know critical information such as the location of special direct fire weapons (i.e., machine gun and sniper weapons) to plan their concept of operations. In the defense, the location of special direct fire weapons has a big impact on the squad leadership in preparing their defensive positions. It is important to the squad members because it affects their actions (i.e., whether to “low crawl,” to use cover at long ranges or at night, to use smoke, etc.).

However, squad members did not rate the knowledge of indirect fire weapons or air support as critical because this knowledge did not directly affect their actions.

3.2.7 OpFor Physical and Mental Status

Knowledge concerning the number of dead OpFor and the physical and mental status of the live OpFor was not considered critical at any of the four echelons.

3.2.8 Strongest and Weakest OpFor Location

Identification of the OpFor strong and weak points was considered to be critical by all three leadership levels. At these levels, this knowledge can be exploited. The criticality of the knowledge was highest at the highest echelon and next highest at the next level.

3.2.9 OpFor Intent and Projection of Enemy Activity and OpFor Knowledge of Friendly Activities

The leadership rated the comprehension of the OpFor intent and the ability to project their activity as critical. During the planning for defense and counterattack, the squad leaders, fire team leaders, and squad members found OpFor knowledge of friendly activity to be critical. During the defensive mission, the squad was split into two different locations (building C5 and behind a barricade on the north side of C6). The fact that they would have had to cross a danger area to reinforce each other could have been a contributing factor to their being more concerned about the OpFor knowledge of their activities and location.

3.2.10 COBs

Platoon and squad leaders rated knowledge of the presence of COBs as marginally critical. However, most information about COBs was not considered critical. Caution must be used when one is drawing conclusions about this information because in the simulations used for these vignettes, COBs were not capable of hostile fire or of affecting the outcome of the vignette. In a live vignette, where COBs could be hostile to the friendly forces, knowledge concerning their location, temperament, etc., could be critical. Also, if the friendly unit's mission is to extract the civilians, then knowledge of their location and status would be critical.

3.2.11 Friendly Location and Identification

Knowledge concerning the location of friendly units was considered critical at all echelons. The identification of the friendly unit (i.e., what company, what platoon, etc.) was not considered to be critical information.

3.2.12 Friendly Physical and Mental Status

The status of the squad members was considered critical information by the squad leader and below. The platoon leaders considered platoon morale to be critical, but the unit experience level was not considered to be critical.

3.2.13 Attachments to or Detachments From the Squad and Knowledge of Other Friendly Activity

Information in this category was generally not considered to be critical. Although knowledge of attachments to and detachments from the squad is important for accountability and assignments, it is not deemed critical information for planning. Knowledge of friendly unit activity is a critical piece of information during planning and execution of a defensive mission and during the execution of attack and reconnaissance missions. Knowledge of what or who might be to the front, right, left, and rear could play a part in squad movement to and from the objective.

3.2.14 Friendly Wounded in Action (WIA) and Killed in Action (KIA)

This information was critical to the leadership.

3.2.15 Strongest and Weakest Friendly Locations

This knowledge was considered to be critical by all four echelons.

3.2.16 Knowledge of Terrain, Obstacles, Squad Projected Routes and Movement Rates, and Conditions Affecting the Mission

This information was considered to be critical to all echelons.

3.2.17 Knowledge of Mission Parameters, Command and Control, and Secondary Missions

This information was considered to be critical by the squad and fire team leaders.

3.2.18 Knowledge of Friendly Ammunition and Re-supply Status

All echelons felt that knowledge of ammunition status was critical. The expected time for re-supply of water and food was not considered to be nearly as important.

3.2.19 Information Concerning Buildings on the Objective

The leadership rated this information as critical. This information would affect their approach plans and the weapons and equipment that they would take with them for building entry. Squad members do not need this information because they only react to orders from the leadership.

3.2.20 Squad Members

Squad members had fewer information requirements than the higher echelons. Squad members rated only the information that had a direct effect on their actions as critical. For example, knowledge of obstacles or hazards on potential routes was not considered critical because the leaders plan the routes that squad members will take. Many information items concerning the OpFor were considered critical. Squad members wanted to know where the OpFor were located on their objective or where they were located in proximity to their objective. However, they were not concerned about the OpFor location 25 or

more meters beyond the *borders* of their objective. Knowledge of the OpFor weapons and special equipment was considered to be critical because they affect squad member posture, need for cover and concealment, and so forth. Knowledge about friendly units, which was considered critical to the squad members, included friendly strengths and weaknesses as well as knowledge about unit physical and mental status. Ammunition status was considered to be critical mission information. Squad members were not as interested in information about COBs. However, this may have been an artifact of the vignettes used, since liberation of the COBs was not a mission objective. Squad members should be situationally aware of items that would cause them individual danger and items that would cause them to take one action or another.

3.2.21 Fire Team and Squad Leaders

The CIRs that were identified by fire team and squad leaders were almost identical. Fire team and squad leaders are small unit leaders. Fire team leaders must be prepared to lead the squad if the squad leader becomes incapacitated and therefore must remain situationally aware of the same issues. The items identified by the squad and fire team leaders as most critical were very similar to those identified by the squad members; however, they did identify additional items (mostly comprehension and projection items) that were important to squad leadership decisions.

3.2.22 Platoon Leaders

The CIRs identified by the platoon leaders were fairly similar to those identified by the squad and fire team leaders. Platoon leaders rated the items that would contribute to their decisions (i.e., weakest friendly location and strongest OpFor location) higher than did the lower echelons. They also rated detailed items having to do with close combat (i.e., differentiation between COBs and OpFor) as non-critical, whereas their subordinates rated them as critical.

4. Conclusions

With current tactics, techniques, and procedures, squad members make very few decisions and therefore need less information than the higher echelons. The information provided to squad members should only concern items that they have the ability to impact and items that cause them to take a particular course of action.

Criticality of the knowledge of the OpFor location beyond 50 meters from the objective increases as the level of leadership increases. Squad members are interested in their objective and somewhat interested in the OpFor location within 50 meters of their objective. The leaders are interested in the location of

the OpFor all the way to 1 km because this knowledge is important in their planning.

Occam's razor (the Law of Parsimony) should be applied to the development of the information displays for the platoon. Information "pushed" to the platoon members should be limited to only the critical information that affects their decisions or actions. This would result in less cluttered displays that are easily read and understood. Soldiers should be allowed to "pull" information that is less critical or is only needed occasionally.

The limitations of the simulator used in this study may have had a modest effect on the outcome of some of the ratings. For example, the COBs in the study could not be configured with a weapon and could not be made to act hostile to the friendly units. Live vignettes would contribute greatly to the knowledge gleaned in this experiment. An additional study that analyzes the frequency of the usage of the information would also contribute to the body of knowledge gained in this experiment.

References

- Department of the Army (April 2000). *Ranger handbook* (SH 21-76). Washington, DC: Author. See web site: [http://www.booktrail.com/Military_Elite/Ranger%20Handbook%20\(SH%2021-76\)%20April%202000.asp](http://www.booktrail.com/Military_Elite/Ranger%20Handbook%20(SH%2021-76)%20April%202000.asp).
- Department of the Army (3 March 2002). *Battle drills for the infantry rifle platoon and squad* (Army Training and Evaluation Plan [ARTEP] 7-8). Washington, DC: Author.
- Department of the Army (29 Sep 1994). *Infantry rifle company* (ARTEP 7-10). Washington, DC: Author.
- Department of the Army (22 April 1992). *Infantry rifle platoon and squad* (Field Manual [FM] 7-8). Washington, DC: Author.
- Department of the Army (14 December 1990). Infantry rifle company (FM 7-10). Washington, DC: Author.
- Department of the Army (9 June 1987). *Ranger unit operations* (FM 7-85). Washington, DC: Author.
- Department of the Army (23 December 1992). *The infantry reconnaissance platoon and squad (airborne, air assault, light infantry)* (FM 7-85). Washington, DC: Author.
- Department of the Army (23 December 1992). *The infantry reconnaissance platoon & squad (airborne, air assault, light infantry)* (FM 17-92). Washington, DC: Author.
- Department of the Army (12 May 1993). *An infantryman's guide to combat in built-up areas* (FM 90-10-1). Washington, DC: Author.
- Endsley, M.R., Holder, L.D., Leibrecht, B.C., Garland, D.J., Wampler, R.L., & Matthews, M.D. (January 2000). *Modeling and measuring situation awareness in the infantry operational environment* (Research Report 1753). Fort Benning, GA: Army Research Institute.
- Endsley, M.R. (1987). *SAGAT: A methodology for the measurement of situation awareness* (NOR DOC 87-83). Hawthorne, CA: Northrop Corp.

- Endsley, M.R. (1988). Situation Awareness Global Assessment Technique (SAGAT). In *Proceedings of the National Aerospace and Electronics Conference* (pp. 789-795). New York: Institute of Electrical and Electronics Engineers.
- Endsley, M.R. (1993). A survey of situation awareness requirements in air-to-air combat fighters. *International Journal of Aviation Psychology*, 3, 167-168.
- Endsley, M.R. (1995). Toward a theory of situation awareness in dynamic systems. *Human Factors*, 37, 32-64.
- Offen, L., Crutcher, M., Beckwith, J., & Dutoit, G. (in press). *Dismounted battlespace battle lab (DBBL) and marine corps war fighting lab assessment report for military operations in urban terrain advanced concept technology demonstration (MOUT ACTD): Joint Experiment 1 and Joint Experiment 2*. Ft. Benning, GA: Dismounted Battlespace Battle Lab.
- Payne, J.W., Bettman, J.R., & Johnson, E.J. (1993). *The adaptive decision maker*. Cambridge, MA: Cambridge University Press.
- Phillips, J., McDermott, P.L., Thordsen, M., McCloskey, M., & Klein, G. (September 1998). *Cognitive requirements for small unit leaders in military operations in urban terrain* (Research Report 1728). Ft. Benning, GA: Army Research Institute.
- Pleban, R.J., Eakin, D.E., Salter, M.S., & Matthews, M.D. (2001). *Training and assessment of decision-making skills in virtual environments* (Research Report No. 1767). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Redden, E.S., & Blackwell, C.L. (October 2001). *Situational awareness and communication experiment for military operations in urban terrain: Experiment I* (ARL TR-2583). Aberdeen Proving Ground, MD: U.S. Army Research Laboratory.
- Strater, L.D., Endsley, M.R., Pleban, R.J., & Matthews, M.D. (March 2001). *Measures of platoon leader situation awareness in virtual decision-making exercises* (Research Report 1770). Ft. Benning, GA: Army Research Institute.

APPENDIX A
CIR QUESTIONNAIRE RESULTS

INTENTIONALLY LEFT BLANK

Vignette A, Planning Position

Please answer the following questions based on your experience. Answer all questions as accurately as possible. Circle the appropriate letter.

Script	QUESTIONS/Mean Responses																					
	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20	q21	q22
PLATOON LEADER																						
1	6.50	6.50	6.50	6.50	4.50	6.00	6.50	5.00	6.00	6.00	6.00	5.50	5.50	5.00	5.50	5.00	5.00	5.50	4.00	6.50	6.50	5.00
2	7.00	7.00	6.00	6.50	5.00	6.50	5.50	7.00	5.50	5.50	5.50	4.50	4.50	6.00	6.00	5.00	5.00	4.50	5.00	6.50	7.00	4.00
3	6.00	6.00	6.00	6.50	6.00	5.50	6.00	7.00	5.00	5.00	5.50	5.00	4.50	6.50	7.00	5.00	6.50	6.00	5.00	6.50	6.50	6.00
Total Mean	6.50	6.50	6.17	6.50	5.17	6.00	6.00	6.33	5.50	5.50	5.67	5.00	4.83	5.83	6.17	5.00	5.50	5.33	4.67	6.50	6.67	5.00
SQUAD LEADER																						
1	6.67	6.67	6.67	6.00	6.33	6.00	6.33	6.33	6.33	5.33	6.33	6.00	6.33	6.00	6.00	5.67	5.00	5.00	5.00	5.33	6.00	6.00
2	5.67	6.00	5.67	6.00	5.67	5.67	7.00	6.33	5.67	5.67	5.00	5.00	5.00	5.00	5.67	5.00	5.67	5.33	5.33	6.00	6.33	5.67
3	6.00	6.00	6.00	7.00	5.50	6.50	7.00	6.50	6.50	5.50	5.50	5.50	5.50	6.00	6.50	5.00	5.00	5.50	4.50	6.50	6.50	5.00
Total Mean	6.11	6.22	6.11	6.33	5.83	6.06	6.78	6.39	6.17	5.50	5.61	5.50	5.61	5.67	6.06	5.22	5.22	5.28	4.94	5.94	6.28	5.56
FIRE TEAM LEADER																						
1	5.80	6.00	5.80	5.80	5.60	5.60	5.60	NA	5.60	5.20	5.40	6.40	6.60	6.40	6.60	6.20	6.40	5.80	5.80	5.80	6.60	5.00
2	6.83	6.33	6.67	5.83	5.67	5.83	6.17	NA	6.33	6.00	5.50	6.17	4.83	6.17	6.33	5.50	6.33	5.50	6.17	5.67	5.83	5.50
3	6.50	6.00	6.00	6.25	5.00	5.25	6.75	NA	7.00	6.00	5.50	5.50	5.00	6.75	7.00	6.25	6.25	6.50	6.00	5.25	5.50	4.50
Total Mean	6.38	6.11	6.16	5.96	5.42	5.56	6.17	NA	6.31	5.73	5.47	6.02	5.48	6.44	6.64	5.98	6.33	5.93	5.99	5.57	5.98	5.00
SQUAD MEMBER																						
1	6.24	6.18	6.18	5.94	5.65	5.94	6.12	NA	6.06	5.81	5.65	5.47	5.47	5.76	6.06	5.53	5.47	5.53	5.29	5.35	6.06	4.65
2	5.64	4.79	5.50	4.50	4.36	5.00	5.00	NA	5.07	5.14	4.36	5.07	4.43	5.50	5.36	4.57	4.77	4.64	4.75	5.07	5.07	4.29
3	6.42	5.83	6.25	5.42	5.33	5.25	6.00	NA	5.33	5.75	4.92	4.92	4.58	5.92	5.67	5.42	5.67	5.00	4.92	5.42	5.42	3.92
Total Mean	6.10	5.60	5.98	5.29	5.11	5.40	5.71	NA	5.49	5.57	4.98	5.15	4.83	5.73	5.70	5.17	5.30	5.06	4.99	5.28	5.52	4.29

(Questions) Vignette A, Planning Position

1. What size of OpFor force is located on your Platoon (Squad)'s objective?
2. Are there any crew-served automatic weapons that are located on your Platoon (Squad)'s objective?
3. Are there any Sniper-type weapons located on your Platoon (Squad)'s objective?
4. Are there any known obstacles located on the Platoon (Squad)'s objective?
5. What are the OpFor preparing for at this time?
6. Does the OpFor have any reinforcement capability?
7. Does the OpFor have the capability to employ NBC?
8. Draw a sketch of the floor plan of your Platoon (Squad)'s objective building(s).
9. Does the OpFor have any indirect fire capability?
10. Does the OpFor have any air support capability?
11. Are there any COBs located on your Platoon (Squad)'s objective?
12. How do we identify the COBs and differentiate them from the OpFor?
13. What, if any, is the status/temperament of the COBs at this time?
14. What is your Platoon (Squad) and/or Company's right and left limits for supporting fires?
(Describe using building numbers or terrain features.)
15. What is the signal to lift/shift supporting fires for your Platoon (Squad)/Company?
16. What unit is to the right of your Platoon (Squad)?
17. What time does the lead element cross the line of departure?
18. What/where is your secondary objective?
19. Do you have any attachments to your Platoon (Squad)?
20. On your Platoon (Squad) objective, where is the weakest OpFor location?
21. On your Platoon (Squad) objective, where is the strongest OpFor location?
22. Will weather impact your operation?

Vignette A, Occupy Attack Position

	QUESTIONS/Mean Responses																						
Script	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20	q21	q22	q23
	PLATOON LEADER																						
1	5.00	5.00	4.67	4.67	5.67	6.00	6.00	5.00	6.00	6.33	5.67	6.00	4.67	4.33	3.67	5.00	5.33	6.00	5.67	5.67	6.00	6.00	5.67
2	3.00	2.00	4.50	3.00	6.00	7.00	7.00	6.00	6.00	6.00	6.00	6.50	4.00	3.50	4.50	5.50	6.50	5.00	5.50	6.00	5.50	6.00	5.50
3	4.00	6.00	4.00	6.00	7.00	6.00	7.00	5.00	7.00	6.00	5.00	6.00	6.00	6.00	5.00	6.00	6.00	5.00	7.00	6.00	5.00	6.00	7.00
Total Mean	4.00	4.33	4.39	4.56	6.22	6.33	6.67	5.33	6.33	6.11	5.56	6.17	4.89	4.61	4.39	5.50	5.94	5.33	6.06	5.89	5.50	6.00	6.06
	SQUAD LEADER																						
1	5.67	6.33	5.67	6.00	6.33	6.67	6.67	6.33	6.33	6.67	6.00	6.33	6.00	6.33	6.00	6.00	6.33	6.00	6.00	5.67	5.67	6.00	6.67
2	3.67	4.00	3.67	4.00	4.33	6.33	6.00	5.33	5.67	5.33	5.67	5.00	5.33	5.33	5.33	5.33	5.67	5.33	6.33	6.33	6.00	5.67	6.33
3	4.50	5.00	4.50	4.50	5.50	6.50	5.50	6.00	7.00	5.50	6.00	5.50	5.00	5.00	5.00	5.50	5.50	4.00	7.00	6.00	5.50	5.00	5.50
Total Mean	4.61	5.11	4.61	4.83	5.39	6.50	6.06	5.89	6.33	5.83	5.89	6.17	5.33	5.55	5.44	5.61	5.83	5.11	6.44	6.00	5.72	5.56	6.17
	FIRE TEAM LEADER																						
1	5.40	5.60	5.20	4.80	5.80	5.60	5.60	5.80	5.60	6.20	5.80	5.80	5.60	5.40	5.80	5.60	5.80	5.40	6.00	5.80	5.40	5.20	5.80
2	5.83	4.67	5.50	5.17	5.17	6.50	6.00	5.67	6.00	5.83	6.17	6.50	5.33	5.67	6.17	6.17	6.50	6.33	6.80	6.50	6.33	6.50	6.33
3	5.25	5.00	5.00	5.75	6.00	6.25	6.75	5.50	7.00	6.50	5.25	5.75	6.00	6.50	5.50	5.50	6.00	4.00	6.33	6.25	4.75	6.25	4.75
Total Mean	5.49	5.09	5.23	5.24	5.66	6.12	6.12	5.66	6.20	6.18	5.74	6.02	5.64	5.86	5.82	5.76	6.10	5.24	6.38	6.18	5.49	5.98	5.63
	SQUAD MEMBER																						
1	4.89	4.94	5.06	4.78	5.76	5.78	6.11	5.72	5.78	5.72	5.44	5.78	5.06	5.50	5.22	5.56	5.94	5.24	6.22	6.06	5.67	5.61	5.72
2	4.29	4.50	4.07	4.36	4.50	6.29	6.00	5.36	5.23	5.29	5.36	5.43	4.86	5.21	5.07	5.00	5.36	4.64	5.29	5.50	4.79	4.93	5.21
3	4.50	4.58	3.75	4.75	5.42	5.92	6.33	4.92	5.83	5.08	5.67	5.50	4.92	5.25	5.42	5.58	6.25	4.75	6.42	6.25	5.92	5.25	5.08
Total Mean	4.56	4.67	4.29	4.63	5.23	6.00	6.15	5.33	5.61	5.36	5.49	5.57	4.95	5.32	5.24	5.38	5.85	4.88	5.98	5.94	5.46	5.26	5.34

1. How many, if any, KIA OpFor are there on objective one?
2. What is the status of COBs on objective one?
3. How many, if any, KIA OpFor are there on objective two?
4. What is the status of COBs on objective two?
5. How many friendly KIA/WIA did the Platoon (Squad) receive on objective's one and two?
6. How many OpFor are on objective three?
7. Where, if any, are the OpFor located on objective three?
8. Are there any OpFor located in building C1?

(Questions cont) Vignette A, Occupy Attack Position

9. Are there any obstacles between objective two and three?
10. What are the OpFor (if any) most likely to do on objective three?
11. What are the OpFor preparing for at this time?
12. What size, if any, reinforcement capability does the OpFor possess?
13. What is the status/temperament of the COBs at this time?
14. How many members of the 1st Squad are located in building C5?
15. Are all members of third Squad located in C4 A and B?
16. What is the location of the unit on your right?
17. Do the OpFor have automatic weapons?
18. What is the morale of the OpFor?
19. What is the morale of the Platoon (Squad)?
20. Do the OpFor have any long-ranged sight capability?
21. Are the OpFor made up of elite, regular, or militia?
22. Are the OpFor standing in place, falling back to prepared positions, or are they running?
23. What is the construction of the building on your objective (i.e., triple brick, reinforced concrete, wood frame, etc.)?

Vignette A, Post Attack Position

Script	QUESTIONS/Mean Responses															
	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16
PLATOON LEADER																
1	6.00	4.67	5.67	5.67	5.67	6.00	6.00	6.33	5.67	5.67	6.33	5.33	5.67	5.33	6.00	5.67
2	4.50	6.00	6.50	6.00	6.50	6.50	6.50	4.00	4.00	5.50	6.50	5.50	5.50	5.00	6.50	5.00
3	7.00	5.50	5.00	5.50	5.50	5.00	6.00	6.00	5.50	6.50	6.50	5.00	5.00	4.50	6.50	4.50
Total Mean	5.83	5.39	5.72	5.72	5.89	5.83	6.17	5.44	5.06	5.89	6.44	5.28	5.39	4.94	6.33	5.06
SQUAD LEADER																
1	6.33	6.33	6.33	6.00	6.33	6.50	5.67	5.67	5.00	6.00	6.67	6.33	5.67	5.67	5.67	6.00
2	5.67	6.00	5.00	5.00	6.00	5.67	6.33	5.33	5.33	5.67	5.67	5.67	5.00	5.00	6.33	5.67
3	6.00	6.50	6.00	5.00	5.00	6.50	7.00	5.00	5.00	5.00	5.00	6.50	5.00	5.50	7.00	6.00
Total Mean	6.00	6.28	5.78	5.33	5.78	6.22	6.33	5.33	5.11	5.56	5.78	6.17	5.22	5.39	6.33	5.89
FIRE TEAM LEADER																
1	6.40	6.20	5.80	5.40	5.40	5.60	5.60	5.20	5.00	5.80	5.80	5.40	5.40	5.40	5.60	5.40
2	6.67	6.17	6.00	6.17	5.83	6.00	6.00	5.50	4.50	5.67	6.33	6.17	6.17	5.83	6.83	6.00
3	6.75	4.75	5.50	5.75	5.25	5.75	6.25	5.50	5.25	5.75	5.75	6.50	6.75	6.25	7.00	6.50
Total Mean	6.61	5.71	5.77	5.77	5.49	5.78	5.95	5.40	4.92	5.74	5.96	6.02	6.11	5.83	6.48	5.97
SQUAD MEMBER																
1	5.89	5.72	5.78	5.50	5.50	5.67	5.78	5.78	5.39	5.83	5.83	5.72	5.50	5.44	6.39	5.72
2	6.00	5.57	5.07	4.93	4.50	4.36	5.14	5.00	4.71	5.36	5.64	4.86	4.69	4.71	5.93	5.14
3	6.17	5.75	5.67	5.25	5.50	5.17	5.08	4.83	4.67	5.67	5.83	5.75	4.92	5.17	6.25	5.50
Total Mean	6.02	5.68	5.51	5.23	5.17	5.07	5.33	5.20	4.92	5.62	5.77	5.44	5.04	5.11	6.19	5.45

1. How many OpFor were on your Platoon (Squad)'s objective?
2. To where did the OpFor on your 2nd Platoon (Squad)'s objective escape?
3. How long, if at all, will it take the OpFor to reinforce with at least a squad-size element?
4. What OpFor activity, if any, has been reported west of McKenna?
5. What is the current location, if any, of OpFor outside of McKenna?
6. In what direction, if any, was the OpFor unit outside of McKenna village reported to be moving?
7. Does the OpFor have the capability to reinforce McKenna with a platoon-size element?
8. What was the OpFor intent?

(Questions cont) Vignette A, Post Attack Position

9. How many, if any, COBs were on the Company's objective?
10. What is the current location of your 2nd Squad Leader?
11. How many, if any, friendly KIA/WIAs did your Platoon (Squad) receive during the attack?
12. What is your Squad/Company's next mission?
13. Where is the 2nd Platoon's CCP/EPW point located?
14. What is the disposition of your 1st Squad?
15. Do you have enough ammo to defend against counterattack?
16. Is fatigue an issue?

Vignette B, Planning Position

	QUESTIONS/Mean Responses																					
Script	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20	q21	q22
	PLATOON LEADER																					
1	6.00	5.50	5.00	5.50	6.00	4.50	5.00	5.00	5.50	6.00	4.50	4.50	4.50	4.50	5.50	4.50	4.50	4.00	5.00	6.50	5.50	4.50
2	7.00	6.00	6.00	6.00	6.00	2.00	6.00	6.00	6.00	7.00	4.00	6.00	7.00	6.00	7.00	6.00	6.00	6.00	7.00	6.00	5.00	5.00
3	6.50	5.50	6.50	5.50	6.00	4.00	7.00	5.50	5.00	7.00	4.50	5.50	7.00	6.00	7.00	6.00	4.50	5.00	6.50	6.00	4.50	6.50
Total Mean	6.50	5.67	5.83	5.67	6.00	3.50	6.00	5.50	5.50	6.67	4.33	5.33	6.17	5.50	6.50	5.50	5.00	5.00	6.17	6.17	5.00	5.33
	SQUAD LEADER																					
1	6.67	5.67	6.00	6.67	6.00	5.33	5.33	5.67	5.67	6.33	5.33	6.33	6.33	6.00	6.33	6.67	6.67	6.00	6.33	6.00	6.33	5.67
2	6.67	5.67	5.67	6.00	6.00	5.67	6.33	6.00	6.00	6.67	5.00	7.00	7.00	7.00	6.67	7.00	6.00	6.67	7.00	6.67	6.67	6.67
3	6.50	6.00	6.00	6.00	6.50	5.00	6.50	7.00	5.00	5.50	4.50	7.00	5.50	5.50	5.50	5.50	5.00	4.50	5.00	5.50	6.00	5.50
Total Mean	6.61	5.78	5.89	6.22	6.17	5.33	6.05	6.22	5.56	6.17	4.94	6.78	6.28	6.17	6.17	6.39	5.89	5.72	6.11	6.06	6.33	5.95
	FIRE TEAM LEADER																					
1	6.00	6.20	5.60	5.80	6.00	5.40	6.60	5.80	5.20	6.00	5.60	6.20	6.20	6.20	5.80	6.20	5.60	5.80	5.80	5.40	6.00	5.60
2	6.83	6.83	6.17	6.50	5.50	4.83	5.67	5.50	5.67	6.00	5.83	6.33	5.00	5.00	6.17	6.17	5.83	6.17	6.17	6.17	6.00	5.17
3	6.75	6.75	5.50	6.25	6.75	5.50	6.25	6.75	6.50	6.25	5.75	6.00	5.75	5.75	6.25	6.00	5.75	4.75	6.00	6.25	6.75	6.00
Total Mean	6.53	6.59	5.76	6.18	6.08	5.24	6.17	6.02	5.79	6.08	5.73	6.18	5.65	5.65	6.07	6.12	5.73	5.57	5.99	5.94	6.25	5.59
	SQUAD MEMBER																					
1	5.67	5.72	5.89	5.78	5.61	4.83	5.65	5.44	5.22	6.06	5.00	6.00	5.71	5.71	6.06	5.78	5.61	5.39	5.89	6.00	5.28	5.50
2	5.87	5.40	5.47	5.40	5.27	4.53	5.53	5.53	5.07	5.67	4.53	5.80	5.13	5.60	5.79	5.57	5.50	5.14	5.93	5.79	5.29	4.93
3	5.75	5.50	5.67	5.50	5.42	4.75	5.83	5.58	5.50	6.08	5.00	6.42	6.00	6.33	6.42	5.33	5.33	5.00	5.58	5.83	5.92	5.08
Total Mean	5.76	5.54	5.68	5.56	5.43	4.70	5.67	5.52	5.26	5.94	4.84	6.07	5.61	5.88	6.09	5.56	5.48	5.18	5.80	5.87	5.50	5.17

1. What size OpFor force do you expect to counterattack the 2nd Platoon's position?
2. Does the Counterattack OpFor have any crew-served automatic weapons?
3. What are the OpFor preparing for at this time?
4. What size, if any, reinforcement capability does the OpFor possess?
5. Does the OpFor have any indirect fire capability?
6. What is the disposition of the COBs in McKenna village?
7. Describe your Platoon (Squad)'s sector of fire. (Use building numbers and terrain features, i.e., NW corner of building A1 to the cemetery.)

(Questions cont) Vignette B, Planning Position

8. What are your primary Target Reference Point(s)?
9. What unit is to the right of your Platoon (Squad)?
10. What is the most likely OpFor avenue of approach for reinforcements?
11. Do you have any attachments to your Platoon (Squad)?
12. Does the enemy know the location of your Platoon (Squad)?
13. Which location in your Platoon (Squad) is weakest?
14. Which location in your Platoon (Squad) is strongest?
15. Which section of your Platoon (Squad) is currently exposed to enemy fire or attack?
16. Who has the advantage in the current situation?
17. How dispersed do you expect the enemy's formation to be during the counterattack?
18. Does the enemy have adequate ammunition for the counterattack?
19. Are there any building vantage points around your defensive position that would be advantageous for the enemy to occupy?
20. What is the projected area of enemy attack?
21. What are the priority of fires?
22. How will casualties be handled?

Vignette B, Defense Position

	QUESTIONS/Mean Responses											
Script	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12
	PLATOON LEADER											
1	4.50	5.50	5.50	5.50	5.00	5.50	5.00	4.00	5.00	4.00	5.00	4.50
2	7.00	6.00	6.00	6.00	7.00	4.00	6.00	4.00	6.00	2.00	6.00	7.00
3	4.50	4.50	5.00	6.00	5.50	6.00	7.00	5.00	5.00	6.00	7.00	7.00
Total Mean	5.33	5.33	5.50	5.83	5.83	5.17	6.00	4.33	5.33	4.00	6.00	6.17
	SQUAD LEADER											
1	4.67	6.00	6.50	6.00	5.00	6.00	4.33	6.33	4.67	6.33	6.67	5.00
2	6.33	6.33	6.33	6.33	6.33	6.33	5.67	5.67	6.33	6.33	6.67	6.67
3	6.00	6.50	6.50	6.00	6.50	5.50	5.50	6.00	5.50	6.00	7.00	5.50
Total Mean	5.67	6.28	6.44	6.11	5.94	5.94	5.17	6.00	5.50	6.22	6.78	5.72
	FIRE TEAM LEADER											
1	5.75	6.25	5.00	5.50	5.75	5.75	6.25	6.25	5.00	5.25	6.50	6.00
2	6.33	6.00	5.67	5.67	6.33	6.33	6.33	5.50	5.83	6.17	6.83	6.50
3	6.25	5.75	6.25	6.25	6.25	6.50	6.75	5.25	6.25	5.50	7.00	6.25
Total Mean	6.11	6.00	5.64	5.81	6.11	6.19	6.44	5.67	5.69	5.64	6.78	6.25
	SQUAD MEMBER											
1	5.24	5.41	5.82	5.88	5.94	5.53	5.94	5.35	5.53	5.47	6.35	5.76
2	4.93	4.64	4.93	5.00	5.07	5.20	5.67	4.27	5.14	4.87	5.73	5.53
3	5.50	5.33	5.25	5.08	6.08	5.67	6.17	5.08	5.42	4.58	6.50	5.83
Total Mean	5.22	5.13	5.33	5.32	5.70	5.47	5.93	4.90	5.36	4.97	6.19	5.71

1. How long, if at all, will it take the OpFor to reinforce with at least a squad-size element?
2. What OpFor activity, if any, has been reported east of McKenna?
3. What is the current location, if any, of OpFor outside of McKenna?
4. In what direction, if any, was the OpFor unit outside of McKenna village reported to be moving?
5. Does the OpFor have the capability to reinforce McKenna with a platoon-size element?
6. What was the OpFor intent?
7. What is the current location of your 2nd Squad leader?
8. What is your 2nd Platoon (Squad)'s next mission?

(Questions cont) Vignette B, Defense Position

9. Where is your 2nd Platoon's CCP/EPW point located?
10. When do you expect a resupply of water and food?
11. What is your ammunition status?
12. Which area of your Platoon (Squad) is weakest?

Vignette C, Planning Position

	QUESTIONS/Mean Responses																																
Script	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20	q21	q22	q23	q24	q25	q26	q27	q28	q29	q30	q31		
	PLATOON LEADER																																
1	5.50	5.50	5.50	6.00	5.00	5.50	5.50	5.50	5.00	5.00	6.00	5.00	6.00	5.00	5.00	5.00	5.00	5.00	5.00	5.50	5.00	5.00	5.50	4.50	5.00	5.50	5.50	6.50	6.50	5.50	6.00		
2	6.00	7.00	7.00	7.00	7.00	5.00	5.00	6.00	5.00	5.00	5.00	4.00	4.00	4.00	6.00	7.00	7.00	7.00	6.00	6.00	6.00	7.00	7.00	6.00	5.00	7.00	3.00	4.00	5.00	4.00	6.00		
3	7.00	6.00	6.50	7.00	7.00	6.00	5.50	5.50	5.50	5.50	5.00	6.00	5.00	5.50	4.50	7.00	6.50	7.00	6.00	6.00	6.50	7.00	7.00	6.50	6.00	6.50	6.00	5.00	6.50	6.50	6.00		
Total Mean	6.17	6.17	6.33	6.67	6.33	5.50	5.33	5.67	5.17	5.17	5.33	5.00	5.00	4.83	5.17	6.33	6.17	6.33	5.67	5.83	5.83	6.33	6.50	5.67	5.33	6.33	4.83	5.17	6.00	5.33	6.00		
	SQUAD LEADER																																
1	6.67	5.33	5.33	6.00	6.00	5.33	5.00	6.33	5.67	6.00	5.00	4.67	4.67	5.67	4.33	6.00	6.00	5.00	5.00	5.67	5.33	6.00	6.00	5.00	4.67	6.00	4.33	5.33	5.33	5.33	5.33		
2	6.33	6.00	6.33	6.67	6.33	5.67	6.00	6.00	6.00	6.33	6.33	5.67	5.67	6.00	5.67	6.33	7.00	6.33	6.00	6.00	6.67	6.67	6.67	6.33	5.67	6.00	5.00	5.33	5.67	6.00	6.67		
3	6.50	6.00	6.50	6.50	6.50	6.00	6.00	6.00	6.00	7.00	7.00	5.50	4.50	4.50	4.00	6.50	6.00	6.00	6.00	6.00	6.50	7.00	7.00	6.50	7.00	6.00	4.50	5.00	5.50	5.00	6.00		
Total Mean	6.50	5.78	6.05	6.39	6.28	5.67	5.67	6.11	5.89	6.44	6.11	5.28	4.95	5.39	4.67	6.28	6.33	5.78	5.67	5.89	6.17	6.56	6.56	5.94	5.78	6.00	4.61	5.22	5.50	5.44	6.00		
	FIRE TEAM LEADER																																
1	6.00	6.40	6.00	6.00	6.20	5.40	5.20	5.60	5.80	5.60	6.00	6.00	5.60	5.80	6.00	5.80	6.40	6.00	5.80	5.60	6.20	6.20	5.80	6.00	6.00	6.40	5.60	5.60	5.80	5.80	6.00		
2	6.33	6.50	6.17	6.67	6.67	6.17	5.33	6.00	5.50	5.33	5.33	4.83	4.83	4.67	5.17	5.00	5.00	5.50	5.00	5.83	6.17	6.67	6.50	6.17	5.33	5.67	5.67	5.67	6.00	6.50	6.00		
3	6.50	6.50	6.50	6.25	6.00	6.25	5.25	6.00	6.50	6.50	6.75	5.75	5.25	5.75	5.50	5.50	6.25	5.50	6.50	6.50	6.00	6.00	6.25	5.75	5.50	5.75	4.75	4.75	5.75	5.25	5.25		
Total Mean	6.28	6.47	6.22	6.31	6.29	5.94	5.26	5.87	5.93	5.81	6.03	5.53	5.23	5.41	5.56	5.43	5.88	5.67	5.77	5.98	6.12	6.29	6.18	5.97	5.61	5.94	5.34	5.34	5.85	5.85	5.75		
	SQUAD MEMBER																																
1	5.53	5.87	6.13	5.87	6.00	5.47	5.33	5.67	5.73	5.50	5.60	5.33	5.40	5.33	5.40	5.64	5.80	5.73	5.80	5.93	6.00	6.20	5.60	5.27	5.73	5.87	5.33	5.13	5.67	5.93	5.73		
2	5.93	5.73	5.73	6.00	5.93	5.27	5.07	4.40	5.20	4.87	5.20	4.73	4.67	5.00	4.93	5.27	6.00	5.53	5.33	5.60	5.87	6.33	5.80	5.60	5.47	6.00	5.27	5.53	5.60	5.80	6.33		
3	6.17	5.83	5.67	6.17	6.00	5.83	4.75	5.50	4.58	4.75	6.00	4.50	4.25	4.58	5.08	5.08	5.75	5.50	5.75	5.42	5.75	5.92	5.75	5.08	5.17	5.67	4.83	5.50	5.75	5.50	5.58		
Total Mean	5.88	5.81	5.84	6.01	5.98	5.52	5.05	5.19	5.17	5.04	5.60	4.85	4.77	4.97	5.14	5.33	5.85	5.59	5.63	5.65	5.87	6.15	5.72	5.32	5.46	5.85	5.14	5.39	5.67	5.74	5.88		

1. What size of OpFor force is located on your Platoon (Squad)'s objective?
2. What type, if any, crew-served automatic weapons are located in/around your Platoon (Squad)'s objective?
3. Where, if any, are the crew-served automatic weapons located in/around your Platoon (Squad)'s objective?
4. Are there any Sniper-type weapons located in/around your Platoon (Squad)'s objective?
5. If there are Sniper-type weapons in/around the Platoon (Squad)'s objective, where are they located?
6. Are there any obstacles located in/around the Platoon (Squad)'s objective?

(Questions cont) Vignette C, Planning Position

7. What are the OpFor preparing for at this time?
8. Does the OpFor have any reinforcement capability?
9. Does the OpFor have any indirect fire capability?
10. Does the OpFor have any air support capability?
11. Does the OpFor have the capability to employ NBC?
12. How many COBs are located on your Platoon (Squad)'s objective?
13. What is the status/temperament of the COBs at this time?
14. What is the location, if any, of the COBs in your Platoon (Squad)'s objective?
15. What unit is to the right of your Platoon (Squad)?
16. Does the OpFor have any high tech (night vision devices, sensors, etc.) capability?
17. What, if any, are the locations of OpFor LP/OPs?
18. Has the OpFor been using patrolling activities outside of McKenna village?
19. If you make your approach to the observation point from the northwest, do you have terrain masking from McKenna excluding the tower in building C3?
20. If you make your approach to the observation point from the southwest, do you have terrain masking from McKenna excluding the tower in building C3?
21. What is the best approach to your observation point?
22. Will the terrain offer concealment during your observation?
23. Will you have good visibility of your recon objective (i.e., problems with fog, canopy, smoke, etc.)?
24. Are there any hazards (i.e., rivers, open areas, steep terrain, etc.) between you and your recon objective?
25. Do you expect any areas of poor communication on your route to the recon objective?
26. When approaching your planned observation point, are there any projected areas of enemy detection?
27. What light levels do you expect to encounter on your route?
28. What is the estimated time required to move to your observation point?
29. What is the projected safety of your route?
30. What is the experience level of your unit?
31. What type of resistance do you expect to encounter?

Vignette C, Recon Phase

	QUESTIONS/Mean Responses																			
Script	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20
	PLATOON LEADER																			
1	4.50	5.50	7.00	5.50	5.50	4.00	5.50	5.50	5.50	5.50	6.00	5.50	6.00	5.50	4.50	5.00	6.00	4.50	5.50	5.00
2	6.00	7.00	7.00	6.00	5.00	5.00	5.00	7.00	7.00	7.00	7.00	7.00	4.00	5.00	6.00	6.00	6.00	7.00	6.00	7.00
3	6.50	5.00	5.00	5.00	5.50	5.00	5.00	5.00	6.00	6.50	6.00	4.50	4.50	5.00	6.50	6.50	6.00	6.00	6.00	5.50
Total Mean	5.67	5.83	6.33	5.50	5.33	4.67	5.17	5.83	6.17	6.33	6.33	5.67	4.83	5.17	5.67	5.83	6.00	5.83	5.83	5.83
	SQUAD LEADER																			
1	6.33	6.00	6.67	6.67	5.67	5.50	4.67	4.67	5.33	5.67	6.00	5.00	4.67	4.33	4.67	6.00	6.00	6.00	6.00	6.67
2	6.67	6.33	5.67	5.33	5.33	5.00	5.33	6.67	6.67	6.33	6.33	6.33	6.33	6.33	6.67	5.67	5.67	6.67	6.33	6.67
3	6.50	5.50	5.50	6.00	5.00	4.50	6.00	6.50	6.50	6.50	6.50	6.00	5.50	6.00	6.00	6.00	6.00	6.00	6.00	5.50
Total Mean	6.50	5.94	5.95	6.00	5.33	5.00	5.33	5.95	6.17	6.17	6.28	5.78	5.50	5.55	5.78	5.89	5.89	6.22	6.11	6.28
	FIRE TEAM LEADER																			
1	6.00	5.20	5.60	5.60	5.40	5.40	5.40	5.40	5.80	6.00	5.80	6.00	5.00	6.00	6.20	6.20	6.20	6.20	6.40	6.40
2	6.67	6.00	6.33	6.33	4.67	4.50	4.83	6.33	6.17	6.83	6.50	5.33	4.83	5.67	6.00	6.17	6.33	6.33	5.83	6.67
3	6.00	5.75	5.25	5.50	6.25	6.25	5.00	6.00	6.25	6.75	6.25	4.75	5.25	5.75	6.25	5.25	5.25	6.25	6.75	6.50
Total Mean	6.22	5.65	5.73	5.81	5.44	5.38	5.08	5.91	6.07	6.53	6.18	5.36	5.03	5.81	6.15	5.87	5.93	6.26	6.33	6.52
	SQUAD MEMBER																			
1	5.35	5.18	5.06	5.00	4.82	5.24	5.00	5.59	5.88	6.00	5.82	5.47	5.06	5.71	5.71	5.29	5.18	5.35	5.53	5.59
2	6.07	4.93	5.33	5.00	5.13	4.93	4.07	5.47	5.73	6.13	6.20	5.67	5.00	4.80	5.73	5.40	5.27	5.33	5.60	6.00
3	6.33	5.83	5.42	5.00	4.75	4.92	5.25	5.50	6.00	6.17	6.00	5.08	5.17	5.50	5.83	5.25	5.25	5.58	5.92	6.17
Total Mean	5.92	5.31	5.27	5.00	4.90	5.03	4.77	5.52	5.87	6.10	6.01	5.41	5.08	5.34	5.76	5.31	5.23	5.42	5.68	5.92

1. How many OpFor are/were there on your objective?
2. How long, if at all, will it take the OpFor to reinforce with at least a squad-size element?
3. What OpFor activity, if any, has been reported outside of McKenna?
4. What appears to be the OpFor's intent?
5. How many COBs are located on the objective?
6. What is the disposition, if any, of the COBs?
7. What is your Platoon (Squad)'s next mission?
8. Does the OpFor have any OP/LPs on the west or south sides of McKenna?

(Questions cont) Vignette C, Recon Phase

9. Where, if any, are the OpFor patrolling activities located?
10. What is the best approach to the objective for the Platoon (Squad)?
11. Does the OpFor have any long-range sights?
12. Does the OpFor have any night vision devices?
13. Are any friendly elements not executing plans per their orders?
14. Which Company (Platoon Squad) elements are in communication with you?
15. Which enemy element is your highest level threat?
16. Please mark on the map the entry points that can best be breached using explosives.
17. Please mark on the map the entry points that can best be breached using mechanical devices.
18. Please mark on the map the areas of fortification.
19. Which buildings are most accessible?
20. Please mark on the map the projected enemy field of fire/observation.

APPENDIX B
LITERATURE SEARCH RESULTS

INTENTIONALLY LEFT BLANK

Table B-1. Results of Literature Search for Clearing a Building CIRs

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	Availability of Supplies	X	X	X												
	Condition of Soldiers	X	X	X												
	Availability of Soldiers		X													
	Communication Status	X	X	X												
	<i>Time</i>															
	Until Deployment		X	X												
	Of Attack			X												
	<i>Civilian</i>															
	Number of COB's			X												
	Location of COB's			X												
	How to ID COB's															
	Morale of COB's			X												
	Changes to the Situation		X	X												
	Loss of Leaders		X	X												
	Signal															
	Marking of Cleared Room			X	X			X			X	X				
	Lift and Shift Of fires			X	X			X			X	X				
	Rules of Engagement			X		X				X						X

Table B-2. Results of Literature Search for Defending a MOUT Objective CIRs

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
RIFLEMAN	<i>Enemy</i>				X						X					
	Strength / Size				X						X					X
	Location				X						X					X
	Composition															
	Tactics															X
	Morale															
	NBC contamination				X											X
	<i>Building</i>															
	Construction															X
	Layout															X
	Boobytraps (in or around)				X						X					X
	<i>Terrain</i>				X						X					
	Obstacles				X						X					X
	Visibility															
	Cover															
	Concealment															
	Trafficability															
	Urbanization															
	Environmental Condition															
	Location of Hazards															
	Status of Hazards															
	<i>Troops</i>				X						X					
	Location of Teammates				X						X					

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	Location of Friendly Forces				X						X					X
	Sectors of Fire				X						X					
	Secondary Position				X			X			X	X				
	Route				X			X			X	X				
	Counterattack				X			X			X	X				
	Availability of Ammo				X											
	Availability of Medical															X
	Availability of Supplies				X						X					
	Communication Equipment				X						X					X
	Time				X						X					X
	Until Deployment															X
	Of Attack															X
	Civilian															X
	Number of COB's															
	Location of COB's															
	How to ID COB's															X
	Morale of COB's															
	Changes to the Situation															
	Information from RECON				X						X					
	Rules of Engagement					X				X						

[illegible]

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	Security				X						X					
	Availability of Ammo															
	Secondary Position				X			X			X	X				
	Route				X			X			X	X				
	Counterattack				X			X			X	X				
	Sectors of Fire				X						X					
	Availability of Medical															
	Availability of Supplies															
	Communication Equipment				X						X					
	Time Until Deployment				X						X					
	Of Attack															
	Civilian															
	Number of COB's															
	Location of COB's															
	How to ID COB's															
	Morale of COB's															
	Changes to the Situation															
	Information from RECON				X						X					
	Rules of Engagement					X				X						
	Signals															
	Unit Signal				X			X			X	X				

[illegible]

[illegible]

[illegible]

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	Location of COB's															
	How to ID COB's															
	Morale of COB's															
	Changes to the Situation															
	Information from RECON				X						X					
	Rules of Engagement					X				X						
	Signals															
	Unit Signal				X			X			X	X				
	Challenge and Password				X			X			X	X				
	Final protective fire				X			X			X	X				
	Running Password				X			X			X	X				
	Lift and Shift Of fires				X			X			X	X				

Table B-3. Results of Literature Search for Reconnoitering a MOUT Objective

[illegible]

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	<i>Troops</i>						X									
	Location of Teammates															X
	Location of Friendly Forces															
	Availability of Ammo															
	Availability of Medical															
	Availability of Supplies															
	<i>Time</i>															
	Until Deployment															X
	Of Attack															
	<i>Civilian</i>															X
	Number of COB's															X
	Location of COB's															X
	How to ID COB's															X
	Morale of COB's															X
	Changes to the Situation															
	Rules of Engagement					X				X						
	Signals															X
	Near and Far				X			X			X	X				
	Challenge and Password				X			X			X	X				
	Running Password				X			X			X	X				

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	<i>Troops</i>						X									
	Location of Teammates															
	Location of Friendly Forces															
	Availability of Ammo															
	Availability of Medical															
	Availability of Supplies															
	<i>Time</i>															
	Until Deployment															
	Of Attack															
	<i>Civilian</i>															
	Number of COB's															
	Location of COB's															
	How to ID COB's															
	Morale of COB's															
	Changes to the Situation															
	Rules of Engagement					X				X						
	Signals															
	Near and Far				X			X			X	X				
	Challenge and Password				X			X			X	X				
	Running Password				X			X			X	X				

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	<i>Troops</i>						X									
	Location of Teammates															
	Location of Friendly Forces															
	Availability of Ammo															
	Availability of Medical															
	Availability of Supplies															
	Coordinating Instruction						X									
	Timeline Update						X									
	<i>Time</i>															
	Until Deployment															
	Of Attack															
	Civilian															
	Number of COB's															
	Location of COB's															
	How to ID COB's															
	Morale of COB's															
	Changes to the Situation															
	Rule of Engagement					X				X						
	Signals															
	Near and Far				X			X			X	X				
	Challenge and Password				X			X			X	X				
	Running Password				X			X			X	X				

[illegible]

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	<i>Troops</i>						X									
	Location of Teammates															
	Location of Friendly Forces															
	Availability of Ammo															
	Availability of Medical															
	Availability of Supplies						X									
	Coordinating Instruction						X									
	Timeline Update						X									
	Rehearsals						X									
	Security						X									
	<i>Time</i>															
	Until Deployment															
	Of Attack															
	<i>Civilian</i>															
	Number of COB's															
	Location of COB's															
	How to ID COB's															
	Morale of COB's															
	Changes to the Situation															
	Rules of Engagement					X				X						

DUTY POSITION	CIR	REFERENCE														
		ARI	ARI	ARI	FM	FM	FM	FM	FM	SH	ARTEP	ARTEP	JE-1	JE-2	SA CE I	SME
		1728	1753	1770	7-8	7-10	17-92	90-10-1	7-85	21-76	7-8	7-10				
	Signals															
	Near and Far				X			X			X	X				
	Challenge and Password				X			X			X	X				X
	Running Password				X			X			X	X				

APPENDIX C
SMART SENSOR WEB DEMOGRAPHIC
QUESTIONNAIRE RESULTS

INTENTIONALLY LEFT BLANK

SMART SENSOR WEB
DEMOGRAPHIC QUESTIONNAIRE RESULTS

ARMY

SAMPLE SIZE = 17

<u>RANK</u>	<u>AGE</u>	<u>DUTY POSITION FOR THIS EXPERIMENT</u>
E-2 - 2 E-5 - 5	Mean = 24	
E-3 - 1 2LT - 1	(Range 18 - 29 years)	Platoon Leader - 2
E-4 - 7 1LT - 1		Squad Leader - 1
		Team Leader - 4
		Rifleman - 9
		SAW - 1

1. Handedness: 13 Right 3 Left 1 NR
2. Height: Mean = 70 inches (Range 64 to 76)
3. Weight: Mean = 189 pounds (Range 121 to 254)
4. Vision:
 - a. Do you wear glasses when performing military duties?
 4 Yes 13 No
 - b. Do you wear contact lenses when performing military duties?
 1 Yes 16 No
 - c. Is your vision in each eye 20/20 or correctable to 20/20?
 12 Yes 5 No
5. Education: Mean = 13 years
6. Current MOS Months (Mean) in Current MOS
 11A - 1 43 months
 11B - 2
 11M - 14
7. Months (Mean) in current job = 25 months
8. Months (Mean) of experience in Infantry-related MOS = 39 months
9. Months (Mean) of military service = 47 months

10. Months (Mean) in these leadership positions:
- a. Fire Team Leader = 5 months
 - b. Squad Leader = 1 month
11. Months (Mean) of military training/instruction received in light infantry operations:
- a. Classroom training at Infantry school = 2 months
 - b. Field exercises (i.e., NTC, JOTC, CRTC, JRTC, MOUT training) = 8 months
12. Months (Mean) of military training/instruction received in the following areas:
- a. Land navigation (map reading, use of GPS data, following planned route) = 6 months
 - b. Route planning = 1 month
 - c. Communications = 5 months
13. Latest Physical Fitness (PFT) Score (Mean) = 258 (out of 300)
14. Latest Firing Qualification Test (FQT) Score (Mean) = 34 (out of 40)
- | | | | |
|-----------------|------|---|----|
| Type of weapon: | M4 | - | 2 |
| (how many used) | M16 | - | 13 |
| | M203 | - | 1 |
| | NR | - | 1 |

15. Self rating of Knowledge, Skills, and Abilities (KSA) related to Infantry duties:

1	2	3	4	5
poor	below average	average	above average	outstanding
MEAN RESPONSE				
Knowledge of Infantry tactics, techniques, and procedures (TTP).				3.59
Knowledge of computers.				3.18
Knowledge of electronics.				2.71
Knowledge of mechanics and maintenance procedures for weapon systems and equipment used.				3.53
Knowledge of map reading and orientation in field setting.				3.71
Knowledge of land navigation.				3.59
Knowledge of reconnaissance, surveillance, and target acquisition procedures.				2.44
Knowledge relating to communications equipment and communications procedures.				2.88
Marksmanship skills.				4.24
Map reading skills.				3.59
Land navigation skills.				3.53
Computer skills (keyboards, mouse, track balls, navigating in and out of menus, etc.).				3.35
Communication skills (ability to use communications equipment and face-to-face communications to enhance mission accomplishment).				3.41
Leadership skills				3.88

16. a. Months (Mean) of military deployment for peacekeeping, peace enforcement, stability operations of combat = 5 months
b. If so, where? Korea

NATIONAL GUARD
SAMPLE SIZE = 48

<u>RANK</u>		<u>AGE</u>	<u>DUTY POSITION</u> <u>FOR THIS EXPERIMENT</u>
E-1 - 3	E-7 - 2	Mean = 31	Platoon Leader - 2
E-2 - 4	E-9 - 1	(Range 17 - 53 years)	Squad Leader - 7
E-3 - 4	1LT - 1		Team Leader - 9
E-4 - 16	2LT - 1		Rifleman - 20
E-5 - 7	CPT - 2		SAW - 7
E-6 - 7			NR - 3

1. Handedness: 40 Right 7 Left 1 NR
2. Height: Mean = 70 inches (Range 61 to 78)
3. Weight: Mean = 189 pounds (Range 126 to 275)
4. Vision:
 - a. Do you wear glasses when performing military duties?
9 Yes 38 No 1 NR
 - b. Do you wear contact lenses when performing military duties?
4 Yes 43 No 1 NR
 - c. Is your vision in each eye 20/20 or correctable to 20/20?
42 Yes 6 No
5. Education: Mean = 13.6 years
6. Current MOS Months (Mean) in Current MOS
 11A - 3 13B - 2 61 months
 11B - 3 31U - 1
 11M - 36 91B - 1
 NR - 2
7. Months (Mean) in current job = 33 months
8. Months (Mean) of experience in Infantry-related MOS = 95 months
9. Months (Mean) of military service = 115 months

10. Months (Mean) in these leadership positions:
- a. Fire Team Leader = 13 months
 - b. Squad Leader = 18 months
11. Months (Mean) of military training/instruction received in light infantry operations:
- a. Classroom training at Infantry school = 7 months
 - b. Field exercises (i.e., NTC, JOTC, CRTC, JRTC, MOUT training) = 9 months
12. Months (Mean) of military training/instruction received in the following areas:
- a. Land navigation (map reading, use of GPS data, following planned route) = 22 months
 - b. Route planning = 15 months
 - c. Communications = 23 months
13. Latest Physical Fitness (PFT) Score (Mean) = 239 (out of 300)
14. Latest Firing Qualification Test (FQT) Score (Mean) = 36 (out of 40)
- | | | | |
|-----------------|-----|---|----|
| Type of weapon: | SAW | - | 2 |
| (how many used) | M16 | - | 38 |
| | M9 | - | 3 |
| | NR | - | 5 |

15. Self rating of Knowledge, Skills, and Abilities (KSA) related to Infantry duties:

1	2	3	4	5
poor	below average	average	above average	outstanding
MEAN RESPONSE				
Knowledge of Infantry tactics, techniques, and procedures (TTP).				3.15
Knowledge of computers.				3.09
Knowledge of electronics.				2.87
Knowledge of mechanics and maintenance procedures for weapon systems and equipment used.				3.43
Knowledge of map reading and orientation in field setting.				3.45
Knowledge of land navigation.				3.28
Knowledge of reconnaissance, surveillance, and target acquisition procedures.				2.96
Knowledge relating to communications equipment and communications procedures.				3.02
Marksmanship skills.				3.77
Map reading skills.				3.34
Land navigation skills.				3.30
Computer skills (keyboards, mouse, track balls, navigating in and out of menus, etc.).				3.34
Communication skills (ability to use communications equipment and face-to-face communications to enhance mission accomplishment).				3.26
Leadership skills				3.43

16. a. Months (Mean) of military deployment for peacekeeping, peace enforcement, stability operations of combat = 2 months

b. If so, where? Panama - 2 Saudi Arabia - 1
 Korea - 3 Bosnia - 2
 Kuwait - 3

NO. OF
COPIES ORGANIZATION

1 ADMINISTRATOR
DEFENSE TECHNICAL INFO CTR
ATTN DTIC OCA
8725 JOHN J KINGMAN RD STE 0944
FT BELVOIR VA 22060-6218

1 DIRECTOR
US ARMY RSCH LABORATORY
ATTN AMSRL CI AI R REC MGMT
2800 POWDER MILL RD
ADELPHI MD 20783-1197

1 DIRECTOR
US ARMY RSCH LABORATORY
ATTN AMSRL CI LL TECH LIB
2800 POWDER MILL RD
ADELPHI MD 20783-1197

1 DIRECTOR
US ARMY RSCH LABORATORY
ATTN AMSRL D D SMITH
2800 POWDER MILL RD
ADELPHI MD 20783-1197

1 DIR FOR PERS TECHNOLOGIES
DPY CHIEF OF STAFF PERS
300 ARMY PENTAGON 2C733
WASHINGTON DC 20310-0300

1 DIRECTOR
ARMY AUDIOLOGY & SPEECH CTR
WALTER REED ARMY MED CTR
WASHINGTON DC 20307-5001

1 OUSD(A)/DDDR&E(R&A)/E&LS
PENTAGON ROOM 3D129
WASHINGTON DC 20301-3080

1 CODE 1142PS
OFC OF NAVAL RSCH
800 N QUINCY STREET
ARLINGTON VA 22217-5000

1 WALTER REED INST OF RSCH
ATTN SGRD UWI C
COL REDMOND
WASHINGTON DC 20307-5100

1 CDR US ARMY RSCH INST
ATTN PERI ZT DR E M JOHNSON
5001 EISENHOWER AVENUE
ALEXANDRIA VA 22333-5600

NO. OF
COPIES ORGANIZATION

1 DEF LOGISTICS STUDIES
INFORMATION EXCHANGE
ATTN DIR DLSIE ATSZ DL
BLDG 12500
2401 QUARTERS ROAD
FORT LEE VA 23801-1705

1 HEADQUARTERS USATRADOC
ATTN ATCD SP
FORT MONROE VA 23651

1 CDR USATRADOC
COMMAND SAFETY OFC
ATTN ATOS PESSAGNO/LYNE
FORT MONROE VA 23651-5000

1 DIRECTOR TDAD DCST
ATTN ATTG C
BLDG 161
FORT MONROE VA 23651-5000

1 HQ USAMRDC
ATTN SGRD PLC
FORT DETRICK MD 21701

1 CDR
USA AEROMEDICAL RSCH LAB
ATTN LIBRARY
FORT RUCKER AL 36362-5292

1 US ARMY SAFETY CTR
ATTN CSSC SE
FORT RUCKER AL 36362

1 CHIEF
ARMY RSCH INST
AVIATION R&D ACTIVITY
ATTN PERI IR
FORT RUCKER AL 36362-5354

1 AIR FORCE FLIGHT DYNAMICS LAB
ATTN AFWAL/FIES/SURVIAC
WRIGHT PATTERSON AFB OH 45433

1 US ARMY NATICK RD&E CTR
ATTN STRNC YBA
NATICK MA 01760-5020

1 US ARMY TROOP SUPPORT CMD
NATICK RD&E CTR
ATTN BEHAVIORAL SCI DIV SSD
NATICK MA 01760-5020

NO. OF
COPIES ORGANIZATION

1 US ARMY TROOP SUPPORT CMD
NATICK RD&E CTR
ATTN TECH LIB (STRNC MIL)
NATICK MA 01760-5040

1 DR RICHARD JOHNSON
HEALTH & PERFORMANCE DIV
US ARIEM
NATICK MA 01760-5007

1 PROGRAM MANAGER RAH-66
ATTN SFAE AV RAH
BLDG 5681 WOOD RD
REDSTONE ARSENAL AL 35898

1 NAVAL SUB MED RSCH LAB
MEDICAL LIB BLDG 148
BOX 900 SUBMARINE BASE
NEW LONDON
GROTON CT 06340

1 USAF ARMSTRONG LAB/CFTO
ATTN DR F W BAUMGARDNER
SUSTAINED OPERATIONS BR
BROOKS AFB TX 78235-5000

1 CDR
USAMC LOGISTICS SUP ACTIVITY
ATTN AMXLS AE
REDSTONE ARSENAL AL
35898-7466

1 ARI FIELD UNIT FT KNOX
BLDG 2423 PERI IK
FORT KNOX KY 40121-5620

1 CDR
WHITE SANDS MISSILE RANGE
ATTN STEWS TE RE
WSMR NM 88002

1 STRICOM
12350 RSCH PARKWAY
ORLANDO FL 32826-3276

1 PURDUE UNIVERSITY
SERIALS UNIT
CDM KARDEX
1535 STEWART CTR
WEST LAFAYETTE IN
47907-1535

NO. OF
COPIES ORGANIZATION

1 GOVT PUBLICATIONS LIB
409 WILSON M
UNIVERSITY OF MINNESOTA
MINNEAPOLIS MN 55455

1 DR RICHARD PEW
BBN SYSTEMS & TECH CORP
10 MOULTON STREET
CAMBRIDGE MA 02138

1 MR R BEGGS
BOEING-HELICOPTER CO
P30-18
PO BOX 16858
PHILADELPHIA PA 19142

1 DR ROBERT KENNEDY
ESSEX CORPORATION STE 227
1040 WOODCOCK ROAD
ORLANDO FL 32803

1 GENERAL DYNAMICS
LAND SYSTEMS DIV LIBRARY
PO BOX 1901
WARREN MI 48090

1 LAWRENCE C PERLMUTER PHD
UNIV OF HEALTH SCIENCES
THE CHICAGO MEDICAL SCHOOL
DEPT OF PSYCHOLOGY
3333 GREEN BAY ROAD
NORTH CHICAGO IL 60064

1 DR MM AYOUB DIRECTOR
INST FOR ERGONOMICS RSCH
TEXAS TECH UNIVERSITY
LUBBOCK TX 79409

1 MR WALT TRUSZKOWSKI
NASA/GODDARD SPACE
FLIGHT CTR
CODE 588.0
GREENBELT MD 20771

1 DR NORMAN BADLER
DEPT OF COMPUTER & INFO
SCIENCE
UNIV OF PENNSYLVANIA
PHILADELPHIA PA 19104-6389

1 CDR
US ARMY RSCH INST OF
ENVIRONMNTL MEDICINE
NATICK MA 01760-5007

NO. OF
COPIES ORGANIZATION

1 HQDA (DAPE ZXO)
ATTN DR FISCHL
WASHINGTON DC 20310-0300

1 HUMAN FACTORS ENG PROGRAM
DEPT OF BIOMEDICAL ENGNG
COLLEGE OF ENGINEERING &
COMPUTER SCIENCE
WRIGHT STATE UNIVERSITY
DAYTON OH 45435

1 CDR
USA MEDICAL R&D COMMAND
ATTN SGRD PLC LTC K FRIEDL
FORT DETRICK MD 21701-5012

1 PEO ARMORED SYS MODERNIZATION
US ARMY TANK-AUTOMOTIVE CMD
ATTN SFAE ASM S
WARREN MI 48397-5000

1 PEO COMMUNICATIONS
ATTN SFAE CM RE
FT MONMOUTH NJ 07703-5000

1 PEO AIR DEF
ATTN SFAE AD S
US ARMY MISSILE COMMAND
REDSTONE ARSENAL AL
35898-5750

1 PEO STRATEGIC DEF
PO BOX 15280 ATTN DASD ZA
US ARMY STRATEGIC DEF CMD
ARLINGTON VA 22215-0280

1 JON TATRO
HUMAN FACTORS SYS DESIGN
BELL HELICOPTER TEXTRON INC
PO BOX 482 MAIL STOP 6
FT WORTH TX 76101

1 CHIEF CREW SYS INTEGRATION
SIKORSKY AIRCRAFT M/S S3258
NORTH MAIN STREET
STRATFORD CT 06602

1 GENERAL ELECTRIC COMPANY
ARMAMENT SYS DEPT RM 1309
ATTN HF/MANPRINT R C MCLANE
LAKESIDE AVENUE
BURLINGTON VT 05401-4985

1 OASD (FM&P)
WASHINGTON DC 20301-4000

NO. OF
COPIES ORGANIZATION

1 COMMANDANT
US ARMY ARMOR SCHOOL
ATTN ATSB CDS
FT KNOX KY 40121-5215

1 CDR
US ARMY AVIATION CTR
ATTN ATZQ CDM S
FT RUCKER AL 36362-5163

1 CDR
US ARMY SIGNAL CTR &
FT GORDON
ATTN ATZH CDM
FT GORDON GA 30905-5090

1 DIRECTOR
US ARMY AEROFLIGHT
DYNAMICS DIR
MAIL STOP 239-9
NASA AMES RSCH CTR
MOFFETT FIELD CA 94035-1000

1 CDR
MARINE CORPS SYSTEMS CMD
ATTN CBGT
QUANTICO VA 22134-5080

1 DIR AMC-FIELD ASSIST IN
SCIENCE & TECHNOLOGY
ATTN AMC-FAST
FT BELVOIR VA 22060-5606

1 CDR US ARMY FORCES CMD
ATTN FCDJ SA BLDG 600
AMC FAST SCIENCE ADVISER
FT MCPHERSON GA 30330-6000

1 CDR
I CORPS AND FORT LEWIS
AMC FAST SCIENCE ADVISER
ATTN AFZH CSS
FORT LEWIS WA 98433-5000

1 HQ III CORPS & FORT HOOD
OFC OF THE SCIENCE ADVISER
ATTN AFZF CS SA
FORT HOOD TX 76544-5056

1 CDR
HQ XVIII ABN CORPS & FT BRAGG
OFC OF THE SCI ADV BLDG 1-1621
ATTN AFZA GD FAST
FORT BRAGG NC 28307-5000

NO. OF
COPIES ORGANIZATION

1 SOUTHCOM WASHINGTON
FIELD OFC
1919 SOUTH EADS ST STE L09
AMC FAST SCIENCE ADVISER
ARLINGTON VA 22202

1 HQ US SPECIAL OPERATIONS CMD
AMC FAST SCIENCE ADVISER
ATTN SOSD
MACDILL AIR FORCE BASE
TAMPA FL 33608-0442

1 HQ US ARMY EUROPE AND
7TH ARMY
ATTN AEAGX SA
OFC OF THE SCIENCE ADVISER
APO AE 09014

1 CDR
HEADQUARTERS USEUCOM
AMC FAST SCIENCE ADVISER
UNIT 30400 BOX 138
APO AE 09128

1 HQ 7TH ARMY TRAINING CMD
UNIT #28130
AMC FAST SCIENCE ADVISER
ATTN AETT SA
APO AE 09114

1 CDR
HHC SOUTHERN EUROPEAN
TASK FORCE
ATTN AESE SA BLDG 98
AMC FAST SCIENCE ADVISER
APO AE 09630

1 CDR US ARMY PACIFIC
AMC FAST SCIENCE ADVISER
ATTN APSA
FT SHAFTER HI 96858-5L00

1 AMC FAST SCIENCE ADVISERS
PCS #303 BOX 45 CS-SO
APO AP 96204-0045

1 CDR & DIR USAE WATERWAYS
EXPERIMENTAL STATION
ATTN CEWES IM MI R
A S CLARK
CD DEPT #1153
3909 HALLS FERRY ROAD
VICKSBURG MS 39180-6199

NO. OF
COPIES ORGANIZATION

1 ENGINEERING PSYCH LAB
DEPT OF BEHAVIORAL
SCIENCES & LEADERSHIP
BLDG 601 ROOM 281
US MILITARY ACADEMY
WEST POINT NY 10996-1784

3 DIR SANDIA NATL LAB
ENGNRNG MECHANICS DEPT
MS 9042 ATTN J HANDROCK
Y R KAN J LAUFFER
PO BOX 969
LIVERMORE CA 94551-0969

1 US ARMY RSCH INST
ATTN PERI IK D L FINLEY
2423 MORANDE STREET
FORT KNOX KY 40121-5620

1 ARL HRED AVNC FLD ELMT
ATTN AMSRL HR MJ D DURBIN
BLDG 4506 (DCD) RM 107
FT RUCKER AL 36362-5000

1 ARL HRED AMCOM FLD ELMT
ATTN AMSRL HR MI
BLDG 5464 RM 202
REDSTONE ARSENAL AL
35898-5000

1 ARL HRED AMCOM FLD ELMT
ATTN AMSRL HR MO T COOK
BLDG 5400 RM C242
REDSTONE ARS AL 35898-7290

1 ARL HRED USAADASCH FLD ELMT
ATTN AMSRL HR ME
K REYNOLDS
ATTN ATSA CD
5800 CARTER ROAD
FORT BLISS TX 79916-3802

1 ARL HRED ARDEC FLD ELMT
ATTN AMSRL HR MG R SPINE
BUILDING 333
PICATINNY ARSENAL NJ
07806-5000

1 ARL HRED ARMC FLD ELMT
ATTN AMSRL HR MH C BURNS
BLDG 1002 ROOM 206B
1ST CAVALRY REGIMENT RD
FT KNOX KY 40121

NO. OF
COPIES ORGANIZATION

1 ARL HRED CECOM FLD ELMT
ATTN AMSRL HR ML J MARTIN
MYER CENTER RM 2D311
FT MONMOUTH NJ 07703-5630

1 ARL HRED FT BELVOIR FLD ELMT
ATTN AMSRL HR MK P SCHOOL
10170 BEACH RD
FORT BELVOIR VA 22060-5800

1 ARL HRED FT HOOD FLD ELMT
ATTN AMSRL HR MV HQ USAOTC
S MIDDLEBROOKS
91012 STATION AVE ROOM 111
FT HOOD TX 76544-5073

1 ARL HRED FT HUACHUCA
FIELD ELEMENT
ATTN AMSRL HR MY M BARNES
RILEY BARRACKS BLDG 51005
FT HUACHUCA AZ 85613

1 ARL HRED FLW FLD ELMT
ATTN AMSRL HR MZ A DAVISON
320 MANSCEN LOOP STE 166
FT LEONARD WOOD MO 65473-8929

1 ARL HRED NATICK FLD ELMT
ATTN AMSRL HR MQ M R FLETCHER
NATICK SOLDIER CTR BLDG 3
RM 341 AMSSB RSS E
NATICK MA 01760-5020

1 ARL HRED OPTEC FLD ELMT
ATTN AMSRL HR MR H DENNY
ATEC CSTE PM ARL
4501 FORD AVE RM 870
ALEXANDRIA VA 22302-1458

1 ARL HRED SC&FG FLD ELMT
ATTN AMSRL HR MS R ANDERS
SIGNAL TOWERS RM 303A
FORT GORDON GA 30905-5233

1 ARL HRED STRICOM FLD ELMT
ATTN AMSRL HR MT A GALBAY
12350 RESEARCH PARKWAY
ORLANDO FL 32826-3276

1 ARL HRED TACOM FLD ELMT
ATTN AMSRL HR MU M SINGAPORE
6501 E 11 MILE RD MAIL STOP 284
BLDG 200A 2ND FL RM 2104
WARREN MI 48397-5000

NO. OF
COPIES ORGANIZATION

1 ARL HRED USAFAS FLD ELMT
ATTN AMSRL HR MF L PIERCE
BLDG 3040 RM 220
FORT SILL OK 73503-5600

5 ARL HRED USAIC FLD ELMT
ATTN AMSRL HR MW E REDDEN
BLDG 4 ROOM 332
FT BENNING GA 31905-5400

1 ARL HRED USASOC FLD ELMT
ATTN AMSRL HR MN R SPENCER
DCSFDI HF
HQ USASOC BLDG E2929
FORT BRAGG NC 28310-5000

1 ARL HRED HFID FLD ELMT
ATTN AMSRL HR MP
D UNGVARSKY
BATTLE CMD BATTLE LAB
415 SHERMAN AVE UNIT 3
FT LEAVENWORTH KS 66027-2326

1 CDR AMC - FAST
JRTC & FORT POLK
ATTN AFZX GT DR J AINSWORTH
CMD SCIENCE ADVISOR G3
FORT POLK LA 71459-5355

1 CDR HRED AMEDD
ATTN AMSRL HR MM COL N VAUSE
2250 STANLEY RD STE 322
FT SAM HOUSTON TX 78234

1 C2 FUTURE COMBAT SYSTEMS
DARPA/ATO DR GARY SAUER
3701 NORTH FAIRFAX DRIVE
ARLINGTON VA 22203-1714

1 SCENPRO INC
ATTN BARBARA M BROWN
101 W RENNER RD STE 130
RICHARDSON TX 75082

1 BRAD BEST
WEAN HALL 8215
PITTSBURGH PA 15213

1 DAVID GREINKE
ONE VIRGINIA SQUARE
3601 WILSON BLVD STE 500
ARLINGTON VA 22201

NO. OF
COPIES ORGANIZATION

ABERDEEN PROVING GROUND

2	DIRECTOR US ARMY RSCH LABORATORY ATTN AMSRL CI LP (TECH LIB) BLDG 305 APG AA
1	LIBRARY ARL BLDG 459 APG-AA
1	ARL HRED ATTN AMSRL HR MB F PARAGALLO BLDG 459 APG-AA
1	US ATEC RYAN BLDG APG-AA
1	CDR CHEMICAL BIOLOGICAL & DEF CMD ATTN AMSCB CI APG-EA

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE March 2002		3. REPORT TYPE AND DATES COVERED Final	
4. TITLE AND SUBTITLE Virtual Environment Study of Mission-Based Critical Information Requirements				5. FUNDING NUMBERS AMS Code 622716 PR: AH70	
6. AUTHOR(S) Redden, E.S. (ARL)					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Research Laboratory Human Research & Engineering Directorate Aberdeen Proving Ground, MD 21005-5425				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Research Laboratory Human Research & Engineering Directorate Aberdeen Proving Ground, MD 21005-5425				10. SPONSORING/MONITORING AGENCY REPORT NUMBER ARL-TR-2636	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) The Human Research and Engineering Directorate of the U.S. Army Research Laboratory conducted an experiment to determine the critical information required by soldiers in four echelons (squad member, fire team leader, squad leader, and platoon leader). This information is intended for use in the development of the design requirements for information systems such as the Smart Sensor Web. The experiment was conducted in the Dismounted Battlespace Battle Lab's Squad Synthetic Environment (SSE), a virtual environment that allows the squad to participate in force-on-force exercises. A validation study of the SSE was conducted before the start of the experiment to ensure that information gathered in the virtual environment would be comparable to that gathered in a live experiment. The eight squads that participated in the experiment conducted infantry operations using scripted vignettes that were prepared to include as many situations as possible that are typically encountered during infantry operations. After participation in each vignette, soldiers rated the criticality of each of the situational awareness (SA) items on a questionnaire. This questionnaire was developed after a literature search and a subject matter expert conference that were conducted to gather potential SA critical information items.					
14. SUBJECT TERMS critical information requirements virtual environment CIRs				15. NUMBER OF PAGES 85	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified		20. LIMITATION OF ABSTRACT	